APPENDIX H

Noise Impact Assessment

GANNETT FLEMING

NOISE IMPACT ASSESSMENT
STEVENSON ROAD NORTH IMPROVEMENTS
FROM TAUNTON ROAD WEST TO CONLIN ROAD WEST
CITY OF OSHAWA

FOR

GANNETT FLEMING

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1.0 INTRODUCTION

Gannett Fleming is the consulting engineering firm retained by the City of Oshawa to prepare a Municipal Class Environmental Assessment (MCEA) for the Stevenson Road North corridor improvements between Conlin Road West and Taunton Road West. J.E. COULTER ASSOCIATES LIMITED has been retained to complete a Noise Impact Assessment of the preferred alternative to determine the impacts on the nearby sensitive receptors. The proposed improvements involve reconstructing and urbanizing the roadway within the Right-of-Way (ROW). A widening is not being assessed at this time. Please refer to Figure 1 in Appendix A for a Key Plan of the area.

2.0 PROJECT DESCRIPTION

Stevenson Road North is currently a two-lane, rural north-south road, with no paved shoulders or sidewalks, and has existing roadside safety concerns related to road geometry and sightlines. The City of Oshawa is undertaking a Schedule 'C' MCEA for proposed improvements to the Stevenson Road North Corridor, from Taunton Road West to Conlin Road West.

Three alternatives were proposed for the Stevenson Road North corridor:

1. Do Nothing – no improvements to existing conditions
2. Minor Operational Improvements – repaving and addressing road deficiencies
3. Reconstruct and Widen ROW.

After evaluation of the three alternatives, it was recommended to reconstruct and urbanize the road within the existing ROW and widen the ROW in the future. The purpose of this assessment is to review the potential noise impacts caused from reconstructing and urbanizing Stevenson Road North. The future widening would be reviewed when proposed, likely part of a separate MCEA.

3.0 ENVIRONMENTAL NOISE GUIDELINES AND POLICIES

The noise impacts of the proposed extension are being evaluated based on the Ontario Ministry of Transportation's (MTO) Environmental Guide for Noise (2022) as the City of Oshawa does not have any applicable noise guidelines for roadway improvement projects. The MTO guide uses similar evaluation parameters to the 1986 MTO/MOE Joint Protocol "A Protocol for Dealing with Noise Concerns During the Preparation, Review and Evaluation of Provincial Highways Environmental Assessments". However, the MTO guide now specifically includes reference to road projects, not just highway projects.

The Regional Municipality of Durham's Report #2012-W-83 (June 2012) includes a policy and guidelines for the installation and maintenance of noise attenuation barriers associated with Regional road expansion projects. The policy states that based on the mature state of development, sound levels of greater than 60 dBA in Outdoor Living Areas (OLAs) adjacent to regional roads will trigger the review of noise attenuation barriers for new road expansion construction projects (including new road construction or the widening of existing roads for new through lanes). The barriers would need to provide a minimum sound level reduction of 6 dB, and would need to be technically and economically feasible.

As Stevenson Road (under the City of Oshawa's jurisdiction) is not a Regional road, the Region of Durham's policies are not applicable to the project and the assessment is based solely on the MTO noise guide.

3.1 Environmental Noise Guidelines

The MTO noise guide compares the future daytime (0700h–2300h) equivalent sound levels (16-hour L_{eq}) at a sensitive receptor under two different scenarios, typically 10 years after the construction of the project. The comparison is between the sound levels that would be present under the following scenarios:

- Future No-Build – Future sound levels without the project
- Future Build – Future sound levels with the project.

Noise mitigation measures such as noise barriers must be investigated if the predicted noise impacts between these two scenarios are greater than 5 dB.

The noise guide also states that if the future overall sound levels are greater than 65 dBA 16-hour, L_{eq} then noise mitigation must be considered. However, this criterion is not being applied to this project as it is typically applied to provincial highway projects and not regional roads. The criteria used in this assessment are summarized in Table 1 below.

Table 1: Noise Level Criteria

Change in Noise Level due to Proposed Improvements/Projected Future Build Noise Levels	Mitigation Effort Required
< 5 dB change	None
≥ 5 dB change	Investigate noise control measures

If the change in sound levels exceed 5 dB with the project, mitigation is to be provided based on a review of economic, technical, and administrative feasibility outlined in Table 2 below.

Table 2: Noise Mitigation Feasibility Considerations

Technical Feasibility	Review the constructability of the noise mitigation (i.e., design of wall, roadside safety, shadow effect, topography, ability to provide a continuous barrier, etc.).
Economic Feasibility	Carry out a cost-benefit assessment of the noise mitigation (i.e., determine cost per benefitted receiver).
Administrative Feasibility	Determine the ability to locate the noise mitigation on lands within public ownership (i.e., provincial or municipal right-of-way)

3.2 Construction Noise

Similar to other roadway projects, construction noise is not assessed in a quantitative manner. The MTO noise guide outlines requirements and procedures for construction activities, however since this is not a provincial project the construction activities should abide by municipal by-laws. Generally, municipal by-laws prohibit or limit noisy activity in residential areas during sensitive time periods such as weekends, holidays and nighttime. For construction related noise, the City of Oshawa's Noise By-law would apply.

The Ministry of the Environment, conservation and Parks (MECP) does not promulgate construction noise or vibration limits at receptors. Instead of receptor-based limits, MECP provides equipment based limits in *NPC-11*5 and *NPC-118*. These documents outline sound level requirements for individual pieces of construction equipment.

4.0 NOISE SENSITIVE AREAS

For the proposed improvements, there are Noise Sensitive Areas (NSA) located to the east and west of Stevenson Road. The NSAs were identified using current air photo/mapping/zoning. The sensitive receptors in the NSAs are low-rise residential receptors that front Stevenson Road North and are shown in Figures 2 to 8 in Appendix A. The sound levels have been calculated at their Outdoor Living Areas (OLA). As the receptors front onto Stevenson Road, the OLAs are partially shielded from the roadway by the residences themselves.

Sound levels have been calculated at the Outdoor Living Area (OLA) of the receptors. The MTO noise guide defines an OLA as an area at ground level, intended and designed for the enjoyment of the outdoor environment, and readily accessible from the building. This area is typically the backyard of a dwelling but may be located on any side depending on the receptor configuration. The location of the OLA is 3m from the dwelling façade at height of 1.5 m above the existing ground surface. Table 3, below, summarizes the eight closest noise sensitive receptors exposed to the project that are expected to experience the highest potential impacts from the project. All other nearby receptors will have similar or lower impacts due to their increased setback distance from the project and similar exposure to Stevenson Road North.

Table 3: Noise Sensitive Receptors

Receptor	Address
1	1510 Stevenson Road North
2	1590 Stevenson Road North
3	1642 Stevenson Road North
4	1715 Stevenson Road North
5	1750 Stevenson Road North
6	1866 Stevenson Road North
7	1925 Stevenson Road North
8	2000 Stevenson Road North

5.0 IMPACT ASSESSMENT

5.1 Traffic Volumes

Traffic data in the form of Average Annual Daily Traffic (AADT) has been provided for the existing conditions (2022) and future conditions (2033) by Gannett Fleming as shown in Figure 9 in Appendix A. Traffic volumes beyond 2033 were not provided but are not expected to significantly vary from the 2033 volumes until additional lanes are added. Truck percentages and day/night splits were also provided. Medium and heavy truck percentages have been obtained by diving the overall truck percentage equally. The volumes are summarized in Table 4 below.

