

Borrello Subdivision
City of Ottawa
Environmental Noise
Impact Assessment

Prepared For:

3428 Woodroffe Avenue
Mr. Antonino Borrello
.

Prepared By:

Robinson Land Development

Our Project No. 14057
December 10, 2015
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1.0 INTRODUCTION

This report has been prepared on behalf of our client, Mr. Antonino Borrello, in order to assess the environmental noise impact on a proposed 30 lot subdivision at 3428 Woodroffe Avenue. The site plan is bounded by Woodroffe Avenue to the east and existing residential lands to the north, west and south within the City of Ottawa. The location of the development is shown on **Figure 1**.

This report will examine the noise impacts on the development from the local transportation corridors, establish noise attenuation measures, if required, and make recommendations on the findings.

2.0 SOUND LEVEL CRITERIA

2.1 Sound Level Limits

The criteria established by the City of Ottawa Environmental Noise Control Guidelines Planning and Growth Management Department City of Ottawa approved by city council May 10, 2006 forms the basis of this analysis.

Reference is also made to the criteria established by the Ministry of the Environment in its publication LU-131 Noise Assessment Criteria in Land Use Planning October 1997.

The following noise levels originating from road traffic will be used as the maximum acceptable levels:

2.1.1 Sound Level Criteria for Outdoor Living Areas (OLA)

Day-time Period: (16 hr) 07:00 to 23:00 55 dBA Leq

0 < Leq < 55 dBA no measures are required
55 < Leq < 60 dBA control measures may be used or warning clause
60 < Leq control measures are required

Leq is defined as the energy equivalent sound level during an hour.

2.1.2 Sound Level Criteria For Indoor Living/Dining Areas at Plane of Window (POW)

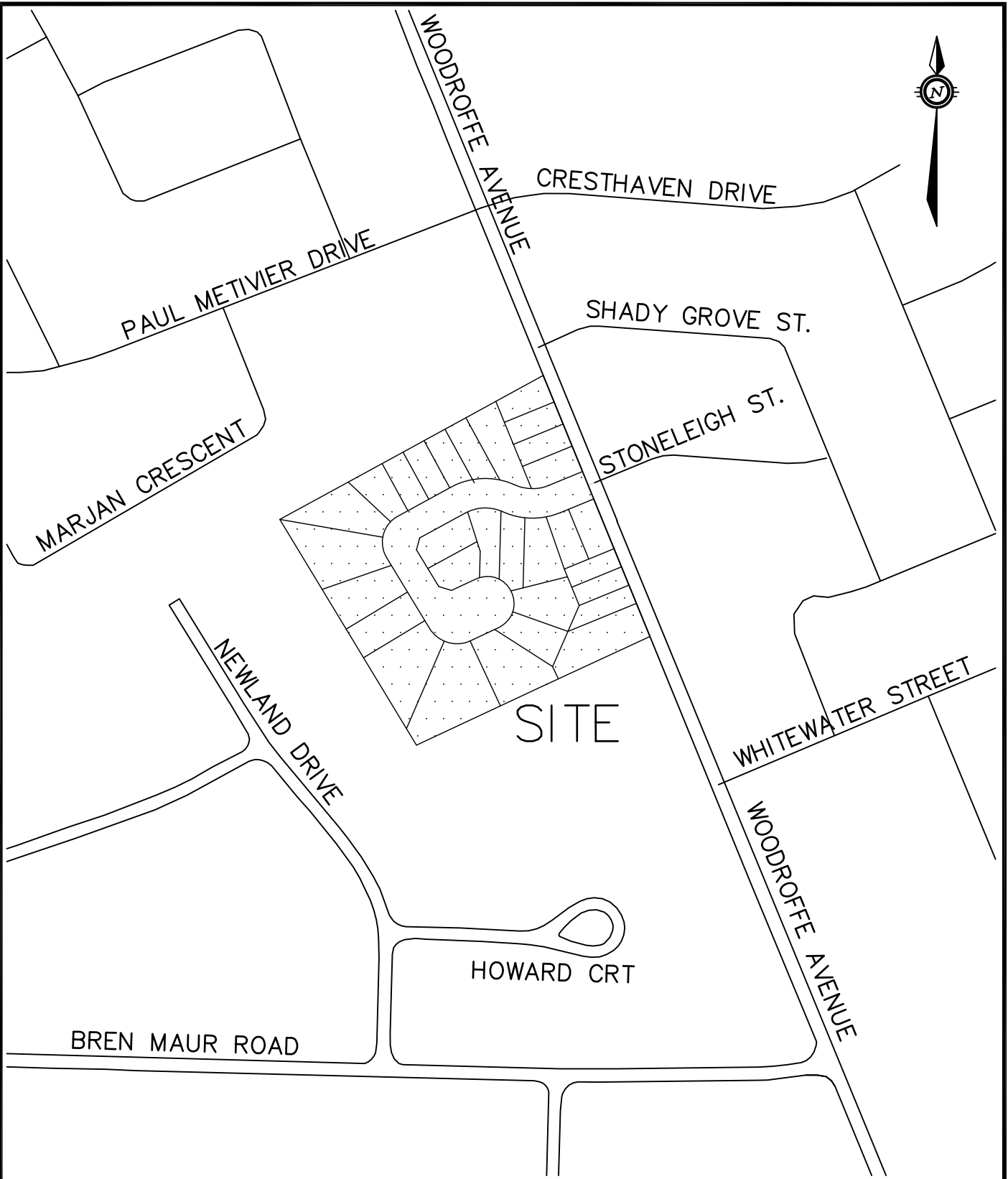
Day-time Period: (16 hr) 07:00 to 23:00 55 dBA Leq

0 < Leq < 55 dBA no measures are required
55 < Leq < 65 dBA provision for future A/C plus warning clause
65 < Leq mandatory A/C, building component design plus warning clause

2.1.3 Sound Level Criteria for Indoor Bedroom at Plane of Window (POW)

Night-time Period: (8 hr) 23:00 to 07:00 50 dBA Leq

0 < Leq < 50 dBA no measures are required
50 < Leq < 60 dBA provision for future A/C plus warning clause
60 < Leq mandatory A/C, building component design plus warning clause



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scale	N.T.S.	CLIENT:	BORRELLO SUBDIVISION	project no.	14057
date	22/05/15	TITLE:	KEY PLAN		FIG 1.0
drawn by	JHB				

