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Environmental Noise Control Study

Proposed Multi-Storey Apartment Buildings
Smyth Road at Riverside Drive, Ottawa

Prepared For

Schlegel Villages

November 2, 2021

Report: PG5948-1

Paterson Group Inc.
Consulting Engineers
154 Colonnade Road South
Ottawa (Nepean), Ontario
Canada K2E 7J5

Tel: (613) 226-7381
Fax: (613) 226-6344
www.patersongroup.ca

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1.0 Introduction

Paterson Group (Paterson) was commissioned by Schlegel Villages to conduct an environmental noise control study for the proposed multi-storey apartment buildings to be located at Smyth Road at Riverside Drive, in the City of Ottawa.

The objective of the current study is to:

- Determine the primary noise sources impacting the site and compare the projected sound levels to guidelines set out by the Ministry of Environment and Climate Change (MOECC) and the City of Ottawa.

- Review the projected noise levels and offer recommendations regarding warning classes, construction materials or alternative sound barriers.

The following report has been prepared specifically and solely for the aforementioned project which is described herein. It contains our findings and includes acoustical recommendations pertaining to the design and construction of the subject development as they are understood at the time of writing this report.

This study has been conducted according to City of Ottawa document - Engineering Noise Control Guidelines (ENCG), dated January 2016, and the Ontario Ministry of the Environment Guideline NPC-300.

2.0 Proposed Development

It is understood that the proposed development will consist of two (2) phases. The first phase consists of an eight (8) storey LTC Home rising approximately 24 metres above grade, and the second phase consists of a fifteen (15) storey Retirement Dwelling rising approximately 45 metres above grade. A total of 256 units and 250 units are expected at the Phase 1 – LTC Home and Phase 2 – Retirement Dwelling, respectively. Associated at-grade parking areas, LTC secure garden, common garden, village courtyard, landscaped areas, and walkways are also anticipated. No outdoor living area is identified on the proposed site plan.

3.0 Methodology and Noise Assessment Criteria

The City of Ottawa outlines three (3) sources of environmental noise that must be analyzed separately:

- Surface Transportation Noise
- Stationary Noise
  - new noise-sensitive development applications (noise receptors) in proximity to existing or approved stationary sources of noise, and
  - new stationary sources of noise (noise generating) in proximity to existing or approved noise-sensitive developments
- Aircraft Noise

Surface Transportation Noise

Surface roadway traffic noise, equivalent to sound level energy L_{eq}, provides a measure of the time varying noise level over a period of time. For roadways, the L_{eq} is commonly calculated on the basis of 16-hour (L_{eq16}) daytime (07:00-23:00) and 8-hour (L_{eq8}) nighttime (23:00-7:00) split to assess its impact on residential, commercial and institutional buildings.

The City of Ottawa's Official Plan dictates that the influence area must contain any of following conditions to classify as a surface transportation noise source for a subject site:

- Within 100 m of the right-of-way of an existing or proposed arterial, collector or major collector road; a light rail transit corridor; bus rapid transit, or transit priority corridor
- Within 250 m of the right-of-way for an existing or proposed highway or secondary rail line
- Within 300 m from the right of way of a proposed or existing rail corridor or a secondary main railway line
- Within 500 m of an existing 400 series provincial highway, freeway or principle main railway line.

The Environmental Noise Guidelines for Stationary and Transportation Sources – NPC-300 outlines the limitations of noise levels in relation to the location of the receptors. These can be found in the following tables:

Table 1 - Noise Level Limit for Outdoor Living Areas

Time Period	L_{eq} Level (dBA)
Daytime, 7:00-23:00	55
➢ Standard taken from Table 2.2a; Sound Level Limit for Outdoor Living Areas – Road and Rail	

Table 2 - Noise Level Limits for Indoor Living Areas

Type of Space	Time Period	L_{eq} Level (dBA)	
		Road	Rail
General offices, reception areas, retail stores, etc.	Daytime 7:00-23:00	50	45
Theatres, places of worship, libraries, individual or semi-private offices, conference rooms, reading rooms, etc.	Daytime 7:00-23:00	45	40
Living/dining/den areas of **residences**, hospitals, nursing/retirement homes, schools, day-care centres	Daytime 7:00-23:00	45	40
Living/dining/den areas of **residences**, hospitals, nursing/retirement homes etc. (except schools or day-care centres)	Nighttime 23:00-7:00	45	40
Sleeping quarters of hotels/motels	Nighttime 23:00-7:00	45	40
Sleeping quarters of **residences**, hospitals, nursing/retirement homes, etc.	Nighttime 23:00-7:00	40	35
➢ Standards taken from Table 2.2b, Sound Level Limit for Indoor Living Areas – Road and Rail and Table 2.2c, Supplementary Sound Level Limits for Indoor Spaces – Road and Rail			

Predicted noise levels at the pane of window (POW) dictate the action required to achieve recommended noise levels. It is noted in ENCG that the limits outlined in Table 2 are for the noise levels on the interior of the window glass pane. An open window is considered to provide a 10 dBA noise reduction, while a standard closed window is capable to provide a minimum 20 dBA noise reduction. Therefore, where noise levels exceed 55 dBA daytime and 50 dBA nighttime, the ventilation for the building should consider the provision for central air conditioning. Where noise levels exceed 65 dBA daytime and 60 dBA nighttime, central air conditioning will be required, and the building components will require higher levels of sound attenuation.

If the noise level limits at POW are exceeded, the following Warning Clauses should be included in related deeds of sale:

Table 3 - Warning Clauses for Noise Level Exceedances

Warning Clause	Description
Warning Clause Type A	"Purchasers/tenants are advised that sound levels due to increasing road traffic (rail traffic) (air traffic) may occasionally interfere with some activities of the dwelling occupants as the sound levels exceed the sound level limits of the Municipality and the Ministry of the Environment."
Warning Clause 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 traffic (rail traffic) (air traffic) may on occasions interfere with some activities of the dwelling occupants as the sound levels exceed the sound level limits of the Municipality and the Ministry of the Environment."
Warning Clause 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 Municipality and the Ministry of the Environment."
Warning Clause 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 sound level limits of the Municipality and the Ministry of the Environment."
➢ Clauses taken from section C8 Warning Clauses; Environmental Noise Guidelines for Stationary and Transportation Sources - NPC-300	

Stationary Noise

Stationary noise sources include sources or facilities that are fixed or mobile and can cause a combination of sound and vibration levels emitted beyond the property line. These sources may include commercial air conditioner units, generators and fans. Facilities that may contribute to stationary noise may include car washes, snow disposal sites, transit stations and manufacturing facilities.

The subject site is not in proximity to existing or approved stationary sources of noise. Therefore, a stationary noise analysis will not be required.

Aircraft / Airport Noise

The subject site is not located within the Airport Vicinity Development Zone. Therefore this project will not require an aircraft/airport noise analysis. No warning clauses regarding aircraft or airport noise will be required.

4.0 Methodology and Vibration Assessment Criteria

Due to the location of the existing O-Train Railway Trillium Line, a ground vibration and ground-borne noise review was also performed for this development.

Effects of the Rail Corridor on the Proposed Development

The human body can be affected by exposure to vibration, in particular ground-borne vibrations occurring at low frequencies. These can be caused by the surrounding vibration sources previously identified, such as wheels on a road or rail system. These ground-borne vibrations can cause the building to shake (ground-borne vibration) and/or cause rumbling sounds (ground-borne noise).

The methods of defining and measuring vibrations has its own challenges, based on the oscillatory motion identified as a vibration. Due to the nature of the oscillatory motion of the vibration, there is no net movement of the vibration element, and therefore motion descriptors are zero.

There are two (2) main methods of defining the magnitude of the overall vibration. The main one utilized in construction activities is the peak particle velocity (PPV). The PPV is defined as the maximum instantaneous positive or negative peak of the vibration signal and is often used when monitoring blasting vibrations and is ideal for evaluating the potential for building damage.

However, human responses require a different method of analysis as the human body requires time to respond to vibration signals. The average vibration amplitude would be an applicable method of reporting the ground-borne vibrations that humans would respond to, however, with the vibration being represented as a sine wave, the average vibration amplitude would be zero. Therefore, the root mean square (RMS) amplitude, typically calculated over a 1 second interval, is utilized for the analysis. The RMS value is always less than the PPV.

General factors that could affect the magnitude of the created vibrations include, but are not limited to, whether the rail is above grade or below grade, speed, vehicle suspension, wheel and track condition, track support system, depth of system and soil conditions. It should be noted that vibrations that travel through the bedrock surface should be minimal, but can travel a further distance.

The Federal Transit Administration's Transit Noise and Vibration Impact Assessment Manual: FTA Report No. 0123 dated September 2018 outlines the vibration standards caused by rail sources. Upon review of this document, the following standards were obtained that are applicable to this analysis.

The criteria for the environmental impact from vibrations are based on the RMS vibration levels for repeated events. The proposed development would be classified as a Vibration Category 2 - Residential. The following table outlines the limits for ground-borne vibrations.

Table 4 - Ground-Borne Vibration (GBV) for General Assessment

Land Use Category	GBV Impact Levels (VdB re 1 micro-inch/sec)		
	Frequent Events	**Occasional Events**	**Infrequent Events**
Category 2	72 VdB	75 VdB	80 VdB
➢ Standards taken from Table 6.3; Indoor Ground-Borne Vibration and Ground-Borne Noise Impact Criteria for General Vibration Assessment. ➢ Frequent events is defined as more than 70 vibration events of the same source per day. Most rapid transit projects fall into this category. ➢ Occasional events is define as between 30 and 70 vibration events of the same source per day. Most commuter trunk lines have this number of operations. ➢ Infrequent events is defined as fewer than 30 vibration events of the same kind per day. This category includes most commuter rail branch lines.			

Ground-borne vibration can also result in ground-borne noise. This is separate from the noise caused by the trains directly, and instead focuses on the vibration of objects to emit noise. Similar to ground-borne vibration, the noise impacts are based on a criteria for human annoyance and activity interference. For residential buildings, the criteria for acceptability is given in the following table:

Table 5 - Ground-Borne Noise (GBN) for General Assessment

Land Use Category	GBN Impact Levels (dBA re 20 micro Pascals)		
	Frequent Events	**Occasional Events**	**Infrequent Events**
Category 2	35 VdB	38 VdB	43 VdB
➢ Standards taken from Table 6.3; Indoor Ground-Borne Vibration and Ground-Borne Noise Impact Criteria for General Vibration Assessment. ➢ Frequent events is defined as more than 70 vibration events of the same source per day. Most rapid transit projects fall into this category. ➢ Occasional events is define as between 30 and 70 vibration events of the same source per day. Most commuter trunk lines have this number of operations. ➢ Infrequent events is defined as fewer than 30 vibration events of the same kind per day. This category includes most commuter rail branch lines.			

5.0 Analysis

Surface Transportation Noise

The subject buildings are bordered to the north by Smyth Road followed by residential dwellings, to the east by VIA train railway followed by residential dwellings, to the south by institutional buildings, to the west by Transitway followed by Riverside Drive. Riverside Drive and Transitway are identified within the 100 m radius of Phase 1 - LTC Home, while Riverside Drive, Smyth Road, and Transitway are identified within the 100 m radius of Phase 2 – Retirement Dwelling.

Based on the City of Ottawa's Official Plan, Schedule F, Smyth Road is considered a 4 lane urban arterial divided road (4-UAD), and Riverside Drive is considered a 2 lane urban arterial road (2-UAU). Other roads within the 100 m radius of the proposed buildings are not classified as either arterial, collector or major collector roads and therefore are not included in this study.

The noise levels from road traffic are provided by the City of Ottawa, taking into consideration the right-of-way width and the implied roadway classification. It is understood that these values represent the maximum allowable capacity of the proposed roadways. The parameters to be used for sound level predictions can be found below.

Table 6 - Traffic and Road Parameters

Segment	Roadway Classification	AADT Veh/Day	Speed Limit (km/h)	Day/Night Split %	Medium Truck %	Heavy Truck %
Smyth Road	4-UAD	35000	50	92/8	7	5
Riverside Drive	2-UAU	15000	60	92/8	7	5
➢ Data obtained from the City of Ottawa document ENCG						

The Transitway is located at an elevation approximately 6 m below the elevation of both proposed buildings, with a 4 m vertical sidewall. This vertical sidewall will act as a sound barrier and has been designed taking this factor into consideration. The traffic volume of buses along the Transitway was calculated by counting the number of buses scheduled to travel on the Transitway during the daytime (7:00-23:00) and nighttime (23:00-7:00) on a weekday. Copies of the bus schedules are included in Appendix 3.

Table 7 - Transitway Parameters

Segment	Maximum Speed (km/hr)	Number of Trips/day (Daytime)	Number of Trips/day (Nighttime)
OC Transpo Bus	80	864	146
➢ Data calculated from the OC Transpo online schedules			

The Ottawa-Fallowfield Rail Line is located within 300 m of both proposed buildings. It is understood the Ottawa-Fallowfield Rail Line is used by VIA Rail. The traffic volume of VIA trains along the Ottawa-Fallowfield Rail Line was calculated by counting the number of trains scheduled to travel along the railway line on a weekday. Copies of the train schedules are included in Appendix 3. It was further confirmed by VIA Rail Canada that each VIA train consists of a diesel locomotive pulling 5 cars.

Table 8 - Rail Parameters

Segment	Engine Type	Maximum Speed (km/hr)	Number of Trips/day	Length of Train
VIA Rail	Diesel	100	12	7
➢ Data calculated from the VIA Train online schedules				

All noise sources for Phase 1 - LTC Home and Phase 2 – Retirement Dwelling are presented in Drawings PG5948-3 and PG5948-4 - Site Geometry, respectively, located in Appendix 1.

For this analysis, a reception point was taken at the centre of each floor, at the first floor and top floor. The following elevations were selected at the proposed buildings for analysis. Reception points are detailed on Drawing PG5948-2 - Receptor Locations presented in Appendix 1.

Table 9 - Elevation of Reception Points

Building	Floor Number	Elevation at Centre of Window (m)	Floor Use	Daytime / Nighttime Analysis
LTC Home Retirement Dwelling	First Floor	1.5	Living Area/Bedroom	Daytime / Nighttime
LTC Home	Eighth Floor	22.5	Living Area/Bedroom	Daytime / Nighttime
Retirement Dwelling	Fifteenth Floor	43.5	Living Area/Bedroom	Daytime / Nighttime

All horizontal distances have been measured from the reception point to the edge of the right-of-way. The rail line was analyzed where it intersected the 300 m buffer zone, the roadway was analyzed where it intersected the 100 m buffer zone, which is reflected in the local angles described in Paterson Drawings PG5948-3A to 3E and PG5948-4A to 4D - Site Geometry in Appendix 1.

Table 11 - Summary of Reception Points and Geometry, located in Appendix 1, provides a summary of the points of reception and their geometry with respect to the noise sources. The analysis is completed so that no effects of sound reflection off of the building facade are considered, as stipulated by the ENGC.

The subject site is gently sloping downward towards the west and at grade with the neighbouring roads within 100 m radius.

The analysis was completed using STAMSON version 5.04, a computer program which uses the road and rail traffic noise prediction methods using ORNAMENT (Ontario Road Noise Analysis Method for Environment and Transportation) and STEAM (Sound from Trains Environment Analysis Method), publications from the Ontario Ministry of Environment and Energy.

Standard mitigation measures for the VIA Train Rail Line - principle main line include a 30 m setback, a 2.5 m high earthen berm and a possible 3 m high acoustical fence. In this analysis, the mitigation measure includes a 30 m setback from the VIA Train railway. It is understood that acoustic fence and earthen berm are not included in this project. The railway is located at a slope with elevation 2 m higher than proposed buildings.

Ground-Borne Noise and Vibration

The VIA Train Rail Line is located along the eastern property line. It is understood that there will be 12 trains a day, at a maximum speed of approximately 100 km/hr (62 mph). It is further understood that there will be a 40 m (131 ft) buffer zone and a 35 m (115 ft) buffer zone from the centerline of VIA Train railway to the closest possible location of the proposed Phase 1 – LTC Home and Phase 2 – Retirement Dwelling, respectively.

The following figure is a base curve for ground surface vibration levels, assuming the equipment is in good condition and speeds of 80 km/hr (50 mph). Due to the nature of the rail line, identified as a rapid transit or light rail vehicle, this figure is applicable for the proposed buildings.

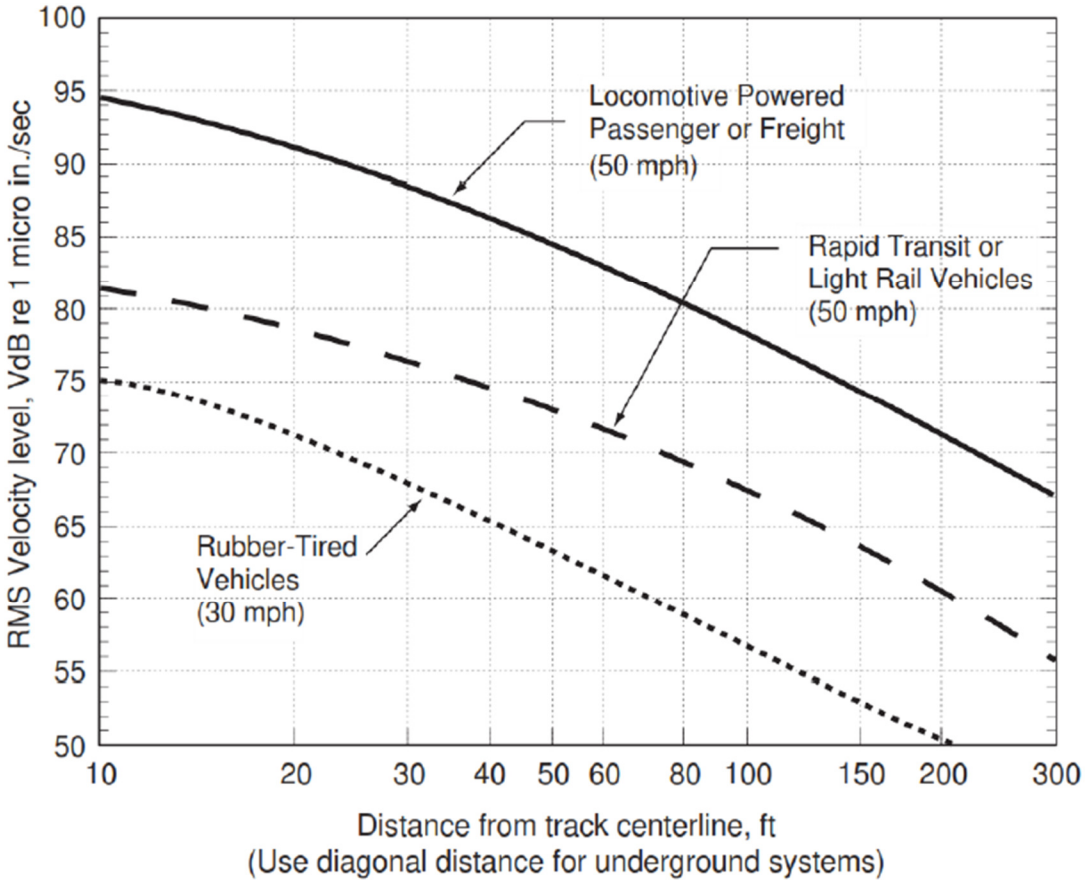

Figure 1. Generalized Ground Surface Vibration Curve

Figure 1 provides the generalized ground surface vibration curve, but adjustments, noted in Tables 6-11, 6-12 and 6-13 of the Transit Noise and Vibration Impact Assessment, can be made to the ground-borne vibration parameters. The most common adjustments are noted below:

Speed:	Vehicle speed - 97 km/hr (60 mph)	+1.6 dB
Track Conditions:	stiff primary suspension	+8 dB
Track Treatments:	Ballast	-10 dB
	High-resistence fasteners	-5 dB
	Resiliently supported ties	-10 dB
Track Structure:	at-grade tie & ballast; Elevated	-10 dB
	at-grade tie & ballast; Open cut	0 dB
Geologic Conditions:	in Soil	+10 dB
	in Rock layer (50 ft bgs.)	+2 dB
Building Foundation:	Large Masonry on Piles	-10 dB
	Large Masonry on Spread Footings	-13 dB
Floor-to-Floor Attenuation:	1 to 5 Floors above Grade	-2 dB/Floor
	5 to 10 Floors above Grade	-1 dB/Floor
	10 to 15 Floors above Grade	0 dB/Floor
Amplification due to Resonances:		+6 dB

From a review of the neighbouring railway, the following conditions were confirmed:

Vehicle speed - 100 km/hr (62 mph)
Soft Primary Suspension (resonance around 8-10 Hz)
No track treatment: Floating slab trackbed
No track treatment: Ballast Mats
No track treatment: High resilience fasteners
No track treatment: Resiliently supported ties.
No Worn or Corrugated Track
Track located at a slope with elevation 2 m higher than proposed buildings

From a review of the geotechnical founding conditions and the proposed buildings, the following conditions were confirmed:

Bedrock anticipated at 5 to 10 m below ground surface
Proposed buildings to be founded on glacial till
The rail line is constructed on (assumed) fill or engineered fill
Proposed buildings to be an 8-storey masonry and a 15-storey masonry

6.0 Results

Surface Transportation Noise

The primary descriptors are the 16-hour daytime (7:00-23:00) and the 8-hour nighttime (23:00-7:00) equivalent sound levels, $L_{eq(16)}$ and $L_{eq(8)}$ for City roads.

The exterior noise levels due to roadway traffic sources were analyzed with the STAMSON version 5.04 software at all reception points. The input and output data of the STAMSON modeling can be found in Appendix 2, and the summary of the results can be found in Table 10.

Table 10 - Exterior Noise Levels due to Roadway Traffic Sources

Reception Point	Height Above Grade (m)	Receptor Location	Daytime $L_{eq(16)}$ (dBA)	Nighttime $L_{eq(8)}$ (dBA)
REC 1-1	1.5	LTC Home - Western Elevation, 1st Floor	54	48
REC 1-8	22.5	LTC Home - Western Elevation, 8th Floor	64	58
REC 2-1	1.5	LTC Home - Northern Elevation, 1st Floor	54	44
REC 2-8	22.5	LTC Home - Northern Elevation, 8th Floor	59	49
REC 3-1	1.5	LTC Home - Eastern Elevation, 1st Floor	59	0
REC 3-8	22.5	LTC Home - Eastern Elevation, 8th Floor	62	0
REC 4-1	1.5	LTC Home - Southern Elevation, 1st Floor	53	28
REC 4-8	22.5	LTC Home - Southern Elevation, 8th Floor	57	36
REC 5-1	1.5	LTC Home - Southern Elevation, 1st Floor	49	36
REC 5-8	22.5	LTC Home - Southern Elevation, 8th Floor	56	48
REC 6-1	1.5	Retirement Dwelling - Western Elevation, 1st Floor	60	52
REC 6-15	43.5	Retirement Dwelling - Western Elevation, 15th Floor	65	59
REC 7-1	1.5	Retirement Dwelling - Northern Elevation, 1st Floor	67	59
REC 7-15	43.5	Retirement Dwelling - Northern Elevation, 15th Floor	70	62
REC 8-1	1.5	Retirement Dwelling - Eastern Elevation, 1st Floor	61	47

Reception Point	Height Above Grade (m)	Receptor Location	Daytime $L_{eq(16)}$ (dBA)	Nighttime $L_{eq(8)}$ (dBA)
REC 8-15	43.5	Retirement Dwelling - Eastern Elevation, 15th Floor	64	51
REC 9-1	1.5	Retirement Dwelling - Southern Elevation, 1st Floor	52	39
REC 9-15	43.5	Retirement Dwelling - Southern Elevation, 15th Floor	57	47

Ground-Borne Noise and Vibration

Based on the site proximity to the rail line, the closest locations of Phase 1 – LTC Home and Phase 2 – Retirement Dwelling were selected for the analysis at 40 m (131 ft) and 35 m (115 ft), respectively. Therefore, the maximum ground-borne vibrations at Phase 1 – LTC Home and Phase 2 – Retirement Dwelling will be 65 VdB and 67 VdB, respectively, based on the Generalized Ground Surface Vibration Curve (Figure 1) printed in the FTA document "Transit Noise and Vibration Impact Assessment Manual" dated September 2018. The following table outlines the adjustments for this site:

train speed of 100 km/hr (+1.9 dB)
no special vehicle parameters (0 dB)
no track conditions (0 dB)
no track treatments (0 dB)
not resiliently supported ties (0 dB)
Type of Transit: at-grade tie & ballast; open cut (0 dB)
Propagation in soil layer (+10 dB)
Coupling to building foundation – large masonry on spread footings (-13 dB)

Therefore, before floor to floor receiver adjustments, the ground-borne vibration at Phase 1 – LTC Home and Phase 2 – Retirement Dwelling will be 64 dB and 66 dB, respectively. Calculating the floor to floor adjustments, the ground-borne vibration at Phase 1 – LTC Home will be 68 dB on the first floor and 57 dB on the eighth floor, and the ground-borne vibration at Phase 2 – Retirement Dwelling will be 70 dB on the first floor and 57 dB on the fifteenth floor. The estimated ground-borne vibrations at both buildings are below the 80 dBA threshold value. Therefore, both buildings are considered acceptable and no additional mitigation measures are required with respect to ground-borne vibration from the rail line.

