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ENVIRONMENTAL NOISE IMPACT STUDY - **Project: 21370.00**

Proposed Residential Development
Queenswood Church

Ottawa, Ontario

Prepared for:

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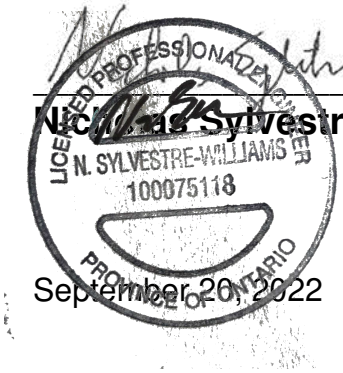

September 20, 2022

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1 Introduction

KPMB Architects has retained the services of Aercoustics Engineering Limited (Aercoustics) to prepare an Environmental Noise Impact Study E(NIS) in support Site Plan Approval for Queenswood United Church Residential development at 360 Kennedy Ln E in Ottawa ON.

It is Aercoustics understanding that the City of Ottawa has required the following: *A road noise study is required since the site in withing 100m of a collector (Prestone Drive).*

The purpose of this study was to examine the existing and future noise environment in the development area and evaluate its impact potential on future noise sensitive receptors. This study also investigates the noise controls required for the development to meet the noise guidelines of the Ontario Ministry of the Environment Conservation, and Parks (MECP) and to satisfy the requirements of the Municipality. This report considered the MECP guideline NPC-300 "*Stationary and Transportation Sources – Approval and Planning"* (August 2013).

Figure 1 provides a key plan showing the proposed development location.

Figure 1: Key Plan

Figure 2 (in Section 3.1) shows the Site Plan of the proposed development with road traffic noise calculation locations indicated. The Draft Plan of Subdivision for the project was prepared by KPMB Architects.

The proposed site is located at the SE side of Kennedy Ln E and to the south of the existing church. There is a local park to the south of the proposed development and residential area to the west, east and south (beyond Queenswood Ridge Park).

The major existing noise source in the area of study is road traffic Promenade Prestone Drive and Tompkins Avenue. No other significant noise sources have been noted in the area.

This report is based on the following information:

- Draft Plan Site Plan prepared by KPMB in October 2021
- Road traffic information provided by the City of Ottawa, and
- Google images and maps

2 Guidelines and Criteria

2.1 Transportation Noise – Outdoor Living Area (OLA)

MECP Guidelines recommend that equivalent noise levels (Leq-16hr) in outdoor living areas should not exceed 55 dBA. Predicted noise levels between 55 dBA and 60 dBA may be acceptable provided that the future occupants of the building are made aware of the potential noise problems through appropriate warning clauses. Noise levels above 60 dBA are generally not acceptable.

2.2 Transportation Noise – Indoor Living Spaces

Indoor noise levels due to road traffic were examined with respect to the MECP Guidelines. Bedrooms are required to meet an indoor Leq-8hr of 40 dBA from road traffic. The indoor equivalent noise level (Leq-16hr) due to road traffic should not exceed 45 dBA for living or dining rooms. Lounges, lobbies, retail or general office spaces should meet the indoor noise level of 50 dBA from road traffic. In order to achieve these levels, the MECP Guidelines provide a basis for the types of windows, exterior walls, and doors that will be required based on projected outdoor noise levels.

The MECP also requires that a central air conditioning system be installed for dwellings when the daytime or nighttime outdoor transportation noise levels at the façade of the dwelling are above 65 dBA or 60 dBA, respectively. The provision for the future installation of central air conditioning must be made if:

- the nighttime sound level is greater than 50 dBA and less than or equal to 60 dBA on the outside face of a bedroom window;
- the daytime sound level is greater than 55 dBA and less than or equal to 65 dBA on the outside face of a bedroom window; or
- the daytime sound level is greater than 55 dBA and less than or equal to 65 dBA on the outside face of a living/dining room window.