2.2 Attenuation Requirements

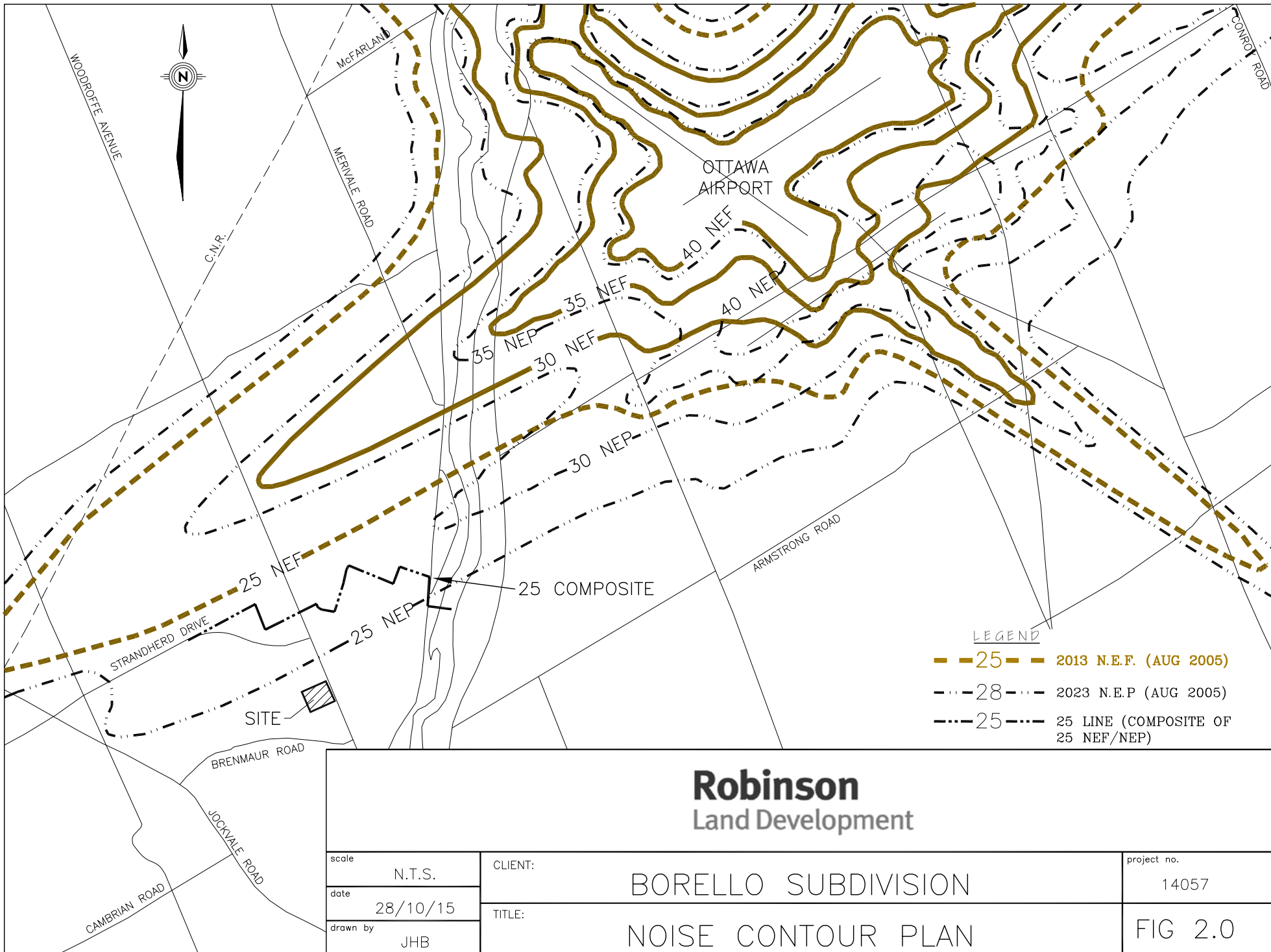
The Sound Level Limits as given in Section 2.1 could be more thoroughly described as:

- i. No control measures are required if the noise levels do not exceed the criteria for each location.
- ii. If the day-time outside living area (OLA) sound level exceeds 60 dBA then noise control measures are required to meet the criteria of 55 dBA.
- iii. If the night-time sound level at the outside wall exceeds Leq 50 dBA but is less than or equal to 60 dBA, or if the day-time sound level at the outside wall exceeds Leq 55 dBA but is less than or equal to 65 dBA, then provision for future installation of central air-conditioning is required. The appropriate notice(s) on title to this effect is to be included in all relevant Development Agreements.
- iv. If the night-time sound level at the outside wall of a bedroom exceeds Leq 60 dBA, or if the day-time sound level at the outside wall of a living/dining room exceeds Leq 65 dBA then central air-conditioning is mandatory. The location and installation of the air-conditioner must comply with the noise criteria of NPC-216 and guidelines of Environmental Noise Guidelines for Installation of Residential Air-conditioning Equipment. Furthermore, building components (windows, doors and walls) must be specified and designed to reduce the indoor sound levels to 40 dBA for sleeping quarters and 45 dBA for living quarters. The appropriate notice(s) on title to this effect is to be included in all relevant Development Agreements.

3.0 ANALYSIS AND PROCEDURE

3.1 Noise Sources

The proposed development will be subjected to noise generated from the vehicular traffic travelling along Woodroffe Avenue. The site is located approximately 5 kilometres southwest of the McDonald-Cartier Airport; however, the development is below the 25 line (composite of both the 25 NEF/NEP) on the Airports design dated August 2005, and, therefore, no further assessment of aircraft noise is required. The location of the NEF and NEP are shown on the attached **Figure 2**.



LEGEND

- 25 2013 N.E.F. (AUG 2005)
- 28 2023 N.E.P (AUG 2005)
- 25 25 LINE (COMPOSITE OF 25 NEF/NEP)

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<small>scale</small>	N.T.S.	<small>CLIENT:</small>	project no.
<small>date</small>	28/10/15	BORELLO SUBDIVISION	
<small>drawn by</small>	JHB	TITLE: NOISE CONTOUR PLAN	
			14057
			FIG 2.0

3.2 Noise Levels Associated with Road Traffic

3.2.1 Traffic Information

	ROW Width (m)	Implied Roadway Class	AADT Veh/Day	Posted Speed Km/Hr	Day/Night Split % / %	Medium Trucks %	Heavy Trucks %
A	37.5-44.5	6-Lane Urban Arterial-Divided (6-UAD)	50,000	50-80	92/8	7	5
	34-37.5	4-Lane Urban Arterial-Divided (4-UAD)	35,000	50-80	92/8	7	5
	23-34	4-Lane Urban Arterial-Undivided (4-UAU)	30,000	50-80	92/8	7	5
	23-34	4-Lane Major Collector (4-UMCU)	24,000	40-60	92/8	7	5
	30-35.5	2-Lane Rural Arterial (2-RAU)	15,000	50-80	92/8	7	5
	20-30	2-Lane Urban Arterial (2-UAU)	15,000	50-80	92/8	7	5
	20-30	2-Lane Major Collector (2-UMCU)	12,000	40-60	92/8	7	5
	30-35.5	2-Lane Outer Rural Arterial (near the extremities of the city)(2-RAU)	10,000	50-80	92/8	7	5
	20-30	2-Lane Urban Collector	8,000	40-50	92/8	7	5

A) Woodroffe Avenue

(i)	R.O.W. Width	21.5 m.
(ii)	Roadway Class	2-Lane Major Collector
(iii)	Posted Speed Limit	50 km/hr
(iv)	Road Gradient	0 to 3.0 %
(v)	Road Pavement Type	Typical Asphalt
(vi)	Topography	Flat/Gentle Slope with barrier as required
(vii)	AADT	12,000 VPD

3.2.2 Alignment and Grade

The alignment and grades for Woodroffe Avenue are indicated on the attached drawing 14057-GR1 in Appendix C.