Ground-borne noise is a common concern for buildings in close proximity to a rail line. The vibration of the transit structure excites the adjacent ground, creating vibration waves that propagate through the subsurface materials, and into the foundation of neighbouring buildings. This vibration will then be transferred throughout the building, often at the resonance frequency of the various components of the building. This ground-borne vibration of floors and walls may cause items to rattle, or it may manifest itself as a rumble, defined as ground-borne noise.

A conservative conversion from ground-borne vibration to ground-borne noise noted in Table 6-14 of the Transit Noise and Vibration Impact Assessment, can be made to the adjusted ground-borne vibration parameters. The conversion is as follow:

Low frequency (<30 Hz):	-50 dB
Typical (peak 30 to 60 Hz):	-35 dB
High frequency (>60 Hz):	-20 dB

The existing railway is classified as a surface track, and therefore would be considered mid-frequency. The conversion from ground-borne vibration to ground-borne noise will result in the estimated ground-borne noise of 33 dBA and 22 dBA, respectively, for the receivers at the first floor and the eighth floor at Phase 1 - LTC. With the same conversion method, the estimated ground-borne noise at the first floor and fifteenth floor at Phase 2 – Retirement Dwelling will be 35 dBA and 22 dBA, respectively. The estimated ground-borne noises at both buildings are below the 43 dBA threshold value. Therefore, both buildings are considered acceptable and no further noise attenuation features are required.

7.0 Discussion and Recommendations

7.1 Outdoor Living Areas

No outdoor living areas were identified for this development.

7.2 Indoor Living Areas and Ventilation

The results of the STAMSON modeling indicate that the noise levels at Phase 1 – LTC Home will range between 49 dBA and 64 dBA during the daytime period (07:00-23:00) and between 0 dBA and 58 dBA during the nighttime period (23:00-7:00). The noise levels on the western, northern, eastern, and southern elevations will exceed the limit for the exterior of the pane of glass (55 dBA) specified by the ENCG. Therefore, units on the western northern, eastern, and southern elevations of this building should be designed with the provision of a central air conditioning unit, along with the warning clause Type C, as outlined in Table 3. It is also noted that the results of STAMSON modeling indicate that the noise levels will be below 65 dBA, and therefore standard building materials are acceptable to provide adequate soundproofing.

The results of the STAMSON modeling indicate that the noise levels at Phase 2 – Retirement Dwelling will range between 52 dBA and 70 dBA during the daytime period (07:00-23:00) and between 39 dBA and 62 dBA during the nighttime period (23:00-7:00). The noise levels on the western, northern, eastern, and southern elevations will exceed the limit for the exterior of the pane of glass (55 dBA) specified by the ENCG. It is also noted that the noise levels on the western and northern elevations will exceed 65 dBA. Therefore, units on the western, northern, eastern, and southern elevations of this building should be supplied with a central air conditioning unit, along with the warning clause Type D, as outlined in Table 3.

This building does exceed the 65 dBA threshold for noise on the western and northern elevations. Therefore, an analysis of the building materials will be required. However, at this time the building materials and exterior wall construction details have not been finalized.

Proposed Construction Specifications

It is understood that typical window and wall details are proposed for the residential buildings. The effectiveness of the noise insulation can be expressed as the Acoustical Insulation Factor (AIF), calculated as follows:

$$AIF = L_{eq(16)(Exterior)} - L_{eq(16)(Interior)} + 10\log_{10}(N) + 2 \text{ dBA}$$

Where:

$L_{eq(16)(Exterior)}$ = Calculated value at the window pane
$L_{eq(16)(Interior)}$ = 45 dBA
N = number of components in the room

No floor plans or detailed design drawings were provided for this portion of the review. A conservative approach is to assume that there are 2 components per room. Therefore, the AIF would need to be at least 30 dBA.

A conversion from AIF to a Standard Transmission Class (STC) rating will require the knowledge of room dimensions in addition to the wall and window dimensions. However, a conservative approach would be to increase the AIF factor by 3. **Therefore, provided the building materials of either the windows and/or exterior walls have an STC rating of 33 or higher, this would be a sufficient noise attenuation device.**

A review of industry standards for construction material indicates that, as long as the exterior cladding of the western and northern elevations consist of brick or concrete panels and that all windows consist of double pane glass, these materials have an STC rating of greater than 33 and are considered acceptable. If alternative materials are to be utilized on the western and northern elevations, then a review will need to be completed once design details are finalized.

8.0 Summary of Findings

The subject site is located at Smyth Road at Riverside Drive, in the City of Ottawa. It is understood that the proposed development will consist of two phases. The first phase consists of an eight (8) storey LTC Home rising approximately 24 metres above grade. The second phase consists of a fifteen (15) storey Residential Dwelling rising approximately 45 metres above grade. There are four major sources of surface transportation noise to the proposed buildings: Smyth Road, Riverside Drive, Transitway and the Ottawa-Fallowfield Corridor VIA Train Rail Line.

Several reception points were selected for the analysis, consisting of pane of glass reception points on both the first and top level. The estimated ground-borne vibrations for the receivers at proposed Phase 1 – LTC will be 68 dB on the first floor and 57 dB on the eighth floor, and the estimated ground-borne vibrations for the receivers at proposed Phase 2 – Retirement Dwelling will be 70 dB on the first floor and 57 dB on the fifteenth floor. The estimated ground-borne vibrations at both buildings are considered acceptable as outlined in by the FTA. Therefore, no additional mitigation measures are required with respect to ground-borne vibration from the rail line. The estimated ground-borne noises for the receivers at Phase 1 – LTC will be 33 dB on the first floor and 22 dB on the eighth floor, and the estimated ground-borne vibrations for the receivers at Phase 2 – Retirement Dwelling will be 35 dB on the first floor and 22 dB on the fifteenth floor. The estimated ground-borne noises at both buildings are considered acceptable as outlined in by the FTA. Therefore, no additional mitigation measures are required with respect to ground-borne noise from the rail line.

Several reception points were selected at proposed Phase 1 – LTC Home and Phase 2 – Retirement Dwelling for the surface transportation noise analysis, consisting of the centre of first level and top level. The results of STAMSON modeling indicate that the western, northern, eastern, and southern elevations of both proposed buildings are expected to exceed the 55 dBA threshold specified by the ENCG. It is also noted that the noise levels on the western and northern elevations of Phase 2 – Retirement Dwelling will exceed 65 dBA. Therefore, it is required for all units of Phase 1 – LTC Home to be designed with the provision of a central air conditioning unit, along with a warning clause Type C, and it is required for all units of Phase 2 – Retirement Dwelling to be supplied with the installation of a central air conditioning unit, along with a warning clause Type D. A review of the proposed building materials on the western and northern elevations of proposed Phase 2 – Retirement Dwelling will also need to be completed.

The following warning clause is to be included on all Offers of Purchase and Sale and/or lease agreements at building Phase 1 – LTC Home:

> "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 Municipality and the Ministry of the Environment."

The following warning clause is to be included on all Offers of Purchase and Sale and/or lease agreements at building Phase 2 – Retirement Dwelling:

> "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 sound level limits of the Municipality and the Ministry of the Environment."

9.0 Statement of Limitations

The recommendations made in this report are in accordance with our present understanding of the project. Our recommendations should be reviewed when the project drawings and specifications are complete.

The present report applies only to the project described in this document. Use of this report for purposes other than those described herein or by person(s) other than Schlegel Villages or their agent(s) is not authorized without review by this firm for the applicability of our recommendations to the altered use of the report.

Paterson Group Inc.

November 2, 2021

Yolanda Tang, M.Sc.Eng

Stephanie A. Boisvenue, P.Eng.

Report Distribution:

- ❑ Schlegel Villages (email copy)
- ❑ Paterson Group (1 copy)

APPENDIX 1

TABLE 10 - SUMMARY OF RECEPTION POINTS AND GEOMETRY

DRAWING PG5948-1 - SITE PLAN

DRAWING PG5948-2 - RECEPTOR LOCATION PLAN

DRAWING PG5948-3 – SITE GEOMETRY

DRAWING PG5948-3A - SITE GEOMETRY (REC 1-1 and REC 1-8)

DRAWING PG5948-3B - SITE GEOMETRY (REC 2-1 and REC 2-8)

DRAWING PG5948-3C - SITE GEOMETRY (REC 3-1 and REC 3-8)

DRAWING PG5948-3D - SITE GEOMETRY (REC 4-1 and REC 4-8)

DRAWING PG5948-3E - SITE GEOMETRY (REC 5-1 and REC 5-8)

DRAWING PG5948-4 – SITE GEOMETRY

DRAWING PG5948-4A - SITE GEOMETRY (REC 6-1 and REC 6-15)

DRAWING PG5948-4B - SITE GEOMETRY (REC 7-1 and REC 7-15)

DRAWING PG5948-4C - SITE GEOMETRY (REC 8-1 and REC 8-15)

DRAWING PG5948-4D - SITE GEOMETRY (REC 9-1 and REC 9-15)

Table 10 - Summary of Reception Points and Geometry
Smyth Road at Riverside Drive

Point of Reception	Location	Leq Day (dBA)	Smyth Road						Riverside Drive					
			Horizontal (m)	Vertical (m)	Total (m)	Local Angle (degree)	Number of Rows of Houses	Density (%)	Horizontal (m)	Vertical (m)	Total (m)	Local Angle (degree)	Number of Rows of Houses	Density (%)
REC 1-1	Phase 1 - LTC Home, Western Elevation, 1st Floor	54	n/a	n/a	n/a	n/a	n/a	n/a	75	1.5	75.0	0, 68	n/a	n/a
REC 1-8	Phase 1 - LTC Home, Western Elevation, 8th Floor	64	n/a	n/a	n/a	n/a	n/a	n/a	75	22.5	78.3	0, 68	n/a	n/a
REC 2-1	Phase 1 - LTC Home, Northern Elevation, 1st Floor	54	n/a	n/a	n/a	n/a	n/a	n/a	90	1.5	90.0	0, 47	n/a	n/a
REC 2-8	Phase 1 - LTC Home, Northern Elevation, 8th Floor	59	n/a	n/a	n/a	n/a	n/a	n/a	90	22.5	92.8	0, 47	n/a	n/a
REC 3-1	Phase 1 - LTC Home, Eastern Elevation, 1st Floor	59	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
REC 3-8	Phase 1 - LTC Home, Eastern Elevation, 8th Floor	62	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
REC 4-1	Phase 1 - LTC Home, Southern Elevation, 1st Floor	53	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
REC 4-8	Phase 1 - LTC Home, Southern Elevation, 8th Floor	57	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
REC 5-1	Phase 1 - LTC Home, Southern Elevation, 1st Floor	49	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
REC 5-8	Phase 1 - LTC Home, Southern Elevation, 8th Floor	56	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
REC 6-1	Phase 2 - Retirement Dwellings, Western Elevation, 1st Floor	60	50	1.5	50.0	-78, 0	n/a	n/a	95	1.5	95.0	-40, 47	n/a	n/a
REC 6-15	Phase 2 - Retirement Dwellings, Western Elevation, 15th Floor	65	50	43.5	66.3	-78, 0	n/a	n/a	95	43.5	104.5	-40, 47	n/a	n/a
REC 7-1	Phase 2 - Retirement Dwellings, Northern Elevation, 1st Floor	67	25	1.5	25.0	-90, 56	n/a	n/a	90	1.5	90.0	0, 32	n/a	n/a
REC 7-15	Phase 2 - Retirement Dwellings, Northern Elevation, 15th Floor	70	25	43.5	50.2	-90, 56	n/a	n/a	90	43.5	100.0	0, 32	n/a	n/a
REC 8-1	Phase 2 - Retirement Dwellings, Eastern Elevation, 1st Floor	61	70	1.5	70.0	0, 41	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
REC 8-15	Phase 2 - Retirement Dwellings, Eastern Elevation, 15th Floor	64	70	43.5	82.4	0, 41	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
REC 9-1	Phase 2 - Retirement Dwellings, Southern Elevation, 1st Floor	52	n/a	n/a	n/a	n/a	n/a	n/a	95	1.5	0.0	-20, 0	1	20
REC 9-15	Phase 2 - Retirement Dwellings, Southern Elevation, 15th Floor	57	n/a	n/a	n/a	n/a	n/a	n/a	95	43.5	0.0	-20, 0	1	20

Table 10 - Summary of Reception Points and Geometry
Smyth Road at Riverside Drive

Point of Reception	Location	Leq Day (dBA)	Bus Transitway						VIA Rail Line					
			Horizontal (m)	Vertical (m)	Total (m)	Local Angle (degree)	Number of Rows of Houses	Density (%)	Horizontal (m)	Vertical (m)	Total (m)	Local Angle (degree)	Number of Rows of Houses	Density (%)
REC 1-1	Phase 1 - LTC Home, Western Elevation, 1st Floor	54	30	1.5	30.0	-72, 87	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
REC 1-8	Phase 1 - LTC Home, Western Elevation, 8th Floor	64	30	22.5	37.5	-72, 87	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
REC 2-1	Phase 1 - LTC Home, Northern Elevation, 1st Floor	54	65	1.5	65.0	0, 65	n/a	n/a	65	1.5	65.0	-79, 0	1	20
REC 2-8	Phase 1 - LTC Home, Northern Elevation, 8th Floor	59	65	22.5	68.8	0, 65	n/a	n/a	65	22.5	68.8	-79, 0	1	20
REC 3-1	Phase 1 - LTC Home, Eastern Elevation, 1st Floor	59	n/a	n/a	n/a	n/a	n/a	n/a	30	1.5	30.0	-84, 84	n/a	n/a
REC 3-8	Phase 1 - LTC Home, Eastern Elevation, 8th Floor	62	n/a	n/a	n/a	n/a	n/a	n/a	30	22.5	37.5	-84, 84	n/a	n/a
REC 4-1	Phase 1 - LTC Home, Southern Elevation, 1st Floor	53	85	1.5	85.0	-48, 0	1	20	50	1.5	50.0	0, 80	n/a	n/a
REC 4-8	Phase 1 - LTC Home, Southern Elevation, 8th Floor	57	85	22.5	87.9	-48, 0	1	20	50	22.5	54.8	0, 80	n/a	n/a
REC 5-1	Phase 1 - LTC Home, Southern Elevation, 1st Floor	49	40	1.5	40.0	-66, 0	n/a	n/a	90	1.5	90.0	0, 72	n/a	n/a
REC 5-8	Phase 1 - LTC Home, Southern Elevation, 8th Floor	56	40	22.5	45.9	-66, 0	n/a	n/a	90	22.5	92.8	0, 72	n/a	n/a
REC 6-1	Phase 2 - Retirement Dwellings, Western Elevation, 1st Floor	60	65	1.5	65.0	-58, 64	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
REC 6-15	Phase 2 - Retirement Dwellings, Western Elevation, 15th Floor	65	65	43.5	78.2	-58, 64	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
REC 7-1	Phase 2 - Retirement Dwellings, Northern Elevation, 1st Floor	67	65	1.5	65.0	0, 52	n/a	n/a	65	1.5	65.0	-81, 0	n/a	n/a
REC 7-15	Phase 2 - Retirement Dwellings, Northern Elevation, 15th Floor	70	65	43.5	78.2	0, 52	n/a	n/a	65	43.5	78.2	-81, 0	n/a	n/a
REC 8-1	Phase 2 - Retirement Dwellings, Eastern Elevation, 1st Floor	61	n/a	n/a	n/a	n/a	n/a	n/a	30	1.5	30.0	-84, 84	n/a	n/a
REC 8-15	Phase 2 - Retirement Dwellings, Eastern Elevation, 15th Floor	64	n/a	n/a	n/a	n/a	n/a	n/a	30	43.5	52.8	-84, 84	n/a	n/a
REC 9-1	Phase 2 - Retirement Dwellings, Southern Elevation, 1st Floor	52	70	1.5	70.0	-42, 0	1	20	65	1.5	65.0	0, 79	1	20
REC 9-15	Phase 2 - Retirement Dwellings, Southern Elevation, 15th Floor	57	70	43.5	82.4	-42, 0	1	20	65	43.5	78.2	0, 79	1	20

TRANSITWAY

SMYTH ROAD

PHASE 1
MULTI-STOREY
APARTMENT
BUILDING

PHASE 2
MULTI-STOREY
APARTMENT BUILDING

RAILWAY LINE

SCALE: 1:750

0 10 20 30 50m

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NO.	REVISIONS	DATE	INITIAL

SCHLEGEL VILLAGES

NOISE ATTENUATION STUDY
PROPOSED MULTI-STOREY APARTMENT BUILDINGS
SMYTH ROAD AT RIVERSIDE DRIVE

OTTAWA, ONTARIO

Title:

SITE PLAN

Scale: 1:750	Date: 08/2021
Drawn by: YA	Report No.: PG5948-1
Checked by: YT	Dwg. No.: PG5948-1
Approved by: SB	Revision No.:

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TRANSITWAY

SMYTH ROAD

REC 1-1
REC 1-8

REC 5-1
REC 5-8

PHASE 1
MULTI-STOREY
APARTMENT
BUILDING

REC 2-1
REC 2-8

REC 4-1
REC 4-8

REC 3-1
REC 3-8

REC 6-1
REC 6-15

PHASE 2
MULTI-STOREY
APARTMENT BUILDING

REC 9-1
REC 9-15

REC 7-1
REC 7-15

REC 8-1
REC 8-15

RAILWAY LINE

LEGEND:

RECEPTOR LOCATION

SCALE: 1:750

0 10 20 30 50m

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SCHLEGEL VILLAGES

NOISE ATTENUATION STUDY
PROPOSED MULTI-STOREY APARTMENT BUILDINGS
SMYTH ROAD AT RIVERSIDE DRIVE

OTTAWA, ONTARIO

Title:

RECEPTOR LOCATION PLAN

Scale: 1:750	Date: 08/2021
Drawn by: YA	Report No.: PG5948-1
Checked by: YT	Dwg. No.: PG5948-2
Approved by: SB	Revision No.:

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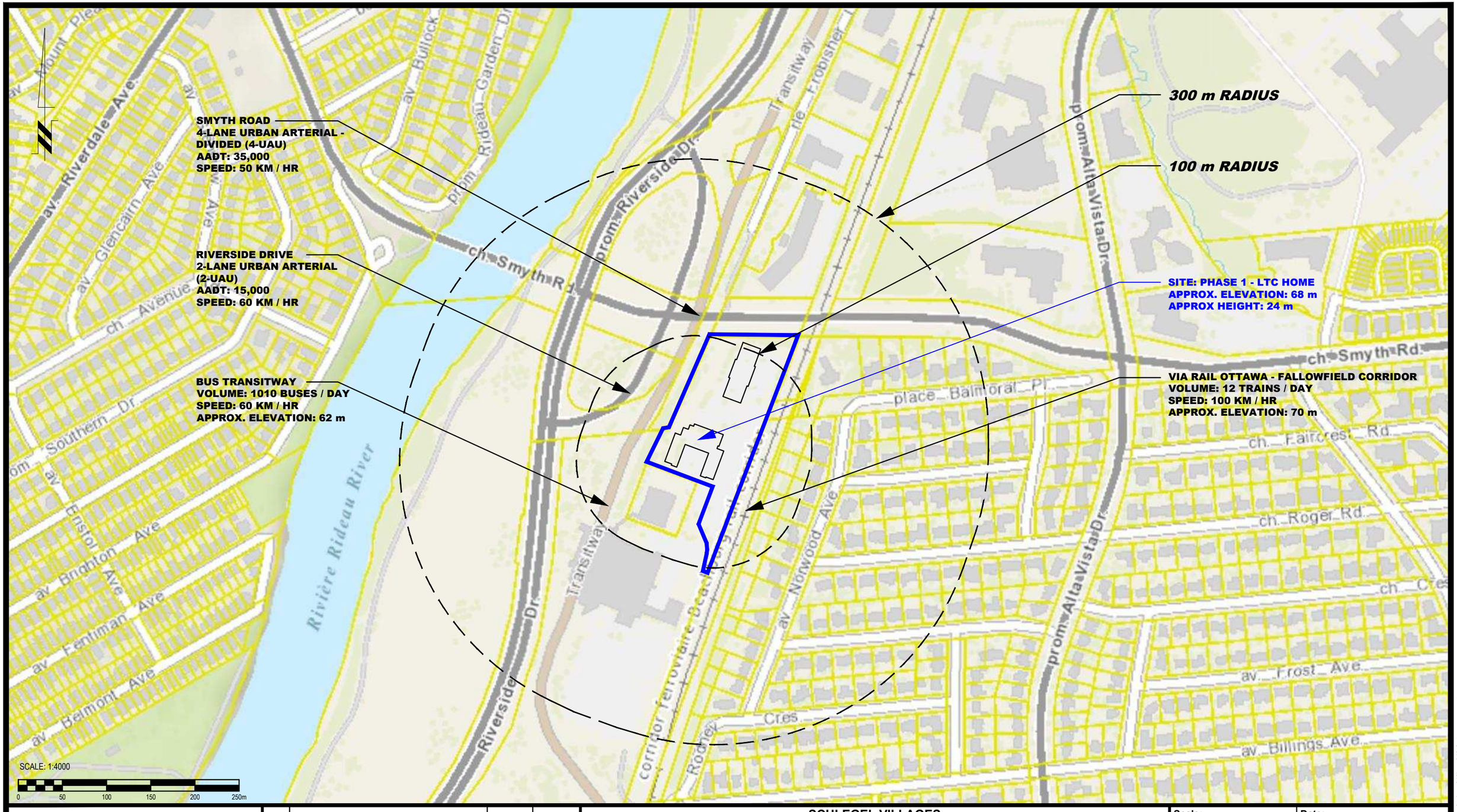

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SCHLEGEL VILLAGES
NOISE ATTENUATION STUDY
PROPOSED MULTI-STOREY APARTMENT BUILDINGS
SMYTH ROAD AT RIVERSIDE DRIVE
PHASE 1 - LTC HOME
OTTAWA, ONTARIO

Title:

SITE GEOMETRY

Scale: 1:4000	Date: 08/2021
Drawn by: YA	Report No.: PG5948-1
Checked by: YT	Dwg. No.: PG5948-3
Approved by: SB	Revision No.:

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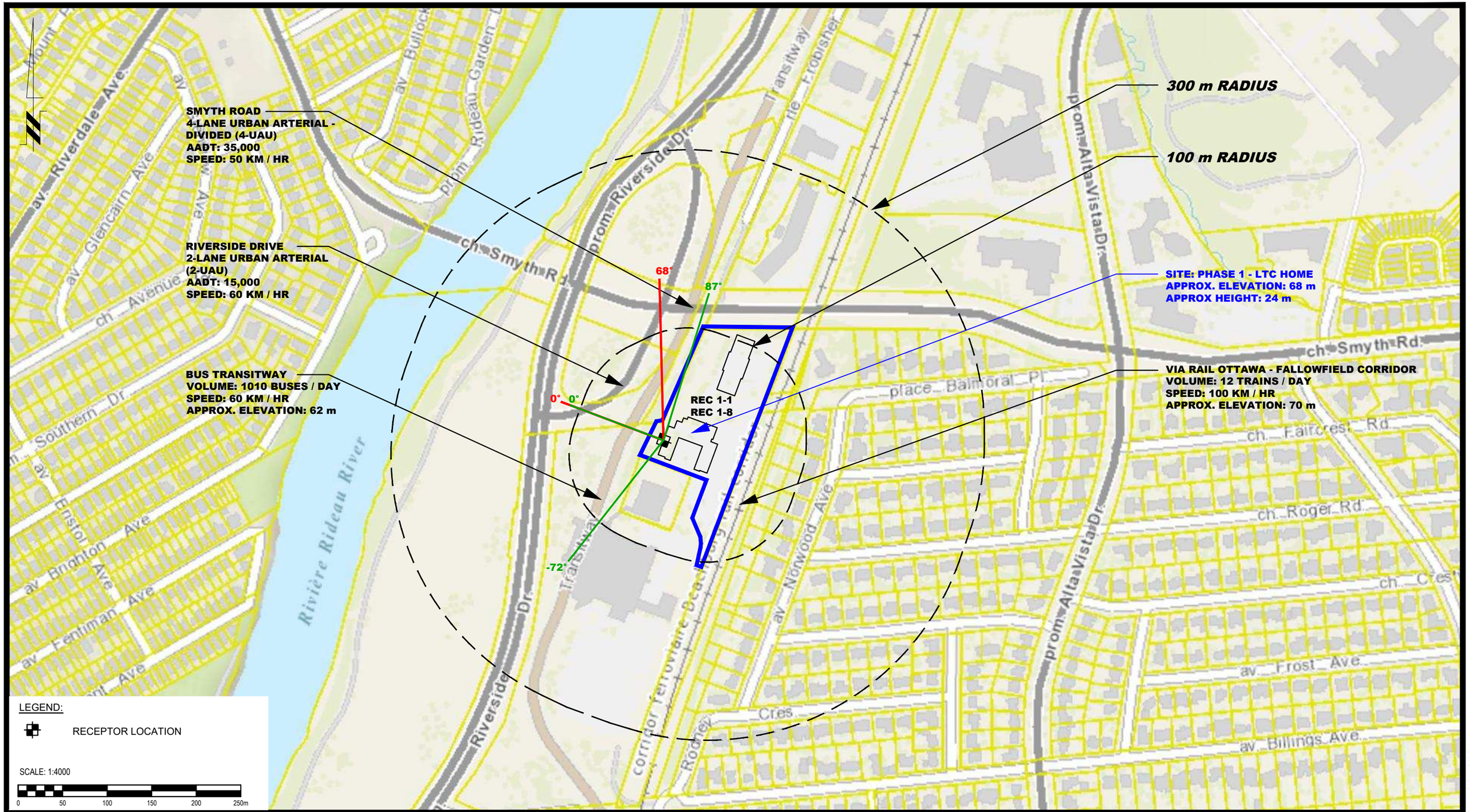

