ENVIRONMENTAL NOISE IMPACT STUDY

"STEVEN STREET HOUSING CO-OP"
16 STEVEN STREET
HAMILTON, ON

Prepared For:

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Our File No: 21-2224

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1.0 INTRODUCTION

dBA Acoustical Consultants Inc. has been requested to provide an environmental noise impact study on behalf of T. Johns Consulting Group, for Steven Street Housing Co-op at 16 Steven Street, Hamilton, ON for the re-adaptive use of the existing 3-storey building.

The purpose of the study is to determine the noise impact from King Street East, Main Street East, Wentworth Street North, and Wilson Street vehicular traffic that may impact the proposed 3-storey residential building, as required for draft plan approval for the City of Hamilton.

This study will detail noise impact relative to the site plan and recommend noise control measures necessary (if applicable) to meet MECP Publication NPC-300 entitled "Stationary & Transportation Sources-Approval & Planning guidelines while satisfying the planning requirements of the City of Hamilton. See attached Figure 1 Site Location.

2.0 SITE DESCRIPTION

Proposed is a re-adaptive use of the existing 3-storey building, which will consist of 15 residential apartment units. There will not be changes to the existing exterior structure, only internal modifications. There is proposed an outdoor community greenspace (BBQ, garden, picnic table) on the east side of the property. See attached Figure 2 Site Plan.

The proposed site property is located approximately 8m east of the center line of Steven Street. To the north is King William Street, due to low traffic volumes this roadway will not have an acoustical impact on the proposed site development. To the south, approximately 60m, is King Street East, approximately 279m south is Main Street East, approximately 231m east is Wentworth Street North, and approximately 181m north is Wilson Street.

Surrounding the proposed site development are existing 2-3-storey residential properties separating Wentworth Street North and Wilson Street. These residential properties provide ample shielding from both roadways which has been confirmed by the attached Stamson traffic calculation sheets and have no acoustical impact on the proposed site development. King Street East and Main Street East are considered the major road noise for the site development. Both roadways have shielding from existing large commercial/residential building along both roadways. There are no area stationary noise sources that will have an impact on the proposed site. See attached Figure 1 Site Location.

3.0 NOISE IMPACT ASSESSMENT

3.1 NOISE CRITERIA

The Ministry of Environment, Conservation & Parks (MECP) specifies limits for road noise relative to new residential developments. The MECP Publication NPC-300 entitled "Stationary & Transportation Sources-Approval & Planning, specifies the criteria, summarized as follows:

TABLE1- Road Traffic Sound Levels Limits	
Time Period	Leq (dBA)
07:00 – 23:00 (16 hr.)	55 Outdoor Living area
	55 Plane of Window
23:00 – 07:00 (8 hr.)	50 Plane of Bedroom window

The OLA refers to an outdoor patio, a backyard, a terrace or other area where outdoor passive recreation is expected. Noise levels are calculated at the upper storey bedroom window to represent nighttime (23:00-0700) periods.

Where noise levels estimated in the (OLA) and at the first-floor window, (POW) are equal to or less than the values listed in Table 1, no noise control measures are required. Where noise levels exceed Table 1 values, the following action is required:

TABLE 2 –Noise Control Requirements		
Time Period	Noise Level Leq (dBA)	Action Required
07:00 - 23:00 Daytime (OLA)	56 to 60	Warning Clause Type "A"
	> 60	Barrier & Warning Clause Type "B"
07:00 – 23:00 Daytime (POW)	>55	Provision for A/C, Warning Clause "C"
	>65	Central A/C, Warning Clause "D"
	>65	Building Component Specification
23:00 to 07:00 Nighttime (POW)	> 50	Provision for A/C and Warning Clause Type "C"
	> 60	Building Component Specification
	> 60	Central Air and Warning Clause Type "D"

Where nighttime noise levels exceed 60 dBA, building components must be designed to meet Table 3 indoor sound level limits.

TABLE 3 - Indoor Road Sound Levels Limits		
Indoor Location	Leq (dBA)	
	Road	Rail
Living/Dining 7:00 – 23:00	45	N/A
Bedroom 23:00 - 07:00	40	N/A

3.2 ROAD NOISE

Predicted road traffic noise levels were calculated for King Street East, Main Street East, Wentworth Street North and Wilson Street, the major road noise source in the site development area. Road traffic volumes for King Street East, 2017, Main Street East, 2019, Wentworth Street East, (2019) and Wilson Street, (2018) AADT (Annual Average Daily Traffic) were sourced from the City of Hamilton MS2 Transportation Data Management System webpage. See Appendix "A".

The MOE computer program STAMSON version 5.04 was used to carry out prediction calculations and the traffic data is summarized in Table 4. The daytime/nighttime volume ratios relative to all roadways were calculated using a 90/10 split. (See Appendix "A")

King Street East and Main Street East are both one way, 4-lane roadways with roadside parking and has a maximum posted speed for all vehicles of 50 km/hr. The percentage of annual growth for all roadways was figured at 2.0% and forecasted until the year 2032. The AADT (Annual Average Daily Traffic) volumes were used and are reflective as the worst-case scenario. Truck volumes on all roadways were factored at 2.0% medium and 2.0% heavy of the total vehicle volumes and Table 5 summarizes the "free field" traffic noise prediction results, modeled at 2 receptor location representatives of the north façade first and third floor and east OLA. (See Figure 3 Receptor Location).