3.2.3 Noise Level Calculations

Calculations for roadway noise level predictions were completed using the Ministry of the Environment "STAMSON 5.02" computer software program.

In order to establish the projected noise levels affecting the site, the following assumptions

were made:

Receiver Locations:	For outdoor sound levels: 3.0m from facade and 1.5m above ground.
Centre-Line Off-Set:	Woodroffe Avenue to be a 21.5m right-of-way with the centre-line of the roadway being 10.75m from the property line.
Minimum Setbacks:	6.0m rear-yard setback from the building to the property line. 3.0m front-yard setback from the building to the property line. 3.0m corner side yard setback from the building to the property line. 0.6m to 1.2m side-yard setback from the building to the property line.
Receiver Heights:	Signal Homes First floor receiver height – 1.5m (Living/Dining Room) Second floor receiver – 4.5m (Bedroom)

The predicted noise levels for the day-time and night-time periods were calculated for the receivers at the locations as shown on Drawing 14057-N101 in Appendix B.

Table 1
Location of Receiver

Receiver	Location	Distance to Centre-Line of Road Woodroffe Avenue
R1	Lot 1; front outside Exterior wall/Bedroom window	15.7m
R2	Lot 26; side outside Exterior wall/Bedroom window	15.7m
R3	Lot 26; rear outside Exterior wall/Bedroom window	20.0m
R4	Lot 25; OLA Exterior wall/Bedroom window	30.7m
R5	Lot 1; OLA Exterior wall/Bedroom window	35.0m
R6	Lot 4; OLA Exterior wall/Bedroom window	35.0m
R7	Lot 25; front outside Exterior wall/Bedroom window	28.5m
R8	Lot 30; front outside Exterior wall/Bedroom window	15.8m
R9	Lot 30; OLA Exterior wall/Bedroom window	35.0m

4.0 RESULTS OF CALCULATIONS AND DISCUSSION

Noise levels were determined for both day-time and night-time periods at nine (9) different

location as shown on Drawing 14057 - N101. As the noise levels will be the highest at these locations, the calculations represent the worst cases with respect to noise levels on the site. When required, the calculations were based on sound barriers being placed at the location assessed.

Table 2
Noise Levels Associated With Vehicular Traffic

Receiver I.D.	Location	Unattenuated Noise (dBA)	Attenuated Noise (dBA)
R1	Lot 1; front outside POW (DAY)	65.73	
	Exterior wall Bedroom window (NIGHT)	58.30	
R2	Lot 26; side outside POW (DAY)	65.73	
	Exterior wall/Bedroom window (NIGHT)	58.30	
R3	Lot 26; rear outside OLA (DAY)	62.99	55.11
	Exterior wall/Bedroom window (NIGHT)	55.59	55.59
R4	Lot 25; rear outside OLA (DAY)	57.70	
	Exterior wall/Bedroom window (NIGHT)	50.41	
R5	Lot 1; rear outside OLA (DAY)	59.12	
	Exterior wall/Bedroom window (NIGHT)	51.96	
R6	Lot 4; rear outside OLA (DAY)	59.06	
	Exterior wall/Bedroom window (NIGHT)	51.46	
R7	Lot 25; front outside POW (DAY)	60.62	
	Exterior wall/Bedroom window (NIGHT)	53.02	
R8	Lot 30; front outside POW (DAY)	66.31	
	Exterior wall/Bedroom window (NIGHT)	58.88	
R9	Lot 30; rear outside OLA (DAY)	57.56	
	Exterior wall/Bedroom window (NIGHT)	50.45	

Note: The reports generated by the STAMSON software may be found in Appendix A.

5.0 NOISE CONTROL MEASURES

5.1 Outdoor Measures

5.1.1 As noted in Section 2.2, the Ministry of Environment and Energy has established that when the excess above the recommended OLA sound level limits is between 1 dBA and 5 dBA, residential development can be completed with no excessive noise control measures incorporated into the site. However, prospective purchasers (buyers and/or tenants) should be advised of the slight noise problem.

5.1.2 The day time noise levels shown in Table 2 indicate that Lot 26 has a requirement for measures to provide noise attenuation for the private backyard or deck area. This lot is to be provided with a 2.20 high noise barrier (as shown on 14057-N101).

Lot 26

5.2 Indoor Measures

When noise levels at the building face of the units exceed 65 dBA (daytime) and/or 60 dBA

(night-time) they require the mandatory installation of central air conditioning, a review of building components to achieve indoor sound level criteria (per Section 2.2(v)), and a Type D warning clause (clauses are detailed in Section 6.0). The affected units are summarized in Table 3 in Section 7.0.

Lots 1-4
Lots 26-30

6.0 WARNING CLAUSES

The suggested wording of the warning clauses are as follows:

- A Purchasers/tenants are advised that despite and inclusion of noise control features in this development and within the building units, sound levels due to increasing road traffic may, on occasion, interfere with some activities of the dwelling occupants as the sound levels exceed the sound level limits of the City and the Ministry of the Environment and Climate Change.

To ensure that provincial sound level limits are not exceeded, this dwelling unit has been designed with the provision for central air conditioning (or similar mechanical systems). The 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 and Climate Change.”

- B Purchasers/tenants are advised that despite and inclusion of noise control features in this development and within the building units, sound levels due to increasing road traffic may, on occasion, interfere with some activities of the dwelling occupants as the sound levels exceed the sound level limits of the City and the Ministry of the Environment and Climate Change.

To ensure that provincial sound level limits are not exceeded, this dwelling unit has been supplied with central air conditioning system (or similar mechanical systems). The 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 and Climate Change.”

- C “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 may, on occasion, interfere with some activities of the dwelling occupants as the sound levels exceed the sound level limits of the City and the Ministry of the Environment.

To help address the need for sound attenuation this development includes:

- multi-pane glass;
- double brick veneer;
- an acoustic barrier.

To ensure that provincial sound level limits are not exceeded it is important to maintain these sound attenuation features.

The acoustic barrier shall be maintained and kept in good repair by the property owner. Any maintenance, repair or replacement is the responsibility of the owner and shall be with the same material or to the same standards, having the same colour, appearance and function of the original.

This dwelling unit has been supplied with central air conditioning system (or similar mechanical systems). The 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

7.0 RECOMMENDATIONS AND CONCLUSIONS

The foregoing Sections indicate that some of the units to be constructed in this development will be affected by vehicular traffic noise. The housing units are to be constructed with the building envelope capable of reducing the predicted night time noise to a level that would satisfy the M.O.E. guidelines. The proposed warning clauses and measures are summarized in the following Table 3.