This provision involves a ducted heating system sized to accommodate the addition of central air conditioning by the occupant.

The required limits as per the NPC-300 noise guidelines are summarized in Table 1 below.

Table 1: Indoor Noise Limits Due to Road Traffic

Type of Space	Time Period	Minimum LEQ (dBA) Road Traffic
Living/dining, den areas of residences, hospitals, nursing homes, schools, day-care centres (Indoor)	07:00 – 23:00	45 dBA
Living/dining, den areas of residences, hospitals, nursing homes (Indoor)	23:00 – 07:00	45 dBA
Sleeping quarters (Indoor)	07:00 – 23:00	45 dBA
	23:00 – 07:00	40 dBA
Outdoor Living Areas (OLA)	07:00 – 23:00	55 dBA

3 Noise Level Predictions Procedures and Data

3.1 Road Traffic Noise Calculations Procedure

The dominant road traffic source in the proposed development is Promenade Prestone Drive and Tompkins Avenue.

Noise level calculations were performed in accordance with the MECP Guidelines and by the Guidelines of the Ontario Road Noise Analysis Method for Environment and Transportation (ORNAMENT). Sample copies of the traffic noise predictions from MECP's Road and Rail Traffic Noise Prediction Model STAMSON (Version 5.04) are included in Appendix B.

The equivalent sound levels (Leq) due to road traffic were calculated at worst case noise sensitive receptors in the proposed development. Calculations were performed for both daytime and nighttime conditions at receiver heights representing 1st and 3rd storey receptors respectively. Also, critical locations of the outdoor living areas (OLAs) have been investigated.

Calculation locations A and B, shown in Figure 2 below represent the 'worst case noise sensitive receptors' within the proposed development.

