



# **ENVIRONMENTAL NOISE ASSESSMENT**

**MN 233 UPPER QUEEN STREET, THORNDALE**

LDS PROJECT NO. LD-00267  
APRIL 12, 2022

Submitted to:

**MUNICIPALITY OF THAMES CENTRE**

Department of Planning and Development

Distribution (via email):

RAND Developments  
Knutson Development Consultants Inc.

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## 1.0 Introduction

LDS Consultants Inc. was retained by RAND Developments to complete an Environmental Noise Assessment for the property located at MN 233 Upper Queen Street in Thorndale. The site is located on the south side of Upper Queen Street and east of Agnes Street, as illustrated in Figure 1. The proposed development is comprised of 0.95 hectares and is proposed for the construction of thirty-eight (38) vacant land condominium (VLC) units. The purpose of this study is to assess the noise impact of railway traffic from CN's Guelph Subdivision rail line on the subject property using the computerized version of the MECP's noise model (STAMSON v5.03). Recommendations for noise control measures will be outlined to achieve acceptable noise levels for future residents of the proposed development while satisfying the planning requirements of the Municipality of Thames Centre.

## 2.0 Criteria

This report and the included analysis have been prepared to meet the requirements presented in the Ministry of the Environment and Climate Change's (MECP's) publication titled "Environmental Noise Guideline – Stationery and Transportation Sources – Approval and Planning (NPC-300)".

### 2.1 Guidelines

The MECP has produced noise level guidelines for the use in noise assessment and land use planning. Noise level criteria for residential land use are summarized below in Table 1.

**Table 1 – Noise Criteria for Residential Land Use**

Location	Day-Time (7:00 - 23:00 (16hr))	Night-Time (23:00 - 7:00 (8hr))
Outdoor Living Area	55 dBA	N/A
Indoor Living Area	40 dBA at plane of living room window	35 dBA at plane of bedroom window

Noise levels in excess of the guidelines presented in Table 1 are acceptable under certain conditions and with certain provisions. Tables 2 and 3 set out noise levels in excess of the specified criteria, and the required provisions to allow residential activity in locations where noise level criteria are exceeded. MECP noise warning clauses are provided in Appendix A.

**Table 2 – Rail Day-Time Noise, Ventilation and Warning Clause Requirements**

Location	Leq (16hr)	Ventilation Requirements	Outdoor Control Measures	Warning Clause
Outdoor Living Area	Leq ≤ 55 dBA	N/A	None required	Not Required
	55 < Leq ≤ 60 dBA	N/A	Control Measures (barriers) not required but should be considered	Required if resultant Leq exceeds 55dBA Type A
	Leq > 60 dBA	N/A	Control measures (barriers) required to reduce the Leq to below 60 dBA and as close to 55dBA as technically, economically, and administratively feasible.	Required if resultant Leq exceeds 60dBA Type B
Plane of Livingroom Window	Leq ≤ 40 dBA	N/A	N/A	Not Required
	40 < Leq ≤ 50 dBA	Forced air heating with provision for central air conditioning	N/A	Required Type C
	Leq > 50 dBA	Central air conditioning	N/A	Required Type D

(Source: MECP's NPC-300 Publication)

**Table 3 – Rail Night-Time Noise, Ventilation and Warning Clause Requirements**

Location	Leq (8hr)	Ventilation Requirements	Warning Clause*
Plane of Bedroom Window	Leq ≤ 35 dBA	Not Required	Not Required
	35 < Leq ≤ 45 dBA	Forced air heating with provision for central air conditioning	Required - Type C
	Leq > 45 dBA	Central air conditioning	Required- Type D

(Source: MOECC's NPC-300 Publication)

### 3.0 Analysis Procedures

#### 3.1 Rail Traffic Data

Rail traffic data for the adjacent CN Guelph Subdivision was received from CN, attached in Appendix B. There are two way-freight (<25 cars, 4 engines) and three passenger (<10 cars, 2 engines) trains that travel this segment of CN's rail line during day-time hours. As described in the attached correspondence, rail traffics volumes are expected to increase by 2.5% per annum for 10 years. The projected growth is reflected in the volume of trains outlined in Table 4. There are no train whistle by-laws in the vicinity of the subject site, thus train whistles will be included in the noise calculations. As well, the mainline track was considered to be continuously welded rail throughout the study area as stated in the Train Data.

