

GRADIENTWIND

ENGINEERS & SCIENTISTS

June 19, 2025

Habitat for Humanity

Attn: Erin O'Connor
3 Iber Road
Stittsville, ON K2S 1E6

Dear Mr. O'Connor:

Re: Transportation Noise Assessment
40 Beechcliffe Street, Ottawa, ON
GWE File No.: 25-077 – Transportation Noise

1. INTRODUCTION

Gradient Wind Engineering Inc. (Gradient Wind) was retained by Habitat for Humanity to undertake a transportation noise assessment for the proposed residential development at 40 Beechcliffe Street in Ottawa, Ontario. This roadway traffic noise report summarizes the methodology, results and recommendations related to a transportation noise assessment. Gradient Wind's scope of work involved assessing exterior noise levels generated by local roadway, railway, and future light rail transit (LRT) traffic to ensure appropriate noise control measures and mitigation are provided for the development. The transportation noise assessment was performed on the basis of theoretical noise calculation methods conforming to the City of Ottawa¹ and Ministry of the Environment, Conservation and Parks (MECP)² guidelines. Our study was based on site grade drawings prepared by David Schaeffer Engineering Ltd. dated June 2025, and future traffic volumes corresponding to the City of Ottawa's Official Plan (OP). The LRT traffic volumes were based on the City of Ottawa's Environmental Assessment Report for the Barrhaven LRT project.

¹ City of Ottawa – Environmental Noise Control Guidelines, January 2016

² Ministry of the Environment and Climate Change (MOECC) – Environmental Noise Guideline, Publication NPC-300, August 2013

2. TERMS OF REFERENCE

The focus of this roadway traffic noise assessment is a proposed residential townhouse development comprising eight two-storey townhouse blocks with three to five units per block. Each unit contains a rear backyard and a 2 m high berm spanning the townhouse blocks to the east, ending just before unit 4 on block 8. The site is bound by Woodroffe Avenue to the east, Knoxdale Road to the south, the Canadian National Rail (CN) railway to the north, and Beechcliffe Street to the west. The major source of traffic noise affecting the development is Woodroffe Avenue to the east, Knoxdale Road to the south, the CN railway to the north, and the upcoming Barrhaven LRT to the east. It should be noted that the Barrhaven LRT project is planned for completion in 30-50 years. Figure 1 illustrates a complete site plan with surrounding context.

3. OBJECTIVES

The main goals of this work are to: (i) calculate the future noise levels on the study buildings produced by local roadway, railway, and future LRT traffic and (ii) ensure that exterior noise levels do not exceed the ENCG objective limit, as specified in Section 4.2.1 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 (2×10^{-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 Transportation Noise

4.2.1 Criteria for Transportation Noise

For vehicle traffic, 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.

Predicted noise levels at the plane of window (POW) and outdoor living area (OLA) dictate the action required to achieve the recommended indoor and OLA sound levels, as specified in the ENCG. When noise levels at these areas meet or exceed the ENCG objective limit of 55 dBA, specific outdoor, ventilation and Warning Clause requirements may apply. In addition, where noise levels exceed 65 dBA, upgraded building components must be designed to ensure indoor sound level limits can be met.

4.2.2 Roadway, LRT, and Railway 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 Plan³ which provides 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 1 (below) summarizes the AADT values used for the roadway, LRT lines, and railway included in this assessment.

Existing daily rail traffic data is based on Gradient Wind's experience, as well as noise reports prepared by others for projects in the area surrounding the rail line of interest. The Arnprior-Nepean rail line to the north is operated by Nylene Canada Inc. Rail traffic is limited to one train a week. This assessment considers one inbound and one outbound train with the worst-case scenario being the round trip completed in a single day. Therefore, the rail traffic is assumed to remain constant over the next 15 years

³ City of Ottawa Transportation Master Plan, November 2013

A proposed future LRT system is anticipated to be built adjacent to the site on an overhead guideway. Information about the LRT system is based on the Environmental Assessment Report.

TABLE 1A: ROADWAY AND LRT TRAFFIC DATA

Roadway	Roadway Class	Speed Limit (km/h)	Official Plan AADT
Woodroffe Avenue	4-Lane Urban Arterial-Divided (4-UAD)	60	35,000
Knoxdale Road	4-Lane Major Collector (4-UMCU)	40	24,000
Barrhaven LRT	Light Rail Transit	40*	540/60*

* - Daytime/nighttime volumes. Operational speed considered as trains move in and out of the Knoxdale Station.

TABLE 1B: RAIL TRAFFIC DATA

Segment	Train Type	Locomotive / cars	Speed Limit (km/h)	Trains per period Day / Night
CN / Arnprior-Nepean Railway	Freight	1 / 6	16	2 / 0

4.2.3 Theoretical Roadway and LRT Traffic 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, and by using existing building locations as noise barriers. In addition to the traffic volumes summarized in Table 1, 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 was taken to be 92% / 8% respectively for all streets
- Absorptive intermediate ground surfaces are used

- Receptor heights were placed at a height of 1.5 m (above grade) and 4.5 m (above grade) to represent the backyard outdoor living area, and second floor plane of window, respectively.
- Knoxdale Road was only considered as a source of traffic noise for receptors 5 and 6 that are near the roadway. The remaining receptors are located greater than 240 m away from Knoxdale road
- The study site topography was modelled using the grading plan prepared by David Schaeffer Engineering Ltd. in June 2025
- The Barrhaven LRT transit corridor was treated as a 6-car subway using the RT Custom feature in STAMSON
- An LRT speed of 40 km/h was used. This is conservative as the Knoxdale station is located directly east of the development where the trains would be operating at lower speeds coming in and out of the station.
- The Barrhaven LRT is proposed to be on an elevated guideway and will have a 2 m high noise screen along this section of track on the westside of the guideway.
- Six noise receptors were strategically placed throughout the development (Figure 2)

4.2.4 Theoretical Railway Traffic Noise Predictions

When an area is influenced by road and rail traffic, the criteria requires the outdoor noise impact from each source to be examined for comparison to respective criterion. Calculations were performed for receptors in close proximity to the railway with the assistance of the MECF rail and road noise analysis program STAMSON 5.04, which incorporates the calculation model '*Sound from Trains Environment Analysis Method*' (STEAM). The impact from railway noise is then combined with roadway predictions using a logarithmic addition at each point of reception and compared to the relevant criteria.

Similar to the roadway traffic noise calculations, the railway line was treated as a single line source of noise, and existing and proposed building locations were used as noise barriers. In addition to the railway volumes summarized in Table 2, theoretical noise predictions were also based on the following parameters:

- For the CN rail, the freight train consists of 1 locomotive and 6 cars with a speed of 16 km/h.
- Whistle events were not considered because there are no level crossings in the area.

- Rail lines were assumed not to be welded.

The noise generated from both on-road and railway traffic were combined for the 6 receptor locations identified in Figure 2.

5. RESULTS AND CONCLUSIONS

The results of the roadway traffic noise calculations are summarized in Table 2 below. A complete set of input and output data from all STAMSON 5.04 calculations are available in Appendix A and Figures A1 to A6.

TABLE 2: EXTERIOR NOISE LEVELS DUE TO TRANSPORTATION SOURCES

Receptor Number	Receptor Location	Roadway Noise Level (dBA)		Railway Noise Level (dBA)		LRT Noise Level (dBA)		Total Noise Level (dBA)	
		Day	Night	Day	Night	Day	Night	Day	Night
1	POW – East Façade located north of development	61	54	41	0	44	37	62	54
2	OLA – Backyard located north of development	60	N/A	42	N/A	43	N/A	60	N/A
3	POW – East Façade located nearest to LRT	61	54	36	0	43	37	62	54
4	OLA – Backyard located nearest to LRT	60	N/A	35	N/A	43	N/A	60	N/A
5	POW – East Façade located south of development	62	55	30	0	42	36	62	55
6	OLA – Backyard located south of development	62	N/A	27	N/A	42	N/A	62	N/A

N/A: Nighttime noise levels at OLAs are not considered as per ENCG

The results of the current study indicate that noise levels will range between 60 and 62 dBA during the daytime period (07:00-23:00) and between 54 and 55 dBA during the nighttime period (23:00-07:00). The highest noise levels occur along the east façade of the units which is most exposed to Woodroffe Avenue and the future Barrhaven LRT. Noise levels exceed the ENCG objective limit of 55 dBA and 50 dBA during the daytime and nighttime respectively. While not mandatory, air conditioning if installed would allow



windows to remain closed to ensure the indoor sound level meets the ENCG limits. The forced air heating system should be sized to allow for provisions for air conditioning. Air Conditioning would be installed at the owner's discretion. A Type C warning clause will also be required to be placed on all Lease, Purchase and Sale Agreements, as summarized below:

TYPE C

"This dwelling unit has been designed with the provision for adding central air conditioning at the occupant's discretion. Installation of central air conditioning by the occupant in low and medium density developments will allow windows and exterior doors to remain closed, thereby ensuring that the indoor sound levels are within the sound level limits of the City of Ottawa and the Ministry of the Environment."

Noise levels at the outdoor living area are expected to exceed 60 dBA during the daytime. Therefore, taller noise screens may be needed in the backyard area to reduce the noise level to 55 dBA. The berm ends before reaching the backyard of unit 4 in block 8, which are represented by receptor, resulting in an expected daytime noise level of 62 dBA. A barrier investigation determined that a solid noise wall with a height of 1.85 m surrounding the unit 4, block 8 backyard and integrated with the berm is required to reduce the sound level to 58 dBA. Figure 3 outlines the exact location of the noise barrier. A Type B warning clause will be required on all Lease, Purchase, and Sale Agreements, as noted below:

TYPE B

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

As the development is adjacent to a future LRT line and station, the Rail Construction Program Office recommends that the warning clause identified below be included in all Lease, Purchase and Sale Agreements.

"The Owner hereby acknowledges and agrees:

- i) The proximity of the proposed development of the lands described in Schedule "A" hereto (the "Lands") to the City's existing and future transit operations, may result in noise, vibration, electromagnetic interferences, stray current transmissions, smoke and particulate matter (collectively referred to as "Interferences") to the development;*
- ii) It has been advised by the City to apply reasonable attenuation measures with respect to the level of the Interferences on and within the Lands and the proposed development; and*
- iii) The Owner acknowledges and agrees all agreements of purchase and sale and lease agreements, and all information on all plans and documents used for marketing purposes, for the whole or any part of the subject lands, shall contain the following clauses which shall also be incorporated in all transfer/deeds and leases from the Owner so that the clauses shall be covenants running with the lands for the benefit of the owner of the adjacent road:*

'The Transferee/Lessee for himself, his heirs, executors, administrators, successors and assigns acknowledges being advised that a public transit light-rail rapid transit system (LRT) is proposed to be located in proximity to the subject lands, and the construction, operation and maintenance of the LRT may result in environmental impacts including, but not limited to noise, vibration, electromagnetic interferences, stray current transmissions, smoke and particulate matter (collectively referred to as the Interferences) to the subject lands. The Transferee/Lessee acknowledges and agrees that despite the inclusion of noise control features within the subject lands, Interferences may continue to be of concern, occasionally interfering with some activities of the occupants on the subject lands.



The Transferee covenants with the Transferor and the Lessee covenants with the Lessor that the above clauses verbatim shall be included in all subsequent lease agreements, agreements of purchase and sale and deeds conveying the lands described herein, which covenants shall run with the lands and are for the benefit of the owner of the adjacent road.”

This concludes our 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.

Doryan S2.