Table 3
Warning Clause Requirements

Receiver I.D.	Location	Warning Clauses Required (Detailed In Section 6.0)	Mandatory A/C	Building Envelope Review
R1	Lot 1; front outside	B	Yes	Yes
R2	Lot 26; side outside	C	Yes	Yes
R3	Lot 26; rear outside	C		
R4	Lot 25; rear outside	A		
R5	Lot 1; rear outside			
R6	Lot 4; rear outside			
R7	Lot 25; front outside	A		
R8	Lot 30; front outside	B	Yes	Yes
R9	Lot 30; rear outside			
*Represented by results from R1	Lots 1-4,	B	Yes	Yes
*Represented by results from R8	Lots 27-30	B	Yes	Yes

Prepared By:

Reviewed By:

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Appendix A

Noise Analysis Results
Stamson Reports

Filename: r1.te Time Period: Day/Night 16/8 hours
 Description:

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

 Car traffic volume : 9715/845 veh/TimePeriod
 Medium truck volume : 773/67 veh/TimePeriod
 Heavy truck volume : 552/48 veh/TimePeriod
 Posted speed limit : 50 km/h
 Road gradient : 0 %
 Road pavement : 1 (Typical asphalt or concrete)

Data for Segment # 1: Woodroffe (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 : 15.70 / 15.70 m
 Receiver height : 1.50 / 4.50 m
 Topography : 1 (Flat/gentle slope; no barrier)
 Reference angle : 0.00

Results segment # 1: Woodroffe (day)

 Source height = 1.50 m

ROAD (0.00 + 65.73 + 0.00) = 65.73 dBA

Angle1	Angle2	Alpha	RefLeq	P. Adj	D. Adj	F. Adj	W. Adj	H. Adj	B. Adj	SubLeq
-90	90	0.66	67.51	0.00	-0.33	-1.46	0.00	0.00	0.00	65.73

Segment Leq : 65.73 dBA

Total Leq All Segments: 65.73 dBA

Results segment # 1: Woodroffe (night)

 Source height = 1.50 m

ROAD (0.00 + 58.30 + 0.00) = 58.30 dBA

Angle1	Angle2	Alpha	RefLeq	P. Adj	D. Adj	F. Adj	W. Adj	H. Adj	B. Adj	SubLeq
-90	90	0.57	59.91	0.00	-0.31	-1.30	0.00	0.00	0.00	58.30

Segment Leq : 58.30 dBA

Total Leq All Segments: 58.30 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 65.73
 (NIGHT): 58.30

Filename: r2.te Time Period: Day/Night 16/8 hours
 Description:

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

 Car traffic volume : 9715/845 veh/TimePeriod
 Medium truck volume : 773/67 veh/TimePeriod
 Heavy truck volume : 552/48 veh/TimePeriod
 Posted speed limit : 50 km/h
 Road gradient : 1 %
 Road pavement : 1 (Typical asphalt or concrete)

Data for Segment # 1: Woodroffe (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 : 15.70 / 15.70 m
 Receiver height : 1.50 / 4.50 m
 Topography : 1 (Flat/gentle slope; no barrier)
 Reference angle : 0.00

Results segment # 1: Woodroffe (day)

 Source height = 1.50 m

ROAD (0.00 + 65.73 + 0.00) = 65.73 dBA

Angle1	Angle2	Alpha	RefLeq	P. Adj	D. Adj	F. Adj	W. Adj	H. Adj	B. Adj	SubLeq
-90	90	0.66	67.51	0.00	-0.33	-1.46	0.00	0.00	0.00	65.73

Segment Leq : 65.73 dBA

Total Leq All Segments: 65.73 dBA

Results segment # 1: Woodroffe (night)

 Source height = 1.50 m

ROAD (0.00 + 58.30 + 0.00) = 58.30 dBA

Angle1	Angle2	Alpha	RefLeq	P. Adj	D. Adj	F. Adj	W. Adj	H. Adj	B. Adj	SubLeq
-90	90	0.57	59.91	0.00	-0.31	-1.30	0.00	0.00	0.00	58.30

Segment Leq : 58.30 dBA

Total Leq All Segments: 58.30 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 65.73
 (NIGHT): 58.30

Filename: r3.te Time Period: Day/Night 16/8 hours
 Description:

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

 Car traffic volume : 9715/845 veh/TimePeriod
 Medium truck volume : 773/67 veh/TimePeriod
 Heavy truck volume : 552/48 veh/TimePeriod
 Posted speed limit : 50 km/h
 Road gradient : 1 %
 Road pavement : 1 (Typical asphalt or concrete)

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

 Angle1 Angle2 : -45.00 deg 75.00 deg
 Wood depth : 0 (No woods.)
 No of house rows : 0 / 0
 Surface : 1 (Absorptive ground surface)
 Receiver source distance : 20.00 / 20.00 m
 Receiver height : 1.50 / 4.50 m
 Topography : 1 (Flat/gentle slope; no barrier)
 Reference angle : 0.00

Results segment # 1: Woodroffe (day)

 Source height = 1.50 m

ROAD (0.00 + 62.99 + 0.00) = 62.99 dBA

Angle1	Angle2	Alpha	RefLeq	P. Adj	D. Adj	F. Adj	W. Adj	H. Adj	B. Adj	SubLeq
-45	75	0.66	67.51	0.00	-2.07	-2.44	0.00	0.00	0.00	62.99

Segment Leq : 62.99 dBA

Total Leq All Segments: 62.99 dBA

Results segment # 1: Woodroffe (night)

 Source height = 1.50 m

ROAD (0.00 + 55.59 + 0.00) = 55.59 dBA

Angle1	Angle2	Alpha	RefLeq	P. Adj	D. Adj	F. Adj	W. Adj	H. Adj	B. Adj	SubLeq
-45	75	0.57	59.91	0.00	-1.96	-2.36	0.00	0.00	0.00	55.59

Segment Leq : 55.59 dBA

Total Leq All Segments: 55.59 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 62.99
 (NIGHT): 55.59

Filename: r3barr.te Time Period: Day/Night 16/8 hours
 Description:

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

 Car traffic volume : 9715/845 veh/TimePeriod
 Medium truck volume : 773/67 veh/TimePeriod
 Heavy truck volume : 552/48 veh/TimePeriod
 Posted speed limit : 50 km/h
 Road gradient : 1 %
 Road pavement : 1 (Typical asphalt or concrete)

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

 Angle1 Angle2 : -45.00 deg 75.00 deg
 Wood depth : 0 (No woods.)
 No of house rows : 0 / 0
 Surface : 1 (Absorptive ground surface)
 Receiver source distance : 20.00 / 20.00 m
 Receiver height : 1.50 / 4.50 m
 Topography : 2 (Flat/gentle slope; with barrier)
 Barrier angle1 : -45.00 deg Angle2 : 75.00 deg
 Barrier height : 2.20 m
 Barrier receiver distance : 10.00 / 10.00 m
 Source elevation : 101.91 m
 Receiver elevation : 102.40 m
 Barrier elevation : 102.25 m
 Reference angle : 0.00

Results segment # 1: Woodroffe (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	1.40	103.65

ROAD (0.00 + 56.11 + 0.00) = 56.11 dBA

Angle1	Angle2	Alpha	RefLeq	P. Adj	D. Adj	F. Adj	W. Adj	H. Adj	B. Adj	SubLeq
-45	75	0.53	67.51	0.00	-1.91	-2.32	0.00	0.00	-7.17	56.11

Segment Leq : 56.11 dBA

Total Leq All Segments: 56.11 dBA

Results segment # 1: Woodroffe (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	1.40	103.65

R3-BARR

-----+-----+-----+-----
 1.50 ! 4.50 ! 2.90 ! 105.15

ROAD (0.00 + 55.59 + 0.00) = 55.59 dBA

Angle1	Angle2	Alpha	RefLeq	P. Adj	D. Adj	F. Adj	W. Adj	H. Adj	B. Adj	SubLeq
-45	75	0.44	59.91	0.00	-1.80	-2.23	0.00	0.00	-2.51	53.37*
-45	75	0.57	59.91	0.00	-1.96	-2.36	0.00	0.00	0.00	55.59

* Bright Zone !

