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Environmental Noise Control Study

Proposed Residential Buildings
21 Withrow Avenue - Ottawa

Prepared For

Theberge Homes

September 29, 2017

Report: PG4239-1

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Appendices

1.0 Introduction

Paterson Group (Paterson) was commissioned by Theberge Homes to conduct an environmental noise control study for the proposed residential buildings to be located at 21 Withrow Avenue, 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 Background

It is understood that the proposed development will consist of several low-rise residential buildings with associated parking and landscaped areas. It is assumed that each building will consist of a two storey structure with a basement level.

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

The City of Ottawa's Official Plan, in addition to the ENCG dictate 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 NPC-300 outlines the limitations of the stationary and environmental noise levels in relation to the location of the receptors. These can be found in the following tables:

Table 1 - Sound Level Limits for Outdoor Living Areas

Time Period	Required $L_{eq(16)}$ (dBA)
16-hour, 7:00-23:00	55

- Standards taken from Table 2.2a; Sound Level Limit for Outdoor Living Areas - Road and Rail

Table 2 - Sound Level Limits for Indoor Living Area			
Type of Space	**Time Period**	**Required L_{eq} (dBA)**	
		Road	**Rail**
Living/Dining, den areas of residences, hospitals, nursing homes, schools, daycare centres, etc	7:00-23:00	45	40
Theaters, place of worship, libraries, individual or semi-private offices, conference rooms, reading rooms	23:00-7:00	45	40
Sleeping quarters	7:00-23:00	45	40
	23:00-7:00	40	35
❑ Standards taken from Table 2.2b; Sound Level Limit for Indoor Living Areas - Road and Rail			

If the sound level limits are exceeded at the window panes for the indoor living areas, the following Warning Clauses may be referenced:

Table 3 - Warning Clauses for Sound 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 - 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 impact of stationary noise sources are directly related to the location of the subject site within the urban environment. The proposed development can be classified as Class 2 by provincial guidelines and outlined in the ENGC, meaning "a suburban areas of the City outside of the busy core where the urban hum is evident but within the urban boundary."

Table 4 - Guidelines for Stationary Noise - Class 2

Time of Day	Outdoor Point of Reception	Pane of Window
7:00-19:00	50	50
19:00-23:00	45	50
23:00-7:00	-	45

❑ Standards taken from Table 3.2a; Guidelines for Stationary Noise - Steady and Varying Sound

Aircraft/Airport Noise

Aircraft noise is distinct, as it is typically low frequency for longer durations. The sound level may also differ between different types of aircraft. Due to the location of the subject site, an analysis of aircraft/airport noise is not required.

4.0 Analysis

The proposed development is bordered to the south by Withrow Avenue, and to the north, east and west by residential buildings. Rita Avenue intersects with the subject property along the west property line.

Based on the City of Ottawa Official Plan, Schedule E, Withrow Avenue is classified as a 2 lane urban collector (2-UCU). The remainder of the roads within the 100 m radius include St. Helen's Place, Rossland Avenue, Cleto Avenue, Rita Avenue and Tower Road. However, Schedule E does not classify these roads as either an arterial, collector or major collector road. Noise sources are presented on Paterson Drawing PG4239-1 - Site Plan, located in Appendix 1.

There are no stationary noise sources or aircraft noise within the influence area for this subject site.

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 class. 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 5 - Traffic and Road Parameters

Road	Implied Roadway	AADT (Veh/day)	Posted Speed (km/h)	Day/Night Split %	Medium Truck %	Heavy Truck %
Withrow Avenue	2-UCU	8,000	40	92/8	7	5

❑ Data obtained from the City of Ottawa document ENCG

There were several reception points that were considered for a thorough analysis of the proposed residential development. No Outdoor Living Areas (OLA) were noted on the site plan. However, due to the nature of the proposed residential development, exterior reception points throughout the property were also analyzed. The analysis is completed so that no effects of sound reflection off of the building facade is considered, as stipulated by the ENGC.

Additional reception points were selected at the bedroom windows at different elevations. For this analysis, a reception point was taken at the centre of the window pane, at the ground level and at the second floor. Reception points are noted on Paterson Drawing PG4239-2 - Receptor Locations, located in Appendix 1.

Table 10 - 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 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.

5.0 Results

The primary descriptors are the 16-hour daytime and the 8-hour night time equivalent sound levels, $L_{eq(16)}$ and the $L_{eq(8)}$ for City roads.

The proposed traffic noise levels were analyzed at all reception points. The results of the STAMSON software can be located in Appendix 2, and the summary of the results can be noted in Table 6.

Table 6 - Proposed Noise Levels

Reception Point	Description	Outdoor Area $L_{EQ(16)}$ (dBA)	Daytime at Facade $L_{EQ(16)}$ (dBA)	Nighttime at Facade $L_{eq(8)}$ (dBA)
REC 1-1	Southern Property Line - ground floor	--	62.50	54.91
REC 1-2	Southern Property Line - second floor	--	62.65	55.06
REC 2-1	Centre of property - ground floor	--	52.52	44.93
REC 2-2	Centre of property - ground floor	--	45.56	45.56
REC 3-1	Southeastern Property Line - ground floor	--	52.15	44.56
REC 3-2	Southeastern Property Line - second floor	--	52.68	45.09
REC 4-1	Northern Property Portion - ground floor	--	47.13	39.54
REC 4-2	Northern Property Portion - second floor	--	48.25	40.66
REC 5-0	Rear yard - eastern edge of property	54.9	–	--
REC 6-0	Rear yard - western edge of property	55.08	–	--
REC 7-0	Rear yard - northeastern edge of property	46.77	--	--

6.0 Discussion and Recommendations

6.1 Outdoor Living Areas

There were no outdoor living areas identified on the proposed development. However, the rear yards are of sufficient size to be analyzed. Three (3) reception points were located within the rear yards. This location was completed as a "free-field" sound level, so it is not affected by the presence of the building under assessment. The results of the STAMSON modeling indicates that the maximum $L_{eq(16)}$ from all sources will be 55.08 dBA, located at the western property edge, in the rear yard. This value is above the 55 dBA that was specified in Table 1, and therefore noise attenuation measures are to be provided.

6.2 Indoor Living Areas and Ventilation

The results of the STAMSON modelling indicates that the $L_{eq(16)}$ ranges between 62.65 dBA and 45.56 dBA. These values exceed the limit of 45 dBA as specified in Table 2 and therefore warning clauses will be required to be stated on any property titles. The applicable warning clauses are summarized in Table 7.

Table 7 - Summary of Warning Clauses

Elevation	Applicable Warning Clause	Additional Considerations
Residential Buildings (units south of Kilmore Private)	Warning Clause Type C	All units must be equipped with a central air conditioning system, reducing the need to open windows.

6.3 Noise Control Measures for Surface Transportation Noise

Outdoor Living Area

As described in subsection 6.1, where the daytime sound levels in outdoor living areas (OLA) exceeds 55 dBA, noise control measures should be implemented.

The following table outlines the MOECC recommended options for sound mitigation and the respected responses.

Table 8 - Outdoor Living Area Noise Mitigation Solutions

MOECC Recommended Option	Site Specific Response
Distance set back with soft ground.	The proposed development configuration limits the actual maximum set back distance. An additional set back is not feasible.
Insertion of noise insensitive land uses between the source and sensitive receptor.	Not applicable to this development.
Orientation of buildings to provide sheltered zones in rear yards.	The proposed buildings are situation in order to shield the rear yards from the noise sources. Additional analysis is provided for this solution.
Shared outdoor amenity areas.	Not required
Earth berms (sound barriers).	Not required
Acoustic Barriers.	Not required

The MOECC also states that warning clauses may be necessary, and it include reference to specific noise mitigation measures in the development and whether noise is expected to increase in the future. It should be noted that there is a need to maintain the mitigation.

The sound mitigation measure that is to be utilized for this development will be the orientation of the buildings. It is noted that the proposed buildings will have a rear yard that will be blocked by the proposed building.

A second analysis was completed using the STAMSON software taking into consideration one row of housing, at 50% density of the houses. Based on our analysis, the maximum $L_{eq(16)}$ will be 51.56 dBA, when taking into consideration the row of housing, which is below the 55 dBA threshhold. **Therefore, no additional mitigation factors will be required, and no warning clauses will be required for the outdoor living space provided the one row of housing is constructed.**

Indoor Living Area

As described in Table 10, where the daytime sound level at the plane of the window exceeds 60 dBA on the southern elevation, noise control measures should be implemented. The following table outlines the MOECC recommended options for sound mitigation and the respected responses.