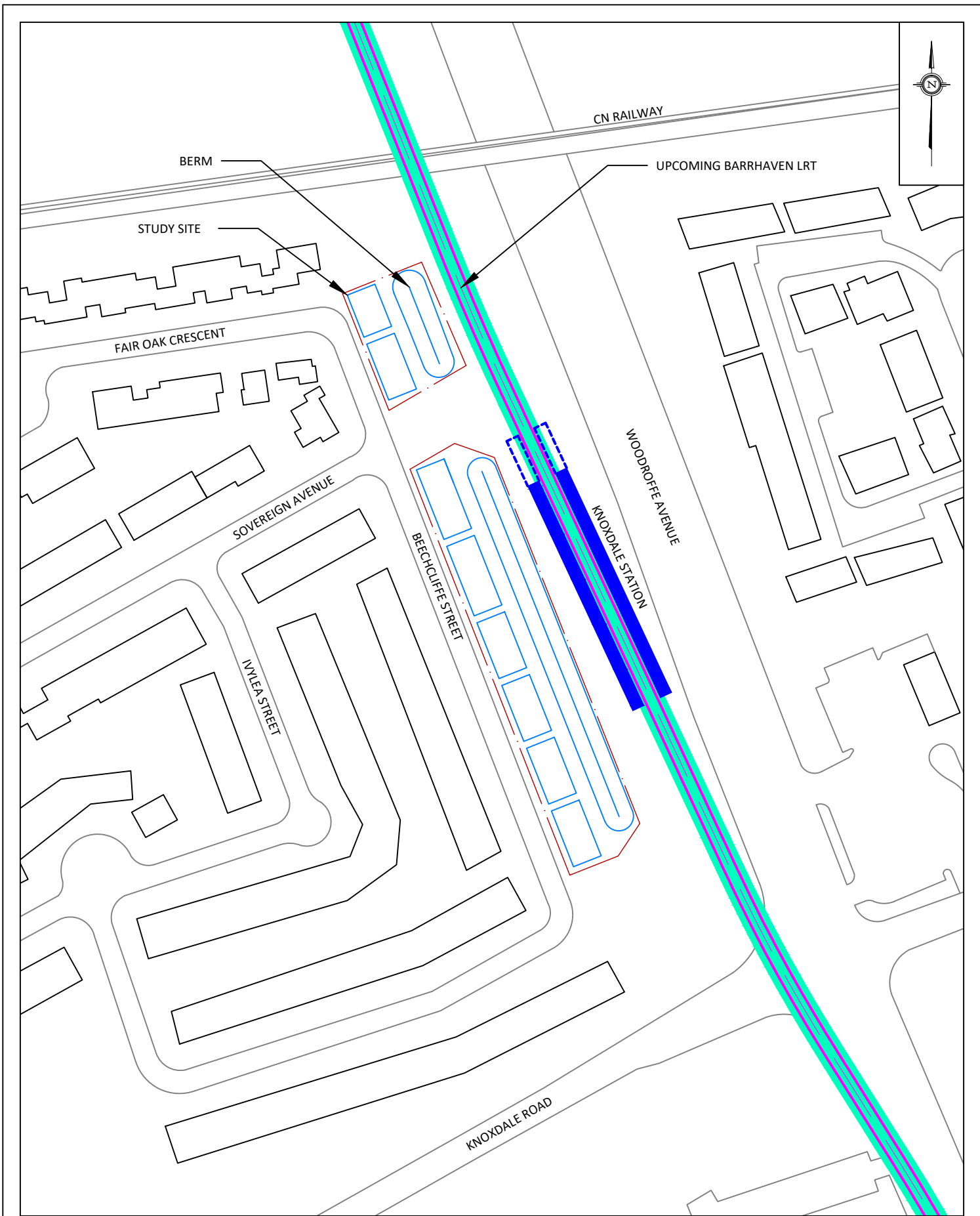
Doryan Saavedra, B.Eng.
Junior Acoustic Scientist



Joshua Foster, P.Eng.
Lead Engineer

Gradient Wind File #25-077 – Transportation Noise







GRADIENTWIND ENGINEERS & SCIENTISTS 127 WALGREEN ROAD, OTTAWA, ON 613 836 0934 • GRADIENTWIND.COM	PROJECT		40 BEECHCLIFFE STREET, OTTAWA ROADWAY TRAFFIC NOISE ASSESSMENT		DESCRIPTION
	SCALE	1:1000	DRAWING NO.	25-077-2	
	DATE	JUNE 4, 2025	DRAWN BY	T.K.	
FIGURE 2: RECEPTOR LOCATIONS					



GRADIENTWIND ENGINEERS & SCIENTISTS 127 WALGREEN ROAD, OTTAWA, ON 613 836 0934 • GRADIENTWIND.COM	PROJECT		40 BEECHCLIFFE STREET, OTTAWA ROADWAY TRAFFIC NOISE ASSESSMENT		DESCRIPTION
	SCALE	1:1000	DRAWING NO.	25-077-3	
	DATE	JUNE 4, 2025	DRAWN BY	T.K.	
	FIGURE 3: ADDITIONAL NOISE BARRIER REQUIREMENTS				

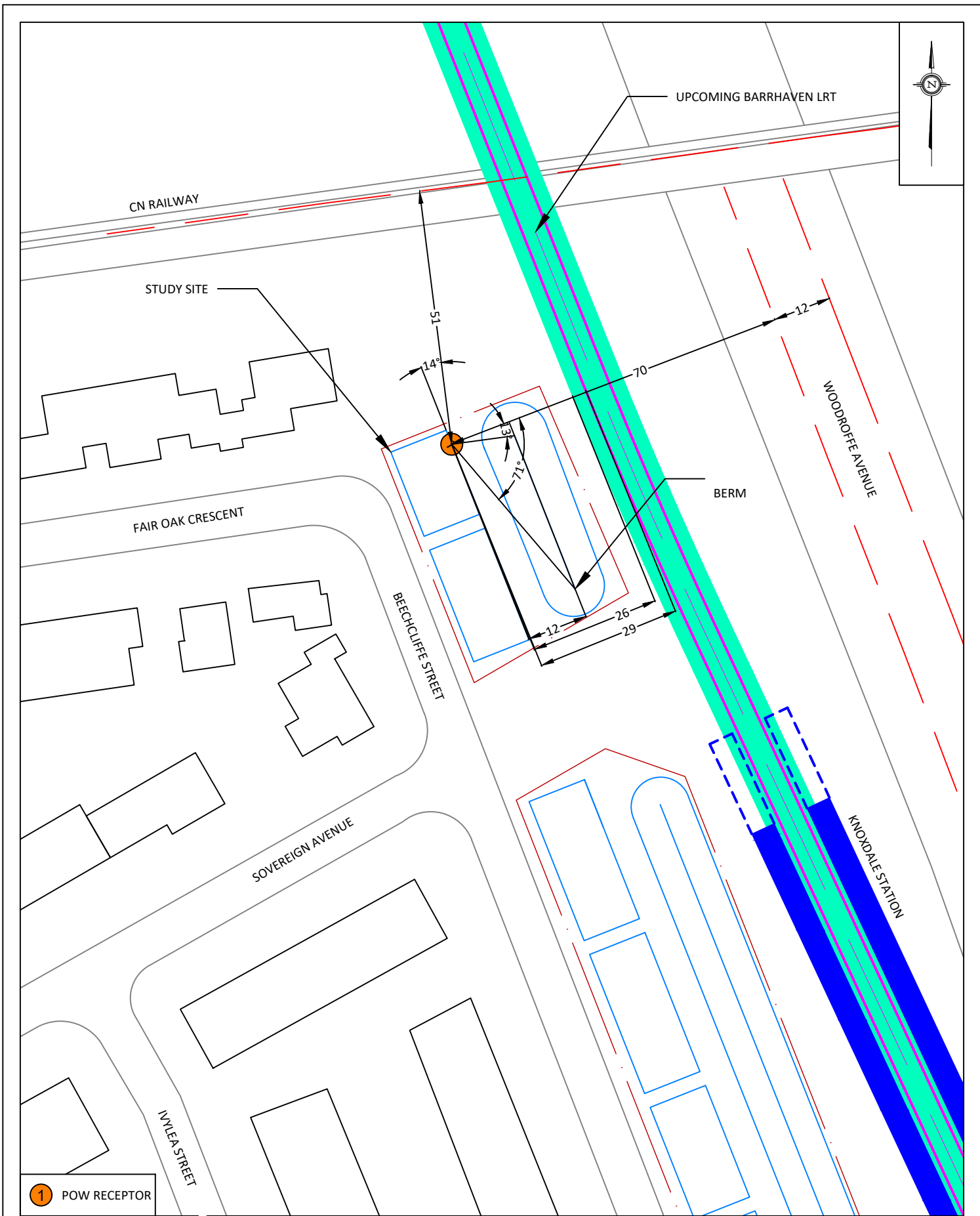
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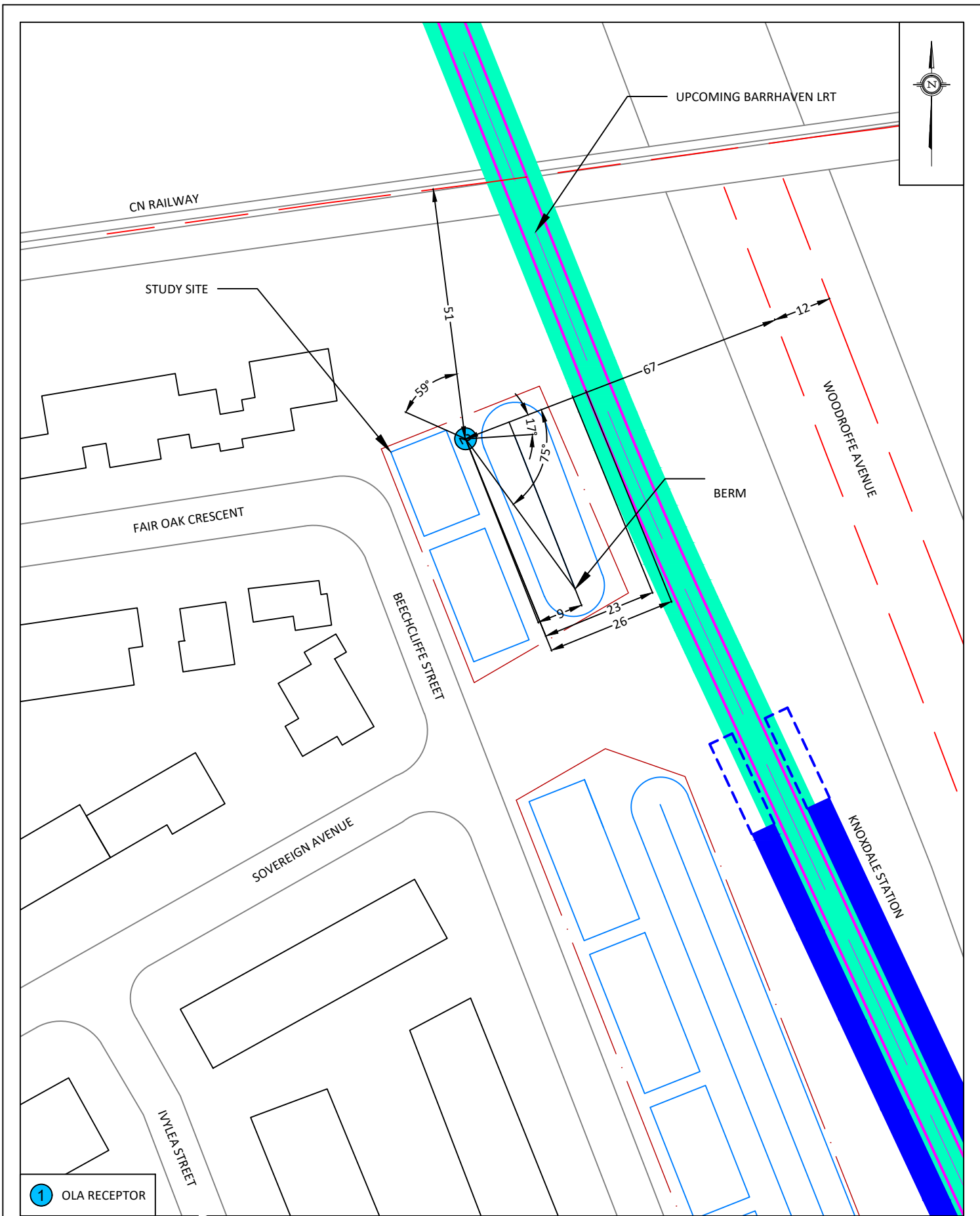