Segment Leq : 55.59 dBA

Total Leq All Segments: 55.59 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 56.11
 (NIGHT): 55.59

Filename: r4.te Time Period: Day/Night 16/8 hours
 Description:

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

 Car traffic volume : 9715/845 veh/TimePeriod
 Medium truck volume : 773/67 veh/TimePeriod
 Heavy truck volume : 552/48 veh/TimePeriod
 Posted speed limit : 50 km/h
 Road gradient : 1 %
 Road pavement : 1 (Typical asphalt or concrete)

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

 Angle1 Angle2 : -20.00 deg 45.00 deg
 Wood depth : 0 (No woods.)
 No of house rows : 0 / 0
 Surface : 1 (Absorptive ground surface)
 Receiver source distance : 30.70 / 30.70 m
 Receiver height : 1.50 / 4.50 m
 Topography : 1 (Flat/gentle slope; no barrier)
 Reference angle : 0.00

Results segment # 1: Woodroffe (day)

 Source height = 1.50 m

ROAD (0.00 + 57.70 + 0.00) = 57.70 dBA

Angle1	Angle2	Alpha	RefLeq	P. Adj	D. Adj	F. Adj	W. Adj	H. Adj	B. Adj	SubLeq
-20	45	0.66	67.51	0.00	-5.16	-4.65	0.00	0.00	0.00	57.70

Segment Leq : 57.70 dBA

Total Leq All Segments: 57.70 dBA

♀
 Results segment # 1: Woodroffe (night)

 Source height = 1.50 m

ROAD (0.00 + 50.41 + 0.00) = 50.41 dBA

Angle1	Angle2	Alpha	RefLeq	P. Adj	D. Adj	F. Adj	W. Adj	H. Adj	B. Adj	SubLeq
-20	45	0.57	59.91	0.00	-4.88	-4.62	0.00	0.00	0.00	50.41

Segment Leq : 50.41 dBA

Total Leq All Segments: 50.41 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 57.70
 (NIGHT): 50.41

Filename: r5.te Time Period: Day/Night 16/8 hours
 Description:

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

 Car traffic volume : 9715/845 veh/TimePeriod
 Medium truck volume : 773/67 veh/TimePeriod
 Heavy truck volume : 552/48 veh/TimePeriod
 Posted speed limit : 50 km/h
 Road gradient : 0 %
 Road pavement : 1 (Typical asphalt or concrete)

Data for Segment # 1: Woodroffe (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 : 35.00 / 35.00 m
 Receiver height : 1.50 / 4.50 m
 Topography : 1 (Flat/gentle slope; no barrier)
 Reference angle : 0.00

Results segment # 1: Woodroffe (day)

 Source height = 1.50 m

ROAD (0.00 + 59.12 + 0.00) = 59.12 dBA

Angle1	Angle2	Alpha	RefLeq	P. Adj	D. Adj	F. Adj	W. Adj	H. Adj	B. Adj	SubLeq
-90	45	0.66	67.51	0.00	-6.11	-2.29	0.00	0.00	0.00	59.12

Segment Leq : 59.12 dBA

Total Leq All Segments: 59.12 dBA

Results segment # 1: Woodroffe (night)

 Source height = 1.50 m

ROAD (0.00 + 51.96 + 0.00) = 51.96 dBA

Angle1	Angle2	Alpha	RefLeq	P. Adj	D. Adj	F. Adj	W. Adj	H. Adj	B. Adj	SubLeq
-90	45	0.57	59.91	0.00	-5.78	-2.18	0.00	0.00	0.00	51.96

Segment Leq : 51.96 dBA

Total Leq All Segments: 51.96 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 59.12
 (NIGHT): 51.96

Filename: r6.te Time Period: Day/Night 16/8 hours
 Description:

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

 Car traffic volume : 9715/845 veh/TimePeriod
 Medium truck volume : 773/67 veh/TimePeriod
 Heavy truck volume : 552/48 veh/TimePeriod
 Posted speed limit : 50 km/h
 Road gradient : 0 %
 Road pavement : 1 (Typical asphalt or concrete)

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

 Angle1 Angle2 : 0.00 deg 60.00 deg
 Wood depth : 0 (No woods.)
 No of house rows : 0 / 0
 Surface : 2 (Reflective ground surface)
 Receiver source distance : 35.00 / 35.00 m
 Receiver height : 1.50 / 4.50 m
 Topography : 1 (Flat/gentle slope; no barrier)
 Reference angle : 0.00

Results segment # 1: Woodroffe (day)

 Source height = 1.50 m

ROAD (0.00 + 59.06 + 0.00) = 59.06 dBA

Angle1	Angle2	Alpha	RefLeq	P. Adj	D. Adj	F. Adj	W. Adj	H. Adj	B. Adj	SubLeq
0	60	0.00	67.51	0.00	-3.68	-4.77	0.00	0.00	0.00	59.06

Segment Leq : 59.06 dBA

Total Leq All Segments: 59.06 dBA

Results segment # 1: Woodroffe (night)

 Source height = 1.50 m

ROAD (0.00 + 51.46 + 0.00) = 51.46 dBA

Angle1	Angle2	Alpha	RefLeq	P. Adj	D. Adj	F. Adj	W. Adj	H. Adj	B. Adj	SubLeq
0	60	0.00	59.91	0.00	-3.68	-4.77	0.00	0.00	0.00	51.46

Segment Leq : 51.46 dBA

Total Leq All Segments: 51.46 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 59.06
 (NIGHT): 51.46

Filename: r7.te Time Period: Day/Night 16/8 hours
 Description:

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

 Car traffic volume : 9715/845 veh/TimePeriod
 Medium truck volume : 773/67 veh/TimePeriod
 Heavy truck volume : 552/48 veh/TimePeriod
 Posted speed limit : 50 km/h
 Road gradient : 1 %
 Road pavement : 1 (Typical asphalt or concrete)

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

 Angle1 Angle2 : -70.00 deg 0.00 deg
 Wood depth : 0 (No woods.)
 No of house rows : 0 / 0
 Surface : 2 (Reflective ground surface)
 Receiver source distance : 28.50 / 28.50 m
 Receiver height : 1.50 / 4.50 m
 Topography : 1 (Flat/gentle slope; no barrier)
 Reference angle : 0.00

Results segment # 1: Woodroffe (day)