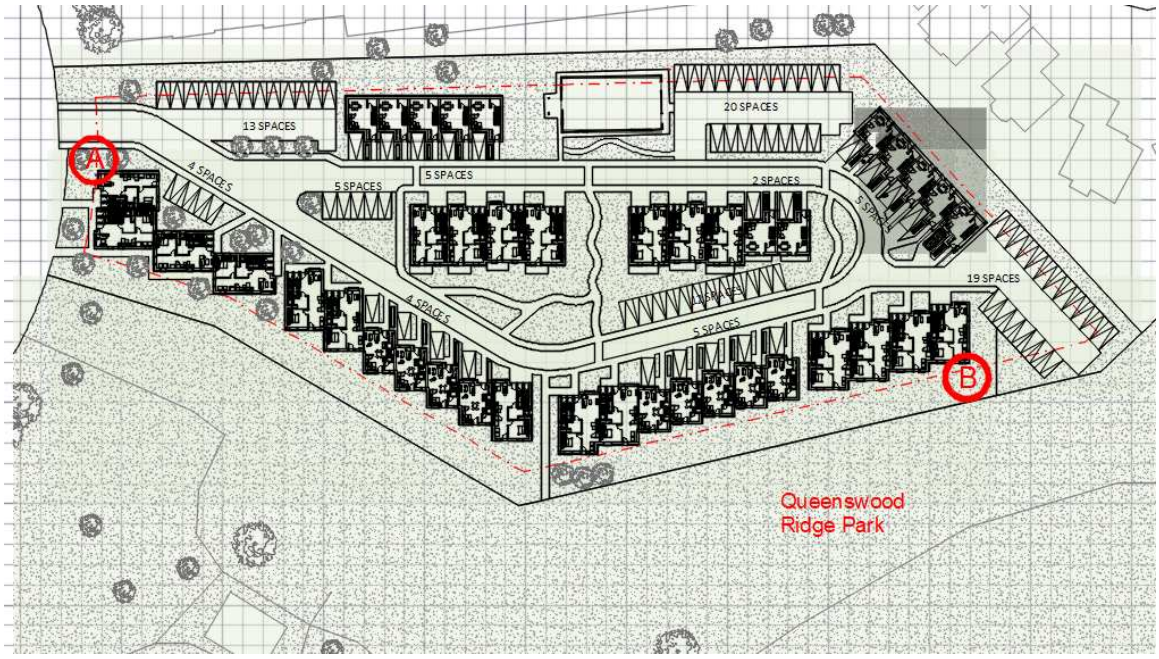

Figure 2: Site Plan showing Critical Calculation Locations

3.2 Road Traffic Data

Road traffic noise predictions were based on the road traffic data outlined in Table 3 below. The road traffic volumes for Promenade Prestone Drive and Thompkins Avenue were obtained from the City of Ottawa. Copies of the correspondence and received data are included in Appendix A.

Note that a 2% annual growth factor has been applied to calculate future, 10 years from now, AADTs for both roads.

Table 2: Road Traffic Volumes

	Promenade Prestone Drive	Tompkins Avenue
AADT	3570 (year 2015)	3240 (year 2018)
Day/Night Split (%)	90/10	90/10
Percentage of Trucks (%)	4.5%	2%
Medium/Heavy Ratio (%)	50/50	50/50
Posted Speed (km/hr)	40	40

4 Transportation Noise Predictions

Table 3 below, list the daytime and nighttime unmitigated sound levels due to the road traffic in the area. The results are predicted at a critical noise sensitive locations, Locations A and B are shown in Figure 2 of this report. Sample calculations are provided in Appendix A.

Table 3: Calculated Unmitigated Noise Levels Due to Road Traffic

Calculation Location (Figure 2)	Lot Number/ Description	Leq (dBA)		
		Day	Night	Unmitigated OLA
A	NW end of proposed development	38	33	n/a
B	SE corner of proposed development	46	41	45

The noise levels listed in the table above were used to determine the window glazing as well as exterior wall requirements for each designated point of reception. These requirements were based on assumed 32% ratios of window surface area to the floor area.

5 Transportation Noise Control Recommendations

5.1 Transportation Noise – Outdoor Living Spaces

Outdoor sound levels were examined with respect to MECP Guidelines as summarized in Section 2 of this report.

The critical Outdoor Living Areas (OLA), namely backyards adjacent to Queenswood Ridge Park and possibly having line of sight with traffic on Promenade Preston Drive and/or Tompkins Avenue are considered in this report. They are represented by calculation location B.

Based on the sound level predictions none of OLAs are predicted to have a sound level from road traffic noise of more than 55 dBA, therefore no noise controls are not required for this proposed development.

5.2 Transportation Noise – Indoor Living Spaces

Indoor sound levels were examined with respect to MECP Guidelines as summarized in Section 2 of this report.

Based on the sound level predictions, the project does not require any upgrades to the building envelopes of the proposed dwellings nor central air conditioning is required for

any of the dwellings. The construction of the dwellings meeting general requirements of the Ontario Building Code (OBC) will also suffice for the noise control reasons.

Table 5: Summary of Traffic Noise Control Recommendations

Location	Daytime STC(*)	Nighttime STC(*)	Central Air Conditioning	Acoustic Barriers	Warning Clauses
All dwelling units	OBC	OBC	OBC	Not required	Not required

(*) Window Glazing STC is based on an assumed window-to-floor ration of 32%, this needs to be verified once the final architectural design of the project becomes available
OBC indicates window/door glazing that meets minimum Ontario Building Code requirements, no upgrades are needed for noise control reasons

The results of this study indicate the proposed dwellings are predicted to be in compliance with the MECP and the municipality criteria for indoor sound levels given that the recommendations listed in Table 5 above are implemented.

6 References

1. ORNAMENT – “Ontario Road Noise Analysis Method for Environmental and Transportation”, Ontario Ministry of the Environment, October 1989.

2. “Stationery and Transportation Sources – Approval and Planning”, Ontario Ministry of the Environment, Publication NPC-300, August 2013.