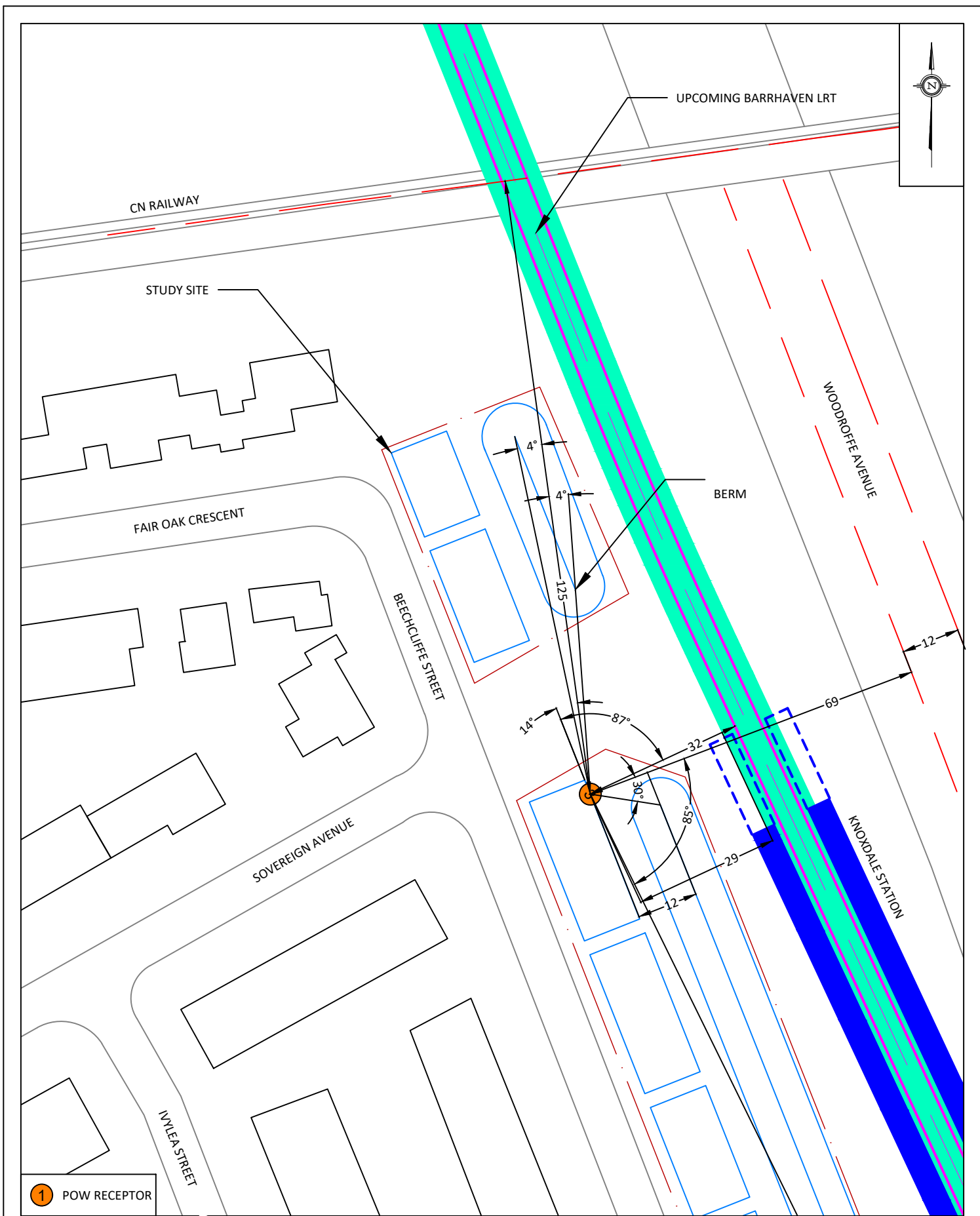
APPENDIX A

STAMSON 5.04 – INPUT AND OUTPUT DATA

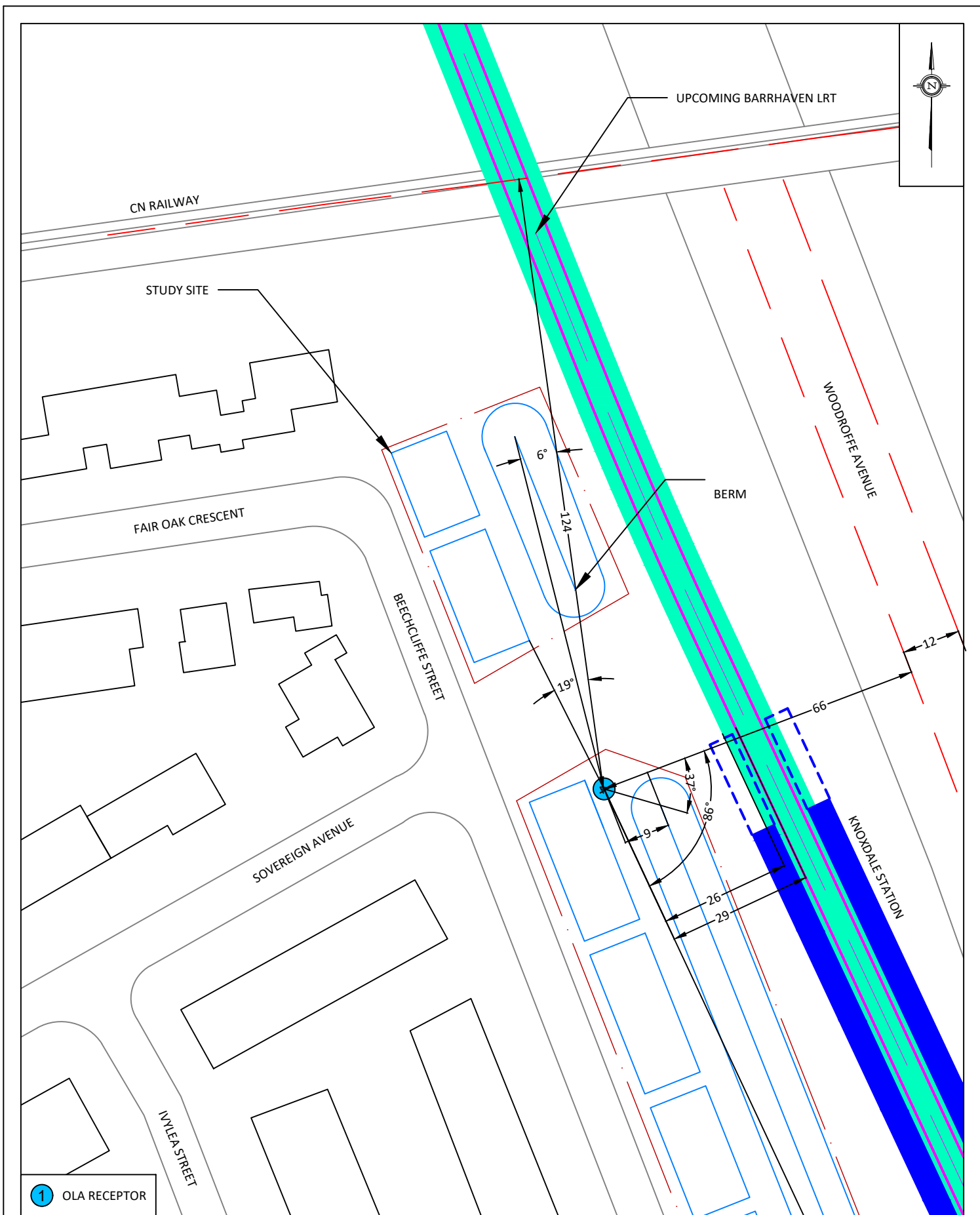


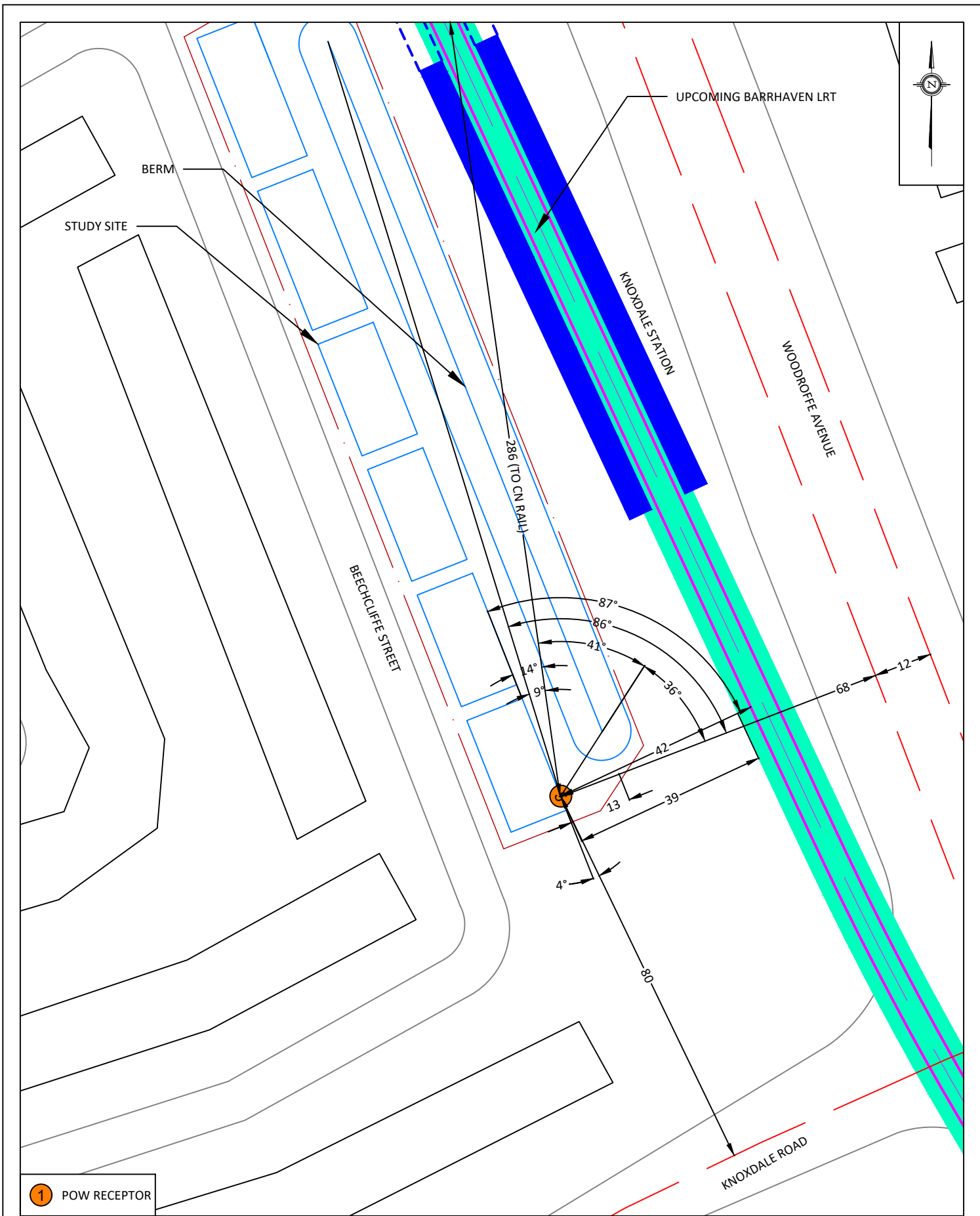
GRADIENTWIND ENGINEERS & SCIENTISTS 127 WALGREEN ROAD, OTTAWA, ON 613 836 0934 • GRADIENTWIND.COM	PROJECT		40 BEECHCLIFFE STREET, OTTAWA ROADWAY TRAFFIC NOISE ASSESSMENT		DESCRIPTION
	SCALE	1:1000	DRAWING NO.	25-077-A1	
	DATE	JUNE 4, 2025	DRAWN BY	T.K.	
	FIGURE A1: STAMSON INPUT PARAMETERS RECEPTOR 1				



