

## ROADWAY TRAFFIC NOISE ASSESSMENT

South Nepean Town Centre  
Ottawa, Ontario

REPORT: GW19-035 — Traffic Noise



May 1, 2020

PREPARED FOR

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## EXECUTIVE SUMMARY

This report describes a roadway traffic noise assessment undertaken for parcel “Block 4” of the proposed South Nepean Town Centre subdivision development in Ottawa, Ontario. Gradient Wind completed a detailed traffic noise assessment for the entire subdivision development (refer to Gradient Wind report #19-035 – Traffic Noise R2). Since the study was completed, the layout of parcel Block 4 has been revised. This study was conducted to account for the changes to the Block 4 massing in support of an upcoming site plan control application.

Block 4 is situated at the southwest corner of the overall development site, bounded by parcel ‘Block 1’ to the north, Jockvale Road to the east, Street ‘B’ to the south and Street ‘C’ to the west. Chapman Mills Drive runs along the north side of parcel ‘Block 1’. Jockvale Road runs between Block 4, and Blocks 5 and 8. Block 4 comprises eleven residential buildings, ranging from 8 to 12 units each. No outdoor living areas are defined in the plans for Block 4. Figure 1 illustrates a complete site plan with the surrounding context.

The assessment is based on (i) theoretical noise prediction methods that conform to the Ministry of the Environment, Conservation and Parks (MECP) and City of Ottawa requirements; (ii) noise level criteria as specified by the City of Ottawa’s Environmental Noise Control Guidelines (ENCG); (iii) future vehicular traffic volumes based on the City of Ottawa’s Official Plan roadway classifications; and (iv) site servicing plan prepared by Stantec Inc.

The results of the current analysis indicate that noise levels will range between 51 and 65 dBA during the daytime period (07:00-23:00) and between 44 and 58 dBA during the nighttime period (23:00-07:00). The highest noise level (65 dBA) occurs at west side of the parcel block which is nearest and most exposed to Jockvale Road. As the noise levels at plane of window (POW) receptors don’t exceed 65 dBA during daytime period and 60 dBA during nighttime period, standard building components will be sufficient to attenuate indoor noise levels when windows are closed.



The results of the analysis indicate that buildings (Blocks) 3, 4, 5, 6, and east half of Block 2 will require forced air heating with provision for the installation of central air conditioning which will allow occupants to keep windows closed and maintain a comfortable living environment. In addition to ventilation requirements, warning clauses will also be required in all Lease, Purchase and Sale Agreements for the aforementioned blocks, as summarized in Section 6.

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## **1. INTRODUCTION**

Gradient Wind Engineering Inc. (Gradient Wind) was retained by Caivan Communities to undertake a detailed roadway traffic noise assessment for parcel 'Block 4' of the proposed South Nepean Town Centre subdivision development in Ottawa, Ontario. Gradient Wind completed a detailed traffic noise assessment for the entire subdivision development (refer to Gradient Wind report #19-035 – Traffic Noise R2). Since the study was completed, the layout of parcel Block 4 has been revised. This report summarizes the methodology, results, and recommendations related to the assessment of exterior and interior noise levels generated by local roadway traffic for the Block 4 site plan control application.

Our work is based on theoretical noise calculation methods conforming to the City of Ottawa<sup>1</sup> and Ministry of the Environment, Conservation and Parks (MECP)<sup>2</sup> guidelines. Noise calculations were based on site servicing plan prepared by Stantec Inc., with future traffic volumes corresponding to the City of Ottawa's Official Plan (OP) roadway classifications.

## **2. TERMS OF REFERENCE**

Parcel 'Block 4' is situated at the southwest corner of the proposed development site. The proposed development site is nearly rectangular in shape and comprises back-to-back townhomes and apartment buildings on six (6) separate parcel blocks. Parcel Block 4 is bounded by parcel 'Block 1' to the north, Jockvale Road to the east, Street 'B' to the south and Street 'C' to the west. Chapman Mills Drive runs along the north side of parcel 'Block 1'. Jockvale Road runs between parcel 'Block 4', and parcels Blocks 5 and 8. Parcel Block 4 comprises eleven residential buildings, ranging from 8 to 12 units each. No outdoor living areas are defined in the plans for parcel Block 4.

The major source of roadway traffic noise is Jockvale Road to the east of the parcel block. Figure 1 illustrates a complete site plan with the surrounding context. Chapman Mills Drive is beyond 100 m and is therefore considered insignificant based on the results of the previous study.

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<sup>1</sup> City of Ottawa Environmental Noise Control Guidelines, January 2016

<sup>2</sup> Ontario Ministry of the Environment and Climate Change – Environmental Noise Guidelines, Publication NPC-300, Queens Printer for Ontario, Toronto, 2013

### 3. OBJECTIVES

The principal objectives of this study are to (i) calculate the future noise levels on the study buildings produced by local roadway traffic, and (ii) ensure that interior and exterior noise levels do not exceed the allowable limits specified by the City of Ottawa's Environmental Noise Control Guidelines as outlined in Section 4.2 of this report.

### 4. METHODOLOGY

#### 4.1 Background

Noise can be defined as any obtrusive sound. It is created at a source, transmitted through a medium, such as air, and intercepted by a receiver. Noise may be characterized in terms of the power of the source or the sound pressure at a specific distance. While the power of a source is characteristic of that particular source, the sound pressure depends on the location of the receiver and the path that the noise takes to reach the receiver. Measurement of noise is based on the decibel unit, dBA, which is a logarithmic ratio referenced to a standard noise level ( $2 \times 10^{-5}$  Pascals). The 'A' suffix refers to a weighting scale, which better represents how the noise is perceived by the human ear. With this scale, a doubling of power results in a 3 dBA increase in measured noise levels and is just perceptible to most people. An increase of 10 dBA is often perceived to be twice as loud.

