

**TRAFFIC NOISE  
ASSESSMENT**

South Nepean Town Centre  
Ottawa, Ontario

REPORT: GWE19-035 – Traffic Noise



April 29, 2019

PREPARED FOR  
Frank Cairo

**Caivan Communities**

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PREPARED BY

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## EXECUTIVE SUMMARY

This report describes a traffic noise assessment undertaken for the proposed South Nepean Town Centre subdivision development in Ottawa, Ontario. The proposed development is a nearly rectangular lot and comprises back-to-back townhomes and apartment buildings on six (6) separate blocks, in addition to a school and park. The site is surrounded by undeveloped land in all directions, with a number of existing low-rise residential properties located along Greenbank Road to the east. The major sources of traffic noise are Greenbank Road, Jockvale Road, Chapman Mills Drive and the associate Buss Rapid Transit (BRT) lanes. Figure 1 illustrates a complete site plan with surrounding context.

The assessment is based on (i) theoretical noise prediction methods that conform to the Ministry of the Environment, Conservation and Parks (MECP) and City of Ottawa requirements; (ii) noise level criteria as specified by the City of Ottawa's Environmental Noise Control Guidelines (ENCG); (iii) future vehicular traffic volumes based on the City of Ottawa's Official Plan roadway classifications; and (iv) concept drawings prepared by Korsiak Urban Planning.

The results of the current analysis indicate that noise levels will range between 51 and 72 dBA during the daytime period (07:00-23:00) and between 43 and 65 dBA during the nighttime period (23:00-07:00). The highest noise level (72 dBA) occurs at the eastern end of the development, which is nearest and most exposed to Greenbank Road. Building components with a higher Sound Transmission Class (STC) rating will be required where exterior noise levels exceed 65 dBA, as indicated in Figure 3.

Building 1-4,7-10,1-16,19 will require central air conditioning, which will allow occupants to keep windows closed and maintain a comfortable living environment. Building 18,20,22,34-36 will require forced air heating with provision for central air conditioning. Warning Clauses will also be required be placed on all Lease, Purchase and Sale Agreements, as summarized in Section 6.

Noise levels at the Block 3 amenity space are expected to approach 61 dBA during the daytime period. If this area is to be used as an outdoor living area, noise control measures are required to reduce the  $L_{eq}$  to 55 dBA. Further analysis investigated the noise mitigating impact of including a 2.7 m noise barrier at the norther end of the amenity area (see Figure 5). Results of the investigation proved that noise levels can be reduced to 55 dBA. The noise barrier must be constructed from materials having a minimum surface



density of 20 kg/m<sup>2</sup> (STC rating of 30) and contain no gaps. Design of the noise barrier will conform to the requirements outlined in Part 5 of the ENCG. The following information will be required by the City for review prior to installation of the barrier:

1. Shop drawings, signed and sealed by a qualified Professional Engineer licenced by the Professional Engineers of Ontario, showing the details of the acoustic barrier systems components, including material specifications.
2. Structural drawing(s), signed by a qualified Professional Engineer licenced by the Professional Engineers of Ontario, showing foundation details and specifying design criteria, climatic design loads, as well as applicable geotechnical data used in the design.
3. Layout plan, and wall elevations, showing proposed colours and patterns.



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## 1. INTRODUCTION

Gradient Wind Engineering Inc. (Gradient Wind) was retained by Caivan Communities to undertake a detailed roadway traffic noise assessment of the proposed South Nepean Town Centre subdivision development in Ottawa, Ontario. This report summarizes the methodology, results, and recommendations related to the assessment of exterior and interior noise levels generated by local roadway traffic.

Our work is based on theoretical noise calculation methods conforming to the City of Ottawa<sup>1</sup> and Ministry of the Environment, Conservation and Parks (MECP)<sup>2</sup> guidelines. Noise calculations were based on concept drawings prepared by Korsiak Urban Planning, with future traffic volumes corresponding to the City of Ottawa's Official Plan (OP) roadway classifications.

## 2. TERMS OF REFERENCE

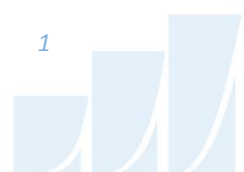
The proposed development is a nearly rectangular lot and comprises back-to-back townhomes and apartment buildings on six (6) separate blocks, in addition to a school and park. Blocks 1 and 6 are found at the west side, Block 3 and 4 at the east side and Block 2 and 5 at the centre of the site. Block 3 features apartment buildings, while the remaining blocks comprise townhomes. A park and school are located at the south side, fronting Street 'B'. The development site is bound by Greenbank Road to the east, Chapman Mills Drive to the north and proposed Street 'B' to the south. Jockvale Road extends north to south through the middle of the site between Blocks 1 and 6 and Blocks 2 and 5, while proposed Street 'A' travels through the site separating Blocks 2 and 5 from Block 3 and 4.

The site is surrounded by undeveloped land in all directions, with a number of existing low-rise residential properties located along Greenbank Road to the east. The major sources of traffic noise are Greenbank Road, Jockvale Road, Chapman Mills Drive and the associate Buss Rapid Transit (BRT) lanes. Figure 1 illustrates a complete site plan with surrounding context.

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<sup>1</sup> City of Ottawa Environmental Noise Control Guidelines, January 2016

<sup>2</sup> Ontario Ministry of the Environment and Climate Change – Environmental Noise Guidelines, Publication NPC-300, Queens Printer for Ontario, Toronto, 2013



### **3. OBJECTIVES**

The principal objectives of this study are to (i) calculate the future noise levels on the study buildings produced by local roadway traffic, and (ii) ensure that interior and exterior noise levels do not exceed the allowable limits specified by the City of Ottawa’s Environmental Noise Control Guidelines as outlined in Section 4.2 of this report.

### **4. METHODOLOGY**

#### **4.1 Background**

Noise can be defined as any obtrusive sound. It is created at a source, transmitted through a medium, such as air, and intercepted by a receiver. Noise may be characterized in terms of the power of the source or the sound pressure at a specific distance. While the power of a source is characteristic of that particular source, the sound pressure depends on the location of the receiver and the path that the noise takes to reach the receiver. Measurement of noise is based on the decibel unit, dBA, which is a logarithmic ratio referenced to a standard noise level ( $2 \times 10^{-5}$  Pascals). The ‘A’ suffix refers to a weighting scale, which better represents how the noise is perceived by the human ear. With this scale, a doubling of power results in a 3 dBA increase in measured noise levels and is just perceptible to most people. An increase of 10 dBA is often perceived to be twice as loud.

#### **4.2 Roadway Traffic Noise**

##### **4.2.1 Criteria for Roadway Traffic Noise**

For surface roadway traffic noise, the equivalent sound energy level,  $L_{eq}$ , provides a measure of the time varying noise levels, which is well correlated with the annoyance of sound. It is defined as the continuous sound level, which has the same energy as a time varying noise level over a period of time. For roadways, the  $L_{eq}$  is commonly calculated on the basis of a 16-hour ( $L_{eq16}$ ) daytime (07:00-23:00) / 8-hour ( $L_{eq8}$ ) nighttime (23:00-07:00) split to assess its impact on residential buildings. The City of Ottawa’s Environmental Noise Control Guidelines (ENCG) specifies that the recommended indoor noise limit range (that is relevant to this study) is 45 and 40 dBA for living rooms and sleeping quarters respectively for roadway as listed in Table 1.



**TABLE 1: INDOOR SOUND LEVEL CRITERIA (ROAD)<sup>3</sup>**

Type of Space	Time Period	Leq (dBA)
General offices, reception areas, retail stores, etc.	07:00 – 23:00	50
Living/dining/den areas of <b>residences</b> , hospitals, schools, nursing/retirement homes, day-care centres, theatres, places of worship, libraries, individual or semi-private offices, conference rooms, etc.	07:00 – 23:00	45
Sleeping quarters of hotels/motels	23:00 – 07:00	45
Sleeping quarters of <b>residences</b> , hospitals, nursing/retirement homes, etc.	23:00 – 07:00	40

Predicted noise levels at the plane of window (POW) dictate the action required to achieve the recommended sound levels. An open window is considered to provide a 10 dBA reduction in noise, while a standard closed window is capable of providing a minimum 20 dBA noise reduction<sup>4</sup>. A closed window due to a ventilation requirement will bring noise levels down to achieve an acceptable indoor environment<sup>5</sup>. Therefore, where noise levels exceed 55 dBA daytime and 50 dBA nighttime, the ventilation for the building should consider the need for having windows and doors closed, which triggers the need for forced air heating with provision for central air conditioning. Where noise levels exceed 65 dBA daytime and 60 dBA nighttime, air conditioning will be required and building components will require higher levels of sound attenuation<sup>6</sup>.

The sound level criterion for outdoor living areas is 55 dBA, which applies during the daytime (07:00 to 23:00). When noise levels exceed 55 dBA, mitigation must be provided to reduce noise levels where technically and administratively feasible to acceptable levels at or below the criterion.

<sup>3</sup> Adapted from ENCG 2016 – Tables 2.2b and 2.2c

<sup>4</sup> Burberry, P.B. (2014). Mitchell’s Environment and Services. Routledge, Page 125

<sup>5</sup> MECP, Environmental Noise Guidelines, NPC 300 – Part C, Section 7.8

<sup>6</sup> MECP, Environmental Noise Guidelines, NPC 300 – Part C, Section 7.1.3

## 4.2.2 Theoretical Roadway Noise Predictions

Noise predictions were performed with the aid of the MECP computerized noise assessment program, STAMSON 5.04, for road analysis. Appendix A includes the STAMSON 5.04 input and output data.

Roadway traffic noise calculations were performed by treating each roadway segment as separate line sources of noise. In addition to the traffic volumes summarized in Table 2, theoretical noise predictions were based on the following parameters:

- Truck traffic on all roadways was taken to comprise 5% heavy trucks and 7% medium trucks, as per ENCG requirements for noise level predictions.
- The day/night split for all streets was taken to be 92%/8%, respectively.
- Ground surfaces were taken to be reflective and absorptive based on intermediate ground characteristics.
- Topography was assumed to be a flat/gentle slope surrounding the study building.
- Receptor height was taken to be 4.5 metres at Level 2 for the centre of the window (height to 2<sup>nd</sup> floor + 1.5 metres), based on ORNMENT recommendations. Ground level receptor height is 1.5 m.
- Stacked townhouses considered as noise barrier at 9 m in height.
- Noise receptors were strategically placed at 17 locations around the study area (see Figure 2).
- Receptor distances and exposure angles are illustrated in Figure A1-5.

## 4.2.1 Roadway Traffic Volumes

The ENCG dictates that noise calculations should consider future sound levels based on a roadway's classification at the mature state of development. Therefore, traffic volumes are based on the roadway classifications outlined in the City of Ottawa's Official Plan (OP) and Transportation Master Plan<sup>7</sup> which provide additional details on future roadway expansions. Average Annual Daily Traffic (AADT) volumes are then based on data in Table B1 of the ENCG for each roadway classification. Table 2 (below) summarizes the AADT values used for each roadway included in this assessment.

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<sup>7</sup> City of Ottawa Transportation Master Plan, November 2013



**TABLE 2: ROADWAY TRAFFIC DATA**

Segment	Roadway Traffic Data	Speed Limit (km/h)	Traffic Volumes
Greenbank Road	4-UAD	60	<b>35,000</b>
Jockvale Road	2-UCU	50	<b>8,000</b>
Chapman Mills Drive	2-UMCU	50	<b>12,000</b>
BRT	Bus	50	<b>191/67*</b>

\* - Daytime/nighttime traffic volumes

### 4.3 Indoor Noise Calculations

The difference between outdoor and indoor noise levels is the noise attenuation provided by the building envelope. According to common industry practice, complete walls and individual wall elements are rated according to the Sound Transmission Class (STC). The STC ratings of common residential walls built in conformance with the Ontario Building Code (2012) typically exceed STC 35, depending on exterior cladding, thickness and interior finish details. For example, brick veneer walls can achieve STC 50 or more. Standard commercially sided exterior metal stud walls have around STC 45. Standard good quality double-glazed non-operable windows can have STC ratings ranging from 25 to 40, depending on the window manufacturer, pane thickness and inter-pane spacing. As previously mentioned, the windows are the known weak point in a partition.

As per Section 4.2, when daytime noise levels (from road and rail sources) at the plane of the window exceed 65 dBA, calculations must be performed to evaluate the sound transmission quality of the building components to ensure acceptable indoor noise levels. The calculation procedure<sup>8</sup> considers:

- Window type and total area as a percentage of total room floor area
- Exterior wall type and total area as a percentage of the total room floor area
- Acoustic absorption characteristics of the room
- Outdoor noise source type and approach geometry
- Indoor sound level criteria, which varies according to the intended use of a space

<sup>8</sup> Building Practice Note: Controlling Sound Transmission into Buildings by J.D. Quirt, National Research Council of Canada, September 1985

Based on published research<sup>9</sup>, exterior walls possess specific sound attenuation characteristics that are used as a basis for calculating the required STC ratings of windows in the same partition. Due to the limited information available at the time of the study, which was prepared for site plan approval, detailed floor layouts and building elevations have not been finalized; therefore, detailed STC calculations could not be performed at this time. As a guideline, the anticipated STC requirements for windows have been estimated based on the overall noise reduction required for each intended use of space (STC = outdoor noise level – targeted indoor noise levels).

## **5. RESULTS AND DISCUSSION**

### **5.1 Roadway Traffic Noise Levels**

The results of the roadway traffic noise calculations are summarized in Table 3 below. A complete set of input and output data from all STAMSON 5.04 calculations are available in Appendix A.

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<sup>9</sup> CMHC, Road & Rail Noise: Effects on Housing

**TABLE 3: EXTERIOR NOISE LEVELS DUE TO ROAD TRAFFIC**

Receptor Number	Receptor Height Above Grade (m)	Receptor Location	STAMSON 5.04 Noise Level (dBA)	
			Day	Night
1	4.5	POW – Building 16 – East Façade	72	65
2	4.5	POW – Building 16 – North Façade	70	62
3	4.5	POW – Building 19 – East Façade	72	65
4	4.5	POW – Building 19 – South Façade	68	60
5	4.5	POW – Building 18 – South Façade	64	57
6	4.5	POW – Building 17 – South Façade	55	48
7	4.5	POW – Building 15 – North Façade	68	60
8	4.5	POW – Building 7 – North Façade	67	60
9	4.5	POW – Building 7 – West Façade	67	59
10	4.5	POW – Building 1 – North Façade	66	59
11	4.5	POW – Building 35 – East Façade	65	58
12	4.5	POW – Building 4 – East Façade	66	58
13	4.5	POW – Building 13 – South Façade	51	43
14	4.5	POW – Building 6 – West Façade	53	46
15	1.5	School	59	52
16	1.5	Park	54	46
17	1.5	Block 3 Amenity	61	54

The results of the current analysis indicate that noise levels will range between 51 and 72 dBA during the daytime period (07:00-23:00) and between 43 and 65 dBA during the nighttime period (23:00-07:00). The highest noise level (72 dBA) occurs at the eastern end of the development, which is nearest and most exposed to Greenbank Road.

## 5.2 Noise Control Measures

The noise levels predicted due to roadway traffic exceed the criteria listed in Section 4.2 for building components. As discussed in Section 4.3, the anticipated STC requirements for windows have been estimated based on the overall noise reduction required for each intended use of space (STC = outdoor noise level – targeted indoor noise levels). As per city of Ottawa requirements, detailed STC calculations will be required to be completed prior to building permit application for each unit type. The STC requirements for the windows are summarized below for various units within the development (see Figure 3):

**TABLE 4: WINDOW STC REQUIREMENTS**

Building Number	Bedroom Windows				Living Room Windows			
	North Façade	East Façade	South Façade	West Façade	North Façade	East Façade	South Façade	West Façade
1	31	OBC	OBC	OBC	26	OBC	OBC	OBC
2	31	OBC	OBC	OBC	26	OBC	OBC	OBC
3	OBC	31	OBC	OBC	OBC	26	OBC	OBC
4	OBC	31	OBC	OBC	OBC	26	OBC	OBC
7	31	OBC	OBC	31	26	OBC	OBC	26
8	31	OBC	OBC	OBC	26	OBC	OBC	OBC
9	31	OBC	OBC	OBC	26	OBC	OBC	OBC
10	31	OBC	OBC	OBC	26	OBC	OBC	OBC
14	OBC	OBC	OBC	31	OBC	OBC	OBC	26
15	31	OBC	OBC	OBC	26	OBC	OBC	OBC
16	35	35	31	OBC	30	30	26	OBC
19	31	35	31	OBC	26	30	26	OBC



Exterior wall components on these façades will require a minimum STC of 45, which will be achieved with brick cladding or an acoustical equivalent according to NRC test data<sup>10</sup>. The STC requirements apply to windows, doors, spandrel panels and curtainwall elements. Exterior wall components on these façades are recommended to have a minimum STC of 45, where a window/wall system is used. A review of window supplier literature indicates that the specified STC ratings can be achieved by a variety of window systems having a combination of glass thickness and inter-pane spacing. We have specified an example window configuration, however several manufacturers and various combinations of window components, such as those proposed, will offer the necessary sound attenuation rating. It is the responsibility of the manufacturer to ensure that the specified window achieves the required STC. This can only be assured by using window configurations that have been certified by laboratory testing. The requirements for STC ratings assume that the remaining components of the building are constructed and installed according to the minimum standards of the Ontario Building Code. The specified STC requirements also apply to swinging and/or sliding patio doors.