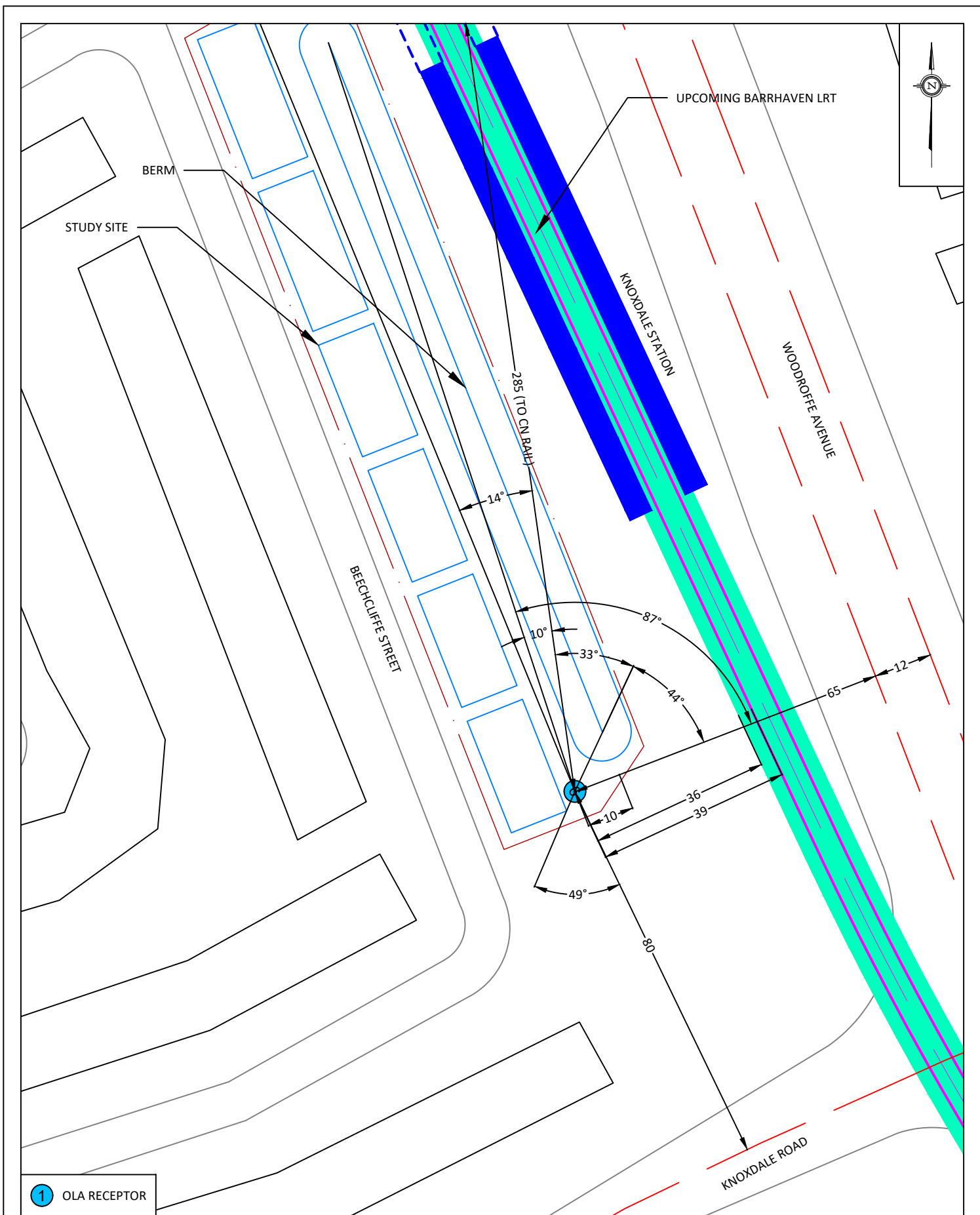


GRADIENTWIND ENGINEERS & SCIENTISTS 127 WALGREEN ROAD, OTTAWA, ON 613 836 0934 • GRADIENTWIND.COM	PROJECT		40 BEECHCLIFFE STREET, OTTAWA ROADWAY TRAFFIC NOISE ASSESSMENT		DESCRIPTION	FIGURE A3: STAMSON INPUT PARAMETERS RECEPTOR 3
	SCALE	1:1000	DRAWING NO.	25-077-A3		
	DATE	JUNE 4, 2025	DRAWN BY	T.K.		





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	SCALE	1:1000	DRAWING NO.	25-077-A5	
	DATE	JUNE 4, 2025	DRAWN BY	T.K.	
	FIGURE A5: STAMSON INPUT PARAMETERS RECEPTOR 5				



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STAMSON 5.0 NORMAL REPORT Date: 09-06-2025 09:38:29
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r1.te Time Period: Day/Night 16/8 hours
Description: POW Receptor 1

Rail data, segment # 1: CN (day/night)

Train	! Trains	! Speed	!# loc	!# Cars	! Eng	!Cont					
Type	!	!(km/h)	!/Train	!/Train	! type	!weld					
1. Freight	!	2.0/0.0	!	16.0	!	1.0	!	6.0	!Diesel	!	No

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

Angle1	Angle2	:	-14.00 deg	90.00 deg
Wood depth	:	0	(No woods.)	
No of house rows	:	0 / 0		
Surface	:	1	(Absorptive ground surface)	
Receiver source distance	:	51.06 / 51.06	m	
Receiver height	:	4.50 / 4.50	m	
Topography	:	2	(Flat/gentle slope; with barrier)	
No Whistle				
Barrier angle1	:	-14.00 deg	Angle2	: 90.00 deg
Barrier height	:	0.00 m		
Barrier receiver distance	:	0.01 / 0.01	m	
Source elevation	:	90.00 m		
Receiver elevation	:	88.99 m		
Barrier elevation	:	88.83 m		
Reference angle	:	0.00		



Results segment # 1: CN (day)

Barrier height for grazing incidence

Source Height (m)	! Receiver ! Height (m)	! Barrier ! Height (m)	! Elevation of ! Barrier Top (m)
4.00 !	4.50 !	4.66 !	93.49
0.50 !	4.50 !	4.66 !	93.49

LOCOMOTIVE (0.00 + 41.20 + 0.00) = 41.20 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-14	90	0.50	52.53	-7.95	-3.38	0.00	0.00	-0.01	41.19*
-14	90	0.50	52.53	-7.95	-3.38	0.00	0.00	0.00	41.20

* Bright Zone !

WHEEL (0.00 + 26.18 + 0.00) = 26.18 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-14	90	0.60	38.23	-8.51	-3.53	0.00	0.00	-0.02	26.17*
-14	90	0.60	38.23	-8.51	-3.53	0.00	0.00	0.00	26.18

* Bright Zone !

Segment Leq : 41.33 dBA

Total Leq All Segments: 41.33 dBA



Results segment # 1: CN (night)

Barrier height for grazing incidence

Source Height (m)	! Receiver ! Height (m)	! Barrier ! Height (m)	! Elevation of ! Barrier Top (m)
4.00 !	4.50 !	4.66 !	93.49
0.50 !	4.50 !	4.66 !	93.49

LOCOMOTIVE (0.00 + -11.33 + 0.00) = 0.00 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-14	90	0.50	0.00	-7.95	-3.38	0.00	0.00	-0.01	-11.34*
-14	90	0.50	0.00	-7.95	-3.38	0.00	0.00	0.00	-11.33

* Bright Zone !

WHEEL (0.00 + -12.05 + 0.00) = 0.00 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-14	90	0.60	0.00	-8.51	-3.53	0.00	0.00	-0.02	-12.06*
-14	90	0.60	0.00	-8.51	-3.53	0.00	0.00	0.00	-12.05

* Bright Zone !

Segment Leq : 0.00 dBA

Total Leq All Segments: 0.00 dBA



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

```
-----
Car traffic volume   : 14168/1232   veh/TimePeriod  *
Medium truck volume  : 1127/98      veh/TimePeriod  *
Heavy truck volume   : 805/70       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): 17500
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: Woodroffe S (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 : 69.84 / 69.84 m
Receiver height       : 4.50 / 4.50 m
Topography            : 2          (Flat/gentle slope; with barrier)
Barrier angle1        : 13.00 deg  Angle2 : 71.00 deg
Barrier height         : 1.92 m
Barrier receiver distance : 12.40 / 12.40 m
Source elevation       : 88.49 m
Receiver elevation     : 88.99 m
Barrier elevation      : 88.99 m
Reference angle        : 0.00
```



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

Car traffic volume : 14168/1232 veh/TimePeriod *
Medium truck volume : 1127/98 veh/TimePeriod *
Heavy truck volume : 805/70 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): 17500
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: Woodroffe N (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 : 81.64 / 81.64 m
Receiver height : 4.50 / 4.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : 13.00 deg Angle2 : 71.00 deg
Barrier height : 1.92 m
Barrier receiver distance : 12.40 / 12.40 m
Source elevation : 88.49 m
Receiver elevation : 88.99 m
Barrier elevation : 88.99 m
Reference angle : 0.00



Results segment # 1: Woodroffe S (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	3.88	92.87

ROAD (56.63 + 54.37 + 45.70) = 58.87 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	13	0.57	70.67	0.00	-10.49	-3.54	0.00	0.00	0.00	56.63
13	71	0.45	70.67	0.00	-9.72	-5.63	0.00	0.00	-0.01	55.30*
13	71	0.57	70.67	0.00	-10.49	-5.80	0.00	0.00	0.00	54.37
71	90	0.57	70.67	0.00	-10.49	-14.48	0.00	0.00	0.00	45.70

* Bright Zone !

Segment Leq : 58.87 dBA

Results segment # 2: Woodroffe N (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	3.97	92.96

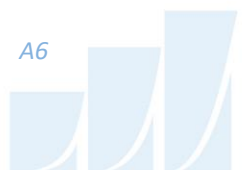
ROAD (55.57 + 53.31 + 44.64) = 57.81 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	13	0.57	70.67	0.00	-11.55	-3.54	0.00	0.00	0.00	55.57
13	71	0.45	70.67	0.00	-10.71	-5.63	0.00	0.00	-0.00	54.33*
13	71	0.57	70.67	0.00	-11.55	-5.80	0.00	0.00	0.00	53.31
71	90	0.57	70.67	0.00	-11.55	-14.48	0.00	0.00	0.00	44.64

* Bright Zone !

Segment Leq : 57.81 dBA

Total Leq All Segments: 61.38 dBA



Results segment # 1: Woodroffe S (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	3.88	92.87

ROAD (49.04 + 46.78 + 38.10) = 51.28 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	13	0.57	63.07	0.00	-10.49	-3.54	0.00	0.00	0.00	49.04
13	71	0.45	63.07	0.00	-9.72	-5.63	0.00	0.00	-0.01	47.71*
13	71	0.57	63.07	0.00	-10.49	-5.80	0.00	0.00	0.00	46.78
71	90	0.57	63.07	0.00	-10.49	-14.48	0.00	0.00	0.00	38.10

* Bright Zone !

Segment Leq : 51.28 dBA

Results segment # 2: Woodroffe N (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	3.97	92.96

ROAD (47.97 + 45.71 + 37.04) = 50.21 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	13	0.57	63.07	0.00	-11.55	-3.54	0.00	0.00	0.00	47.97
13	71	0.45	63.07	0.00	-10.71	-5.63	0.00	0.00	-0.00	46.73*
13	71	0.57	63.07	0.00	-11.55	-5.80	0.00	0.00	0.00	45.71
71	90	0.57	63.07	0.00	-11.55	-14.48	0.00	0.00	0.00	37.04

* Bright Zone !

Segment Leq : 50.21 dBA

Total Leq All Segments: 53.79 dBA



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

1 - 6-car Subway:

Traffic volume : 540/60 veh/TimePeriod
Speed : 40 km/h

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

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 29.13 / 29.13 m
Receiver height : 4.50 / 4.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -90.00 deg Angle2 : 90.00 deg
Barrier height : 2.00 m
Barrier receiver distance : 26.21 / 26.21 m
Source elevation : 99.45 m
Receiver elevation : 88.99 m
Barrier elevation : 99.45 m
Reference angle : 0.00



Results segment # 1: LRT (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	4.50	-0.15	99.30

RT/Custom (0.00 + 43.97 + 0.00) = 43.97 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.48	62.38	-4.27	-1.14	0.00	0.00	-13.00	43.97

Segment Leq : 43.97 dBA

Total Leq All Segments: 43.97 dBA

Results segment # 1: LRT (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	4.50	-0.15	99.30

RT/Custom (0.00 + 37.44 + 0.00) = 37.44 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.48	55.85	-4.27	-1.14	0.00	0.00	-13.00	37.44

Segment Leq : 37.44 dBA

Total Leq All Segments: 37.44 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 61.50
(NIGHT): 53.89



GRADIENTWIND

ENGINEERS & SCIENTISTS

STAMSON 5.0 NORMAL REPORT Date: 09-06-2025 11:50:44
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r2.te Time Period: Day/Night 16/8 hours
Description: OLA Receptor 2

Rail data, segment # 1: CN (day/night)

Train	! Trains	! Speed	!# loc	!# Cars	! Eng	!Cont					
Type	!	!(km/h)	!/Train	!/Train	! type	!weld					
1. Freight	!	2.0/0.0	!	16.0	!	1.0	!	6.0	!Diesel	!	No

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

Angle1	Angle2	:	-59.00 deg	90.00 deg
Wood depth	:	0	(No woods.)	
No of house rows	:	0 / 0		
Surface	:	1	(Absorptive ground surface)	
Receiver source distance	:	50.72 / 50.72	m	
Receiver height	:	1.50 / 1.50	m	
Topography	:	2	(Flat/gentle slope; with barrier)	
No Whistle				
Barrier angle1	:	-59.00 deg	Angle2	: 90.00 deg
Barrier height	:	0.00 m		
Barrier receiver distance	:	0.01 / 0.01	m	
Source elevation	:	90.00 m		
Receiver elevation	:	88.83 m		
Barrier elevation	:	88.83 m		
Reference angle	:	0.00		



Results segment # 1: CN (day)

Barrier height for grazing incidence

Source Height (m)	! Receiver ! Height (m)	! Barrier ! Height (m)	! Elevation of ! Barrier Top (m)
4.00 !	1.50 !	1.50 !	90.33
0.50 !	1.50 !	1.50 !	90.33

LOCOMOTIVE (0.00 + 42.35 + 0.00) = 42.35 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-59	90	0.58	52.53	-8.39	-1.80	0.00	0.00	-0.03	42.32*
-59	90	0.58	52.53	-8.39	-1.80	0.00	0.00	0.00	42.35

* Bright Zone !