LEGEND:

RECEPTOR LOCATION

SCALE: 1:4000

0 50 100 150 200 250m

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SCHLEGEL VILLAGES
NOISE ATTENUATION STUDY
PROPOSED MULTI-STOREY APARTMENT BUILDINGS
SMYTH ROAD AT RIVERSIDE DRIVE
OTTAWA, PHASE 1 - LTC HOME ONTARIO

Title:

SITE GEOMETRY - REC 1-1 AND REC 1-8

Scale: 1:4000	Date: 08/2021
Drawn by: YA	Report No.: PG5948-1
Checked by: YT	Dwg. No.: PG5948-3A
Approved by: SB	Revision No.:

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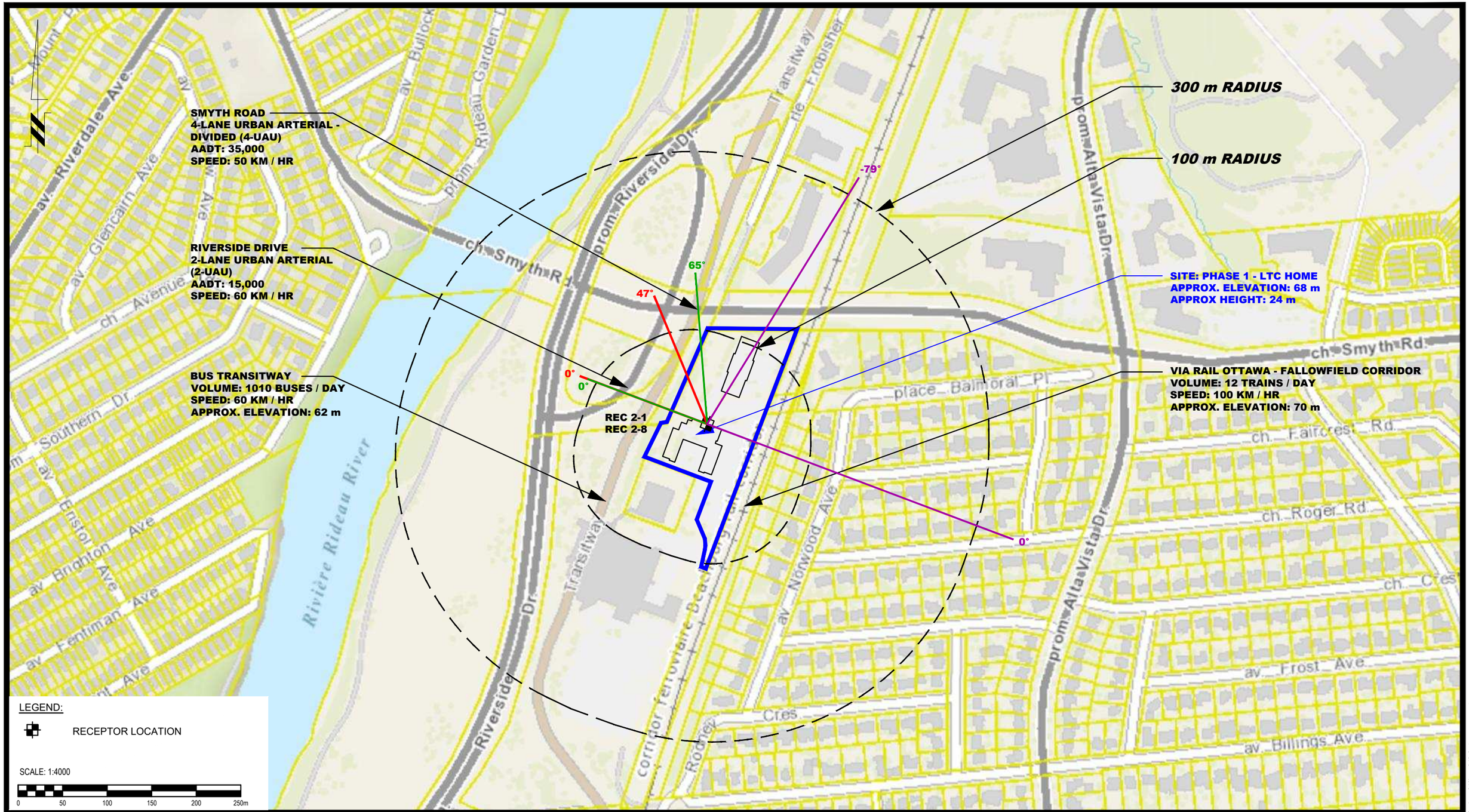

LEGEND:

RECEPTOR LOCATION

SCALE: 1:4000

0 50 100 150 200 250m

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NOISE ATTENUATION STUDY
PROPOSED MULTI-STOREY APARTMENT BUILDINGS
SMYTH ROAD AT RIVERSIDE DRIVE
PHASE 1 - LTC HOME
OTTAWA, ONTARIO

Title:

SITE GEOMETRY - REC 2-1 AND REC 2-8

Scale: 1:4000	Date: 08/2021
Drawn by: YA	Report No.: PG5948-1
Checked by: YT	Dwg. No.: PG5948-3B
Approved by: SB	Revision No.:

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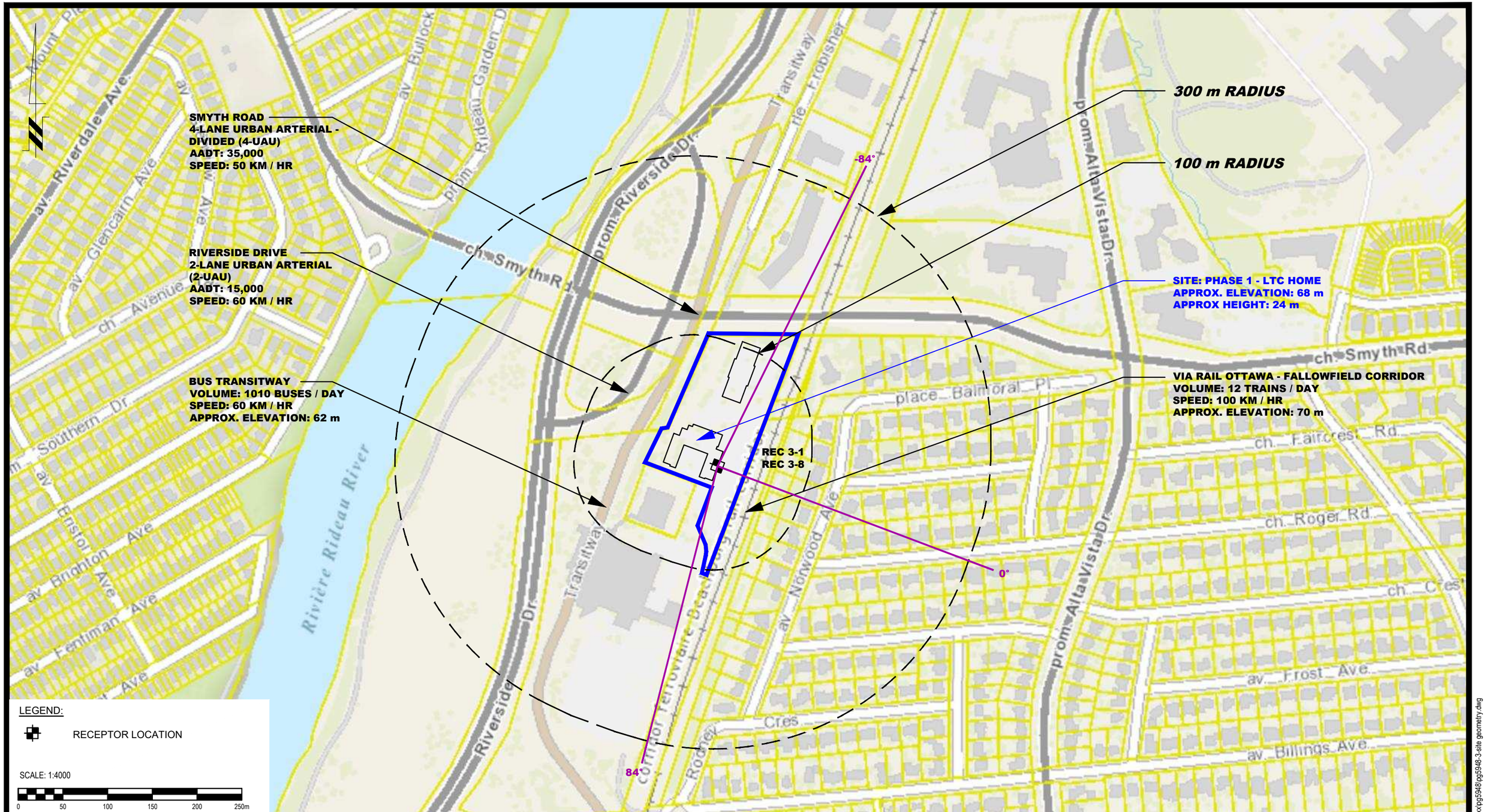

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NOISE ATTENUATION STUDY
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SMYTH ROAD AT RIVERSIDE DRIVE
PHASE 1 - LTC HOME
OTTAWA, ONTARIO

Title:

SITE GEOMETRY - REC 3-1 AND REC 3-8

Scale: 1:4000	Date: 08/2021
Drawn by: YA	Report No.: PG5948-1
Checked by: YT	Dwg. No.: PG5948-3C
Approved by: SB	Revision No.:

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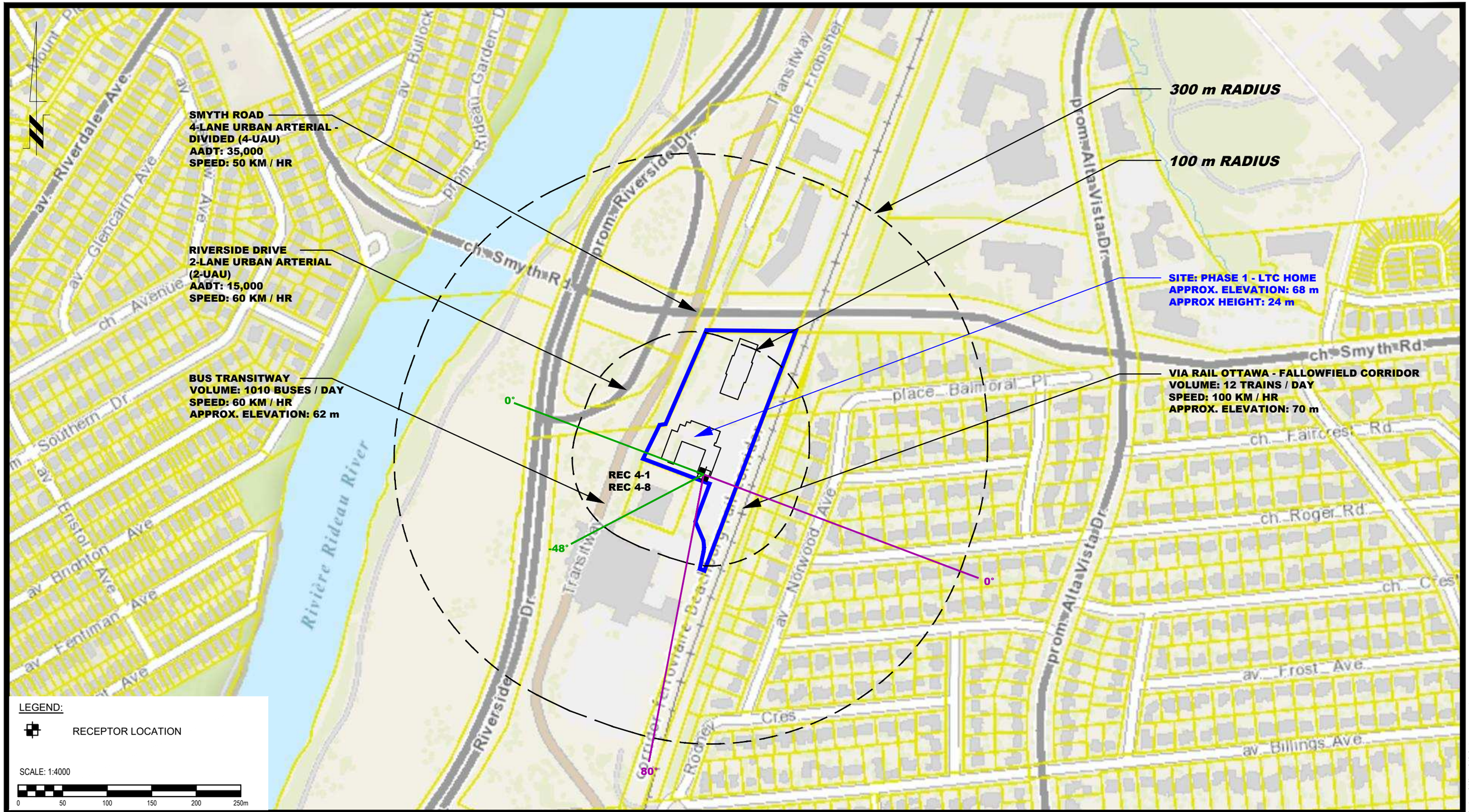

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NOISE ATTENUATION STUDY
PROPOSED MULTI-STOREY APARTMENT BUILDINGS
SMYTH ROAD AT RIVERSIDE DRIVE
PHASE 1 - LTC HOME
OTTAWA, ONTARIO

Title:
SITE GEOMETRY - REC 4-1 AND REC 4-8

Scale: 1:4000	Date: 08/2021
Drawn by: YA	Report No.: PG5948-1
Checked by: YT	Dwg. No.: PG5948-3D
Approved by: SB	Revision No.:

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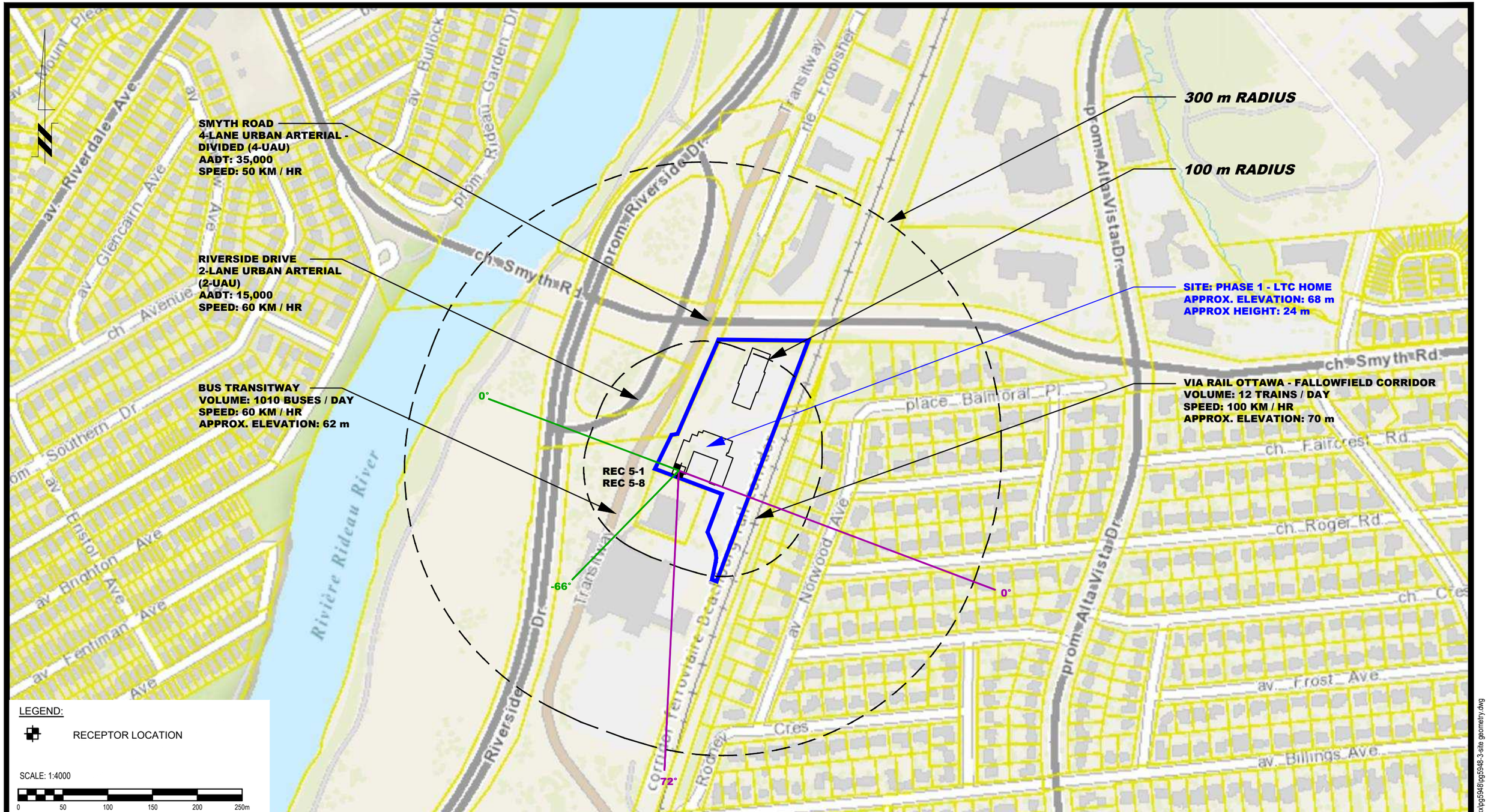

LEGEND:

RECEPTOR LOCATION

SCALE: 1:4000

0 50 100 150 200 250m

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SCHLEGEL VILLAGES
NOISE ATTENUATION STUDY
PROPOSED MULTI-STOREY APARTMENT BUILDINGS
SMYTH ROAD AT RIVERSIDE DRIVE
PHASE 1 - LTC HOME
OTTAWA, ONTARIO

Title:

SITE GEOMETRY - REC 5-1 AND REC 5-8

Scale: 1:4000	Date: 08/2021
Drawn by: YA	Report No.: PG5948-1
Checked by: YT	Dwg. No.: PG5948-3E
Approved by: SB	Revision No.:

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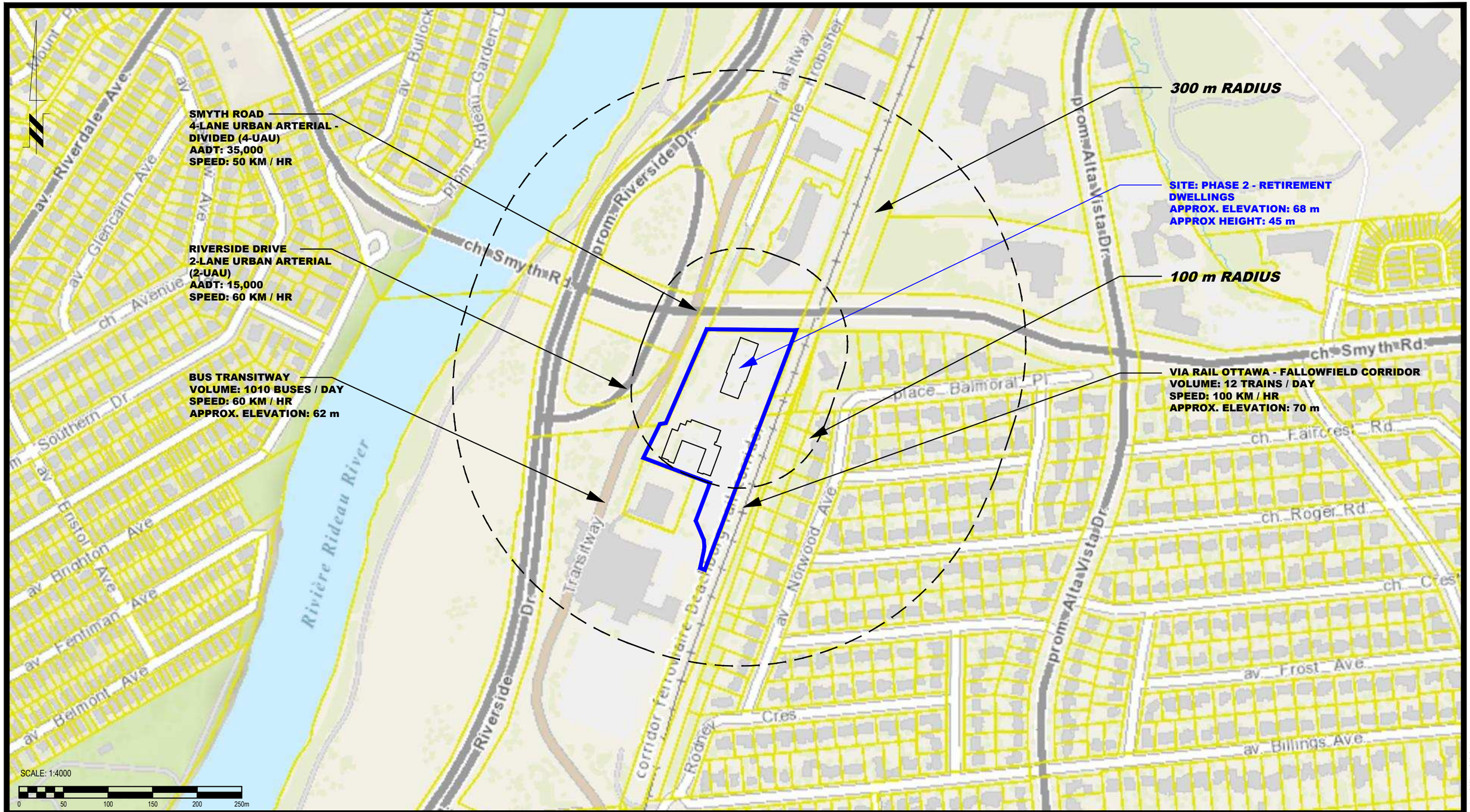

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SCHLEGEL VILLAGES
NOISE ATTENUATION STUDY
PROPOSED MULTI-STOREY APARTMENT BUILDINGS
SMYTH ROAD AT RIVERSIDE DRIVE
PHASE 2 - RETIREMENT DWELLINGS
OTTAWA, ONTARIO

Title:

SITE GEOMETRY

Scale: 1:4000	Date: 08/2021
Drawn by: YA	Report No.: PG5948-1
Checked by: YT	Dwg. No.: PG5948-4
Approved by: SB	Revision No.:

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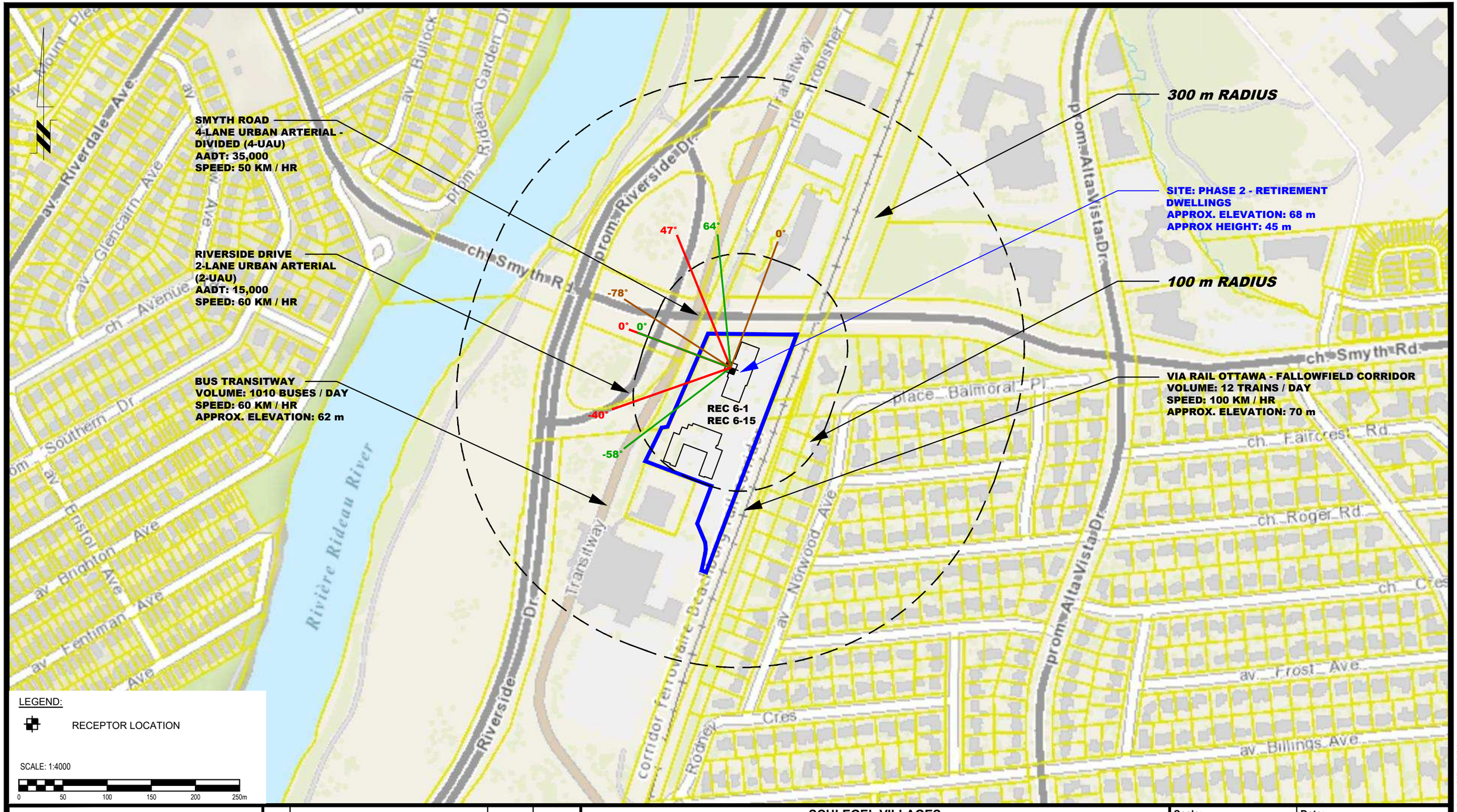

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SCHLEGEL VILLAGES
NOISE ATTENUATION STUDY
PROPOSED MULTI-STOREY APARTMENT BUILDINGS
SMYTH ROAD AT RIVERSIDE DRIVE
PHASE 2 - RETIREMENT DWELLINGS
OTTAWA, ONTARIO

Title:

SITE GEOMETRY - REC 6-1 AND REC 6-15

Scale: 1:4000	Date: 08/2021
Drawn by: YA	Report No.: PG5948-1
Checked by: YT	Dwg. No.: PG5948-4A
Approved by: SB	Revision No.:

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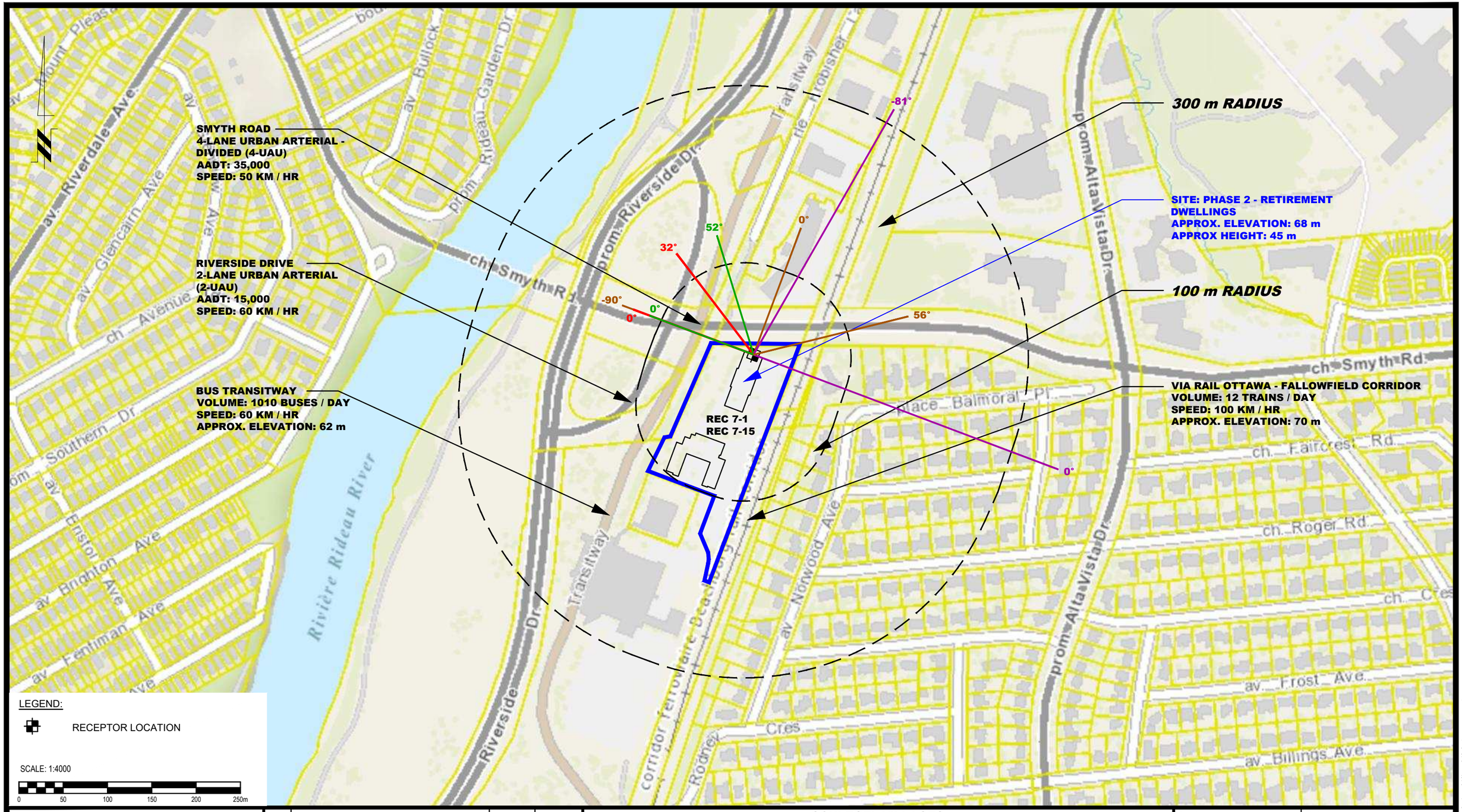

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NO.	REVISIONS	DATE	INITIAL

SCHLEGEL VILLAGES
NOISE ATTENUATION STUDY
PROPOSED MULTI-STOREY APARTMENT BUILDINGS
SMYTH ROAD AT RIVERSIDE DRIVE
PHASE 2 - RETIREMENT DWELLINGS
OTTAWA, ONTARIO

Title:
SITE GEOMETRY - REC 7-1 AND REC 7-15

Scale: 1:4000	Date: 08/2021
Drawn by: YA	Report No.: PG5948-1
Checked by: YT	Dwg. No.: PG5948-4B
Approved by: SB	Revision No.:

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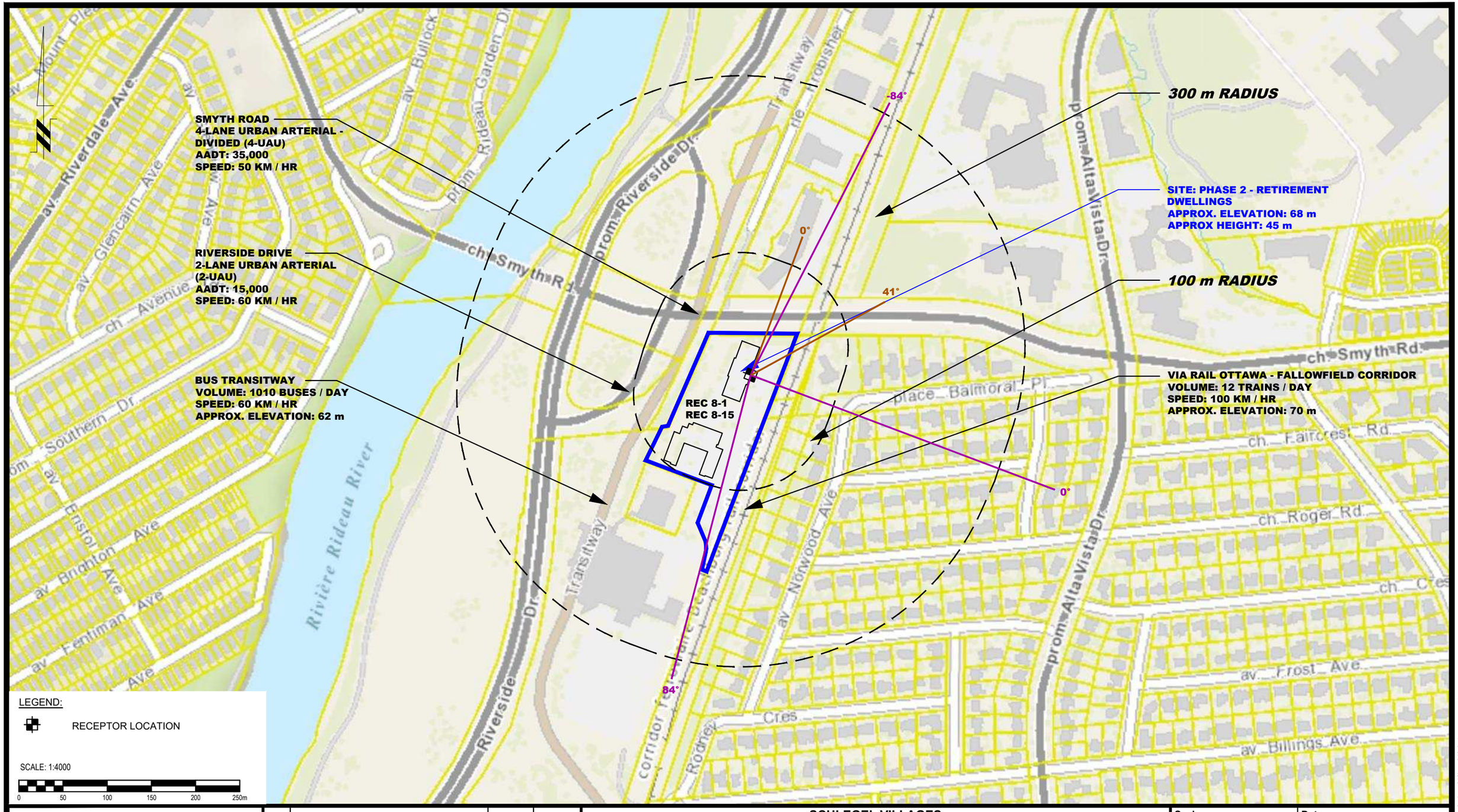

LEGEND:

RECEPTOR LOCATION

SCALE: 1:4000

0 50 100 150 200 250m

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NO.	REVISIONS	DATE	INITIAL

SCHLEGEL VILLAGES
NOISE ATTENUATION STUDY
PROPOSED MULTI-STOREY APARTMENT BUILDINGS
SMYTH ROAD AT RIVERSIDE DRIVE
PHASE 2 - RETIREMENT DWELLINGS
OTTAWA, ONTARIO

Title:

SITE GEOMETRY - REC 8-1 AND REC 8-15

Scale: 1:4000	Date: 08/2021
Drawn by: YA	Report No.: PG5948-1
Checked by: YT	Dwg. No.: PG5948-4C
Approved by: SB	Revision No.:

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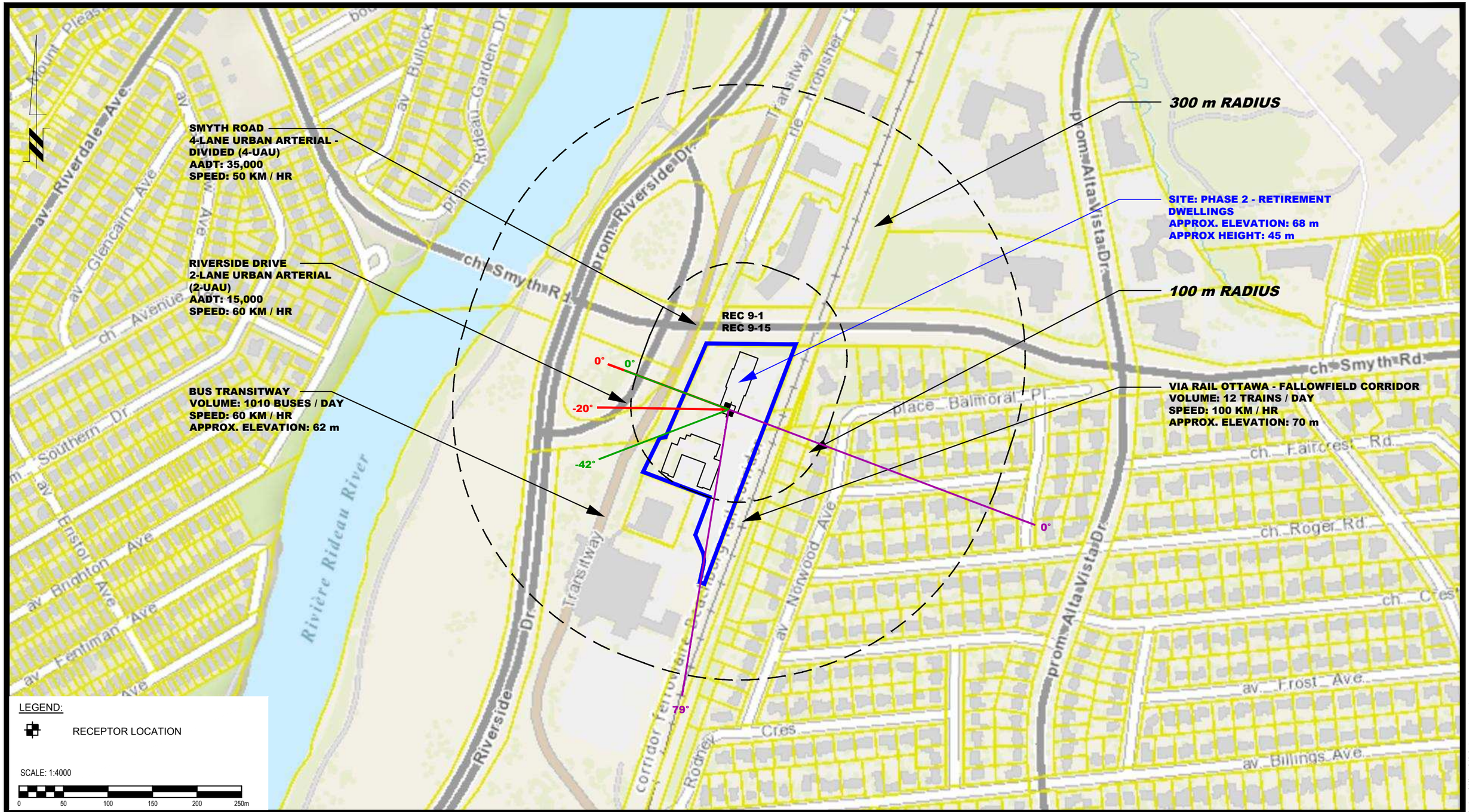

patersongroup
consulting engineers
154 Colonnade Road South
Ottawa, Ontario K2E 7J5
Tel: (613) 226-7381 Fax: (613) 226-6344

NO.	REVISIONS	DATE	INITIAL

SCHLEGEL VILLAGES
NOISE ATTENUATION STUDY
PROPOSED MULTI-STOREY APARTMENT BUILDINGS
SMYTH ROAD AT RIVERSIDE DRIVE
PHASE 2 - RETIREMENT DWELLINGS
OTTAWA, ONTARIO

Title:
SITE GEOMETRY - REC 9-1 AND REC 9-15

Scale: 1:4000	Date: 08/2021
Drawn by: YA	Report No.: PG5948-1
Checked by: YT	Dwg. No.: PG5948-4D
Approved by: SB	Revision No.:

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APPENDIX 2

STAMSON RESULTS

STAMSON 5.0 NORMAL REPORT Date: 23-08-2021 15:42:55
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: rec11.te Time Period: Day/Night 16/8 hours
Description: Reception Point 1-1

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

Car traffic volume : 12144/1056 veh/TimePeriod *
Medium truck volume : 966/84 veh/TimePeriod *
Heavy truck volume : 690/60 veh/TimePeriod *
Posted speed limit : 60 km/h
Road gradient : 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): 15000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 1: Riverside Dr (day/night)

Angle1 Angle2 : 0.00 deg 68.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 75.00 / 75.00 m
Receiver height : 1.50 / 1.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Riverside Dr (day)

Source height = 1.50 m

ROAD (0.00 + 53.43 + 0.00) = 53.43 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	68	0.66	70.00	0.00	-11.60	-4.97	0.00	0.00	0.00	53.43

Segment Leq : 53.43 dBA

Total Leq All Segments: 53.43 dBA

↟
Results segment # 1: Riverside Dr (night)

Source height = 1.50 m

ROAD (0.00 + 45.83 + 0.00) = 45.83 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	68	0.66	62.40	0.00	-11.60	-4.97	0.00	0.00	0.00	45.83

Segment Leq : 45.83 dBA

Total Leq All Segments: 45.83 dBA

↟
RT/Custom data, segment # 1: Transitway (day/night)
---
1 - Bus:
Traffic volume : 864/146 veh/TimePeriod
Speed : 80 km/h

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

Angle1 Angle2 : -72.00 deg 87.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 30.00 / 30.00 m
Receiver height : 1.50 / 1.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -72.00 deg Angle2 : 87.00 deg
Barrier height : 4.00 m
Barrier receiver distance : 25.00 / 25.00 m
Source elevation : 62.00 m
Receiver elevation : 68.00 m
Barrier elevation : 62.00 m
Reference angle : 0.00

↟
Results segment # 1: Transitway (day)

Source height = 0.50 m

Barrier height for grazing incidence

```
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       0.50 !        1.50 !        1.67 !        63.67

RT/Custom (0.00 + 47.62 + 0.00) = 47.62 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
   -72     87   0.45  65.97  -4.36  -1.33   0.00   0.00 -12.65  47.62
-------------------------------------------------------------------------

Segment Leq : 47.62 dBA

Total Leq All Segments: 47.62 dBA

↟
Results segment # 1: Transitway (night)
---------------------------------------

Source height = 0.50 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       0.50 !        1.50 !        1.67 !        63.67

RT/Custom (0.00 + 42.91 + 0.00) = 42.91 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
   -72     87   0.45  61.26  -4.36  -1.33   0.00   0.00 -12.65  42.91
-------------------------------------------------------------------------

Segment Leq : 42.91 dBA

Total Leq All Segments: 42.91 dBA

↟



TOTAL Leq FROM ALL SOURCES (DAY): 54.44
                          (NIGHT): 47.62
↟
↟
```

STAMSON 5.0 NORMAL REPORT Date: 23-08-2021 15:46:42
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: rec18.te Time Period: Day/Night 16/8 hours
Description: Reception Point 1-8

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

Car traffic volume : 12144/1056 veh/TimePeriod *
Medium truck volume : 966/84 veh/TimePeriod *
Heavy truck volume : 690/60 veh/TimePeriod *
Posted speed limit : 60 km/h
Road gradient : 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): 15000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 1: Riverside Dr (day/night)

Angle1 Angle2 : 0.00 deg 68.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 75.00 / 75.00 m
Receiver height : 22.50 / 22.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

↑
Results segment # 1: Riverside Dr (day)

Source height = 1.50 m

ROAD (0.00 + 58.53 + 0.00) = 58.53 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	68	0.03	70.00	0.00	-7.20	-4.26	0.00	0.00	0.00	58.53

Segment Leq : 58.53 dBA

Total Leq All Segments: 58.53 dBA

↟
Results segment # 1: Riverside Dr (night)

Source height = 1.50 m

ROAD (0.00 + 50.93 + 0.00) = 50.93 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	68	0.03	62.40	0.00	-7.20	-4.26	0.00	0.00	0.00	50.93

Segment Leq : 50.93 dBA

Total Leq All Segments: 50.93 dBA

↟
RT/Custom data, segment # 1: Transitway (day/night)
---
1 - Bus:
Traffic volume : 864/146 veh/TimePeriod
Speed : 80 km/h

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

Angle1 Angle2 : -72.00 deg 87.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 30.00 / 30.00 m
Receiver height : 22.50 / 22.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -72.00 deg Angle2 : 87.00 deg
Barrier height : 4.00 m
Barrier receiver distance : 25.00 / 25.00 m
Source elevation : 62.00 m
Receiver elevation : 68.00 m
Barrier elevation : 62.00 m
Reference angle : 0.00

↟
Results segment # 1: Transitway (day)

Source height = 0.50 m

Barrier height for grazing incidence

```
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       0.50 !       22.50 !        5.17 !        67.17

RT/Custom (0.00 + 62.12 + 0.00) = 62.12 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------
   -72     87   0.00  65.97  -3.01  -0.54   0.00   0.00  -1.31  61.11*
   -72     87   0.06  65.97  -3.19  -0.66   0.00   0.00   0.00  62.12
-------------------------------------------------------------------

 * Bright Zone !

Segment Leq : 62.12 dBA

Total Leq All Segments: 62.12 dBA

↟
Results segment # 1: Transitway (night)
---------------------------------------

Source height = 0.50 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       0.50 !       22.50 !        5.17 !        67.17

RT/Custom (0.00 + 57.41 + 0.00) = 57.41 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------
   -72     87   0.00  61.26  -3.01  -0.54   0.00   0.00  -1.31  56.40*
   -72     87   0.06  61.26  -3.19  -0.66   0.00   0.00   0.00  57.41
-------------------------------------------------------------------

 * Bright Zone !

Segment Leq : 57.41 dBA

Total Leq All Segments: 57.41 dBA

↟



TOTAL Leq FROM ALL SOURCES (DAY): 63.70
                           (NIGHT): 58.29
```

STAMSON 5.0 NORMAL REPORT Date: 23-08-2021 16:33:41
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: rec21.te Time Period: Day/Night 16/8 hours
Description: Reception Point 2-1

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

Train Type	Trains	Speed (km/h)	# loc /Train	# Cars /Train	Eng type	Cont weld
1. VIA Train	12.0/0.0	100.0	1.0	6.0	Diesel	No

Data for Segment # 1: VIA Train (day/night)

```
Angle1   Angle2           : -79.00 deg   0.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      1 / 1
House density             :     20 %
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  65.00 / 65.00  m
Receiver height           :   1.50 / 1.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
No Whistle
Barrier angle1            : -79.00 deg   Angle2 : 0.00 deg
Barrier height            :   0.00 m
Barrier receiver distance :  60.00 / 60.00  m
Source elevation          :  70.00 m
Receiver elevation        :  68.00 m
Barrier elevation         :  68.00 m
Reference angle           :   0.00
```

Results segment # 1: VIA Train (day)

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
4.00	1.50	5.65	73.65
0.50	1.50	2.42	70.42

LOCOMOTIVE (0.00 + 49.14 + 0.00) = 49.14 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-79	0	0.58	64.65	-10.09	-4.52	0.00	-0.90	0.00	49.14
-79	0	0.58	64.65	-10.09	-4.52	0.00	0.00	0.00	50.04*

```
   -79      0   0.58  64.65 -10.09  -4.52   0.00   0.00   0.00  50.04
-------------------------------------------------------------------------

 * Bright Zone !

WHEEL (0.00 + 42.41 + 0.00) = 42.41 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
   -79      0   0.66  58.50 -10.57  -4.62   0.00  -0.90   0.00  42.41
   -79      0   0.66  58.50 -10.57  -4.62   0.00   0.00   0.00  43.31*
   -79      0   0.66  58.50 -10.57  -4.62   0.00   0.00   0.00  43.31
-------------------------------------------------------------------------

 * Bright Zone !

Segment Leq : 49.98 dBA

Total Leq All Segments: 49.98 dBA

♠
Results segment # 1: VIA Train (night)
--------------------------------------

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       4.00 !        1.50 !        5.65 !        73.65
       0.50 !        1.50 !        2.42 !        70.42

LOCOMOTIVE (0.00 + -15.51 + 0.00) = 0.00 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
   -79      0   0.58   0.00 -10.09  -4.52   0.00  -0.90   0.00 -15.51
   -79      0   0.58   0.00 -10.09  -4.52   0.00   0.00   0.00 -14.61*
   -79      0   0.58   0.00 -10.09  -4.52   0.00   0.00   0.00 -14.61
-------------------------------------------------------------------------

 * Bright Zone !

WHEEL (0.00 + -16.09 + 0.00) = 0.00 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
   -79      0   0.66   0.00 -10.57  -4.62   0.00  -0.90   0.00 -16.09
   -79      0   0.66   0.00 -10.57  -4.62   0.00   0.00   0.00 -15.19*
   -79      0   0.66   0.00 -10.57  -4.62   0.00   0.00   0.00 -15.19
-------------------------------------------------------------------------

 * Bright Zone !
```