Appendix A
Road Traffic Data and Sample Calculations

```
STAMSON 5.0        NORMAL REPORT        Date: 20-09-2022 11:52:06
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: A_new.te             Time Period: Day/Night 16/8 hours
Description:


Road data, segment # 1: Presone2rows (day/night)
-----------------------------------------------
Car traffic volume  :  4212/468   veh/TimePeriod  *
Medium truck volume :   110/12    veh/TimePeriod  *
Heavy truck volume  :    88/10    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):   3570
    Percentage of Annual Growth        :   2.00
    Number of Years of Growth          :  16.00
    Medium Truck % of Total Volume     :   2.50
    Heavy Truck  % of Total Volume     :   2.00
    Day (16 hrs) % of Total Volume     :  90.00

Data for Segment # 1: Presone2rows (day/night)
-----------------------------------------------
Angle1   Angle2           : -60.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      2 / 2
House density             :     65 %
Surface                   :      1       (Absorptive ground
surface)
Receiver source distance  : 100.00 / 100.00 m
Receiver height           :   1.50 / 7.50   m
Topography                :      1       (Flat/gentle slope; no
barrier)
Reference angle           :   0.00

Results segment # 1: Presone2rows (day)
---------------------------------------

Source height = 1.19 m

ROAD (0.00 + 37.64 + 0.00) = 37.64 dBA
```

```
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj
B.Adj SubLeq
-------------------------------------------------------------------
-----------
   -60     90   0.66  58.62   0.00 -13.68  -1.87   0.00  -5.43
0.00  37.64
-------------------------------------------------------------------
-----------

Segment Leq : 37.64 dBA

Total Leq All Segments: 37.64 dBA

Results segment # 1: Presone2rows (night)
-----------------------------------------

Source height = 1.20 m

ROAD (0.00 + 32.79 + 0.00) = 32.79 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj
B.Adj SubLeq
-------------------------------------------------------------------
-----------
   -60     90   0.49  52.13   0.00 -12.27  -1.64   0.00  -5.43
0.00  32.79
-------------------------------------------------------------------
-----------

Segment Leq : 32.79 dBA

Total Leq All Segments: 32.79 dBA



TOTAL Leq FROM ALL SOURCES (DAY): 37.64
                           (NIGHT): 32.79
```

```
STAMSON 5.0        NORMAL REPORT        Date: 20-09-2022 11:37:12
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: B_new.te             Time Period: Day/Night 16/8 hours
Description:


Road data, segment # 1: Prestone opn (day/night)
-----------------------------------------------
Car traffic volume  :  4212/468   veh/TimePeriod  *
Medium truck volume :   110/12    veh/TimePeriod  *
Heavy truck volume  :    88/10    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):   3570
    Percentage of Annual Growth        :   2.00
    Number of Years of Growth          :  16.00
    Medium Truck % of Total Volume     :   2.50
    Heavy Truck  % of Total Volume     :   2.00
    Day (16 hrs) % of Total Volume     :  90.00

Data for Segment # 1: Prestone opn (day/night)
-----------------------------------------------
Angle1   Angle2           : -90.00 deg   45.00 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 / 7.50   m
Topography                :      1       (Flat/gentle slope; no
barrier)
Reference angle           :   0.00
```

```
Road data, segment # 2: Prestone 2r (day/night)
-----------------------------------------------
Car traffic volume  :  4212/468   veh/TimePeriod  *
Medium truck volume :   110/12    veh/TimePeriod  *
Heavy truck volume  :    88/10    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):   3570
    Percentage of Annual Growth        :   2.00
    Number of Years of Growth          :  16.00
    Medium Truck % of Total Volume     :   2.50
    Heavy Truck  % of Total Volume     :   2.00
    Day (16 hrs) % of Total Volume     :  90.00

Data for Segment # 2: Prestone 2r (day/night)
-----------------------------------------------
Angle1   Angle2           :  45.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      2 / 2