WHEEL (0.00 + 27.55 + 0.00) = 27.55 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-59	90	0.66	38.23	-8.78	-1.89	0.00	0.00	-0.03	27.52*
-59	90	0.66	38.23	-8.78	-1.89	0.00	0.00	0.00	27.55

* Bright Zone !

Segment Leq : 42.49 dBA

Total Leq All Segments: 42.49 dBA



Results segment # 1: CN (night)

Barrier height for grazing incidence

Source Height (m)	! Receiver Height (m)	! Barrier Height (m)	! Elevation of Barrier Top (m)
4.00 !	1.50 !	1.50 !	90.33
0.50 !	1.50 !	1.50 !	90.33

LOCOMOTIVE (0.00 + -10.18 + 0.00) = 0.00 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-59	90	0.58	0.00	-8.39	-1.80	0.00	0.00	-0.03	-10.21*
-59	90	0.58	0.00	-8.39	-1.80	0.00	0.00	0.00	-10.18

* Bright Zone !

WHEEL (0.00 + -10.67 + 0.00) = 0.00 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-59	90	0.66	0.00	-8.78	-1.89	0.00	0.00	-0.03	-10.71*
-59	90	0.66	0.00	-8.78	-1.89	0.00	0.00	0.00	-10.67

* Bright Zone !

Segment Leq : 0.00 dBA

Total Leq All Segments: 0.00 dBA



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

Car traffic volume : 14168/1232 veh/TimePeriod *
Medium truck volume : 1127/98 veh/TimePeriod *
Heavy truck volume : 805/70 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): 17500
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: Woodroffe S (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 : 66.85 / 66.85 m
Receiver height : 1.50 / 1.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : 17.00 deg Angle2 : 75.00 deg
Barrier height : 1.92 m
Barrier receiver distance : 9.40 / 9.40 m
Source elevation : 88.49 m
Receiver elevation : 88.83 m
Barrier elevation : 88.99 m
Reference angle : 0.00



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

Car traffic volume : 14168/1232 veh/TimePeriod *
Medium truck volume : 1127/98 veh/TimePeriod *
Heavy truck volume : 805/70 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): 17500
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: Woodroffe N (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 : 78.65 / 78.65 m
Receiver height : 1.50 / 1.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : 17.00 deg Angle2 : 75.00 deg
Barrier height : 1.92 m
Barrier receiver distance : 9.40 / 9.40 m
Source elevation : 88.49 m
Receiver elevation : 88.83 m
Barrier elevation : 88.99 m
Reference angle : 0.00



Results segment # 1: Woodroffe S (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	!
		1.29	!
			90.28

ROAD (56.43 + 48.90 + 43.04) = 57.31 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	17	0.66	70.67	0.00	-10.77	-3.46	0.00	0.00	0.00	56.43
17	75	0.54	70.67	0.00	-10.03	-5.94	0.00	0.00	-5.80	48.90
75	90	0.66	70.67	0.00	-10.77	-16.85	0.00	0.00	0.00	43.04

Segment Leq : 57.31 dBA

Results segment # 2: Woodroffe N (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	!
		1.30	!
			90.29

ROAD (55.26 + 47.85 + 41.87) = 56.15 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	17	0.66	70.67	0.00	-11.95	-3.46	0.00	0.00	0.00	55.26
17	75	0.54	70.67	0.00	-11.12	-5.94	0.00	0.00	-5.76	47.85
75	90	0.66	70.67	0.00	-11.95	-16.85	0.00	0.00	0.00	41.87

Segment Leq : 56.15 dBA

Total Leq All Segments: 59.78 dBA



Results segment # 1: Woodroffe S (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	1.29	90.28

ROAD (48.84 + 41.31 + 35.45) = 49.71 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	17	0.66	63.07	0.00	-10.77	-3.46	0.00	0.00	0.00	48.84
17	75	0.54	63.07	0.00	-10.03	-5.94	0.00	0.00	-5.80	41.31
75	90	0.66	63.07	0.00	-10.77	-16.85	0.00	0.00	0.00	35.45

Segment Leq : 49.71 dBA

Results segment # 2: Woodroffe N (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	1.30	90.29

ROAD (47.67 + 40.25 + 34.27) = 48.55 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	17	0.66	63.07	0.00	-11.95	-3.46	0.00	0.00	0.00	47.67
17	75	0.54	63.07	0.00	-11.12	-5.94	0.00	0.00	-5.76	40.25
75	90	0.66	63.07	0.00	-11.95	-16.85	0.00	0.00	0.00	34.27

Segment Leq : 48.55 dBA

Total Leq All Segments: 52.18 dBA



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

1 - 6-car Subway:

Traffic volume : 540/60 veh/TimePeriod
Speed : 40 km/h

Data for Segment # 1: LRT (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 : 26.13 / 26.13 m
Receiver height : 1.50 / 1.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -90.00 deg Angle2 : 90.00 deg
Barrier height : 2.00 m
Barrier receiver distance : 23.21 / 23.21 m
Source elevation : 99.45 m
Receiver elevation : 88.83 m
Barrier elevation : 99.45 m
Reference angle : 0.00



Results segment # 1: LRT (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	-0.58	98.87

RT/Custom (0.00 + 43.16 + 0.00) = 43.16 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.57	62.38	-3.78	-1.30	0.00	0.00	-14.13	43.16

Segment Leq : 43.16 dBA

Total Leq All Segments: 43.16 dBA

Results segment # 1: LRT (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	-0.58	98.87

RT/Custom (0.00 + 36.62 + 0.00) = 36.62 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.57	55.85	-3.78	-1.30	0.00	0.00	-14.13	36.62

Segment Leq : 36.62 dBA

Total Leq All Segments: 36.62 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 59.95
(NIGHT): 52.30



GRADIENTWIND

ENGINEERS & SCIENTISTS

STAMSON 5.0 NORMAL REPORT Date: 09-06-2025 08:50:23
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r3.te Time Period: Day/Night 16/8 hours
Description: POW Receptor 3

Rail data, segment # 1: CN (day/night)

Train	! Trains	! Speed	!# loc	!# Cars	! Eng	!Cont					
Type	!	!(km/h)	!/Train	!/Train	! type	!weld					
1. Freight	!	2.0/0.0	!	16.0	!	1.0	!	6.0	!Diesel	!	No

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

Angle1	Angle2	:	-14.00 deg	90.00 deg
Wood depth	:	0	(No woods.)	
No of house rows	:	0 / 0		
Surface	:	1	(Absorptive ground surface)	
Receiver source distance	:	124.91 / 124.91 m		
Receiver height	:	4.50 / 4.50 m		
Topography	:	2	(Flat/gentle slope; with barrier)	
No Whistle				
Barrier angle1	:	-4.00 deg	Angle2 :	4.00 deg
Barrier height	:	1.89 m		
Barrier receiver distance	:	12.35 / 12.35 m		
Source elevation	:	90.00 m		
Receiver elevation	:	88.75 m		
Barrier elevation	:	88.59 m		
Reference angle	:	0.00		



Results segment # 1: CN (day)

Barrier height for grazing incidence

Source Height (m)	! Receiver ! Height (m)	! Barrier ! Height (m)	! Elevation of ! Barrier Top (m)
4.00 !	4.50 !	4.73 !	93.32
0.50 !	4.50 !	4.39 !	92.98

LOCOMOTIVE (26.19 + 25.24 + 34.33) = 35.39 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-14	-4	0.50	52.53	-13.76	-12.58	0.00	0.00	0.00	26.19
-4	4	0.38	52.53	-12.72	-13.52	0.00	0.00	0.00	26.29*
-4	4	0.50	52.53	-13.76	-13.52	0.00	0.00	0.00	25.24
4	90	0.50	52.53	-13.76	-4.44	0.00	0.00	0.00	34.33

* Bright Zone !

WHEEL (10.91 + 9.97 + 18.86) = 19.97 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-14	-4	0.60	38.23	-14.73	-12.59	0.00	0.00	0.00	10.91
-4	4	0.49	38.23	-13.68	-13.52	0.00	0.00	0.00	11.02*
-4	4	0.60	38.23	-14.73	-13.52	0.00	0.00	0.00	9.97
4	90	0.60	38.23	-14.73	-4.64	0.00	0.00	0.00	18.86

* Bright Zone !

Segment Leq : 35.51 dBA

Total Leq All Segments: 35.51 dBA



Results segment # 1: CN (night)

Barrier height for grazing incidence

Source Height (m)	! Receiver ! Height (m)	! Barrier ! Height (m)	! Elevation of ! Barrier Top (m)
4.00 !	4.50 !	4.73 !	93.32
0.50 !	4.50 !	4.39 !	92.98

LOCOMOTIVE (-26.34 + -27.29 + -18.20) = 0.00 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-14	-4	0.50	0.00	-13.76	-12.58	0.00	0.00	0.00	-26.34
-4	4	0.38	0.00	-12.72	-13.52	0.00	0.00	0.00	-26.24*
-4	4	0.50	0.00	-13.76	-13.52	0.00	0.00	0.00	-27.29
4	90	0.50	0.00	-13.76	-4.44	0.00	0.00	0.00	-18.20

* Bright Zone !

WHEEL (-27.32 + -28.25 + -19.37) = 0.00 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-14	-4	0.60	0.00	-14.73	-12.59	0.00	0.00	0.00	-27.32
-4	4	0.49	0.00	-13.68	-13.52	0.00	0.00	0.00	-27.21*
-4	4	0.60	0.00	-14.73	-13.52	0.00	0.00	0.00	-28.25
4	90	0.60	0.00	-14.73	-4.64	0.00	0.00	0.00	-19.37

* Bright Zone !

Segment Leq : 0.00 dBA

Total Leq All Segments: 0.00 dBA



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

Car traffic volume : 14168/1232 veh/TimePeriod *
Medium truck volume : 1127/98 veh/TimePeriod *
Heavy truck volume : 805/70 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): 17500
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: Woodroffe S (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 : 69.34 / 69.34 m
Receiver height : 4.50 / 4.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : 30.00 deg Angle2 : 90.00 deg
Barrier height : 1.89 m
Barrier receiver distance : 12.35 / 12.35 m
Source elevation : 88.49 m
Receiver elevation : 88.75 m
Barrier elevation : 88.59 m
Reference angle : 0.00



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

Car traffic volume : 14168/1232 veh/TimePeriod *
Medium truck volume : 1127/98 veh/TimePeriod *
Heavy truck volume : 805/70 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): 17500
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: Woodroffe N (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 : 81.15 / 81.15 m
Receiver height : 4.50 / 4.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : 30.00 deg Angle2 : 90.00 deg
Barrier height : 1.89 m
Barrier receiver distance : 12.35 / 12.35 m
Source elevation : 88.49 m
Receiver elevation : 88.75 m
Barrier elevation : 88.59 m
Reference angle : 0.00



Results segment # 1: Woodroffe S (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 !	4.08 !	92.67

ROAD (57.49 + 53.41 + 0.00) = 58.92 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	30	0.57	70.67	0.00	-10.44	-2.74	0.00	0.00	0.00	57.49
30	90	0.46	70.67	0.00	-9.69	-6.47	0.00	0.00	-0.56	53.95*
30	90	0.57	70.67	0.00	-10.44	-6.82	0.00	0.00	0.00	53.41

* Bright Zone !

Segment Leq : 58.92 dBA

Results segment # 2: Woodroffe N (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 !	4.16 !	92.75

ROAD (56.42 + 52.34 + 0.00) = 57.85 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	30	0.57	70.67	0.00	-11.51	-2.74	0.00	0.00	0.00	56.42
30	90	0.46	70.67	0.00	-10.68	-6.47	0.00	0.00	-0.54	52.98*
30	90	0.57	70.67	0.00	-11.51	-6.82	0.00	0.00	0.00	52.34

* Bright Zone !

Segment Leq : 57.85 dBA

Total Leq All Segments: 61.43 dBA



Results segment # 1: Woodroffe S (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	4.08	92.67

ROAD (49.89 + 45.81 + 0.00) = 51.33 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	30	0.57	63.07	0.00	-10.44	-2.74	0.00	0.00	0.00	49.89
30	90	0.46	63.07	0.00	-9.69	-6.47	0.00	0.00	-0.56	46.35*
30	90	0.57	63.07	0.00	-10.44	-6.82	0.00	0.00	0.00	45.81

* Bright Zone !

Segment Leq : 51.33 dBA

Results segment # 2: Woodroffe N (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	4.16	92.75

ROAD (48.82 + 44.74 + 0.00) = 50.25 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	30	0.57	63.07	0.00	-11.51	-2.74	0.00	0.00	0.00	48.82
30	90	0.46	63.07	0.00	-10.68	-6.47	0.00	0.00	-0.54	45.38*
30	90	0.57	63.07	0.00	-11.51	-6.82	0.00	0.00	0.00	44.74

* Bright Zone !