Table 4: Traffic Volumes

Road Segment	AADT		Truck (%)		Day/Night Split (%)	Speed Limit (km/h)
	Existing (2022)	Future (2033)	Medium	Heavy		
Steven Road: Conlin Road to Taunton Road	1,900	2,700	1	1	68/32	50
Conlin Road: Thornton Road to Stevenson Road	13,200	17,400	2	2	71/29	50
Conlin Road: Stevenson Road to Simcoe Road	13,800	18,200	2	2	71/29	50
Taunton Road: Thornton Road to Stevenson Road	26,800	29,900	3	3	71/29	60
Taunton Road: Stevenson Road to Simcoe Road	28,300	31,600	2	2	71/29	60

5.2 Predicted Sound Levels

Sound levels for the OLAs were calculated without the project and with the project. Sound levels were calculated using the STAMSON v 5.04 computer program's implementation of the ORNAMENT prediction model.

The sound levels are calculated in the outdoor living areas of the receptors, 3m from the rear face of the building and 1.5m high off the ground. Sound levels were calculated on the basis of a 16-hour daytime L_{eq} (07:00–23:00).

Three conditions have been assessed: Existing (2022), Future "Do Nothing" (2033), and Future "With Reconstruction Within the ROW" (2033). The existing sound levels have been provided as a reference to document the current conditions. They are not used in the analysis that determines if noise mitigation is required. Since this project does not involve the addition of additional travel lanes, the Future "Do Nothing" and Future "With Reconstruction Within the ROW" traffic volumes are identical. The only substantive changes that would affect the overall sound levels are minor shifts to the roadway alignment. The predicted sound levels are summarized in Table 5, below.

Table 5: Predicted Sound Levels

Receptor	Daytime Sound Level (dBA, 16-hour, L_{eq})			Noise Impact due to Project* (dB)	≥ +5 dB Impact
	Existing (2022)	Future "Do Nothing" (2033)	Future "With Reconstruction Within ROW" (2033)		
1	41.0	42.4	42.5	0.1	No
2	40.2	41.7	41.7	0	No
3	43.3	44.6	44.7	0.1	No
4	42.6	44.1	44.1	0	No
5	41.9	43.4	43.4	0	No
6	42.7	44.2	44.2	0	No
7	40.3	43.4	43.4	0	No
8	54.2	55.4	55.4	0	No

*The noise impact is defined as the Future "With Reconstruction within ROW" noise level minus the Future "Do Nothing" sound level.

As seen in Table 5, the changes in sound levels with the project do not exceed 5 dB at any of the receptors. This is expected as the only substantive change that would affect the overall sound levels are minor shifts in the roadway alignment.

While the Region of Durham's noise policy do not apply to a City road, it should be noted that all sound levels are still below 60 dB and would not require noise mitigation in any case.

5.3 Noise Mitigation

Noise mitigation is not required as the change in sound levels with the project is less than 1 dB when compared to the sound levels without the project at all the receptors. This is well below the 5 dB impact needed to consider noise mitigation measures.

6.0 CONSTRUCTION NOISE

Construction noise is temporary and will cease once the project is completed. As it is transient and not permanent, the associated effects of construction noise will be short term in nature. It is recommended the City of Oshawa Noise By-law be adhered to by the contractor during construction of the project.

In addition to adhering to the by-law, the contractor's equipment must also meet the MECP guidelines as found in *NPC-115* and *NPC-118*, which sets sound emission standards for various items of construction equipment according to the date of manufacture of the equipment.

Much of the construction equipment that is likely to be required for the proposed road construction work is not unusual. As a result, the sounds associated with the construction activities will not be alien to most residents in an urban area. It is recommended the City's standard complaints procedure be applied to this project, to provide a forum for residents to voice their concerns over unwarranted construction noise. If warranted, the Region may request the contractor to conduct sound level monitoring of construction activities.

7.0 CONCLUSION

The results of the assessment show that there is no change in future sound level with the project. Given the lack of impacts, noise mitigation is not required for the nearby sensitive receptors.

Construction activity should adhere to the City of Oshawa noise by-laws and provincial guidelines as found in *NPC-115* and *NPC-118*. The City's standard protocol for addressing noise complaints during construction should be applied to the project. A noise monitoring program may be required in the event of complaints from nearby residents, as a result of construction noise.