Table 9 - Indoor Living Area Noise Mitigation Solutions

MOECC Recommended Option	Site Specific Response
Distance set back with soft ground.	The proposed development configuration limits the actual maximum set back distance. An additional set back is not feasible.
Insertion of noise insensitive land uses between the source and sensitive receptor.	Not applicable to this development.
Orientation of buildings to provide sheltered zones or modified interior spaces (room and corridor arrangement) and amenity areas	The proposed buildings are situated in order to shield the rear yards from the noise sources. There is a possibility that living areas and bedrooms will face the noise source.
Enhanced construction techniques and construction quality (e.g. brick veneers, multi-pane windows).	Construction techniques and building materials are to be analyzed to confirm sufficient soundproofing.
Earth berms (sound barriers).	Not required
Indoor isolation - air conditioning and ventilation, enhanced dampening materials (indoor isolation)	Not required

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:

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

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 22 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 25 or higher, this would be a sufficient noise attenuation device.**

7.0 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 the Theberge Homes 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.

Stephanie A. Boisvenue, P.Eng.

David J. Gilbert, P.Eng.

Report Distribution:

- ❑ Theberge Homes. (3 copies)
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APPENDIX 1

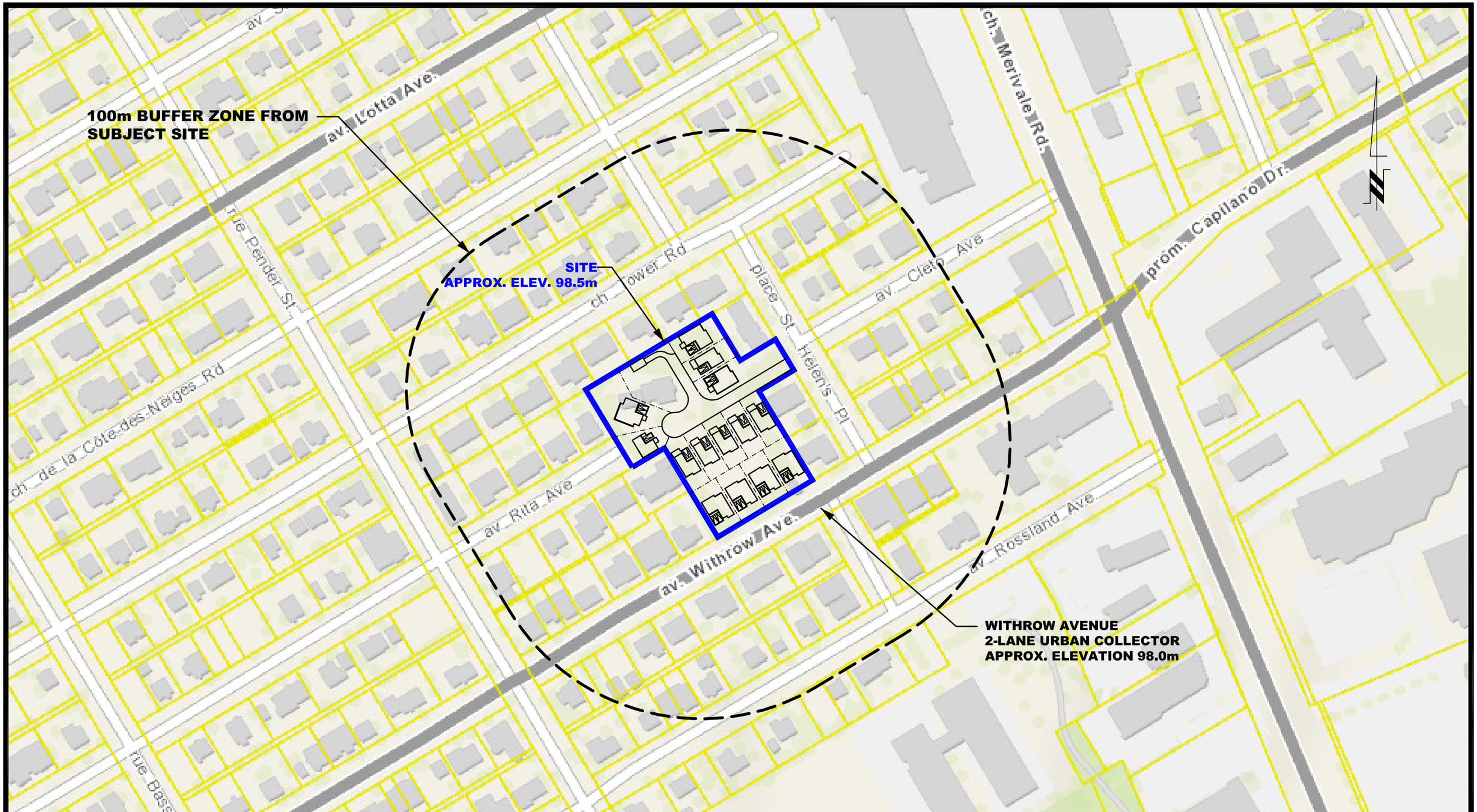
TABLE 10 - SUMMARY OF RECEPTION POINTS AND GEOMETRY

DRAWING PG4239-1 - SITE PLAN

DRAWING PG4239-2 - RECEPTOR LOCATIONS

Table 10 - Summary of Reception Points and Geometry
21 Withrow Avenue

Point of Reception	Location	Leq Day (dBA)	Withrow Avenue						
			Horizontal (m)	Vertical (m)	Total (m)	Local Angle (degree)	Barrier Height (m)	Distance (m)	Rows of Houses
REC 1-1	Southern property line, ground floor	62.5	15	1.5	15.07481	-90, 90	n/a	n/a	n/a
REC 1-2	Southern property line, second floor	55.06	15	4.5	15.66046	-90, 90	n/a	n/a	n/a
REC 2-1	Centre of property, ground floor	52.52	48	1.5	48.02343	-90, -34	7.5	20	1
						-34, 59	n/a	n/a	n/a
						59, 90	7.5	60	1
REC 2-2	Centre of property, second floor	45.56	48	4.5	48.21048	-90, -34	7.5	20	1
						-34, 59	n/a	n/a	n/a
						59, 90	7.5	60	1
REC 3-1	Centre of property, ground floor	52.15	48	1.5	48.02343	-90, -62	7.5	64	1
						-62, 26	n/a	n/a	n/a
						26, 90	7.5	40	1
REC 3-2	Centre of property, second floor	52.68	48	4.5	48.21048	-90, -62	7.5	64	1
						-62, 26	n/a	n/a	n/a
						26, 90	7.5	40	1
REC 4-1	Northern property portion, ground floor	47.13	80	1.5	80.01406	-90, -13	7.5	20	2
						-13, 42	n/a	n/a	n/a
						42, 90	7.5	90	2
REC 4-2	Northern portion of property, second floor	48.25	80	4.5	80.12646	-90, -13	7.5	20	2
						-13, 42	n/a	n/a	n/a
						42, 90	7.5	90	2
REC 5-0	Backyard, centre of property	54.9	35	1	35.01428	-90, -32	7.5	30	1
						-32, 69	n/a	n/a	n/a
						69, 90	7.5	65	1
REC 6-0	Backyard, centre of property	55.08	35	1	35.01428	-90, -73	7.5	68	1
						-73, 34	n/a	n/a	n/a
						34, 90	7.5	25	1
REC 7-0	Backyard, western portion of property	46.77	85	1	85.00588	-90, -10	7.5	20	2
						-10, 42	n/a	n/a	n/a
						42, 90	7.5	60	2



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NO.	REVISIONS	DATE	INITIAL
0			

THEBERGE DEVELOPMENTS

NOISE ATTENUATION STUDY
21 WITHROW AVENUE

OTTAWA, ONTARIO

Title:

SITE PLAN

Scale: 1:2000	Date: 08/2017
Drawn by: MPG	Report No.: PG4239-1
Checked by: SB	Dwg. No.: **PG4239-1**
Approved by: DJG	Revision No.: 0