Segment Leq : 50.25 dBA

Total Leq All Segments: 53.83 dBA



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

1 - 6-car Subway:

Traffic volume : 540/60 veh/TimePeriod
Speed : 40 km/h

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

Angle1 Angle2 : -87.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 32.27 / 32.27 m
Receiver height : 4.50 / 4.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -87.00 deg Angle2 : 90.00 deg
Barrier height : 2.00 m
Barrier receiver distance : 29.37 / 29.37 m
Source elevation : 99.00 m
Receiver elevation : 88.75 m
Barrier elevation : 99.00 m
Reference angle : 0.00



Results segment # 1: LRT (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	4.50	-0.06	98.94

RT/Custom (0.00 + 43.29 + 0.00) = 43.29 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-87	90	0.48	62.38	-4.92	-1.15	0.00	0.00	-13.01	43.29

Segment Leq : 43.29 dBA

Total Leq All Segments: 43.29 dBA

Results segment # 1: LRT (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	4.50	-0.06	98.94

RT/Custom (0.00 + 36.75 + 0.00) = 36.75 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-87	90	0.48	55.85	-4.92	-1.15	0.00	0.00	-13.01	36.75

Segment Leq : 36.75 dBA

Total Leq All Segments: 36.75 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 61.51
(NIGHT): 53.92



GRADIENTWIND

ENGINEERS & SCIENTISTS

STAMSON 5.0 NORMAL REPORT Date: 09-06-2025 09:30:36
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r4.te Time Period: Day/Night 16/8 hours
Description: OLA Receptor 4

Rail data, segment # 1: CN (day/night)

Train Type	! Trains !	! Speed !(km/h)	!# loc !/Train!	!# Cars !/Train!	! Eng ! type	!Cont !weld				
1. Freight	!	2.0/0.0	!	16.0	!	1.0	!	6.0	!Diesel!	No

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

Angle1	Angle2	:	-19.00 deg	90.00 deg
Wood depth	:	0	(No woods.)	
No of house rows	:	0 / 0		
Surface	:	1	(Absorptive ground surface)	
Receiver source distance	:	124.21 / 124.21 m		
Receiver height	:	1.50 / 1.50 m		
Topography	:	2	(Flat/gentle slope; with barrier)	
No Whistle				
Barrier angle1	:	-6.00 deg	Angle2 :	0.00 deg
Barrier height	:	1.89 m		
Barrier receiver distance	:	9.35 / 9.35 m		
Source elevation	:	90.00 m		
Receiver elevation	:	88.32 m		
Barrier elevation	:	88.59 m		
Reference angle	:	0.00		



Results segment # 1: CN (day)

Barrier height for grazing incidence

Source Height (m)	! Receiver ! Height (m)	! Barrier ! Height (m)	! Elevation of ! Barrier Top (m)
4.00 !	1.50 !	1.54 !	90.13
0.50 !	1.50 !	1.28 !	89.87

LOCOMOTIVE (26.50 + 18.89 + 33.64) = 34.53 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-19	-6	0.58	52.53	-14.55	-11.48	0.00	0.00	0.00	26.50
-6	0	0.47	52.53	-13.51	-14.77	0.00	0.00	-5.35	18.89
0	90	0.58	52.53	-14.55	-4.34	0.00	0.00	0.00	33.64

WHEEL (11.50 + 2.94 + 18.52) = 19.41 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-19	-6	0.66	38.23	-15.24	-11.49	0.00	0.00	0.00	11.50
-6	0	0.58	38.23	-14.47	-14.78	0.00	0.00	-6.04	2.94
0	90	0.66	38.23	-15.24	-4.47	0.00	0.00	0.00	18.52

Segment Leq : 34.66 dBA

Total Leq All Segments: 34.66 dBA



Results segment # 1: CN (night)

Barrier height for grazing incidence

Source Height (m)	! Receiver Height (m)	! Barrier Height (m)	! Elevation of Barrier Top (m)
4.00 !	1.50 !	1.54 !	90.13
0.50 !	1.50 !	1.28 !	89.87

LOCOMOTIVE (-26.03 + -33.64 + -18.89) = 0.00 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-19	-6	0.58	0.00	-14.55	-11.48	0.00	0.00	0.00	-26.03
-6	0	0.47	0.00	-13.51	-14.77	0.00	0.00	-5.35	-33.64
0	90	0.58	0.00	-14.55	-4.34	0.00	0.00	0.00	-18.89

WHEEL (-26.73 + -35.29 + -19.71) = 0.00 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-19	-6	0.66	0.00	-15.24	-11.49	0.00	0.00	0.00	-26.73
-6	0	0.58	0.00	-14.47	-14.78	0.00	0.00	-6.04	-35.29
0	90	0.66	0.00	-15.24	-4.47	0.00	0.00	0.00	-19.71

Segment Leq : 0.00 dBA

Total Leq All Segments: 0.00 dBA



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

Car traffic volume : 14168/1232 veh/TimePeriod *
Medium truck volume : 1127/98 veh/TimePeriod *
Heavy truck volume : 805/70 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): 17500
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: Woodroffe S (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 : 66.35 / 66.35 m
Receiver height : 1.50 / 1.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : 37.00 deg Angle2 : 86.00 deg
Barrier height : 1.89 m
Barrier receiver distance : 9.35 / 9.35 m
Source elevation : 88.49 m
Receiver elevation : 88.32 m
Barrier elevation : 88.59 m
Reference angle : 0.00



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

Car traffic volume : 14168/1232 veh/TimePeriod *
Medium truck volume : 1127/98 veh/TimePeriod *
Heavy truck volume : 805/70 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): 17500
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: Woodroffe N (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 : 78.15 / 78.15 m
Receiver height : 1.50 / 1.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : 37.00 deg Angle2 : 86.00 deg
Barrier height : 1.89 m
Barrier receiver distance : 9.35 / 9.35 m
Source elevation : 88.49 m
Receiver elevation : 88.32 m
Barrier elevation : 88.59 m
Reference angle : 0.00



Results segment # 1: Woodroffe S (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	!
		1.25	!
			89.84

ROAD (57.38 + 47.48 + 33.58) = 57.82 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	37	0.66	70.67	0.00	-10.72	-2.57	0.00	0.00	0.00	57.38
37	86	0.55	70.67	0.00	-9.99	-7.62	0.00	0.00	-5.58	47.48
86	90	0.66	70.67	0.00	-10.72	-26.36	0.00	0.00	0.00	33.58

Segment Leq : 57.82 dBA

Results segment # 2: Woodroffe N (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	!
		1.25	!
			89.84

ROAD (56.20 + 46.39 + 32.40) = 56.65 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	37	0.66	70.67	0.00	-11.90	-2.57	0.00	0.00	0.00	56.20
37	86	0.55	70.67	0.00	-11.09	-7.62	0.00	0.00	-5.57	46.39
86	90	0.66	70.67	0.00	-11.90	-26.36	0.00	0.00	0.00	32.40

Segment Leq : 56.65 dBA

Total Leq All Segments: 60.28 dBA



Results segment # 1: Woodroffe S (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	!
		1.25	!
			89.84

ROAD (49.78 + 39.88 + 25.99) = 50.22 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	37	0.66	63.07	0.00	-10.72	-2.57	0.00	0.00	0.00	49.78
37	86	0.55	63.07	0.00	-9.99	-7.62	0.00	0.00	-5.58	39.88
86	90	0.66	63.07	0.00	-10.72	-26.36	0.00	0.00	0.00	25.99

Segment Leq : 50.22 dBA

Results segment # 2: Woodroffe N (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	!
		1.25	!
			89.84

ROAD (48.60 + 38.79 + 24.81) = 49.05 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	37	0.66	63.07	0.00	-11.90	-2.57	0.00	0.00	0.00	48.60
37	86	0.55	63.07	0.00	-11.09	-7.62	0.00	0.00	-5.57	38.79
86	90	0.66	63.07	0.00	-11.90	-26.36	0.00	0.00	0.00	24.81

Segment Leq : 49.05 dBA

Total Leq All Segments: 52.68 dBA



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

1 - 6-car Subway:

Traffic volume : 540/60 veh/TimePeriod
Speed : 40 km/h

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

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 29.28 / 29.28 m
Receiver height : 1.50 / 1.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -90.00 deg Angle2 : 90.00 deg
Barrier height : 2.00 m
Barrier receiver distance : 26.37 / 26.37 m
Source elevation : 99.00 m
Receiver elevation : 88.32 m
Barrier elevation : 99.00 m
Reference angle : 0.00



Results segment # 1: LRT (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	-0.46	98.54

RT/Custom (0.00 + 42.67 + 0.00) = 42.67 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.57	62.38	-4.56	-1.30	0.00	0.00	-13.84	42.67

Segment Leq : 42.67 dBA

Total Leq All Segments: 42.67 dBA

Results segment # 1: LRT (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	-0.46	98.54

RT/Custom (0.00 + 36.14 + 0.00) = 36.14 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.57	55.85	-4.56	-1.30	0.00	0.00	-13.84	36.14

Segment Leq : 36.14 dBA

Total Leq All Segments: 36.14 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 60.37
(NIGHT): 52.78



GRADIENTWIND

ENGINEERS & SCIENTISTS

STAMSON 5.0 NORMAL REPORT Date: 09-06-2025 09:13:00
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r5.te Time Period: Day/Night 16/8 hours
Description: POW Receptor 5

Rail data, segment # 1: CN (day/night)

Train	! Trains	! Speed	!# loc	!# Cars	! Eng	!Cont					
Type	!	!(km/h)	!/Train	!/Train	! type	!weld					
1. Freight	!	2.0/0.0	!	16.0	!	1.0	!	6.0	!Diesel	!	No

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

Angle1	Angle2	:	-14.00 deg	90.00 deg
Wood depth	:	0	(No woods.)	
No of house rows	:	0 / 0		
Surface	:	1	(Absorptive ground surface)	
Receiver source distance	:	286.12 / 286.12 m		
Receiver height	:	4.50 / 4.50 m		
Topography	:	2	(Flat/gentle slope; with barrier)	
No Whistle				
Barrier angle1	:	-9.00 deg	Angle2 :	41.00 deg
Barrier height	:	1.85 m		
Barrier receiver distance	:	12.56 / 12.56 m		
Source elevation	:	90.00 m		
Receiver elevation	:	88.91 m		
Barrier elevation	:	88.64 m		
Reference angle	:	0.00		



Results segment # 1: CN (day)

Barrier height for grazing incidence

Source Height (m)	! Receiver ! Height (m)	! Barrier ! Height (m)	! Elevation of ! Barrier Top (m)
4.00 !	4.50 !	4.80 !	93.44
0.50 !	4.50 !	4.64 !	93.28

LOCOMOTIVE (17.78 + 27.67 + 25.54) = 30.01 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-14	-9	0.50	52.53	-19.14	-15.61	0.00	0.00	0.00	17.78
-9	41	0.38	52.53	-17.72	-5.69	0.00	0.00	0.00	29.12*
-9	41	0.50	52.53	-19.14	-5.72	0.00	0.00	0.00	27.67
41	90	0.50	52.53	-19.14	-7.85	0.00	0.00	0.00	25.54

* Bright Zone !

WHEEL (2.12 + 11.99 + 9.50) = 14.21 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-14	-9	0.60	38.23	-20.49	-15.62	0.00	0.00	0.00	2.12
-9	41	0.49	38.23	-19.07	-5.72	0.00	0.00	0.00	13.44*
-9	41	0.60	38.23	-20.49	-5.75	0.00	0.00	0.00	11.99
41	90	0.60	38.23	-20.49	-8.24	0.00	0.00	0.00	9.50

* Bright Zone !

Segment Leq : 30.12 dBA

Total Leq All Segments: 30.12 dBA



Results segment # 1: CN (night)

Barrier height for grazing incidence

Source Height (m)	! Receiver ! Height (m)	! Barrier ! Height (m)	! Elevation of ! Barrier Top (m)
4.00 !	4.50 !	4.80 !	93.44
0.50 !	4.50 !	4.64 !	93.28

LOCOMOTIVE (-34.75 + -24.86 + -26.99) = 0.00 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-14	-9	0.50	0.00	-19.14	-15.61	0.00	0.00	0.00	-34.75
-9	41	0.38	0.00	-17.72	-5.69	0.00	0.00	0.00	-23.41*
-9	41	0.50	0.00	-19.14	-5.72	0.00	0.00	0.00	-24.86
41	90	0.50	0.00	-19.14	-7.85	0.00	0.00	0.00	-26.99

* Bright Zone !