Results of the calculations also indicate that various buildings will require air conditioning, which will allow occupants to keep windows closed and maintain a comfortable living environment; while other buildings will require forced air heating with provisions for central air conditioning, as indicated in Table 5 and illustrated in Figure 4. In addition to ventilation requirements, Warning Clauses will also be required to be placed on all Lease, Purchase and Sale Agreements, as summarized Section 6.

**TABLE 5: SITE VENTILATION REQUIREMENTS**

Building Number	Ventilation Requirements
1-4,7-10,14-16,19	Air Conditioning
18,20,22,34-36	Forced Air Heating with Provisions for Air Conditioning

<sup>10</sup> J.S. Bradley and J.A. Birta. Laboratory Measurements of the Sound Insulation of Building Façade Elements, National Research Council October 2000.

### 5.3 Noise Barrier Calculation

Noise levels at the Block 3 amenity space are expected to approach 61 dBA during the daytime period. If this area is to be used as an outdoor living area, noise control measures are required to reduce the  $L_{eq}$  to 55 dBA. Further analysis investigated the noise mitigating impact of including a 2.7 m noise barrier at the norther end of the amenity area (Figure 5). Results of the investigation proved that noise levels can be reduced to 55 dBA. Table 6 summarizes the results of the barrier investigation.

**TABLE 6: RESULTS OF NOISE BARRIER INVESTIGATION**

Reference Receptor	Barrier Height (m)	Daytime Noise Level (dBA)
17	No Barrier	61
	2	57
	2.7	55

## 6. CONCLUSIONS AND RECOMMENDATIONS

The results of the current analysis indicate that noise levels will range between 51 and 72 dBA during the daytime period (07:00-23:00) and between 43 and 65 dBA during the nighttime period (23:00-07:00). The highest noise level (72 dBA) occurs at the eastern end of the development, which is nearest and most exposed to Greenbank Road. Building components with a higher Sound Transmission Class (STC) rating will be required where exterior noise levels exceed 65 dBA, as indicated in Figure 3.

Building 1-4,7-10,14,19 will require central air conditioning, which will allow occupants to keep windows closed and maintain a comfortable living environment. The following Warning Clause<sup>11</sup> will also be required be placed on all Lease, Purchase and Sale Agreements, as summarized below:

*“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 roadway 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 and Climate Change. To help address the need for sound attenuation, this development includes:*

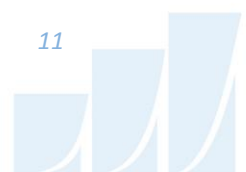
- *STC rated multi-pane glazing elements*
- *STC rated exterior walls*

*This dwelling unit has also been designed with air conditioning. 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 and Climate Change.*

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

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<sup>11</sup> City of Ottawa Environmental Noise Control Guidelines, January 2016



Building 15-16 will require central air conditioning, which will allow occupants to keep windows closed and maintain a comfortable living environment. The following Warning Clause<sup>12</sup> will also be required be placed on all Lease, Purchase and Sale Agreements, as summarized below:

*“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 roadway 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 and Climate Change. To help address the need for sound attenuation, this development includes:*

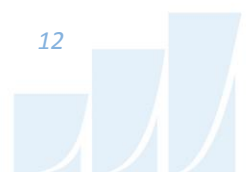
- *STC rated multi-pane glazing elements*
- *STC rated exterior walls*
- *An acoustic barrier of 2.7 m in height*

*This dwelling unit has also been designed with air conditioning. 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 and Climate Change.*

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

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<sup>12</sup> City of Ottawa Environmental Noise Control Guidelines, January 2016





Building 18,20,22,34-36 will require forced air heating with provision for central air conditioning, which will allow occupants to keep windows closed and maintain a comfortable living environment. The following Warning Clause<sup>13</sup> will also be required be placed on all Lease, Purchase and Sale Agreements, as summarized below:

*“Purchasers/tenants are advised sound levels due to increasing roadway traffic may occasionally interfere with some outdoor activities as the sound levels may exceed the sound level limits of the City the Ministry of the Environment, Conservation and Parks.*

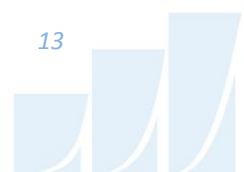
*To help address the need for sound attenuation this unit has been designed with forced air heating and provision for central air conditioning at the occupant’s discretion. Installation of central air conditioning will allow windows and exterior doors to remain closed, thereby ensuring that the indoor sound levels are within the sound level limits of the City and the Ministry of the Environment, Conservation and Parks.*

Noise levels at the Block 3 amenity space are expected to approach 61 dBA during the daytime period. If this area is to be used as an outdoor living area, noise control measures are required to reduce the  $L_{eq}$  to 55 dBA. Further analysis investigated the noise mitigating impact of including a 2.7 m noise barrier at the norther end of the amenity area (see Figure 5). Results of the investigation proved that noise levels can be reduced to 55 dBA. The noise barrier must be constructed from materials having a minimum surface density of 20 kg/m<sup>2</sup> (STC rating of 30) and contain no gaps. Design of the noise barrier will conform to the requirements outlined in Part 5 of the ENCG. The following information will be required by the City for review prior to installation of the barrier:

1. Shop drawings, signed and sealed by a qualified Professional Engineer licenced by the Professional Engineers of Ontario, showing the details of the acoustic barrier systems components, including material specifications.
2. Structural drawing(s), signed by a qualified Professional Engineer licenced by the Professional Engineers of Ontario, showing foundation details and specifying design criteria, climatic design loads, as well as applicable geotechnical data used in the design.

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<sup>13</sup> City of Ottawa Environmental Noise Control Guidelines, January 2016

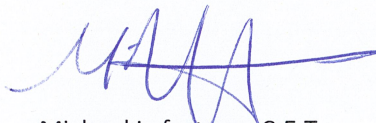


3. Layout plan, and wall elevations, showing proposed colours and patterns.

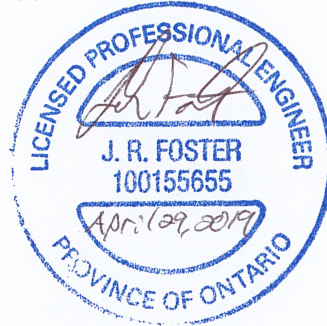
This concludes our traffic noise assessment and report. If you have any questions or wish to discuss our findings, please advise us. In the interim, we thank you for the opportunity to be of service.

Sincerely,

**Gradient Wind Engineering Inc.**



Michael Lafortune, C.E.T.  
Environmental Scientist  
GWE19-035 – Traffic Noise



Joshua Foster, P.Eng.  
Principal





FIGURE 1:  
SITE PLAN AND SURROUNDING CONTEXT

PROJECT	SOUTH NEPEAN TOWN CENTRE, OTTAWA ROADWAY TRAFFIC NOISE ASSESSMENT		DESCRIPTION
SCALE	1:2000 (APPROX.)	DRAWING NO.	GWE19-035-1
DATE	MARCH 19, 2019	DRAWN BY	M.L.





- ① 2ND FLOOR RECEPTOR
- ① OLA RECEPTOR

PROJECT	SOUTH NEPEAN TOWN CENTRE, OTTAWA ROADWAY TRAFFIC NOISE ASSESSMENT	
SCALE	1:2000 (APPROX.)	DRAWING NO. GWE19-035-2
DATE	MARCH 19, 2019	DRAWN BY M.L.



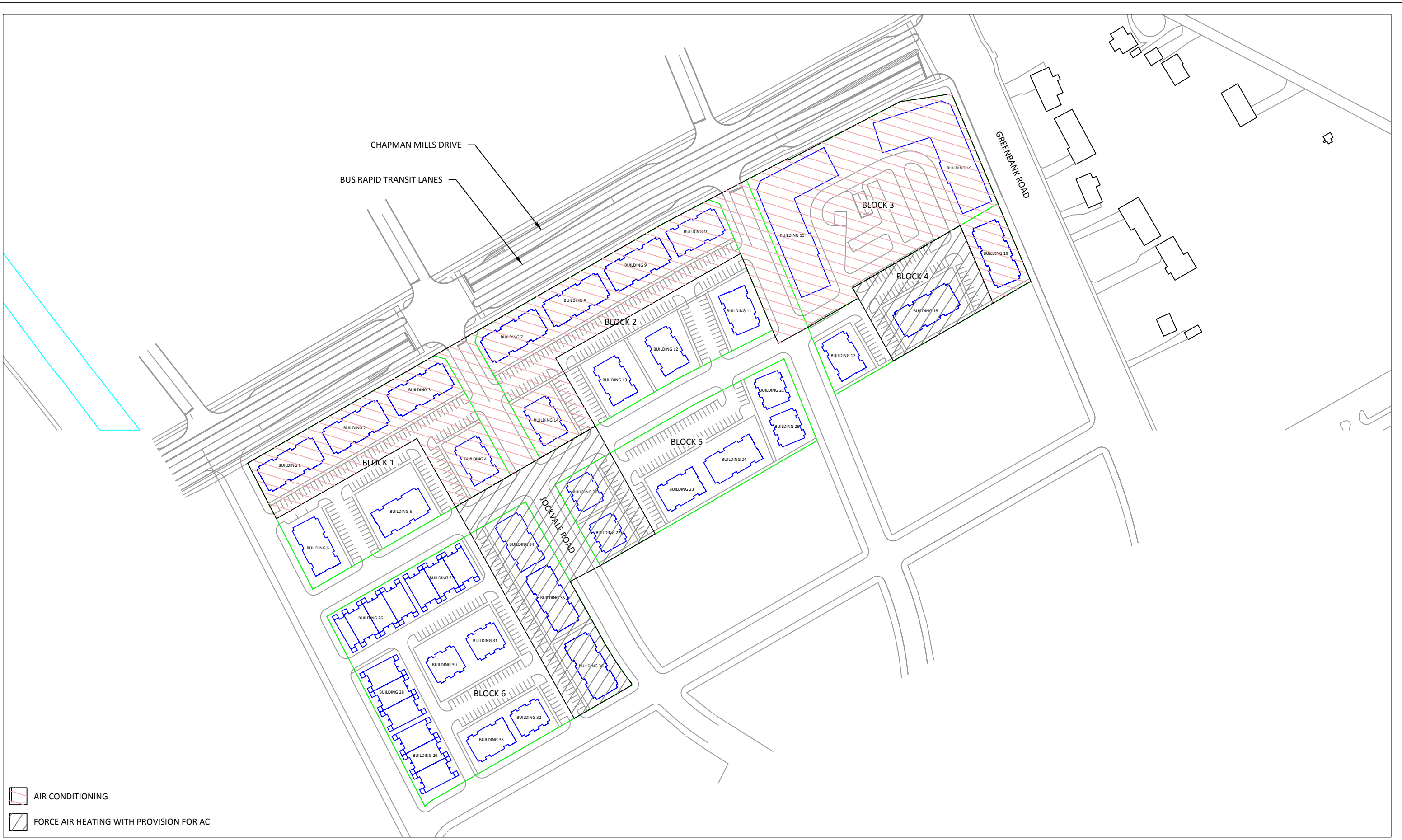


BEDROOM/LIVING ROOM WINDOWS: STC 35/30  

 BEDROOM/LIVING ROOM WINDOWS: STC 31/26

PROJECT	SOUTH NEPEAN TOWN CENTRE, OTTAWA ROADWAY TRAFFIC NOISE ASSESSMENT	
SCALE	1:2000 (APPROX.)	DRAWING NO. GWE19-035-3
DATE	MARCH 19, 2019	DRAWN BY M.L.

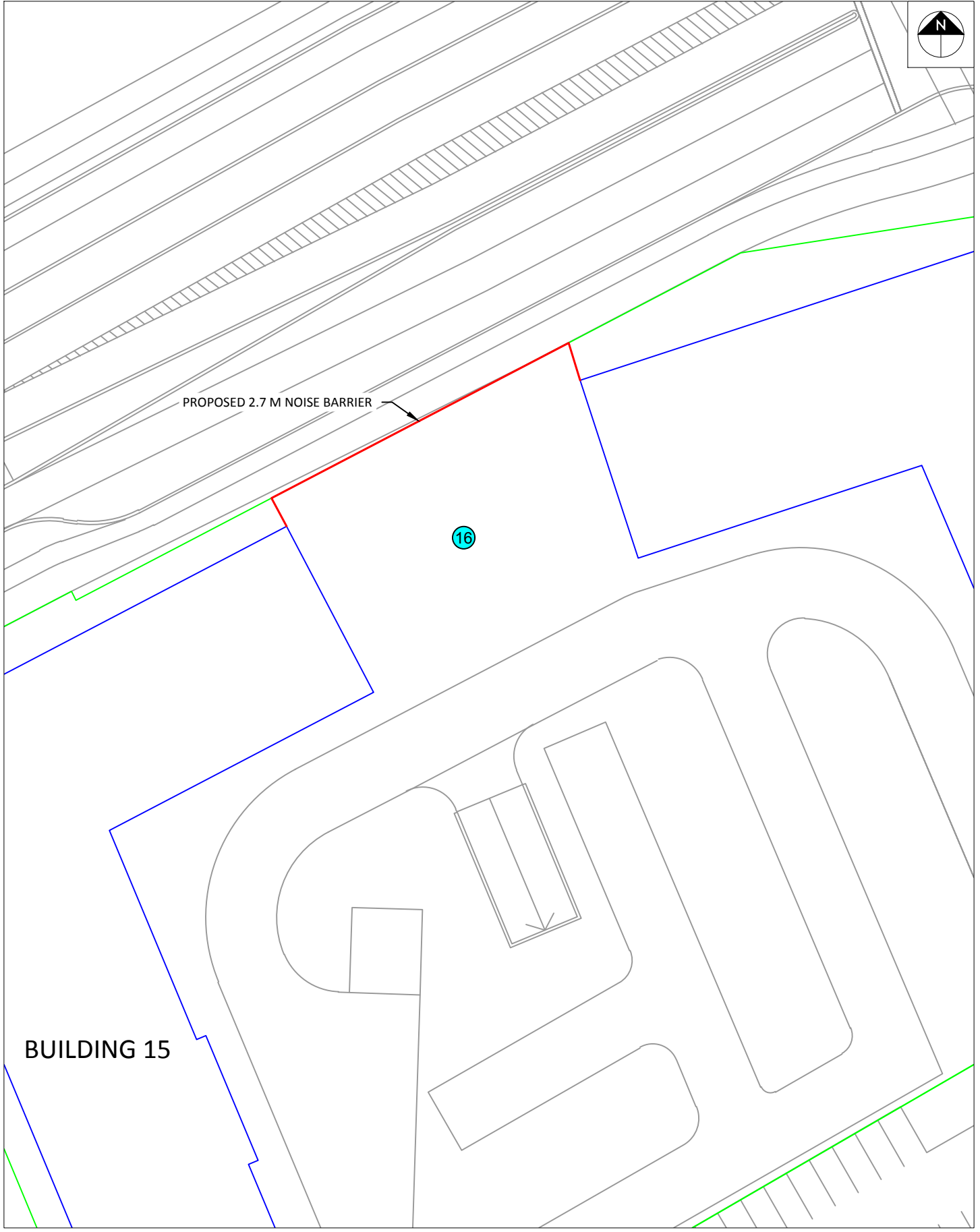




- AIR CONDITIONING
- FORCE AIR HEATING WITH PROVISION FOR AC

PROJECT	SOUTH NEPEAN TOWN CENTRE, OTTAWA ROADWAY TRAFFIC NOISE ASSESSMENT	
SCALE	1:2000 (APPROX.)	DRAWING NO. GWE19-035-4
DATE	MARCH 19, 2019	DRAWN BY M.L.