TABLE 4 – Future Road Traffic Volumes			
King Street East	AADT 28845 Vehicles		
	Cars	Medium Trucks	Heavy Trucks
Day	24922	519	519
Night	2769	58	58
TABLE 4 – Future Road Traffic Volumes			
Main Street East	AADT 35968 Vehicles		
	Cars	Medium Trucks	Heavy Trucks
Day	31076	647	647
Night	3453	72	72

TABLE 4 – Future Road Traffic Volumes			
Wentworth Street North	AADT 8205 Vehicles		
	Cars	Medium Trucks	Heavy Trucks
Day	7089	148	148
Night	788	16	16
Wilson Street	AADT 10803 Vehicles		
	Cars	Medium Trucks	Heavy Trucks
Day	9333	194	194
Night	1037	22	22

The following Table 5A summarizes the King Street East "free field" traffic noise prediction results, modeled at 2 receptor location represents the south façades and OLA's within the proposed development (See Figure 3 Receptor Locations).

TABLE 5A – Predicted King Street East Future Traffic Noise (dBA)		
Location	07:00 – 23:00	23:00 – 07:00
R1 – South Façade 1st Floor and OLA	47 (2m)	40 (2m)
R2 – South Façade 3rd Floor	55 (12m)	48 (12m)

The following Table 5B summarizes the Main Street East "free field" traffic noise prediction results, modeled at 2 receptor location represents the south façades and OLA's within the proposed development (See Figure 3 Receptor Locations).

TABLE 5B – Predicted Main Street East Future Traffic Noise (dBA)		
Location	07:00 – 23:00	23:00 – 07:00
R1 – South Façade 1st Floor and OLA	33 (2m)	27 (2m)
R2 – South Façade 3rd Floor	47 (12m)	41 (12m)

The following Table 5C summarizes the Wentworth Street North "free field" traffic noise prediction results, modeled at 2 receptor location represents the south façades and OLA's within the proposed development (See Figure 3 Receptor Locations).

TABLE 5C – Predicted Wentworth Street North Future Traffic Noise (dBA)		
Location	07:00 – 23:00	23:00 – 07:00
R1 – South Façade 1st Floor and OLA	23 (2m)	16 (2m)
R2 – South Façade 3rd Floor	41 (12m)	35 (12m)

The following Table 5D summarizes the Wilson Street "free field" traffic noise prediction results, modeled at 2 receptor location represents the south façades and OLA's within the proposed development (See Figure 3 Receptor Locations).

TABLE 5D – Predicted Wilson Street Future Traffic Noise (dBA)		
Location	07:00 – 23:00	23:00 – 07:00
R1 – South Façade 1st Floor and OLA	31 (2m)	24 (2m)
R2 – South Façade 3rd Floor	44 (12m)	37 (12m)

The following Table 5E summarizes the Combined "free field" traffic noise prediction results, modeled at 2 receptor location represents the south façades and OLA's within the proposed development (See Figure 3 Receptor Locations).

TABLE 5E – Predicted Combined Future Traffic Noise (dBA)		
Location	07:00 – 23:00	23:00 – 07:00
R1 – South Façade 1st Floor and OLA	47 (2m)	41 (2m)
R2 – South Façade 3rd Floor	56 (12m)	50 (12m)

4.0 RECOMMENDATIONS - NOISE CONTROL

4.1 OUTDOOR NOISE LEVELS

Calculated daytime road noise levels at the Plane of Window (POW) do not exceed the 55 dBA daytime for R1, however noise levels for R2 do exceed the 55 dBA this criterion is outlined in Table 1. Calculated road noise levels do not exceed the 55 dBA for the New Community Greenspace Outdoor Living Area (OLA). As a result, traffic noise levels are below the limits indicated in Table 1, no noise mitigation are required for the New Community Greenspace Outdoor Living Area (OLA).

4.2 INDOOR NOISE LEVELS

Calculated nighttime road noise levels at the Plane of Window (POW) do not exceed 50 dBA criteria outlined in Table 1 indoor spaces any proposed residential units throughout the development. Specific building components (walls, windows, doors etc.) are not required for the building therefore, Ontario Building Code (OBC) will suffice.

5.0 VENTILATION / WARNING CLAUSES

Ventilation and warning clauses requirements are not required; however, an existing rooftop HVAC unit will provide central air conditioning for all residential units.

6.0 SUMMARY OF RECOMMENDATIONS

The following noise control measures are required to satisfy the indoor and outdoors noise level criterion:

- Ontario Building Code (OBC) is required for all windows throughout the building.

7.0 CONCLUSIONS

dBA Acoustical Consultants Inc. has provided an environmental noise impact study on behalf of T. Johns Consulting Group, for Steven Street Housing Co-op at 16 Steven Street, Hamilton, ON for the re-adaptive use of the existing 3-storey building.

This study has determined the noise impact from King Street East, Main Street East, Wentworth Street North, and Wilson Street vehicular traffic at the proposed 3-storey residential building, as required for draft plan approval for the City of Hamilton.