WHEEL (-36.10 + -26.24 + -28.73) = 0.00 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-14	-9	0.60	0.00	-20.49	-15.62	0.00	0.00	0.00	-36.10
-9	41	0.49	0.00	-19.07	-5.72	0.00	0.00	0.00	-24.78*
-9	41	0.60	0.00	-20.49	-5.75	0.00	0.00	0.00	-26.24
41	90	0.60	0.00	-20.49	-8.24	0.00	0.00	0.00	-28.73

* Bright Zone !

Segment Leq : 0.00 dBA

Total Leq All Segments: 0.00 dBA



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

Car traffic volume : 14168/1232 veh/TimePeriod *
Medium truck volume : 1127/98 veh/TimePeriod *
Heavy truck volume : 805/70 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): 17500
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: Woodroffe S (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 : 67.98 / 67.98 m
Receiver height : 4.50 / 4.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -86.00 deg Angle2 : -36.00 deg
Barrier height : 1.85 m
Barrier receiver distance : 12.56 / 12.56 m
Source elevation : 88.49 m
Receiver elevation : 88.91 m
Barrier elevation : 88.64 m
Reference angle : 0.00



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

Car traffic volume : 14168/1232 veh/TimePeriod *
Medium truck volume : 1127/98 veh/TimePeriod *
Heavy truck volume : 805/70 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): 17500
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: Woodroffe N (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 : 79.82 / 79.82 m
Receiver height : 4.50 / 4.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -86.00 deg Angle2 : -36.00 deg
Barrier height : 1.85 m
Barrier receiver distance : 12.56 / 12.56 m
Source elevation : 88.49 m
Receiver elevation : 88.91 m
Barrier elevation : 88.64 m
Reference angle : 0.00



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

Car traffic volume : 19430/1690 veh/TimePeriod *
Medium truck volume : 1546/134 veh/TimePeriod *
Heavy truck volume : 1104/96 veh/TimePeriod *
Posted speed limit : 40 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): 24000
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: Knoxdale (day/night)

Angle1 Angle2 : -90.00 deg 4.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 80.43 / 80.43 m
Receiver height : 4.50 / 4.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -90.00 deg Angle2 : 4.00 deg
Barrier height : 0.00 m
Barrier receiver distance : 0.01 / 0.01 m
Source elevation : 88.42 m
Receiver elevation : 88.91 m
Barrier elevation : 88.66 m
Reference angle : 0.00



Results segment # 1: Woodroffe S (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	!
		4.14	!
			92.78

ROAD (35.28 + 52.79 + 57.86) = 59.06 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	-86	0.57	70.67	0.00	-10.30	-25.08	0.00	0.00	0.00	35.28
-86	-36	0.46	70.67	0.00	-9.58	-7.22	0.00	0.00	-0.38	53.50*
-86	-36	0.57	70.67	0.00	-10.30	-7.57	0.00	0.00	0.00	52.79
-36	90	0.57	70.67	0.00	-10.30	-2.50	0.00	0.00	0.00	57.86

* Bright Zone !

Segment Leq : 59.06 dBA

Results segment # 2: Woodroffe N (day)

Source height = 1.50 m

Barrier height for grazing incidence

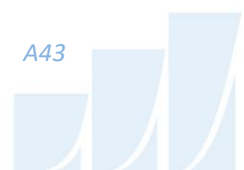
Source Height (m)	! Receiver ! Height (m)	! Barrier ! Height (m)	! Elevation of ! Barrier Top (m)
1.50	!	4.50	!
		4.23	!
			92.87

ROAD (34.18 + 51.69 + 56.77) = 57.96 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	-86	0.57	70.67	0.00	-11.40	-25.08	0.00	0.00	0.00	34.18
-86	-36	0.46	70.67	0.00	-10.59	-7.22	0.00	0.00	-0.35	52.51*
-86	-36	0.57	70.67	0.00	-11.40	-7.57	0.00	0.00	0.00	51.69
-36	90	0.57	70.67	0.00	-11.40	-2.50	0.00	0.00	0.00	56.77

* Bright Zone !

Segment Leq : 57.96 dBA



Results segment # 3: Knoxdale (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	4.75	93.41

ROAD (0.00 + 53.22 + 0.00) = 53.22 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	4	0.57	68.73	0.00	-11.45	-4.06	0.00	0.00	-0.02	53.20*
-90	4	0.57	68.73	0.00	-11.45	-4.06	0.00	0.00	0.00	53.22

* Bright Zone !

Segment Leq : 53.22 dBA

Total Leq All Segments: 62.15 dBA

Results segment # 1: Woodroffe S (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	4.14	92.78

ROAD (27.68 + 45.19 + 50.27) = 51.46 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	-86	0.57	63.07	0.00	-10.30	-25.08	0.00	0.00	0.00	27.68
-86	-36	0.46	63.07	0.00	-9.58	-7.22	0.00	0.00	-0.38	45.90*
-86	-36	0.57	63.07	0.00	-10.30	-7.57	0.00	0.00	0.00	45.19
-36	90	0.57	63.07	0.00	-10.30	-2.50	0.00	0.00	0.00	50.27

* Bright Zone !

Segment Leq : 51.46 dBA



Results segment # 2: Woodroffe N (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	!
		4.23	!
			92.87

ROAD (26.59 + 44.10 + 49.17) = 50.37 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	-86	0.57	63.07	0.00	-11.40	-25.08	0.00	0.00	0.00	26.59
-86	-36	0.46	63.07	0.00	-10.59	-7.22	0.00	0.00	-0.35	44.91*
-86	-36	0.57	63.07	0.00	-11.40	-7.57	0.00	0.00	0.00	44.10
-36	90	0.57	63.07	0.00	-11.40	-2.50	0.00	0.00	0.00	49.17

* Bright Zone !

Segment Leq : 50.37 dBA

Results segment # 3: Knoxdale (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	!
		4.75	!
			93.41

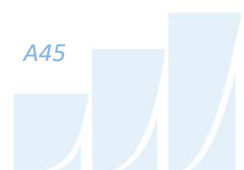
ROAD (0.00 + 45.62 + 0.00) = 45.62 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	4	0.57	61.13	0.00	-11.45	-4.06	0.00	0.00	-0.02	45.60*
-90	4	0.57	61.13	0.00	-11.45	-4.06	0.00	0.00	0.00	45.62

* Bright Zone !

Segment Leq : 45.62 dBA

Total Leq All Segments: 54.55 dBA



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

1 - 6-car Subway:

Traffic volume : 540/60 veh/TimePeriod
Speed : 40 km/h

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

Angle1 Angle2 : -87.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 42.29 / 42.29 m
Receiver height : 4.50 / 4.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -87.00 deg Angle2 : 90.00 deg
Barrier height : 2.00 m
Barrier receiver distance : 39.36 / 39.36 m
Source elevation : 98.00 m
Receiver elevation : 88.91 m
Barrier elevation : 98.00 m
Reference angle : 0.00



Results segment # 1: LRT (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	4.50	0.15	98.15

RT/Custom (0.00 + 42.36 + 0.00) = 42.36 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-87	90	0.48	62.38	-6.66	-1.15	0.00	0.00	-12.20	42.36

Segment Leq : 42.36 dBA

Total Leq All Segments: 42.36 dBA

Results segment # 1: LRT (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	4.50	0.15	98.15

RT/Custom (0.00 + 35.83 + 0.00) = 35.83 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-87	90	0.48	55.85	-6.66	-1.15	0.00	0.00	-12.20	35.83

Segment Leq : 35.83 dBA

Total Leq All Segments: 35.83 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 62.20
(NIGHT): 54.61



GRADIENTWIND

ENGINEERS & SCIENTISTS

STAMSON 5.0 NORMAL REPORT Date: 09-06-2025 09:37:18
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r6.te Time Period: Day/Night 16/8 hours
Description: OLA Receptor 6

Rail data, segment # 1: CN (day/night)

Train	! Trains	! Speed	!# loc	!# Cars	! Eng	!Cont					
Type	!	!(km/h)	!/Train	!/Train	! type	!weld					
1. Freight	!	2.0/0.0	!	16.0	!	1.0	!	6.0	!Diesel	!	No

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

Angle1	Angle2	:	-14.00 deg	90.00 deg
Wood depth	:	0	(No woods.)	
No of house rows	:	0 / 0		
Surface	:	1	(Absorptive ground surface)	
Receiver source distance	:	285.47 / 285.47 m		
Receiver height	:	1.50 / 1.50 m		
Topography	:	2	(Flat/gentle slope; with barrier)	
No Whistle				
Barrier angle1	:	-10.00 deg	Angle2 :	33.00 deg
Barrier height	:	1.85 m		
Barrier receiver distance	:	9.58 / 9.58 m		
Source elevation	:	90.00 m		
Receiver elevation	:	88.62 m		
Barrier elevation	:	88.64 m		
Reference angle	:	0.00		



Results segment # 1: CN (day)

Barrier height for grazing incidence

Source Height (m)	! Receiver Height (m)	! Barrier Height (m)	! Elevation of Barrier Top (m)
4.00 !	1.50 !	1.61 !	90.25
0.50 !	1.50 !	1.49 !	90.13

LOCOMOTIVE (15.66 + 22.20 + 25.06) = 27.19 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-14	-10	0.58	52.53	-20.28	-16.59	0.00	0.00	0.00	15.66
-10	33	0.47	52.53	-18.86	-6.31	0.00	0.00	-5.16	22.20
33	90	0.58	52.53	-20.28	-7.19	0.00	0.00	0.00	25.06

WHEEL (0.39 + 6.35 + 9.56) = 11.60 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-14	-10	0.66	38.23	-21.24	-16.60	0.00	0.00	0.00	0.39
-10	33	0.58	38.23	-20.20	-6.33	0.00	0.00	-5.34	6.35
33	90	0.66	38.23	-21.24	-7.43	0.00	0.00	0.00	9.56

Segment Leq : 27.31 dBA

Total Leq All Segments: 27.31 dBA



Results segment # 1: CN (night)

Barrier height for grazing incidence

Source Height (m)	! Receiver Height (m)	! Barrier Height (m)	! Elevation of Barrier Top (m)
4.00 !	1.50 !	1.61 !	90.25
0.50 !	1.50 !	1.49 !	90.13

LOCOMOTIVE (-36.87 + -30.33 + -27.47) = 0.00 dBA

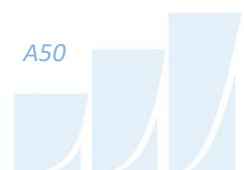
Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-14	-10	0.58	0.00	-20.28	-16.59	0.00	0.00	0.00	-36.87
-10	33	0.47	0.00	-18.86	-6.31	0.00	0.00	-5.16	-30.33
33	90	0.58	0.00	-20.28	-7.19	0.00	0.00	0.00	-27.47

WHEEL (-37.84 + -31.87 + -28.67) = 0.00 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-14	-10	0.66	0.00	-21.24	-16.60	0.00	0.00	0.00	-37.84
-10	33	0.58	0.00	-20.20	-6.33	0.00	0.00	-5.34	-31.87
33	90	0.66	0.00	-21.24	-7.43	0.00	0.00	0.00	-28.67

Segment Leq : 0.00 dBA

Total Leq All Segments: 0.00 dBA



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

Car traffic volume : 14168/1232 veh/TimePeriod *
Medium truck volume : 1127/98 veh/TimePeriod *
Heavy truck volume : 805/70 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): 17500
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: Woodroffe S (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 : 64.99 / 64.99 m
Receiver height : 1.50 / 1.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -87.00 deg Angle2 : -44.00 deg
Barrier height : 1.85 m
Barrier receiver distance : 9.58 / 9.58 m
Source elevation : 88.49 m
Receiver elevation : 88.62 m
Barrier elevation : 88.64 m
Reference angle : 0.00



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

Car traffic volume : 14168/1232 veh/TimePeriod *
Medium truck volume : 1127/98 veh/TimePeriod *
Heavy truck volume : 805/70 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): 17500
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: Woodroffe N (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 : 76.82 / 76.82 m
Receiver height : 1.50 / 1.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -87.00 deg Angle2 : -44.00 deg
Barrier height : 1.85 m
Barrier receiver distance : 9.58 / 9.58 m
Source elevation : 88.49 m
Receiver elevation : 88.62 m
Barrier elevation : 88.64 m
Reference angle : 0.00



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

```
-----
Car traffic volume   : 19430/1690   veh/TimePeriod  *
Medium truck volume  : 1546/134    veh/TimePeriod  *
Heavy truck volume   : 1104/96     veh/TimePeriod  *
Posted speed limit   : 40 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): 24000
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: Knoxdale (day/night)