 Source height = 1.50 m

ROAD (0.00 + 60.62 + 0.00) = 60.62 dBA

Angle1	Angle2	Alpha	RefLeq	P. Adj	D. Adj	F. Adj	W. Adj	H. Adj	B. Adj	SubLeq
-70	0	0.00	67.51	0.00	-2.79	-4.10	0.00	0.00	0.00	60.62

Segment Leq : 60.62 dBA

Total Leq All Segments: 60.62 dBA

Results segment # 1: Woodroffe (night)

 Source height = 1.50 m

ROAD (0.00 + 53.02 + 0.00) = 53.02 dBA

Angle1	Angle2	Alpha	RefLeq	P. Adj	D. Adj	F. Adj	W. Adj	H. Adj	B. Adj	SubLeq
-70	0	0.00	59.91	0.00	-2.79	-4.10	0.00	0.00	0.00	53.02

Segment Leq : 53.02 dBA

Total Leq All Segments: 53.02 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 60.62
 (NIGHT): 53.02

Filename: r8.te Time Period: Day/Night 16/8 hours
 Description:

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

 Car traffic volume : 9715/845 veh/TimePeriod
 Medium truck volume : 773/67 veh/TimePeriod
 Heavy truck volume : 552/48 veh/TimePeriod
 Posted speed limit : 50 km/h
 Road gradient : 3 %
 Road pavement : 1 (Typical asphalt or concrete)

Data for Segment # 1: Woodroffe (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 : 15.80 / 15.80 m
 Receiver height : 1.50 / 4.50 m
 Topography : 1 (Flat/gentle slope; no barrier)
 Reference angle : 0.00

Results segment # 1: Woodroffe (day)

 Source height = 1.50 m

ROAD (0.00 + 66.31 + 0.00) = 66.31 dBA

Angle1	Angle2	Alpha	RefLeq	P. Adj	D. Adj	F. Adj	W. Adj	H. Adj	B. Adj	SubLeq
-90	90	0.66	68.14	0.00	-0.37	-1.46	0.00	0.00	0.00	66.31

Segment Leq : 66.31 dBA

Total Leq All Segments: 66.31 dBA

Results segment # 1: Woodroffe (night)

 Source height = 1.50 m

ROAD (0.00 + 58.88 + 0.00) = 58.88 dBA

Angle1	Angle2	Alpha	RefLeq	P. Adj	D. Adj	F. Adj	W. Adj	H. Adj	B. Adj	SubLeq
-90	90	0.57	60.54	0.00	-0.35	-1.30	0.00	0.00	0.00	58.88

Segment Leq : 58.88 dBA

Total Leq All Segments: 58.88 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 66.31
 (NIGHT): 58.88

Filename: r9.te Time Period: Day/Night 16/8 hours
 Description:

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

 Car traffic volume : 9715/845 veh/TimePeriod
 Medium truck volume : 773/67 veh/TimePeriod
 Heavy truck volume : 552/48 veh/TimePeriod
 Posted speed limit : 50 km/h
 Road gradient : 3 %
 Road pavement : 1 (Typical asphalt or concrete)

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

 Angle1 Angle2 : 0.00 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 / 4.50 m
 Topography : 1 (Flat/gentle slope; no barrier)
 Reference angle : 0.00

Results segment # 1: Woodroffe (day)

 Source height = 1.50 m

ROAD (0.00 + 57.56 + 0.00) = 57.56 dBA

Angle1	Angle2	Alpha	RefLeq	P. Adj	D. Adj	F. Adj	W. Adj	H. Adj	B. Adj	SubLeq
0	90	0.66	68.14	0.00	-6.11	-4.47	0.00	0.00	0.00	57.56

Segment Leq : 57.56 dBA

Total Leq All Segments: 57.56 dBA

Results segment # 1: Woodroffe (night)

 Source height = 1.50 m

ROAD (0.00 + 50.45 + 0.00) = 50.45 dBA

Angle1	Angle2	Alpha	RefLeq	P. Adj	D. Adj	F. Adj	W. Adj	H. Adj	B. Adj	SubLeq
0	90	0.57	60.54	0.00	-5.78	-4.31	0.00	0.00	0.00	50.45

Segment Leq : 50.45 dBA

Total Leq All Segments: 50.45 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 57.56
 (NIGHT): 50.45

Appendix B

Drawing 14057–N101
Noise Analysis Site Plan



LEGEND

R11 ● RECEIVER LOCATION AND ID

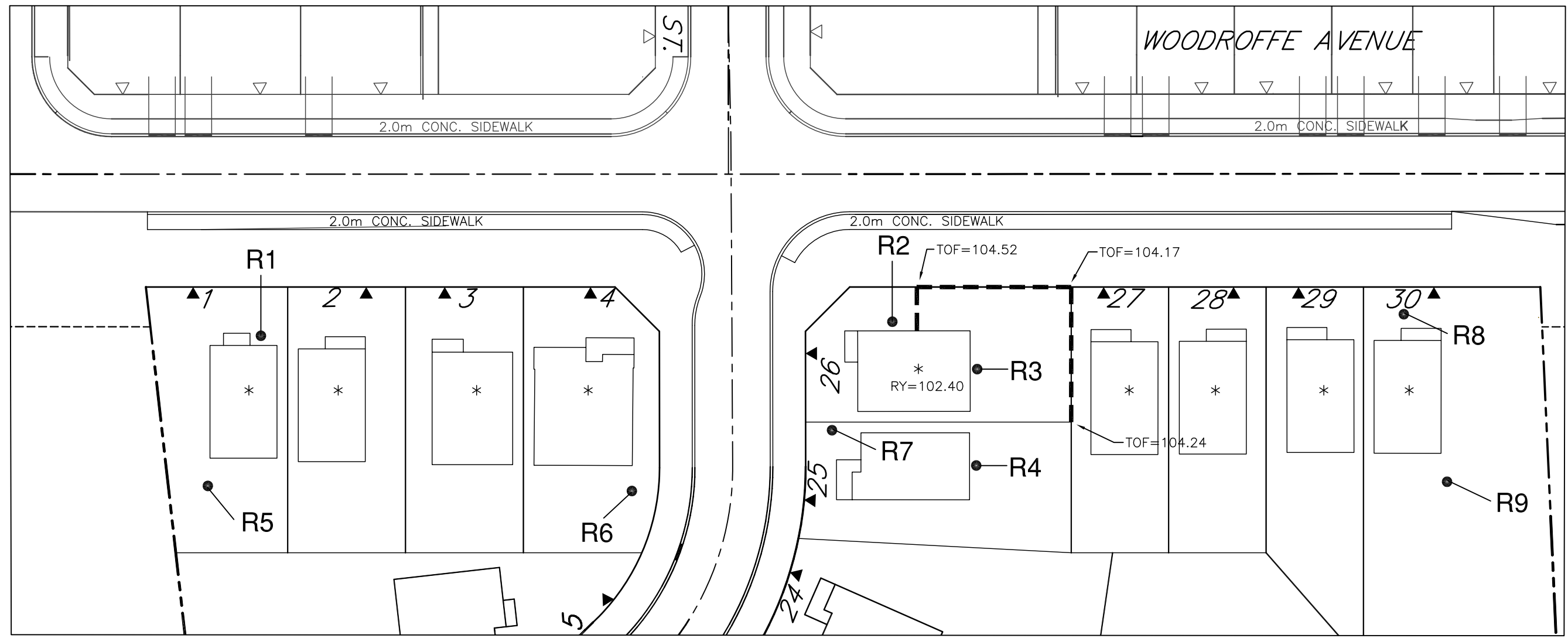
* UNITS REQUIRING CENTRAL AIR CONDITIONING