PROPOSED 2.7 M NOISE BARRIER

16

BUILDING 15

# GRADIENTWIND

ENGINEERS & SCIENTISTS



## APPENDIX A

### STAMSON 5.04 – INPUT AND OUTPUT DATA



# GRADIENTWIND

ENGINEERS & SCIENTISTS

STAMSON 5.0                  NORMAL REPORT                  Date: 18-03-2019 11:08:37  
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: rl.te                                  Time Period: Day/Night 16/8 hours  
Description:

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

-----  
Car traffic volume : 28336/2464 veh/TimePeriod \*  
Medium truck volume : 2254/196 veh/TimePeriod \*  
Heavy truck volume : 1610/140 veh/TimePeriod \*  
Posted speed limit : 60 km/h  
Road gradient : 0 %  
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 35000  
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: Greenbank (day/night)

-----  
Angle1    Angle2                                : -90.00 deg    90.00 deg  
Wood depth : 0                                    (No woods.)  
No of house rows : 0 / 0  
Surface : 2                                        (Reflective ground surface)  
Receiver source distance : 21.00 / 21.00 m  
Receiver height : 4.50 / 4.50 m  
Topography : 1                                    (Flat/gentle slope; no barrier)  
Reference angle : 0.00



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

-----  
Car traffic volume : 9715/845 veh/TimePeriod \*  
Medium truck volume : 773/67 veh/TimePeriod \*  
Heavy truck volume : 552/48 veh/TimePeriod \*  
Posted speed limit : 50 km/h  
Road gradient : 0 %  
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 12000  
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: Chapman (day/night)

-----  
Angle1 Angle2 : 6.00 deg 90.00 deg  
Wood depth : 0 (No woods.)  
No of house rows : 0 / 0  
Surface : 2 (Reflective ground surface)  
Receiver source distance : 41.00 / 41.00 m  
Receiver height : 4.50 / 4.50 m  
Topography : 1 (Flat/gentle slope; no barrier)  
Reference angle : 0.00



Results segment # 1: Greenbank (day)

Source height = 1.50 m

ROAD (0.00 + 72.21 + 0.00) = 72.21 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	73.68	0.00	-1.46	0.00	0.00	0.00	0.00	72.21

Segment Leq : 72.21 dBA

Results segment # 2: Chapman (day)

Source height = 1.50 m

ROAD (0.00 + 59.83 + 0.00) = 59.83 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
6	90	0.00	67.51	0.00	-4.37	-3.31	0.00	0.00	0.00	59.83

Segment Leq : 59.83 dBA

Total Leq All Segments: 72.45 dBA

Results segment # 1: Greenbank (night)

Source height = 1.50 m

ROAD (0.00 + 64.62 + 0.00) = 64.62 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	66.08	0.00	-1.46	0.00	0.00	0.00	0.00	64.62

Segment Leq : 64.62 dBA

Results segment # 2: Chapman (night)

Source height = 1.50 m

ROAD (0.00 + 52.23 + 0.00) = 52.23 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
6	90	0.00	59.91	0.00	-4.37	-3.31	0.00	0.00	0.00	52.23

Segment Leq : 52.23 dBA

Total Leq All Segments: 64.86 dBA



# GRADIENTWIND

ENGINEERS & SCIENTISTS

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

-----  
 1 - Bus:  
 Traffic volume : 191/67 veh/TimePeriod  
 Speed : 50 km/h

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

-----  
 Angle1 Angle2 : 6.00 deg 90.00 deg  
 Wood depth : 0 (No woods.)  
 No of house rows : 0 / 0  
 Surface : 2 (Reflective ground surface)  
 Receiver source distance : 41.00 / 41.00 m  
 Receiver height : 4.50 / 4.50 m  
 Topography : 1 (Flat/gentle slope; no barrier)  
 Reference angle : 0.00

Results segment # 1: Bus (day)

-----  
 Source height = 0.50 m

RT/Custom (0.00 + 46.86 + 0.00) = 46.86 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
6	90	0.00	54.54	-4.37	-3.31	0.00	0.00	0.00	46.86

-----  
 Segment Leq : 46.86 dBA

Total Leq All Segments: 46.86 dBA

Results segment # 1: Bus (night)

-----  
 Source height = 0.50 m

RT/Custom (0.00 + 45.32 + 0.00) = 45.32 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
6	90	0.00	53.00	-4.37	-3.31	0.00	0.00	0.00	45.32

-----  
 Segment Leq : 45.32 dBA

Total Leq All Segments: 45.32 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 72.47  
 (NIGHT): 64.91



# GRADIENTWIND

ENGINEERS & SCIENTISTS

STAMSON 5.0          NORMAL REPORT          Date: 18-03-2019 11:09:48  
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r2.te                                  Time Period: Day/Night 16/8 hours  
Description:

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

-----  
Car traffic volume    : 28336/2464    veh/TimePeriod    \*  
Medium truck volume   : 2254/196     veh/TimePeriod    \*  
Heavy truck volume    : 1610/140    veh/TimePeriod    \*  
Posted speed limit    :     60 km/h  
Road gradient          :     0 %  
Road pavement         :     1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 35000  
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: Greenbank (day/night)

-----  
Angle1    Angle2            : -90.00 deg    5.00 deg  
Wood depth                 :     0         (No woods.)  
No of house rows           :     0 / 0  
Surface                     :     2         (Reflective ground surface)  
Receiver source distance    : 29.00 / 29.00 m  
Receiver height             : 4.50 / 4.50 m  
Topography                 :     1         (Flat/gentle slope; no barrier)  
Reference angle             :     0.00



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

-----  
Car traffic volume : 9715/845 veh/TimePeriod \*  
Medium truck volume : 773/67 veh/TimePeriod \*  
Heavy truck volume : 552/48 veh/TimePeriod \*  
Posted speed limit : 50 km/h  
Road gradient : 0 %  
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 12000  
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: Chapman (day/night)

-----  
Angle1 Angle2 : -79.00 deg 90.00 deg  
Wood depth : 0 (No woods.)  
No of house rows : 0 / 0  
Surface : 2 (Reflective ground surface)  
Receiver source distance : 31.00 / 31.00 m  
Receiver height : 4.50 / 4.50 m  
Topography : 1 (Flat/gentle slope; no barrier)  
Reference angle : 0.00



Results segment # 1: Greenbank (day)

Source height = 1.50 m

ROAD (0.00 + 68.04 + 0.00) = 68.04 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	5	0.00	73.68	0.00	-2.86	-2.78	0.00	0.00	0.00	68.04

Segment Leq : 68.04 dBA

Results segment # 2: Chapman (day)

Source height = 1.50 m

ROAD (0.00 + 64.08 + 0.00) = 64.08 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-79	90	0.00	67.51	0.00	-3.15	-0.27	0.00	0.00	0.00	64.08

Segment Leq : 64.08 dBA

Total Leq All Segments: 69.51 dBA

Results segment # 1: Greenbank (night)

Source height = 1.50 m

ROAD (0.00 + 60.44 + 0.00) = 60.44 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	5	0.00	66.08	0.00	-2.86	-2.78	0.00	0.00	0.00	60.44

Segment Leq : 60.44 dBA

Results segment # 2: Chapman (night)

Source height = 1.50 m

ROAD (0.00 + 56.49 + 0.00) = 56.49 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-79	90	0.00	59.91	0.00	-3.15	-0.27	0.00	0.00	0.00	56.49

Segment Leq : 56.49 dBA

Total Leq All Segments: 61.91 dBA



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

-----  
 1 - Bus:  
 Traffic volume : 191/67 veh/TimePeriod  
 Speed : 50 km/h

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

-----  
 Angle1 Angle2 : -79.00 deg 90.00 deg  
 Wood depth : 0 (No woods.)  
 No of house rows : 0 / 0  
 Surface : 2 (Reflective ground surface)  
 Receiver source distance : 31.00 / 31.00 m  
 Receiver height : 4.50 / 4.50 m  
 Topography : 1 (Flat/gentle slope; no barrier)  
 Reference angle : 0.00

Results segment # 1: Bus (day)

-----  
 Source height = 0.50 m

RT/Custom (0.00 + 51.11 + 0.00) = 51.11 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-79	90	0.00	54.54	-3.15	-0.27	0.00	0.00	0.00	51.11

-----  
 Segment Leq : 51.11 dBA

Total Leq All Segments: 51.11 dBA

Results segment # 1: Bus (night)

-----  
 Source height = 0.50 m

RT/Custom (0.00 + 49.57 + 0.00) = 49.57 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-79	90	0.00	53.00	-3.15	-0.27	0.00	0.00	0.00	49.57

-----  
 Segment Leq : 49.57 dBA

Total Leq All Segments: 49.57 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 69.57  
 (NIGHT): 62.16





# GRADIENTWIND

ENGINEERS & SCIENTISTS

STAMSON 5.0 NORMAL REPORT Date: 18-03-2019 11:09:54  
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r3.te Time Period: Day/Night 16/8 hours  
Description:

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

-----  
Car traffic volume : 28336/2464 veh/TimePeriod \*  
Medium truck volume : 2254/196 veh/TimePeriod \*  
Heavy truck volume : 1610/140 veh/TimePeriod \*  
Posted speed limit : 60 km/h  
Road gradient : 0 %  
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 35000  
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: Greenbank (day/night)

-----  
Angle1 Angle2 : -90.00 deg 90.00 deg  
Wood depth : 0 (No woods.)  
No of house rows : 0 / 0  
Surface : 2 (Reflective ground surface)  
Receiver source distance : 21.00 / 21.00 m  
Receiver height : 4.50 / 4.50 m  
Topography : 1 (Flat/gentle slope; no barrier)  
Reference angle : 0.00



# GRADIENTWIND

ENGINEERS & SCIENTISTS

Results segment # 1: Greenbank (day)

Source height = 1.50 m

ROAD (0.00 + 72.21 + 0.00) = 72.21 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	73.68	0.00	-1.46	0.00	0.00	0.00	0.00	72.21

Segment Leq : 72.21 dBA

Total Leq All Segments: 72.21 dBA

Results segment # 1: Greenbank (night)

Source height = 1.50 m

ROAD (0.00 + 64.62 + 0.00) = 64.62 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	66.08	0.00	-1.46	0.00	0.00	0.00	0.00	64.62

Segment Leq : 64.62 dBA

Total Leq All Segments: 64.62 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 72.21  
(NIGHT): 64.62



# GRADIENTWIND

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STAMSON 5.0                  NORMAL REPORT                  Date: 18-03-2019 11:10:00  
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r4.te                                  Time Period: Day/Night 16/8 hours  
Description:

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

-----  
Car traffic volume   : 28336/2464   veh/TimePeriod   \*  
Medium truck volume : 2254/196   veh/TimePeriod   \*  
Heavy truck volume  : 1610/140   veh/TimePeriod   \*  
Posted speed limit  :     60 km/h  
Road gradient       :     0 %  
Road pavement       :     1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 35000  
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: Greenbank (day/night)

-----  
Angle1   Angle2               : 0.00 deg   90.00 deg  
Wood depth                    : 0           (No woods.)  
No of house rows               : 0 / 0  
Surface                        : 2           (Reflective ground surface)  
Receiver source distance      : 28.00 / 28.00   m  
Receiver height                : 4.50 / 4.50    m  
Topography                    : 1           (Flat/gentle slope; no barrier)  
Reference angle               : 0.00



# GRADIENTWIND

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Results segment # 1: Greenbank (day)

Source height = 1.50 m

ROAD (0.00 + 67.96 + 0.00) = 67.96 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	90	0.00	73.68	0.00	-2.71	-3.01	0.00	0.00	0.00	67.96

Segment Leq : 67.96 dBA

Total Leq All Segments: 67.96 dBA

Results segment # 1: Greenbank (night)

Source height = 1.50 m

ROAD (0.00 + 60.36 + 0.00) = 60.36 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	90	0.00	66.08	0.00	-2.71	-3.01	0.00	0.00	0.00	60.36

Segment Leq : 60.36 dBA

Total Leq All Segments: 60.36 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 67.96  
(NIGHT): 60.36



# GRADIENTWIND

ENGINEERS & SCIENTISTS

STAMSON 5.0          NORMAL REPORT          Date: 18-03-2019 11:10:08  
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r5.te                                  Time Period: Day/Night 16/8 hours  
Description:

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

-----  
Car traffic volume : 28336/2464 veh/TimePeriod \*  
Medium truck volume : 2254/196 veh/TimePeriod \*  
Heavy truck volume : 1610/140 veh/TimePeriod \*  
Posted speed limit : 60 km/h  
Road gradient : 0 %  
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 35000  
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: Greenbank (day/night)

-----  
Angle1 Angle2 : -3.00 deg 90.00 deg  
Wood depth : 0 (No woods.)  
No of house rows : 0 / 0  
Surface : 2 (Reflective ground surface)  
Receiver source distance : 67.00 / 67.00 m  
Receiver height : 4.50 / 4.50 m  
Topography : 1 (Flat/gentle slope; no barrier)  
Reference angle : 0.00



# GRADIENTWIND

ENGINEERS & SCIENTISTS

Results segment # 1: Greenbank (day)

Source height = 1.50 m

ROAD (0.00 + 64.31 + 0.00) = 64.31 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-3	90	0.00	73.68	0.00	-6.50	-2.87	0.00	0.00	0.00	64.31

Segment Leq : 64.31 dBA

Total Leq All Segments: 64.31 dBA

Results segment # 1: Greenbank (night)

Source height = 1.50 m

ROAD (0.00 + 56.71 + 0.00) = 56.71 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-3	90	0.00	66.08	0.00	-6.50	-2.87	0.00	0.00	0.00	56.71

Segment Leq : 56.71 dBA

Total Leq All Segments: 56.71 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 64.31  
(NIGHT): 56.71



# GRADIENTWIND

ENGINEERS & SCIENTISTS

STAMSON 5.0                      NORMAL REPORT                      Date: 18-03-2019 11:10:16  
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r6.te    Time Period: Day/Night 16/8 hours  
Description:

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

-----  
Car traffic volume    : 28336/2464    veh/TimePeriod    \*  
Medium truck volume : 2254/196    veh/TimePeriod    \*  
Heavy truck volume   : 1610/140    veh/TimePeriod    \*  
Posted speed limit    :     60 km/h  
Road gradient         :     0 %  
Road pavement        :     1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 35000  
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: Greenbank (day/night)

-----  
Angle1    Angle2                 : -7.00 deg    90.00 deg  
Wood depth                        :     0        (No woods.)  
No of house rows                  :     0 / 0  
Surface                             :     1        (Absorptive ground surface)  
Receiver source distance         : 129.00 / 129.00 m  
Receiver height                    :     4.50 / 4.50    m  
Topography                         :     1        (Flat/gentle slope; no barrier)  
Reference angle                    :     0.00



# GRADIENTWIND

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Results segment # 1: Greenbank (day)

Source height = 1.50 m

ROAD (0.00 + 55.12 + 0.00) = 55.12 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-7	90	0.57	73.68	0.00	-14.67	-3.88	0.00	0.00	0.00	55.12

Segment Leq : 55.12 dBA

Total Leq All Segments: 55.12 dBA

Results segment # 1: Greenbank (night)

Source height = 1.50 m

ROAD (0.00 + 47.53 + 0.00) = 47.53 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-7	90	0.57	66.08	0.00	-14.67	-3.88	0.00	0.00	0.00	47.53

Segment Leq : 47.53 dBA

Total Leq All Segments: 47.53 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 55.12  
(NIGHT): 47.53





# GRADIENTWIND

ENGINEERS & SCIENTISTS

STAMSON 5.0          NORMAL REPORT          Date: 18-03-2019 11:10:23  
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r7.te                          Time Period: Day/Night 16/8 hours  
Description:

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

-----

Car traffic volume : 28336/2464 veh/TimePeriod \*  
Medium truck volume : 2254/196 veh/TimePeriod \*  
Heavy truck volume : 1610/140 veh/TimePeriod \*  
Posted speed limit : 60 km/h  
Road gradient : 0 %  
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 35000  
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: Greenbank (day/night)

-----

Angle1    Angle2            : -90.00 deg    -4.00 deg  
Wood depth                : 0            (No woods.)  
No of house rows         : 0 / 0  
Surface                    : 2            (Reflective ground surface)  
Receiver source distance : 102.00 / 102.00 m  
Receiver height          : 4.50 / 4.50 m  
Topography                : 1            (Flat/gentle slope; no barrier)  
Reference angle          : 0.00



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

-----  
Car traffic volume : 9715/845 veh/TimePeriod \*  
Medium truck volume : 773/67 veh/TimePeriod \*  
Heavy truck volume : 552/48 veh/TimePeriod \*  
Posted speed limit : 50 km/h  
Road gradient : 0 %  
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 12000  
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: Chapman (day/night)

-----  
Angle1 Angle2 : -90.00 deg 90.00 deg  
Wood depth : 0 (No woods.)  
No of house rows : 0 / 0  
Surface : 2 (Reflective ground surface)  
Receiver source distance : 22.00 / 22.00 m  
Receiver height : 4.50 / 4.50 m  
Topography : 1 (Flat/gentle slope; no barrier)  
Reference angle : 0.00



Results segment # 1: Greenbank (day)

-----

Source height = 1.50 m

ROAD (0.00 + 62.14 + 0.00) = 62.14 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	-4	0.00	73.68	0.00	-8.33	-3.21	0.00	0.00	0.00	62.14

Segment Leq : 62.14 dBA

Results segment # 2: Chapman (day)

-----

Source height = 1.50 m

ROAD (0.00 + 65.85 + 0.00) = 65.85 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	67.51	0.00	-1.66	0.00	0.00	0.00	0.00	65.85

Segment Leq : 65.85 dBA

Total Leq All Segments: 67.39 dBA

Results segment # 1: Greenbank (night)

-----

Source height = 1.50 m

ROAD (0.00 + 54.55 + 0.00) = 54.55 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	-4	0.00	66.08	0.00	-8.33	-3.21	0.00	0.00	0.00	54.55

Segment Leq : 54.55 dBA

Results segment # 2: Chapman (night)

-----

Source height = 1.50 m

ROAD (0.00 + 58.25 + 0.00) = 58.25 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	59.91	0.00	-1.66	0.00	0.00	0.00	0.00	58.25