This study detailed noise impact relative to the site plan and recommended OBC requirements necessary to meet MECP Publication NPC-300 entitled “Stationary & Transportation Sources-Approval & Planning guidelines while satisfying the planning requirements of the City of Hamilton.

FIGURE 1
SITE LOCATION

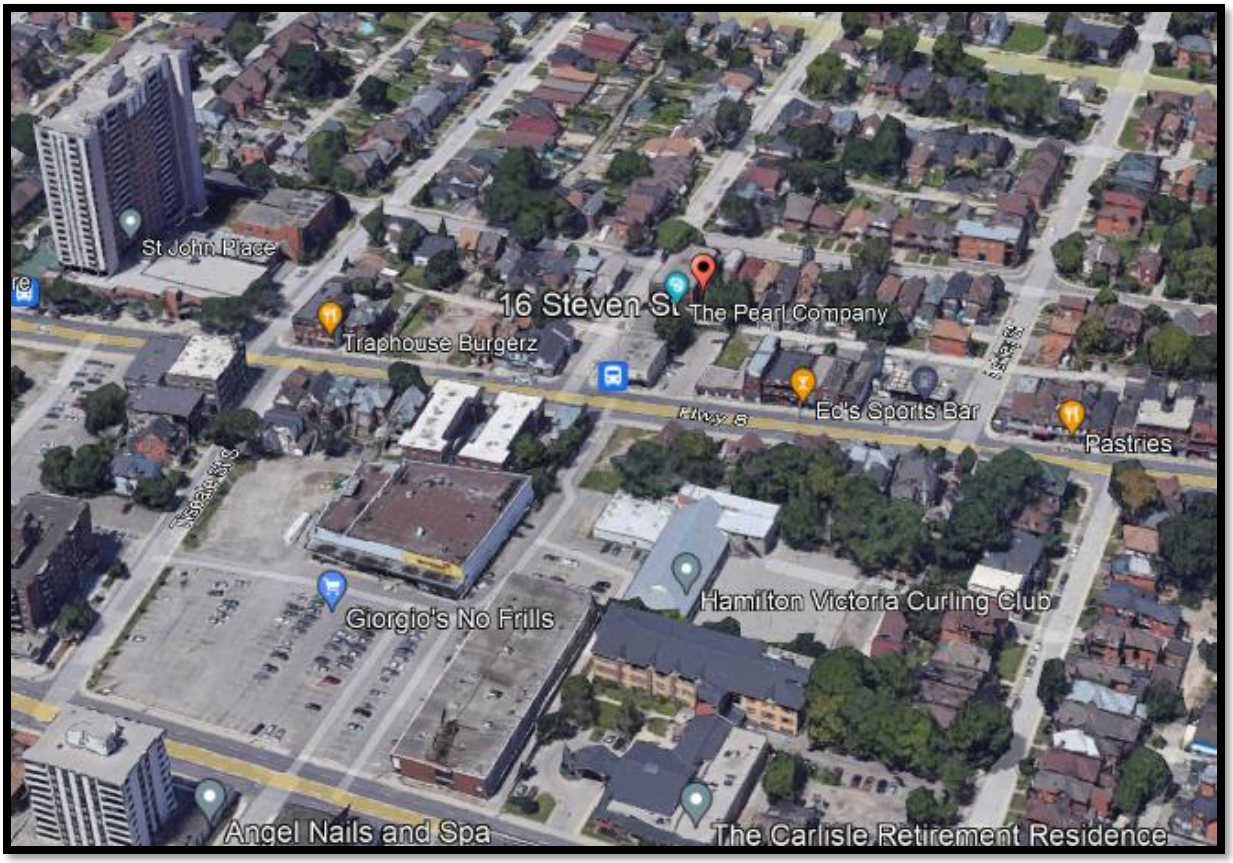