#### 4.2 Roadway Traffic Noise

##### 4.2.1 Criteria for Roadway Traffic Noise

For surface roadway traffic noise, the equivalent sound energy level,  $L_{eq}$ , provides a measure of the time-varying noise levels, which is well correlated with the annoyance of sound. It is defined as the continuous sound level, which has the same energy as a time-varying noise level over a period of time. For roadways, the  $L_{eq}$  is commonly calculated on the basis of a 16-hour ( $L_{eq16}$ ) daytime (07:00-23:00) / 8-hour ( $L_{eq8}$ ) nighttime (23:00-07:00) split to assess its impact on residential buildings. The City of Ottawa's Environmental Noise Control Guidelines (ENCG) specifies that the recommended indoor noise limit range (that is relevant to this study) is 45 and 40 dBA for living rooms and sleeping quarters respectively for roadway as listed in Table 1.



**TABLE 1: INDOOR SOUND LEVEL CRITERIA (ROAD)<sup>3</sup>**

| Type of Space   | Time Period   | Leq (dBA) |
|---|---------------|-----------|
| General offices, reception areas, retail stores, etc.   | 07:00 – 23:00 | 50        |
| Living/dining/den areas of <b>residences</b> , hospitals, schools, nursing/retirement homes, day-care centres, theatres, places of worship, libraries, individual or semi-private offices, conference rooms, etc. | 07:00 – 23:00 | 45        |
| Sleeping quarters of hotels/motels  | 23:00 – 07:00 | 45        |
| Sleeping quarters of <b>residences</b> , hospitals, nursing/retirement homes, etc.  | 23:00 – 07:00 | 40        |

Predicted noise levels at the plane of window (POW) dictate the action required to achieve the recommended sound levels. An open window is considered to provide a 10 dBA reduction in noise, while a standard closed window is capable of providing a minimum 20 dBA noise reduction<sup>4</sup>. A closed window due to a ventilation requirement will bring noise levels down to achieve an acceptable indoor environment<sup>5</sup>. Therefore, where noise levels exceed 55 dBA daytime and 50 dBA nighttime, the ventilation for the building should consider the need for having windows and doors closed, which triggers the need for forced air heating with provision for central air conditioning. Where noise levels exceed 65 dBA daytime and 60 dBA nighttime, air conditioning will be required and building components will require higher levels of sound attenuation<sup>6</sup>.

The sound level criterion for outdoor living areas is 55 dBA, which applies during the daytime (07:00 to 23:00). When noise levels exceed 55 dBA, mitigation must be provided to reduce noise levels where technically and administratively feasible to acceptable levels at or below the criterion.

<sup>3</sup> Adapted from ENCG 2016 – Tables 2.2b and 2.2c

<sup>4</sup> Burberry, P.B. (2014). Mitchell's Environment and Services. Routledge, Page 125

<sup>5</sup> MECP, Environmental Noise Guidelines, NPC 300 – Part C, Section 7.8

<sup>6</sup> MECP, Environmental Noise Guidelines, NPC 300 – Part C, Section 7.1.3



## 4.2.2 Theoretical Roadway Noise Predictions

Noise predictions were performed with the aid of the MECP computerized noise assessment program, STAMSON 5.04, for road analysis. Appendix A includes the STAMSON 5.04 input and output data.

Roadway traffic noise calculations were performed by treating each roadway segment as separate line sources of noise. In addition to the traffic volumes summarized in Table 2, theoretical noise predictions were based on the following parameters:

- Truck traffic on all roadways was taken to comprise 5% heavy trucks and 7% medium trucks, as per ENCG requirements for noise level predictions.
- The day/night split for all streets was taken to be 92%/8%, respectively.
- Ground surfaces were taken to be reflective and absorptive based on intermediate ground characteristics.
- Topography was assumed to be a flat/gentle slope surrounding the study building.
- Jockvale Road was taken as the only noise source as it is the only arterial, collector, or major collector road within 100 m of the site.
- Receptor height was taken to be 4.5 metres at Level 2 for the centre of the window (height to 2<sup>nd</sup> floor + 1.5 metres), based on ORNAMENT recommendations.
- Stacked townhouses considered as noise barriers at 6 m in height.
- Noise receptors were strategically placed at 5 locations around the study area (see Figure 2).
- Receptor distances and exposure angles are illustrated in Figures 3 and 4.

### 4.2.1 Roadway Traffic Volumes

The ENCG dictates that noise calculations should consider future sound levels based on a roadway's classification at the mature state of development. Therefore, traffic volumes are based on the roadway classifications outlined in the City of Ottawa's Official Plan (OP) and Transportation Master Plan<sup>7</sup> which provide additional details on future roadway expansions. Average Annual Daily Traffic (AADT) volumes are then based on data in Table B1 of the ENCG for each roadway classification. Table 2 (below) summarizes the AADT values used for each roadway included in this assessment.

---

<sup>7</sup> City of Ottawa Transportation Master Plan, November 2013



**TABLE 2: ROADWAY TRAFFIC DATA**

| Segment       | Roadway Traffic Data | Speed Limit (km/h) | Traffic Volumes |
|---------------|----------------------|--------------------|-----------------|
| Jockvale Road | 2-UCU                | 50                 | <b>8,000</b>    |

## 5. RESULTS AND DISCUSSION

### 5.1 Roadway Traffic Noise Levels

The results of the roadway traffic noise calculations are summarized in Table 3 below. A complete set of input and output data from all STAMSON 5.04 calculations are available in Appendix A.