#### 3.2 Calculation Methods and Parameters

Rail noise levels were calculated using the Stamson v5.03 computer program from the MECP. There is no rail traffic during night-time hours, therefore only day-time noise conditions have been calculated for both indoor and outdoor living areas. These calculations will dictate which units require noise control measures, which depends on the exceedance levels described in Tables 2 and 3. Indoor day-time levels were estimated by placing the receiver 1.5m off the ground surface against the pane of the window (POW). Similarly, the day-time OLA noise levels were estimated by placing the receiver 1.5m off the ground and 3m off the building envelope. The noise assessment was calculated using 5 rows of houses at a 20% house density, which represents the 5 lots between the railway corridor and the subject site.

**Table 4 – Summary of Rail Traffic Volumes and Parameters**

Day-time Period (7:00-23:00)	CN Guelph Subdivision <i>Speed Limit = 24 km per hour</i>		
	Number of Trains	Max Length (cars)	Max Engines
Way Freight	3	25	4
Passenger	4	10	2

### 4.0 Projected Noise Levels

The receiver distance of 94.89m was used for the initial assessment representing the closest distance from the railway corridor to the subject property as shown in Figure 1. The closest distance results in the maximum sound propagation from the rail line. This conservative measure resulted in a Leq of 39.99 dBA which is below the day-time outdoor living area and indoor living area threshold of 55 dBA and 40 dBA respectively, as outlined in Table 2. Unit 36 is the closest VLC unit to the railway situated approximately 100m away, this distance resulted in a Leq of 39.63 dBA. As the receiver moved to the rear of the property the a Leq decreased to 37.76 dBA. The calculated noise levels are provided in Appendix C, and description of noise warning clauses are provided in Appendix A, it being noted that MOECC Warning Clauses aren't applicable to these units as the subject property meets the minimum noise requirements for day-time indoor and outdoor living areas. Additionally, CN's standard warning clause which is required for all residential developments located within 300m of their branch line should be registered on the title of all units, as detailed in Appendix A. It should be noted again that there is no rail traffic at night, thus the assessment was modeled using day-time standards.

## 5.0 Conclusions and Recommendations

Based on the preceding findings, the following recommendations are made.

- Based on a 10-year projected horizon, Day-time Outdoor Living Area and Day-time Indoor Living Area predicted noise levels are below the MECP's criteria of 55 dBA and 40 dBA respectively. Therefore, noise control barriers and MOECC warning clauses are not required for the subject site;
- CN's standard warning clause should be inserted in all development agreements, offers to purchase, and agreements of purchase and sale or lease of each dwelling unit within 300m of the railway right-of-way, as per Appendix A; and,
- All buildings must be constructed in accordance with the Ontario Building Code.

The inclusion of these measures will allow the residential development to proceed in accordance with the MECP's criteria with respect to environmental noise.

We trust this report to be complete, however should any questions arise please do not hesitate to contact the undersigned.

Sincerely,

LDS CONSULTANTS INC.



**Anthony Gubbels, P. Eng.**

Principal, Community Development

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c: (519) 494-7785

e: [anthony.gubbels@LDSConsultants.ca](mailto:anthony.gubbels@LDSConsultants.ca)

A handwritten signature in black ink, appearing to read "C. Brown".

**Connor Brown**

EIT

o: (226) 289-2952

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## Figures





**APPENDIX A**  
**WARNING CLAUSES**

## MOECC Warning Clauses

The following warning clauses may be used individually or in combination:

### TYPE A:

“Purchasers / tenants are advised that sound levels due to increasing road (rail) (air) traffic may occasionally interfere with some activities of the dwelling occupants as the sound levels exceed the Municipality’s and the Ministry of the Environment’s noise criteria.”

### 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) (air) traffic may on occasion interfere with some activities of the dwelling occupants as the sound levels exceed the Municipality’s and the Ministry of the Environment’s noise criteria.”

### TYPE C

“This dwelling unit has been fitted with a forced air heating system and the ducting, etc. was sized to accommodate central air conditioning. Installation of central air conditioning by the occupant will allow windows and exterior doors to remain closed, thereby ensuring that the indoor sound levels are within the Municipality’s and the Ministry of the Environment’s noise criteria. (Note: The location and installation of the outdoor air conditioning device should be done so as to comply with noise criteria of MOE Publication NPC-216, Residential Air Conditioning Devices and thus minimize the noise impacts both on and in the immediate vicinity of the subject property.)”