APPENDIX A: FIGURES AND TRAFFIC DATA

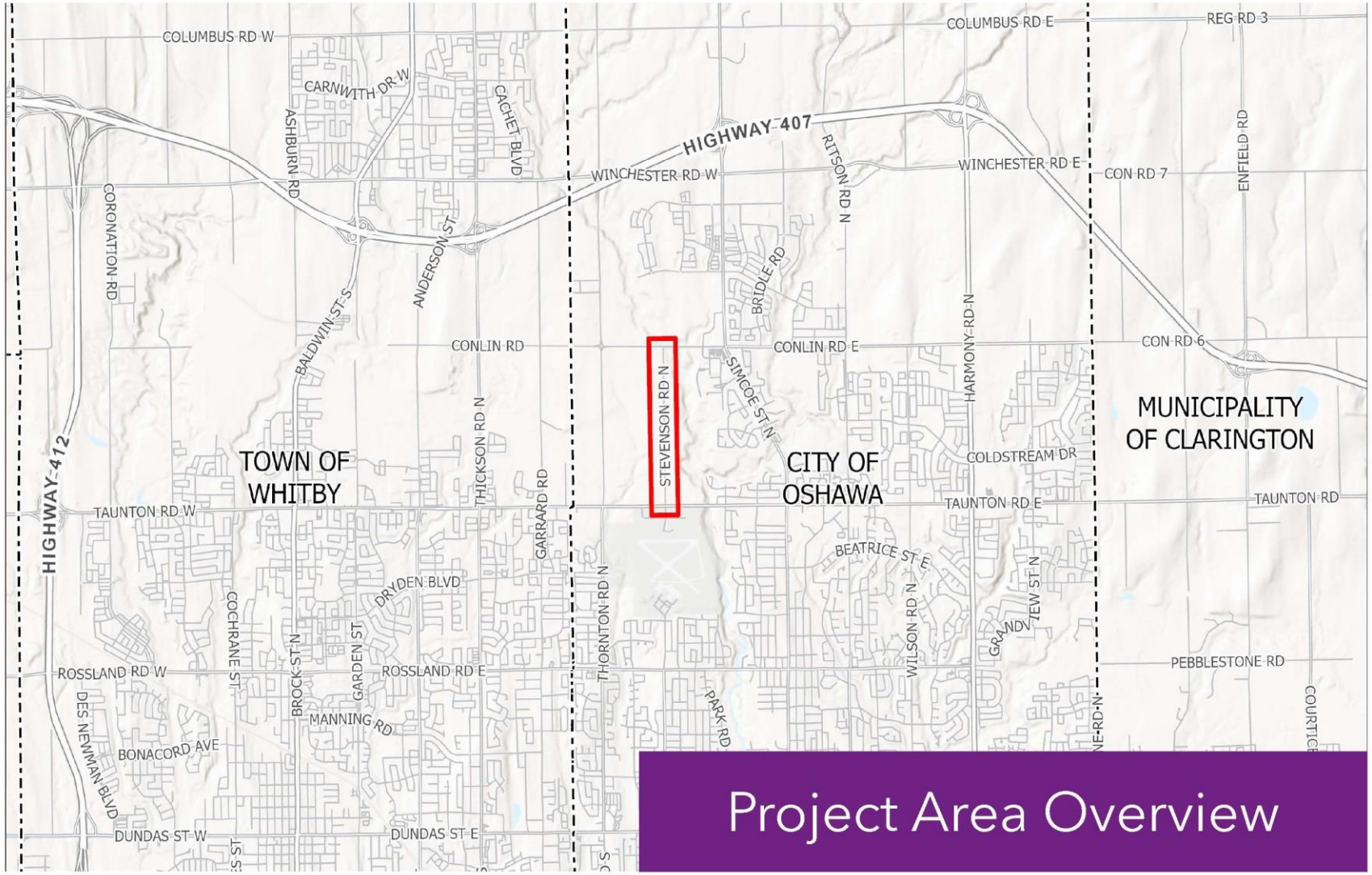

Figure 1: Key Plan

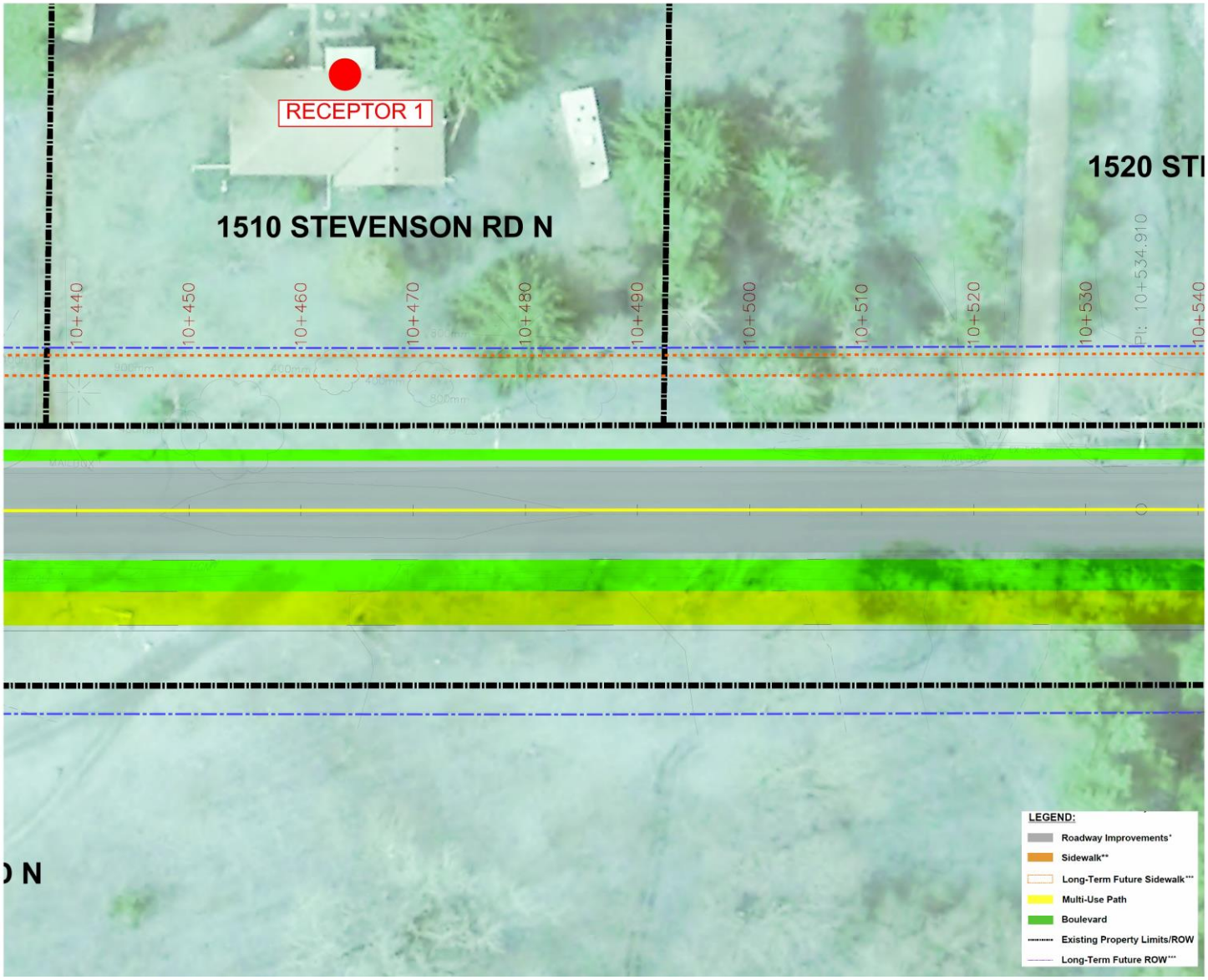

Figure 2: Location of Receptor 1

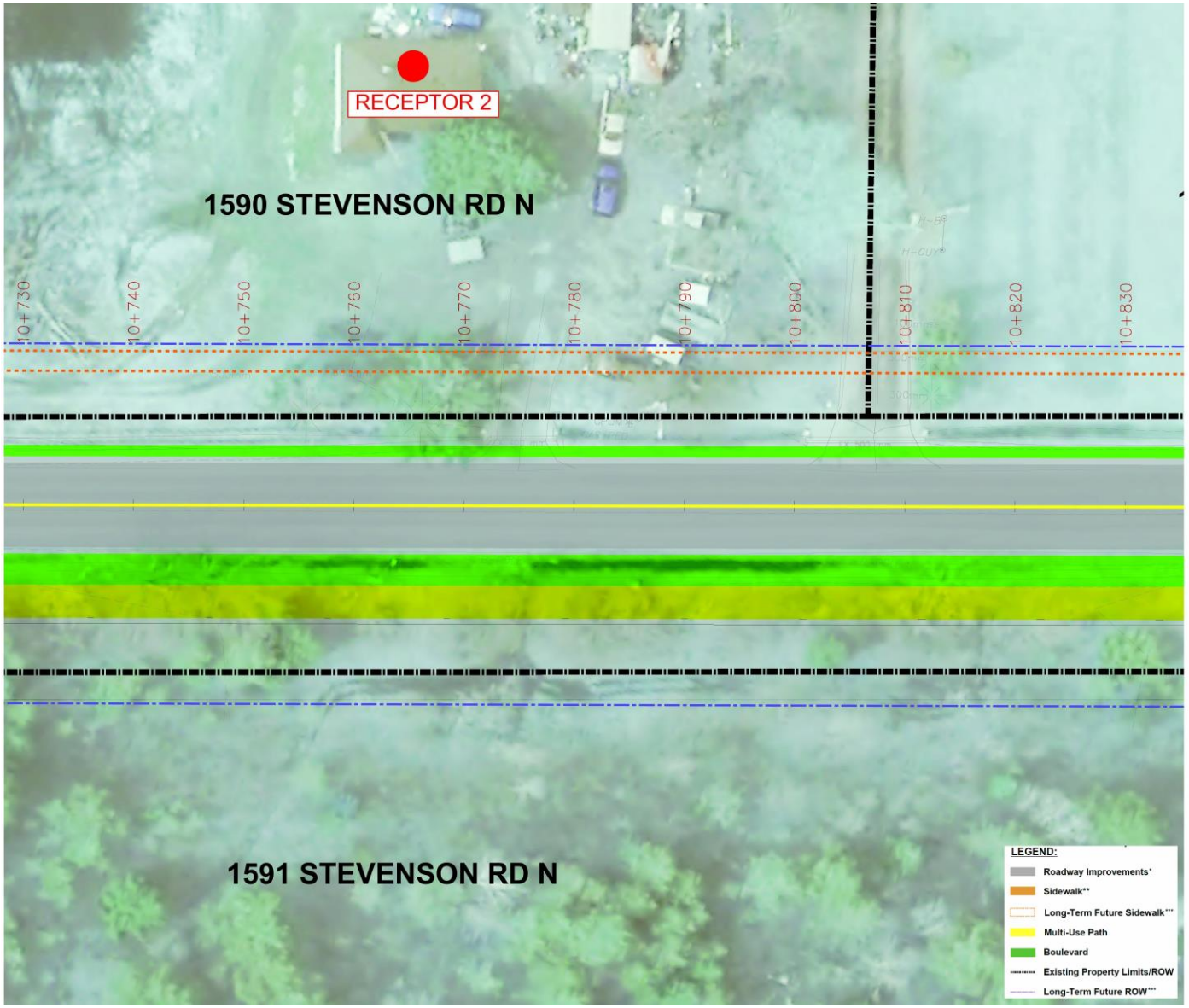

Figure 3: Location of Receptor 2

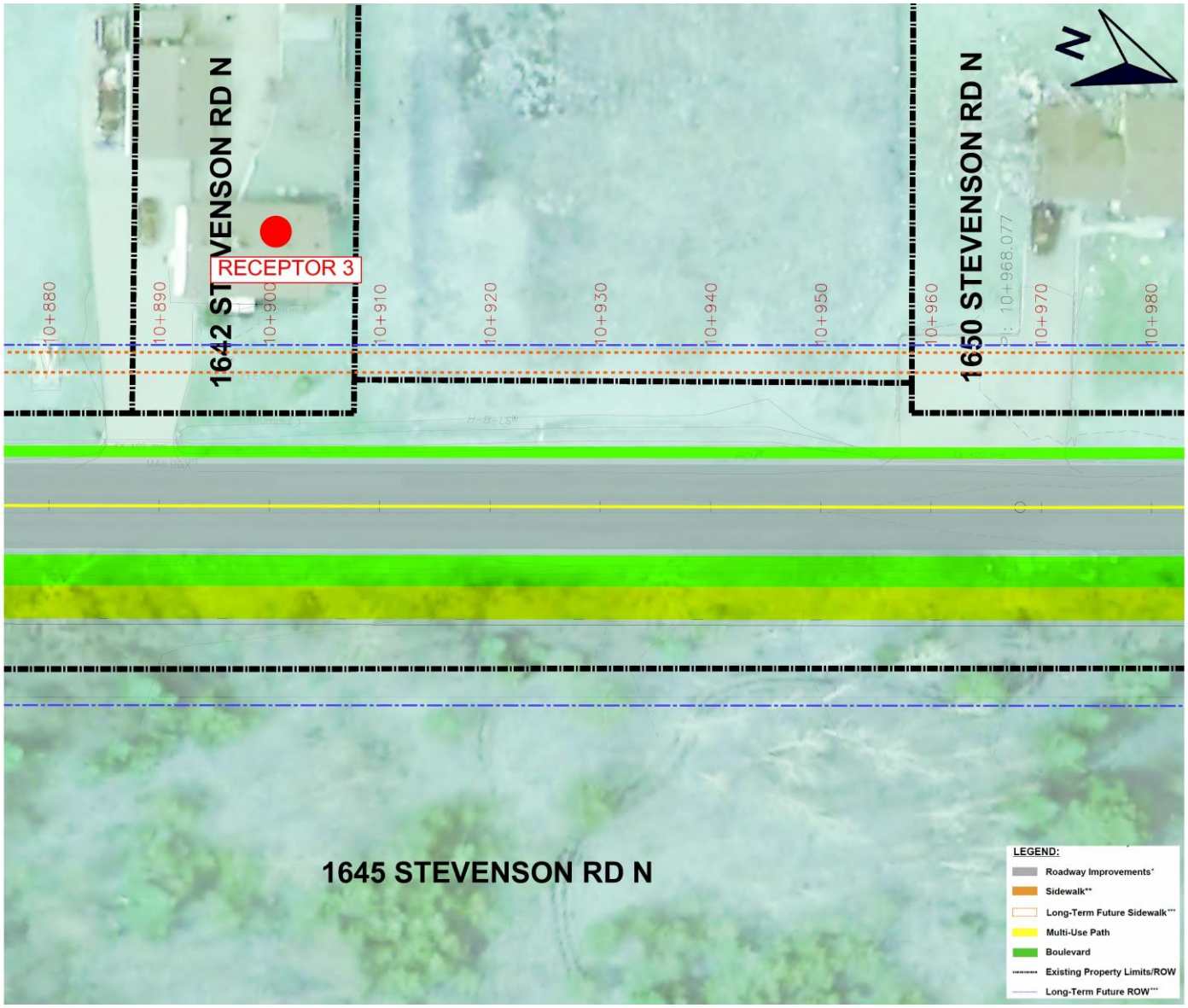

Figure 4: Location of Receptor 3

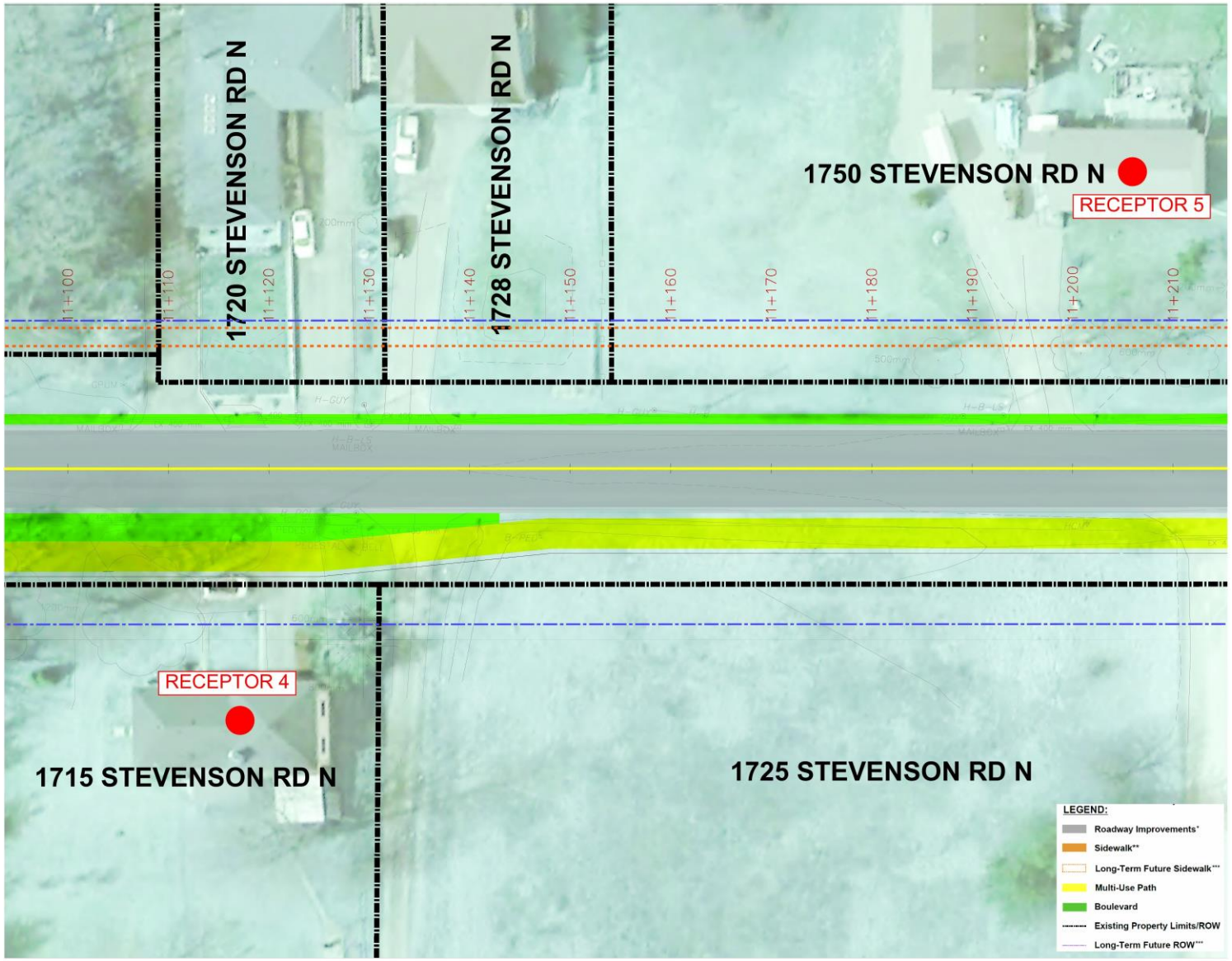

Figure 5: Location of Receptors 4 and 5

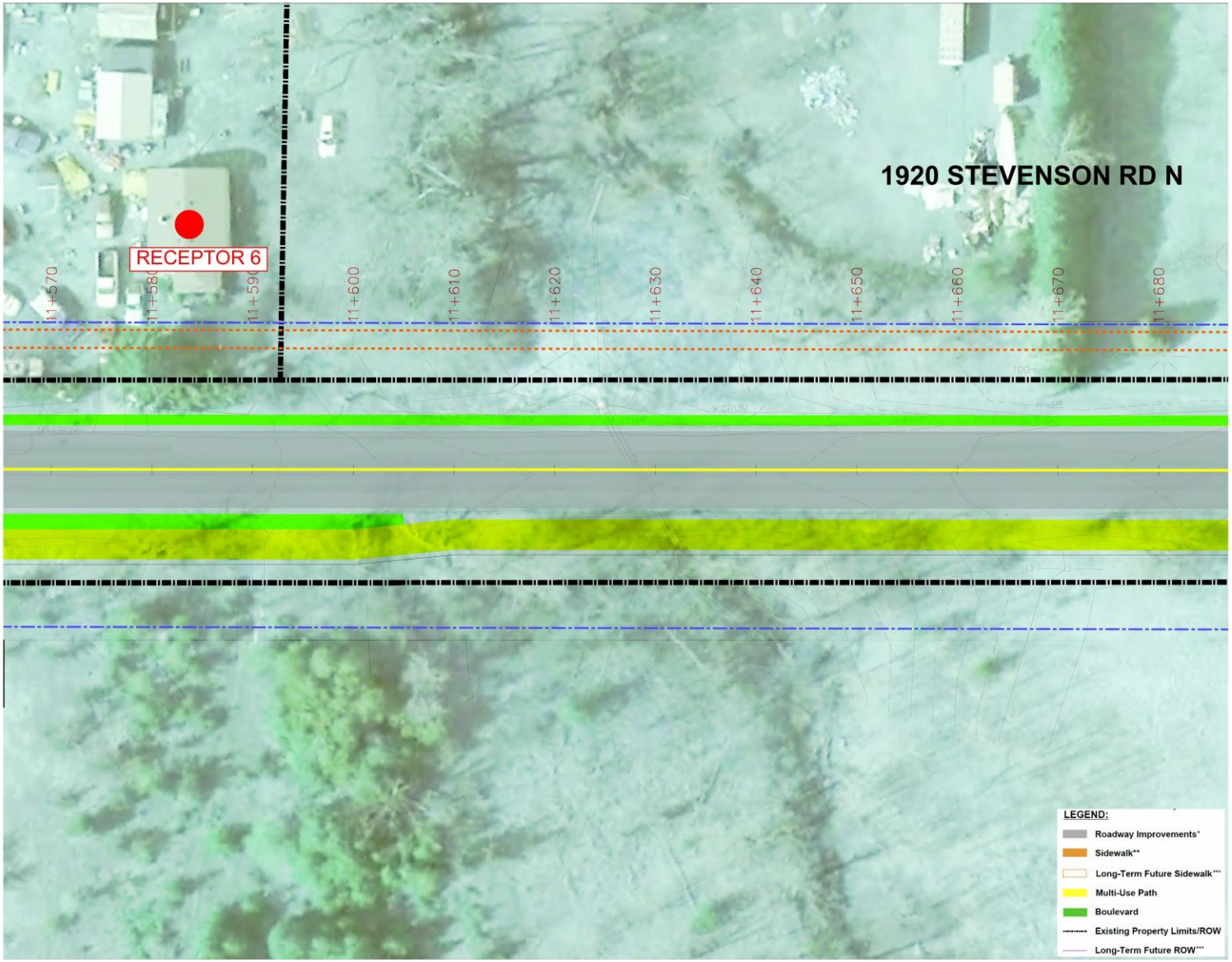

Figure 6: Location of Receptors 6

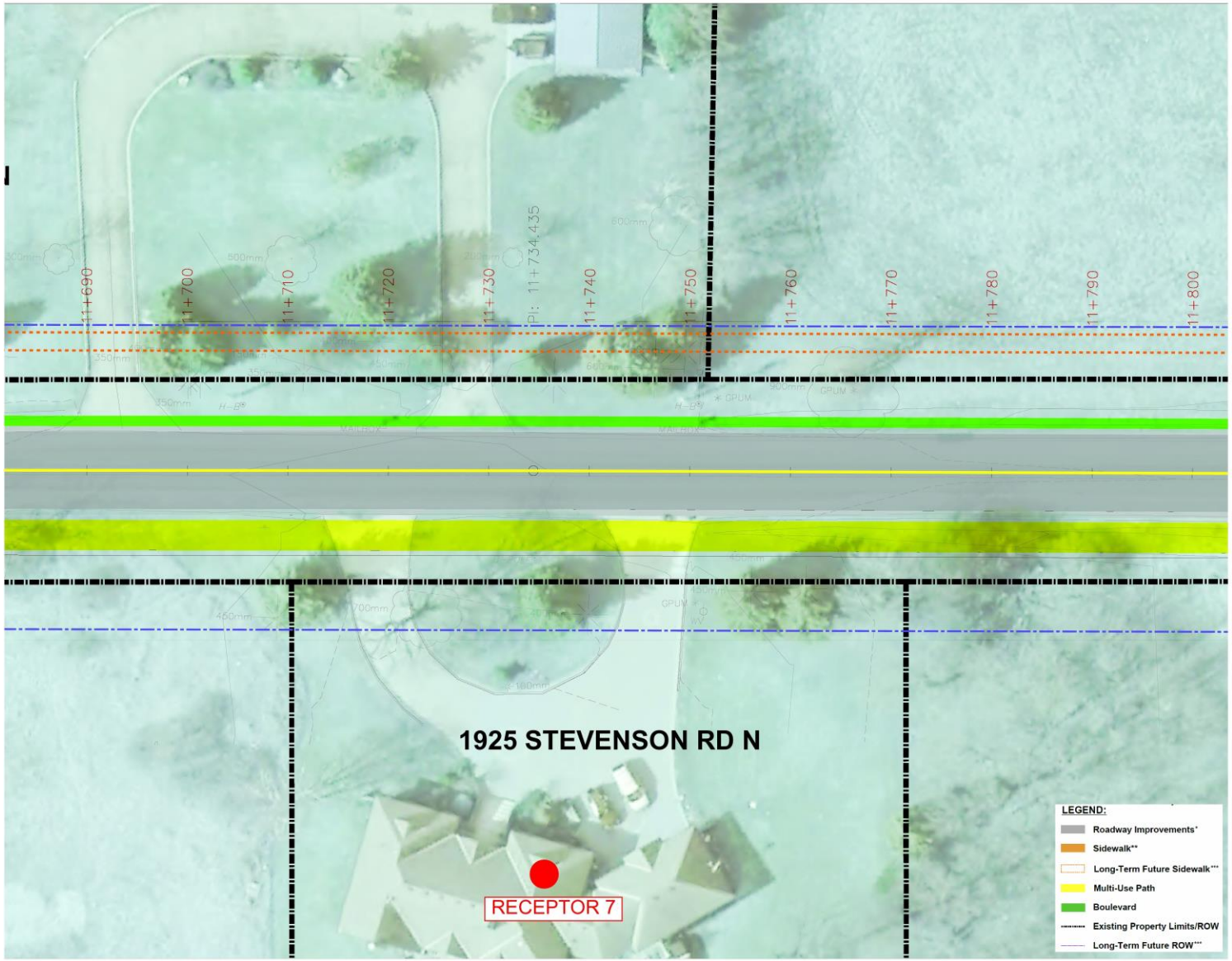

Figure 7: Location of Receptors 7

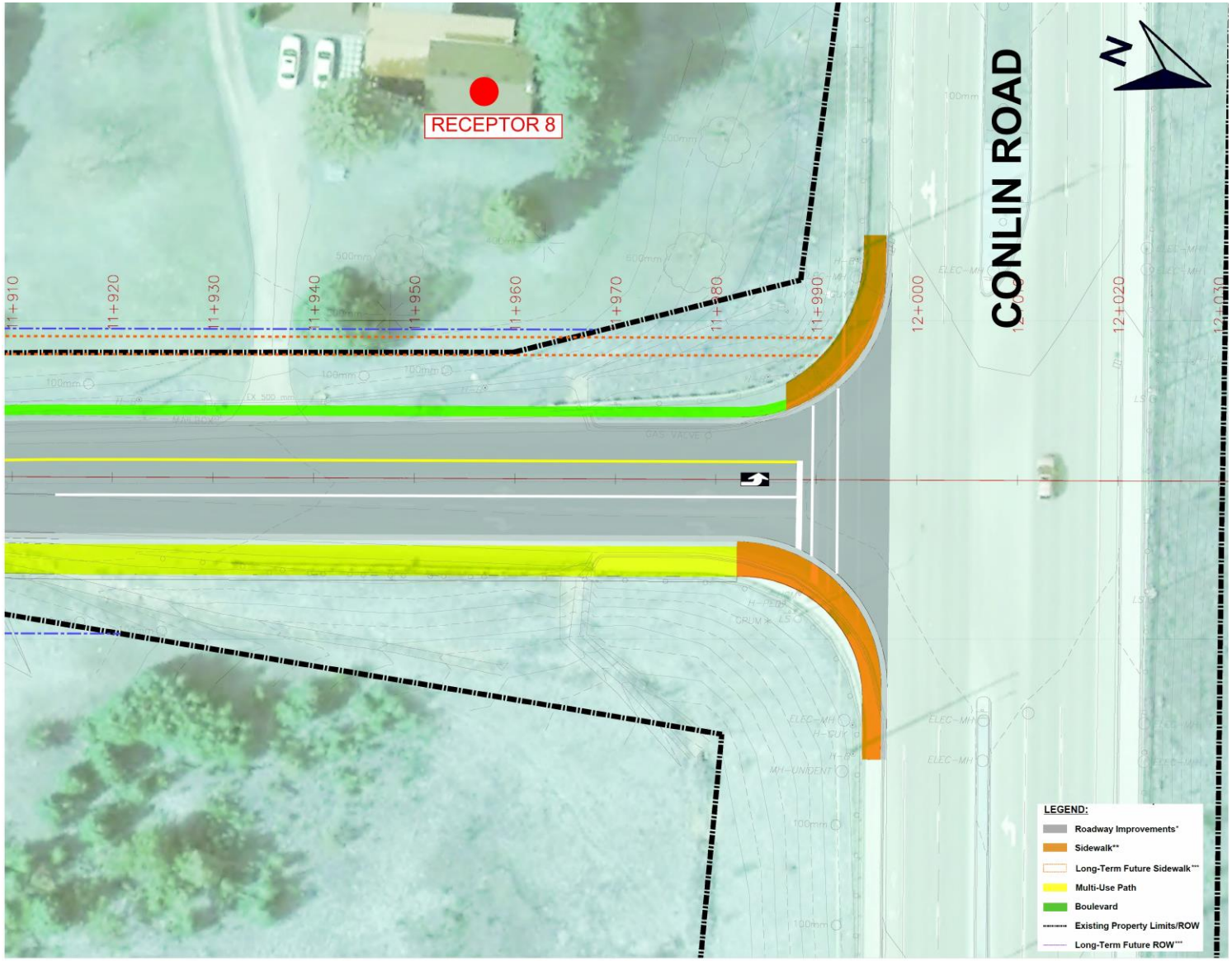

Figure 8: Location of Receptors 8

Stevenson Road North EA - AADT for Existing and Future Conditions

Date: October, 2024

Road Segment	Existing Conditions (2022)				Future Conditions (2033)		
	Estimated AADT	Growth Rate	Day/night Split	Truck %	Estimated AADT	Day/night Split	Truck %
Stevenson Road: Conlin Road to Taunton Road	1,900	3.0%	68%/32%	2.0%	2,700	68%/32%	2.0%
Conlin Road: Thornton Road to Stevenson Road	13,200	2.5%	71%/29%	4.0%	17,400	71%/29%	4.0%
Conlin Road: Stevenson Road to Simcoe Road	13,800	2.5%	71%/29%	4.0%	18,200	71%/29%	4.0%
Taunton Road: Thornton Road to Stevenson Road	26,800	1.0%	71%/29%	6.0%	29,900	71%/29%	6.0%