Segment Leq : 58.25 dBA

Total Leq All Segments: 59.79 dBA



# GRADIENTWIND

ENGINEERS & SCIENTISTS

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

-----  
 1 - Bus:  
 Traffic volume : 191/67 veh/TimePeriod  
 Speed : 50 km/h

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

-----  
 Angle1 Angle2 : -90.00 deg 90.00 deg  
 Wood depth : 0 (No woods.)  
 No of house rows : 0 / 0  
 Surface : 2 (Reflective ground surface)  
 Receiver source distance : 22.00 / 22.00 m  
 Receiver height : 4.50 / 4.50 m  
 Topography : 1 (Flat/gentle slope; no barrier)  
 Reference angle : 0.00

Results segment # 1: Bus (day)

-----  
 Source height = 0.50 m

RT/Custom (0.00 + 52.87 + 0.00) = 52.87 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	54.54	-1.66	0.00	0.00	0.00	0.00	52.87

-----  
 Segment Leq : 52.87 dBA

Total Leq All Segments: 52.87 dBA

Results segment # 1: Bus (night)

-----  
 Source height = 0.50 m

RT/Custom (0.00 + 51.33 + 0.00) = 51.33 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	53.00	-1.66	0.00	0.00	0.00	0.00	51.33

-----  
 Segment Leq : 51.33 dBA

Total Leq All Segments: 51.33 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 67.54  
 (NIGHT): 60.37



# GRADIENTWIND

ENGINEERS & SCIENTISTS

STAMSON 5.0                  NORMAL REPORT                  Date: 18-03-2019 11:12:23  
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r8.te                                  Time Period: Day/Night 16/8 hours  
Description:

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

-----  
Car traffic volume    : 6477/563    veh/TimePeriod    \*  
Medium truck volume : 515/45     veh/TimePeriod    \*  
Heavy truck volume  : 368/32     veh/TimePeriod    \*  
Posted speed limit  : 50 km/h  
Road gradient        : 0 %  
Road pavement       : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 8000  
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: Jockvale (day/night)

-----  
Angle1    Angle2                    : 0.00 deg    90.00 deg  
Wood depth                         : 0            (No woods.)  
No of house rows                   : 0 / 0  
Surface                              : 2            (Reflective ground surface)  
Receiver source distance           : 20.00 / 20.00 m  
Receiver height                    : 4.50 / 4.50 m  
Topography                         : 1            (Flat/gentle slope; no barrier)  
Reference angle                    : 0.00



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

-----  
Car traffic volume : 9715/845 veh/TimePeriod \*  
Medium truck volume : 773/67 veh/TimePeriod \*  
Heavy truck volume : 552/48 veh/TimePeriod \*  
Posted speed limit : 50 km/h  
Road gradient : 0 %  
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 12000  
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: Chapman (day/night)

-----  
Angle1 Angle2 : -90.00 deg 90.00 deg  
Wood depth : 0 (No woods.)  
No of house rows : 0 / 0  
Surface : 2 (Reflective ground surface)  
Receiver source distance : 22.00 / 22.00 m  
Receiver height : 4.50 / 4.50 m  
Topography : 1 (Flat/gentle slope; no barrier)  
Reference angle : 0.00



Results segment # 1: Jockvale (day)

-----

Source height = 1.50 m

ROAD (0.00 + 61.49 + 0.00) = 61.49 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	90	0.00	65.75	0.00	-1.25	-3.01	0.00	0.00	0.00	61.49

-----

Segment Leq : 61.49 dBA

Results segment # 2: Chapman (day)

-----

Source height = 1.50 m

ROAD (0.00 + 65.85 + 0.00) = 65.85 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	67.51	0.00	-1.66	0.00	0.00	0.00	0.00	65.85

-----

Segment Leq : 65.85 dBA

Total Leq All Segments: 67.21 dBA

Results segment # 1: Jockvale (night)

-----

Source height = 1.50 m

ROAD (0.00 + 53.90 + 0.00) = 53.90 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	90	0.00	58.16	0.00	-1.25	-3.01	0.00	0.00	0.00	53.90

-----

Segment Leq : 53.90 dBA

Results segment # 2: Chapman (night)

-----

Source height = 1.50 m

ROAD (0.00 + 58.25 + 0.00) = 58.25 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	59.91	0.00	-1.66	0.00	0.00	0.00	0.00	58.25

-----

Segment Leq : 58.25 dBA

Total Leq All Segments: 59.61 dBA



# GRADIENTWIND

ENGINEERS & SCIENTISTS

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

-----  
 1 - Bus:  
 Traffic volume : 191/67 veh/TimePeriod  
 Speed : 50 km/h

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

-----  
 Angle1 Angle2 : -90.00 deg 90.00 deg  
 Wood depth : 0 (No woods.)  
 No of house rows : 0 / 0  
 Surface : 2 (Reflective ground surface)  
 Receiver source distance : 22.00 / 22.00 m  
 Receiver height : 4.50 / 4.50 m  
 Topography : 1 (Flat/gentle slope; no barrier)  
 Reference angle : 0.00

Results segment # 1: Bus (day)

-----  
 Source height = 0.50 m

RT/Custom (0.00 + 52.87 + 0.00) = 52.87 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	54.54	-1.66	0.00	0.00	0.00	0.00	52.87

-----  
 Segment Leq : 52.87 dBA

Total Leq All Segments: 52.87 dBA

Results segment # 1: Bus (night)

-----  
 Source height = 0.50 m

RT/Custom (0.00 + 51.33 + 0.00) = 51.33 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	53.00	-1.66	0.00	0.00	0.00	0.00	51.33

-----  
 Segment Leq : 51.33 dBA

Total Leq All Segments: 51.33 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 67.36  
 (NIGHT): 60.21





STAMSON 5.0          NORMAL REPORT          Date: 18-03-2019 11:13:08  
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r9.te                                  Time Period: Day/Night 16/8 hours  
Description:

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

-----  
Car traffic volume : 6477/563    veh/TimePeriod \*  
Medium truck volume : 515/45    veh/TimePeriod \*  
Heavy truck volume : 368/32    veh/TimePeriod \*  
Posted speed limit : 50 km/h  
Road gradient : 0 %  
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 8000  
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: Jockvale (day/night)

-----  
Angle1    Angle2                         : -90.00 deg    90.00 deg  
Wood depth                                : 0            (No woods.)  
No of house rows                         : 0 / 0  
Surface                                    : 2            (Reflective ground surface)  
Receiver source distance                 : 15.00 / 20.00 m  
Receiver height                            : 4.50 / 4.50 m  
Topography                                : 1            (Flat/gentle slope; no barrier)  
Reference angle                            : 0.00



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

-----  
Car traffic volume : 9715/845 veh/TimePeriod \*  
Medium truck volume : 773/67 veh/TimePeriod \*  
Heavy truck volume : 552/48 veh/TimePeriod \*  
Posted speed limit : 50 km/h  
Road gradient : 0 %  
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 12000  
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: Chapman (day/night)

-----  
Angle1 Angle2 : -90.00 deg 0.00 deg  
Wood depth : 0 (No woods.)  
No of house rows : 0 / 0  
Surface : 2 (Reflective ground surface)  
Receiver source distance : 29.00 / 29.00 m  
Receiver height : 4.50 / 4.50 m  
Topography : 1 (Flat/gentle slope; no barrier)  
Reference angle : 0.00



Results segment # 1: Jockvale (day)

-----

Source height = 1.50 m

ROAD (0.00 + 65.75 + 0.00) = 65.75 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	65.75	0.00	0.00	0.00	0.00	0.00	0.00	65.75

Segment Leq : 65.75 dBA

Results segment # 2: Chapman (day)

-----

Source height = 1.50 m

ROAD (0.00 + 61.64 + 0.00) = 61.64 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	0	0.00	67.51	0.00	-2.86	-3.01	0.00	0.00	0.00	61.64

Segment Leq : 61.64 dBA

Total Leq All Segments: 67.17 dBA

Results segment # 1: Jockvale (night)

-----

Source height = 1.50 m

ROAD (0.00 + 56.91 + 0.00) = 56.91 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	58.16	0.00	-1.25	0.00	0.00	0.00	0.00	56.91

Segment Leq : 56.91 dBA

Results segment # 2: Chapman (night)

-----

Source height = 1.50 m

ROAD (0.00 + 54.04 + 0.00) = 54.04 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	0	0.00	59.91	0.00	-2.86	-3.01	0.00	0.00	0.00	54.04

Segment Leq : 54.04 dBA

Total Leq All Segments: 58.72 dBA



# GRADIENTWIND

ENGINEERS & SCIENTISTS

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

-----  
 1 - Bus:  
 Traffic volume : 191/67 veh/TimePeriod  
 Speed : 50 km/h

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

-----  
 Angle1 Angle2 : -90.00 deg 0.00 deg  
 Wood depth : 0 (No woods.)  
 No of house rows : 0 / 0  
 Surface : 2 (Reflective ground surface)  
 Receiver source distance : 29.00 / 29.00 m  
 Receiver height : 4.50 / 4.50 m  
 Topography : 1 (Flat/gentle slope; no barrier)  
 Reference angle : 0.00

Results segment # 1: Bus (day)

-----  
 Source height = 0.50 m

RT/Custom (0.00 + 48.66 + 0.00) = 48.66 dBA  

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	0	0.00	54.54	-2.86	-3.01	0.00	0.00	0.00	48.66

 -----

Segment Leq : 48.66 dBA

Total Leq All Segments: 48.66 dBA

Results segment # 1: Bus (night)

-----  
 Source height = 0.50 m

RT/Custom (0.00 + 47.12 + 0.00) = 47.12 dBA  

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	0	0.00	53.00	-2.86	-3.01	0.00	0.00	0.00	47.12

 -----

Segment Leq : 47.12 dBA

Total Leq All Segments: 47.12 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 67.24  
 (NIGHT): 59.01



# GRADIENTWIND

ENGINEERS & SCIENTISTS

STAMSON 5.0            NORMAL REPORT            Date: 18-03-2019 11:08:53  
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r10.te                    Time Period: Day/Night 16/8 hours  
Description:

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

-----

Car traffic volume : 9715/845    veh/TimePeriod    \*  
Medium truck volume : 773/67    veh/TimePeriod    \*  
Heavy truck volume : 552/48    veh/TimePeriod    \*  
Posted speed limit : 50 km/h  
Road gradient : 0 %  
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 12000  
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: Chapman (day/night)

-----

Angle1 Angle2 : -90.00 deg 90.00 deg  
Wood depth : 0 (No woods.)  
No of house rows : 0 / 0  
Surface : 2 (Reflective ground surface)  
Receiver source distance : 25.00 / 25.00 m  
Receiver height : 4.50 / 4.50 m  
Topography : 1 (Flat/gentle slope; no barrier)  
Reference angle : 0.00



# GRADIENTWIND

ENGINEERS & SCIENTISTS

Results segment # 1: Chapman (day)

Source height = 1.50 m

ROAD (0.00 + 65.29 + 0.00) = 65.29 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	67.51	0.00	-2.22	0.00	0.00	0.00	0.00	65.29

Segment Leq : 65.29 dBA

Total Leq All Segments: 65.29 dBA

Results segment # 1: Chapman (night)

Source height = 1.50 m

ROAD (0.00 + 57.69 + 0.00) = 57.69 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	59.91	0.00	-2.22	0.00	0.00	0.00	0.00	57.69

Segment Leq : 57.69 dBA

Total Leq All Segments: 57.69 dBA



# GRADIENTWIND

ENGINEERS & SCIENTISTS

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

-----  
 1 - Bus:  
 Traffic volume : 191/67 veh/TimePeriod  
 Speed : 50 km/h

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

-----  
 Angle1 Angle2 : -90.00 deg 90.00 deg  
 Wood depth : 0 (No woods.)  
 No of house rows : 0 / 0  
 Surface : 2 (Reflective ground surface)  
 Receiver source distance : 25.00 / 25.00 m  
 Receiver height : 4.50 / 4.50 m  
 Topography : 1 (Flat/gentle slope; no barrier)  
 Reference angle : 0.00

Results segment # 1: Bus (day)

-----  
 Source height = 0.50 m

RT/Custom (0.00 + 52.32 + 0.00) = 52.32 dBA  

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	54.54	-2.22	0.00	0.00	0.00	0.00	52.32

 -----

Segment Leq : 52.32 dBA

Total Leq All Segments: 52.32 dBA

Results segment # 1: Bus (night)

-----  
 Source height = 0.50 m

RT/Custom (0.00 + 50.78 + 0.00) = 50.78 dBA  

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	53.00	-2.22	0.00	0.00	0.00	0.00	50.78

 -----

Segment Leq : 50.78 dBA

Total Leq All Segments: 50.78 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 65.50  
 (NIGHT): 58.50



# GRADIENTWIND

ENGINEERS & SCIENTISTS

STAMSON 5.0                  NORMAL REPORT                  Date: 18-03-2019 11:08:58  
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r11.te                                  Time Period: Day/Night 16/8 hours  
Description:

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

-----  
Car traffic volume : 6477/563    veh/TimePeriod \*  
Medium truck volume : 515/45    veh/TimePeriod \*  
Heavy truck volume : 368/32    veh/TimePeriod \*  
Posted speed limit : 50 km/h  
Road gradient : 0 %  
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 8000  
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: Jockvale (day/night)

-----  
Angle1    Angle2                                  : -90.00 deg    90.00 deg  
Wood depth : 0    (No woods.)  
No of house rows : 0 / 0  
Surface : 2    (Reflective ground surface)  
Receiver source distance : 16.00 / 16.00 m  
Receiver height : 4.50 / 4.50 m  
Topography : 1    (Flat/gentle slope; no barrier)  
Reference angle : 0.00





# GRADIENTWIND

ENGINEERS & SCIENTISTS

Results segment # 1: Jockvale (day)

Source height = 1.50 m

ROAD (0.00 + 65.47 + 0.00) = 65.47 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	65.75	0.00	-0.28	0.00	0.00	0.00	0.00	65.47

Segment Leq : 65.47 dBA

Total Leq All Segments: 65.47 dBA

Results segment # 1: Jockvale (night)

Source height = 1.50 m

ROAD (0.00 + 57.88 + 0.00) = 57.88 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	58.16	0.00	-0.28	0.00	0.00	0.00	0.00	57.88

Segment Leq : 57.88 dBA

Total Leq All Segments: 57.88 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 65.47  
(NIGHT): 57.88



# GRADIENTWIND

ENGINEERS & SCIENTISTS

STAMSON 5.0                  NORMAL REPORT                  Date: 18-03-2019 11:09:03  
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r12.te                                  Time Period: Day/Night 16/8 hours  
Description:

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

-----  
Car traffic volume : 6477/563    veh/TimePeriod \*  
Medium truck volume : 515/45    veh/TimePeriod \*  
Heavy truck volume : 368/32    veh/TimePeriod \*  
Posted speed limit : 50 km/h  
Road gradient : 0 %  
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 8000  
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: Jockvale (day/night)

-----  
Angle1    Angle2                    : -90.00 deg    90.00 deg  
Wood depth : 0                            (No woods.)  
No of house rows : 0 / 0  
Surface : 2                                (Reflective ground surface)  
Receiver source distance : 15.00 / 15.00 m  
Receiver height : 4.50 / 4.50 m  
Topography : 1                            (Flat/gentle slope; no barrier)  
Reference angle : 0.00



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

-----  
Car traffic volume : 9715/845 veh/TimePeriod \*  
Medium truck volume : 773/67 veh/TimePeriod \*  
Heavy truck volume : 552/48 veh/TimePeriod \*  
Posted speed limit : 50 km/h  
Road gradient : 0 %  
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 12000  
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: Chapman (day/night)

-----  
Angle1 Angle2 : 0.00 deg 25.00 deg  
Wood depth : 0 (No woods.)  
No of house rows : 0 / 0  
Surface : 2 (Reflective ground surface)  
Receiver source distance : 83.00 / 83.00 m  
Receiver height : 4.50 / 4.50 m  
Topography : 1 (Flat/gentle slope; no barrier)  
Reference angle : 0.00



# GRADIENTWIND

ENGINEERS & SCIENTISTS

Results segment # 1: Jockvale (day)

Source height = 1.50 m

ROAD (0.00 + 65.75 + 0.00) = 65.75 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	65.75	0.00	0.00	0.00	0.00	0.00	0.00	65.75

Segment Leq : 65.75 dBA

Results segment # 2: Chapman (day)

Source height = 1.50 m

ROAD (0.00 + 51.51 + 0.00) = 51.51 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	25	0.00	67.51	0.00	-7.43	-8.57	0.00	0.00	0.00	51.51

Segment Leq : 51.51 dBA

Total Leq All Segments: 65.91 dBA

Results segment # 1: Jockvale (night)

Source height = 1.50 m

ROAD (0.00 + 58.16 + 0.00) = 58.16 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	58.16	0.00	0.00	0.00	0.00	0.00	0.00	58.16

Segment Leq : 58.16 dBA

Results segment # 2: Chapman (night)

Source height = 1.50 m

ROAD (0.00 + 43.91 + 0.00) = 43.91 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	25	0.00	59.91	0.00	-7.43	-8.57	0.00	0.00	0.00	43.91

Segment Leq : 43.91 dBA

Total Leq All Segments: 58.32 dBA



# GRADIENTWIND

ENGINEERS & SCIENTISTS

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

-----  
 1 - Bus:  
 Traffic volume : 191/67 veh/TimePeriod  
 Speed : 50 km/h

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

-----  
 Angle1 Angle2 : 0.00 deg 25.00 deg  
 Wood depth : 0 (No woods.)  
 No of house rows : 0 / 0  
 Surface : 2 (Reflective ground surface)  
 Receiver source distance : 83.00 / 83.00 m  
 Receiver height : 4.50 / 4.50 m  
 Topography : 1 (Flat/gentle slope; no barrier)  
 Reference angle : 0.00