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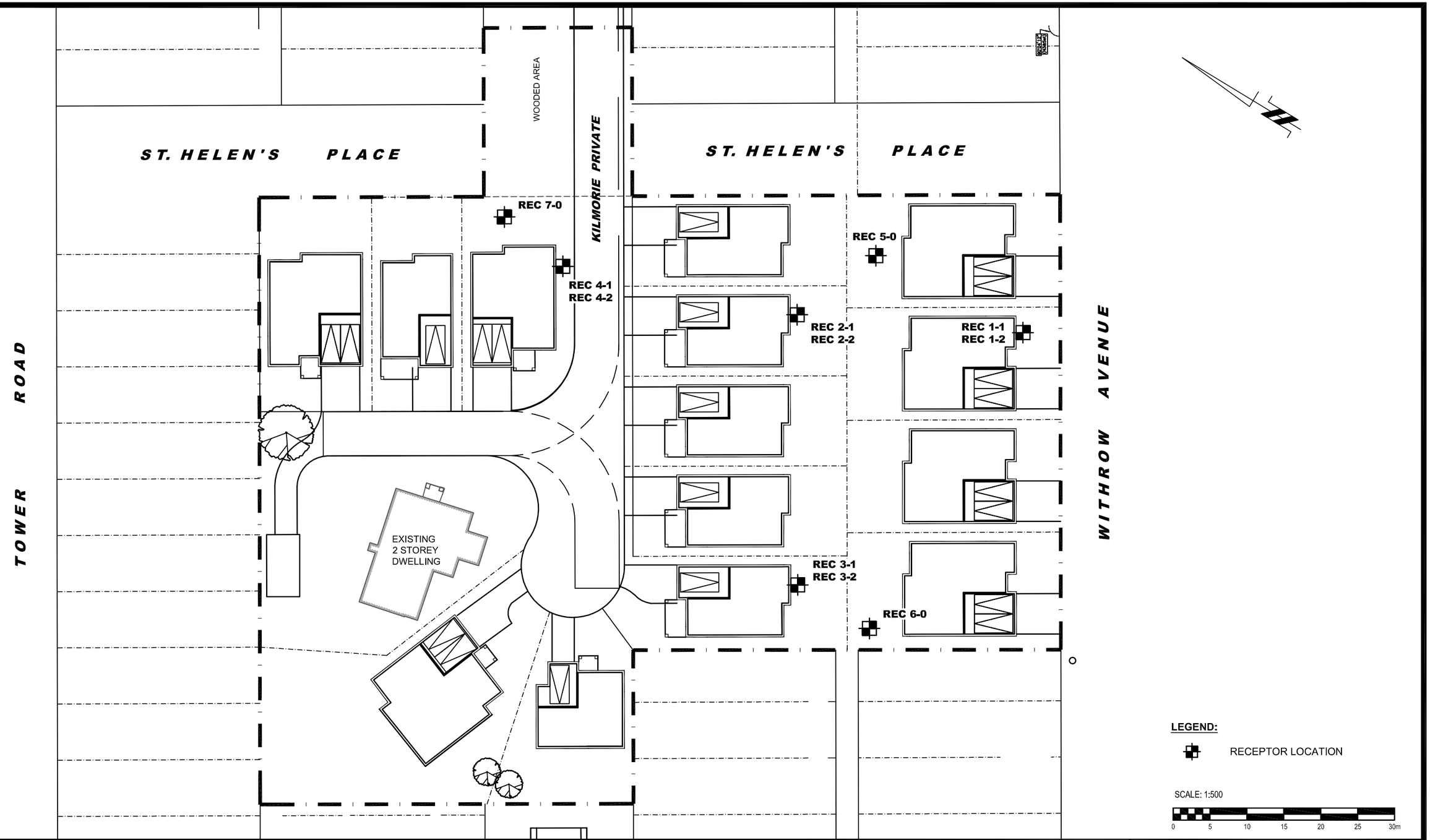

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NO.	REVISIONS	DATE	INITIAL
0			

THEBERGE DEVELOPMENTS

NOISE ATTENUATION STUDY
21 WITHROW AVENUE

OTTAWA, ONTARIO

Title:

RECEPTOR LOCATION PLAN

Scale: 1:500	Date: 08/2017
Drawn by: MPG	Report No.: PG4239-1
Checked by: SB	Dwg. No.: PG4239-1
Approved by: DJG	Revision No.: 0

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APPENDIX 2

STAMSON RESULTS

STAMSON 5.0 NORMAL REPORT Date: 05-09-2017 13:32:30
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: REC11.te Time Period: Day/Night 16/8 hours
Description: Receiver 1-1

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

Car traffic volume	6477/563	veh/TimePeriod *
Medium truck volume	515/45	veh/TimePeriod *
Heavy truck volume	368/32	veh/TimePeriod *
Posted speed limit	40 km/h	
Road gradient	0 %	
Road pavement	1 (Typical asphalt or concrete)	

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

24 hr Traffic Volume (AADT or SADT)	8000
Percentage of Annual Growth	0.00
Number of Years of Growth	0.00
Medium Truck % of Total Volume	7.00
Heavy Truck % of Total Volume	5.00
Day (16 hrs) % of Total Volume	92.00

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

Angle1 Angle2	-90.00 deg	90.00 deg
Wood depth	0	(No woods.)
No of house rows	0 / 0	
Surface	1	(Absorptive ground surface)
Receiver source distance	15.00 / 15.00	m
Receiver height	1.50 / 1.50	m
Topography	1	(Flat/gentle slope; no barrier)
Reference angle	0.00	

♀
Results segment # 1: Withrow (day)

Source height = 1.50 m

ROAD (0.00 + 62.50 + 0.00) = 62.50 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.66	63.96	0.00	0.00	-1.46	0.00	0.00	0.00	62.50

Segment Leq : 62.50 dBA

Total Leq All Segments: 62.50 dBA

♀
Results segment # 1: Withrow (night)

Source height = 1.50 m

ROAD (0.00 + 54.91 + 0.00) = 54.91 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.66	56.36	0.00	0.00	-1.46	0.00	0.00	0.00	54.91

Segment Leq : 54.91 dBA

Total Leq All Segments: 54.91 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 62.50
(NIGHT): 54.91

STAMSON 5.0 NORMAL REPORT Date: 05-09-2017 13:33:26
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: REC12.te Time Period: Day/Night 16/8 hours
Description: Receiver 1-2

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

Car traffic volume	6477/563	veh/TimePeriod *
Medium truck volume	515/45	veh/TimePeriod *
Heavy truck volume	368/32	veh/TimePeriod *
Posted speed limit	40 km/h	
Road gradient	0 %	
Road pavement	1 (Typical asphalt or concrete)	

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

24 hr Traffic Volume (AADT or SADT)	8000
Percentage of Annual Growth	0.00
Number of Years of Growth	0.00
Medium Truck % of Total Volume	7.00
Heavy Truck % of Total Volume	5.00
Day (16 hrs) % of Total Volume	92.00

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

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

♀
Results segment # 1: Withrow (day)

Source height = 1.50 m

ROAD (0.00 + 62.65 + 0.00) = 62.65 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.57	63.96	0.00	0.00	-1.30	0.00	0.00	0.00	62.65

Segment Leq : 62.65 dBA

Total Leq All Segments: 62.65 dBA

♀
Results segment # 1: Withrow (night)

Source height = 1.50 m

ROAD (0.00 + 55.06 + 0.00) = 55.06 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.57	56.36	0.00	0.00	-1.30	0.00	0.00	0.00	55.06

Segment Leq : 55.06 dBA

Total Leq All Segments: 55.06 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 62.65
(NIGHT): 55.06

STAMSON 5.0 NORMAL REPORT Date: 05-09-2017 13:50:38
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

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

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

Car traffic volume	: 6477/563	veh/TimePeriod *
Medium truck volume	: 515/45	veh/TimePeriod *
Heavy truck volume	: 368/32	veh/TimePeriod *
Posted speed limit	: 40 km/h	
Road gradient	: 0 %	
Road pavement	: 1 (Typical asphalt or concrete)	

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

24 hr Traffic Volume (AADT or SADT)	: 8000
Percentage of Annual Growth	: 0.00
Number of Years of Growth	: 0.00
Medium Truck % of Total Volume	: 7.00
Heavy Truck % of Total Volume	: 5.00
Day (16 hrs) % of Total Volume	: 92.00

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

Angle1 Angle2	: -90.00 deg	-34.00 deg
Wood depth	: 0	(No woods.)
No of house rows	: 0 / 0	
Surface	: 1	(Absorptive ground surface)
Receiver source distance	: 48.00 / 48.00	m
Receiver height	: 1.50 / 1.50	m
Topography	: 2	(Flat/gentle slope; with barrier)
Barrier angle1	: -90.00 deg	Angle2 : -34.00 deg
Barrier height	: 7.50 m	
Barrier receiver distance	: 20.00 / 20.00	m
Source elevation	: 0.00 m	
Receiver elevation	: 0.00 m	
Barrier elevation	: 0.00 m	
Reference angle	: 0.00	

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

Car traffic volume	: 6477/563	veh/TimePeriod *
Medium truck volume	: 515/45	veh/TimePeriod *
Heavy truck volume	: 368/32	veh/TimePeriod *
Posted speed limit	: 40 km/h	
Road gradient	: 0 %	
Road pavement	: 1 (Typical asphalt or concrete)	

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

24 hr Traffic Volume (AADT or SADT)	: 8000
Percentage of Annual Growth	: 0.00
Number of Years of Growth	: 0.00
Medium Truck % of Total Volume	: 7.00
Heavy Truck % of Total Volume	: 5.00
Day (16 hrs) % of Total Volume	: 92.00

