

Geotechnical
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Environmental Noise Control Study - Stationary Noise Component

Proposed Residential Development
Brazeau Lands
Borrisokane Road - Ottawa

Prepared For

Caivan Communities

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1.0 Introduction

Paterson Group (Paterson) was commissioned by Caivan Communities to conduct a Stationary Noise Review to supplement the Noise Feasibility study prepared by Gradient Wind for the proposed residential development to be located at Borrisokane Road, in the City of Ottawa. A Report entitled Traffic Noise Feasibility Assessment - Brazeau Subdivision dated December 3 2018 was prepared by Gradient Wind Engineers and Scientists (Gradient Wind) for the subject site. The report prepared by Gradient Wind is an analysis of the surface transportation noise for the phases of the development. It should be noted that Paterson's report was solely prepared to review the stationary noise source, which is identified as the adjacent property (Aggregate extraction operation at Costello Pit).

The following report has been prepared specifically and solely for the aforementioned project which is described herein. It contains our findings and includes acoustical recommendations pertaining to the design and construction of the subject development as they are understood at the time of writing this report.

This study has been conducted according to City of Ottawa document - Engineering Noise Control Guidelines (ENCG), dated January 2016, and the Ontario Ministry of the Environment Guideline NPC-300.

2.0 Background

It is understood that the proposed development will consist of single houses, townhouses and stacked townhouse units. The single houses and townhouses will have outdoor living areas. Local roadways and landscaped areas are also anticipated.

It is further understood that the Costello Pit may cease all operations prior to the commencement of construction, or during construction of the aforementioned residential development. If this is the situation, then the stationary noise source would have been eliminated and all noise attenuation recommendations contained within this document will no longer be required.

3.0 Methodology and Noise Assessment Criteria

Stationary Noise

Stationary noise sources include sources or facilities that are fixed or mobile and can cause a combination of sound and vibration levels emitted beyond the property line. These sources may include commercial air conditioner units, generators and fans. Facilities that may contribute to stationary noise may include car washes, snow disposal sites, transit stations and manufacturing facilities. In this situation, the stationary noise source consists of an existing mineral aggregate pit.

The impact of stationary noise sources are directly related to the location of the subject site within the urban environment. The proposed development can be classified as Class 2 by provincial guidelines and outlined in the ENG, meaning “a suburban areas of the City outside of the busy core where the urban hum is evident but within the urban boundary.”

Table 1 - Guidelines for Stationary Noise - Class 2		
Time of Day	Outdoor Point of Reception	Pane of Window
7:00-19:00	50	50
19:00-23:00	45	50
23:00-7:00	-	45
1. Standards taken from Table 3.2a; Guidelines for Stationary Noise - Steady and Varying Sound		

If the sound level limits are exceeded the following Warning Clause may be referenced:

Table 2 - Warning Clauses for Sound Level Exceedances	
Warning Clause	Description
Warning Clause Type E	"Purchasers/tenants are advised that due to the proximity of the adjacent industry (facility) (utility), noise from the industry (facility) (utility) may at times be audible."
2. Clauses taken from section C8 Warning Clauses; Environmental Noise Guidelines - NPC-300	

4.0 Analysis

The stationary noise source consisting of the Costello Pit was identified within the 300 m radius from the proposed development. It is understood that all mineral extraction within the western portion of the pit has been completed and a line indicating this portion of the pit is noted on Figure 1 included in Appendix 1. It is also understood that the Costello Pit will be terminating the mineral extraction process over the entire pit within the next 2 years. Therefore, this stationary noise source is considered temporary and all analysis and recommendations made with respect to this stationary noise source can be removed from all deeds of sale once the pit is closed.

The noise sources were modelled as the worst case indicator as specified by the Owner of the Costello Pit. The equipment utilized in the analysis is representative of the equipment that is used for mineral extraction. The equipment consists of an excavator, two loaders, a screener, an idling truck, and a truck route into and out of the existing Costello Pit. A break down of the frequency's and sound levels of this equipment is included in Appendix 1.

Reception points were selected to obtain a broad definition of the noise levels at the outdoor living areas in addition to the pane of glass at the first level of the proposed houses.

The existing mineral extraction pit is the only stationary noise source located within the proximity of the proposed development. The analysis was completed with specialized noise software: Predictor-Lima Version 11.21. Eleven (11) reception points were selected within the 300 m proximity radius for our analysis. The reception points were selected at a 1.5 m elevations, so that both pane of glass and outdoor living areas could be interpolated. The results of these reception points are included in Appendix 1.