Segment Leq : 0.00 dBA

Total Leq All Segments: 0.00 dBA

↟
Road data, segment # 1: Riverside Dr (day/night)

Car traffic volume : 12144/1056 veh/TimePeriod *
Medium truck volume : 966/84 veh/TimePeriod *
Heavy truck volume : 690/60 veh/TimePeriod *
Posted speed limit : 60 km/h
Road gradient : 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): 15000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 1: Riverside Dr (day/night)

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

↟
Results segment # 1: Riverside Dr (day)

Source height = 1.50 m

ROAD (0.00 + 50.91 + 0.00) = 50.91 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	47	0.66	70.00	0.00	-12.92	-6.17	0.00	0.00	0.00	50.91

Segment Leq : 50.91 dBA

Total Leq All Segments: 50.91 dBA

Results segment # 1: Riverside Dr (night)

Source height = 1.50 m

ROAD (0.00 + 43.32 + 0.00) = 43.32 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	47	0.66	62.40	0.00	-12.92	-6.17	0.00	0.00	0.00	43.32

Segment Leq : 43.32 dBA

Total Leq All Segments: 43.32 dBA

RT/Custom data, segment # 1: Transitway (day/night)
---
1 - Bus:
Traffic volume : 864/146 veh/TimePeriod
Speed : 80 km/h

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

Angle1 Angle2 : 0.00 deg 65.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 65.00 / 65.00 m
Receiver height : 1.50 / 1.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : 0.00 deg Angle2 : 65.00 deg
Barrier height : 4.00 m
Barrier receiver distance : 60.00 / 60.00 m
Source elevation : 62.00 m
Receiver elevation : 68.00 m
Barrier elevation : 62.00 m
Reference angle : 0.00

Results segment # 1: Transitway (day)

Source height = 0.50 m

Barrier height for grazing incidence

Source ! Receiver ! Barrier ! Elevation of

```
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       0.50 !        1.50 !        1.04 !        63.04

RT/Custom (0.00 + 36.23 + 0.00) = 36.23 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
     0     65   0.45  65.97  -9.23  -4.89   0.00   0.00 -15.62  36.23
-------------------------------------------------------------------------

Segment Leq : 36.23 dBA

Total Leq All Segments: 36.23 dBA

↟
Results segment # 1: Transitway (night)
---------------------------------------

Source height = 0.50 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       0.50 !        1.50 !        1.04 !        63.04

RT/Custom (0.00 + 31.52 + 0.00) = 31.52 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
     0     65   0.45  61.26  -9.23  -4.89   0.00   0.00 -15.62  31.52
-------------------------------------------------------------------------

Segment Leq : 31.52 dBA

Total Leq All Segments: 31.52 dBA

↟



TOTAL Leq FROM ALL SOURCES (DAY): 53.56
                           (NIGHT): 43.60
↟
↟
```

STAMSON 5.0 NORMAL REPORT Date: 23-08-2021 16:44:43
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: rec28.te Time Period: Day/Night 16/8 hours
Description: Reception Point 2-8

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

Train Type	Trains	Speed (km/h)	# loc /Train	# Cars /Train	Eng type	Cont weld
1. VIA Train	12.0/0.0	100.0	1.0	6.0	Diesel	No

Data for Segment # 1: VIA Train (day/night)

Angle1 Angle2	-79.00 deg 0.00 deg
Wood depth	0 (No woods.)
No of house rows	1 / 1
House density	20 %
Surface	1 (Absorptive ground surface)
Receiver source distance	65.00 / 65.00 m
Receiver height	22.50 / 22.50 m
Topography	2 (Flat/gentle slope; with barrier)
No Whistle	
Barrier angle1	-79.00 deg Angle2 : 0.00 deg
Barrier height	0.00 m
Barrier receiver distance	60.00 / 60.00 m
Source elevation	70.00 m
Receiver elevation	68.00 m
Barrier elevation	68.00 m
Reference angle	0.00

Results segment # 1: VIA Train (day)

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
4.00	22.50	7.27	75.27
0.50	22.50	4.04	72.04

LOCOMOTIVE (0.00 + 53.81 + 0.00) = 53.81 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-79	0	0.00	64.65	-6.37	-3.58	0.00	-0.90	0.00	53.81
-79	0	0.00	64.65	-6.37	-3.58	0.00	0.00	0.00	54.71*

```
   -79      0   0.00  64.65  -6.37  -3.58   0.00   0.00   0.00  54.71
-------------------------------------------------------------------

 * Bright Zone !

WHEEL (0.00 + 47.17 + 0.00) = 47.17 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------
   -79      0   0.06  58.50  -6.75  -3.68   0.00  -0.90   0.00  47.17
   -79      0   0.06  58.50  -6.75  -3.68   0.00   0.00   0.00  48.07*
   -79      0   0.06  58.50  -6.75  -3.68   0.00   0.00   0.00  48.07
-------------------------------------------------------------------

 * Bright Zone !

Segment Leq : 54.66 dBA

Total Leq All Segments: 54.66 dBA

♠
Results segment # 1: VIA Train (night)
--------------------------------------

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       4.00 !       22.50 !        7.27 !        75.27
       0.50 !       22.50 !        4.04 !        72.04

LOCOMOTIVE (0.00 + -10.84 + 0.00) = 0.00 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------
   -79      0   0.00   0.00  -6.37  -3.58   0.00  -0.90   0.00 -10.84
   -79      0   0.00   0.00  -6.37  -3.58   0.00   0.00   0.00  -9.94*
   -79      0   0.00   0.00  -6.37  -3.58   0.00   0.00   0.00  -9.94
-------------------------------------------------------------------

 * Bright Zone !

WHEEL (0.00 + -11.33 + 0.00) = 0.00 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------
   -79      0   0.06   0.00  -6.75  -3.68   0.00  -0.90   0.00 -11.33
   -79      0   0.06   0.00  -6.75  -3.68   0.00   0.00   0.00 -10.43*
   -79      0   0.06   0.00  -6.75  -3.68   0.00   0.00   0.00 -10.43
-------------------------------------------------------------------

 * Bright Zone !
```

Segment Leq : 0.00 dBA

Total Leq All Segments: 0.00 dBA

↟
Road data, segment # 1: Riverside Dr (day/night)

Car traffic volume : 12144/1056 veh/TimePeriod *
Medium truck volume : 966/84 veh/TimePeriod *
Heavy truck volume : 690/60 veh/TimePeriod *
Posted speed limit : 60 km/h
Road gradient : 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): 15000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 1: Riverside Dr (day/night)

Angle1 Angle2 : 0.00 deg 47.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 90.00 / 90.00 m
Receiver height : 22.50 / 22.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

↟
Results segment # 1: Riverside Dr (day)

Source height = 1.50 m

ROAD (0.00 + 56.13 + 0.00) = 56.13 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	47	0.03	70.00	0.00	-8.02	-5.85	0.00	0.00	0.00	56.13

Segment Leq : 56.13 dBA

Total Leq All Segments: 56.13 dBA

Results segment # 1: Riverside Dr (night)

Source height = 1.50 m

ROAD (0.00 + 48.54 + 0.00) = 48.54 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	47	0.03	62.40	0.00	-8.02	-5.85	0.00	0.00	0.00	48.54

Segment Leq : 48.54 dBA

Total Leq All Segments: 48.54 dBA

RT/Custom data, segment # 1: Transitway (day/night)
---
1 - Bus:
Traffic volume : 864/146 veh/TimePeriod
Speed : 80 km/h

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

Angle1 Angle2 : 0.00 deg 65.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 65.00 / 65.00 m
Receiver height : 22.50 / 22.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : 0.00 deg Angle2 : 65.00 deg
Barrier height : 4.00 m
Barrier receiver distance : 60.00 / 60.00 m
Source elevation : 62.00 m
Receiver elevation : 68.00 m
Barrier elevation : 62.00 m
Reference angle : 0.00

Results segment # 1: Transitway (day)

Source height = 0.50 m

Barrier height for grazing incidence

Source ! Receiver ! Barrier ! Elevation of

```
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       0.50 !       22.50 !        2.65 !        64.65

RT/Custom (0.00 + 46.20 + 0.00) = 46.20 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
     0     65   0.00  65.97  -6.37  -4.42   0.00   0.00  -8.98  46.20
-------------------------------------------------------------------------

Segment Leq : 46.20 dBA

Total Leq All Segments: 46.20 dBA

↟
Results segment # 1: Transitway (night)
---------------------------------------

Source height = 0.50 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       0.50 !       22.50 !        2.65 !        64.65

RT/Custom (0.00 + 41.48 + 0.00) = 41.48 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
     0     65   0.00  61.26  -6.37  -4.42   0.00   0.00  -8.98  41.48
-------------------------------------------------------------------------

Segment Leq : 41.48 dBA

Total Leq All Segments: 41.48 dBA

↟



TOTAL Leq FROM ALL SOURCES (DAY): 58.72
                           (NIGHT): 49.32
↟
↟
```

STAMSON 5.0 NORMAL REPORT Date: 24-08-2021 15:33:12
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: rec31.te Time Period: Day/Night 16/8 hours
Description: Reception Point 3-1

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

Train Type	Trains	Speed (km/h)	# loc /Train	# Cars /Train	Eng type	Cont weld
1. VIA Train	12.0/0.0	100.0	1.0	6.0	Diesel	No

Data for Segment # 1: VIA Train (day/night)

```
Angle1   Angle2           : -84.00 deg   84.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  30.00 / 30.00  m
Receiver height           :   1.50 / 1.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
No Whistle
Barrier angle1            : -84.00 deg   Angle2 : 84.00 deg
Barrier height            :   0.00 m
Barrier receiver distance :  25.00 / 25.00  m
Source elevation          :  70.00 m
Receiver elevation        :  68.00 m
Barrier elevation         :  68.00 m
Reference angle           :   0.00
```

↑

Results segment # 1: VIA Train (day)

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
4.00	1.50	5.25	73.25
0.50	1.50	2.33	70.33

LOCOMOTIVE (0.00 + 58.49 + 0.00) = 58.49 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-84	84	0.58	64.65	-4.77	-1.40	0.00	0.00	0.00	58.49*
-84	84	0.58	64.65	-4.77	-1.40	0.00	0.00	0.00	58.49

```
 * Bright Zone !

WHEEL (0.00 + 51.99 + 0.00) = 51.99 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------
   -84     84   0.66  58.50  -5.00  -1.51   0.00   0.00  -0.00  51.99*
   -84     84   0.66  58.50  -5.00  -1.51   0.00   0.00   0.00  51.99
-------------------------------------------------------------------

 * Bright Zone !

Segment Leq : 59.37 dBA

Total Leq All Segments: 59.37 dBA

♠
Results segment # 1: VIA Train (night)
--------------------------------------

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       4.00 !        1.50 !        5.25 !        73.25
       0.50 !        1.50 !        2.33 !        70.33

LOCOMOTIVE (0.00 + -6.17 + 0.00) = 0.00 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------
   -84     84   0.58   0.00  -4.77  -1.40   0.00   0.00   0.00  -6.17*
   -84     84   0.58   0.00  -4.77  -1.40   0.00   0.00   0.00  -6.17
-------------------------------------------------------------------

 * Bright Zone !

WHEEL (0.00 + -6.51 + 0.00) = 0.00 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------
   -84     84   0.66   0.00  -5.00  -1.51   0.00   0.00  -0.00  -6.51*
   -84     84   0.66   0.00  -5.00  -1.51   0.00   0.00   0.00  -6.51
-------------------------------------------------------------------

 * Bright Zone !

Segment Leq : 0.00 dBA

Total Leq All Segments: 0.00 dBA
```

↑

TOTAL Leq FROM ALL SOURCES (DAY): 59.37
(NIGHT): 0.00

↑
↑

STAMSON 5.0 NORMAL REPORT Date: 24-08-2021 15:34:35
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: rec38.te Time Period: Day/Night 16/8 hours
Description: Reception Point 3-8

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

Train Type	Trains	Speed (km/h)	# loc /Train	# Cars /Train	Eng type	Cont weld
1. VIA Train	12.0/0.0	100.0	1.0	6.0	Diesel	No

Data for Segment # 1: VIA Train (day/night)

```
Angle1   Angle2           : -84.00 deg   84.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  30.00 / 30.00  m
Receiver height           :  22.50 / 22.50  m
Topography                :      2       (Flat/gentle slope; with barrier)
No Whistle
Barrier angle1            : -84.00 deg   Angle2 : 84.00 deg
Barrier height            :   0.00 m
Barrier receiver distance :  25.00 / 25.00  m
Source elevation          :  70.00 m
Receiver elevation        :  68.00 m
Barrier elevation         :  68.00 m
Reference angle           :   0.00
```

Results segment # 1: VIA Train (day)

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
4.00	22.50	8.75	76.75
0.50	22.50	5.83	73.83

LOCOMOTIVE (0.00 + 61.34 + 0.00) = 61.34 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-84	84	0.00	64.65	-3.01	-0.30	0.00	0.00	0.00	61.34*
-84	84	0.00	64.65	-3.01	-0.30	0.00	0.00	0.00	61.34

```
 * Bright Zone !

WHEEL (0.00 + 54.88 + 0.00) = 54.88 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------
   -84     84   0.06  58.50  -3.19  -0.43   0.00   0.00   0.00  54.88*
   -84     84   0.06  58.50  -3.19  -0.43   0.00   0.00   0.00  54.88
-------------------------------------------------------------------

 * Bright Zone !

Segment Leq : 62.22 dBA

Total Leq All Segments: 62.22 dBA

♠
Results segment # 1: VIA Train (night)
--------------------------------------

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       4.00 !       22.50 !        8.75 !        76.75
       0.50 !       22.50 !        5.83 !        73.83

LOCOMOTIVE (0.00 + -3.31 + 0.00) = 0.00 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------
   -84     84   0.00   0.00  -3.01  -0.30   0.00   0.00   0.00  -3.31*
   -84     84   0.00   0.00  -3.01  -0.30   0.00   0.00   0.00  -3.31
-------------------------------------------------------------------

 * Bright Zone !

WHEEL (0.00 + -3.62 + 0.00) = 0.00 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------
   -84     84   0.06   0.00  -3.19  -0.43   0.00   0.00   0.00  -3.62*
   -84     84   0.06   0.00  -3.19  -0.43   0.00   0.00   0.00  -3.62
-------------------------------------------------------------------

 * Bright Zone !

Segment Leq : 0.00 dBA

Total Leq All Segments: 0.00 dBA
```

↑

TOTAL Leq FROM ALL SOURCES (DAY): 62.22
(NIGHT): 0.00

↑
↑

STAMSON 5.0 NORMAL REPORT Date: 24-08-2021 08:52:49
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: rec41.te Time Period: Day/Night 16/8 hours
Description: Reception Point 4-1

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

Train Type	Trains	Speed (km/h)	# loc /Train	# Cars /Train	Eng type	Cont weld
1. VIA Train	12.0/0.0	100.0	1.0	6.0	Diesel	No

Data for Segment # 1: VIA Train (day/night)

Angle1 Angle2	:	0.00 deg 80.00 deg
Wood depth	:	0 (No woods.)
No of house rows	:	0 / 0
Surface	:	1 (Absorptive ground surface)
Receiver source distance	:	50.00 / 50.00 m
Receiver height	:	1.50 / 1.50 m
Topography	:	2 (Flat/gentle slope; with barrier)
No Whistle		
Barrier angle1	:	0.00 deg Angle2 : 80.00 deg
Barrier height	:	0.00 m
Barrier receiver distance	:	45.00 / 45.00 m
Source elevation	:	70.00 m
Receiver elevation	:	68.00 m
Barrier elevation	:	68.00 m
Reference angle	:	0.00

Results segment # 1: VIA Train (day)

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
4.00	1.50	5.55	73.55
0.50	1.50	2.40	70.40

LOCOMOTIVE (0.00 + 51.87 + 0.00) = 51.87 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	80	0.58	64.65	-8.29	-4.49	0.00	0.00	0.00	51.87*
0	80	0.58	64.65	-8.29	-4.49	0.00	0.00	0.00	51.87

 * Bright Zone !

WHEEL (0.00 + 45.23 + 0.00) = 45.23 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	80	0.66	58.50	-8.68	-4.60	0.00	0.00	0.00	45.23*
0	80	0.66	58.50	-8.68	-4.60	0.00	0.00	0.00	45.23

 * Bright Zone !

Segment Leq : 52.72 dBA

Total Leq All Segments: 52.72 dBA

Results segment # 1: VIA Train (night)

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
4.00	1.50	5.55	73.55
0.50	1.50	2.40	70.40

LOCOMOTIVE (0.00 + -12.78 + 0.00) = 0.00 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	80	0.58	0.00	-8.29	-4.49	0.00	0.00	0.00	-12.78*
0	80	0.58	0.00	-8.29	-4.49	0.00	0.00	0.00	-12.78

 * Bright Zone !

WHEEL (0.00 + -13.28 + 0.00) = 0.00 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	80	0.66	0.00	-8.68	-4.60	0.00	0.00	0.00	-13.28*
0	80	0.66	0.00	-8.68	-4.60	0.00	0.00	0.00	-13.28

 * Bright Zone !

Segment Leq : 0.00 dBA

Total Leq All Segments: 0.00 dBA

↟
RT/Custom data, segment # 1: Transitway (day/night)
---
1 - Bus:
Traffic volume   :   864/146   veh/TimePeriod
Speed   :   80 km/h

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

Angle1   Angle2   : -48.00 deg   0.00 deg
Wood depth   :   0   (No woods.)
No of house rows   :   1 / 1
House density   :   20 %
Surface   :   1   (Absorptive ground surface)
Receiver source distance : 85.00 / 85.00 m
Receiver height   :   1.50 / 1.50   m
Topography   :   2   (Flat/gentle slope; with barrier)
Barrier angle1   : -48.00 deg   Angle2 : 0.00 deg
Barrier height   :   4.00 m
Barrier receiver distance : 80.00 / 80.00 m
Source elevation   : 62.00 m
Receiver elevation   : 68.00 m
Barrier elevation   : 62.00 m
Reference angle   :   0.00

↟
Results segment # 1: Transitway (day)

Source height = 0.50 m

Barrier height for grazing incidence

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

       0.50 !   1.50 !   0.91 !   62.91

RT/Custom (0.00 + 32.50 + 0.00) = 32.50 dBA
Angle1 Angle2 Alpha RefLeq D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq
---
   -48   0   0.66 65.97 -12.51 -6.09   0.00 -0.90   0.00 46.47
   -48   0   0.45 65.97 -10.92 -5.98   0.00   0.00 -16.56 32.50

Segment Leq : 32.50 dBA

Total Leq All Segments: 32.50 dBA

↟

Results segment # 1: Transitway (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	0.91	62.91

RT/Custom (0.00 + 27.79 + 0.00) = 27.79 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-48	0	0.66	61.26	-12.51	-6.09	0.00	-0.90	0.00	41.76
-48	0	0.45	61.26	-10.92	-5.98	0.00	0.00	-16.56	27.79

Segment Leq : 27.79 dBA

Total Leq All Segments: 27.79 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 52.76
(NIGHT): 27.79

STAMSON 5.0 NORMAL REPORT Date: 24-08-2021 08:57:18
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: rec48.te Time Period: Day/Night 16/8 hours
Description: Reception Point 4-8

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

Train Type	Trains	Speed (km/h)	# loc /Train	# Cars /Train	Eng type	Cont weld
1. VIA Train	12.0/0.0	100.0	1.0	6.0	Diesel	No

Data for Segment # 1: VIA Train (day/night)

Angle1 Angle2	:	0.00 deg 80.00 deg
Wood depth	:	0 (No woods.)
No of house rows	:	0 / 0
Surface	:	1 (Absorptive ground surface)
Receiver source distance	:	50.00 / 50.00 m
Receiver height	:	22.50 / 22.50 m
Topography	:	2 (Flat/gentle slope; with barrier)
No Whistle		
Barrier angle1	:	0.00 deg Angle2 : 80.00 deg
Barrier height	:	0.00 m
Barrier receiver distance	:	45.00 / 45.00 m
Source elevation	:	70.00 m
Receiver elevation	:	68.00 m
Barrier elevation	:	68.00 m
Reference angle	:	0.00

Results segment # 1: VIA Train (day)

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
4.00	22.50	7.65	75.65
0.50	22.50	4.50	72.50

LOCOMOTIVE (0.00 + 55.90 + 0.00) = 55.90 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	80	0.00	64.65	-5.23	-3.52	0.00	0.00	0.00	55.90*
0	80	0.00	64.65	-5.23	-3.52	0.00	0.00	0.00	55.90

```
 * Bright Zone !

WHEEL (0.00 + 49.33 + 0.00) = 49.33 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------
     0     80   0.06  58.50  -5.54  -3.63   0.00   0.00   0.00  49.33*
     0     80   0.06  58.50  -5.54  -3.63   0.00   0.00   0.00  49.33
-------------------------------------------------------------------

 * Bright Zone !

Segment Leq : 56.76 dBA

Total Leq All Segments: 56.76 dBA

♠
Results segment # 1: VIA Train (night)
--------------------------------------

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       4.00 !       22.50 !        7.65 !        75.65
       0.50 !       22.50 !        4.50 !        72.50

LOCOMOTIVE (0.00 + -8.75 + 0.00) = 0.00 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------
     0     80   0.00   0.00  -5.23  -3.52   0.00   0.00   0.00  -8.75*
     0     80   0.00   0.00  -5.23  -3.52   0.00   0.00   0.00  -8.75
-------------------------------------------------------------------

 * Bright Zone !

WHEEL (0.00 + -9.18 + 0.00) = 0.00 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------
     0     80   0.06   0.00  -5.54  -3.63   0.00   0.00   0.00  -9.18*
     0     80   0.06   0.00  -5.54  -3.63   0.00   0.00   0.00  -9.18
-------------------------------------------------------------------

 * Bright Zone !

Segment Leq : 0.00 dBA

Total Leq All Segments: 0.00 dBA
```

↟
RT/Custom data, segment # 1: Transitway (day/night)
---
1 - Bus:
Traffic volume   :   864/146   veh/TimePeriod
Speed   :   80 km/h

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

Angle1   Angle2   : -48.00 deg   0.00 deg
Wood depth   :   0   (No woods.)
No of house rows   :   1 / 1
House density   :   20 %
Surface   :   1   (Absorptive ground surface)
Receiver source distance : 85.00 / 85.00 m
Receiver height   : 22.50 / 22.50 m
Topography   :   2   (Flat/gentle slope; with barrier)
Barrier angle1   : -48.00 deg   Angle2 : 0.00 deg
Barrier height   :   4.00 m
Barrier receiver distance : 80.00 / 80.00 m
Source elevation   : 62.00 m
Receiver elevation   : 68.00 m
Barrier elevation   : 62.00 m
Reference angle   :   0.00

↟
Results segment # 1: Transitway (day)

Source height = 0.50 m

Barrier height for grazing incidence

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

       0.50 !   22.50 !   2.15 !   64.15

RT/Custom (0.00 + 40.94 + 0.00) = 40.94 dBA
Angle1 Angle2 Alpha RefLeq D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq
---
   -48   0   0.06 65.97 -7.99 -5.77   0.00 -0.90   0.00 51.31
   -48   0   0.00 65.97 -7.53 -5.74   0.00   0.00 -11.75 40.94

Segment Leq : 40.94 dBA

Total Leq All Segments: 40.94 dBA

↟

Results segment # 1: Transitway (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	22.50	2.15	64.15

RT/Custom (0.00 + 36.23 + 0.00) = 36.23 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-48	0	0.06	61.26	-7.99	-5.77	0.00	-0.90	0.00	46.60
-48	0	0.00	61.26	-7.53	-5.74	0.00	0.00	-11.75	36.23

Segment Leq : 36.23 dBA

Total Leq All Segments: 36.23 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 56.87
(NIGHT): 36.23

STAMSON 5.0 NORMAL REPORT Date: 24-08-2021 09:08:05
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: rec51.te Time Period: Day/Night 16/8 hours
Description: Reception Point 5-1