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

```
Angle1   Angle2           : -34.00 deg   59.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  48.00 / 48.00  m
Receiver height           :   1.50 / 1.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00
```

♀

```
Road data, segment # 3: Withrow (day/night)
-------------------------------------------
Car traffic volume  :  6477/563   veh/TimePeriod  *
Medium truck volume :   515/45    veh/TimePeriod  *
Heavy truck volume  :   368/32    veh/TimePeriod  *
Posted speed limit  :    40 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

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

    24 hr Traffic Volume (AADT or SADT):   8000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 3: Withrow (day/night)
-----------------------------------------
Angle1   Angle2           :  59.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  48.00 / 48.00  m
Receiver height           :   1.50 / 1.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            :  59.00 deg   Angle2 : 90.00 deg
Barrier height            :   7.50 m
Barrier receiver distance :  47.00 / 47.00  m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00
```

♀

```
Results segment # 1: Withrow (day)
----------------------------------

Source height = 1.50 m

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

ROAD (0.00 + 38.33 + 0.00) = 38.33 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90    -34   0.21  63.96   0.00  -6.11  -5.97   0.00   0.00 -13.54  38.33
-------------------------------------------------------------------------------
```

Segment Leq : 38.33 dBA

♀
Results segment # 2: Withrow (day)

Source height = 1.50 m

ROAD (0.00 + 52.30 + 0.00) = 52.30 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-34	59	0.66	63.96	0.00	-8.39	-3.27	0.00	0.00	0.00	52.30

Segment Leq : 52.30 dBA

♀
Results segment # 3: Withrow (day)

Source height = 1.50 m

Barrier height for grazing incidence

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

ROAD (0.00 + 33.08 + 0.00) = 33.08 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
59	90	0.21	63.96	0.00	-6.11	-9.04	0.00	0.00	-15.72	33.08

Segment Leq : 33.08 dBA

Total Leq All Segments: 52.52 dBA

♀
Results segment # 1: Withrow (night)

Source height = 1.50 m

Barrier height for grazing incidence

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

ROAD (0.00 + 30.73 + 0.00) = 30.73 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	-34	0.21	56.36	0.00	-6.11	-5.97	0.00	0.00	-13.54	30.73

Segment Leq : 30.73 dBA

♀
Results segment # 2: Withrow (night)

Source height = 1.50 m

ROAD (0.00 + 44.71 + 0.00) = 44.71 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-34	59	0.66	56.36	0.00	-8.39	-3.27	0.00	0.00	0.00	44.71

Segment Leq : 44.71 dBA

♀

Results segment # 3: Withrow (night)

Source height = 1.50 m

Barrier height for grazing incidence

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

ROAD (0.00 + 25.48 + 0.00) = 25.48 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
59	90	0.21	56.36	0.00	-6.11	-9.04	0.00	0.00	-15.72	25.48

Segment Leq : 25.48 dBA

Total Leq All Segments: 44.93 dBA

♀

TOTAL Leq FROM ALL SOURCES (DAY): 52.52
(NIGHT): 44.93

♀
♀

STAMSON 5.0 NORMAL REPORT Date: 05-09-2017 13:53:49
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: REC22.te Time Period: Day/Night 16/8 hours
Description: Receiver 2-2

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

Car traffic volume	6477/563	veh/TimePeriod *
Medium truck volume	515/45	veh/TimePeriod *
Heavy truck volume	368/32	veh/TimePeriod *
Posted speed limit	40 km/h	
Road gradient	0 %	
Road pavement	1 (Typical asphalt or concrete)	

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

24 hr Traffic Volume (AADT or SADT)	8000
Percentage of Annual Growth	0.00
Number of Years of Growth	0.00
Medium Truck % of Total Volume	7.00
Heavy Truck % of Total Volume	5.00
Day (16 hrs) % of Total Volume	92.00

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

Angle1 Angle2	-90.00 deg	-34.00 deg
Wood depth	0	(No woods.)
No of house rows	0 / 0	
Surface	1	(Absorptive ground surface)
Receiver source distance	48.00 / 48.00	m
Receiver height	4.50 / 4.50	m
Topography	2	(Flat/gentle slope; with barrier)
Barrier angle1	-90.00 deg	Angle2 : -34.00 deg
Barrier height	7.50 m	
Barrier receiver distance	20.00 / 20.00	m
Source elevation	0.00 m	
Receiver elevation	0.00 m	
Barrier elevation	0.00 m	
Reference angle	0.00	

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

Car traffic volume	6477/563	veh/TimePeriod *
Medium truck volume	515/45	veh/TimePeriod *
Heavy truck volume	368/32	veh/TimePeriod *
Posted speed limit	40 km/h	
Road gradient	0 %	
Road pavement	1 (Typical asphalt or concrete)	

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

24 hr Traffic Volume (AADT or SADT)	8000
Percentage of Annual Growth	0.00
Number of Years of Growth	0.00
Medium Truck % of Total Volume	7.00
Heavy Truck % of Total Volume	5.00
Day (16 hrs) % of Total Volume	92.00

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

```
Angle1   Angle2           : -34.00 deg   59.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  48.00 / 48.00  m
Receiver height           :   4.50 / 4.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00
```

♀

```
Road data, segment # 3: Withrow (day/night)
-------------------------------------------
Car traffic volume  :  6477/563   veh/TimePeriod  *
Medium truck volume :   515/45    veh/TimePeriod  *
Heavy truck volume  :   368/32    veh/TimePeriod  *
Posted speed limit  :    40 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

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

    24 hr Traffic Volume (AADT or SADT):   8000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 3: Withrow (day/night)
-----------------------------------------
Angle1   Angle2           :  59.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  48.00 / 48.00  m
Receiver height           :   4.50 / 4.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            :  59.00 deg   Angle2 : 90.00 deg
Barrier height            :   7.50 m
Barrier receiver distance :  47.00 / 47.00  m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00
```

♀

```
Results segment # 1: Withrow (day)
----------------------------------

Source height = 1.50 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.50 !        4.50 !        3.25 !         3.25

ROAD (0.00 + 41.26 + 0.00) = 41.26 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90    -34   0.12  63.96   0.00  -5.66  -5.60   0.00   0.00 -11.44  41.26
-------------------------------------------------------------------------------
```

Segment Leq : 41.26 dBA

♀
Results segment # 2: Withrow (day)

Source height = 1.50 m

ROAD (0.00 + 52.81 + 0.00) = 52.81 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-34	59	0.57	63.96	0.00	-7.93	-3.22	0.00	0.00	0.00	52.81

Segment Leq : 52.81 dBA

♀
Results segment # 3: Withrow (day)

Source height = 1.50 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.50	4.50	1.56	1.56

ROAD (0.00 + 34.32 + 0.00) = 34.32 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
59	90	0.12	63.96	0.00	-5.66	-8.46	0.00	0.00	-15.52	34.32

Segment Leq : 34.32 dBA

Total Leq All Segments: 53.16 dBA

♀
Results segment # 1: Withrow (night)

Source height = 1.50 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.50	4.50	3.25	3.25

ROAD (0.00 + 33.66 + 0.00) = 33.66 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	-34	0.12	56.36	0.00	-5.66	-5.60	0.00	0.00	-11.44	33.66

Segment Leq : 33.66 dBA

♀
Results segment # 2: Withrow (night)

Source height = 1.50 m

ROAD (0.00 + 45.21 + 0.00) = 45.21 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-34	59	0.57	56.36	0.00	-7.93	-3.22	0.00	0.00	0.00	45.21

Segment Leq : 45.21 dBA

♀

Results segment # 3: Withrow (night)

Source height = 1.50 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.50	4.50	1.56	1.56

ROAD (0.00 + 26.72 + 0.00) = 26.72 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
59	90	0.12	56.36	0.00	-5.66	-8.46	0.00	0.00	-15.52	26.72

Segment Leq : 26.72 dBA

Total Leq All Segments: 45.56 dBA

♀

TOTAL Leq FROM ALL SOURCES (DAY): 53.16
(NIGHT): 45.56

♀
♀

STAMSON 5.0 NORMAL REPORT Date: 05-09-2017 14:03:43
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: REC31.te Time Period: Day/Night 16/8 hours
Description: Receiver 3-1

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

Car traffic volume : 6477/563 veh/TimePeriod *
Medium truck volume : 515/45 veh/TimePeriod *
Heavy truck volume : 368/32 veh/TimePeriod *
Posted speed limit : 40 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 8000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

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

Angle1 Angle2 : -90.00 deg -62.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 48.00 / 48.00 m
Receiver height : 1.50 / 1.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -90.00 deg Angle2 : -62.00 deg
Barrier height : 7.50 m
Barrier receiver distance : 47.00 / 47.00 m
Source elevation : 0.00 m
Receiver elevation : 0.00 m
Barrier elevation : 0.00 m
Reference angle : 0.00