5.0 Discussion

Results of the analysis can be found in Appendix 1. Reception points were analyzed at a 1.5 m elevation. Due to the proximity of the stationary noise source, it is recommended that the northernmost houses that are within 30 m of the active aggregate pit not be constructed.

It is also understood that the existing Costello Pit may cease operations before or during the construction of the aforementioned residential development. Therefore, if the Costello Pit is no longer in operation, all recommendations provided in this report are no longer valid and should be disregarded.

An analysis was completed for the proposed residential development, taking into consideration the lot layouts and approximate dwelling alignment. An initial analysis was performed with no sound mitigation measures. This analysis resulted in a maximum value of 61 dBA, which is well above the 50 dBA limit. Therefore, noise mitigation measures will be required.

As per the Environmental Noise Guidelines prepared by the City of Ottawa, the following chart outlines the procedures to follow for exceedances to the stationary noise levels.

Table 3 - Noise Control Measures for New Development in Proximity to Stationary Noise Sources	
Primary Mitigation Measure in order of Preference	Proposed Mitigation Measure
Insertion of noise insensitive land uses between the source and sensitive receptors	No development is to occur within 30 m of the Costello Pit while it is in operation
Orientation of buildings to provide quiet zones in rear yards, interior spaces and amenity areas	only rear yards located on the western portion of the development will have rear yards are directly exposed to the Costello Pit.
construction techniques, enhanced construction quality	Exceedances for outdoor living areas only - standard construction techniques are considered acceptable.
earth berms	a 4 m high earth berm is proposed along the northern property line, adjacent to the Costello Pit
acoustic barriers	proposed to protect the back yards of the proposed residential buildings at the western portion of the site..

It is understood that there is a 30 m development setback from the northern property line. Once the Costello Pit ceases mineral extraction operations, those blocks can be constructed.

A 4 m high soil berm is proposed to cross the lots located along the northern property line in order to provide noise mitigation to the remainder of the development. In addition, a 2.2 m high sound barrier is to be constructed along the western property line, to protect the side yards that are exposed to the Costello Pit. This sound barrier is to extend from the soil berm to the main access road, approximately 160 m. In order to be effective, all sound barriers are to be constructed of solid material with no gaps, cracks, holes or openings and must have a minimum surface weight of 20 kg/m². With these noise mitigation measures in place, the maximum value of 59 dBA will still be encountered at reception point 1-2 and 56 dBA at reception point 1-1. The remainder of the reception points are either below 50 dBA, or marginally exceeding the 50 dBA threshold by up to 4 dBA. This is considered acceptable with the understanding that the Costello Pit will be a temporary noise source.

Additionally, due to the proximity of the existing stationary noise source, a Warning Clause Type E should be applied to the deeds of sale in if the Costello Pit is still in operation. The wording of the warning clause should be agreed upon by both the Ministry of Natural Resources and the City of Ottawa. A suggested noise warning clause is as follows:

Purchasers/land owners are advised that there is a licensed sand and gravel pit less than 300 metres away and that, from time to time, they may experience noise, dust and/or vibration as a result of the ongoing operations.

6.0 Conclusion

It is understood that the Costello Pit may cease operations prior to construction, or during construction of the proposed development. Therefore, noise mitigation measures for the stationary noise source have been recommended. If the Costello Pit ceases operation at any time, all recommendations provided in this report are no longer required as the noise source has been removed.

If the Costello Pit is in operation for the construction of the development, it is understood that there will be a hold on the northern blocks, and a 4 m high soil berm will be constructed across those lots. In addition, a 2.2 m high sound barrier is to be constructed along the western limit of the development, extending from the soil berm to the main access road, an approximate 160 m length.

Due to the proximity of the Costello Pit, a Warning Clause should be on the deed of sale. Suggested wording is as follows:

Purchasers/land owners are advised that there is a licensed sand and gravel pit less than 300 metres away and that, from time to time, they may experience noise, dust and/or vibration as a result of the ongoing operations.

As it is understood that the Costello Pit will cease all mineral extraction within the next 2 years, this warning clause is considered temporary and is only applicable while the Costello Pit is within operation.