### TYPE D

“This dwelling unit has been supplied with a central air conditioning system which will allow windows and exterior doors to remain closed, thereby ensuring that the indoor sound levels are within the Municipality’s and the Ministry of the Environment’s noise criteria.”

## **CN's Standard Warning Clause**

The following clause should be inserted in all development agreements, offers to purchase, and agreements of Purchase and Sale or Lease of each dwelling unit within 300m of the railway right-of-way:

“Warning: Canadian National Railway Company or its assigns or successors in interest has or have a rights-of-way within 300 metres from the land the subject hereof. There may be alterations to or expansions of the railway facilities on such rights-of-way in the future including the possibility that the railway or its assigns or successors as aforesaid may expand its operations, which expansion may affect the living environment of the residents in the vicinity, notwithstanding the inclusion of any noise and vibration attenuating measures in the design of the development and individual dwelling(s). CNR will not be responsible for any complaints or claims arising from use of such facilities and/or operations on, over or under the aforesaid rights-of-way.”

## **APPENDIX B**

### **CN Train Count Data**



# Train Count Data

**System Engineering  
Engineering Services**

1 Administration Road  
Concord, ON, L4K 1B9  
T: 905.669.3264  
F: 905.760.3406

## TRANSMITTAL

*To:* LDS Consultants Inc.      *Project :* GPH-110.58- Thorndale Rd. Thorndale, ON  
*Destinataire :* 15875 Robins Hill Road,  
Unit 1 London ON  
N5V0A5

*Att'n:* Joe Vandenberg      *Routing:* joe.vandenberg@LDSconsultants.ca  
*From:* Michael Vallins      *Date:* 2020/05/14  
*Expéditeur :*

*Cc:* Adjacent Development  
CN via e-mail

Urgent    For Your Use    For Review    For Your Information    Confidential

**Re: Train Traffic Data – CN Guelph Subdivision- Thorndale Road in Thorndale, ON**

Please find attached the requested Train Traffic Data; this data does not reflect GO Metrolinx Traffic. The application fee in the amount of **\$500.00** +HST will be invoiced.

Should you have any questions, please do not hesitate to contact the undersigned at 905-669-3264.

Sincerely,  
CN Design & Construction

Michael Vallins P.Eng  
Manager, Public Works- Eastern Canada  
permits.gld@cn.ca

Date: 2020/05/14

Project Number: GPH-110.58- Thorndale Rd., Thorndale, ON

Dear Joe:

**Re: Train Traffic Data – CN Guelph Subdivision near Thorndale Rd., Thorndale, ON**

The following is provided in response to Joe's 2020/04/02 request for information regarding rail traffic in the vicinity of Thorndale Rd. in Thorndale at approximately Mile 110.58 on CN's Guelph Subdivision.

Typical daily traffic volumes are recorded below. However, traffic volumes may fluctuate due to overall economic conditions, varying traffic demands, weather conditions, track maintenance programs, statutory holidays and traffic detours that when required may be heavy although temporary. For the purpose of noise and vibration reports, train volumes must be escalated by 2.5% per annum for a 10-year period.

Typical daily traffic volumes at this site location are as follows:

**\*Maximum train speed is given in Miles per Hour**

	0700-2300			
Type of Train	Volumes	Max.Consist	Max. Speed	Max. Power
Freight	0	140	15	4
Way Freight	2	25	15	4
Passenger	3	10	15	2

	2300-0700			
Type of Train	Volumes	Max.Consist	Max. Speed	Max. Power
Freight	0	140	15	4
Way Freight	0	25	15	4
Passenger	0	10	15	2

The volumes recorded reflect westbound and eastbound freight and passenger operations on CN's Guelph Subdivision.

Except where anti-whistling bylaws are in effect, engine-warning whistles and bells are normally sounded at all at-grade crossings. There are five (5) at-grade crossing in the immediate vicinity of the study area at Mile 109.76 Conc. 3-4, Lot 17, Mile 110.01 Farm Xing, Mile 110.58 Thorndale Rd., Mile 111.37 Farm Xing and Mile 111.86 City Road 27. Anti-whistling bylaws are not in effect at these crossings. Please note that engine warning whistles may be sounded in cases of emergency, as a safety and or warning precaution at station locations and pedestrian crossings and occasionally for operating requirements.