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

Car traffic volume : 6477/563 veh/TimePeriod *
Medium truck volume : 515/45 veh/TimePeriod *
Heavy truck volume : 368/32 veh/TimePeriod *
Posted speed limit : 40 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 8000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

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

```
Angle1   Angle2           : -62.00 deg   26.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  48.00 / 48.00  m
Receiver height           :   1.50 / 1.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00
```

♀

```
Road data, segment # 3: Withrow (day/night)
-------------------------------------------
Car traffic volume  :  6477/563   veh/TimePeriod  *
Medium truck volume :   515/45    veh/TimePeriod  *
Heavy truck volume  :   368/32    veh/TimePeriod  *
Posted speed limit  :    40 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

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

    24 hr Traffic Volume (AADT or SADT):   8000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 3: Withrow (day/night)
-----------------------------------------
Angle1   Angle2           :  26.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  48.00 / 48.00  m
Receiver height           :   1.50 / 1.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            :  26.00 deg   Angle2 : 90.00 deg
Barrier height            :   7.50 m
Barrier receiver distance :  47.00 / 47.00  m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00
```

♀

```
Results segment # 1: Withrow (day)
----------------------------------

Source height = 1.50 m

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

ROAD (0.00 + 32.83 + 0.00) = 32.83 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90    -62   0.21  63.96   0.00  -6.11  -9.58   0.00   0.00 -15.44  32.83
-------------------------------------------------------------------------------
```

Segment Leq : 32.83 dBA

♀
Results segment # 2: Withrow (day)

Source height = 1.50 m

ROAD (0.00 + 52.01 + 0.00) = 52.01 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-62	26	0.66	63.96	0.00	-8.39	-3.56	0.00	0.00	0.00	52.01

Segment Leq : 52.01 dBA

♀
Results segment # 3: Withrow (day)

Source height = 1.50 m

Barrier height for grazing incidence

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

ROAD (0.00 + 35.14 + 0.00) = 35.14 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
26	90	0.21	63.96	0.00	-6.11	-5.29	0.00	0.00	-17.42	35.14

Segment Leq : 35.14 dBA

Total Leq All Segments: 52.15 dBA

♀
Results segment # 1: Withrow (night)

Source height = 1.50 m

Barrier height for grazing incidence

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

ROAD (0.00 + 25.24 + 0.00) = 25.24 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	-62	0.21	56.36	0.00	-6.11	-9.58	0.00	0.00	-15.44	25.24

Segment Leq : 25.24 dBA

♀
Results segment # 2: Withrow (night)

Source height = 1.50 m

ROAD (0.00 + 44.42 + 0.00) = 44.42 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-62	26	0.66	56.36	0.00	-8.39	-3.56	0.00	0.00	0.00	44.42

Segment Leq : 44.42 dBA

♀

Results segment # 3: Withrow (night)

Source height = 1.50 m

Barrier height for grazing incidence

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

ROAD (0.00 + 27.54 + 0.00) = 27.54 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
26	90	0.21	56.36	0.00	-6.11	-5.29	0.00	0.00	-17.42	27.54

Segment Leq : 27.54 dBA

Total Leq All Segments: 44.56 dBA

♀

TOTAL Leq FROM ALL SOURCES (DAY): 52.15
(NIGHT): 44.56

♀
♀

STAMSON 5.0 NORMAL REPORT Date: 05-09-2017 14:09:48
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: REC32.te Time Period: Day/Night 16/8 hours
Description: Receiver 3-2

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

Car traffic volume : 6477/563 veh/TimePeriod *
Medium truck volume : 515/45 veh/TimePeriod *
Heavy truck volume : 368/32 veh/TimePeriod *
Posted speed limit : 40 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 8000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

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

Angle1 Angle2 : -90.00 deg -62.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 48.00 / 48.00 m
Receiver height : 4.50 / 4.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -90.00 deg Angle2 : -62.00 deg
Barrier height : 7.50 m
Barrier receiver distance : 47.00 / 47.00 m
Source elevation : 0.00 m
Receiver elevation : 0.00 m
Barrier elevation : 0.00 m
Reference angle : 0.00

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

Car traffic volume : 6477/563 veh/TimePeriod *
Medium truck volume : 515/45 veh/TimePeriod *
Heavy truck volume : 368/32 veh/TimePeriod *
Posted speed limit : 40 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 8000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

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

```
Angle1   Angle2           : -62.00 deg   26.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  48.00 / 48.00  m
Receiver height           :   4.50 / 4.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00
```

♀

```
Road data, segment # 3: Withrow (day/night)
-------------------------------------------
Car traffic volume  :  6477/563   veh/TimePeriod  *
Medium truck volume :   515/45    veh/TimePeriod  *
Heavy truck volume  :   368/32    veh/TimePeriod  *
Posted speed limit  :    40 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

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

    24 hr Traffic Volume (AADT or SADT):   8000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 3: Withrow (day/night)
-----------------------------------------
Angle1   Angle2           :  26.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  48.00 / 48.00  m
Receiver height           :   4.50 / 4.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            :  26.00 deg   Angle2 : 90.00 deg
Barrier height            :   7.50 m
Barrier receiver distance :  47.00 / 47.00  m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00
```

♀

```
Results segment # 1: Withrow (day)
----------------------------------

Source height = 1.50 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.50 !        4.50 !        1.56 !         1.56

ROAD (0.00 + 34.11 + 0.00) = 34.11 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90    -62   0.12  63.96   0.00  -5.66  -8.95   0.00   0.00 -15.23  34.11
-------------------------------------------------------------------------------
```

Segment Leq : 34.11 dBA

♀
Results segment # 2: Withrow (day)

Source height = 1.50 m

ROAD (0.00 + 52.52 + 0.00) = 52.52 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-62	26	0.57	63.96	0.00	-7.93	-3.50	0.00	0.00	0.00	52.52

Segment Leq : 52.52 dBA

♀
Results segment # 3: Withrow (day)

Source height = 1.50 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.50	4.50	1.56	1.56

ROAD (0.00 + 36.06 + 0.00) = 36.06 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
26	90	0.12	63.96	0.00	-5.66	-4.96	0.00	0.00	-17.27	36.06

Segment Leq : 36.06 dBA

Total Leq All Segments: 52.68 dBA

♀
Results segment # 1: Withrow (night)

Source height = 1.50 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.50	4.50	1.56	1.56

ROAD (0.00 + 26.52 + 0.00) = 26.52 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	-62	0.12	56.36	0.00	-5.66	-8.95	0.00	0.00	-15.23	26.52

Segment Leq : 26.52 dBA

♀
Results segment # 2: Withrow (night)

Source height = 1.50 m

ROAD (0.00 + 44.93 + 0.00) = 44.93 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-62	26	0.57	56.36	0.00	-7.93	-3.50	0.00	0.00	0.00	44.93

Segment Leq : 44.93 dBA

♀

Results segment # 3: Withrow (night)

Source height = 1.50 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.50	4.50	1.56	1.56

ROAD (0.00 + 28.47 + 0.00) = 28.47 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
26	90	0.12	56.36	0.00	-5.66	-4.96	0.00	0.00	-17.27	28.47

Segment Leq : 28.47 dBA

Total Leq All Segments: 45.09 dBA

♀

TOTAL Leq FROM ALL SOURCES (DAY): 52.68
(NIGHT): 45.09

♀
♀

STAMSON 5.0 NORMAL REPORT Date: 05-09-2017 14:17:18
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: REC41.te Time Period: Day/Night 16/8 hours
Description: Receiver 4-1

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

Car traffic volume : 6477/563 veh/TimePeriod *
Medium truck volume : 515/45 veh/TimePeriod *
Heavy truck volume : 368/32 veh/TimePeriod *
Posted speed limit : 40 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 8000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

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

Angle1 Angle2 : -90.00 deg -13.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 80.00 / 80.00 m
Receiver height : 1.50 / 1.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -90.00 deg Angle2 : -13.00 deg
Barrier height : 7.50 m
Barrier receiver distance : 20.00 / 20.00 m
Source elevation : 0.00 m
Receiver elevation : 0.00 m
Barrier elevation : 0.00 m
Reference angle : 0.00

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

Car traffic volume : 6477/563 veh/TimePeriod *
Medium truck volume : 515/45 veh/TimePeriod *
Heavy truck volume : 368/32 veh/TimePeriod *
Posted speed limit : 40 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 8000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