FIGURE 2
SITE PLAN

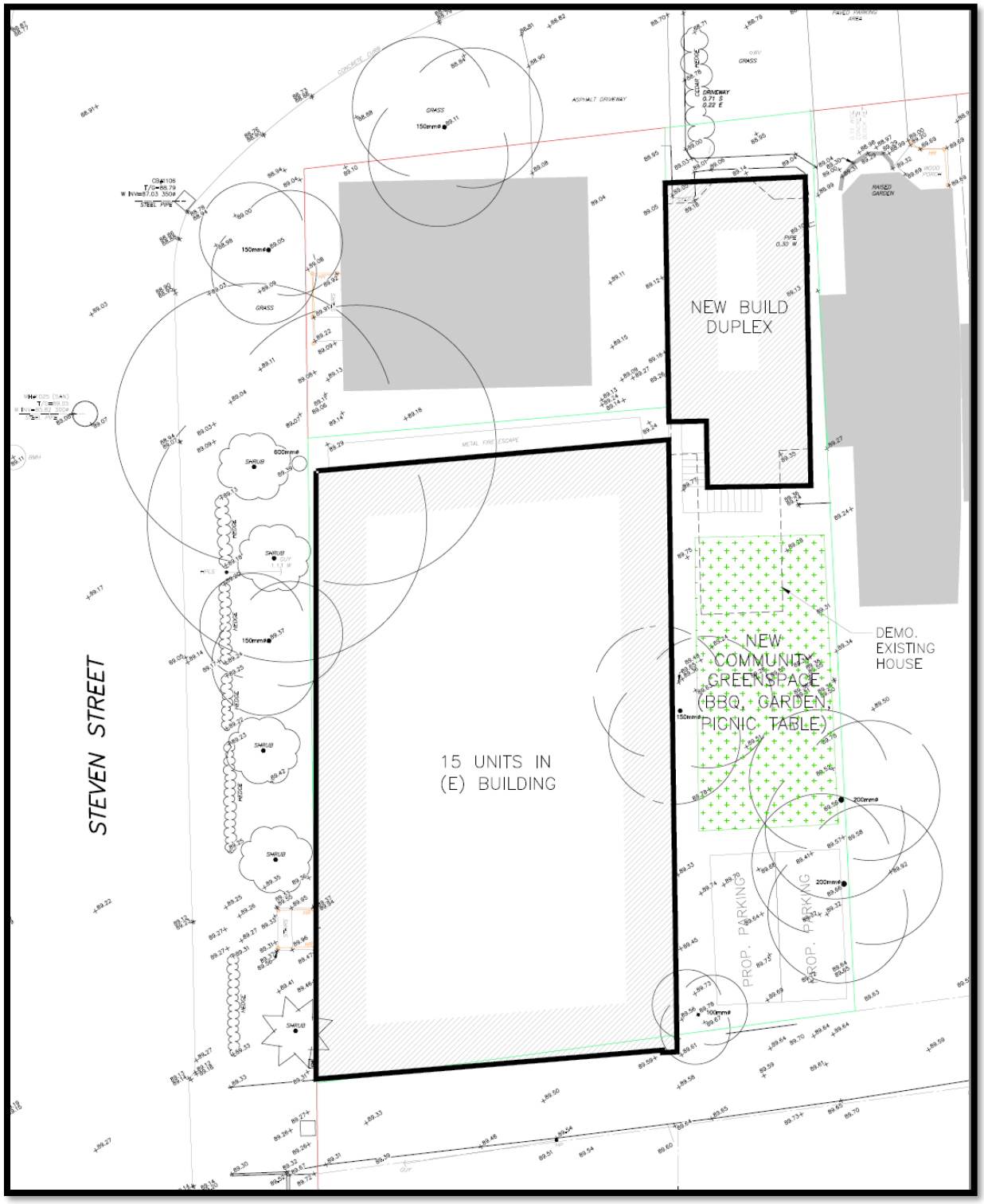
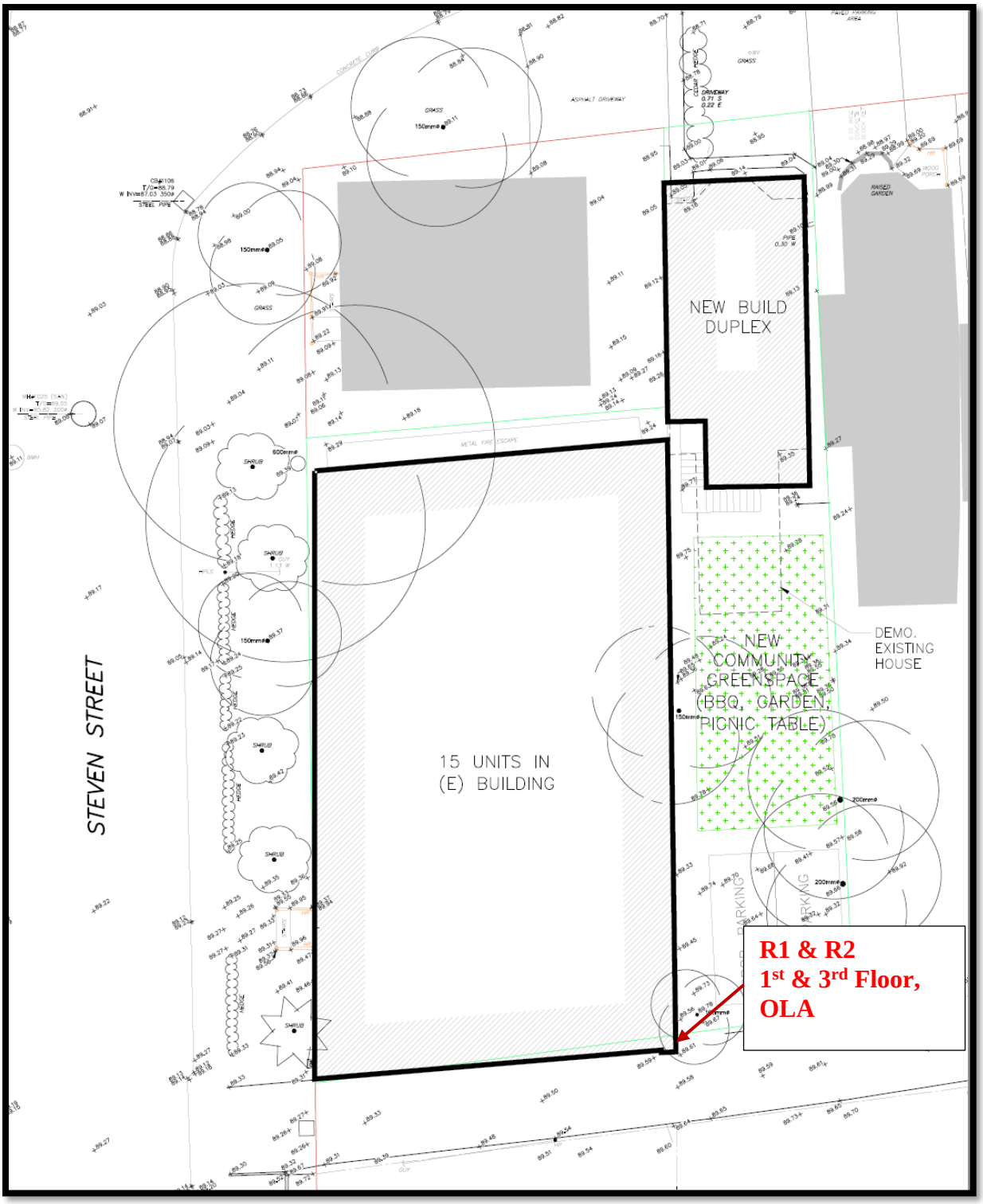
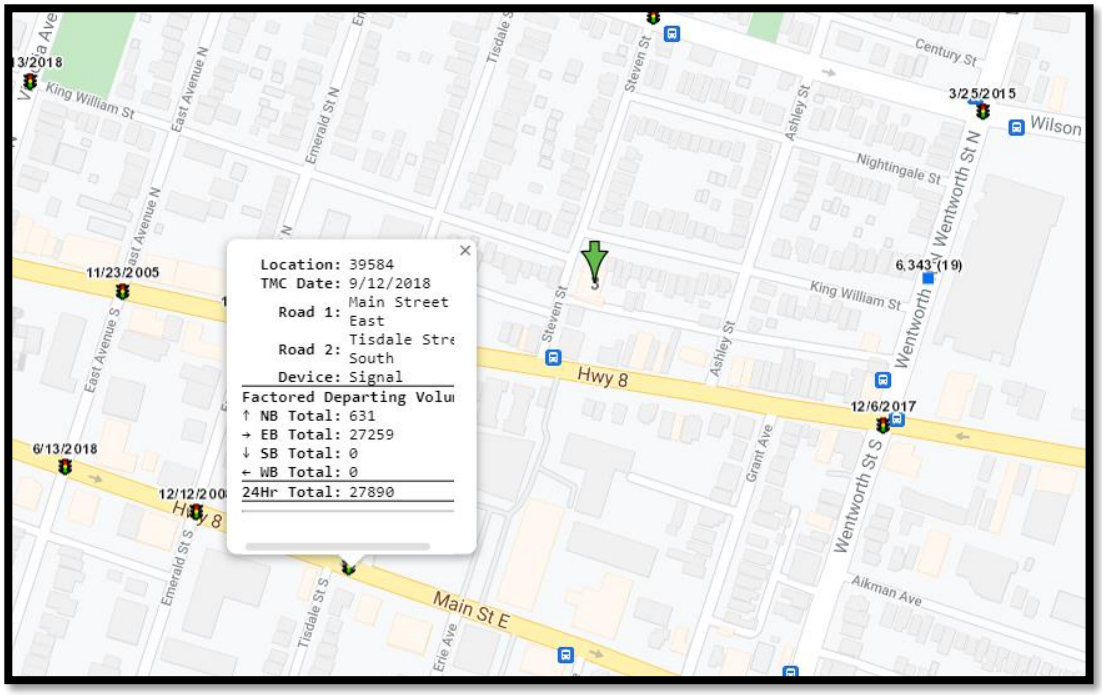