With respect to equipment restrictions, the gross weight of the heaviest permissible car is 263,000 lbs.

The single mainline track is considered to be continuously welded rail throughout the study area.

The Canadian National Railway continues to be strongly opposed to locating developments near railway facilities and rights-of-way due to potential safety and environmental conflicts. Development adjacent to the Railway Right-of-Way is not appropriate without sound impact mitigation measures to reduce the incompatibility. For confirmation of the applicable rail noise, vibration and safety standards, Adjacent Development, Canadian National Railway Properties at [Proximity@cn.ca](mailto:Proximity@cn.ca) should be contacted directly.

I trust the above information will satisfy your current request.

Sincerely,

A handwritten signature in blue ink, appearing to read 'Michael Vallins P.Eng', with a stylized flourish at the end.

Michael Vallins P.Eng  
Manager, Public Works – Eastern Canada  
[permits.gld@cn.ca](mailto:permits.gld@cn.ca)

**APPENDIX C**  
**STAMSON OUTPUT**

Filename:                                  Time Period: Day/Night 16/8 hours  
 Description: OLA Daytime Unattenuated 5 house @ 20%

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

Train Type	! Trains !	! Speed ! (km/h)	!# loc !/Train!	!# Cars !/Train!	Eng type	!Cont !weld
1.	! 3.0/0.0	! 24.0	! 4.0	! 25.0	!Diesel!	! Yes

Data for Segment # 1: Way Freight (day/night)

-----  
 Angle1 Angle2 : -90.00 deg 90.00 deg  
 Wood depth : 0 (No woods.)  
 No of house rows : 5 / 5  
 House density : 20 %  
 Surface : 1 (Absorptive ground surface)  
 Receiver source distance : 94.89 / 94.89 m  
 Receiver height : 1.50 / 4.50 m  
 Topography : 1 (Flat/gentle slope; no barrier)  
 No Whistle  
 Reference angle : 0.00

↑  
 Rail data, segment # 2: Passanger (day/night)

Train Type	! Trains !	! Speed ! (km/h)	!# loc !/Train!	!# Cars !/Train!	Eng type	!Cont !weld
1.	! 4.0/0.0	! 24.0	! 2.0	! 10.0	!Diesel!	! Yes

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

-----  
 Angle1 Angle2 : -90.00 deg 90.00 deg  
 Wood depth : 0 (No woods.)  
 No of house rows : 5 / 5  
 House density : 20 %  
 Surface : 1 (Absorptive ground surface)  
 Receiver source distance : 94.89 / 94.89 m  
 Receiver height : 1.50 / 4.50 m  
 Topography : 1 (Flat/gentle slope; no barrier)  
 No Whistle  
 Reference angle : 0.00

↑  
 Results segment # 1: Way Freight (day)

-----  
 LOCOMOTIVE (0.00 + 37.66 + 0.00) = 37.66 dBA  
 Angle1 Angle2 Alpha RefLeq D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq  
 -----  
 -90 90 0.58 58.59 -12.70 -1.33 0.00 -6.90 0.00 37.66  
 -----

WHEEL (0.00 + 24.27 + 0.00) = 24.27 dBA  
 Angle1 Angle2 Alpha RefLeq D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq  
 -----  
 -90 90 0.66 45.93 -13.30 -1.46 0.00 -6.90 0.00 24.27  
 -----

Segment Leq : 37.85 dBA

↑  
 Results segment # 2: Passanger (day)

-----

LOCOMOTIVE (0.00 + 35.71 + 0.00) = 35.71 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.58	56.64	-12.70	-1.33	0.00	-6.90	0.00	35.71

WHEEL (0.00 + 21.69 + 0.00) = 21.69 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.66	43.34	-13.30	-1.46	0.00	-6.90	0.00	21.69

Segment Leq : 35.88 dBA

Total Leq All Segments: 39.99 dBA

↑  
Results segment # 1: Way Freight (night)

LOCOMOTIVE (0.00 + -20.04 + 0.00) = 0.00 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.50	0.00	-11.98	-1.17	0.00	-6.90	0.00	-20.04