**TABLE 3: EXTERIOR NOISE LEVELS DUE TO ROAD TRAFFIC**

| Receptor Number | Receptor Height Above Grade (m) | Receptor Location            | STAMSON 5.04 Noise Level (dBA) |       |
|-----------------|---------------------------------|------------------------------|--------------------------------|-------|
|                 |                                 |                              | Day                            | Night |
| 1               | 4.5                             | POW – Block 3 – North Façade | 56                             | 48    |
| 2               | 4.5                             | POW – Block 5 – East Façade  | 65                             | 58    |
| 3               | 4.5                             | POW – Block 11 – East Façade | 51                             | 44    |
| 4               | 4.5                             | POW – Block 2 – North Façade | 55                             | 47    |
| 5               | 4.5                             | POW – Block 2 – North Façade | 54                             | 47    |

## 6. CONCLUSIONS AND RECOMMENDATIONS

The results of the current analysis indicate that noise levels will range between 51 and 65 dBA during the daytime period (07:00-23:00) and between 44 and 58 dBA during the nighttime period (23:00-07:00). The highest noise level (65 dBA) occurs at the east façade of Block 5 of the development, which is nearest and most exposed to Jockvale Road.

Blocks 3, 4, 5, 6, and east half of Block 2 will require forced air heating and provision for the installation of central air conditioning which will allow occupants to keep windows closed and maintain a comfortable living environment (see Figure 5). Warning clauses will also be required in all Lease, Purchase and Sale Agreements:



# GRADIENTWIND

ENGINEERS & SCIENTISTS

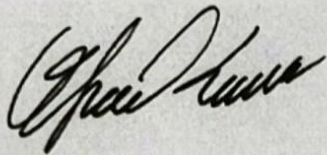
*"Purchasers/tenants are advised that sound levels due to increasing road traffic may occasionally interfere with some outdoor activities as the sound levels may exceed the sound level limits of the City and the Ministry of the Environment.*

*This dwelling unit has also been designed with the provision for adding central air conditioning at the occupant's discretion. Installation of central air conditioning will allow windows and exterior doors to remain closed, thereby ensuring that the indoor sound levels are within the sound level limits of the City and the Ministry of the Environment."*

This concludes our traffic noise assessment and report. If you have any questions or wish to discuss our findings, please advise us. In the interim, we thank you for the opportunity to be of service.

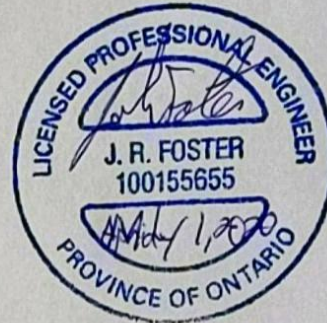
Sincerely,

**Gradient Wind Engineering Inc.**

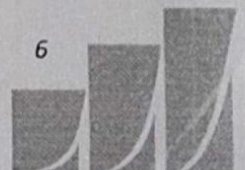


Efser Kara, MSc, LEED GA  
Acoustic Scientist

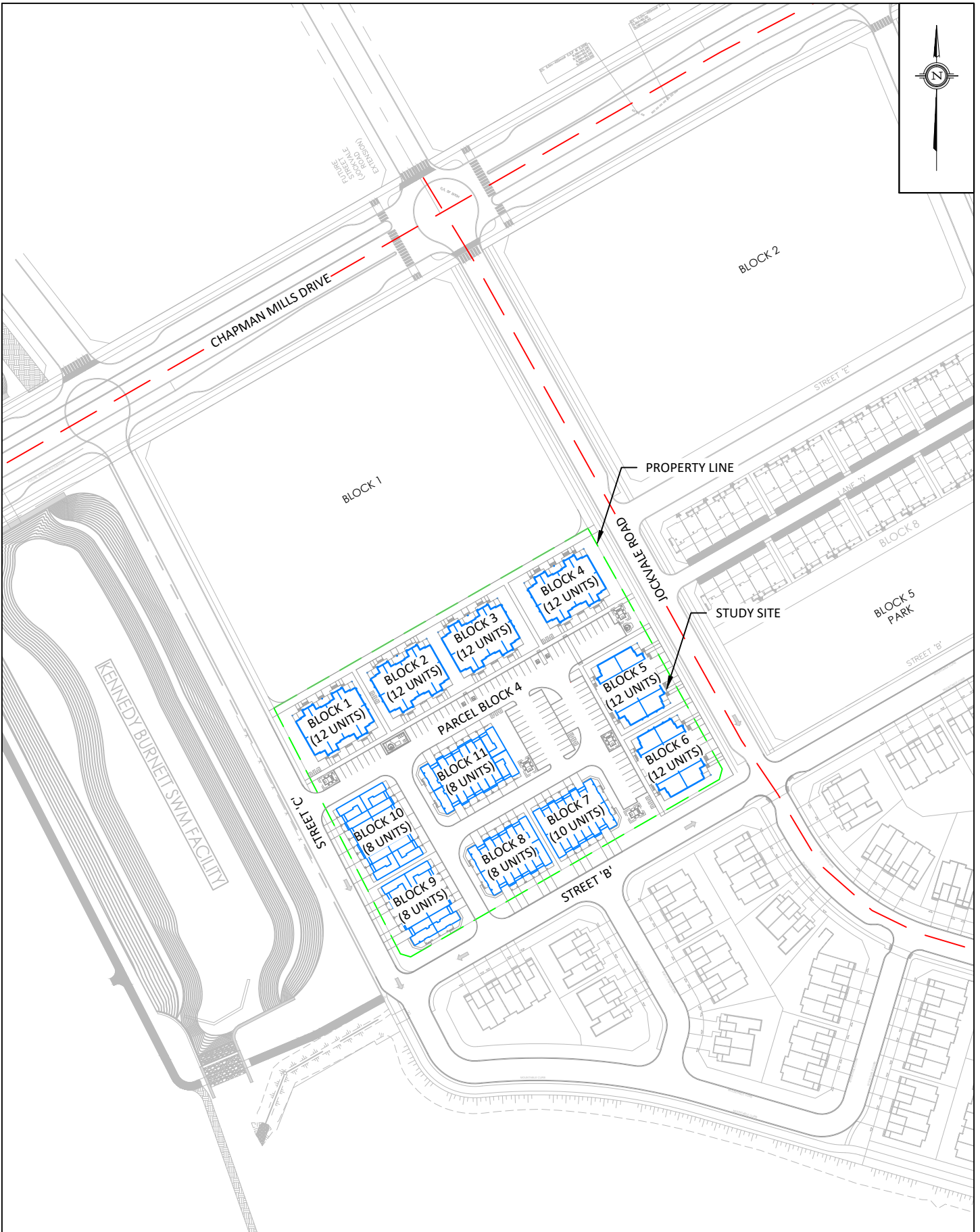
Gradient Wind File #19-035-Traffic Noise