Results segment # 1: Bus (day)

-----  
 Source height = 0.50 m

RT/Custom (0.00 + 38.53 + 0.00) = 38.53 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	25	0.00	54.54	-7.43	-8.57	0.00	0.00	0.00	38.53

Segment Leq : 38.53 dBA

Total Leq All Segments: 38.53 dBA

Results segment # 1: Bus (night)

-----  
 Source height = 0.50 m

RT/Custom (0.00 + 36.99 + 0.00) = 36.99 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	25	0.00	53.00	-7.43	-8.57	0.00	0.00	0.00	36.99

Segment Leq : 36.99 dBA

Total Leq All Segments: 36.99 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 65.92  
 (NIGHT): 58.35



# GRADIENTWIND

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STAMSON 5.0                      NORMAL REPORT                      Date: 18-03-2019 11:09:08  
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r13.te                      Time Period: Day/Night 16/8 hours  
Description:

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

-----  
Car traffic volume    : 6477/563    veh/TimePeriod    \*  
Medium truck volume : 515/45     veh/TimePeriod    \*  
Heavy truck volume  : 368/32     veh/TimePeriod    \*  
Posted speed limit  : 50 km/h  
Road gradient        : 0 %  
Road pavement       : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 8000  
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: Jockvale (day/night)

-----  
Angle1    Angle2                    : -90.00 deg    0.00 deg  
Wood depth                        : 0              (No woods.)  
No of house rows                  : 0 / 0  
Surface                             : 2              (Reflective ground surface)  
Receiver source distance         : 70.00 / 70.00 m  
Receiver height                   : 4.50 / 4.50 m  
Topography                         : 2              (Flat/gentle slope; with barrier)  
Barrier angle                      : -90.00 deg    Angle2 : -26.00 deg  
Barrier height                     : 9.00 m  
Barrier receiver distance         : 53.00 / 53.00 m  
Source elevation                   : 0.00 m  
Receiver elevation                 : 0.00 m  
Barrier elevation                  : 0.00 m  
Reference angle                    : 0.00



# GRADIENTWIND

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Results segment # 1: Jockvale (day)

Source height = 1.50 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.50	4.50	2.23	2.23

ROAD (0.00 + 40.24 + 50.66) = 51.03 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	-26	0.00	65.75	0.00	-6.69	-4.49	0.00	0.00	-14.33	40.24
-26	0	0.00	65.75	0.00	-6.69	-8.40	0.00	0.00	0.00	50.66

Segment Leq : 51.03 dBA

Total Leq All Segments: 51.03 dBA

Results segment # 1: Jockvale (night)

Source height = 1.50 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.50	4.50	2.23	2.23

ROAD (0.00 + 32.64 + 43.06) = 43.44 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	-26	0.00	58.16	0.00	-6.69	-4.49	0.00	0.00	-14.33	32.64
-26	0	0.00	58.16	0.00	-6.69	-8.40	0.00	0.00	0.00	43.06

Segment Leq : 43.44 dBA

Total Leq All Segments: 43.44 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 51.03  
(NIGHT): 43.44



# GRADIENTWIND

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STAMSON 5.0            NORMAL REPORT            Date: 18-03-2019 11:09:13  
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r14.te                            Time Period: Day/Night 16/8 hours  
Description:

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

-----  
Car traffic volume : 9715/845    veh/TimePeriod \*  
Medium truck volume : 773/67    veh/TimePeriod \*  
Heavy truck volume : 552/48    veh/TimePeriod \*  
Posted speed limit : 50 km/h  
Road gradient : 0 %  
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 12000  
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: Chapman (day/night)

-----  
Angle1    Angle2            : -90.00 deg    0.00 deg  
Wood depth : 0                    (No woods.)  
No of house rows : 0 / 0  
Surface : 1                    (Absorptive ground surface)  
Receiver source distance : 72.00 / 72.00 m  
Receiver height : 4.50 / 4.50 m  
Topography : 1                    (Flat/gentle slope; no barrier)  
Reference angle : 0.00





# GRADIENTWIND

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Results segment # 1: Chapman (day)

Source height = 1.50 m

ROAD (0.00 + 52.50 + 0.00) = 52.50 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	0	0.57	67.51	0.00	-10.70	-4.31	0.00	0.00	0.00	52.50

Segment Leq : 52.50 dBA

Total Leq All Segments: 52.50 dBA

Results segment # 1: Chapman (night)

Source height = 1.50 m

ROAD (0.00 + 44.90 + 0.00) = 44.90 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	0	0.57	59.91	0.00	-10.70	-4.31	0.00	0.00	0.00	44.90

Segment Leq : 44.90 dBA

Total Leq All Segments: 44.90 dBA



# GRADIENTWIND

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

-----  
1 - Bus:  
Traffic volume : 191/67 veh/TimePeriod  
Speed : 50 km/h

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

-----  
Angle1 Angle2 : -90.00 deg 0.00 deg  
Wood depth : 0 (No woods.)  
No of house rows : 0 / 0  
Surface : 1 (Absorptive ground surface)  
Receiver source distance : 72.00 / 72.00 m  
Receiver height : 4.50 / 4.50 m  
Topography : 1 (Flat/gentle slope; no barrier)  
Reference angle : 0.00

Results segment # 1: Bus (day)

-----  
Source height = 0.50 m

RT/Custom (0.00 + 39.27 + 0.00) = 39.27 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	0	0.60	54.54	-10.90	-4.37	0.00	0.00	0.00	39.27

-----  
Segment Leq : 39.27 dBA

Total Leq All Segments: 39.27 dBA

Results segment # 1: Bus (night)

-----  
Source height = 0.50 m

RT/Custom (0.00 + 37.73 + 0.00) = 37.73 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	0	0.60	53.00	-10.90	-4.37	0.00	0.00	0.00	37.73

-----  
Segment Leq : 37.73 dBA

Total Leq All Segments: 37.73 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 52.70  
(NIGHT): 45.66



# GRADIENTWIND

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STAMSON 5.0                    NORMAL REPORT                    Date: 18-03-2019 11:09:19  
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r15.te                                    Time Period: Day/Night 16/8 hours  
Description:

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

-----  
Car traffic volume : 28336/2464 veh/TimePeriod \*  
Medium truck volume : 2254/196 veh/TimePeriod \*  
Heavy truck volume : 1610/140 veh/TimePeriod \*  
Posted speed limit : 60 km/h  
Road gradient : 0 %  
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 35000  
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: Greenbank (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 : 83.00 / 83.00 m  
Receiver height : 1.50 / 4.50 m  
Topography : 2 (Flat/gentle slope; with barrier)  
Barrier angle1 : -90.00 deg Angle2 : -43.00 deg  
Barrier height : 9.00 m  
Barrier receiver distance : 60.00 / 60.00 m  
Source elevation : 0.00 m  
Receiver elevation : 0.00 m  
Barrier elevation : 0.00 m  
Reference angle : 0.00



# GRADIENTWIND

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Results segment # 1: Greenbank (day)

Source height = 1.50 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.50	1.50	1.50	1.50

ROAD (0.00 + 45.61 + 58.99) = 59.18 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	-43	0.12	73.68	0.00	-8.32	-6.45	0.00	0.00	-13.30	45.61
-43	90	0.66	73.68	0.00	-12.33	-2.35	0.00	0.00	0.00	58.99

Segment Leq : 59.18 dBA

Total Leq All Segments: 59.18 dBA

Results segment # 1: Greenbank (night)

Source height = 1.50 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.50	4.50	2.33	2.33

ROAD (0.00 + 39.88 + 52.17) = 52.42 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	-43	0.03	66.08	0.00	-7.65	-5.99	0.00	0.00	-12.55	39.88
-43	90	0.57	66.08	0.00	-11.67	-2.24	0.00	0.00	0.00	52.17

Segment Leq : 52.42 dBA

Total Leq All Segments: 52.42 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 59.18  
(NIGHT): 52.42



# GRADIENTWIND

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STAMSON 5.0          NORMAL REPORT          Date: 18-03-2019 11:09:35  
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r16.te                                  Time Period: Day/Night 16/8 hours  
Description:

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

-----  
Car traffic volume   : 28336/2464   veh/TimePeriod \*  
Medium truck volume : 2254/196    veh/TimePeriod \*  
Heavy truck volume  : 1610/140   veh/TimePeriod \*  
Posted speed limit  :     60 km/h  
Road gradient       :     0 %  
Road pavement       :     1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 35000  
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: Greenbank (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 : 242.00 / 242.00 m  
Receiver height     :    1.50 / 1.50    m  
Topography         :     2       (Flat/gentle slope; with barrier)  
Barrier angle       : -90.00 deg   Angle2 : -21.00 deg  
Barrier height      :     9.00 m  
Barrier receiver distance : 220.00 / 220.00 m  
Source elevation    :     0.00 m  
Receiver elevation   :     0.00 m  
Barrier elevation    :     0.00 m  
Reference angle     :     0.00



# GRADIENTWIND

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Road data, segment # 2: Jockvale1 (day/night)

-----  
Car traffic volume : 6477/563 veh/TimePeriod \*  
Medium truck volume : 515/45 veh/TimePeriod \*  
Heavy truck volume : 368/32 veh/TimePeriod \*  
Posted speed limit : 50 km/h  
Road gradient : 0 %  
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 8000  
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: Jockvale1 (day/night)

-----  
Angle1 Angle2 : -30.00 deg 90.00 deg  
Wood depth : 0 (No woods.)  
No of house rows : 0 / 0  
Surface : 1 (Absorptive ground surface)  
Receiver source distance : 79.00 / 79.00 m  
Receiver height : 1.50 / 1.50 m  
Topography : 2 (Flat/gentle slope; with barrier)  
Barrier angle1 : 32.00 deg Angle2 : 90.00 deg  
Barrier height : 9.00 m  
Barrier receiver distance : 62.00 / 62.00 m  
Source elevation : 0.00 m  
Receiver elevation : 0.00 m  
Barrier elevation : 0.00 m  
Reference angle : 0.00



Road data, segment # 3: Jockvale2 (day/night)

-----  
Car traffic volume : 6477/563 veh/TimePeriod \*  
Medium truck volume : 515/45 veh/TimePeriod \*  
Heavy truck volume : 368/32 veh/TimePeriod \*  
Posted speed limit : 50 km/h  
Road gradient : 0 %  
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 8000  
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 # 3: Jockvale2 (day/night)

-----  
Angle1 Angle2 : -43.00 deg -3.00 deg  
Wood depth : 0 (No woods.)  
No of house rows : 0 / 0  
Surface : 1 (Absorptive ground surface)  
Receiver source distance : 91.00 / 91.00 m  
Receiver height : 1.50 / 1.50 m  
Topography : 1 (Flat/gentle slope; no barrier)  
Reference angle : 0.00



# GRADIENTWIND

ENGINEERS & SCIENTISTS

Results segment # 1: Greenbank (day)

Source height = 1.50 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.50	1.50	1.50	1.50

ROAD (0.00 + 41.70 + 50.37) = 50.92 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	-21	0.12	73.68	0.00	-13.53	-4.61	0.00	0.00	-13.84	41.70
-21	90	0.66	73.68	0.00	-20.05	-3.26	0.00	0.00	0.00	50.37

Segment Leq : 50.92 dBA

Results segment # 2: Jockvale1 (day)

Source height = 1.50 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.50	1.50	1.50	1.50

ROAD (49.00 + 37.63 + 0.00) = 49.31 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-30	32	0.66	65.75	0.00	-11.98	-4.77	0.00	0.00	0.00	49.00
32	90	0.12	65.75	0.00	-8.08	-5.44	0.00	0.00	-14.61	37.63

Segment Leq : 49.31 dBA





# GRADIENTWIND

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Results segment # 3: Jockvale2 (day)

Source height = 1.50 m

ROAD (0.00 + 45.92 + 0.00) = 45.92 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-43	-3	0.66	65.75	0.00	-13.00	-6.83	0.00	0.00	0.00	45.92

Segment Leq : 45.92 dBA

Total Leq All Segments: 53.94 dBA

Results segment # 1: Greenbank (night)

Source height = 1.50 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.50	1.50	1.50	1.50

ROAD (0.00 + 34.11 + 42.77) = 43.33 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	-21	0.12	66.08	0.00	-13.53	-4.61	0.00	0.00	-13.84	34.11
-21	90	0.66	66.08	0.00	-20.05	-3.26	0.00	0.00	0.00	42.77

Segment Leq : 43.33 dBA

Results segment # 2: Jockvale1 (night)

Source height = 1.50 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.50	1.50	1.50	1.50

ROAD (41.41 + 30.03 + 0.00) = 41.71 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-30	32	0.66	58.16	0.00	-11.98	-4.77	0.00	0.00	0.00	41.41
32	90	0.12	58.16	0.00	-8.08	-5.44	0.00	0.00	-14.61	30.03

Segment Leq : 41.71 dBA



# GRADIENTWIND

ENGINEERS & SCIENTISTS

Results segment # 3: Jockvale2 (night)

-----  
Source height = 1.50 m

ROAD (0.00 + 38.33 + 0.00) = 38.33 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-43	-3	0.66	58.16	0.00	-13.00	-6.83	0.00	0.00	0.00	38.33

-----

Segment Leq : 38.33 dBA

Total Leq All Segments: 46.35 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 53.94  
(NIGHT): 46.35



# GRADIENTWIND

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STAMSON 5.0          NORMAL REPORT          Date: 18-03-2019 34:24:12  
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r17.te                  Time Period: Day/Night 16/8 hours  
Description:

## Road data, segment # 1: Greenbank1 (day/night)

-----

Car traffic volume    : 28336/2464    veh/TimePeriod    \*  
Medium truck volume  : 2254/196     veh/TimePeriod    \*  
Heavy truck volume    : 1610/140    veh/TimePeriod    \*  
Posted speed limit    :    60 km/h  
Road gradient        :     0 %  
Road pavement        :     1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 35000  
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: Greenbank1 (day/night)

-----

Angle1    Angle2            : -90.00 deg    -30.00 deg  
Wood depth                :     0        (No woods.)  
No of house rows         :     0 / 0  
Surface                    :     1        (Absorptive ground surface)  
Receiver source distance : 84.00 / 84.00 m  
Receiver height          :  1.50 / 1.50 m  
Topography                :     2        (Flat/gentle slope; with barrier)  
Barrier angle            : -90.00 deg    Angle2 : -30.00 deg  
Barrier height            :     0.00 m  
Barrier receiver distance: 16.00 / 16.00 m  
Source elevation         :     0.00 m  
Receiver elevation        :     0.00 m  
Barrier elevation         :     0.00 m  
Reference angle          :     0.00



# GRADIENTWIND

ENGINEERS & SCIENTISTS

Road data, segment # 2: Greenbank2 (day/night)

-----  
Car traffic volume : 28336/2464 veh/TimePeriod \*  
Medium truck volume : 2254/196 veh/TimePeriod \*  
Heavy truck volume : 1610/140 veh/TimePeriod \*  
Posted speed limit : 60 km/h  
Road gradient : 0 %  
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 35000  
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: Greenbank2 (day/night)

-----  
Angle1 Angle2 : -30.00 deg 90.00 deg  
Wood depth : 0 (No woods.)  
No of house rows : 0 / 0  
Surface : 1 (Absorptive ground surface)  
Receiver source distance : 84.00 / 84.00 m  
Receiver height : 1.50 / 1.50 m  
Topography : 2 (Flat/gentle slope; with barrier)  
Barrier angle1 : -30.00 deg Angle2 : 90.00 deg  
Barrier height : 24.00 m  
Barrier receiver distance : 16.00 / 16.00 m  
Source elevation : 0.00 m  
Receiver elevation : 0.00 m  
Barrier elevation : 0.00 m  
Reference angle : 0.00



Road data, segment # 3: Chapman1 (day/night)

-----  
Car traffic volume : 9715/845 veh/TimePeriod \*  
Medium truck volume : 773/67 veh/TimePeriod \*  
Heavy truck volume : 552/48 veh/TimePeriod \*  
Posted speed limit : 50 km/h  
Road gradient : 0 %  
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 12000  
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 # 3: Chapman1 (day/night)

-----  
Angle1 Angle2 : -90.00 deg -57.00 deg  
Wood depth : 0 (No woods.)  
No of house rows : 0 / 0  
Surface : 1 (Absorptive ground surface)  
Receiver source distance : 32.00 / 32.00 m  
Receiver height : 1.50 / 1.50 m  
Topography : 2 (Flat/gentle slope; with barrier)  
Barrier angle1 : -90.00 deg Angle2 : -57.00 deg  
Barrier height : 24.00 m  
Barrier receiver distance : 9.00 / 9.00 m  
Source elevation : 0.00 m  
Receiver elevation : 0.00 m  
Barrier elevation : 0.00 m  
Reference angle : 0.00



# GRADIENTWIND

ENGINEERS & SCIENTISTS

Road data, segment # 4: Chapman2 (day/night)

-----  
Car traffic volume : 9715/845 veh/TimePeriod \*  
Medium truck volume : 773/67 veh/TimePeriod \*  
Heavy truck volume : 552/48 veh/TimePeriod \*  
Posted speed limit : 50 km/h  
Road gradient : 0 %  
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 12000  
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 # 4: Chapman2 (day/night)

-----  
Angle1 Angle2 : -57.00 deg 66.00 deg  
Wood depth : 0 (No woods.)  
No of house rows : 0 / 0  
Surface : 1 (Absorptive ground surface)  
Receiver source distance : 32.00 / 32.00 m  
Receiver height : 1.50 / 1.50 m  
Topography : 2 (Flat/gentle slope; with barrier)  
Barrier angle1 : -57.00 deg Angle2 : 66.00 deg  
Barrier height : 0.00 m  
Barrier receiver distance : 9.00 / 9.00 m  
Source elevation : 0.00 m  
Receiver elevation : 0.00 m  
Barrier elevation : 0.00 m  
Reference angle : 0.00



# GRADIENTWIND

ENGINEERS & SCIENTISTS

Road data, segment # 5: Chapmen3 (day/night)

-----  
Car traffic volume : 9715/845 veh/TimePeriod \*  
Medium truck volume : 773/67 veh/TimePeriod \*  
Heavy truck volume : 552/48 veh/TimePeriod \*  
Posted speed limit : 50 km/h  
Road gradient : 0 %  
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 12000  
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 # 5: Chapmen3 (day/night)

-----  
Angle1 Angle2 : 66.00 deg 90.00 deg  
Wood depth : 0 (No woods.)  
No of house rows : 0 / 0  
Surface : 1 (Absorptive ground surface)  
Receiver source distance : 32.00 / 32.00 m  
Receiver height : 1.50 / 1.50 m  
Topography : 2 (Flat/gentle slope; with barrier)  
Barrier angle1 : 66.00 deg Angle2 : 90.00 deg  
Barrier height : 24.00 m  
Barrier receiver distance : 9.00 / 9.00 m  
Source elevation : 0.00 m  
Receiver elevation : 0.00 m  
Barrier elevation : 0.00 m  
Reference angle : 0.00



# GRADIENTWIND

ENGINEERS & SCIENTISTS

Results segment # 1: Greenbank1 (day)

Source height = 1.50 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.50	1.50	1.50	1.50

ROAD (0.00 + 54.18 + 0.00) = 54.18 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	-30	0.66	73.68	0.00	-12.42	-7.08	0.00	0.00	-1.86	52.31*
-90	-30	0.66	73.68	0.00	-12.42	-7.08	0.00	0.00	0.00	54.18

\* Bright Zone !