WHEEL (0.00 + -21.07 + 0.00) = 0.00 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.60	0.00	-12.82	-1.35	0.00	-6.90	0.00	-21.07

Segment Leq : 0.00 dBA

↑  
Results segment # 2: Passanger (night)

LOCOMOTIVE (0.00 + -20.04 + 0.00) = 0.00 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.50	0.00	-11.98	-1.17	0.00	-6.90	0.00	-20.04

WHEEL (0.00 + -21.07 + 0.00) = 0.00 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.60	0.00	-12.82	-1.35	0.00	-6.90	0.00	-21.07

Segment Leq : 0.00 dBA

Total Leq All Segments: 0.00 dBA

↑  
TOTAL Leq FROM ALL SOURCES (DAY): 39.99  
(NIGHT): 0.00

↑  
↑

Filename:                                  Time Period: Day/Night 16/8 hours  
 Description: OLA Daytime Unattenuated 5 house @ 20% 100m

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

Train Type	! Trains !	! Speed ! (km/h)	!# loc !/Train!	!# Cars !/Train!	Eng type	!Cont !weld
1.	! 3.0/0.0	! 24.0	! 4.0	! 25.0	!Diesel!	! Yes

Data for Segment # 1: Way Freight (day/night)

-----  
 Angle1 Angle2 : -90.00 deg 90.00 deg  
 Wood depth : 0 (No woods.)  
 No of house rows : 5 / 5  
 House density : 20 %  
 Surface : 1 (Absorptive ground surface)  
 Receiver source distance : 100.00 / 100.00 m  
 Receiver height : 1.50 / 4.50 m  
 Topography : 1 (Flat/gentle slope; no barrier)  
 No Whistle  
 Reference angle : 0.00

↑  
 Rail data, segment # 2: Passanger (day/night)

Train Type	! Trains !	! Speed ! (km/h)	!# loc !/Train!	!# Cars !/Train!	Eng type	!Cont !weld
1.	! 4.0/0.0	! 24.0	! 2.0	! 10.0	!Diesel!	! Yes

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

-----  
 Angle1 Angle2 : -90.00 deg 90.00 deg  
 Wood depth : 0 (No woods.)  
 No of house rows : 5 / 5  
 House density : 20 %  
 Surface : 1 (Absorptive ground surface)  
 Receiver source distance : 100.00 / 100.00 m  
 Receiver height : 1.50 / 4.50 m  
 Topography : 1 (Flat/gentle slope; no barrier)  
 No Whistle  
 Reference angle : 0.00

↑  
 Results segment # 1: Way Freight (day)

-----  
 LOCOMOTIVE (0.00 + 37.30 + 0.00) = 37.30 dBA  
 Angle1 Angle2 Alpha RefLeq D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq  
 -----  
 -90 90 0.58 58.59 -13.06 -1.33 0.00 -6.90 0.00 37.30  
 -----

WHEEL (0.00 + 23.89 + 0.00) = 23.89 dBA  
 Angle1 Angle2 Alpha RefLeq D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq  
 -----  
 -90 90 0.66 45.93 -13.68 -1.46 0.00 -6.90 0.00 23.89  
 -----

Segment Leq : 37.49 dBA

↑  
 Results segment # 2: Passanger (day)

-----

LOCOMOTIVE (0.00 + 35.35 + 0.00) = 35.35 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.58	56.64	-13.06	-1.33	0.00	-6.90	0.00	35.35

WHEEL (0.00 + 21.31 + 0.00) = 21.31 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.66	43.34	-13.68	-1.46	0.00	-6.90	0.00	21.31

Segment Leq : 35.52 dBA

Total Leq All Segments: 39.63 dBA

Results segment # 1: Way Freight (night)

LOCOMOTIVE (0.00 + -20.38 + 0.00) = 0.00 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.50	0.00	-12.32	-1.17	0.00	-6.90	0.00	-20.38

WHEEL (0.00 + -21.44 + 0.00) = 0.00 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.60	0.00	-13.18	-1.35	0.00	-6.90	0.00	-21.44

Segment Leq : 0.00 dBA

Results segment # 2: Passanger (night)