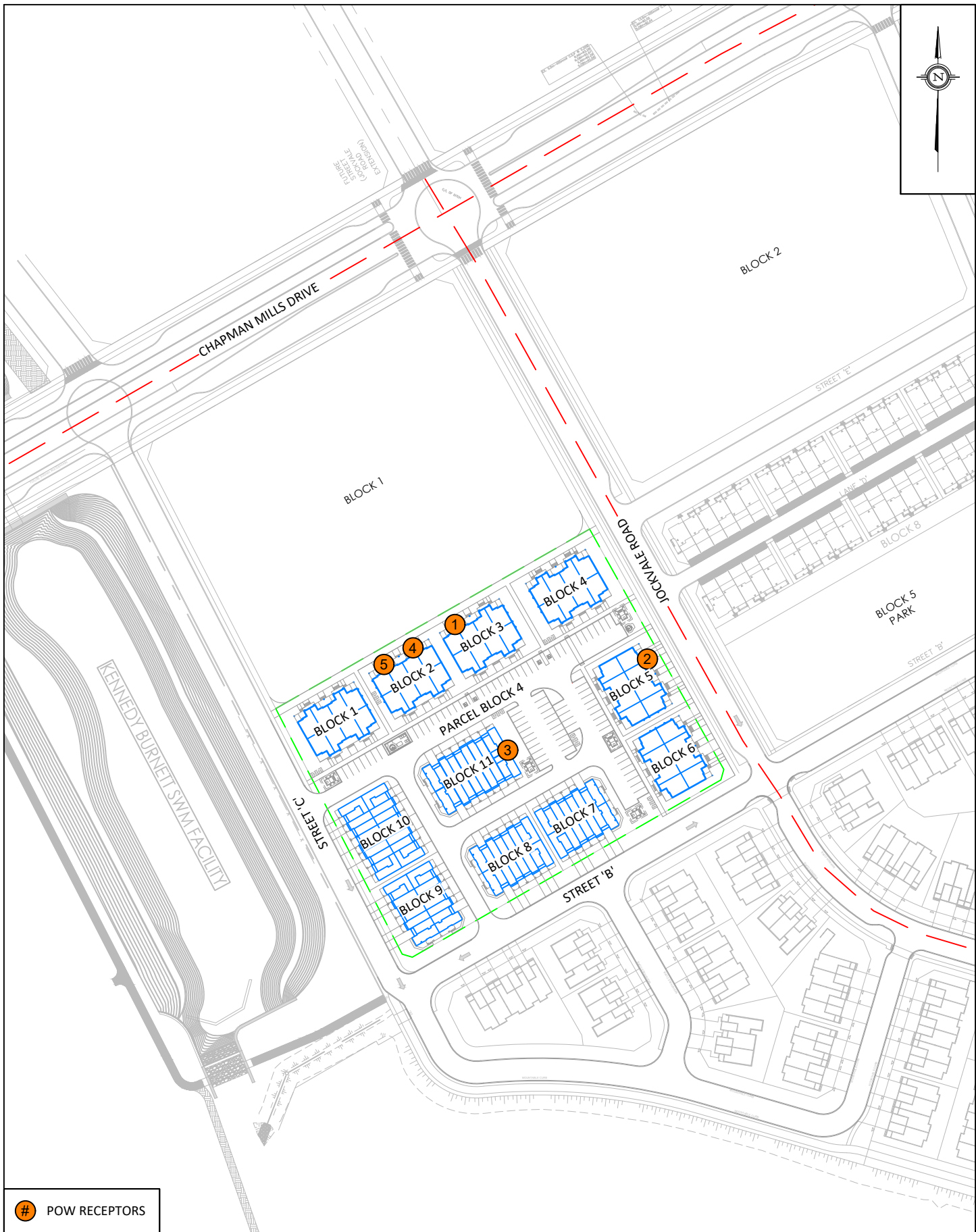


Joshua Foster, P.Eng.  
Principal









# POW RECEPTORS

**GRADIENTWIND**  
ENGINEERS & SCIENTISTS

127 WALGREEN ROAD, OTTAWA, ON  
613 836 0934 • GRADIENTWIND.COM

PROJECT

SOUTH NEPEAN TOWN CENTRE - BLOCK 4  
TRAFFIC NOISE ASSESSMENT

SCALE

1:2000 (APPROX.)

DRAWING NO.