Segment Leq : 54.18 dBA

Results segment # 2: Greenbank2 (day)

Source height = 1.50 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.50	1.50	1.50	1.50

ROAD (0.00 + 45.06 + 0.00) = 45.06 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-30	90	0.00	73.68	0.00	-7.48	-1.76	0.00	0.00	-19.37	45.06

Segment Leq : 45.06 dBA





# GRADIENTWIND

ENGINEERS & SCIENTISTS

Results segment # 3: Chapman1 (day)

Source height = 1.50 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.50	1.50	1.50	1.50

ROAD (0.00 + 38.16 + 0.00) = 38.16 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	-57	0.00	67.51	0.00	-3.29	-7.37	0.00	0.00	-18.69	38.16

Segment Leq : 38.16 dBA

Results segment # 4: Chapman2 (day)

Source height = 1.50 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.50	1.50	1.50	1.50

ROAD (0.00 + 59.79 + 0.00) = 59.79 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-57	66	0.66	67.51	0.00	-5.46	-2.26	0.00	0.00	0.00	59.79*
-57	66	0.66	67.51	0.00	-5.46	-2.26	0.00	0.00	0.00	59.79

\* Bright Zone !

Segment Leq : 59.79 dBA



# GRADIENTWIND

ENGINEERS & SCIENTISTS

Results segment # 5: Chapmen3 (day)

Source height = 1.50 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.50	1.50	1.50	1.50

ROAD (0.00 + 37.19 + 0.00) = 37.19 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
66	90	0.00	67.51	0.00	-3.29	-8.75	0.00	0.00	-18.28	37.19

Segment Leq : 37.19 dBA

Total Leq All Segments: 61.00 dBA

Results segment # 1: Greenbank1 (night)

Source height = 1.50 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.50	1.50	1.50	1.50

ROAD (0.00 + 46.58 + 0.00) = 46.58 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	-30	0.66	66.08	0.00	-12.42	-7.08	0.00	0.00	-1.86	44.72*
-90	-30	0.66	66.08	0.00	-12.42	-7.08	0.00	0.00	0.00	46.58

\* Bright Zone !

Segment Leq : 46.58 dBA



# GRADIENTWIND

ENGINEERS & SCIENTISTS

Results segment # 2: Greenbank2 (night)

Source height = 1.50 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.50	1.50	1.50	1.50

ROAD (0.00 + 37.46 + 0.00) = 37.46 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-30	90	0.00	66.08	0.00	-7.48	-1.76	0.00	0.00	-19.37	37.46

Segment Leq : 37.46 dBA

Results segment # 3: Chapman1 (night)

Source height = 1.50 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.50	1.50	1.50	1.50

ROAD (0.00 + 30.56 + 0.00) = 30.56 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	-57	0.00	59.91	0.00	-3.29	-7.37	0.00	0.00	-18.69	30.56

Segment Leq : 30.56 dBA



# GRADIENTWIND

ENGINEERS & SCIENTISTS

Results segment # 4: Chapman2 (night)

Source height = 1.50 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.50	1.50	1.50	1.50

ROAD (0.00 + 52.19 + 0.00) = 52.19 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-57	66	0.66	59.91	0.00	-5.46	-2.26	0.00	0.00	0.00	52.19*
-57	66	0.66	59.91	0.00	-5.46	-2.26	0.00	0.00	0.00	52.19

\* Bright Zone !

Segment Leq : 52.19 dBA

Results segment # 5: Chapman3 (night)

Source height = 1.50 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.50	1.50	1.50	1.50

ROAD (0.00 + 29.59 + 0.00) = 29.59 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
66	90	0.00	59.91	0.00	-3.29	-8.75	0.00	0.00	-18.28	29.59

Segment Leq : 29.59 dBA

Total Leq All Segments: 53.40 dBA



# GRADIENTWIND

ENGINEERS & SCIENTISTS

RT/Custom data, segment # 1: Bus1 (day/night)

-----  
1 - Bus:  
Traffic volume : 191/67 veh/TimePeriod  
Speed : 50 km/h

Data for Segment # 1: Bus1 (day/night)

-----  
Angle1 Angle2 : -90.00 deg 66.00 deg  
Wood depth : 0 (No woods.)  
No of house rows : 0 / 0  
Surface : 1 (Absorptive ground surface)  
Receiver source distance : 32.00 / 32.00 m  
Receiver height : 1.50 / 1.50 m  
Topography : 2 (Flat/gentle slope; with barrier)  
Barrier angle1 : -90.00 deg Angle2 : -57.00 deg  
Barrier height : 24.00 m  
Barrier receiver distance : 9.00 / 9.00 m  
Source elevation : 0.00 m  
Receiver elevation : 0.00 m  
Barrier elevation : 0.00 m  
Reference angle : 0.00

RT/Custom data, segment # 2: Bus2 (day/night)

-----  
1 - Bus:  
Traffic volume : 191/67 veh/TimePeriod  
Speed : 50 km/h

Data for Segment # 2: Bus2 (day/night)

-----  
Angle1 Angle2 : 66.00 deg 90.00 deg  
Wood depth : 0 (No woods.)  
No of house rows : 0 / 0  
Surface : 1 (Absorptive ground surface)  
Receiver source distance : 32.00 / 32.00 m  
Receiver height : 1.50 / 1.50 m  
Topography : 2 (Flat/gentle slope; with barrier)  
Barrier angle1 : 66.00 deg Angle2 : 90.00 deg  
Barrier height : 24.00 m  
Barrier receiver distance : 9.00 / 9.00 m  
Source elevation : 0.00 m  
Receiver elevation : 0.00 m  
Barrier elevation : 0.00 m  
Reference angle : 0.00



Results segment # 1: Bus1 (day)

Source height = 0.50 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
0.50	1.50	1.22	1.22

RT/Custom (0.00 + 25.16 + 46.82) = 46.85 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	-57	0.00	54.54	-3.29	-7.37	0.00	0.00	-18.72	25.16
-57	66	0.66	54.54	-5.46	-2.26	0.00	0.00	0.00	46.82

Segment Leq : 46.85 dBA

Results segment # 2: Bus2 (day)

Source height = 0.50 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
0.50	1.50	1.22	1.22

RT/Custom (0.00 + 24.17 + 0.00) = 24.17 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
66	90	0.00	54.54	-3.29	-8.75	0.00	0.00	-18.32	24.17

Segment Leq : 24.17 dBA

Total Leq All Segments: 46.87 dBA



Results segment # 1: Bus1 (night)

Source height = 0.50 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
0.50	1.50	1.22	1.22

RT/Custom (0.00 + 23.62 + 45.28) = 45.31 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	-57	0.00	53.00	-3.29	-7.37	0.00	0.00	-18.72	23.62
-57	66	0.66	53.00	-5.46	-2.26	0.00	0.00	0.00	45.28

Segment Leq : 45.31 dBA

Results segment # 2: Bus2 (night)

Source height = 0.50 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
0.50	1.50	1.22	1.22

RT/Custom (0.00 + 22.63 + 0.00) = 22.63 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
66	90	0.00	53.00	-3.29	-8.75	0.00	0.00	-18.32	22.63

Segment Leq : 22.63 dBA

Total Leq All Segments: 45.33 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 61.16  
(NIGHT): 54.03



# GRADIENTWIND

ENGINEERS & SCIENTISTS

STAMSON 5.0                    NORMAL REPORT                    Date: 18-03-2019 34:24:17  
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r17b.te                    Time Period: Day/Night 16/8 hours  
Description:

## Road data, segment # 1: Greenbank1 (day/night)

-----  
Car traffic volume    : 28336/2464    veh/TimePeriod    \*  
Medium truck volume : 2254/196    veh/TimePeriod    \*  
Heavy truck volume   : 1610/140    veh/TimePeriod    \*  
Posted speed limit   :     60 km/h  
Road gradient         :     0 %  
Road pavement        :     1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 35000  
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: Greenbank1 (day/night)

-----  
Angle1    Angle2                : -90.00 deg    -30.00 deg  
Wood depth                        :     0            (No woods.)  
No of house rows                  :     0 / 0  
Surface                            :     1            (Absorptive ground surface)  
Receiver source distance         : 84.00 / 84.00    m  
Receiver height                   : 1.50 / 1.50    m  
Topography                        :     2            (Flat/gentle slope; with barrier)  
Barrier angle                     : -90.00 deg    Angle2 : -30.00 deg  
Barrier height                    : 2.00 m  
Barrier receiver distance         : 16.00 / 16.00    m  
Source elevation                  : 0.00 m  
Receiver elevation                : 0.00 m  
Barrier elevation                 : 0.00 m  
Reference angle                   : 0.00





# GRADIENTWIND

ENGINEERS & SCIENTISTS

Road data, segment # 2: Greenbank2 (day/night)

-----  
Car traffic volume : 28336/2464 veh/TimePeriod \*  
Medium truck volume : 2254/196 veh/TimePeriod \*  
Heavy truck volume : 1610/140 veh/TimePeriod \*  
Posted speed limit : 60 km/h  
Road gradient : 0 %  
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 35000  
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: Greenbank2 (day/night)

-----  
Angle1 Angle2 : -30.00 deg 90.00 deg  
Wood depth : 0 (No woods.)  
No of house rows : 0 / 0  
Surface : 1 (Absorptive ground surface)  
Receiver source distance : 84.00 / 84.00 m  
Receiver height : 1.50 / 1.50 m  
Topography : 2 (Flat/gentle slope; with barrier)  
Barrier angle1 : -30.00 deg Angle2 : 90.00 deg  
Barrier height : 24.00 m  
Barrier receiver distance : 16.00 / 16.00 m  
Source elevation : 0.00 m  
Receiver elevation : 0.00 m  
Barrier elevation : 0.00 m  
Reference angle : 0.00



# GRADIENTWIND

ENGINEERS & SCIENTISTS

Road data, segment # 3: Chapman1 (day/night)

-----  
Car traffic volume : 9715/845 veh/TimePeriod \*  
Medium truck volume : 773/67 veh/TimePeriod \*  
Heavy truck volume : 552/48 veh/TimePeriod \*  
Posted speed limit : 50 km/h  
Road gradient : 0 %  
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 12000  
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 # 3: Chapman1 (day/night)

-----  
Angle1 Angle2 : -90.00 deg -57.00 deg  
Wood depth : 0 (No woods.)  
No of house rows : 0 / 0  
Surface : 1 (Absorptive ground surface)  
Receiver source distance : 32.00 / 32.00 m  
Receiver height : 1.50 / 1.50 m  
Topography : 2 (Flat/gentle slope; with barrier)  
Barrier angle1 : -90.00 deg Angle2 : -57.00 deg  
Barrier height : 24.00 m  
Barrier receiver distance : 9.00 / 9.00 m  
Source elevation : 0.00 m  
Receiver elevation : 0.00 m  
Barrier elevation : 0.00 m  
Reference angle : 0.00



# GRADIENTWIND

ENGINEERS & SCIENTISTS

Road data, segment # 4: Chapman2 (day/night)

-----  
Car traffic volume : 9715/845 veh/TimePeriod \*  
Medium truck volume : 773/67 veh/TimePeriod \*  
Heavy truck volume : 552/48 veh/TimePeriod \*  
Posted speed limit : 50 km/h  
Road gradient : 0 %  
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 12000  
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 # 4: Chapman2 (day/night)

-----  
Angle1 Angle2 : -57.00 deg 66.00 deg  
Wood depth : 0 (No woods.)  
No of house rows : 0 / 0  
Surface : 1 (Absorptive ground surface)  
Receiver source distance : 32.00 / 32.00 m  
Receiver height : 1.50 / 1.50 m  
Topography : 2 (Flat/gentle slope; with barrier)  
Barrier angle1 : -57.00 deg Angle2 : 66.00 deg  
Barrier height : 2.00 m  
Barrier receiver distance : 9.00 / 9.00 m  
Source elevation : 0.00 m  
Receiver elevation : 0.00 m  
Barrier elevation : 0.00 m  
Reference angle : 0.00



# GRADIENTWIND

ENGINEERS & SCIENTISTS

Road data, segment # 5: Chapmen3 (day/night)

-----  
Car traffic volume : 9715/845 veh/TimePeriod \*  
Medium truck volume : 773/67 veh/TimePeriod \*  
Heavy truck volume : 552/48 veh/TimePeriod \*  
Posted speed limit : 50 km/h  
Road gradient : 0 %  
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 12000  
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 # 5: Chapmen3 (day/night)

-----  
Angle1 Angle2 : 66.00 deg 90.00 deg  
Wood depth : 0 (No woods.)  
No of house rows : 0 / 0  
Surface : 1 (Absorptive ground surface)  
Receiver source distance : 32.00 / 32.00 m  
Receiver height : 1.50 / 1.50 m  
Topography : 2 (Flat/gentle slope; with barrier)  
Barrier angle1 : 66.00 deg Angle2 : 90.00 deg  
Barrier height : 24.00 m  
Barrier receiver distance : 9.00 / 9.00 m  
Source elevation : 0.00 m  
Receiver elevation : 0.00 m  
Barrier elevation : 0.00 m  
Reference angle : 0.00



# GRADIENTWIND

ENGINEERS & SCIENTISTS

Results segment # 1: Greenbank1 (day)

Source height = 1.50 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.50	1.50	1.50	1.50

ROAD (0.00 + 50.19 + 0.00) = 50.19 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	-30	0.54	73.68	0.00	-11.52	-6.73	0.00	0.00	-5.24	50.19

Segment Leq : 50.19 dBA

Results segment # 2: Greenbank2 (day)

Source height = 1.50 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.50	1.50	1.50	1.50

ROAD (0.00 + 45.06 + 0.00) = 45.06 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-30	90	0.00	73.68	0.00	-7.48	-1.76	0.00	0.00	-19.37	45.06

Segment Leq : 45.06 dBA



# GRADIENTWIND

ENGINEERS & SCIENTISTS

Results segment # 3: Chapman1 (day)

Source height = 1.50 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.50	1.50	1.50	1.50

ROAD (0.00 + 38.16 + 0.00) = 38.16 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	-57	0.00	67.51	0.00	-3.29	-7.37	0.00	0.00	-18.69	38.16

Segment Leq : 38.16 dBA

Results segment # 4: Chapman2 (day)

Source height = 1.50 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.50	1.50	1.50	1.50

ROAD (0.00 + 54.51 + 0.00) = 54.51 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-57	66	0.54	67.51	0.00	-5.07	-2.15	0.00	0.00	-5.78	54.51

Segment Leq : 54.51 dBA



# GRADIENTWIND

ENGINEERS & SCIENTISTS

Results segment # 5: Chapmen3 (day)

Source height = 1.50 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.50	1.50	1.50	1.50