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

```
Angle1   Angle2           : -13.00 deg   42.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  80.00 / 80.00  m
Receiver height           :   1.50 / 1.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

♀
Road data, segment # 3: Withrow (day/night)
------------------------------------------
Car traffic volume  :  6477/563   veh/TimePeriod  *
Medium truck volume :   515/45    veh/TimePeriod  *
Heavy truck volume  :   368/32    veh/TimePeriod  *
Posted speed limit  :    40 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

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

    24 hr Traffic Volume (AADT or SADT):   8000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 3: Withrow (day/night)
-----------------------------------------
Angle1   Angle2           :  42.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  80.00 / 80.00  m
Receiver height           :   1.50 / 1.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            :  42.00 deg   Angle2 : 90.00 deg
Barrier height            :   7.50 m
Barrier receiver distance :  79.00 / 79.00  m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00

♀
Results segment # 1: Withrow (day)
----------------------------------

Source height = 1.50 m

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

ROAD (0.00 + 37.14 + 0.00) = 37.14 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90    -13   0.21  63.96   0.00  -8.80  -4.35   0.00   0.00 -13.66  37.14
-------------------------------------------------------------------------------
```

Segment Leq : 37.14 dBA

♀
Results segment # 2: Withrow (day)

Source height = 1.50 m

ROAD (0.00 + 46.53 + 0.00) = 46.53 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-13	42	0.66	63.96	0.00	-12.07	-5.36	0.00	0.00	0.00	46.53

Segment Leq : 46.53 dBA

♀
Results segment # 3: Withrow (day)

Source height = 1.50 m

Barrier height for grazing incidence

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

ROAD (0.00 + 31.64 + 0.00) = 31.64 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
42	90	0.21	63.96	0.00	-8.80	-6.77	0.00	0.00	-16.75	31.64

Segment Leq : 31.64 dBA

Total Leq All Segments: 47.13 dBA

♀
Results segment # 1: Withrow (night)

Source height = 1.50 m

Barrier height for grazing incidence

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

ROAD (0.00 + 29.55 + 0.00) = 29.55 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	-13	0.21	56.36	0.00	-8.80	-4.35	0.00	0.00	-13.66	29.55

Segment Leq : 29.55 dBA

♀
Results segment # 2: Withrow (night)

Source height = 1.50 m

ROAD (0.00 + 38.94 + 0.00) = 38.94 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-13	42	0.66	56.36	0.00	-12.07	-5.36	0.00	0.00	0.00	38.94

Segment Leq : 38.94 dBA

Results segment # 3: Withrow (night)

Source height = 1.50 m

Barrier height for grazing incidence

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

ROAD (0.00 + 24.05 + 0.00) = 24.05 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
42	90	0.21	56.36	0.00	-8.80	-6.77	0.00	0.00	-16.75	24.05

Segment Leq : 24.05 dBA

Total Leq All Segments: 39.54 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 47.13
(NIGHT): 39.54

STAMSON 5.0 NORMAL REPORT Date: 08-09-2017 15:04:57
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: rec42.te Time Period: Day/Night 16/8 hours
Description: Reception Point 4-2

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

Car traffic volume	:	6477/563	veh/TimePeriod *
Medium truck volume	:	515/45	veh/TimePeriod *
Heavy truck volume	:	368/32	veh/TimePeriod *
Posted speed limit	:	40 km/h	
Road gradient	:	0 %	
Road pavement	:	1 (Typical asphalt or concrete)	

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

24 hr Traffic Volume (AADT or SADT)	:	8000
Percentage of Annual Growth	:	0.00
Number of Years of Growth	:	0.00
Medium Truck % of Total Volume	:	7.00
Heavy Truck % of Total Volume	:	5.00
Day (16 hrs) % of Total Volume	:	92.00

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

Angle1 Angle2	:	-90.00 deg	-13.00 deg
Wood depth	:	0	(No woods.)
No of house rows	:	0 / 0	
Surface	:	1	(Absorptive ground surface)
Receiver source distance	:	80.00 / 80.00	m
Receiver height	:	4.50 / 4.50	m
Topography	:	2	(Flat/gentle slope; with barrier)
Barrier angle1	:	-90.00 deg	Angle2 : -13.00 deg
Barrier height	:	7.50 m	
Barrier receiver distance	:	20.00 / 20.00	m
Source elevation	:	0.00 m	
Receiver elevation	:	0.00 m	
Barrier elevation	:	0.00 m	
Reference angle	:	0.00	

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

Car traffic volume	:	6477/563	veh/TimePeriod *
Medium truck volume	:	515/45	veh/TimePeriod *
Heavy truck volume	:	368/32	veh/TimePeriod *
Posted speed limit	:	40 km/h	
Road gradient	:	0 %	
Road pavement	:	1 (Typical asphalt or concrete)	

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

24 hr Traffic Volume (AADT or SADT)	:	8000
Percentage of Annual Growth	:	0.00
Number of Years of Growth	:	0.00
Medium Truck % of Total Volume	:	7.00
Heavy Truck % of Total Volume	:	5.00
Day (16 hrs) % of Total Volume	:	92.00

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

```
Angle1   Angle2           : -13.00 deg   42.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  80.00 / 80.00  m
Receiver height           :   4.50 / 4.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00
```

♀

```
Road data, segment # 3: Withrow (day/night)
-------------------------------------------
Car traffic volume  :  6477/563   veh/TimePeriod  *
Medium truck volume :   515/45    veh/TimePeriod  *
Heavy truck volume  :   368/32    veh/TimePeriod  *
Posted speed limit  :    40 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

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

    24 hr Traffic Volume (AADT or SADT):   8000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 3: Withrow (day/night)
-----------------------------------------
Angle1   Angle2           :  42.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  80.00 / 80.00  m
Receiver height           :   4.50 / 4.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            :  42.00 deg   Angle2 : 90.00 deg
Barrier height            :   7.50 m
Barrier receiver distance :  79.00 / 79.00  m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00
```

♀

```
Results segment # 1: Withrow (day)
----------------------------------

Source height = 1.50 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.50 !        4.50 !        3.75 !         3.75

ROAD (0.00 + 40.91 + 0.00) = 40.91 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
   -90    -13   0.12  63.96   0.00  -8.14  -4.08   0.00   0.00 -10.82  40.91
-------------------------------------------------------------------------
```

Segment Leq : 40.91 dBA

♀
Results segment # 2: Withrow (day)

Source height = 1.50 m

ROAD (0.00 + 47.21 + 0.00) = 47.21 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-13	42	0.57	63.96	0.00	-11.41	-5.33	0.00	0.00	0.00	47.21

Segment Leq : 47.21 dBA

♀
Results segment # 3: Withrow (day)

Source height = 1.50 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.50	4.50	1.53	1.53

ROAD (0.00 + 32.82 + 0.00) = 32.82 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
42	90	0.12	63.96	0.00	-8.14	-6.35	0.00	0.00	-16.64	32.82

Segment Leq : 32.82 dBA

Total Leq All Segments: 48.25 dBA

♀
Results segment # 1: Withrow (night)

Source height = 1.50 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.50	4.50	3.75	3.75

ROAD (0.00 + 33.32 + 0.00) = 33.32 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	-13	0.12	56.36	0.00	-8.14	-4.08	0.00	0.00	-10.82	33.32

Segment Leq : 33.32 dBA

♀
Results segment # 2: Withrow (night)

Source height = 1.50 m

ROAD (0.00 + 39.62 + 0.00) = 39.62 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-13	42	0.57	56.36	0.00	-11.41	-5.33	0.00	0.00	0.00	39.62

Segment Leq : 39.62 dBA

♀

Results segment # 3: Withrow (night)

Source height = 1.50 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.50	4.50	1.53	1.53

ROAD (0.00 + 25.23 + 0.00) = 25.23 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
42	90	0.12	56.36	0.00	-8.14	-6.35	0.00	0.00	-16.64	25.23

Segment Leq : 25.23 dBA

Total Leq All Segments: 40.66 dBA

♀

TOTAL Leq FROM ALL SOURCES (DAY): 48.25
(NIGHT): 40.66

♀
♀

STAMSON 5.0 NORMAL REPORT Date: 08-09-2017 14:58:46
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: REC50.te Time Period: Day/Night 16/8 hours
Description: Reception Point 5-0

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

Car traffic volume : 6477/563 veh/TimePeriod *
Medium truck volume : 515/45 veh/TimePeriod *
Heavy truck volume : 368/32 veh/TimePeriod *
Posted speed limit : 40 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 8000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

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

Angle1 Angle2 : -90.00 deg -32.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 35.00 / 35.00 m
Receiver height : 1.50 / 1.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -90.00 deg Angle2 : -32.00 deg
Barrier height : 7.50 m
Barrier receiver distance : 30.00 / 30.00 m
Source elevation : 0.00 m
Receiver elevation : 0.00 m
Barrier elevation : 0.00 m
Reference angle : 0.00