GW19-035-2

DATE

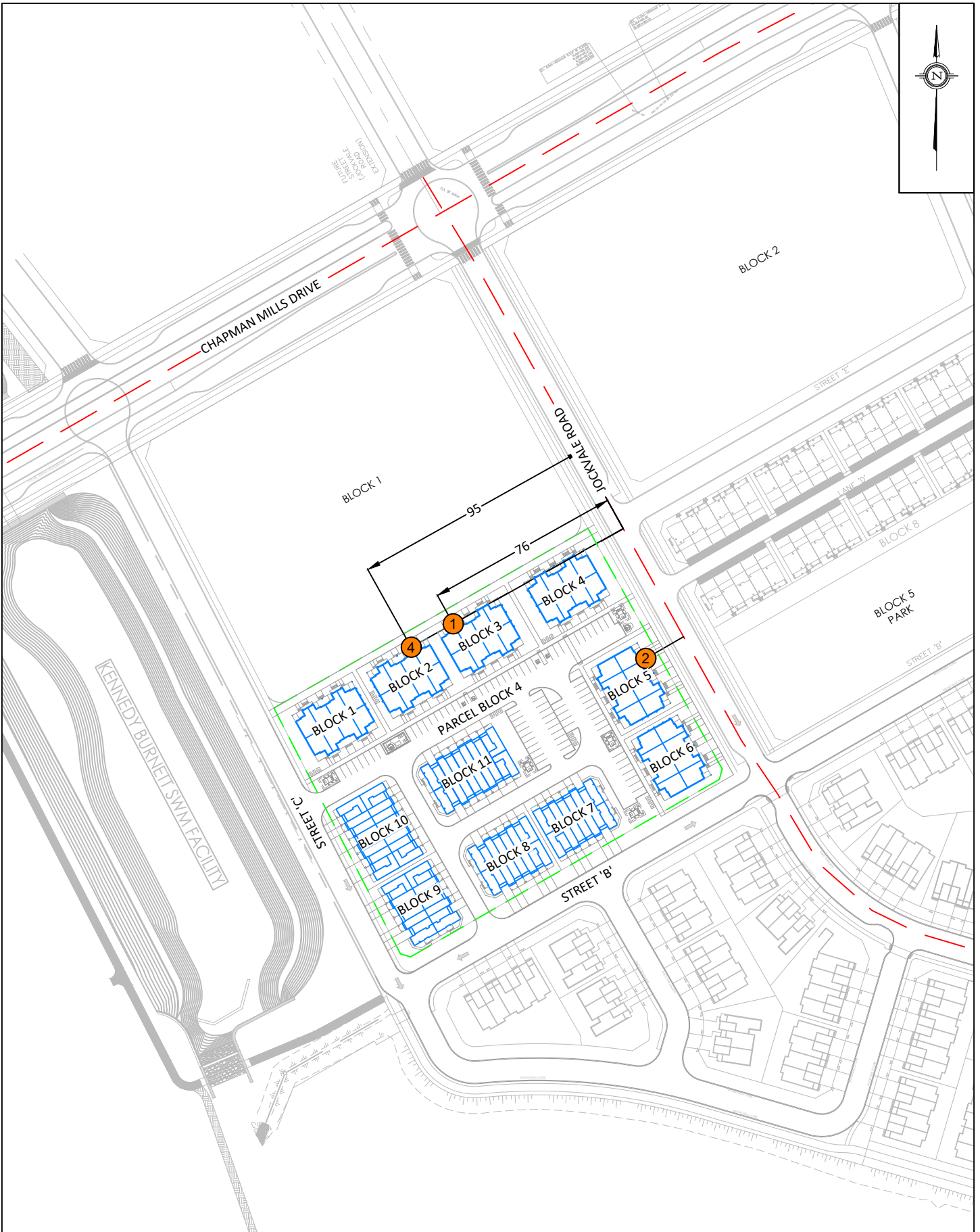
APRIL 27, 2020

DRAWN BY

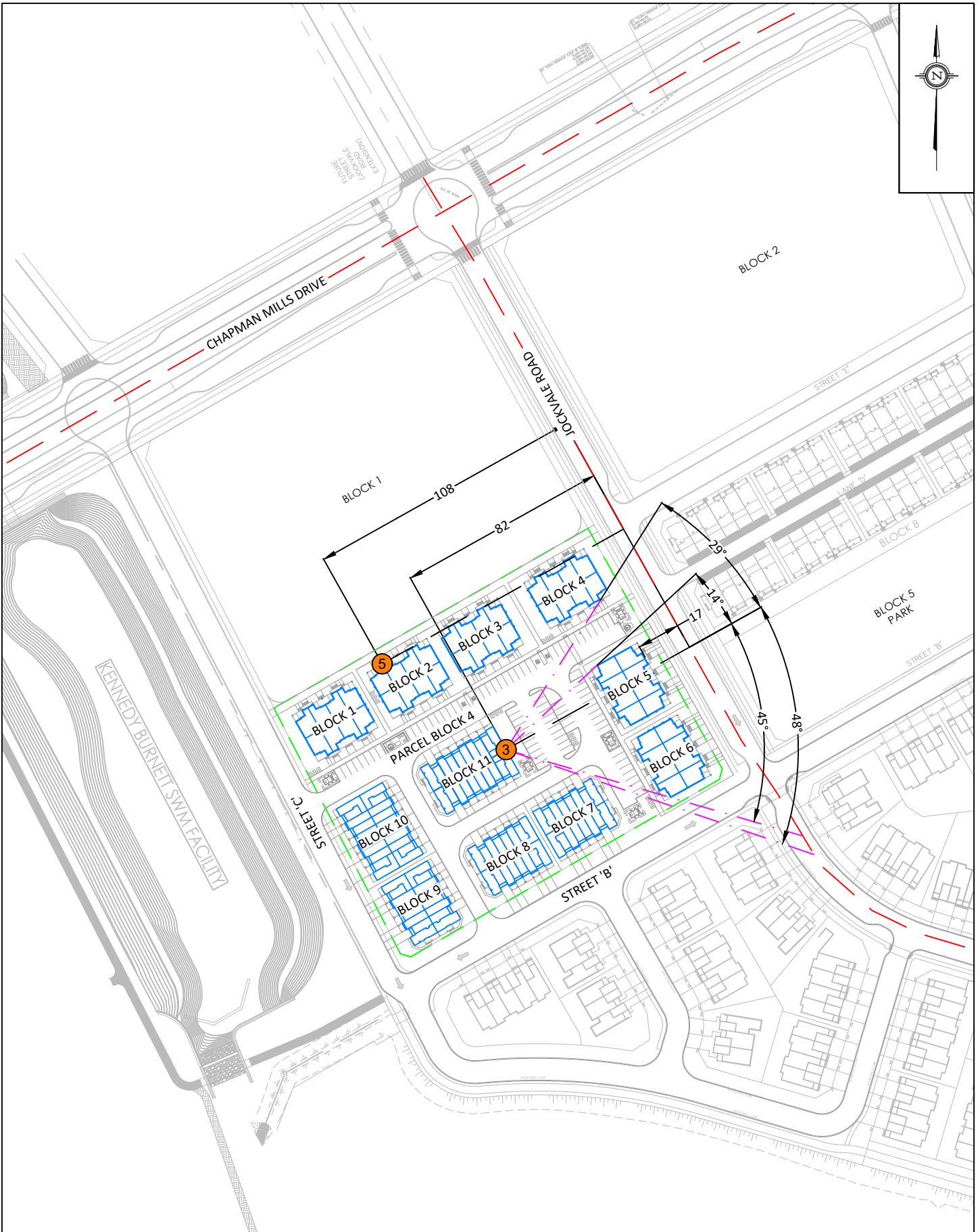
E.K.