ROAD (0.00 + 37.19 + 0.00) = 37.19 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
66	90	0.00	67.51	0.00	-3.29	-8.75	0.00	0.00	-18.28	37.19

Segment Leq : 37.19 dBA

Total Leq All Segments: 56.34 dBA

Results segment # 1: Greenbank1 (night)

Source height = 1.50 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.50	1.50	1.50	1.50

ROAD (0.00 + 42.59 + 0.00) = 42.59 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	-30	0.54	66.08	0.00	-11.52	-6.73	0.00	0.00	-5.24	42.59

Segment Leq : 42.59 dBA



# GRADIENTWIND

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Results segment # 2: Greenbank2 (night)

-----  
 Source height = 1.50 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.50	1.50	1.50	1.50

ROAD (0.00 + 37.46 + 0.00) = 37.46 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-30	90	0.00	66.08	0.00	-7.48	-1.76	0.00	0.00	-19.37	37.46

-----  
 Segment Leq : 37.46 dBA

Results segment # 3: Chapman1 (night)

-----  
 Source height = 1.50 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.50	1.50	1.50	1.50

ROAD (0.00 + 30.56 + 0.00) = 30.56 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	-57	0.00	59.91	0.00	-3.29	-7.37	0.00	0.00	-18.69	30.56

-----  
 Segment Leq : 30.56 dBA





# GRADIENTWIND

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Results segment # 4: Chapman2 (night)

Source height = 1.50 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.50	1.50	1.50	1.50

ROAD (0.00 + 46.91 + 0.00) = 46.91 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-57	66	0.54	59.91	0.00	-5.07	-2.15	0.00	0.00	-5.78	46.91

Segment Leq : 46.91 dBA

Results segment # 5: Chapman3 (night)

Source height = 1.50 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.50	1.50	1.50	1.50

ROAD (0.00 + 29.59 + 0.00) = 29.59 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
66	90	0.00	59.91	0.00	-3.29	-8.75	0.00	0.00	-18.28	29.59

Segment Leq : 29.59 dBA

Total Leq All Segments: 48.74 dBA



RT/Custom data, segment # 1: Bus1 (day/night)

-----  
1 - Bus:  
Traffic volume : 191/67 veh/TimePeriod  
Speed : 50 km/h

Data for Segment # 1: Bus1 (day/night)

-----  
Angle1 Angle2 : -90.00 deg 66.00 deg  
Wood depth : 0 (No woods.)  
No of house rows : 0 / 0  
Surface : 1 (Absorptive ground surface)  
Receiver source distance : 32.00 / 32.00 m  
Receiver height : 1.50 / 1.50 m  
Topography : 2 (Flat/gentle slope; with barrier)  
Barrier angle1 : -90.00 deg Angle2 : -57.00 deg  
Barrier height : 24.00 m  
Barrier receiver distance : 9.00 / 9.00 m  
Source elevation : 0.00 m  
Receiver elevation : 0.00 m  
Barrier elevation : 0.00 m  
Reference angle : 0.00

RT/Custom data, segment # 2: Bus2 (day/night)

-----  
1 - Bus:  
Traffic volume : 191/67 veh/TimePeriod  
Speed : 50 km/h

Data for Segment # 2: Bus2 (day/night)

-----  
Angle1 Angle2 : 66.00 deg 90.00 deg  
Wood depth : 0 (No woods.)  
No of house rows : 0 / 0  
Surface : 1 (Absorptive ground surface)  
Receiver source distance : 32.00 / 32.00 m  
Receiver height : 1.50 / 1.50 m  
Topography : 2 (Flat/gentle slope; with barrier)  
Barrier angle1 : 66.00 deg Angle2 : 90.00 deg  
Barrier height : 24.00 m  
Barrier receiver distance : 9.00 / 9.00 m  
Source elevation : 0.00 m  
Receiver elevation : 0.00 m  
Barrier elevation : 0.00 m  
Reference angle : 0.00



Results segment # 1: Bus1 (day)

Source height = 0.50 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
0.50	1.50	1.22	1.22

RT/Custom (0.00 + 25.16 + 46.82) = 46.85 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	-57	0.00	54.54	-3.29	-7.37	0.00	0.00	-18.72	25.16
-57	66	0.66	54.54	-5.46	-2.26	0.00	0.00	0.00	46.82

Segment Leq : 46.85 dBA

Results segment # 2: Bus2 (day)

Source height = 0.50 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
0.50	1.50	1.22	1.22

RT/Custom (0.00 + 24.17 + 0.00) = 24.17 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
66	90	0.00	54.54	-3.29	-8.75	0.00	0.00	-18.32	24.17

Segment Leq : 24.17 dBA

Total Leq All Segments: 46.87 dBA



Results segment # 1: Bus1 (night)

Source height = 0.50 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
0.50	1.50	1.22	1.22

RT/Custom (0.00 + 23.62 + 45.28) = 45.31 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	-57	0.00	53.00	-3.29	-7.37	0.00	0.00	-18.72	23.62
-57	66	0.66	53.00	-5.46	-2.26	0.00	0.00	0.00	45.28

Segment Leq : 45.31 dBA

Results segment # 2: Bus2 (night)

Source height = 0.50 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
0.50	1.50	1.22	1.22

RT/Custom (0.00 + 22.63 + 0.00) = 22.63 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
66	90	0.00	53.00	-3.29	-8.75	0.00	0.00	-18.32	22.63

Segment Leq : 22.63 dBA

Total Leq All Segments: 45.33 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 56.81  
(NIGHT): 50.37



# GRADIENTWIND

ENGINEERS & SCIENTISTS

STAMSON 5.0                    NORMAL REPORT                    Date: 18-03-2019 34:24:24  
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r17b2.te                    Time Period: Day/Night 16/8 hours  
Description:

## Road data, segment # 1: Greenbank1 (day/night)

-----  
Car traffic volume    : 28336/2464    veh/TimePeriod    \*  
Medium truck volume : 2254/196    veh/TimePeriod    \*  
Heavy truck volume   : 1610/140    veh/TimePeriod    \*  
Posted speed limit    :     60 km/h  
Road gradient         :     0 %  
Road pavement        :     1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 35000  
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: Greenbank1 (day/night)

-----  
Angle1    Angle2                : -90.00 deg    -30.00 deg  
Wood depth                        :     0            (No woods.)  
No of house rows                   :     0 / 0  
Surface                            :     1            (Absorptive ground surface)  
Receiver source distance           : 84.00 / 84.00    m  
Receiver height                    : 1.50 / 1.50    m  
Topography                         :     2            (Flat/gentle slope; with barrier)  
Barrier angle                      : -90.00 deg    Angle2 : -30.00 deg  
Barrier height                     : 2.70 m  
Barrier receiver distance          : 16.00 / 16.00    m  
Source elevation                   : 0.00 m  
Receiver elevation                  : 0.00 m  
Barrier elevation                   : 0.00 m  
Reference angle                    : 0.00



# GRADIENTWIND

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Road data, segment # 2: Greenbank2 (day/night)

-----  
Car traffic volume : 28336/2464 veh/TimePeriod \*  
Medium truck volume : 2254/196 veh/TimePeriod \*  
Heavy truck volume : 1610/140 veh/TimePeriod \*  
Posted speed limit : 60 km/h  
Road gradient : 0 %  
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 35000  
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: Greenbank2 (day/night)

-----  
Angle1 Angle2 : -30.00 deg 90.00 deg  
Wood depth : 0 (No woods.)  
No of house rows : 0 / 0  
Surface : 1 (Absorptive ground surface)  
Receiver source distance : 84.00 / 84.00 m  
Receiver height : 1.50 / 1.50 m  
Topography : 2 (Flat/gentle slope; with barrier)  
Barrier angle1 : -30.00 deg Angle2 : 90.00 deg  
Barrier height : 24.00 m  
Barrier receiver distance : 16.00 / 16.00 m  
Source elevation : 0.00 m  
Receiver elevation : 0.00 m  
Barrier elevation : 0.00 m  
Reference angle : 0.00



# GRADIENTWIND

ENGINEERS & SCIENTISTS

Road data, segment # 3: Chapman1 (day/night)

-----  
Car traffic volume : 9715/845 veh/TimePeriod \*  
Medium truck volume : 773/67 veh/TimePeriod \*  
Heavy truck volume : 552/48 veh/TimePeriod \*  
Posted speed limit : 50 km/h  
Road gradient : 0 %  
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 12000  
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 # 3: Chapman1 (day/night)

-----  
Angle1 Angle2 : -90.00 deg -57.00 deg  
Wood depth : 0 (No woods.)  
No of house rows : 0 / 0  
Surface : 1 (Absorptive ground surface)  
Receiver source distance : 32.00 / 32.00 m  
Receiver height : 1.50 / 1.50 m  
Topography : 2 (Flat/gentle slope; with barrier)  
Barrier angle1 : -90.00 deg Angle2 : -57.00 deg  
Barrier height : 24.00 m  
Barrier receiver distance : 9.00 / 9.00 m  
Source elevation : 0.00 m  
Receiver elevation : 0.00 m  
Barrier elevation : 0.00 m  
Reference angle : 0.00



# GRADIENTWIND

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Road data, segment # 4: Chapman2 (day/night)

-----  
Car traffic volume : 9715/845 veh/TimePeriod \*  
Medium truck volume : 773/67 veh/TimePeriod \*  
Heavy truck volume : 552/48 veh/TimePeriod \*  
Posted speed limit : 50 km/h  
Road gradient : 0 %  
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 12000  
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 # 4: Chapman2 (day/night)

-----  
Angle1 Angle2 : -57.00 deg 66.00 deg  
Wood depth : 0 (No woods.)  
No of house rows : 0 / 0  
Surface : 1 (Absorptive ground surface)  
Receiver source distance : 32.00 / 32.00 m  
Receiver height : 1.50 / 1.50 m  
Topography : 2 (Flat/gentle slope; with barrier)  
Barrier angle1 : -57.00 deg Angle2 : 66.00 deg  
Barrier height : 2.70 m  
Barrier receiver distance : 9.00 / 9.00 m  
Source elevation : 0.00 m  
Receiver elevation : 0.00 m  
Barrier elevation : 0.00 m  
Reference angle : 0.00





# GRADIENTWIND

ENGINEERS & SCIENTISTS

Road data, segment # 5: Chapmen3 (day/night)

-----  
Car traffic volume : 9715/845 veh/TimePeriod \*  
Medium truck volume : 773/67 veh/TimePeriod \*  
Heavy truck volume : 552/48 veh/TimePeriod \*  
Posted speed limit : 50 km/h  
Road gradient : 0 %  
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 12000  
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 # 5: Chapmen3 (day/night)

-----  
Angle1 Angle2 : 66.00 deg 90.00 deg  
Wood depth : 0 (No woods.)  
No of house rows : 0 / 0  
Surface : 1 (Absorptive ground surface)  
Receiver source distance : 32.00 / 32.00 m  
Receiver height : 1.50 / 1.50 m  
Topography : 2 (Flat/gentle slope; with barrier)  
Barrier angle1 : 66.00 deg Angle2 : 90.00 deg  
Barrier height : 24.00 m  
Barrier receiver distance : 9.00 / 9.00 m  
Source elevation : 0.00 m  
Receiver elevation : 0.00 m  
Barrier elevation : 0.00 m  
Reference angle : 0.00



# GRADIENTWIND

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Results segment # 1: Greenbank1 (day)

Source height = 1.50 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.50	1.50	1.50	1.50

ROAD (0.00 + 49.68 + 0.00) = 49.68 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	-30	0.50	73.68	0.00	-11.21	-6.60	0.00	0.00	-6.19	49.68

Segment Leq : 49.68 dBA

Results segment # 2: Greenbank2 (day)

Source height = 1.50 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.50	1.50	1.50	1.50

ROAD (0.00 + 45.06 + 0.00) = 45.06 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-30	90	0.00	73.68	0.00	-7.48	-1.76	0.00	0.00	-19.37	45.06

Segment Leq : 45.06 dBA



Results segment # 3: Chapman1 (day)

Source height = 1.50 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.50	1.50	1.50	1.50

ROAD (0.00 + 38.16 + 0.00) = 38.16 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	-57	0.00	67.51	0.00	-3.29	-7.37	0.00	0.00	-18.69	38.16

Segment Leq : 38.16 dBA

Results segment # 4: Chapman2 (day)

Source height = 1.50 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.50	1.50	1.50	1.50

ROAD (0.00 + 52.00 + 0.00) = 52.00 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-57	66	0.50	67.51	0.00	-4.93	-2.12	0.00	0.00	-8.47	52.00

Segment Leq : 52.00 dBA



# GRADIENTWIND

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Results segment # 5: Chapmen3 (day)

Source height = 1.50 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.50	1.50	1.50	1.50

ROAD (0.00 + 37.19 + 0.00) = 37.19 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
66	90	0.00	67.51	0.00	-3.29	-8.75	0.00	0.00	-18.28	37.19

Segment Leq : 37.19 dBA

Total Leq All Segments: 54.70 dBA

Results segment # 1: Greenbank1 (night)

Source height = 1.50 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.50	1.50	1.50	1.50

ROAD (0.00 + 42.08 + 0.00) = 42.08 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	-30	0.50	66.08	0.00	-11.21	-6.60	0.00	0.00	-6.19	42.08

Segment Leq : 42.08 dBA



# GRADIENTWIND

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Results segment # 2: Greenbank2 (night)

Source height = 1.50 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.50	1.50	1.50	1.50

ROAD (0.00 + 37.46 + 0.00) = 37.46 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-30	90	0.00	66.08	0.00	-7.48	-1.76	0.00	0.00	-19.37	37.46

Segment Leq : 37.46 dBA

Results segment # 3: Chapman1 (night)

Source height = 1.50 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.50	1.50	1.50	1.50

ROAD (0.00 + 30.56 + 0.00) = 30.56 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	-57	0.00	59.91	0.00	-3.29	-7.37	0.00	0.00	-18.69	30.56

Segment Leq : 30.56 dBA



Results segment # 4: Chapman2 (night)

Source height = 1.50 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.50	1.50	1.50	1.50

ROAD (0.00 + 44.40 + 0.00) = 44.40 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-57	66	0.50	59.91	0.00	-4.93	-2.12	0.00	0.00	-8.47	44.40

Segment Leq : 44.40 dBA

Results segment # 5: Chapmen3 (night)

Source height = 1.50 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.50	1.50	1.50	1.50

ROAD (0.00 + 29.59 + 0.00) = 29.59 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
66	90	0.00	59.91	0.00	-3.29	-8.75	0.00	0.00	-18.28	29.59

Segment Leq : 29.59 dBA

Total Leq All Segments: 47.10 dBA



# GRADIENTWIND

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RT/Custom data, segment # 1: Bus1 (day/night)

-----  
1 - Bus:  
Traffic volume : 191/67 veh/TimePeriod  
Speed : 50 km/h

Data for Segment # 1: Bus1 (day/night)

-----  
Angle1 Angle2 : -90.00 deg 66.00 deg  
Wood depth : 0 (No woods.)  
No of house rows : 0 / 0  
Surface : 1 (Absorptive ground surface)  
Receiver source distance : 32.00 / 32.00 m  
Receiver height : 1.50 / 1.50 m  
Topography : 2 (Flat/gentle slope; with barrier)  
Barrier angle1 : -90.00 deg Angle2 : -57.00 deg  
Barrier height : 24.00 m  
Barrier receiver distance : 9.00 / 9.00 m  
Source elevation : 0.00 m  
Receiver elevation : 0.00 m  
Barrier elevation : 0.00 m  
Reference angle : 0.00

RT/Custom data, segment # 2: Bus2 (day/night)

-----  
1 - Bus:  
Traffic volume : 191/67 veh/TimePeriod  
Speed : 50 km/h

Data for Segment # 2: Bus2 (day/night)

-----  
Angle1 Angle2 : 66.00 deg 90.00 deg  
Wood depth : 0 (No woods.)  
No of house rows : 0 / 0  
Surface : 1 (Absorptive ground surface)  
Receiver source distance : 32.00 / 32.00 m  
Receiver height : 1.50 / 1.50 m  
Topography : 2 (Flat/gentle slope; with barrier)  
Barrier angle1 : 66.00 deg Angle2 : 90.00 deg  
Barrier height : 24.00 m  
Barrier receiver distance : 9.00 / 9.00 m  
Source elevation : 0.00 m  
Receiver elevation : 0.00 m  
Barrier elevation : 0.00 m  
Reference angle : 0.00



Results segment # 1: Bus1 (day)

Source height = 0.50 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
0.50	1.50	1.22	1.22

RT/Custom (0.00 + 25.16 + 46.82) = 46.85 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	-57	0.00	54.54	-3.29	-7.37	0.00	0.00	-18.72	25.16
-57	66	0.66	54.54	-5.46	-2.26	0.00	0.00	0.00	46.82

Segment Leq : 46.85 dBA

Results segment # 2: Bus2 (day)

Source height = 0.50 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
0.50	1.50	1.22	1.22

RT/Custom (0.00 + 24.17 + 0.00) = 24.17 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
66	90	0.00	54.54	-3.29	-8.75	0.00	0.00	-18.32	24.17

Segment Leq : 24.17 dBA

Total Leq All Segments: 46.87 dBA





Results segment # 1: Bus1 (night)

Source height = 0.50 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
0.50	1.50	1.22	1.22