----- 2.20m HIGH NOISE BARRIER

TOF=96.65 TOP OF NOISE BARRIER

RY=94.65 FINISHED GRADE AT REAR OF HOUSE

REFER TO GRADING PLAN
14057-GR1 FOR GRADING DETAILS



Filename: p:\14\14057\drawings\14057 - n101.dwg
 Last Saved: 2/16/2017 8:30:00 AM
 Last Plotted: 2/16/2017 9:20:30 AM
 Plotted by: jburns
 Pen Table: rfd-750 scale.ctb

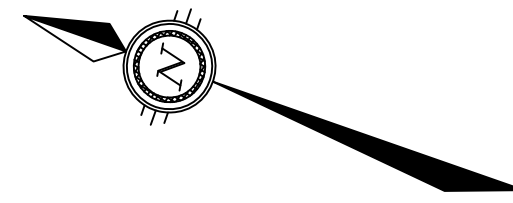
Robinson
Land Development

<small>scale</small>	1:500	<small>CLIENT:</small>	project no.
<small>date</small>	10/12/15	MINTO CHAPMAN MILLS ENVIRONMENTAL NOISE IMPACT ASSESSMENT SITE PLAN	14057
<small>drawn by</small>	JHB		N101

No.	REVISION	DATE	BY
3.	REVISED PER CITY COMMENTS	FEB 16/17	SMC
2.	REVISED PER CITY COMMENTS	SEPT 15/16	SMC
1.	ISSUED FOR APPROVAL	DEC 10/15	SMC

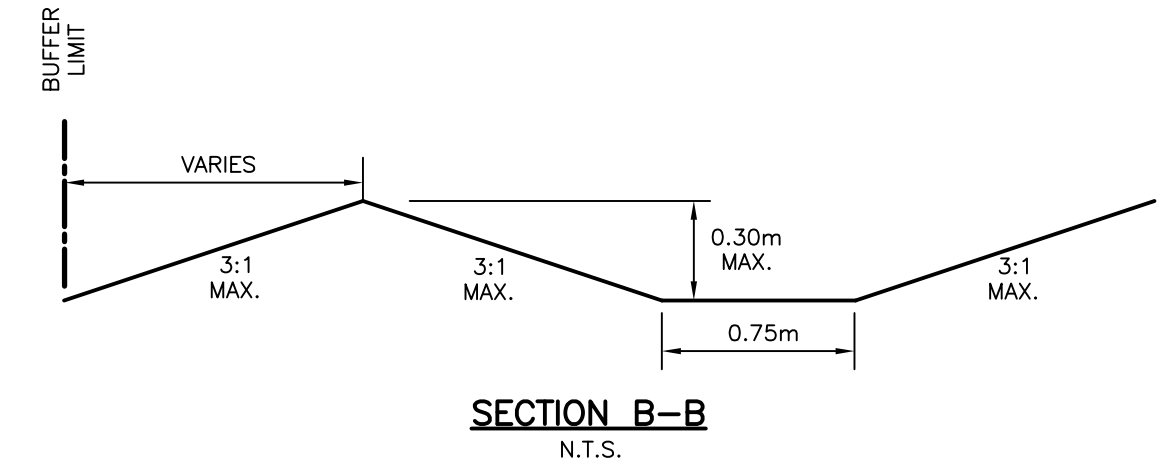
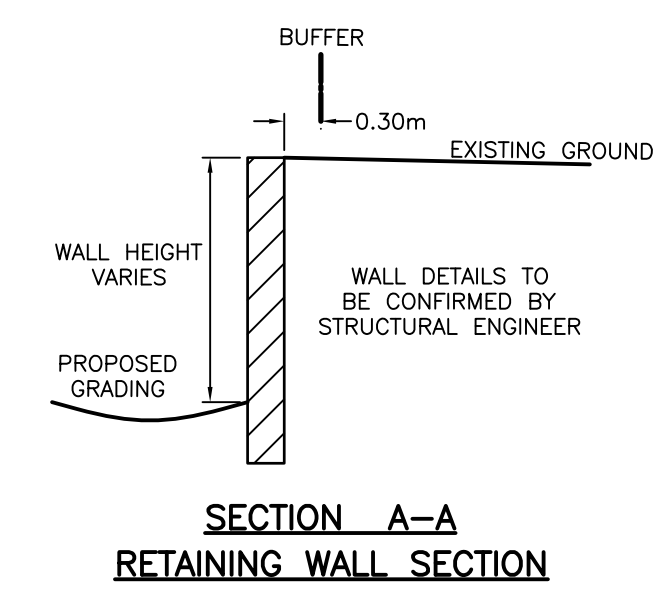
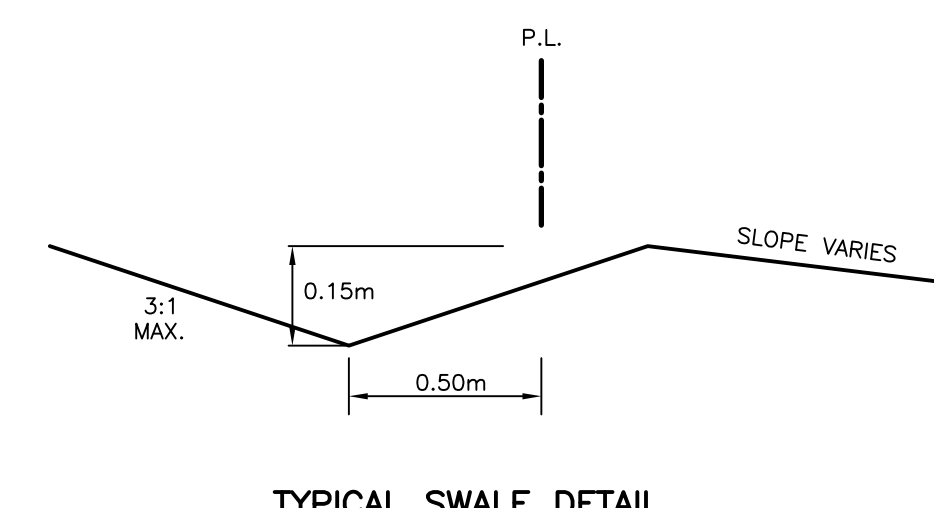
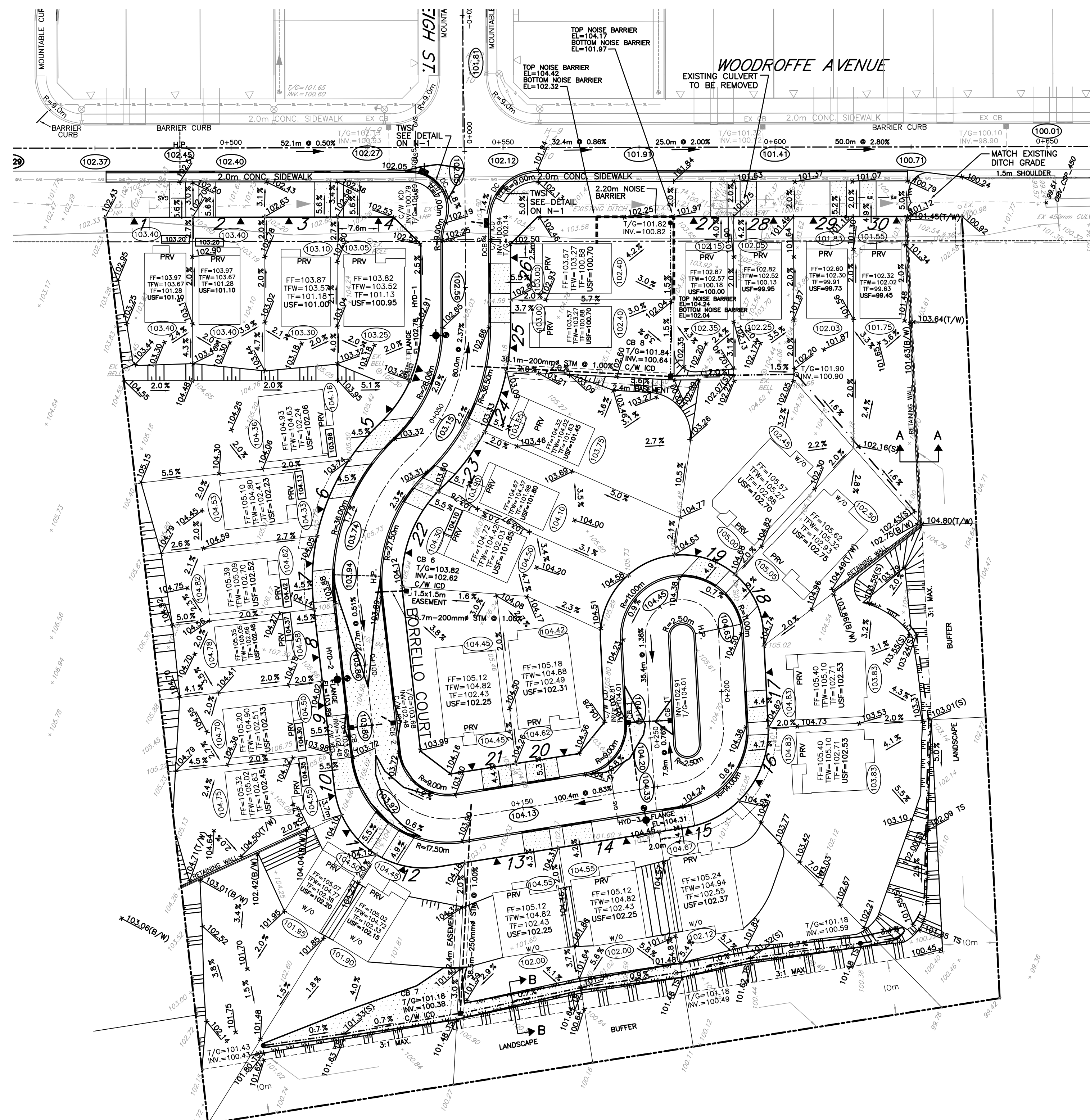
Appendix C