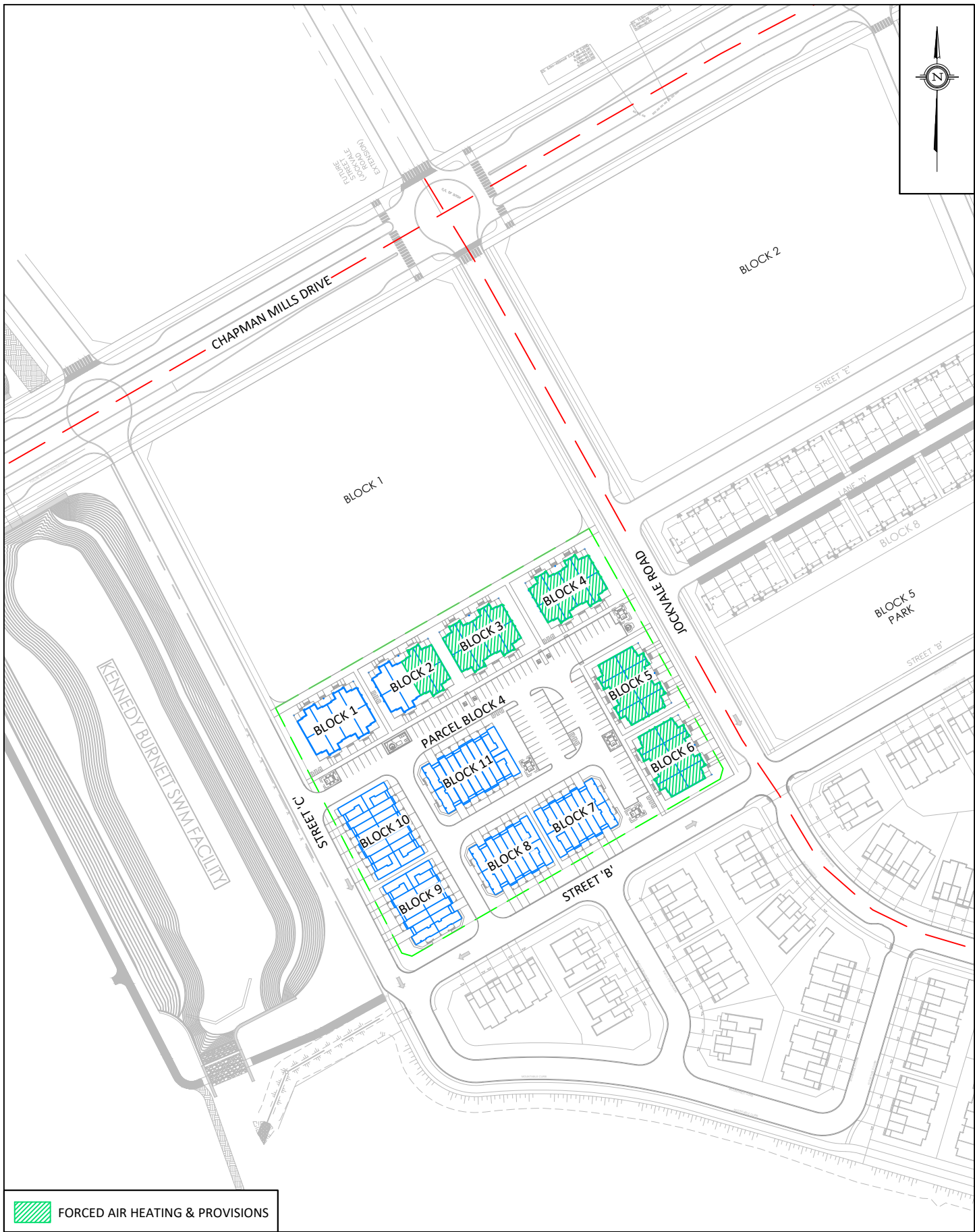
DESCRIPTION

FIGURE 2:  
RECEPTOR LOCATIONS









# GRADIENTWIND

ENGINEERS & SCIENTISTS



## APPENDIX A

### STAMSON 5.04 – INPUT AND OUTPUT DATA



**STAMSON 5.0    NORMAL REPORT    Date: 27-04-2020 13:17:59**  
**MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT**

**Filename: r01.te            Time Period: Day/Night 16/8 hours**  
**Description:**

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

-----  
Angle1 Angle2 : -90.00 deg 0.00 deg  
Wood depth : 0 (No woods.)  
No of house rows : 0 / 0  
Surface : 2 (Reflective ground surface)  
Receiver source distance : 76.00 / 76.00 m  
Receiver height : 4.50 / 4.50 m  
Topography : 1 (Flat/gentle slope; no barrier)  
Reference angle : 0.00



Results segment # 1: Jockvale Dr (day)