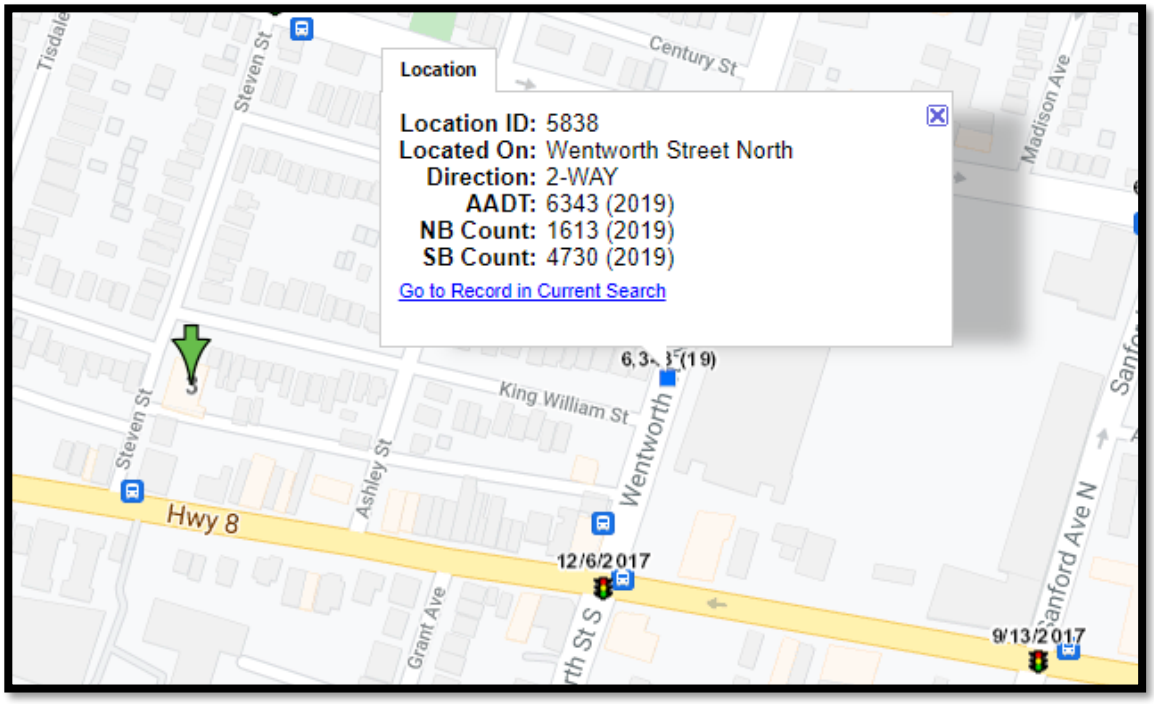
FIGURE 3
RECEPTOR LOCATION

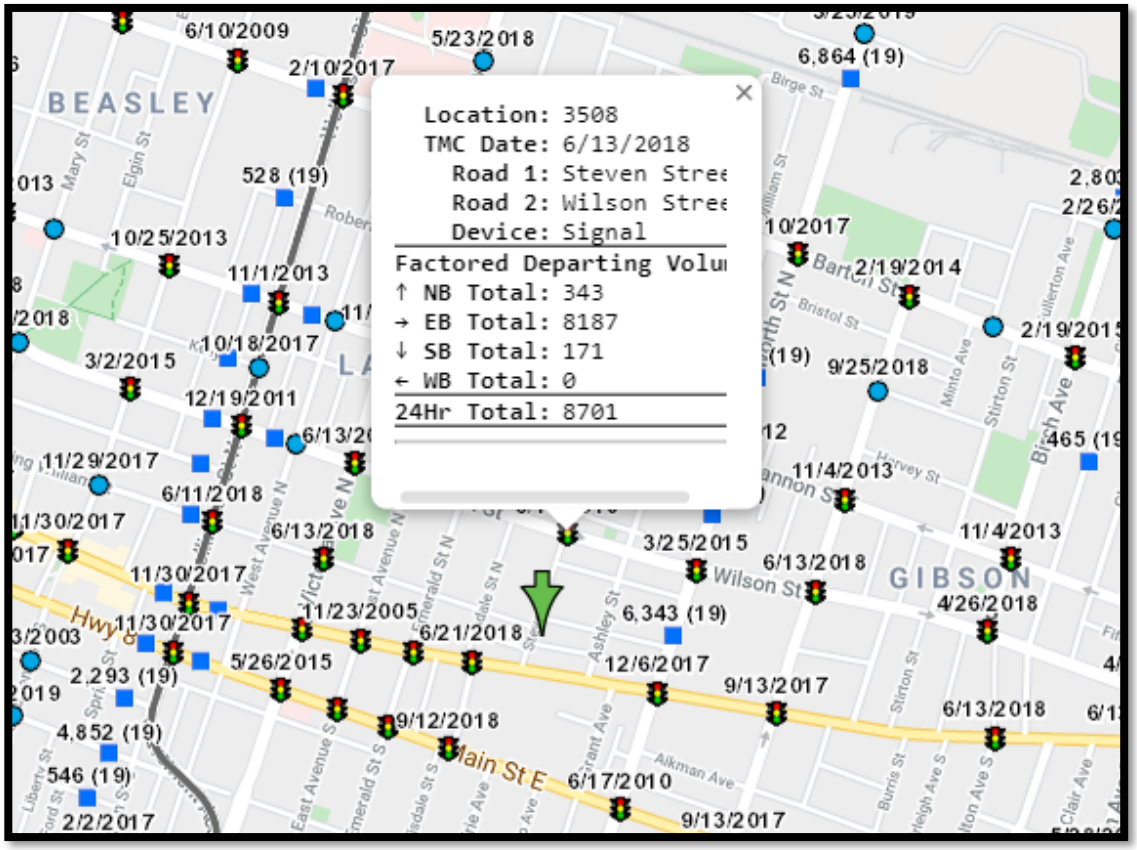


APPENDIX "A"

CITY OF HAMILTON
TRAFFIC DATA




Location
Location ID: 5838
Located On: Wentworth Street North
Direction: 2-WAY
AADT: 6343 (2019)
NB Count: 1613 (2019)
SB Count: 4730 (2019)
Go to Record in Current Search
Century St
Steven St
Madison Ave
King William St
Ashley St
Wentworth
Hwy 8
Grant Ave
12/6/2017
9/13/2017


Location: 3508
TMC Date: 6/13/2018
Road 1: Steven Stree
Road 2: Wilson Stree
Device: Signal
Factored Departing Volu
↑ NB Total: 343
→ EB Total: 8187
↓ SB Total: 171
← WB Total: 0
24Hr Total: 8701
BEASLEY
GIBSON
Wilson St
Main St E
Hwy 8
6/10/2009
2/10/2017
5/23/2018
6,864 (19)
528 (19)
10/25/2013
11/1/2013
10/18/2017
3/2/2015
12/19/2011
11/29/2017
6/11/2018
11/30/2017
6/13/2018
11/23/2005
6/21/2018
5/26/2015
2,293 (19)
4,852 (19)
546 (19)
2/2/2017
9/12/2018
6/17/2010
9/13/2017
6,343 (19)
12/6/2017
3/25/2015
2/19/2014
9/25/2018
11/4/2013
4/26/2018
6/13/2018