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

Train Type	Trains	Speed (km/h)	# loc /Train	# Cars /Train	Eng type	Cont weld
1. VIA Train	12.0/0.0	100.0	1.0	6.0	Diesel	No

Data for Segment # 1: VIA Train (day/night)

Angle1 Angle2	:	0.00 deg 72.00 deg
Wood depth	:	0 (No woods.)
No of house rows	:	0 / 0
Surface	:	1 (Absorptive ground surface)
Receiver source distance	:	90.00 / 90.00 m
Receiver height	:	1.50 / 1.50 m
Topography	:	2 (Flat/gentle slope; with barrier)
No Whistle		
Barrier angle1	:	0.00 deg Angle2 : 72.00 deg
Barrier height	:	0.00 m
Barrier receiver distance	:	85.00 / 85.00 m
Source elevation	:	70.00 m
Receiver elevation	:	68.00 m
Barrier elevation	:	68.00 m
Reference angle	:	0.00

Results segment # 1: VIA Train (day)

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
4.00	1.50	5.75	73.75
0.50	1.50	2.44	70.44

LOCOMOTIVE (0.00 + 47.59 + 0.00) = 47.59 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	72	0.58	64.65	-12.33	-4.73	0.00	0.00	0.00	47.59*
0	72	0.58	64.65	-12.33	-4.73	0.00	0.00	0.00	47.59

```
 * Bright Zone !

WHEEL (0.00 + 40.77 + 0.00) = 40.77 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------
     0     72   0.66  58.50 -12.92  -4.82   0.00   0.00   0.00  40.77*
     0     72   0.66  58.50 -12.92  -4.82   0.00   0.00   0.00  40.77
-------------------------------------------------------------------

 * Bright Zone !

Segment Leq : 48.41 dBA

Total Leq All Segments: 48.41 dBA

↟
Results segment # 1: VIA Train (night)
--------------------------------------

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       4.00 !        1.50 !        5.75 !        73.75
       0.50 !        1.50 !        2.44 !        70.44

LOCOMOTIVE (0.00 + -17.07 + 0.00) = 0.00 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------
     0     72   0.58   0.00 -12.33  -4.73   0.00   0.00   0.00 -17.07*
     0     72   0.58   0.00 -12.33  -4.73   0.00   0.00   0.00 -17.07
-------------------------------------------------------------------

 * Bright Zone !

WHEEL (0.00 + -17.74 + 0.00) = 0.00 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------
     0     72   0.66   0.00 -12.92  -4.82   0.00   0.00   0.00 -17.74*
     0     72   0.66   0.00 -12.92  -4.82   0.00   0.00   0.00 -17.74
-------------------------------------------------------------------

 * Bright Zone !

Segment Leq : 0.00 dBA

Total Leq All Segments: 0.00 dBA
```

RT/Custom data, segment # 1: Transitway (day/night)
---
1 - Bus:
Traffic volume   :   864/146   veh/TimePeriod
Speed   :   80 km/h

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

Angle1   Angle2   : -66.00 deg   0.00 deg
Wood depth   :   0   (No woods.)
No of house rows   :   0 / 0
Surface   :   1   (Absorptive ground surface)
Receiver source distance : 40.00 / 40.00 m
Receiver height   :   1.50 / 1.50   m
Topography   :   2   (Flat/gentle slope; with barrier)
Barrier angle1   : -66.00 deg   Angle2 : 0.00 deg
Barrier height   :   4.00 m
Barrier receiver distance : 35.00 / 35.00 m
Source elevation   : 62.00 m
Receiver elevation   : 68.00 m
Barrier elevation   : 62.00 m
Reference angle   :   0.00

Results segment # 1: Transitway (day)

Source height = 0.50 m

Barrier height for grazing incidence

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

       0.50 !   1.50 !   1.38 !   63.38

RT/Custom (0.00 + 40.29 + 0.00) = 40.29 dBA
Angle1 Angle2 Alpha RefLeq D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq
---
   -66   0   0.45 65.97 -6.18 -4.84   0.00   0.00 -14.66 40.29

Segment Leq : 40.29 dBA

Total Leq All Segments: 40.29 dBA

Results segment # 1: Transitway (night)

Source height = 0.50 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
0.50	1.50	1.38	63.38

RT/Custom (0.00 + 35.58 + 0.00) = 35.58 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-66	0	0.45	61.26	-6.18	-4.84	0.00	0.00	-14.66	35.58

Segment Leq : 35.58 dBA

Total Leq All Segments: 35.58 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 49.03
(NIGHT): 35.58

STAMSON 5.0 NORMAL REPORT Date: 24-08-2021 09:11:05
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: rec58.te Time Period: Day/Night 16/8 hours
Description: Reception Point 5-8

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

Train Type	Trains	Speed (km/h)	# loc /Train	# Cars /Train	Eng type	Cont weld
1. VIA Train	12.0/0.0	100.0	1.0	6.0	Diesel	No

Data for Segment # 1: VIA Train (day/night)

Angle1 Angle2	:	0.00 deg 72.00 deg
Wood depth	:	0 (No woods.)
No of house rows	:	0 / 0
Surface	:	1 (Absorptive ground surface)
Receiver source distance	:	90.00 / 90.00 m
Receiver height	:	22.50 / 22.50 m
Topography	:	2 (Flat/gentle slope; with barrier)
No Whistle		
Barrier angle1	:	0.00 deg Angle2 : 72.00 deg
Barrier height	:	0.00 m
Barrier receiver distance	:	85.00 / 85.00 m
Source elevation	:	70.00 m
Receiver elevation	:	68.00 m
Barrier elevation	:	68.00 m
Reference angle	:	0.00

Results segment # 1: VIA Train (day)

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
4.00	22.50	6.92	74.92
0.50	22.50	3.61	71.61

LOCOMOTIVE (0.00 + 52.89 + 0.00) = 52.89 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	72	0.00	64.65	-7.78	-3.98	0.00	0.00	0.00	52.89*
0	72	0.00	64.65	-7.78	-3.98	0.00	0.00	0.00	52.89

```
 * Bright Zone !

WHEEL (0.00 + 46.19 + 0.00) = 46.19 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------
     0     72   0.06  58.50  -8.25  -4.06   0.00   0.00   0.00  46.19*
     0     72   0.06  58.50  -8.25  -4.06   0.00   0.00   0.00  46.19
-------------------------------------------------------------------

 * Bright Zone !

Segment Leq : 53.73 dBA

Total Leq All Segments: 53.73 dBA

♠
Results segment # 1: VIA Train (night)
--------------------------------------

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       4.00 !       22.50 !        6.92 !        74.92
       0.50 !       22.50 !        3.61 !        71.61

LOCOMOTIVE (0.00 + -11.76 + 0.00) = 0.00 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------
     0     72   0.00   0.00  -7.78  -3.98   0.00   0.00   0.00 -11.76*
     0     72   0.00   0.00  -7.78  -3.98   0.00   0.00   0.00 -11.76
-------------------------------------------------------------------

 * Bright Zone !

WHEEL (0.00 + -12.31 + 0.00) = 0.00 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------
     0     72   0.06   0.00  -8.25  -4.06   0.00   0.00   0.00 -12.31*
     0     72   0.06   0.00  -8.25  -4.06   0.00   0.00   0.00 -12.31
-------------------------------------------------------------------

 * Bright Zone !

Segment Leq : 0.00 dBA

Total Leq All Segments: 0.00 dBA
```

RT/Custom data, segment # 1: Transitway (day/night)
---
1 - Bus:
Traffic volume   :   864/146   veh/TimePeriod
Speed   :   80 km/h

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

Angle1   Angle2   : -66.00 deg   0.00 deg
Wood depth   :   0   (No woods.)
No of house rows   :   0 / 0
Surface   :   1   (Absorptive ground surface)
Receiver source distance : 40.00 / 40.00 m
Receiver height   : 22.50 / 22.50 m
Topography   :   2   (Flat/gentle slope; with barrier)
Barrier angle1   : -66.00 deg   Angle2 : 0.00 deg
Barrier height   :   4.00 m
Barrier receiver distance : 35.00 / 35.00 m
Source elevation   : 62.00 m
Receiver elevation   : 68.00 m
Barrier elevation   : 62.00 m
Reference angle   :   0.00

Results segment # 1: Transitway (day)

Source height = 0.50 m

Barrier height for grazing incidence

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

       0.50 !   22.50 !   4.00 !   66.00

RT/Custom (0.00 + 52.35 + 0.00) = 52.35 dBA
Angle1 Angle2 Alpha RefLeq D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq
---
   -66   0   0.00 65.97 -4.26 -4.36   0.00   0.00 -5.00 52.35

Segment Leq : 52.35 dBA

Total Leq All Segments: 52.35 dBA

Results segment # 1: Transitway (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	22.50	4.00	66.00

RT/Custom (0.00 + 47.64 + 0.00) = 47.64 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-66	0	0.00	61.26	-4.26	-4.36	0.00	0.00	-5.00	47.64

Segment Leq : 47.64 dBA

Total Leq All Segments: 47.64 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 56.10
(NIGHT): 47.64

STAMSON 5.0 NORMAL REPORT Date: 24-08-2021 09:51:26
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: rec61.te Time Period: Day/Night 16/8 hours
Description: Reception Point 6-1

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

Car traffic volume : 12144/1056 veh/TimePeriod *
Medium truck volume : 966/84 veh/TimePeriod *
Heavy truck volume : 690/60 veh/TimePeriod *
Posted speed limit : 60 km/h
Road gradient : 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): 15000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 1: Riverside Dr (day/night)

Angle1 Angle2 : -40.00 deg 47.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 95.00 / 95.00 m
Receiver height : 1.50 / 1.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

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

Car traffic volume : 28336/2464 veh/TimePeriod *
Medium truck volume : 2254/196 veh/TimePeriod *
Heavy truck volume : 1610/140 veh/TimePeriod *
Posted speed limit : 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): 35000
Percentage of Annual Growth : 0.00

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

Data for Segment # 2: Smyth Road (day/night)
------------------------------------------
Angle1   Angle2           : -78.00 deg   0.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  50.00 / 50.00  m
Receiver height           :   1.50 / 1.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

↟
Results segment # 1: Riverside Dr (day)
---------------------------------------

Source height = 1.50 m

ROAD (0.00 + 53.24 + 0.00) = 53.24 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -40     47   0.66  70.00   0.00 -13.31  -3.45   0.00   0.00   0.00  53.24
-------------------------------------------------------------------------------

Segment Leq : 53.24 dBA

↟
Results segment # 2: Smyth Road (day)
-------------------------------------

Source height = 1.50 m

ROAD (0.00 + 58.84 + 0.00) = 58.84 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -78      0   0.66  72.16   0.00  -8.68  -4.64   0.00   0.00   0.00  58.84
-------------------------------------------------------------------------------

Segment Leq : 58.84 dBA

Total Leq All Segments: 59.90 dBA

↟
Results segment # 1: Riverside Dr (night)
-----------------------------------------
```

Source height = 1.50 m

ROAD (0.00 + 45.64 + 0.00) = 45.64 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-40	47	0.66	62.40	0.00	-13.31	-3.45	0.00	0.00	0.00	45.64

Segment Leq : 45.64 dBA

Results segment # 2: Smyth Road (night)

Source height = 1.50 m

ROAD (0.00 + 51.24 + 0.00) = 51.24 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-78	0	0.66	64.56	0.00	-8.68	-4.64	0.00	0.00	0.00	51.24

Segment Leq : 51.24 dBA

Total Leq All Segments: 52.30 dBA

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

1 - Bus:
Traffic volume : 864/146 veh/TimePeriod
Speed : 80 km/h

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

Angle1 Angle2 : -58.00 deg 64.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 65.00 / 65.00 m
Receiver height : 1.50 / 1.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -58.00 deg Angle2 : 64.00 deg
Barrier height : 4.00 m
Barrier receiver distance : 60.00 / 60.00 m
Source elevation : 62.00 m
Receiver elevation : 68.00 m
Barrier elevation : 62.00 m
Reference angle : 0.00

Results segment # 1: Transitway (day)

Source height = 0.50 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
0.50	1.50	1.04	63.04

RT/Custom (0.00 + 38.85 + 0.00) = 38.85 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-58	64	0.45	65.97	-9.23	-2.10	0.00	0.00	-15.79	38.85

Segment Leq : 38.85 dBA

Total Leq All Segments: 38.85 dBA

Results segment # 1: Transitway (night)

Source height = 0.50 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
0.50	1.50	1.04	63.04

RT/Custom (0.00 + 34.14 + 0.00) = 34.14 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-58	64	0.45	61.26	-9.23	-2.10	0.00	0.00	-15.79	34.14

Segment Leq : 34.14 dBA

Total Leq All Segments: 34.14 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 59.93
(NIGHT): 52.36

STAMSON 5.0 NORMAL REPORT Date: 24-08-2021 09:59:01
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: rec615.te Time Period: Day/Night 16/8 hours
Description: Reception Point 6-15

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

Car traffic volume : 12144/1056 veh/TimePeriod *
Medium truck volume : 966/84 veh/TimePeriod *
Heavy truck volume : 690/60 veh/TimePeriod *
Posted speed limit : 60 km/h
Road gradient : 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): 15000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 1: Riverside Dr (day/night)

Angle1 Angle2 : -40.00 deg 47.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 95.00 / 95.00 m
Receiver height : 43.50 / 43.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

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

Car traffic volume : 28336/2464 veh/TimePeriod *
Medium truck volume : 2254/196 veh/TimePeriod *
Heavy truck volume : 1610/140 veh/TimePeriod *
Posted speed limit : 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): 35000
Percentage of Annual Growth : 0.00

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

Data for Segment # 2: Smyth Road (day/night)
------------------------------------------
Angle1   Angle2           : -78.00 deg   0.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  50.00 / 50.00  m
Receiver height           :  43.50 / 43.50  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

↟
Results segment # 1: Riverside Dr (day)
---------------------------------------

Source height = 1.50 m

ROAD (0.00 + 58.82 + 0.00) = 58.82 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -40     47   0.00  70.00   0.00  -8.02  -3.16   0.00   0.00   0.00  58.82
-------------------------------------------------------------------------------

Segment Leq : 58.82 dBA

↟
Results segment # 2: Smyth Road (day)
-------------------------------------

Source height = 1.50 m

ROAD (0.00 + 63.30 + 0.00) = 63.30 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -78      0   0.00  72.16   0.00  -5.23  -3.63   0.00   0.00   0.00  63.30
-------------------------------------------------------------------------------

Segment Leq : 63.30 dBA

Total Leq All Segments: 64.62 dBA

↟
Results segment # 1: Riverside Dr (night)
-----------------------------------------
```

Source height = 1.50 m

ROAD (0.00 + 51.23 + 0.00) = 51.23 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-40	47	0.00	62.40	0.00	-8.02	-3.16	0.00	0.00	0.00	51.23

Segment Leq : 51.23 dBA

Results segment # 2: Smyth Road (night)

Source height = 1.50 m

ROAD (0.00 + 55.70 + 0.00) = 55.70 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-78	0	0.00	64.56	0.00	-5.23	-3.63	0.00	0.00	0.00	55.70

Segment Leq : 55.70 dBA

Total Leq All Segments: 57.03 dBA

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

1 - Bus:
Traffic volume : 864/146 veh/TimePeriod
Speed : 80 km/h

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

Angle1 Angle2 : -58.00 deg 64.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 65.00 / 65.00 m
Receiver height : 43.50 / 43.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -58.00 deg Angle2 : 64.00 deg
Barrier height : 4.00 m
Barrier receiver distance : 60.00 / 60.00 m
Source elevation : 62.00 m
Receiver elevation : 68.00 m
Barrier elevation : 62.00 m
Reference angle : 0.00

Results segment # 1: Transitway (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	43.50	4.27	66.27

RT/Custom (0.00 + 57.91 + 0.00) = 57.91 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-58	64	0.00	65.97	-6.37	-1.69	0.00	0.00	-4.82	53.09*
-58	64	0.00	65.97	-6.37	-1.69	0.00	0.00	0.00	57.91

* Bright Zone !

Segment Leq : 57.91 dBA

Total Leq All Segments: 57.91 dBA

Results segment # 1: Transitway (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	43.50	4.27	66.27

RT/Custom (0.00 + 53.20 + 0.00) = 53.20 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-58	64	0.00	61.26	-6.37	-1.69	0.00	0.00	-4.82	48.38*
-58	64	0.00	61.26	-6.37	-1.69	0.00	0.00	0.00	53.20

* Bright Zone !

Segment Leq : 53.20 dBA

Total Leq All Segments: 53.20 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 65.46
(NIGHT): 58.53

STAMSON 5.0 NORMAL REPORT Date: 24-08-2021 10:23:15
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: rec71.te Time Period: Day/Night 16/8 hours
Description: Reception Point 7-1

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

Train Type	Trains	Speed (km/h)	# loc /Train	# Cars /Train	Eng type	Cont weld
1. VIA Train	12.0/0.0	100.0	1.0	6.0	Diesel	No

Data for Segment # 1: VIA Train (day/night)

```
Angle1   Angle2           : -81.00 deg   0.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  65.00 / 65.00  m
Receiver height           :   1.50 / 1.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
No Whistle
Barrier angle1            : -81.00 deg   Angle2 : 0.00 deg
Barrier height            :   0.00 m
Barrier receiver distance :  60.00 / 60.00  m
Source elevation          :  70.00 m
Receiver elevation        :  68.00 m
Barrier elevation         :  68.00 m
Reference angle           :   0.00
```

Results segment # 1: VIA Train (day)

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
4.00	1.50	5.65	73.65
0.50	1.50	2.42	70.42

LOCOMOTIVE (0.00 + 50.09 + 0.00) = 50.09 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-81	0	0.58	64.65	-10.09	-4.47	0.00	0.00	0.00	50.09*
-81	0	0.58	64.65	-10.09	-4.47	0.00	0.00	0.00	50.09

 * Bright Zone !

WHEEL (0.00 + 43.36 + 0.00) = 43.36 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-81	0	0.66	58.50	-10.57	-4.58	0.00	0.00	0.00	43.36*
-81	0	0.66	58.50	-10.57	-4.58	0.00	0.00	0.00	43.36

 * Bright Zone !

Segment Leq : 50.93 dBA

Total Leq All Segments: 50.93 dBA

↟
Results segment # 1: VIA Train (night)

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
4.00	1.50	5.65	73.65
0.50	1.50	2.42	70.42

LOCOMOTIVE (0.00 + -14.56 + 0.00) = 0.00 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-81	0	0.58	0.00	-10.09	-4.47	0.00	0.00	0.00	-14.56*
-81	0	0.58	0.00	-10.09	-4.47	0.00	0.00	0.00	-14.56

 * Bright Zone !

WHEEL (0.00 + -15.15 + 0.00) = 0.00 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-81	0	0.66	0.00	-10.57	-4.58	0.00	0.00	0.00	-15.15*
-81	0	0.66	0.00	-10.57	-4.58	0.00	0.00	0.00	-15.15

 * Bright Zone !

Segment Leq : 0.00 dBA

Total Leq All Segments: 0.00 dBA

↟
Road data, segment # 1: Riverside Dr (day/night)

Car traffic volume : 12144/1056 veh/TimePeriod *
Medium truck volume : 966/84 veh/TimePeriod *
Heavy truck volume : 690/60 veh/TimePeriod *
Posted speed limit : 60 km/h
Road gradient : 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): 15000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 1: Riverside Dr (day/night)

Angle1 Angle2 : 0.00 deg 32.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 90.00 / 90.00 m
Receiver height : 1.50 / 1.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

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

Car traffic volume : 28336/2464 veh/TimePeriod *
Medium truck volume : 2254/196 veh/TimePeriod *
Heavy truck volume : 1610/140 veh/TimePeriod *
Posted speed limit : 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): 35000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 2: Smyth Road (day/night)

```
-------------------------------------------
Angle1   Angle2           : -90.00 deg   56.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  25.00 / 25.00  m
Receiver height           :   1.50 / 1.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00
```

↟

```
Results segment # 1: Riverside Dr (day)
---------------------------------------

Source height = 1.50 m

ROAD (0.00 + 49.43 + 0.00) = 49.43 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
     0     32   0.66  70.00   0.00 -12.92  -7.65   0.00   0.00   0.00  49.43
-------------------------------------------------------------------------------

Segment Leq : 49.43 dBA
```

↟

```
Results segment # 2: Smyth Road (day)
-------------------------------------

Source height = 1.50 m

ROAD (0.00 + 66.51 + 0.00) = 66.51 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     56   0.66  72.16   0.00  -3.68  -1.97   0.00   0.00   0.00  66.51
-------------------------------------------------------------------------------

Segment Leq : 66.51 dBA

Total Leq All Segments: 66.59 dBA
```

↟

```
Results segment # 1: Riverside Dr (night)
-----------------------------------------

Source height = 1.50 m

ROAD (0.00 + 41.83 + 0.00) = 41.83 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
     0     32   0.66  62.40   0.00 -12.92  -7.65   0.00   0.00   0.00  41.83
```

```
--------------------------------------------------------------------------------

Segment Leq : 41.83 dBA

↟
Results segment # 2: Smyth Road (night)
---------------------------------------

Source height = 1.50 m

ROAD (0.00 + 58.91 + 0.00) = 58.91 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
--------------------------------------------------------------------------------
   -90     56   0.66  64.56   0.00  -3.68  -1.97   0.00   0.00   0.00  58.91
--------------------------------------------------------------------------------

Segment Leq : 58.91 dBA

Total Leq All Segments: 58.99 dBA

↟
RT/Custom data, segment # 1: Transitway (day/night)
---------------------------------------------------
1 - Bus:
Traffic volume    :   864/146   veh/TimePeriod
Speed             :    80 km/h

Data for Segment # 1: Transitway (day/night)
--------------------------------------------
Angle1   Angle2           :   0.00 deg   52.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  65.00 / 65.00  m
Receiver height           :   1.50 / 1.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            :   0.00 deg   Angle2 : 52.00 deg
Barrier height            :   4.00 m
Barrier receiver distance :  60.00 / 60.00  m
Source elevation          :  62.00 m
Receiver elevation        :  68.00 m
Barrier elevation         :  62.00 m
Reference angle           :   0.00

↟
Results segment # 1: Transitway (day)
-------------------------------------

Source height = 0.50 m
```

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
0.50	1.50	1.04	63.04

RT/Custom (0.00 + 34.92 + 0.00) = 34.92 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	52	0.45	65.97	-9.23	-5.68	0.00	0.00	-16.13	34.92

Segment Leq : 34.92 dBA

Total Leq All Segments: 34.92 dBA

↟
Results segment # 1: Transitway (night)

Source height = 0.50 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
0.50	1.50	1.04	63.04

RT/Custom (0.00 + 30.21 + 0.00) = 30.21 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	52	0.45	61.26	-9.23	-5.68	0.00	0.00	-16.13	30.21

Segment Leq : 30.21 dBA

Total Leq All Segments: 30.21 dBA

↟

TOTAL Leq FROM ALL SOURCES (DAY): 66.71
(NIGHT): 59.00
↟
↟

STAMSON 5.0 NORMAL REPORT Date: 24-08-2021 10:27:24
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: rec715.te Time Period: Day/Night 16/8 hours
Description: Reception Point 7-15

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

Train Type	Trains	Speed (km/h)	# loc /Train	# Cars /Train	Eng type	Cont weld
1. VIA Train	12.0/0.0	100.0	1.0	6.0	Diesel	No

Data for Segment # 1: VIA Train (day/night)

```
Angle1   Angle2           : -81.00 deg   0.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  65.00 / 65.00  m
Receiver height           :  43.50 / 43.50  m
Topography                :      2       (Flat/gentle slope; with barrier)
No Whistle
Barrier angle1            : -81.00 deg   Angle2 : 0.00 deg
Barrier height            :   0.00 m
Barrier receiver distance :  60.00 / 60.00  m
Source elevation          :  70.00 m
Receiver elevation        :  68.00 m
Barrier elevation         :  68.00 m
Reference angle           :   0.00
```

Results segment # 1: VIA Train (day)

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
4.00	43.50	8.88	76.88
0.50	43.50	5.65	73.65

LOCOMOTIVE (0.00 + 54.82 + 0.00) = 54.82 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-81	0	0.00	64.65	-6.37	-3.47	0.00	0.00	0.00	54.82*
-81	0	0.00	64.65	-6.37	-3.47	0.00	0.00	0.00	54.82

 * Bright Zone !

WHEEL (0.00 + 48.67 + 0.00) = 48.67 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-81	0	0.00	58.50	-6.37	-3.47	0.00	0.00	0.00	48.67*
-81	0	0.00	58.50	-6.37	-3.47	0.00	0.00	0.00	48.67

 * Bright Zone !