Source height = 1.50 m

ROAD (0.00 + 55.69 + 0.00) = 55.69 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|--------|--------|-------|--------|-------|-------|-------|-------|-------|-------|--------|
|--------|--------|-------|--------|-------|-------|-------|-------|-------|-------|--------|

|     |   |      |       |      |       |       |      |      |      |       |
|-----|---|------|-------|------|-------|-------|------|------|------|-------|
| -90 | 0 | 0.00 | 65.75 | 0.00 | -7.05 | -3.01 | 0.00 | 0.00 | 0.00 | 55.69 |
|-----|---|------|-------|------|-------|-------|------|------|------|-------|

Segment Leq : 55.69 dBA

Total Leq All Segments: 55.69 dBA

Results segment # 1: Jockvale Dr (night)

Source height = 1.50 m

ROAD (0.00 + 48.10 + 0.00) = 48.10 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|--------|--------|-------|--------|-------|-------|-------|-------|-------|-------|--------|
|--------|--------|-------|--------|-------|-------|-------|-------|-------|-------|--------|

|     |   |      |       |      |       |       |      |      |      |       |
|-----|---|------|-------|------|-------|-------|------|------|------|-------|
| -90 | 0 | 0.00 | 58.16 | 0.00 | -7.05 | -3.01 | 0.00 | 0.00 | 0.00 | 48.10 |
|-----|---|------|-------|------|-------|-------|------|------|------|-------|

Segment Leq : 48.10 dBA

Total Leq All Segments: 48.10 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 55.69

(NIGHT): 48.10



**STAMSON 5.0    NORMAL REPORT    Date: 27-04-2020 13:16:50**  
**MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT**

**Filename: r02.te            Time Period: Day/Night 16/8 hours**  
**Description:**

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

-----  
Angle1 Angle2 : -90.00 deg 90.00 deg  
Wood depth : 0 (No woods.)  
No of house rows : 0 / 0  
Surface : 2 (Reflective ground surface)  
Receiver source distance : 17.00 / 17.00 m  
Receiver height : 4.50 / 4.50 m  
Topography : 1 (Flat/gentle slope; no barrier)  
Reference angle : 0.00



Results segment # 1: Jockvale Dr (day)

-----

Source height = 1.50 m

ROAD (0.00 + 65.21 + 0.00) = 65.21 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|--------|--------|-------|--------|-------|-------|-------|-------|-------|-------|--------|
|--------|--------|-------|--------|-------|-------|-------|-------|-------|-------|--------|

-----

|     |    |      |       |      |       |      |      |      |      |       |
|-----|----|------|-------|------|-------|------|------|------|------|-------|
| -90 | 90 | 0.00 | 65.75 | 0.00 | -0.54 | 0.00 | 0.00 | 0.00 | 0.00 | 65.21 |
|-----|----|------|-------|------|-------|------|------|------|------|-------|

-----

Segment Leq : 65.21 dBA

Total Leq All Segments: 65.21 dBA

Results segment # 1: Jockvale Dr (night)

-----

Source height = 1.50 m

ROAD (0.00 + 57.61 + 0.00) = 57.61 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|--------|--------|-------|--------|-------|-------|-------|-------|-------|-------|--------|
|--------|--------|-------|--------|-------|-------|-------|-------|-------|-------|--------|

-----

|     |    |      |       |      |       |      |      |      |      |       |
|-----|----|------|-------|------|-------|------|------|------|------|-------|
| -90 | 90 | 0.00 | 58.16 | 0.00 | -0.54 | 0.00 | 0.00 | 0.00 | 0.00 | 57.61 |
|-----|----|------|-------|------|-------|------|------|------|------|-------|

-----

Segment Leq : 57.61 dBA

Total Leq All Segments: 57.61 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 65.21

(NIGHT): 57.61



**STAMSON 5.0    NORMAL REPORT    Date: 27-04-2020 13:28:14**  
**MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT**

**Filename: r03.te            Time Period: Day/Night 16/8 hours**  
**Description:**

Road data, segment # 1: Jockvale Dr1 (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 : 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): 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: Jockvale Dr1 (day/night)

-----  
Angle1 Angle2 : -90.00 deg -14.00 deg  
Wood depth : 0 (No woods.)  
No of house rows : 0 / 0  
Surface : 2 (Reflective ground surface)  
Receiver source distance : 82.00 / 82.00 m  
Receiver height : 4.50 / 4.50 m  
Topography : 2 (Flat/gentle slope; with barrier)  
Barrier angle1 : -90.00 deg Angle2 : -29.00 deg  
Barrier height : 6.00 m  
Barrier receiver distance : 38.00 / 38.00 m  
Source elevation : 0.00 m  
Receiver elevation : 0.00 m  
Barrier elevation : 0.00 m  
Reference angle : 0.00



Road data, segment # 2: Jockvale Dr2 (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 : 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): 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: Jockvale Dr2 (day/night)

-----

Angle1 Angle2 : -14.00 deg 90.00 deg

Wood depth : 0 (No woods.)

No of house rows : 0 / 0

Surface : 2 (Reflective ground surface)

Receiver source distance : 82.00 / 82.00 m

Receiver height : 4.50 / 4.50 m

Topography : 2 (Flat/gentle slope; with barrier)

Barrier angle1 : -14.00 deg Angle2 : 90.00 deg

Barrier height : 6.00 m

Barrier receiver distance : 44.00 / 44.00 m

Source elevation : 0.00 m

Receiver elevation : 0.00 m

Barrier elevation : 0.00 m

Reference angle : 0.00



Results segment # 1: Jockvale Dr1 (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                | 3.11               | 3.11                         |

ROAD (0.00 + 45.44 + 47.58) = 49.65 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj  | W.Adj | H.Adj | B.Adj | SubLeq |
|--------|--------|-------|--------|-------|-------|--------|-------|-------|-------|--------|
| -90    | -29    | 0.00  | 65.75  | 0.00  | -7.38 | -4.70  | 0.00  | 0.00  | -8.24 | 45.44  |
| -29    | -14    | 0.00  | 65.75  | 0.00  | -7.38 | -10.79 | 0.00  | 0.00  | 0.00  | 47.58  |