Hamilton
TCDS User Guide Help
MS2
Transportation Data Management System

STAMSON CALCULATIONS

```
STAMSON 5.04        SUMMARY REPORT        Date: 13-12-2021 16:27:16
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: Steven1.te           Time Period: Day/Night 16/8 hours
Description: R1- Free Field South Building Facade 1st Floor & OLA
                          TOTAL Leq FROM ALL SOURCES                    (DAY): 47.20
                                                                        (NIGHT): 40.69

Road data, segment # 1: King East (day/night)
----------------------------------------------
Car traffic volume  : 24922/2769  veh/TimePeriod  *
Medium truck volume :   519/58    veh/TimePeriod  *
Heavy truck volume  :   519/58    veh/TimePeriod  *
Posted speed limit  :    50 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

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

    24 hr Traffic Volume (AADT or SADT):  21432
    Percentage of Annual Growth         :   2.00
    Number of Years of Growth           :  15.00
    Medium Truck % of Total Volume      :   2.00
    Heavy Truck  % of Total Volume      :   2.00
    Day (16 hrs) % of Total Volume      :  90.00

Data for Segment # 1: King East (day/night)
----------------------------------------------
Angle1   Angle2           : -45.00 deg   32.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      2 / 2
House density             :     80 %
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  60.00 / 60.00  m
Receiver height           :   2.00 / 2.00   m
Topography                :      1       (Flat/gentle slope; no barrier)

Road data, segment # 2: Main St East (day/night)
------------------------------------------------
Car traffic volume  : 31076/3453  veh/TimePeriod  *
Medium truck volume :   647/72    veh/TimePeriod  *
Heavy truck volume  :   647/72    veh/TimePeriod  *
Posted speed limit  :    50 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

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

    24 hr Traffic Volume (AADT or SADT):  27259
    Percentage of Annual Growth         :   2.00
    Number of Years of Growth           :  14.00
    Medium Truck % of Total Volume      :   2.00
    Heavy Truck  % of Total Volume      :   2.00
    Day (16 hrs) % of Total Volume      :  90.00

Data for Segment # 2: Main St East (day/night)
------------------------------------------------
Angle1   Angle2           : -25.00 deg   30.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      4 / 4
House density             :     80 %
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 279.00 / 279.00 m
Receiver height           :   2.00 / 2.00   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Road data, segment # 3: Wentworth N (day/night)
------------------------------------------------
Car traffic volume  :  7089/788   veh/TimePeriod  *
Medium truck volume :   148/16    veh/TimePeriod  *
Heavy truck volume  :   148/16    veh/TimePeriod  *
Posted speed limit  :    50 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

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

    24 hr Traffic Volume (AADT or SADT):   6343
    Percentage of Annual Growth         :   2.00
    Number of Years of Growth           :  13.00
    Medium Truck % of Total Volume      :   2.00
    Heavy Truck  % of Total Volume      :   2.00
    Day (16 hrs) % of Total Volume      :  90.00
```

```
Data for Segment # 3: Wentworth N (day/night)
---------------------------------------------
Angle1   Angle2           : -20.00 deg   35.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      7 / 7
House density             :     85 %
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 231.00 / 231.00 m
Receiver height           :   2.00 / 2.00   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Road data, segment # 4: Wilson St (day/night)
---------------------------------------------
Car traffic volume  :  9333/1037  veh/TimePeriod  *
Medium truck volume :   194/22    veh/TimePeriod  *
Heavy truck volume  :   194/22    veh/TimePeriod  *
Posted speed limit  :    50 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

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

    24 hr Traffic Volume (AADT or SADT):   8187
    Percentage of Annual Growth        :   2.00
    Number of Years of Growth          :  14.00
    Medium Truck % of Total Volume     :   2.00
    Heavy Truck  % of Total Volume     :   2.00
    Day (16 hrs) % of Total Volume     :  90.00

Data for Segment # 4: Wilson St (day/night)
---------------------------------------------
Angle1   Angle2           : -26.00 deg   23.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      4 / 4
House density             :     75 %
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 183.00 / 183.00 m
Receiver height           :   2.00 / 2.00   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Result summary (day)
--------------------
                    !  source  !   Road   !  Total
                    !  height  !   Leq    !   Leq
                    !   (m)    !  (dBA)   !  (dBA)
--------------------+---------+---------+---------
 1.King East        !     1.19 !    46.90 !    46.90
 2.Main St East     !     1.19 !    33.17 !    33.17
 3.Wentworth N      !     1.19 !    22.78 !    22.78
 4.Wilson St        !     1.19 !    30.87 !    30.87
--------------------+---------+---------+---------
                      Total                47.20 dBA


Result summary (night)
----------------------
                    !  source  !   Road   !  Total
                    !  height  !   Leq    !   Leq
                    !   (m)    !  (dBA)   !  (dBA)
--------------------+---------+---------+---------
 1.King East        !     1.19 !    40.39 !    40.39