7.0 Statement of Limitations

The recommendations made in this report are in accordance with our present understanding of the project. Our recommendations should be reviewed when the project drawings and specifications are complete.

The present report applies only to the project described in this document. Use of this report for purposes other than those described herein or by person(s) other than the Caivan Communities or their agent(s) is not authorized without review by this firm for the applicability of our recommendations to the altered use of the report.

Paterson Group Inc.

Stephanie A. Boisvenue, P.Eng.



David J. Gilbert, P.Eng.

Report Distribution:

- Caivan Communities (3 copies)
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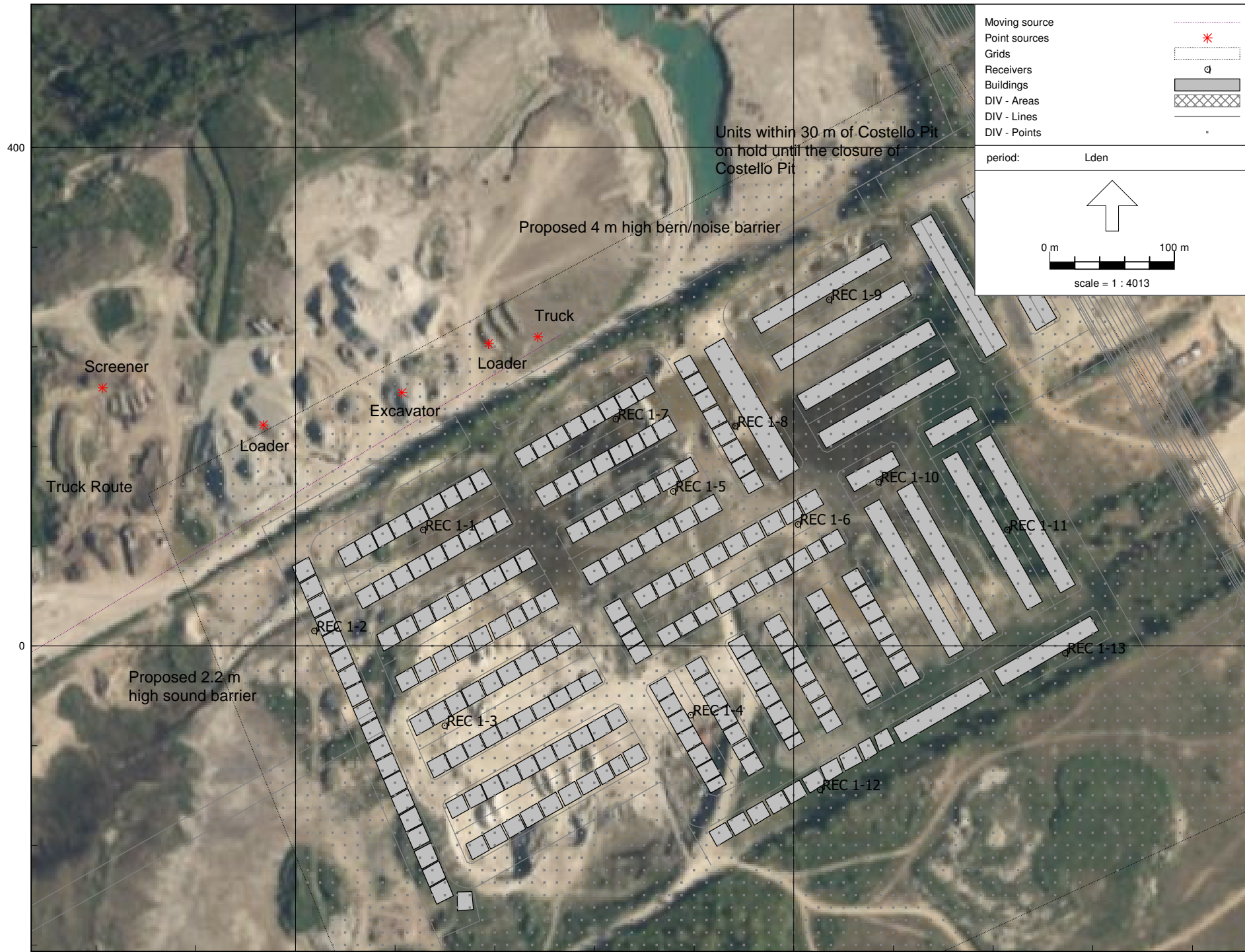
APPENDIX 1