Taunton Road: Stevenson Road to Simcoe Road	28,300	1.0%	71%/29%	4.0%	31,600	71%/29%	4.0%

Notes:

1. Existing AADT was estimated from peak hour link counts (peak hour is assumed to be 10% of AADT).

2. Day/Night split was estimated from available ATR counts.

Figure 9: Traffic Volumes

APPENDIX B: SOUND LEVEL CALCULATIONS

STAMSON 5.0 NORMAL REPORT
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: recep3ex.te Time Period: Day/Night 16/8 hours
Description: Receptor 3 Existing

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

Car traffic volume : 1266/596 veh/TimePeriod *
Medium truck volume : 13/6 veh/TimePeriod *
Heavy truck volume : 13/6 veh/TimePeriod *
Posted speed limit : 50 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 1900
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 1.00
Heavy Truck % of Total Volume : 1.00
Day (16 hrs) % of Total Volume : 68.00

Data for Segment # 1: Stevenson Rd (day/night)

Angle1 Angle2 : -90.00 deg 0.00 deg
Wood depth : 0 (No woods.)
No of house rows : 1
Surface : 1 (Absorptive ground surface)
Receiver source distance : 30.50
Receiver height : 1.50
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Stevenson Rd (day)

Source height = 1.00 m

ROAD (0.00 + 43.26 + 0.00) = 43.26 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	0	0.66	53.62	0.00	-5.00	-4.47	0.00	-0.90	0.00	43.26