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

Car traffic volume : 6477/563 veh/TimePeriod *
Medium truck volume : 515/45 veh/TimePeriod *
Heavy truck volume : 368/32 veh/TimePeriod *
Posted speed limit : 40 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 8000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

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

```
Angle1   Angle2           : -32.00 deg   69.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  35.00 / 35.00  m
Receiver height           :   1.50 / 1.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00
```

♀

```
Road data, segment # 3: Withrow (day/night)
-------------------------------------------
Car traffic volume  :  6477/563   veh/TimePeriod  *
Medium truck volume :   515/45    veh/TimePeriod  *
Heavy truck volume  :   368/32    veh/TimePeriod  *
Posted speed limit  :    40 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

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

    24 hr Traffic Volume (AADT or SADT):   8000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 3: Withrow (day/night)
-----------------------------------------
Angle1   Angle2           :  69.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  35.00 / 35.00  m
Receiver height           :   1.50 / 1.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            :  69.00 deg   Angle2 : 90.00 deg
Barrier height            :   7.50 m
Barrier receiver distance :  34.00 / 34.00  m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00
```

♀

```
Results segment # 1: Withrow (day)
----------------------------------

Source height = 1.50 m

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

ROAD (0.00 + 37.59 + 0.00) = 37.59 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90    -32   0.21  63.96   0.00  -4.45  -5.79   0.00   0.00 -16.11  37.59
-------------------------------------------------------------------------------
```

Segment Leq : 37.59 dBA

♀
Results segment # 2: Withrow (day)

Source height = 1.50 m

ROAD (0.00 + 54.78 + 0.00) = 54.78 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-32	69	0.66	63.96	0.00	-6.11	-3.07	0.00	0.00	0.00	54.78

Segment Leq : 54.78 dBA

♀
Results segment # 3: Withrow (day)

Source height = 1.50 m

Barrier height for grazing incidence

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

ROAD (0.00 + 33.75 + 0.00) = 33.75 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
69	90	0.21	63.96	0.00	-4.45	-11.08	0.00	0.00	-14.67	33.75

Segment Leq : 33.75 dBA

Total Leq All Segments: 54.90 dBA

♀
Results segment # 1: Withrow (night)

Source height = 1.50 m

Barrier height for grazing incidence

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

ROAD (0.00 + 30.00 + 0.00) = 30.00 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	-32	0.21	56.36	0.00	-4.45	-5.79	0.00	0.00	-16.11	30.00

Segment Leq : 30.00 dBA

♀
Results segment # 2: Withrow (night)

Source height = 1.50 m

ROAD (0.00 + 47.18 + 0.00) = 47.18 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-32	69	0.66	56.36	0.00	-6.11	-3.07	0.00	0.00	0.00	47.18

Segment Leq : 47.18 dBA

♀

Results segment # 3: Withrow (night)

Source height = 1.50 m

Barrier height for grazing incidence

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

ROAD (0.00 + 26.16 + 0.00) = 26.16 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
69	90	0.21	56.36	0.00	-4.45	-11.08	0.00	0.00	-14.67	26.16

Segment Leq : 26.16 dBA

Total Leq All Segments: 47.30 dBA

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TOTAL Leq FROM ALL SOURCES (DAY): 54.90
(NIGHT): 47.30

♀
♀

STAMSON 5.0 NORMAL REPORT Date: 08-09-2017 15:00:50
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: REC60.te Time Period: Day/Night 16/8 hours
Description: Reception Point 6-0

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

Car traffic volume	:	6477/563	veh/TimePeriod *
Medium truck volume	:	515/45	veh/TimePeriod *
Heavy truck volume	:	368/32	veh/TimePeriod *
Posted speed limit	:	40 km/h	
Road gradient	:	0 %	
Road pavement	:	1 (Typical asphalt or concrete)	

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

24 hr Traffic Volume (AADT or SADT)	:	8000
Percentage of Annual Growth	:	0.00
Number of Years of Growth	:	0.00
Medium Truck % of Total Volume	:	7.00
Heavy Truck % of Total Volume	:	5.00
Day (16 hrs) % of Total Volume	:	92.00

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

Angle1 Angle2	:	-90.00 deg	-73.00 deg
Wood depth	:	0	(No woods.)
No of house rows	:	0 / 0	
Surface	:	1	(Absorptive ground surface)
Receiver source distance	:	35.00 / 35.00	m
Receiver height	:	1.50 / 1.50	m
Topography	:	2	(Flat/gentle slope; with barrier)
Barrier angle1	:	-90.00 deg	Angle2 : -73.00 deg
Barrier height	:	7.50 m	
Barrier receiver distance	:	34.00 / 34.00	m
Source elevation	:	0.00 m	
Receiver elevation	:	0.00 m	
Barrier elevation	:	0.00 m	
Reference angle	:	0.00	

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

Car traffic volume	:	6477/563	veh/TimePeriod *
Medium truck volume	:	515/45	veh/TimePeriod *
Heavy truck volume	:	368/32	veh/TimePeriod *
Posted speed limit	:	40 km/h	
Road gradient	:	0 %	
Road pavement	:	1 (Typical asphalt or concrete)	

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

24 hr Traffic Volume (AADT or SADT)	:	8000
Percentage of Annual Growth	:	0.00
Number of Years of Growth	:	0.00
Medium Truck % of Total Volume	:	7.00
Heavy Truck % of Total Volume	:	5.00
Day (16 hrs) % of Total Volume	:	92.00

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

```
Angle1   Angle2           : -73.00 deg   34.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  35.00 / 35.00  m
Receiver height           :   1.50 / 1.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00
```

♀

```
Road data, segment # 3: Withrow (day/night)
-------------------------------------------
Car traffic volume  :  6477/563   veh/TimePeriod  *
Medium truck volume :   515/45    veh/TimePeriod  *
Heavy truck volume  :   368/32    veh/TimePeriod  *
Posted speed limit  :    40 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

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

    24 hr Traffic Volume (AADT or SADT):   8000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 3: Withrow (day/night)
-----------------------------------------
Angle1   Angle2           :  34.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  35.00 / 35.00  m
Receiver height           :   1.50 / 1.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            :  34.00 deg   Angle2 : 90.00 deg
Barrier height            :   7.50 m
Barrier receiver distance :  25.00 / 25.00  m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00
```

♀

```
Results segment # 1: Withrow (day)
----------------------------------

Source height = 1.50 m

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

ROAD (0.00 + 33.31 + 0.00) = 33.31 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90    -73   0.21  63.96   0.00  -4.45 -12.19   0.00   0.00 -14.00  33.31
-------------------------------------------------------------------------------
```

Segment Leq : 33.31 dBA

♀
Results segment # 2: Withrow (day)

Source height = 1.50 m

ROAD (0.00 + 54.95 + 0.00) = 54.95 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-73	34	0.66	63.96	0.00	-6.11	-2.89	0.00	0.00	0.00	54.95

Segment Leq : 54.95 dBA

♀
Results segment # 3: Withrow (day)

Source height = 1.50 m

Barrier height for grazing incidence

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

ROAD (0.00 + 38.54 + 0.00) = 38.54 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
34	90	0.21	63.96	0.00	-4.45	-5.97	0.00	0.00	-14.99	38.54

Segment Leq : 38.54 dBA

Total Leq All Segments: 55.08 dBA

♀
Results segment # 1: Withrow (night)

Source height = 1.50 m

Barrier height for grazing incidence

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

ROAD (0.00 + 25.72 + 0.00) = 25.72 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	-73	0.21	56.36	0.00	-4.45	-12.19	0.00	0.00	-14.00	25.72

Segment Leq : 25.72 dBA

♀
Results segment # 2: Withrow (night)

Source height = 1.50 m

ROAD (0.00 + 47.36 + 0.00) = 47.36 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-73	34	0.66	56.36	0.00	-6.11	-2.89	0.00	0.00	0.00	47.36

Segment Leq : 47.36 dBA

♀

Results segment # 3: Withrow (night)

Source height = 1.50 m

Barrier height for grazing incidence

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

ROAD (0.00 + 30.95 + 0.00) = 30.95 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
34	90	0.21	56.36	0.00	-4.45	-5.97	0.00	0.00	-14.99	30.95

Segment Leq : 30.95 dBA

Total Leq All Segments: 47.49 dBA

♀

TOTAL Leq FROM ALL SOURCES (DAY): 55.08
(NIGHT): 47.49

♀
♀

STAMSON 5.0 NORMAL REPORT Date: 08-09-2017 81:00:02
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: rec60a.te Time Period: Day/Night 16/8 hours
Description: Reception Point 6-0 with the houses constructed

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

Car traffic volume	: 6477/563	veh/TimePeriod *
Medium truck volume	: 515/45	veh/TimePeriod *
Heavy truck volume	: 368/32	veh/TimePeriod *
Posted speed limit	: 40 km/h	
Road gradient	: 0 %	
Road pavement	: 1 (Typical asphalt or concrete)	