House density             :     65 %
Surface                   :      1       (Absorptive ground
surface)
Receiver source distance  :  70.00 / 70.00  m
Receiver height           :   1.50 / 7.50   m
Topography                :      1       (Flat/gentle slope; no
barrier)
Reference angle           :   0.00


Road data, segment # 3: Tompkins3rws (day/night)
-----------------------------------------------
Car traffic volume  :  3697/411   veh/TimePeriod  *
Medium truck volume :    38/4     veh/TimePeriod  *
Heavy truck volume  :    38/4     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):   3240
    Percentage of Annual Growth        :   2.00
```

```
    Number of Years of Growth          :  13.00
    Medium Truck % of Total Volume     :   1.00
    Heavy Truck  % of Total Volume     :   1.00
    Day (16 hrs) % of Total Volume     :  90.00

Data for Segment # 3: Tompkins3rws (day/night)
-----------------------------------------------
Angle1   Angle2           : -90.00 deg   -45.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      3 / 3
House density             :     65 %
Surface                   :      1       (Absorptive ground
surface)
Receiver source distance  : 130.00 / 130.00 m
Receiver height           :   1.50 / 7.50   m
Topography                :      1       (Flat/gentle slope; no
barrier)
Reference angle           :   0.00


Road data, segment # 4: Tompkins opn (day/night)
-------------------------------------------------
Car traffic volume  :  3697/411   veh/TimePeriod  *
Medium truck volume :    38/4     veh/TimePeriod  *
Heavy truck volume  :    38/4     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):   3240
    Percentage of Annual Growth        :   2.00
    Number of Years of Growth          :  13.00
    Medium Truck % of Total Volume     :   1.00
    Heavy Truck  % of Total Volume     :   1.00
    Day (16 hrs) % of Total Volume     :  90.00

Data for Segment # 4: Tompkins opn (day/night)
-----------------------------------------------
Angle1   Angle2           : -45.00 deg   15.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground
surface)
Receiver source distance  : 130.00 / 130.00 m
```

```
Receiver height           :   1.50 / 7.50   m
Topography                :      1       (Flat/gentle slope; no
barrier)
Reference angle           :   0.00

Road data, segment # 5: Tompkins2rws (day/night)
-----------------------------------------------
Car traffic volume  :  3697/411   veh/TimePeriod  *
Medium truck volume :    38/4     veh/TimePeriod  *
Heavy truck volume  :    38/4     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):   3240
    Percentage of Annual Growth        :   2.00
    Number of Years of Growth          :  13.00
    Medium Truck % of Total Volume     :   1.00
    Heavy Truck  % of Total Volume     :   1.00
    Day (16 hrs) % of Total Volume     :  90.00

Data for Segment # 5: Tompkins2rws (day/night)
-----------------------------------------------
Angle1   Angle2           :  15.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      2 / 2
House density             :     65 %
Surface                   :      1       (Absorptive ground
surface)
Receiver source distance  : 130.00 / 130.00 m
Receiver height           :   1.50 / 7.50   m
Topography                :      1       (Flat/gentle slope; no
barrier)
Reference angle           :   0.00


Results segment # 1: Prestone opn (day)
---------------------------------------

Source height = 1.19 m

ROAD (0.00 + 45.22 + 0.00) = 45.22 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj
B.Adj SubLeq
```

```
-----------------------------------------------------------------
-----------
   -90     45   0.66  58.62   0.00 -11.11  -2.29   0.00   0.00
0.00  45.22
-----------------------------------------------------------------
-----------

Segment Leq : 45.22 dBA


Results segment # 2: Prestone 2r (day)
--------------------------------------

Source height = 1.19 m

ROAD (0.00 + 32.98 + 0.00) = 32.98 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj
B.Adj SubLeq
-----------------------------------------------------------------
-----------