Segment Leq : 43.26 dBA

Total Leq All Segments: 43.26 dBA

STAMSON 5.0 NORMAL REPORT
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: rec3fdn.te Time Period: Day/Night 16/8 hours
Description: Receptor 3 Future do nothing

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

Car traffic volume : 1799/847 veh/TimePeriod *
Medium truck volume : 18/9 veh/TimePeriod *
Heavy truck volume : 18/9 veh/TimePeriod *
Posted speed limit : 50 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 2700
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 1.00
Heavy Truck % of Total Volume : 1.00
Day (16 hrs) % of Total Volume : 68.00

Data for Segment # 1: Stevenson Rd (day/night)

Angle1 Angle2 : -90.00 deg 0.00 deg
Wood depth : 0 (No woods.)
No of house rows : 1
Surface : 1 (Absorptive ground surface)
Receiver source distance : 30.50
Receiver height : 1.50
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Stevenson Rd (day)

Source height = 1.00 m

ROAD (0.00 + 44.61 + 0.00) = 44.61 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	0	0.66	55.10	0.00	-5.12	-4.47	0.00	-0.90	0.00	44.61

Segment Leq : 44.61 dBA

Total Leq All Segments: 44.61 dBA

STAMSON 5.0 NORMAL REPORT
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: rec3fup.te Time Period: Day/Night 16/8 hours