Segment Leq : 55.76 dBA

Total Leq All Segments: 55.76 dBA

Results segment # 1: VIA Train (night)

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
4.00	43.50	8.88	76.88
0.50	43.50	5.65	73.65

LOCOMOTIVE (0.00 + -9.84 + 0.00) = 0.00 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-81	0	0.00	0.00	-6.37	-3.47	0.00	0.00	0.00	-9.84*
-81	0	0.00	0.00	-6.37	-3.47	0.00	0.00	0.00	-9.84

 * Bright Zone !

WHEEL (0.00 + -9.84 + 0.00) = 0.00 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-81	0	0.00	0.00	-6.37	-3.47	0.00	0.00	0.00	-9.84*
-81	0	0.00	0.00	-6.37	-3.47	0.00	0.00	0.00	-9.84

 * Bright Zone !

Segment Leq : 0.00 dBA

Total Leq All Segments: 0.00 dBA

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

Car traffic volume : 12144/1056 veh/TimePeriod *
Medium truck volume : 966/84 veh/TimePeriod *
Heavy truck volume : 690/60 veh/TimePeriod *
Posted speed limit : 60 km/h
Road gradient : 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): 15000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 1: Riverside Dr (day/night)

Angle1 Angle2 : 0.00 deg 32.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 90.00 / 90.00 m
Receiver height : 43.50 / 43.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

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

Car traffic volume : 28336/2464 veh/TimePeriod *
Medium truck volume : 2254/196 veh/TimePeriod *
Heavy truck volume : 1610/140 veh/TimePeriod *
Posted speed limit : 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): 35000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 2: Smyth Road (day/night)

```
-----------------------------------------
Angle1   Angle2           : -90.00 deg   56.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  25.00 / 25.00  m
Receiver height           :  43.50 / 43.50  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00
```

↟

```
Results segment # 1: Riverside Dr (day)
---------------------------------------

Source height = 1.50 m

ROAD (0.00 + 54.71 + 0.00) = 54.71 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
     0     32   0.00  70.00   0.00  -7.78  -7.50   0.00   0.00   0.00  54.71
-------------------------------------------------------------------------------

Segment Leq : 54.71 dBA
```

↟

```
Results segment # 2: Smyth Road (day)
-------------------------------------

Source height = 1.50 m

ROAD (0.00 + 69.03 + 0.00) = 69.03 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     56   0.00  72.16   0.00  -2.22  -0.91   0.00   0.00   0.00  69.03
-------------------------------------------------------------------------------

Segment Leq : 69.03 dBA

Total Leq All Segments: 69.19 dBA
```

↟

```
Results segment # 1: Riverside Dr (night)
-----------------------------------------

Source height = 1.50 m

ROAD (0.00 + 47.12 + 0.00) = 47.12 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
     0     32   0.00  62.40   0.00  -7.78  -7.50   0.00   0.00   0.00  47.12
```

```
--------------------------------------------------------------------------------

Segment Leq : 47.12 dBA

↟
Results segment # 2: Smyth Road (night)
---------------------------------------

Source height = 1.50 m

ROAD (0.00 + 61.44 + 0.00) = 61.44 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
--------------------------------------------------------------------------------
   -90     56   0.00  64.56   0.00  -2.22  -0.91   0.00   0.00   0.00  61.44
--------------------------------------------------------------------------------

Segment Leq : 61.44 dBA

Total Leq All Segments: 61.60 dBA

↟
RT/Custom data, segment # 1: Transitway (day/night)
---------------------------------------------------
1 - Bus:
Traffic volume    :   864/146   veh/TimePeriod
Speed             :    80 km/h

Data for Segment # 1: Transitway (day/night)
--------------------------------------------
Angle1   Angle2           :   0.00 deg   52.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  65.00 / 65.00  m
Receiver height           :  43.50 / 43.50  m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            :   0.00 deg   Angle2 : 52.00 deg
Barrier height            :   4.00 m
Barrier receiver distance :  60.00 / 60.00  m
Source elevation          :  62.00 m
Receiver elevation        :  68.00 m
Barrier elevation         :  62.00 m
Reference angle           :   0.00

↟
Results segment # 1: Transitway (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	43.50	4.27	66.27

RT/Custom (0.00 + 54.21 + 0.00) = 54.21 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	52	0.00	65.97	-6.37	-5.39	0.00	0.00	-4.81	49.40*
0	52	0.00	65.97	-6.37	-5.39	0.00	0.00	0.00	54.21

* Bright Zone !

Segment Leq : 54.21 dBA

Total Leq All Segments: 54.21 dBA

↟

Results segment # 1: Transitway (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	43.50	4.27	66.27

RT/Custom (0.00 + 49.50 + 0.00) = 49.50 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	52	0.00	61.26	-6.37	-5.39	0.00	0.00	-4.81	44.69*
0	52	0.00	61.26	-6.37	-5.39	0.00	0.00	0.00	49.50

* Bright Zone !

Segment Leq : 49.50 dBA

Total Leq All Segments: 49.50 dBA

↟

TOTAL Leq FROM ALL SOURCES (DAY): 69.51
(NIGHT): 61.86

STAMSON 5.0 NORMAL REPORT Date: 24-08-2021 15:36:09
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: rec81.te Time Period: Day/Night 16/8 hours
Description: Reception Point 8-1

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

Train Type	Trains	Speed (km/h)	# loc /Train	# Cars /Train	Eng type	Cont weld
1. VIA Train	12.0/0.0	100.0	1.0	6.0	Diesel	No

Data for Segment # 1: VIA Train (day/night)

```
Angle1   Angle2           : -84.00 deg   84.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  30.00 / 30.00  m
Receiver height           :   1.50 / 1.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
No Whistle
Barrier angle1            : -84.00 deg   Angle2 : 84.00 deg
Barrier height            :   0.00 m
Barrier receiver distance :  25.00 / 25.00  m
Source elevation          :  70.00 m
Receiver elevation        :  68.00 m
Barrier elevation         :  68.00 m
Reference angle           :   0.00
```

Results segment # 1: VIA Train (day)

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
4.00	1.50	5.25	73.25
0.50	1.50	2.33	70.33

LOCOMOTIVE (0.00 + 58.49 + 0.00) = 58.49 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-84	84	0.58	64.65	-4.77	-1.40	0.00	0.00	0.00	58.49*
-84	84	0.58	64.65	-4.77	-1.40	0.00	0.00	0.00	58.49

```
 * Bright Zone !

WHEEL (0.00 + 51.99 + 0.00) = 51.99 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------
   -84     84   0.66  58.50  -5.00  -1.51   0.00   0.00  -0.00  51.99*
   -84     84   0.66  58.50  -5.00  -1.51   0.00   0.00   0.00  51.99
-------------------------------------------------------------------

 * Bright Zone !

Segment Leq : 59.37 dBA

Total Leq All Segments: 59.37 dBA

♠
Results segment # 1: VIA Train (night)
--------------------------------------

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       4.00 !        1.50 !        5.25 !        73.25
       0.50 !        1.50 !        2.33 !        70.33

LOCOMOTIVE (0.00 + -6.17 + 0.00) = 0.00 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------
   -84     84   0.58   0.00  -4.77  -1.40   0.00   0.00   0.00  -6.17*
   -84     84   0.58   0.00  -4.77  -1.40   0.00   0.00   0.00  -6.17
-------------------------------------------------------------------

 * Bright Zone !

WHEEL (0.00 + -6.51 + 0.00) = 0.00 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------
   -84     84   0.66   0.00  -5.00  -1.51   0.00   0.00  -0.00  -6.51*
   -84     84   0.66   0.00  -5.00  -1.51   0.00   0.00   0.00  -6.51
-------------------------------------------------------------------

 * Bright Zone !

Segment Leq : 0.00 dBA

Total Leq All Segments: 0.00 dBA
```

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

Car traffic volume : 28336/2464 veh/TimePeriod *
Medium truck volume : 2254/196 veh/TimePeriod *
Heavy truck volume : 1610/140 veh/TimePeriod *
Posted speed limit : 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): 35000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 1: Smyth Road (day/night)

Angle1 Angle2 : 0.00 deg 41.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 70.00 / 70.00 m
Receiver height : 1.50 / 1.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Smyth Road (day)

Source height = 1.50 m

ROAD (0.00 + 54.38 + 0.00) = 54.38 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	41	0.66	72.16	0.00	-11.11	-6.68	0.00	0.00	0.00	54.38

Segment Leq : 54.38 dBA

Total Leq All Segments: 54.38 dBA

Results segment # 1: Smyth Road (night)

Source height = 1.50 m

ROAD (0.00 + 46.78 + 0.00) = 46.78 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	41	0.66	64.56	0.00	-11.11	-6.68	0.00	0.00	0.00	46.78

Segment Leq : 46.78 dBA

Total Leq All Segments: 46.78 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 60.57
(NIGHT): 46.78

STAMSON 5.0 NORMAL REPORT Date: 24-08-2021 15:37:56
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: rec815.te Time Period: Day/Night 16/8 hours
Description: Reception Point 8-15

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

Train Type	Trains	Speed (km/h)	# loc /Train	# Cars /Train	Eng type	Cont weld
1. VIA Train	12.0/0.0	100.0	1.0	6.0	Diesel	No

Data for Segment # 1: VIA Train (day/night)

```
Angle1   Angle2           : -84.00 deg   84.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  30.00 / 30.00  m
Receiver height           :  43.50 / 43.50  m
Topography                :      2       (Flat/gentle slope; with barrier)
No Whistle
Barrier angle1            : -84.00 deg   Angle2 : 84.00 deg
Barrier height            :   0.00 m
Barrier receiver distance :  25.00 / 25.00  m
Source elevation          :  70.00 m
Receiver elevation        :  68.00 m
Barrier elevation         :  68.00 m
Reference angle           :   0.00
```

↑

Results segment # 1: VIA Train (day)

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
4.00	43.50	12.25	80.25
0.50	43.50	9.33	77.33

LOCOMOTIVE (0.00 + 61.34 + 0.00) = 61.34 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-84	84	0.00	64.65	-3.01	-0.30	0.00	0.00	0.00	61.34*
-84	84	0.00	64.65	-3.01	-0.30	0.00	0.00	0.00	61.34

```
 * Bright Zone !

WHEEL (0.00 + 55.19 + 0.00) = 55.19 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------
   -84     84   0.00  58.50  -3.01  -0.30   0.00   0.00   0.00  55.19*
   -84     84   0.00  58.50  -3.01  -0.30   0.00   0.00   0.00  55.19
-------------------------------------------------------------------

 * Bright Zone !

Segment Leq : 62.28 dBA

Total Leq All Segments: 62.28 dBA

↟
Results segment # 1: VIA Train (night)
--------------------------------------

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       4.00 !       43.50 !       12.25 !        80.25
       0.50 !       43.50 !        9.33 !        77.33

LOCOMOTIVE (0.00 + -3.31 + 0.00) = 0.00 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------
   -84     84   0.00   0.00  -3.01  -0.30   0.00   0.00   0.00  -3.31*
   -84     84   0.00   0.00  -3.01  -0.30   0.00   0.00   0.00  -3.31
-------------------------------------------------------------------

 * Bright Zone !

WHEEL (0.00 + -3.31 + 0.00) = 0.00 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------
   -84     84   0.00   0.00  -3.01  -0.30   0.00   0.00   0.00  -3.31*
   -84     84   0.00   0.00  -3.01  -0.30   0.00   0.00   0.00  -3.31
-------------------------------------------------------------------

 * Bright Zone !

Segment Leq : 0.00 dBA

Total Leq All Segments: 0.00 dBA
```

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

Car traffic volume	: 28336/2464	veh/TimePeriod *
Medium truck volume	: 2254/196	veh/TimePeriod *
Heavy truck volume	: 1610/140	veh/TimePeriod *
Posted speed limit	: 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)	:	35000
Percentage of Annual Growth	:	0.00
Number of Years of Growth	:	0.00
Medium Truck % of Total Volume	:	7.00
Heavy Truck % of Total Volume	:	5.00
Day (16 hrs) % of Total Volume	:	92.00

Data for Segment # 1: Smyth Road (day/night)

Angle1 Angle2	: 0.00 deg	41.00 deg
Wood depth	: 0	(No woods.)
No of house rows	: 0 / 0	
Surface	: 1	(Absorptive ground surface)
Receiver source distance	: 70.00 / 70.00	m
Receiver height	: 43.50 / 43.50	m
Topography	: 1	(Flat/gentle slope; no barrier)
Reference angle	: 0.00	

Results segment # 1: Smyth Road (day)

Source height = 1.50 m

ROAD (0.00 + 59.04 + 0.00) = 59.04 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	41	0.00	72.16	0.00	-6.69	-6.42	0.00	0.00	0.00	59.04

Segment Leq : 59.04 dBA

Total Leq All Segments: 59.04 dBA

Results segment # 1: Smyth Road (night)

Source height = 1.50 m

ROAD (0.00 + 51.45 + 0.00) = 51.45 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	41	0.00	64.56	0.00	-6.69	-6.42	0.00	0.00	0.00	51.45

Segment Leq : 51.45 dBA

Total Leq All Segments: 51.45 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 63.97
(NIGHT): 51.45

STAMSON 5.0 NORMAL REPORT Date: 24-08-2021 10:54:15
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: rec91.te Time Period: Day/Night 16/8 hours
Description: Reception Point 9-1

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

Train Type	Trains	Speed (km/h)	# loc /Train	# Cars /Train	Eng type	Cont weld
1. VIA Train	12.0/0.0	100.0	1.0	6.0	Diesel	No

Data for Segment # 1: VIA Train (day/night)

Angle1 Angle2	0.00 deg	79.00 deg
Wood depth	0	(No woods.)
No of house rows	1 / 1	
House density	20 %	
Surface	1	(Absorptive ground surface)
Receiver source distance	65.00 / 65.00	m
Receiver height	1.50 / 1.50	m
Topography	2	(Flat/gentle slope; with barrier)
No Whistle		
Barrier angle1	0.00 deg	Angle2 : 79.00 deg
Barrier height	0.00 m	
Barrier receiver distance	60.00 / 60.00	m
Source elevation	70.00 m	
Receiver elevation	68.00 m	
Barrier elevation	68.00 m	
Reference angle	0.00	

Results segment # 1: VIA Train (day)

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
4.00	1.50	5.65	73.65
0.50	1.50	2.42	70.42

LOCOMOTIVE (0.00 + 49.14 + 0.00) = 49.14 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	79	0.58	64.65	-10.09	-4.52	0.00	-0.90	0.00	49.14
0	79	0.58	64.65	-10.09	-4.52	0.00	0.00	0.00	50.04*

```
     0     79   0.58  64.65 -10.09  -4.52   0.00   0.00   0.00  50.04
-------------------------------------------------------------------------

 * Bright Zone !

WHEEL (0.00 + 42.41 + 0.00) = 42.41 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
     0     79   0.66  58.50 -10.57  -4.62   0.00  -0.90   0.00  42.41
     0     79   0.66  58.50 -10.57  -4.62   0.00   0.00   0.00  43.31*
     0     79   0.66  58.50 -10.57  -4.62   0.00   0.00   0.00  43.31
-------------------------------------------------------------------------

 * Bright Zone !

Segment Leq : 49.98 dBA

Total Leq All Segments: 49.98 dBA

♠
Results segment # 1: VIA Train (night)
--------------------------------------

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       4.00 !        1.50 !        5.65 !        73.65
       0.50 !        1.50 !        2.42 !        70.42

LOCOMOTIVE (0.00 + -15.51 + 0.00) = 0.00 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
     0     79   0.58   0.00 -10.09  -4.52   0.00  -0.90   0.00 -15.51
     0     79   0.58   0.00 -10.09  -4.52   0.00   0.00   0.00 -14.61*
     0     79   0.58   0.00 -10.09  -4.52   0.00   0.00   0.00 -14.61
-------------------------------------------------------------------------

 * Bright Zone !

WHEEL (0.00 + -16.09 + 0.00) = 0.00 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
     0     79   0.66   0.00 -10.57  -4.62   0.00  -0.90   0.00 -16.09
     0     79   0.66   0.00 -10.57  -4.62   0.00   0.00   0.00 -15.19*
     0     79   0.66   0.00 -10.57  -4.62   0.00   0.00   0.00 -15.19
-------------------------------------------------------------------------

 * Bright Zone !
```

Segment Leq : 0.00 dBA

Total Leq All Segments: 0.00 dBA

↟
Road data, segment # 1: Riverside Dr (day/night)

Car traffic volume : 12144/1056 veh/TimePeriod *
Medium truck volume : 966/84 veh/TimePeriod *
Heavy truck volume : 690/60 veh/TimePeriod *
Posted speed limit : 60 km/h
Road gradient : 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): 15000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 1: Riverside Dr (day/night)

Angle1 Angle2 : -20.00 deg 0.00 deg
Wood depth : 0 (No woods.)
No of house rows : 1 / 1
House density : 20 %
Surface : 1 (Absorptive ground surface)
Receiver source distance : 95.00 / 95.00 m
Receiver height : 1.50 / 1.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

↟
Results segment # 1: Riverside Dr (day)

Source height = 1.50 m

ROAD (0.00 + 46.19 + 0.00) = 46.19 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-20	0	0.66	70.00	0.00	-13.31	-9.60	0.00	-0.90	0.00	46.19

Segment Leq : 46.19 dBA

Total Leq All Segments: 46.19 dBA

↟
Results segment # 1: Riverside Dr (night)

Source height = 1.50 m

ROAD (0.00 + 38.59 + 0.00) = 38.59 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-20	0	0.66	62.40	0.00	-13.31	-9.60	0.00	-0.90	0.00	38.59

Segment Leq : 38.59 dBA

Total Leq All Segments: 38.59 dBA

↟
RT/Custom data, segment # 1: Transitway (day/night)
---
1 - Bus:
Traffic volume : 864/146 veh/TimePeriod
Speed : 80 km/h

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

Angle1 Angle2 : -42.00 deg 0.00 deg
Wood depth : 0 (No woods.)
No of house rows : 1 / 1
House density : 20 %
Surface : 1 (Absorptive ground surface)
Receiver source distance : 70.00 / 70.00 m
Receiver height : 1.50 / 1.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -42.00 deg Angle2 : 0.00 deg
Barrier height : 4.00 m
Barrier receiver distance : 65.00 / 65.00 m
Source elevation : 62.00 m
Receiver elevation : 68.00 m
Barrier elevation : 62.00 m
Reference angle : 0.00

↟
Results segment # 1: Transitway (day)

Source height = 0.50 m

Barrier height for grazing incidence

```
-------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       0.50 !        1.50 !        1.00 !        63.00

RT/Custom (0.00 + 33.27 + 0.00) = 33.27 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
   -42      0   0.66  65.97 -11.11  -6.59   0.00  -0.90   0.00  47.38
   -42      0   0.45  65.97  -9.70  -6.50   0.00   0.00 -16.49  33.27
-------------------------------------------------------------------------

Segment Leq : 33.27 dBA

Total Leq All Segments: 33.27 dBA

↟
Results segment # 1: Transitway (night)
-------------------------------------

Source height = 0.50 m

Barrier height for grazing incidence
-------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       0.50 !        1.50 !        1.00 !        63.00

RT/Custom (0.00 + 28.56 + 0.00) = 28.56 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
   -42      0   0.66  61.26 -11.11  -6.59   0.00  -0.90   0.00  42.67
   -42      0   0.45  61.26  -9.70  -6.50   0.00   0.00 -16.49  28.56
-------------------------------------------------------------------------

Segment Leq : 28.56 dBA

Total Leq All Segments: 28.56 dBA

↟



TOTAL Leq FROM ALL SOURCES (DAY): 51.56
                           (NIGHT): 39.00
↟
↟
```

STAMSON 5.0 NORMAL REPORT Date: 24-08-2021 10:57:52
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: rec915.te Time Period: Day/Night 16/8 hours
Description: Reception Point 9-15

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

Train Type	Trains	Speed (km/h)	# loc /Train	# Cars /Train	Eng type	Cont weld
1. VIA Train	12.0/0.0	100.0	1.0	6.0	Diesel	No

Data for Segment # 1: VIA Train (day/night)

Angle1 Angle2	0.00 deg	79.00 deg
Wood depth	0	(No woods.)
No of house rows	1 / 1	
House density	20 %	
Surface	1	(Absorptive ground surface)
Receiver source distance	65.00 / 65.00	m
Receiver height	43.50 / 43.50	m
Topography	2	(Flat/gentle slope; with barrier)
No Whistle		
Barrier angle1	0.00 deg	Angle2 : 79.00 deg
Barrier height	0.00 m	
Barrier receiver distance	60.00 / 60.00	m
Source elevation	70.00 m	
Receiver elevation	68.00 m	
Barrier elevation	68.00 m	
Reference angle	0.00	

Results segment # 1: VIA Train (day)

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
4.00	43.50	8.88	76.88
0.50	43.50	5.65	73.65

LOCOMOTIVE (0.00 + 53.81 + 0.00) = 53.81 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	79	0.00	64.65	-6.37	-3.58	0.00	-0.90	0.00	53.81
0	79	0.00	64.65	-6.37	-3.58	0.00	0.00	0.00	54.71*

```
     0     79   0.00  64.65  -6.37  -3.58   0.00   0.00   0.00  54.71
-------------------------------------------------------------------------

 * Bright Zone !

WHEEL (0.00 + 47.66 + 0.00) = 47.66 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
     0     79   0.00  58.50  -6.37  -3.58   0.00  -0.90   0.00  47.66
     0     79   0.00  58.50  -6.37  -3.58   0.00   0.00   0.00  48.56*
     0     79   0.00  58.50  -6.37  -3.58   0.00   0.00   0.00  48.56
-------------------------------------------------------------------------

 * Bright Zone !

Segment Leq : 54.75 dBA

Total Leq All Segments: 54.75 dBA

♠
Results segment # 1: VIA Train (night)
--------------------------------------

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       4.00 !       43.50 !        8.88 !        76.88
       0.50 !       43.50 !        5.65 !        73.65

LOCOMOTIVE (0.00 + -10.84 + 0.00) = 0.00 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
     0     79   0.00   0.00  -6.37  -3.58   0.00  -0.90   0.00 -10.84
     0     79   0.00   0.00  -6.37  -3.58   0.00   0.00   0.00  -9.94*
     0     79   0.00   0.00  -6.37  -3.58   0.00   0.00   0.00  -9.94
-------------------------------------------------------------------------

 * Bright Zone !