```
-----
Angle1   Angle2      : -90.00 deg   49.00 deg
Wood depth : 0        (No woods.)
No of house rows : 0 / 0
Surface     : 1        (Absorptive ground surface)
Receiver source distance : 80.20 / 80.20 m
Receiver height : 1.50 / 1.50 m
Topography    : 2        (Flat/gentle slope; with barrier)
Barrier angle1 : -90.00 deg   Angle2 : 49.00 deg
Barrier height : 0.00 m
Barrier receiver distance : 0.01 / 0.01 m
Source elevation : 88.42 m
Receiver elevation : 88.62 m
Barrier elevation : 88.62 m
Reference angle : 0.00
```



Results segment # 1: Woodroffe S (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	!
		1.46	!
			90.10

ROAD (31.66 + 47.08 + 57.78) = 58.14 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	-87	0.66	70.67	0.00	-10.57	-28.44	0.00	0.00	0.00	31.66
-87	-44	0.55	70.67	0.00	-9.86	-8.53	0.00	0.00	-5.19	47.08
-44	90	0.66	70.67	0.00	-10.57	-2.32	0.00	0.00	0.00	57.78

Segment Leq : 58.14 dBA

Results segment # 2: Woodroffe N (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	!
		1.46	!
			90.10

ROAD (30.45 + 45.96 + 56.57) = 56.94 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	-87	0.66	70.67	0.00	-11.78	-28.44	0.00	0.00	0.00	30.45
-87	-44	0.55	70.67	0.00	-10.99	-8.53	0.00	0.00	-5.19	45.96
-44	90	0.66	70.67	0.00	-11.78	-2.32	0.00	0.00	0.00	56.57

Segment Leq : 56.94 dBA



Results segment # 3: Knoxdale (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	90.12

ROAD (0.00 + 54.48 + 0.00) = 54.48 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	49	0.66	68.73	0.00	-12.09	-2.16	0.00	0.00	-0.04	54.44*
-90	49	0.66	68.73	0.00	-12.09	-2.16	0.00	0.00	0.00	54.48

* Bright Zone !

Segment Leq : 54.48 dBA

Total Leq All Segments: 61.54 dBA

Results segment # 1: Woodroffe S (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	1.46	90.10

ROAD (24.06 + 39.48 + 50.18) = 50.54 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	-87	0.66	63.07	0.00	-10.57	-28.44	0.00	0.00	0.00	24.06
-87	-44	0.55	63.07	0.00	-9.86	-8.53	0.00	0.00	-5.19	39.48
-44	90	0.66	63.07	0.00	-10.57	-2.32	0.00	0.00	0.00	50.18

Segment Leq : 50.54 dBA



Results segment # 2: Woodroffe N (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	!
		1.46	!
			90.10

ROAD (22.86 + 38.36 + 48.97) = 49.34 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	-87	0.66	63.07	0.00	-11.78	-28.44	0.00	0.00	0.00	22.86
-87	-44	0.55	63.07	0.00	-10.99	-8.53	0.00	0.00	-5.19	38.36
-44	90	0.66	63.07	0.00	-11.78	-2.32	0.00	0.00	0.00	48.97

Segment Leq : 49.34 dBA

Results segment # 3: Knoxdale (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	!
			90.12

ROAD (0.00 + 46.88 + 0.00) = 46.88 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	49	0.66	61.13	0.00	-12.09	-2.16	0.00	0.00	-0.04	46.84*
-90	49	0.66	61.13	0.00	-12.09	-2.16	0.00	0.00	0.00	46.88

* Bright Zone !

Segment Leq : 46.88 dBA

Total Leq All Segments: 53.94 dBA



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

1 - 6-car Subway:

Traffic volume : 540/60 veh/TimePeriod
Speed : 40 km/h

Data for Segment # 1: LRT (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 : 39.30 / 39.30 m
Receiver height : 1.50 / 1.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -90.00 deg Angle2 : 90.00 deg
Barrier height : 2.00 m
Barrier receiver distance : 36.36 / 36.36 m
Source elevation : 98.00 m
Receiver elevation : 88.62 m
Barrier elevation : 98.00 m
Reference angle : 0.00



Results segment # 1: LRT (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	-0.13	97.87

RT/Custom (0.00 + 41.67 + 0.00) = 41.67 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.57	62.38	-6.57	-1.30	0.00	0.00	-12.83	41.67

Segment Leq : 41.67 dBA

Total Leq All Segments: 41.67 dBA

Results segment # 1: LRT (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	-0.13	97.87

RT/Custom (0.00 + 35.14 + 0.00) = 35.14 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.57	55.85	-6.57	-1.30	0.00	0.00	-12.83	35.14

Segment Leq : 35.14 dBA

Total Leq All Segments: 35.14 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 61.59
(NIGHT): 54.00



GRADIENTWIND

ENGINEERS & SCIENTISTS

STAMSON 5.0 NORMAL REPORT Date: 11-06-2025 11:30:12
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r6Barr.te Time Period: Day/Night 16/8 hours
Description: OLA Receptor 6 With Barrier

Rail data, segment # 1: CN (day/night)

Train	! Trains	! Speed	!# loc	!# Cars	! Eng	!Cont					
Type	!	!(km/h)	!/Train	!/Train	! type	!weld					
1. Freight	!	2.0/0.0	!	16.0	!	1.0	!	6.0	!Diesel	!	No

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

Angle1	Angle2	:	-14.00 deg	90.00 deg
Wood depth	:	0	(No woods.)	
No of house rows	:	0 / 0		
Surface	:	1	(Absorptive ground surface)	
Receiver source distance	:	285.47 / 285.47 m		
Receiver height	:	1.50 / 1.50 m		
Topography	:	2	(Flat/gentle slope; with barrier)	
No Whistle				
Barrier angle1	:	-10.00 deg	Angle2 :	90.00 deg
Barrier height	:	1.85 m		
Barrier receiver distance	:	9.58 / 9.58 m		
Source elevation	:	90.00 m		
Receiver elevation	:	88.62 m		
Barrier elevation	:	88.64 m		
Reference angle	:	0.00		



Results segment # 1: CN (day)

Barrier height for grazing incidence

Source Height (m)	! Receiver Height (m)	! Barrier Height (m)	! Elevation of Barrier Top (m)
4.00 !	1.50 !	1.61 !	90.25
0.50 !	1.50 !	1.49 !	90.13

LOCOMOTIVE (15.66 + 25.01 + 0.00) = 25.48 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-14	-10	0.58	52.53	-20.28	-16.59	0.00	0.00	0.00	15.66
-10	90	0.47	52.53	-18.86	-3.55	0.00	0.00	-5.11	25.01

WHEEL (0.39 + 9.06 + 0.00) = 9.62 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-14	-10	0.66	38.23	-21.24	-16.60	0.00	0.00	0.00	0.39
-10	90	0.58	38.23	-20.20	-3.72	0.00	0.00	-5.24	9.06

Segment Leq : 25.59 dBA

Total Leq All Segments: 25.59 dBA



Results segment # 1: CN (night)

Barrier height for grazing incidence

Source Height (m)	! Receiver Height (m)	! Barrier Height (m)	! Elevation of Barrier Top (m)
4.00 !	1.50 !	1.61 !	90.25
0.50 !	1.50 !	1.49 !	90.13

LOCOMOTIVE (-36.87 + -27.52 + 0.00) = 0.00 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-14	-10	0.58	0.00	-20.28	-16.59	0.00	0.00	0.00	-36.87
-10	90	0.47	0.00	-18.86	-3.55	0.00	0.00	-5.11	-27.52

WHEEL (-37.84 + -29.16 + 0.00) = 0.00 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-14	-10	0.66	0.00	-21.24	-16.60	0.00	0.00	0.00	-37.84
-10	90	0.58	0.00	-20.20	-3.72	0.00	0.00	-5.24	-29.16

Segment Leq : 0.00 dBA

Total Leq All Segments: 0.00 dBA



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

Car traffic volume : 14168/1232 veh/TimePeriod *
Medium truck volume : 1127/98 veh/TimePeriod *
Heavy truck volume : 805/70 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): 17500
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: Woodroffe S (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 : 64.99 / 64.99 m
Receiver height : 1.50 / 1.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -87.00 deg Angle2 : 90.00 deg
Barrier height : 1.85 m
Barrier receiver distance : 9.58 / 9.58 m
Source elevation : 88.49 m
Receiver elevation : 88.62 m
Barrier elevation : 88.64 m
Reference angle : 0.00



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

Car traffic volume : 14168/1232 veh/TimePeriod *
Medium truck volume : 1127/98 veh/TimePeriod *
Heavy truck volume : 805/70 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): 17500
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: Woodroffe N (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 : 76.82 / 76.82 m
Receiver height : 1.50 / 1.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -87.00 deg Angle2 : 90.00 deg
Barrier height : 1.85 m
Barrier receiver distance : 9.58 / 9.58 m
Source elevation : 88.49 m
Receiver elevation : 88.62 m
Barrier elevation : 88.64 m
Reference angle : 0.00



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

Car traffic volume : 19430/1690 veh/TimePeriod *
Medium truck volume : 1546/134 veh/TimePeriod *
Heavy truck volume : 1104/96 veh/TimePeriod *
Posted speed limit : 40 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): 24000
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: Knoxdale (day/night)

Angle1 Angle2 : -90.00 deg 49.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 80.20 / 80.20 m
Receiver height : 1.50 / 1.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -90.00 deg Angle2 : 49.00 deg
Barrier height : 1.85 m
Barrier receiver distance : 3.04 / 3.04 m
Source elevation : 88.42 m
Receiver elevation : 88.62 m
Barrier elevation : 88.64 m
Reference angle : 0.00



Results segment # 1: Woodroffe S (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	!
		1.46	!
			90.10

ROAD (31.66 + 54.22 + 0.00) = 54.24 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	-87	0.66	70.67	0.00	-10.57	-28.44	0.00	0.00	0.00	31.66
-87	90	0.55	70.67	0.00	-9.86	-1.28	0.00	0.00	-5.31	54.22

Segment Leq : 54.24 dBA

Results segment # 2: Woodroffe N (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	!
		1.46	!
			90.10

ROAD (30.45 + 53.10 + 0.00) = 53.13 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	-87	0.66	70.67	0.00	-11.78	-28.44	0.00	0.00	0.00	30.45
-87	90	0.55	70.67	0.00	-10.99	-1.28	0.00	0.00	-5.29	53.10

Segment Leq : 53.13 dBA



Results segment # 3: Knoxdale (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	1.47	90.11

ROAD (0.00 + 49.58 + 0.00) = 49.58 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	49	0.55	68.73	0.00	-11.28	-2.03	0.00	0.00	-5.85	49.58

Segment Leq : 49.58 dBA

Total Leq All Segments: 57.50 dBA

Results segment # 1: Woodroffe S (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	1.46	90.10

ROAD (24.06 + 46.62 + 0.00) = 46.64 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	-87	0.66	63.07	0.00	-10.57	-28.44	0.00	0.00	0.00	24.06
-87	90	0.55	63.07	0.00	-9.86	-1.28	0.00	0.00	-5.31	46.62

Segment Leq : 46.64 dBA



Results segment # 2: Woodroffe N (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	!
		1.46	!
			90.10

ROAD (22.86 + 45.51 + 0.00) = 45.53 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	-87	0.66	63.07	0.00	-11.78	-28.44	0.00	0.00	0.00	22.86
-87	90	0.55	63.07	0.00	-10.99	-1.28	0.00	0.00	-5.29	45.51

Segment Leq : 45.53 dBA

Results segment # 3: Knoxdale (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	!
		1.47	!
			90.11

ROAD (0.00 + 41.98 + 0.00) = 41.98 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	49	0.55	61.13	0.00	-11.28	-2.03	0.00	0.00	-5.85	41.98

Segment Leq : 41.98 dBA

Total Leq All Segments: 49.90 dBA



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

1 - 6-car Subway:

Traffic volume : 540/60 veh/TimePeriod
Speed : 40 km/h

Data for Segment # 1: LRT (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 : 39.30 / 39.30 m
Receiver height : 1.50 / 1.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -90.00 deg Angle2 : 90.00 deg
Barrier height : 2.00 m
Barrier receiver distance : 36.36 / 36.36 m
Source elevation : 98.00 m
Receiver elevation : 88.62 m
Barrier elevation : 98.00 m
Reference angle : 0.00



Results segment # 1: LRT (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	-0.13	97.87

RT/Custom (0.00 + 41.67 + 0.00) = 41.67 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.57	62.38	-6.57	-1.30	0.00	0.00	-12.83	41.67

Segment Leq : 41.67 dBA

Total Leq All Segments: 41.67 dBA

Results segment # 1: LRT (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	-0.13	97.87

RT/Custom (0.00 + 35.14 + 0.00) = 35.14 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.57	55.85	-6.57	-1.30	0.00	0.00	-12.83	35.14

Segment Leq : 35.14 dBA

Total Leq All Segments: 35.14 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 57.61
(NIGHT): 50.04