LOCOMOTIVE (0.00 + -20.38 + 0.00) = 0.00 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.50	0.00	-12.32	-1.17	0.00	-6.90	0.00	-20.38

WHEEL (0.00 + -21.44 + 0.00) = 0.00 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.60	0.00	-13.18	-1.35	0.00	-6.90	0.00	-21.44

Segment Leq : 0.00 dBA

Total Leq All Segments: 0.00 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 39.63  
(NIGHT): 0.00

Filename:                                  Time Period: Day/Night 16/8 hours  
 Description: OLA Daytime Unattenuated 5 house @ 20%

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

Train Type	! Trains !	! Speed ! (km/h)	!# loc !/Train!	!# Cars !/Train!	Eng type	!Cont !weld
1.	! 3.0/0.0	! 24.0	! 4.0	! 25.0	!Diesel!	! Yes

Data for Segment # 1: Way Freight (day/night)

-----  
 Angle1 Angle2 : -90.00 deg 90.00 deg  
 Wood depth : 0 (No woods.)  
 No of house rows : 5 / 5  
 House density : 20 %  
 Surface : 1 (Absorptive ground surface)  
 Receiver source distance : 131.18 / 131.18 m  
 Receiver height : 1.50 / 4.50 m  
 Topography : 1 (Flat/gentle slope; no barrier)  
 No Whistle  
 Reference angle : 0.00

↑  
 Rail data, segment # 2: Passanger (day/night)

Train Type	! Trains !	! Speed ! (km/h)	!# loc !/Train!	!# Cars !/Train!	Eng type	!Cont !weld
1.	! 4.0/0.0	! 24.0	! 2.0	! 10.0	!Diesel!	! Yes

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

-----  
 Angle1 Angle2 : -90.00 deg 90.00 deg  
 Wood depth : 0 (No woods.)  
 No of house rows : 5 / 5  
 House density : 20 %  
 Surface : 1 (Absorptive ground surface)  
 Receiver source distance : 131.18 / 131.18 m  
 Receiver height : 1.50 / 4.50 m  
 Topography : 1 (Flat/gentle slope; no barrier)  
 No Whistle  
 Reference angle : 0.00

↑  
 Results segment # 1: Way Freight (day)

-----  
 LOCOMOTIVE (0.00 + 35.44 + 0.00) = 35.44 dBA  
 Angle1 Angle2 Alpha RefLeq D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq  
 -----  
 -90 90 0.58 58.59 -14.93 -1.33 0.00 -6.89 0.00 35.44  
 -----

WHEEL (0.00 + 21.94 + 0.00) = 21.94 dBA  
 Angle1 Angle2 Alpha RefLeq D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq  
 -----  
 -90 90 0.66 45.93 -15.63 -1.46 0.00 -6.89 0.00 21.94  
 -----

Segment Leq : 35.63 dBA

↑  
 Results segment # 2: Passanger (day)

-----

LOCOMOTIVE (0.00 + 33.49 + 0.00) = 33.49 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.58	56.64	-14.93	-1.33	0.00	-6.89	0.00	33.49

WHEEL (0.00 + 19.36 + 0.00) = 19.36 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.66	43.34	-15.63	-1.46	0.00	-6.89	0.00	19.36

Segment Leq : 33.65 dBA

Total Leq All Segments: 37.76 dBA

↑  
Results segment # 1: Way Freight (night)

LOCOMOTIVE (0.00 + -22.14 + 0.00) = 0.00 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.50	0.00	-14.08	-1.17	0.00	-6.89	0.00	-22.14

WHEEL (0.00 + -23.31 + 0.00) = 0.00 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.60	0.00	-15.07	-1.35	0.00	-6.89	0.00	-23.31

Segment Leq : 0.00 dBA

↑  
Results segment # 2: Passanger (night)

LOCOMOTIVE (0.00 + -22.14 + 0.00) = 0.00 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.50	0.00	-14.08	-1.17	0.00	-6.89	0.00	-22.14

WHEEL (0.00 + -23.31 + 0.00) = 0.00 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.60	0.00	-15.07	-1.35	0.00	-6.89	0.00	-23.31

Segment Leq : 0.00 dBA

Total Leq All Segments: 0.00 dBA

↑  
TOTAL Leq FROM ALL SOURCES (DAY): 37.76  
(NIGHT): 0.00

↑  
↑