 2.Main St East     !     1.19 !    26.64 !    26.64
 3.Wentworth N      !     1.18 !    16.17 !    16.17
 4.Wilson St        !     1.19 !    24.39 !    24.39
--------------------+---------+---------+---------
                      Total                40.69 dBA
```

```
STAMSON 5.04        SUMMARY REPORT        Date: 13-12-2021 16:34:56
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: steven2.te           Time Period: Day/Night 16/8 hours
Description: R2- Free Field South Building Facade 3rd Floor
                          TOTAL Leq FROM ALL SOURCES                    (DAY): 56.03
                                                                        (NIGHT): 49.51
Road data, segment # 1: King East (day/night)
----------------------------------------------
Car traffic volume  : 24922/2769  veh/TimePeriod  *
Medium truck volume :   519/58    veh/TimePeriod  *
Heavy truck volume  :   519/58    veh/TimePeriod  *
Posted speed limit  :    50 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

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

    24 hr Traffic Volume (AADT or SADT):  21432
    Percentage of Annual Growth        :   2.00
    Number of Years of Growth          :  15.00
    Medium Truck % of Total Volume     :   2.00
    Heavy Truck  % of Total Volume     :   2.00
    Day (16 hrs) % of Total Volume     :  90.00

Data for Segment # 1: King East (day/night)
----------------------------------------------
Angle1   Angle2           : -20.00 deg   37.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  60.00 / 60.00  m
Receiver height           :  12.00 / 12.00  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Road data, segment # 2: Main St East (day/night)
----------------------------------------------
Car traffic volume  : 31076/3453  veh/TimePeriod  *
Medium truck volume :   647/72    veh/TimePeriod  *
Heavy truck volume  :   647/72    veh/TimePeriod  *
Posted speed limit  :    50 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

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

    24 hr Traffic Volume (AADT or SADT):  27259
    Percentage of Annual Growth        :   2.00
    Number of Years of Growth          :  14.00
    Medium Truck % of Total Volume     :   2.00
    Heavy Truck  % of Total Volume     :   2.00
    Day (16 hrs) % of Total Volume     :  90.00

Data for Segment # 2: Main St East (day/night)
----------------------------------------------
Angle1   Angle2           : -35.00 deg   25.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 279.00 / 279.00 m
Receiver height           :  12.00 / 12.00  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Road data, segment # 3: Wentworth N (day/night)
----------------------------------------------
Car traffic volume  :  7089/788   veh/TimePeriod  *
Medium truck volume :   148/16    veh/TimePeriod  *
Heavy truck volume  :   148/16    veh/TimePeriod  *
Posted speed limit  :    50 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

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

    24 hr Traffic Volume (AADT or SADT):   6343
    Percentage of Annual Growth        :   2.00
    Number of Years of Growth          :  13.00
    Medium Truck % of Total Volume     :   2.00
    Heavy Truck  % of Total Volume     :   2.00
    Day (16 hrs) % of Total Volume     :  90.00
```

```
Data for Segment # 3: Wentworth N (day/night)
-----------------------------------------------
Angle1   Angle2           : -20.00 deg   35.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 231.00 / 231.00 m
Receiver height           :  12.00 / 12.00  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Road data, segment # 4: Wilson St (day/night)
-----------------------------------------------
Car traffic volume  :  9333/1037  veh/TimePeriod  *
Medium truck volume :   194/22    veh/TimePeriod  *
Heavy truck volume  :   194/22    veh/TimePeriod  *
Posted speed limit  :    50 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

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

    24 hr Traffic Volume (AADT or SADT):   8187
    Percentage of Annual Growth        :   2.00
    Number of Years of Growth          :  14.00
    Medium Truck % of Total Volume     :   2.00
    Heavy Truck  % of Total Volume     :   2.00
    Day (16 hrs) % of Total Volume     :  90.00

Data for Segment # 4: Wilson St (day/night)
-----------------------------------------------
Angle1   Angle2           : -26.00 deg   23.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 183.00 / 183.00 m
Receiver height           :  12.00 / 12.00  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Result summary (day)
--------------------
                    !  source  !   Road   !  Total
                    !  height  !   Leq    !   Leq
                    !   (m)    !  (dBA)   !  (dBA)
--------------------+---------+---------+---------
 1.King East        !     1.19 !    54.96 !    54.96
 2.Main St East     !     1.19 !    47.11 !    47.11
 3.Wentworth N      !     1.19 !    41.43 !    41.43
 4.Wilson St        !     1.19 !    43.51 !    43.51
--------------------+---------+---------+---------
                      Total                 56.03 dBA

Result summary (night)
----------------------
                    !  source  !   Road   !  Total
                    !  height  !   Leq    !   Leq
                    !   (m)    !  (dBA)   !  (dBA)
--------------------+---------+---------+---------
 1.King East        !     1.19 !    48.44 !    48.44
 2.Main St East     !     1.19 !    40.58 !    40.58
 3.Wentworth N      !     1.18 !    34.82 !    34.82
 4.Wilson St        !     1.19 !    37.03 !    37.03
--------------------+---------+---------+---------
                      Total                 49.51 dBA
```