Description: Receptor 3 Future with Project

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

Car traffic volume : 1799/847 veh/TimePeriod *
Medium truck volume : 18/9 veh/TimePeriod *
Heavy truck volume : 18/9 veh/TimePeriod *
Posted speed limit : 50 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 2700
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 1.00
Heavy Truck % of Total Volume : 1.00
Day (16 hrs) % of Total Volume : 68.00

Data for Segment # 1: Stevenson Rd (day/night)

Angle1 Angle2 : -90.00 deg 0.00 deg
Wood depth : 0 (No woods.)
No of house rows : 1
Surface : 1 (Absorptive ground surface)
Receiver source distance : 30.00
Receiver height : 1.50
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Stevenson Rd (day)

Source height = 1.00 m

ROAD (0.00 + 44.73 + 0.00) = 44.73 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	0	0.66	55.10	0.00	-5.00	-4.47	0.00	-0.90	0.00	44.73

Segment Leq : 44.73 dBA

Total Leq All Segments: 44.73 dBA

STAMSON 5.0 NORMAL REPORT
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: rec8ex.te Time Period: Day/Night 16/8 hours
Description: Receptor 8 Existing

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

Car traffic volume	1266/596	veh/TimePeriod *
Medium truck volume	13/6	veh/TimePeriod *
Heavy truck volume	13/6	veh/TimePeriod *
Posted speed limit	50 km/h	
Road gradient	0 %	
Road pavement	1 (Typical asphalt or concrete)	

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

24 hr Traffic Volume (AADT or SADT)	1900
Percentage of Annual Growth	0.00
Number of Years of Growth	0.00
Medium Truck % of Total Volume	1.00
Heavy Truck % of Total Volume	1.00
Day (16 hrs) % of Total Volume	68.00

Data for Segment # 1: Stevenson Rd (day/night)

Angle1 Angle2	0.00 deg	90.00 deg
Wood depth	0	(No woods.)
No of house rows	1	
Surface	1	(Absorptive ground surface)
Receiver source distance	51.00	
Receiver height	1.50	
Topography	1	(Flat/gentle slope; no barrier)
Reference angle	0.00	

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

Car traffic volume	8997/3675	veh/TimePeriod *
Medium truck volume	187/77	veh/TimePeriod *
Heavy truck volume	187/77	veh/TimePeriod *
Posted speed limit	50 km/h	
Road gradient	0 %	
Road pavement	1 (Typical asphalt or concrete)	

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

24 hr Traffic Volume (AADT or SADT)	13200
Percentage of Annual Growth	0.00
Number of Years of Growth	0.00
Medium Truck % of Total Volume	2.00
Heavy Truck % of Total Volume	2.00
Day (16 hrs) % of Total Volume	71.00