RT/Custom (0.00 + 23.62 + 45.28) = 45.31 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	-57	0.00	53.00	-3.29	-7.37	0.00	0.00	-18.72	23.62
-57	66	0.66	53.00	-5.46	-2.26	0.00	0.00	0.00	45.28

Segment Leq : 45.31 dBA

Results segment # 2: Bus2 (night)

Source height = 0.50 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
0.50	1.50	1.22	1.22

RT/Custom (0.00 + 22.63 + 0.00) = 22.63 dBA

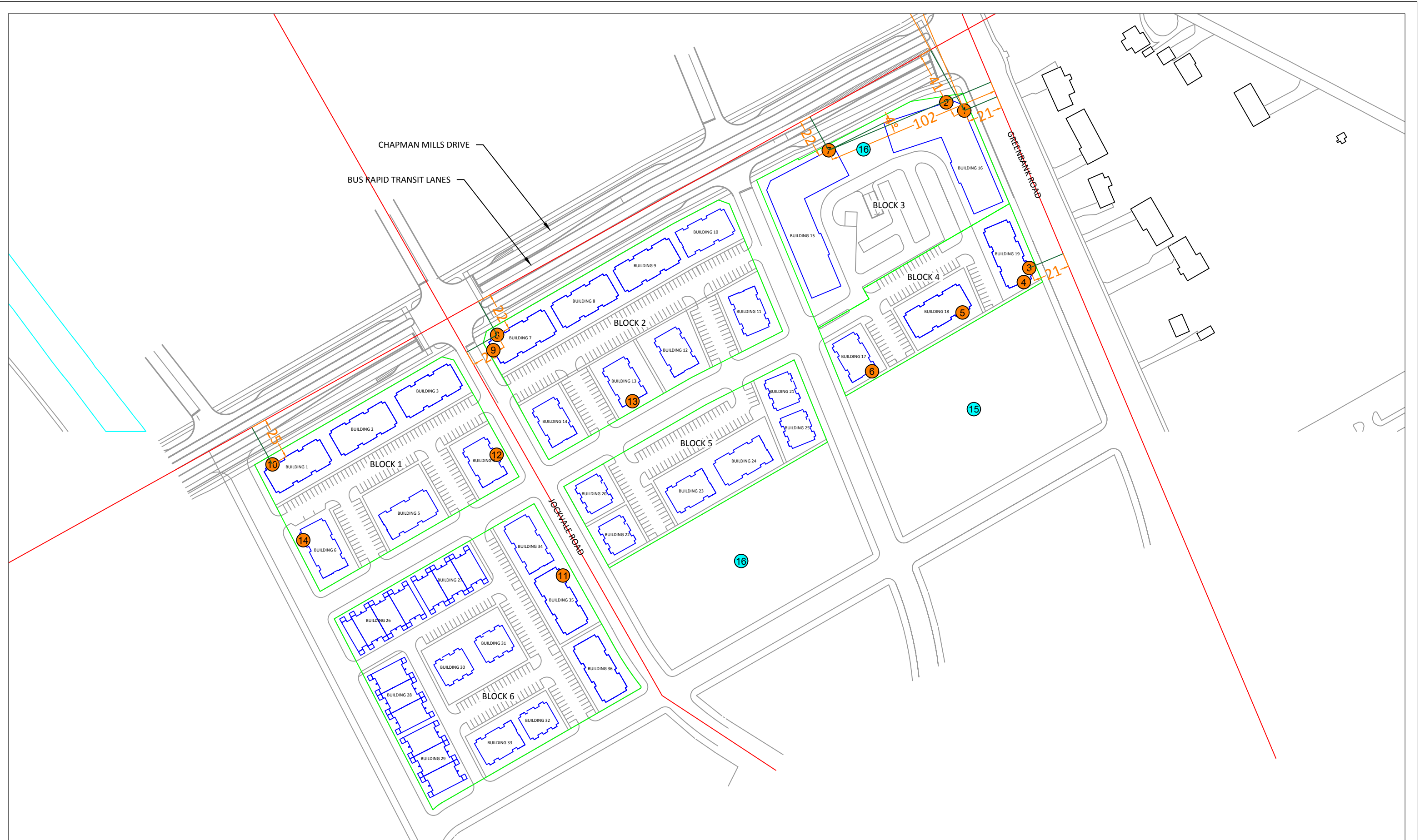
Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
66	90	0.00	53.00	-3.29	-8.75	0.00	0.00	-18.32	22.63

Segment Leq : 22.63 dBA

Total Leq All Segments: 45.33 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 55.36  
(NIGHT): 49.32

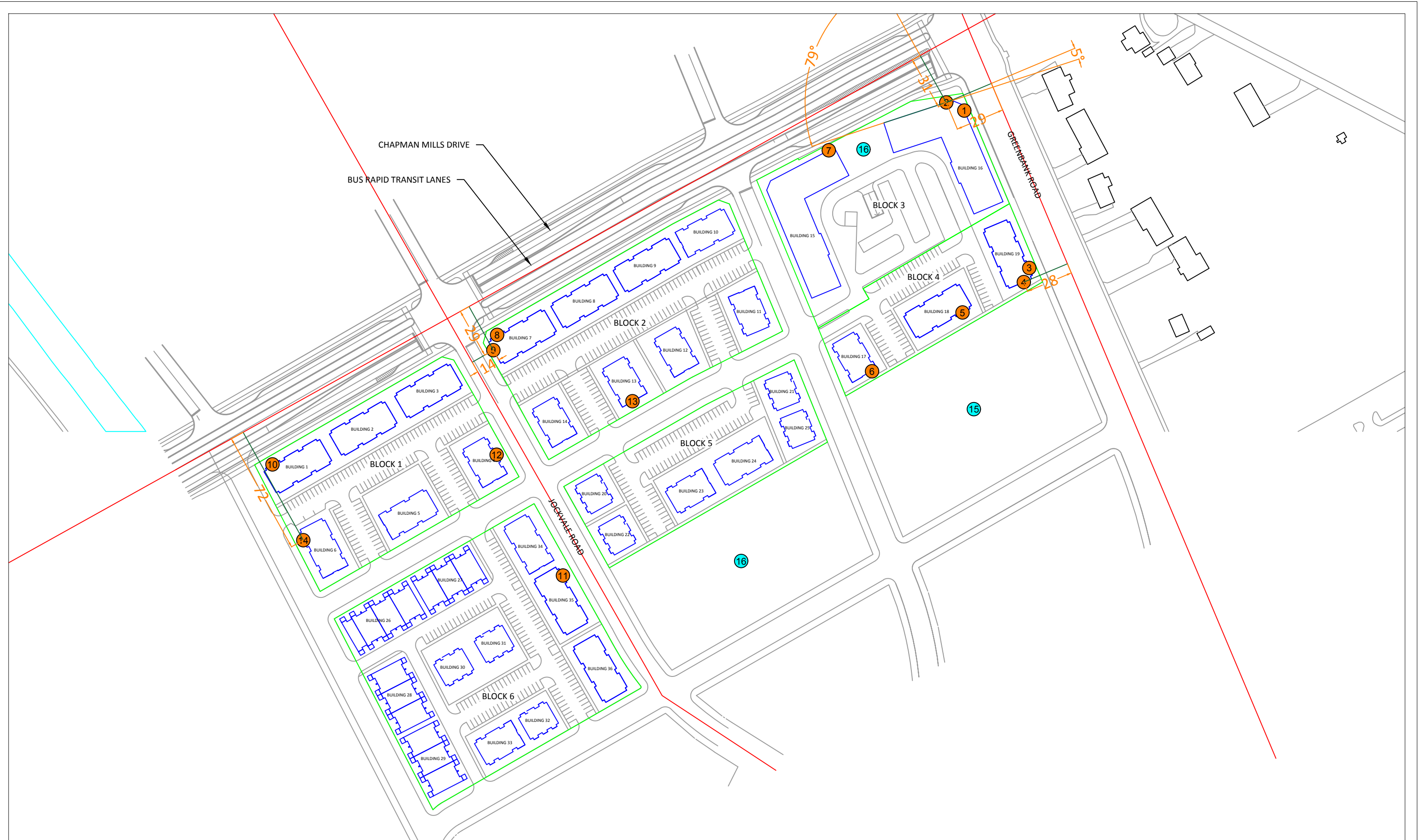




CHAPMAN MILLS DRIVE  
 BUS RAPID TRANSIT LANES

PROJECT	SOUTH NEPEAN TOWN CENTRE, OTTAWA ROADWAY TRAFFIC NOISE ASSESSMENT	
SCALE	1:2000 (APPROX.)	DRAWING NO. GWE19-035-A1
DATE	MARCH 19, 2019	DRAWN BY M.L.





PROJECT	SOUTH NEPEAN TOWN CENTRE, OTTAWA ROADWAY TRAFFIC NOISE ASSESSMENT	
SCALE	1:2000 (APPROX.)	DRAWING NO. GWE19-035-A2
DATE	MARCH 19, 2019	DRAWN BY M.L.



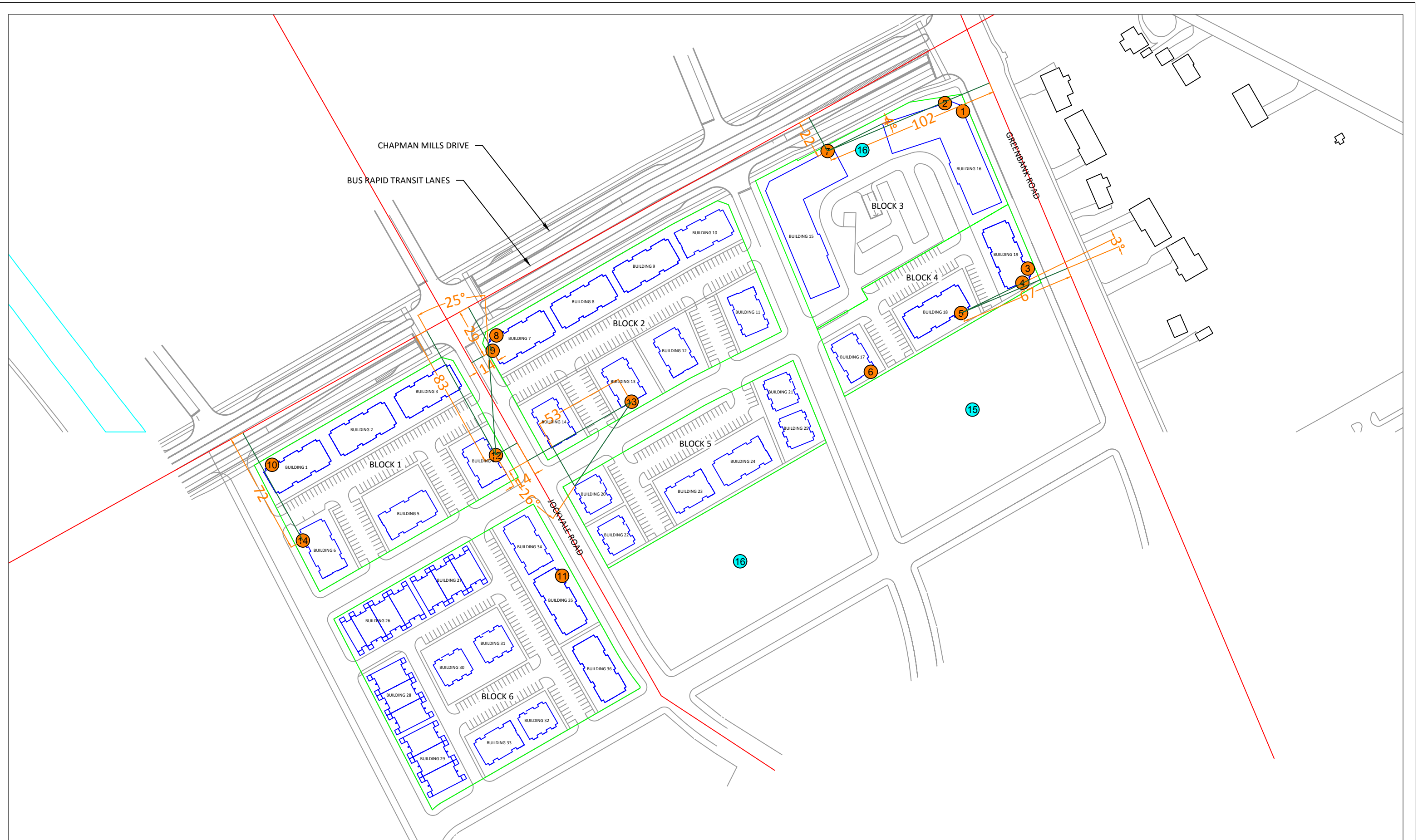


FIGURE A3:  
STAMSON INPUT PARAMETERS: RECEPTOR 5,7,12,13

PROJECT	SOUTH NEPEAN TOWN CENTRE, OTTAWA ROADWAY TRAFFIC NOISE ASSESSMENT	
SCALE	1:2000 (APPROX.)	DRAWING NO. GWE19-035-A3
DATE	MARCH 19, 2019	DRAWN BY M.L.

DESCRIPTION	
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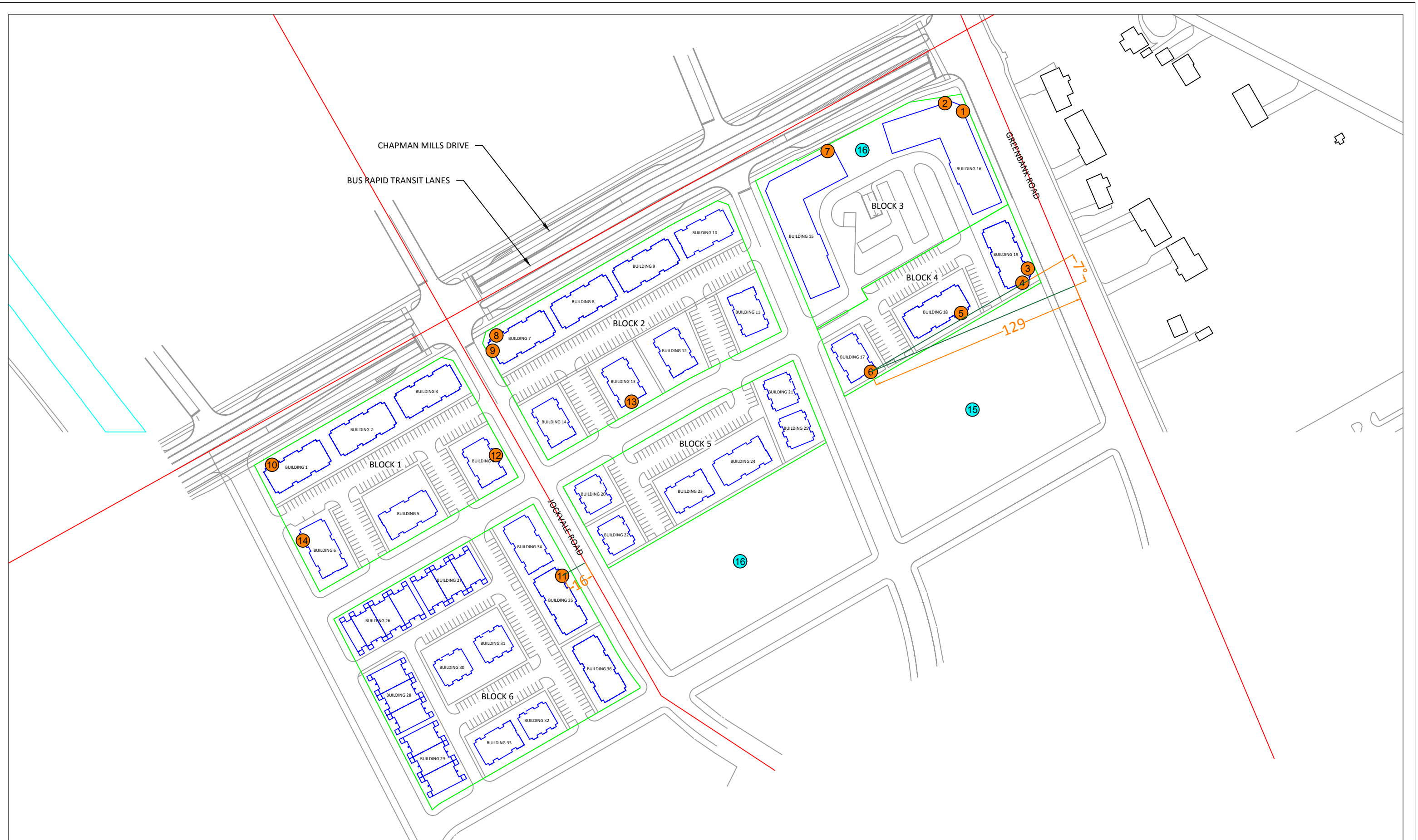


FIGURE A4:  
STAMSON INPUT PARAMETERS: RECEPTOR 6,11

PROJECT	SOUTH NEPEAN TOWN CENTRE, OTTAWA ROADWAY TRAFFIC NOISE ASSESSMENT		DESCRIPTION
SCALE	1:2000 (APPROX.)	DRAWING NO.	GWE19-035-A4
DATE	MARCH 19, 2019	DRAWN BY	M.L.