    45     90   0.66  58.62   0.00 -11.11  -9.05   0.00  -5.48
0.00  32.98
-----------------------------------------------------------------
-----------

Segment Leq : 32.98 dBA


Results segment # 3: Tompkins3rws (day)
---------------------------------------

Source height = 1.00 m

ROAD (0.00 + 24.60 + 0.00) = 24.60 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj
B.Adj SubLeq
-----------------------------------------------------------------
-----------
   -90    -45   0.66  56.10   0.00 -15.57  -9.05   0.00  -6.88
0.00  24.60
-----------------------------------------------------------------
-----------

Segment Leq : 24.60 dBA
```

```
Results segment # 4: Tompkins opn (day)
---------------------------------------

Source height = 1.00 m

ROAD (0.00 + 35.53 + 0.00) = 35.53 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj
B.Adj SubLeq
-------------------------------------------------------------------
-----------
   -45     15   0.66  56.10   0.00 -15.57  -5.01   0.00   0.00
0.00  35.53
-------------------------------------------------------------------
-----------

Segment Leq : 35.53 dBA


Results segment # 5: Tompkins2rws (day)
---------------------------------------

Source height = 1.00 m

ROAD (0.00 + 29.54 + 0.00) = 29.54 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj
B.Adj SubLeq
-------------------------------------------------------------------
-----------
    15     90   0.66  56.10   0.00 -15.57  -5.61   0.00  -5.38
0.00  29.54
-------------------------------------------------------------------
-----------

Segment Leq : 29.54 dBA

Total Leq All Segments: 46.02 dBA


Results segment # 1: Prestone opn (night)
-----------------------------------------

Source height = 1.20 m

ROAD (0.00 + 40.09 + 0.00) = 40.09 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj
B.Adj SubLeq
```

```
-------------------------------------------------------------------
-----------
   -90     45   0.49  52.13   0.00  -9.96  -2.07   0.00   0.00
0.00  40.09
-------------------------------------------------------------------
-----------

Segment Leq : 40.09 dBA


Results segment # 2: Prestone 2r (night)
----------------------------------------

Source height = 1.20 m

ROAD (0.00 + 28.33 + 0.00) = 28.33 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj
B.Adj SubLeq
-------------------------------------------------------------------
-----------
    45     90   0.49  52.13   0.00  -9.96  -8.36   0.00  -5.48
0.00  28.33
-------------------------------------------------------------------
-----------

Segment Leq : 28.33 dBA


Results segment # 3: Tompkins3rws (night)
-----------------------------------------

Source height = 0.99 m

ROAD (0.00 + 20.16 + 0.00) = 20.16 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj
B.Adj SubLeq
-------------------------------------------------------------------
-----------
   -90    -45   0.50  49.45   0.00 -14.02  -8.38   0.00  -6.88
0.00  20.16
-------------------------------------------------------------------
-----------

Segment Leq : 20.16 dBA
```

```
Results segment # 4: Tompkins opn (night)
------------------------------------------

Source height = 0.99 m

ROAD (0.00 + 30.48 + 0.00) = 30.48 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj
B.Adj SubLeq
-------------------------------------------------------------------
-----------
   -45     15   0.50  49.45   0.00 -14.02  -4.95   0.00   0.00
0.00  30.48
-------------------------------------------------------------------
-----------

Segment Leq : 30.48 dBA


Results segment # 5: Tompkins2rws (night)
------------------------------------------

Source height = 0.99 m

ROAD (0.00 + 24.81 + 0.00) = 24.81 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj
B.Adj SubLeq
-------------------------------------------------------------------
-----------
    15     90   0.50  49.45   0.00 -14.02  -5.24   0.00  -5.38
0.00  24.81
-------------------------------------------------------------------
-----------

Segment Leq : 24.81 dBA

Total Leq All Segments: 40.94 dBA




TOTAL Leq FROM ALL SOURCES (DAY): 46.02
                           (NIGHT): 40.94
```

End of Report