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

24 hr Traffic Volume (AADT or SADT)	: 8000
Percentage of Annual Growth	: 0.00
Number of Years of Growth	: 0.00
Medium Truck % of Total Volume	: 7.00
Heavy Truck % of Total Volume	: 5.00
Day (16 hrs) % of Total Volume	: 92.00

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

Angle1 Angle2	: -90.00 deg	-73.00 deg
Wood depth	: 0	(No woods.)
No of house rows	: 0 / 0	
Surface	: 1	(Absorptive ground surface)
Receiver source distance	: 35.00 / 35.00	m
Receiver height	: 1.50 / 1.50	m
Topography	: 2	(Flat/gentle slope; with barrier)
Barrier angle1	: -90.00 deg	Angle2 : -73.00 deg
Barrier height	: 7.50 m	
Barrier receiver distance	: 34.00 / 34.00	m
Source elevation	: 0.00 m	
Receiver elevation	: 0.00 m	
Barrier elevation	: 0.00 m	
Reference angle	: 0.00	

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

Car traffic volume	: 6477/563	veh/TimePeriod *
Medium truck volume	: 515/45	veh/TimePeriod *
Heavy truck volume	: 368/32	veh/TimePeriod *
Posted speed limit	: 40 km/h	
Road gradient	: 0 %	
Road pavement	: 1 (Typical asphalt or concrete)	

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

24 hr Traffic Volume (AADT or SADT)	: 8000
Percentage of Annual Growth	: 0.00
Number of Years of Growth	: 0.00
Medium Truck % of Total Volume	: 7.00
Heavy Truck % of Total Volume	: 5.00
Day (16 hrs) % of Total Volume	: 92.00

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

```
Angle1   Angle2           : -73.00 deg   34.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      1 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  35.00 / 35.00  m
Receiver height           :   1.50 / 1.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00
```

♀

```
Road data, segment # 3: Withrow (day/night)
-------------------------------------------
Car traffic volume  :  6477/563   veh/TimePeriod  *
Medium truck volume :   515/45    veh/TimePeriod  *
Heavy truck volume  :   368/32    veh/TimePeriod  *
Posted speed limit  :    40 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

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

    24 hr Traffic Volume (AADT or SADT):   8000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 3: Withrow (day/night)
-----------------------------------------
Angle1   Angle2           :  34.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  35.00 / 35.00  m
Receiver height           :   1.50 / 1.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            :  34.00 deg   Angle2 : 90.00 deg
Barrier height            :   7.50 m
Barrier receiver distance :  25.00 / 25.00  m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00
```

♀

```
Results segment # 1: Withrow (day)
----------------------------------

Source height = 1.50 m

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

ROAD (0.00 + 33.31 + 0.00) = 33.31 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90    -73   0.21  63.96   0.00  -4.45 -12.19   0.00   0.00 -14.00  33.31
-------------------------------------------------------------------------------
```

Segment Leq : 33.31 dBA

♀
Results segment # 2: Withrow (day)

Source height = 1.50 m

ROAD (0.00 + 51.27 + 0.00) = 51.27 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-73	34	0.66	63.96	0.00	-6.11	-2.89	0.00	-3.68	0.00	51.27

Segment Leq : 51.27 dBA

♀
Results segment # 3: Withrow (day)

Source height = 1.50 m

Barrier height for grazing incidence

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

ROAD (0.00 + 38.54 + 0.00) = 38.54 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
34	90	0.21	63.96	0.00	-4.45	-5.97	0.00	0.00	-14.99	38.54

Segment Leq : 38.54 dBA

Total Leq All Segments: 51.56 dBA

♀
Results segment # 1: Withrow (night)

Source height = 1.50 m

Barrier height for grazing incidence

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

ROAD (0.00 + 25.72 + 0.00) = 25.72 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	-73	0.21	56.36	0.00	-4.45	-12.19	0.00	0.00	-14.00	25.72

Segment Leq : 25.72 dBA

♀
Results segment # 2: Withrow (night)

Source height = 1.50 m

ROAD (0.00 + 47.36 + 0.00) = 47.36 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-73	34	0.66	56.36	0.00	-6.11	-2.89	0.00	0.00	0.00	47.36

Segment Leq : 47.36 dBA

♀

Results segment # 3: Withrow (night)

Source height = 1.50 m

Barrier height for grazing incidence

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

ROAD (0.00 + 30.95 + 0.00) = 30.95 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
34	90	0.21	56.36	0.00	-4.45	-5.97	0.00	0.00	-14.99	30.95

Segment Leq : 30.95 dBA

Total Leq All Segments: 47.49 dBA

♀

TOTAL Leq FROM ALL SOURCES (DAY): 51.56
(NIGHT): 47.49

♀
♀

STAMSON 5.0 NORMAL REPORT Date: 08-09-2017 15:02:16
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: REC70.te Time Period: Day/Night 16/8 hours
Description: Reception Point 7-0

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

Car traffic volume : 6477/563 veh/TimePeriod *
Medium truck volume : 515/45 veh/TimePeriod *
Heavy truck volume : 368/32 veh/TimePeriod *
Posted speed limit : 40 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 8000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

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

Angle1 Angle2 : -90.00 deg -10.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
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 : -90.00 deg Angle2 : -10.00 deg
Barrier height : 7.50 m
Barrier receiver distance : 20.00 / 20.00 m
Source elevation : 0.00 m
Receiver elevation : 0.00 m
Barrier elevation : 0.00 m
Reference angle : 0.00

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

Car traffic volume : 6477/563 veh/TimePeriod *
Medium truck volume : 515/45 veh/TimePeriod *
Heavy truck volume : 368/32 veh/TimePeriod *
Posted speed limit : 40 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 8000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

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

```
Angle1   Angle2           : -10.00 deg   42.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  85.00 / 85.00  m
Receiver height           :   1.50 / 1.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00
```

♀

```
Road data, segment # 3: Withrow (day/night)
-------------------------------------------
Car traffic volume  :  6477/563   veh/TimePeriod  *
Medium truck volume :   515/45    veh/TimePeriod  *
Heavy truck volume  :   368/32    veh/TimePeriod  *
Posted speed limit  :    40 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

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

    24 hr Traffic Volume (AADT or SADT):   8000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 3: Withrow (day/night)
-----------------------------------------
Angle1   Angle2           :  42.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
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            :  42.00 deg   Angle2 : 90.00 deg
Barrier height            :   7.50 m
Barrier receiver distance :  60.00 / 60.00  m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00
```

♀

```
Results segment # 1: Withrow (day)
----------------------------------

Source height = 1.50 m

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

ROAD (0.00 + 36.97 + 0.00) = 36.97 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90    -10   0.21  63.96   0.00  -9.12  -4.16   0.00   0.00 -13.71  36.97
-------------------------------------------------------------------------------
```

Segment Leq : 36.97 dBA

♀
Results segment # 2: Withrow (day)

Source height = 1.50 m

ROAD (0.00 + 45.84 + 0.00) = 45.84 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-10	42	0.66	63.96	0.00	-12.51	-5.61	0.00	0.00	0.00	45.84

Segment Leq : 45.84 dBA

♀
Results segment # 3: Withrow (day)

Source height = 1.50 m

Barrier height for grazing incidence

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

ROAD (0.00 + 36.24 + 0.00) = 36.24 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
42	90	0.21	63.96	0.00	-9.12	-6.77	0.00	0.00	-11.83	36.24

Segment Leq : 36.24 dBA

Total Leq All Segments: 46.77 dBA

♀
Results segment # 1: Withrow (night)

Source height = 1.50 m

Barrier height for grazing incidence

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

ROAD (0.00 + 29.38 + 0.00) = 29.38 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	-10	0.21	56.36	0.00	-9.12	-4.16	0.00	0.00	-13.71	29.38

Segment Leq : 29.38 dBA

♀
Results segment # 2: Withrow (night)

Source height = 1.50 m

ROAD (0.00 + 38.25 + 0.00) = 38.25 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-10	42	0.66	56.36	0.00	-12.51	-5.61	0.00	0.00	0.00	38.25

Segment Leq : 38.25 dBA

♀

Results segment # 3: Withrow (night)

Source height = 1.50 m

Barrier height for grazing incidence

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

ROAD (0.00 + 28.65 + 0.00) = 28.65 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
42	90	0.21	56.36	0.00	-9.12	-6.77	0.00	0.00	-11.83	28.65

Segment Leq : 28.65 dBA

Total Leq All Segments: 39.18 dBA

♀

TOTAL Leq FROM ALL SOURCES (DAY): 46.77
(NIGHT): 39.18

♀
♀