Segment Leq : 49.65 dBA

Results segment # 2: Jockvale Dr2 (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                | 2.89               | 2.89                         |

ROAD (0.00 + 46.44 + 0.00) = 46.44 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|--------|--------|-------|--------|-------|-------|-------|-------|-------|-------|--------|
| -14    | 90     | 0.00  | 65.75  | 0.00  | -7.38 | -2.38 | 0.00  | 0.00  | -9.55 | 46.44  |

Segment Leq : 46.44 dBA

Total Leq All Segments: 51.35 dBA



Results segment # 1: Jockvale Dr1 (night)

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 ! 3.11 ! 3.11

ROAD (0.00 + 37.84 + 39.99) = 42.06 dBA

Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq

-----  
-90 -29 0.00 58.16 0.00 -7.38 -4.70 0.00 0.00 -8.24 37.84

-----  
-29 -14 0.00 58.16 0.00 -7.38 -10.79 0.00 0.00 0.00 39.99  
-----

Segment Leq : 42.06 dBA





Results segment # 2: Jockvale Dr2 (night)

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 ! 2.89 ! 2.89

ROAD (0.00 + 38.85 + 0.00) = 38.85 dBA

Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq

-----  
-14 90 0.00 58.16 0.00 -7.38 -2.38 0.00 0.00 -9.55 38.85  
-----

Segment Leq : 38.85 dBA

Total Leq All Segments: 43.76 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 51.35  
(NIGHT): 43.76



**STAMSON 5.0    NORMAL REPORT    Date: 27-04-2020 15:11:36**  
**MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT**

**Filename: r04.te            Time Period: Day/Night 16/8 hours**  
**Description:**

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

-----  
Angle1 Angle2 : -90.00 deg 0.00 deg  
Wood depth : 0 (No woods.)  
No of house rows : 0 / 0  
Surface : 2 (Reflective ground surface)  
Receiver source distance : 95.00 / 95.00 m  
Receiver height : 4.50 / 4.50 m  
Topography : 1 (Flat/gentle slope; no barrier)  
Reference angle : 0.00



Results segment # 1: Jockvale Dr (day)

Source height = 1.50 m

ROAD (0.00 + 54.72 + 0.00) = 54.72 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|--------|--------|-------|--------|-------|-------|-------|-------|-------|-------|--------|
|--------|--------|-------|--------|-------|-------|-------|-------|-------|-------|--------|

|     |   |      |       |      |       |       |      |      |      |       |
|-----|---|------|-------|------|-------|-------|------|------|------|-------|
| -90 | 0 | 0.00 | 65.75 | 0.00 | -8.02 | -3.01 | 0.00 | 0.00 | 0.00 | 54.72 |
|-----|---|------|-------|------|-------|-------|------|------|------|-------|

Segment Leq : 54.72 dBA

Total Leq All Segments: 54.72 dBA

Results segment # 1: Jockvale Dr (night)

Source height = 1.50 m

ROAD (0.00 + 47.13 + 0.00) = 47.13 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|--------|--------|-------|--------|-------|-------|-------|-------|-------|-------|--------|
|--------|--------|-------|--------|-------|-------|-------|-------|-------|-------|--------|

|     |   |      |       |      |       |       |      |      |      |       |
|-----|---|------|-------|------|-------|-------|------|------|------|-------|
| -90 | 0 | 0.00 | 58.16 | 0.00 | -8.02 | -3.01 | 0.00 | 0.00 | 0.00 | 47.13 |
|-----|---|------|-------|------|-------|-------|------|------|------|-------|

Segment Leq : 47.13 dBA

Total Leq All Segments: 47.13 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 54.72  
(NIGHT): 47.13



**STAMSON 5.0    NORMAL REPORT    Date: 27-04-2020 15:22:54**  
**MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT**

**Filename: r05.te            Time Period: Day/Night 16/8 hours**  
**Description:**

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

-----  
Angle1 Angle2 : -90.00 deg 0.00 deg  
Wood depth : 0 (No woods.)  
No of house rows : 0 / 0  
Surface : 2 (Reflective ground surface)  
Receiver source distance : 108.00 / 108.00 m  
Receiver height : 4.50 / 4.50 m  
Topography : 1 (Flat/gentle slope; no barrier)  
Reference angle : 0.00



Results segment # 1: Jockvale Dr (day)

Source height = 1.50 m

ROAD (0.00 + 54.17 + 0.00) = 54.17 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|--------|--------|-------|--------|-------|-------|-------|-------|-------|-------|--------|
|--------|--------|-------|--------|-------|-------|-------|-------|-------|-------|--------|

|     |   |      |       |      |       |       |      |      |      |       |
|-----|---|------|-------|------|-------|-------|------|------|------|-------|
| -90 | 0 | 0.00 | 65.75 | 0.00 | -8.57 | -3.01 | 0.00 | 0.00 | 0.00 | 54.17 |
|-----|---|------|-------|------|-------|-------|------|------|------|-------|

Segment Leq : 54.17 dBA

Total Leq All Segments: 54.17 dBA

Results segment # 1: Jockvale Dr (night)

Source height = 1.50 m

ROAD (0.00 + 46.57 + 0.00) = 46.57 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|--------|--------|-------|--------|-------|-------|-------|-------|-------|-------|--------|
|--------|--------|-------|--------|-------|-------|-------|-------|-------|-------|--------|

|     |   |      |       |      |       |       |      |      |      |       |
|-----|---|------|-------|------|-------|-------|------|------|------|-------|
| -90 | 0 | 0.00 | 58.16 | 0.00 | -8.57 | -3.01 | 0.00 | 0.00 | 0.00 | 46.57 |
|-----|---|------|-------|------|-------|-------|------|------|------|-------|

Segment Leq : 46.57 dBA

Total Leq All Segments: 46.57 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 54.17  
(NIGHT): 46.57