Drawing 14057-Gr1
Grading Plan



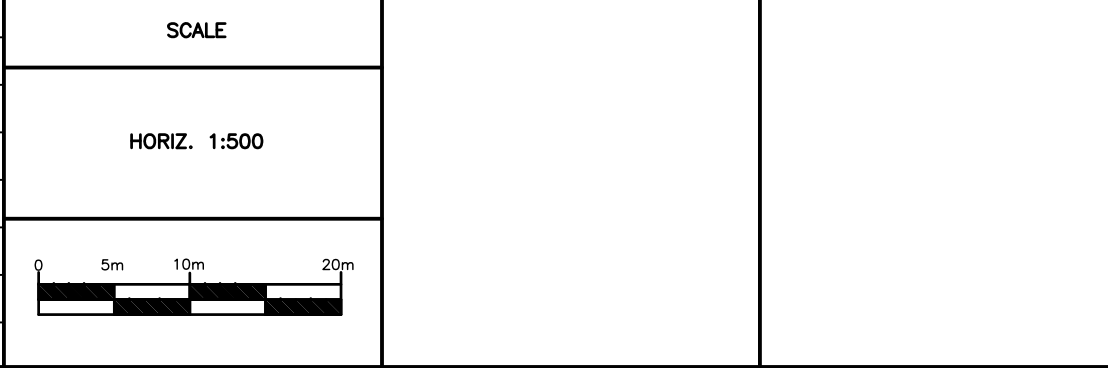
LEGEND

- ▲ PROPOSED SERVICE LATERAL LOCATION
- SINGLE SERVICE
- 135mm SANITARY
- 100mm STORM
- 19mm WATERMAIN
- DRIVEWAY LOCATION
- STREET CATCHBASIN
- REAR YARD CATCHBASIN
- CB T6 CATCHBASIN OUTLETTING TO ANOTHER CATCHBASIN
- CB 6 CATCHBASIN OUTLETTING DIRECTLY TO STORM SEWER SYSTEM
- SWALE c/w SUBDRAIN
- SWALE w/o SUBDRAIN
- PROPOSED DITCH
- EXISTING DITCH
- EASEMENT
- TERRACING
- REAR YARD ELBOW CATCHBASIN
- REAR YARD TEE CATCHBASIN
- (91.80) PROPOSED TERRACE GRADE OR CENTRELINE ROAD GRADE
- (91.70) PROPOSED DRIVEWAY GRADE AT GARAGE
- PROPOSED GRADE
- EXISTING ELEVATION
- 2.5% DRAINAGE DIRECTION AND SLOPE
- PRV PRESSURE REDUCING VALVE REQUIRED
- PONDING AREA



NOTES
 THE POSITION OF ALL POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, DETERMINE THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

NO.	REVISION DESCRIPTION	DATE	BY
5	REVISED PER CITY COMMENTS	21/02/17	SMC
4	REVISED PER CITY COMMENTS	28/09/16	SMC
3	REVISED PER CITY COMMENTS	17/06/16	SMC
2	REVISED PER CITY COMMENTS	10/12/15	SMC
1	ISSUED FOR REVIEW	25/05/15	SMC



Robinson
 Land Development
 350 PALLADIUM DRIVE
 KANATA, ONTARIO K2V 1A8
 TELEPHONE (613) 592-6060

DESIGN	JHB
CHECKED	SMC
DRAWN	JHB
CHECKED	SMC
APPROVED	SMC

BORRELLO SUBDIVISION

514 KOCHAR DRIVE
OTTAWA, ON
K2C 4H3

GRADING AND DRAINAGE PLAN

PROJECT NO.	14057
SURVEY	RLD
DATED	MAY 2015
DWG. No:	14057-GR1