WHEEL (0.00 + -10.84 + 0.00) = 0.00 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
     0     79   0.00   0.00  -6.37  -3.58   0.00  -0.90   0.00 -10.84
     0     79   0.00   0.00  -6.37  -3.58   0.00   0.00   0.00  -9.94*
     0     79   0.00   0.00  -6.37  -3.58   0.00   0.00   0.00  -9.94
-------------------------------------------------------------------------

 * Bright Zone !
```

Segment Leq : 0.00 dBA

Total Leq All Segments: 0.00 dBA

↟

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

```
Car traffic volume  : 12144/1056  veh/TimePeriod  *
Medium truck volume :   966/84    veh/TimePeriod  *
Heavy truck volume  :   690/60    veh/TimePeriod  *
Posted speed limit  :    60 km/h
Road gradient       :     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):  15000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00
```

Data for Segment # 1: Riverside Dr (day/night)

```
Angle1   Angle2           : -20.00 deg   0.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      1 / 1
House density             :     20 %
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  95.00 / 95.00  m
Receiver height           :  43.50 / 43.50  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00
```

↟

Results segment # 1: Riverside Dr (day)

Source height = 1.50 m

ROAD (0.00 + 51.54 + 0.00) = 51.54 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-20	0	0.00	70.00	0.00	-8.02	-9.54	0.00	-0.90	0.00	51.54

Segment Leq : 51.54 dBA

Total Leq All Segments: 51.54 dBA

↟
Results segment # 1: Riverside Dr (night)

Source height = 1.50 m

ROAD (0.00 + 43.94 + 0.00) = 43.94 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-20	0	0.00	62.40	0.00	-8.02	-9.54	0.00	-0.90	0.00	43.94

Segment Leq : 43.94 dBA

Total Leq All Segments: 43.94 dBA

↟
RT/Custom data, segment # 1: Transitway (day/night)
---
1 - Bus:
Traffic volume : 864/146 veh/TimePeriod
Speed : 80 km/h

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

Angle1 Angle2 : -42.00 deg 0.00 deg
Wood depth : 0 (No woods.)
No of house rows : 1 / 1
House density : 20 %
Surface : 1 (Absorptive ground surface)
Receiver source distance : 70.00 / 70.00 m
Receiver height : 43.50 / 43.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -42.00 deg Angle2 : 0.00 deg
Barrier height : 4.00 m
Barrier receiver distance : 65.00 / 65.00 m
Source elevation : 62.00 m
Receiver elevation : 68.00 m
Barrier elevation : 62.00 m
Reference angle : 0.00

↟
Results segment # 1: Transitway (day)

Source height = 0.50 m

Barrier height for grazing incidence

```
-----------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       0.50 !       43.50 !        4.00 !        66.00

RT/Custom (0.00 + 47.96 + 0.00) = 47.96 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
   -42      0   0.00  65.97  -6.69  -6.32   0.00  -0.90   0.00  52.06
   -42      0   0.00  65.97  -6.69  -6.32   0.00   0.00  -5.00  47.96
-------------------------------------------------------------------------

Segment Leq : 47.96 dBA

Total Leq All Segments: 47.96 dBA

↟
Results segment # 1: Transitway (night)
---------------------------------------

Source height = 0.50 m

Barrier height for grazing incidence
-----------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       0.50 !       43.50 !        4.00 !        66.00

RT/Custom (0.00 + 43.25 + 0.00) = 43.25 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
   -42      0   0.00  61.26  -6.69  -6.32   0.00  -0.90   0.00  47.35
   -42      0   0.00  61.26  -6.69  -6.32   0.00   0.00  -5.00  43.25
-------------------------------------------------------------------------

Segment Leq : 43.25 dBA

Total Leq All Segments: 43.25 dBA

↟



TOTAL Leq FROM ALL SOURCES (DAY): 57.02
                          (NIGHT): 46.62
↟
↟
```

APPENDIX 3

OC TRANSPO BUS COUNT

VIA RAIL TRAIN COUNT

Monday, August 16, 2021

10 Hurdman

RIVERSIDE - (3032)

Morning (0:00 to 11:59)

00	04	34	
06	09	39	55
07	10	23	40
	57		
08	10	29	43
	57		
09	12	27	42
	57		
10	12	27	42
	56		
11	11	29	44
	59		

Afternoon (12:00 to 17:59)

12	13	28	43
	58		

13	13	28	45
14	00	15	32
	47	59	
15	14	31	46
16	04	17	31
	46		
17	01	16	34
	49		

Evening (18:00 to 7:59)

18	04	14	29
	43		
19	13	43	
20	12	42	
21	12	42	
22	11	40	
23	09	39	
00	09		
06	09	39	55
07	10	23	40
	57		

Monday, August 16, 2021

10 Lyon

RIVERSIDE - (3032)

Morning (4:00 to 11:59)

04	28		
05	35		
06	05	35	50
07	04	20	33
	50		
08	05	20	35
	50		
09	05	20	35
	50		
10	05	20	35
	50		
11	05	20	35
	50		

Afternoon (12:00 to 17:59)

12	05	20	35

	50		
13	05 50	20	35
14	05 50	20	35
15	05 50	19	35
16	05 52	20	33
17	05 50	20	35

Evening (18:00 to 7:59)

18	06	35	
19	10	40	
20	10	40	
21	09	39	
22	09	39	
23	09		
04	28		
05	35		
06	05	35	50
07	04	20	33

50

Monday, August 16, 2021

48 Elmvale

RIVERSIDE - (3032)

Morning (7:00 to 11:59)

07	03	33
08	03	33
09	03	33
10	03	33
11	03	33

Afternoon (12:00 to 17:59)

12	03	33
13	03	33
14	03	33
15	03	33
16	03	33
17	03	33

Evening (18:00 to 7:59)

18	03	35

19	07	37
20	07	
21	07	
22	07	
23	07	
07	03	33

Monday, August 16, 2021

48 Hurdman

RIVERSIDE - (3032)

Morning (6:00 to 11:59)

06	26	56
07	26	56
08	10	40
09	10	40
10	10	40
11	10	40

Afternoon (12:00 to 17:59)

12	10	40
13	10	40
14	10	40
15	10	39
16	12	42
17	12	42

Evening (18:00 to 7:59)

18	12	42
19	09	40
20	09	
21	09	
22	09	
23	09	
06	26	56
07	26	56

Monday, August 16, 2021

49 Elmvale

RIVERSIDE - (3032)

Morning (8:00 to 11:59)

08	08	38
09	08	
10	08	

Afternoon (12:00 to 17:59)

12	08	
14	08	
15	09	39
16	09	40
17	09	39

Evening (18:00 to 22:59)

18	11	53
19	53	
22	23	

Monday, August 16, 2021

49 Hurdman

RIVERSIDE - (3032)

Morning (6:00 to 11:59)

06	20	50
07	20	51
08	06	36
09	06	
10	35	

Afternoon (12:00 to 17:59)

12	35	
14	35	
15	05	35
16	05	35
17	04	35

Evening (18:00 to 7:59)

18	02	40
19	20	

20	19	
06	20	50
07	20	51

Monday, August 16, 2021

88 Hurdman

RIVERSIDE - (3032)

Morning (0:00 to 11:59)

00	19		
04	54		
05	19	42	
06	18	30	45
07	00	11	33
	44		
08	02	17	24
	41	48	
09	05	09	22
	34	42	52
10	04	19	34
	49		
11	04	19	35
	50		

Afternoon (12:00 to 17:59)

12	05 50	20	35
13	07 52	22	37
14	07 52	22	37
15	11 48	28 58	34
16	07 38	18 48	27 59
17	08 38	19 48	28 58

Evening (18:00 to 7:59)

18	05 38	18 52	24
19	07 50	22	35
20	03 54	18	35
21	15	34	52
22	12	32	52
23	08	28	45

00	12	44	
01	14		
04	54		
05	19	42	
06	18	30	45
07	00	11	33
	44		

Monday, August 16, 2021

88 Terry Fox

RIVERSIDE - (3032)

Morning (4:00 to 11:59)

04	26	x	56	x		
05	26	x	56	y		
06	11	y	26	y	40	
	50					
07	00		10		20	
	30		40		50	
08	00		10		22	
	37		55			
09	10		25		40	
	57					
10	14		27		40	
	55					
11	10		25		39	
	56					

Afternoon (12:00 to 17:59)

12	11 57	26	41
13	12 59	29	44
14	14 59 z	29	44
15	11 47 z	23 z 59	35
16	11 z 47	23 59 z	35 z
17	11 47	23 z	35

Evening (18:00 to 7:59)

18	00 45	15	30
19	00 52	12	32
20	12	37	57
21	17	37	57
22	17	36 y	
23	03 y	33 y	
00	04 y	34 y	

01	04	y			
04	26	x	56	x	
05	26	x	56	y	
06	11	y	26	y	40
	50				
07	00		10		20
	30		40		50

x Via Tyrell/Moodie & Navaho/Woodroffe~Via Tyrell/Moodie et Navaho/Woodroffe

y Via Woodroffe/Navaho~Via Woodroffe/Navaho

z Via Tyrell/Moodie~via Tyrell/Moodie

Monday, August 16, 2021

90 Greenboro

RIVERSIDE - (3032)

Morning (6:00 to 11:59)

06	11	38	53
07	08	23	36
	54		
08	08	22	38
	51		
09	06	21	36
	51		
10	06	21	36
	51		
11	06	21	36
	51		

Afternoon (12:00 to 17:59)

12	06	21	36
	51		
13	06	21	36

	51		
14	06 51	21	36
15	06 51	21	34
16	09 52	21	37
17	08 52	22	37

Evening (18:00 to 7:59)

18	07	23	53
19	23	53	
20	23	53	
21	23	53	
22	23	53	
23	23	53	
00	23		
06	11	38	53
07	08 54	23	36

Monday, August 16, 2021

90 Hurdman

RIVERSIDE - (3032)

Morning (4:00 to 11:59)

04	40		
05	40		
06	00	20	35
	50		
07	05	20	35
	51		
08	06	21	37
	52		
09	04	19	34
	49		
10	04	19	33
	48		
11	03	19	34
	49		

Afternoon (12:00 to 17:59)

12	04 49	19	34
13	04 49	19	34
14	04 49	19	34
15	06 52	23	37
16	07 52	21	35
17	06 51	21	36

Evening (18:00 to 7:59)

18	06	34	
19	02	30	56
20	26	56	
21	26	56	
22	26	56	
23	26	56	
04	40		
05	40		
06	00	20	35

	50		
07	05	20	35
	51		

Monday, August 16, 2021

92 Greenboro

RIVERSIDE - (3032)

Morning (5:00 to 11:59)

05	55		
06	25	59	
07	30		
08	00	30	
09	00	30	
10	00	31	
11	01	31	

Afternoon (12:00 to 17:59)

12	01	31	
13	01	31	
14	01	31	
15	01	28	58
16	28	58	
17	29	59	

Evening (18:00 to 7:59)

18	28	58
19	28	59
20	31	
21	01	30
22	00	30
23	00	36
05	55	
06	25	59
07	30	

Monday, August 16, 2021

92 Hurdman

RIVERSIDE - (3032)

Morning (5:00 to 11:59)

05	37		
06	09	44	
07	15	43	58
08	28	56	
09	24	53	
10	23	53	
11	23	53	

Afternoon (12:00 to 17:59)

12	23	54
13	24	54
14	24	54
15	25	52
16	27	58
17	28	58

Evening (18:00 to 7:59)

18	28	57	
19	25	54	
20	24	53	
21	23	53	
22	23	51	
23	21	52	
05	37		
06	09	44	
07	15	43	58

Monday, August 16, 2021

93 Greenboro / Hurdman

RIVERSIDE - (3032)

Morning (5:00 to 11:59)

05	45		
06	15	30	45
07	00	15	30
	45		
08	00	17	32
	47		
09	02		

Afternoon (12:00 to 17:59)

15	35	
16	07	36
17	07	37

Evening (18:00 to 7:59)

18	07	35
05	45	

06	15	30	45
07	00	15	30
	45		

Monday, August 16, 2021

93 Leitrim

RIVERSIDE - (3032)

Morning (6:00 to 11:59)

06	07	37	
07	07	36	
08	06	31	

Afternoon (12:00 to 17:59)

14	51		
15	06	21	36
	51		
16	06	21	36
	51		
17	06	21	36
	51		

Evening (18:00 to 7:59)

18	06	21	39
06	07	37	

07	07	36

Monday, August 16, 2021

96 **Hurdman / Greenboro**

RIVERSIDE - (3032)

Afternoon (12:00 to 17:59)

15	49	
16	19	36
17	06	32

Evening (18:00 to 19:59)

18	04	30
19	00	

Monday, August 16, 2021

96 Merivale / 96b Hunt Club & Merivale & Colonnade

RIVERSIDE - (3032)

Morning (5:00 to 11:59)

05	43		
06	13		43
07	13	X	43
08	13		43

Evening (18:00 to 7:59)

05	43		
06	13		43
07	13	X	43

X Via Hunt Club Lowes~Via Hunt Club Lowes

Monday, August 16, 2021

97 Airport ~ Aéroport

RIVERSIDE - (3032)

Morning (0:00 to 11:59)

00	03		33			
01	03		33			
02	03		33			
03	27					
04	01		30		57	
05	23		49			
06	11		26		41	X
	56					
07	11	X	26		41	X
	56					
08	11	X	26		41	X
	56					
09	11	X	26		41	X
	56					
10	11	X	25		39	X

	53				
11	08	⚠	23	38	⚠
	53				

Afternoon (12:00 to 17:59)

12	08	⚠	23	38	⚠
	53				
13	08	⚠	23	38	⚠
	54				
14	09	⚠	26	41	⚠
	55				
15	10	⚠	25	43	⚠
	58				
16	13	⚠	28	43	⚠
	58				
17	13	⚠	28	42	⚠
	57				

Evening (18:00 to 7:59)

18	12	⚠	26	41	⚠
	56				
19	12	⚠	28	43	⚠
	58				

20	15	x		30		45	x	
21	00			15	x	30		
	45	x						
22	00			15	x	30		
	44	x		58	y			
23	14	x		29	y	44	x	
	59	y						
00	14	y		34		59		
01	27			57				
02	25							
03	27							
04	01			30		57		
05	23			49				
06	11			26		41	x	
	56							
07	11	x		26		41	x	
	56							

x Southkeys Loop~Southkeys Loop

y via Uplands~via Uplands

Monday, August 16, 2021

97 Hurdman & N Rideau

RIVERSIDE - (3032)

Morning (0:00 to 11:59)

00	06	36	
01	04	34	
02	04	34	
03	04	42	
04	10	40	
05	10	40	55
06	10	26	42
	58		
07	14	29	44
08	00	15	30
	45		
09	00	14	28
	43	58	
10	13	28	43
	57		

11	11 56	26	41

Afternoon (12:00 to 17:59)

12	11 56	26	41
13	11 56	26	41
14	11 58	27	42
15	14	29	46
16	01 46	16	31
17	01 46	16	31

Evening (18:00 to 7:59)

18	01 44	14 59	29
19	14 59	29	44
20	14	29	45
21	01	16	31

	46		
22	01 46	16	31
23	01 48	16	32
00	17	47	
01	04	30	
02	01	34	
03	04	42	
04	10	40	
05	10	40	55
06	10 58	26	42
07	14	29	44

Monday, August 16, 2021

98 Hawthorne

RIVERSIDE - (3032)

Morning (5:00 to 11:59)

05	59		
06	30		
07	00	30	
08	05	34	
09	03	32	
10	02	17	32
	47		
11	02	17	32
	47		

Afternoon (12:00 to 17:59)

12	02	17	32
	47		
13	02	17	32
	47		
14	01	16	31

	46		
15	00	14	29
	44	59	
16	14	29	44
	59		
17	14	29	44
	59		

Evening (18:00 to 7:59)

18	14	32	47
19	02	17	32
20	02	32	
21	02	32	
22	02	32	
23	02	34	
00	06		
05	59		
06	30		
07	00	30	

Monday, August 16, 2021

98 Hurdman

RIVERSIDE - (3032)

Morning (5:00 to 11:59)

05	23	48	
06	14	38	53
07	08	25	40
	55		
08	10	25	40
	55		
09	09	22	35
	50		
10	05	20	35
	49		
11	05	20	35
	50		

Afternoon (12:00 to 17:59)

12	05	20	35
	50		

13	06 51	21	36
14	07 52	22	37
15	06 53	21	37
16	08	39	
17	10	41	

Evening (18:00 to 7:59)

18	10	41	
19	11	41	
20	11	41	
21	08	38	
22	08	35	
23	02	29	
05	23	48	
06	14	38	53
07	08 55	25	40

Monday, August 16, 2021

99 Barrhaven

RIVERSIDE - (3032)

Morning (5:00 to 11:59)

05	20	44	
06	23	53	
07	23	48	
08	17	47	
09	18		

Afternoon (12:00 to 17:59)

14	38	58	
15	13	28	43
	58		
16	13	28	43
	58		
17	13	28	43
	58		

Evening (18:00 to 7:59)

18	18	
05	20	44
06	23	53
07	23	48

Monday, August 16, 2021

99 **Greenboro & Hurdman**

RIVERSIDE - (3032)

Morning (6:00 to 11:59)

06	05	25	41
	56		
07	11	30	45
08	00	15	30
	45		
09	00	18	

Afternoon (12:00 to 17:59)

15	51	
16	18	45
17	15	48

Evening (18:00 to 7:59)

18	17	47	
06	05	25	41
	56		

07	11	30	45

Monday, August 16, 2021

190 Hurdman

RIVERSIDE - (3032)

Morning (6:00 to 11:59)

06	55

Afternoon (12:00 to 17:59)

15	30

Evening (18:00 to 6:59)

06	55

Monday, August 16, 2021

190 Mooney's Bay

RIVERSIDE - (3032)

Morning (6:00 to 11:59)

06	38

Afternoon (12:00 to 17:59)

15	13

Evening (18:00 to 6:59)

06	38

Monday, August 16, 2021

199 Hurdman

RIVERSIDE - (3032)

Afternoon (12:00 to 17:59)

16	47
17	16

Monday, August 16, 2021

199 Leikin

RIVERSIDE - (3032)

Morning (6:00 to 11:59)

06	18
07	18

Evening (18:00 to 7:59)

06	18
07	18

Monday, August 16, 2021

290 Hurdman

RIVERSIDE - (3032)

Morning (6:00 to 11:59)

06	46	
07	14	47
08	18	50
09	21	

Evening (18:00 to 7:59)

06	46	
07	14	47

Monday, August 16, 2021

290 McCarthy

RIVERSIDE - (3032)

Afternoon (12:00 to 17:59)

15	44	
16	09	38
17	10	40

Evening (18:00 to 18:59)

18	14	44

Monday, August 16, 2021

291 Herongate

RIVERSIDE - (3032)

Afternoon (12:00 to 17:59)

15	42	
16	07	35
17	03	32

Evening (18:00 to 18:59)

18	00	26

Monday, August 16, 2021

291 Hurdman

RIVERSIDE - (3032)

Morning (6:00 to 11:59)

06	21	51
07	23	48
08	16	48

Evening (18:00 to 7:59)

06	21	51
07	23	48

Monday, August 16, 2021

294 Findlay Creek

RIVERSIDE - (3032)

Afternoon (12:00 to 17:59)

15	33	
16	03	33
17	03	33

Evening (18:00 to 18:59)

18	03

Monday, August 16, 2021

294 Hurdman

RIVERSIDE - (3032)

Morning (6:00 to 11:59)

06	24	54	
07	27		
08	03	28	55

Evening (18:00 to 7:59)

06	24	54
07	27	

Monday, August 16, 2021

299 Hurdman

RIVERSIDE - (3032)

Morning (7:00 to 11:59)

07	05
08	03

Evening (18:00 to 7:59)

07	05

Monday, August 16, 2021

299 **Manotick**

RIVERSIDE - (3032)

Afternoon (12:00 to 17:59)

16	39
17	31

Train Schedule:

Montréal/Ottawa - Toronto

- Locations in bold indicate a possible connection.
- Travel between Union Station and Pearson Airport on UP Express trains in 25 minutes, with departures every 15 minutes.
- No local service between Guildwood and Toronto
- Schedules are valid all year round

# Train	63	633	65	67
Business class	Yes	Yes	Yes	Yes
Baggage check-in	No	Yes	Yes	No
Dates	All year round	All year round	All year round	All year round
Days	Day 1 MTWTFSS	Day 1 MTWTFSS	Day 1 MTWTFSS	Day 1 MTWTFSS

# Train		63	633	65	67
Dorval, QC Shuttle service runs between the station and the airport.	Departure	09:15	**09:24**	**11:26**	**13:47**
Cornwall, ON	Departure	10:05	-	12:17	14:36
Ottawa, ON OC Transpo offers frequent bus service from the Ottawa train station to downtown Ottawa. For Further information call (613) 560-5000.	Arrival	-	**11:04 Eastern Time**	-	-
Fallowfield, ON	-	-	-	-	-
Smiths Falls, ON	-	-	-	-	-
Brockville, ON	Departure	10:51	-	-	-
Gananoque, ON	-	-	-	-	-
Kingston, ON	Arrival Departure	**11:34** **11:38**	-	**13:41** **13:45**	**15:58** **16:02**

# Train		63	633	65	67
Trenton Junction, ON	-	-	-	-	-
Cobourg, ON	Departure	13:02	-	15:04	17:21
Port Hope, ON	-	-	-	-	-
Oshawa, ON	Departure	13:40	-	15:39	17:56
Guildwood, ON Stops to disembark. Conditional stop	Departure	14:00	-	16:00	18:15
Toronto, ON Shuttle service runs between the station and the airport.	Arrival	**14:18 Eastern Time**	-	**16:18 Eastern Time**	**18:33 Eastern Time**

Train Schedule:

Ottawa - Kingston - Toronto

- Locations in bold indicate a possible connection.
- No local service between Guildwood and Toronto
- Travel between Union Station and Pearson Airport on UP Express trains in 25 minutes, with departures every 15 minutes.
- No local service between Ottawa and Fallowfield
- No local service between Toronto and Guildwood.
- Schedules are valid all year round

# Train	643	47	53	55	59
Business class	Yes	Yes	Yes	Yes	Yes
Baggage check-in	No	No	No	No	No
Dates	All year round	All year round	All year round	All year round	All year round

# Train		643	47	53	55	59
Ottawa, ON OC Transpo offers frequent bus service from the Ottawa train station to downtown Ottawa. For Further information call (613) 560-5000.	Departure	**08:35 Eastern Time**	**12:31 Eastern Time**	**11:45 Eastern Time**	**15:03 Eastern Time**	**18:05 Eastern Time**
Fallowfield, ON	Departure	08:56	12:52	12:05	15:22	18:26
Smiths Falls, ON	Departure	09:24	-	12:35	-	18:54
Brockville, ON	Departure	09:53	13:59	13:10	16:22	19:27
Kingston, ON	Arrival Departure	**10:33** **10:36**	**14:44** **14:48**	**13:57** **14:01**	**17:02** **17:06**	**20:08** **20:11**
Napanee, ON	Departure	10:57	-	-	17:29	-
Belleville, ON	Departure	11:20	15:31	14:43	17:51	20:53
Trenton Junction, ON Conditional stop	Departure	11:32	-	-	18:01	21:04

# Train		643	47	53	55	59
Oshawa, ON Conditional stop	Departure	12:38	16:41	15:56	19:08	22:07
Guildwood, ON Stops to disembark. Conditional stop	Departure	13:00	17:00	16:15	19:30	22:30
Toronto, ON Shuttle service runs between the station and the airport.	Arrival	**13:18 Eastern Time**	**17:18 Eastern Time**	**16:33 Eastern Time**	**19:48 Eastern Time**	**22:48 Eastern Time**

Train Schedule:

Toronto - Kingston - Ottawa

- Locations in bold indicate a possible connection.
- Travel between Union Station and Pearson Airport on UP Express trains in 25 minutes, with departures every 15 minutes.
- No local service between Guildwood and Toronto.
- No local service between Fallowfield and Ottawa
- Schedules are valid all year round

# Train	52	40	42	46	54
Business class	Yes	Yes	Yes	Yes	Yes
Baggage check-in	No	No	No	No	No
Dates	All year round	All year round	All year round	All year round	All year round
	Day 1	Day 1	Day 1	Day 1	Day 1

# Train		52	40	42	46	54
Guildwood, ON	Departure	08:52	10:52	12:37	15:52	18:07
Oshawa, ON	Arrival Departure	- 09:11	-	12:50 12:55	- 16:10	- 18:23
Port Hope, ON	Departure	-	-	13:20	-	18:49
Cobourg, ON	Departure	09:43	-	13:29	16:43	18:57
Trenton Junction, ON	Departure	-	-	13:53	-	19:24
Belleville, ON	Departure	10:20	12:09	14:07	-	19:39
Napanee, ON	Departure	-	-	14:26	-	19:59
Kingston, ON	Arrival Departure	**10:57** **11:01**	**12:46** **12:49**	**-** **14:47**	**17:52** **17:55**	**20:18** **20:21**
Gananoque, ON	Departure	-	-	15:09	-	-
Brockville, ON	Departure	11:56	-	15:34	18:40	21:07

# Train		52	40	42	46	54
Ottawa, ON OC Transpo offers frequent bus service from the Ottawa train station to downtown Ottawa. For Further information call (613) 560-5000.	Arrival	**13:25 Eastern Time**	**14:54 Eastern Time**	**16:52 Eastern Time**	**20:14 Eastern Time**	**22:26 Eastern Time**

Train Schedule:

Toronto - Ottawa/Montréal

- Locations in bold indicate a possible connection.
- No local service between Guildwood and Toronto.
- Travel between Union Station and Pearson Airport on UP Express trains in 25 minutes, with departures every 15 minutes.
- No local service between Dorval and Montreal
- No local service between Fallowfield and Ottawa
- Schedules are valid all year round

# Train	52	64	42	68
Business class	Yes	Yes	Yes	Yes
Baggage check-in	No	No	No	No
Dates	All year round	All year round	All year round	All year round

# Train		52	64	42	68
Toronto, ON Shuttle service runs between the station and the airport.	Departure	**08:32 Eastern Time**	**11:32 Eastern Time**	**12:17 Eastern Time**	**17:02 Eastern Time**
Guildwood, ON	Departure	08:52	11:52	12:37	17:22
Oshawa, ON	Arrival Departure	- 09:11	- 12:11	12:50 12:55	- 17:40
Port Hope, ON	Departure	-	-	13:20	-
Cobourg, ON	Departure	09:43	12:48	13:29	18:11
Trenton Junction, ON	Departure	-	-	13:53	-
Belleville, ON	Departure	10:20	13:29	14:07	18:49
Napanee, ON	Departure	-	-	14:26	-
Kingston, ON	Arrival Departure	**10:57** **11:01**	**14:06** **14:11**	**-** **14:47**	**-** **19:27**

# Train		52	64	42	68
Smiths Falls, ON	Departure	12:25	-	16:08	-
Fallowfield, ON	Departure	13:08	-	16:35	-
Ottawa, ON OC Transpo offers frequent bus service from the Ottawa train station to downtown Ottawa. For Further information call (613) 560-5000.	Arrival	**13:25 Eastern Time**	-	**16:52 Eastern Time**	-
Cornwall, ON	Departure	-	15:49	-	21:04
Dorval, QC Shuttle service runs between the station and the airport.	Departure	-	**16:41**	-	**21:53**
Montréal, QC	Arrival	-	**17:01 Eastern Time**	-	**22:13 Eastern Time**