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

Angle1 Angle2	: -90.00 deg	90.00 deg	
Wood depth	: 0	(No woods.)	
No of house rows	: 0		
Surface	: 1	(Absorptive ground surface)	
Receiver source distance	: 47.00		
Receiver height	: 1.50		
Topography	: 1	(Flat/gentle slope; no barrier)	
Reference angle	: 0.00		

Results segment # 1: Stevenson Rd (day)

Source height = 1.00 m

ROAD (0.00 + 37.60 + 0.00) = 37.60 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	90	0.66	53.62	0.00	-8.82	-4.47	0.00	-2.73	0.00	37.60

Segment Leq : 37.60 dBA

Results segment # 2: Conlin (day)

Source height = 1.19 m

ROAD (0.00 + 54.07 + 0.00) = 54.07 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.66	63.76	0.00	-8.23	-1.46	0.00	0.00	0.00	54.07

Segment Leq : 54.07 dBA

Total Leq All Segments: 54.17 dBA

STAMSON 5.0 NORMAL REPORT
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: rec8fdn.te Time Period: Day/Night 16/8 hours
Description: Receptor 8 Future do nothing

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

Car traffic volume	:	1799/847 veh/TimePeriod	*
Medium truck volume	:	18/9 veh/TimePeriod	*
Heavy truck volume	:	18/9 veh/TimePeriod	*
Posted speed limit	:	50 km/h	
Road gradient	:	0 %	
Road pavement	:	1 (Typical asphalt or concrete)	

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

24 hr Traffic Volume (AADT or SADT)	:	2700
Percentage of Annual Growth	:	0.00
Number of Years of Growth	:	0.00
Medium Truck % of Total Volume	:	1.00
Heavy Truck % of Total Volume	:	1.00
Day (16 hrs) % of Total Volume	:	68.00

Data for Segment # 1: Stevenson Rd (day/night)

Angle1 Angle2	:	0.00 deg	90.00 deg
Wood depth	:	0	(No woods.)
No of house rows	:	1	
Surface	:	1	(Absorptive ground surface)
Receiver source distance	:	51.00	
Receiver height	:	1.50	
Topography	:	1	(Flat/gentle slope; no barrier)
Reference angle	:	0.00	

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

Car traffic volume	:	11860/4844 veh/TimePeriod	*
Medium truck volume	:	247/101 veh/TimePeriod	*
Heavy truck volume	:	247/101 veh/TimePeriod	*
Posted speed limit	:	50 km/h	
Road gradient	:	0 %	
Road pavement	:	1 (Typical asphalt or concrete)	

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

24 hr Traffic Volume (AADT or SADT)	:	17400
Percentage of Annual Growth	:	0.00
Number of Years of Growth	:	0.00
Medium Truck % of Total Volume	:	2.00
Heavy Truck % of Total Volume	:	2.00
Day (16 hrs) % of Total Volume	:	71.00

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

Angle1 Angle2	:	-90.00 deg	90.00 deg
Wood depth	:	0	(No woods.)
No of house rows	:	0	
Surface	:	1	(Absorptive ground surface)
Receiver source distance	:	47.00	
Receiver height	:	1.50	
Topography	:	1	(Flat/gentle slope; no barrier)
Reference angle	:	0.00	

Results segment # 1: Stevenson Rd (day)

Source height = 1.00 m

ROAD (0.00 + 39.08 + 0.00) = 39.08 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	90	0.66	55.10	0.00	-8.82	-4.47	0.00	-2.73	0.00	39.08

Segment Leq : 39.08 dBA

Results segment # 2: Conlin (day)

Source height = 1.19 m

ROAD (0.00 + 55.28 + 0.00) = 55.28 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.66	64.97	0.00	-8.23	-1.46	0.00	0.00	0.00	55.28

Segment Leq : 55.28 dBA

Total Leq All Segments: 55.38 dBA

STAMSON 5.0 NORMAL REPORT
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: rec8fup.te Time Period: Day/Night 16/8 hours
Description: Receptor 8 Future with Project

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

Car traffic volume	:	1799/847 veh/TimePeriod	*
Medium truck volume	:	18/9 veh/TimePeriod	*
Heavy truck volume	:	18/9 veh/TimePeriod	*
Posted speed limit	:	50 km/h	
Road gradient	:	0 %	
Road pavement	:	1 (Typical asphalt or concrete)	

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

24 hr Traffic Volume (AADT or SADT)	:	2700
Percentage of Annual Growth	:	0.00
Number of Years of Growth	:	0.00
Medium Truck % of Total Volume	:	1.00
Heavy Truck % of Total Volume	:	1.00
Day (16 hrs) % of Total Volume	:	68.00

Data for Segment # 1: Stevenson Rd (day/night)

Angle1 Angle2	:	0.00 deg	90.00 deg
Wood depth	:	0	(No woods.)
No of house rows	:	1	
Surface	:	1	(Absorptive ground surface)
Receiver source distance	:	50.00	
Receiver height	:	1.50	
Topography	:	1	(Flat/gentle slope; no barrier)
Reference angle	:	0.00	

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

Car traffic volume	:	11860/4844 veh/TimePeriod	*
Medium truck volume	:	247/101 veh/TimePeriod	*
Heavy truck volume	:	247/101 veh/TimePeriod	*
Posted speed limit	:	50 km/h	
Road gradient	:	0 %	
Road pavement	:	1 (Typical asphalt or concrete)	

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

24 hr Traffic Volume (AADT or SADT)	:	17400
Percentage of Annual Growth	:	0.00
Number of Years of Growth	:	0.00
Medium Truck % of Total Volume	:	2.00
Heavy Truck % of Total Volume	:	2.00
Day (16 hrs) % of Total Volume	:	71.00

```
Data for Segment # 2: Conlin (day/night)
----------------------------------------
Angle1   Angle2           : -90.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  47.00
Receiver height           :   1.50
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Results segment # 1: Stevenson Rd (day)
---------------------------------------

Source height = 1.00 m

ROAD (0.00 + 39.22 + 0.00) = 39.22 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
     0     90   0.66  55.10   0.00  -8.68  -4.47   0.00  -2.73   0.00
39.22
-------------------------------------------------------------------------
--

Segment Leq : 39.22 dBA


Results segment # 2: Conlin (day)
---------------------------------

Source height = 1.19 m

ROAD (0.00 + 55.28 + 0.00) = 55.28 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
   -90     90   0.66  64.97   0.00  -8.23  -1.46   0.00   0.00   0.00
55.28
-------------------------------------------------------------------------
--

Segment Leq : 55.28 dBA

Total Leq All Segments: 55.39 dBA
```

APPENDIX C: REFERENCES

1. Ministry of the Environment, “Model Municipal Noise Control By-Law, Final Report,” August 1978.

2. Model Municipal Noise Control By-Law, Final Report, Publication NPC-115, Construction Equipment, August 1978

3. Ministry of the Environment's STAMSON Computer Programme (Version 5.04).

4. Ministry of Transportation, Environmental Guide for Noise, October 2022

5. City of Oshawa, Public Information Centre #2 – Stevenson Road North Environmental Assessment from Taunton Road West to Conlin Road West, June 2024

6. The Regional Municipality of Durham, Report: 2012-W-83, June 2012