FIGURE 1 - NOISE MODEL

FIGURE 2 - TABLE OF RESULTS - NO NOISE MITIGATION MEASURES

FIGURE 3 - TABLE OF RESULTS - WITH NOISE MITIGATION MEASURES

ITEM PROPERTIES



Caivan Communities
 Table of Results - No noise barriers

Paterson Group Inc

Report: Table of Results
 Model: no noise barriers
 LAeq: total results for receivers
 Group: (main group)
 Group Reduction: No

Name				
Receiver	Description	Height	Day	Night
REC 1-1_A		1.50	54.8	54.8
REC 1-1_B		4.50	56.2	56.2
REC 1-10_A		1.50	43.3	43.3
REC 1-10_B		4.50	45.0	45.0
REC 1-11_A		1.50	38.6	38.6
REC 1-11_B		4.50	41.6	41.6
REC 1-12_A		1.50	41.4	41.4
REC 1-12_B		4.50	43.4	43.4
REC 1-13_A		1.50	35.5	35.5
REC 1-13_B		4.50	38.0	38.0
REC 1-2_A		1.50	61.0	61.0
REC 1-2_B		4.50	61.0	61.0
REC 1-3_A		4.50	49.7	49.7
REC 1-4_A		1.50	50.7	50.7
REC 1-4_B		4.50	51.9	51.9
REC 1-5_A		1.50	48.8	48.8
REC 1-5_B		4.50	51.5	51.5
REC 1-6_A		1.50	44.9	44.9
REC 1-6_B		4.50	48.0	48.0
REC 1-7_A		1.50	54.0	54.0
REC 1-7_B		4.50	55.3	55.3
REC 1-8_A		1.50	49.7	49.7
REC 1-8_B		4.50	52.7	52.7
REC 1-9_A		1.50	51.5	51.5
REC 1-9_B		4.50	51.6	51.6

All shown dB values are A-weighted

Table of Results - Including noise barriers

Report: Table of Results
 Model: Base Model
 LAeq: total results for receivers
 Group: (main group)
 Group Reduction: No

Name				
Receiver	Description	Height	Day	Night
REC 1-1_A		1.50	54.1	54.1
REC 1-1_B		4.50	56.0	56.0
REC 1-10_A		1.50	42.8	42.8
REC 1-10_B		4.50	44.9	44.9
REC 1-11_A		1.50	38.6	38.6
REC 1-11_B		4.50	41.6	41.6
REC 1-12_A		1.50	41.3	41.3
REC 1-12_B		4.50	43.3	43.3
REC 1-13_A		1.50	35.5	35.5
REC 1-13_B		4.50	38.0	38.0
REC 1-2_A		1.50	57.4	57.4
REC 1-2_B		4.50	59.0	59.0
REC 1-3_A		4.50	49.6	49.6
REC 1-4_A		1.50	50.0	50.0
REC 1-4_B		4.50	51.4	51.4
REC 1-5_A		1.50	48.7	48.7
REC 1-5_B		4.50	51.5	51.5
REC 1-6_A		1.50	44.8	44.8
REC 1-6_B		4.50	48.0	48.0
REC 1-7_A		1.50	53.1	53.1
REC 1-7_B		4.50	55.1	55.1
REC 1-8_A		1.50	49.7	49.7
REC 1-8_B		4.50	52.7	52.7
REC 1-9_A		1.50	48.1	48.1
REC 1-9_B		4.50	49.8	49.8

All shown dB values are A-weighted

Caivan Communities
Item Properties

Paterson Group Inc

Model: Base Model
version of Brazeau Pit - Brazeau Pit
Group: (main group)
Listing of: Moving source, for method Industrial noise - LimA - ISO 9613.1/2

Name	Lw 63	Lw 125	Lw 250	Lw 500	Lw 1k	Lw 2k	Lw 4k	Lw 8k	Red 63	Red 125	Red 250
Haul Route	79.10	87.80	91.90	96.50	100.20	97.50	90.50	83.60	0.00	0.00	0.00

Caivan Communities
 Item Properties

Paterson Group Inc

Model: Base Model
 version of Brazeau Pit - Brazeau Pit
 Group: (main group)
 Listing of: Point sources, for method Industrial noise - LimA - ISO 9613.1/2

Name	No building	No ind.site	Lw 63	Lw 125	Lw 250	Lw 500	Lw 1k	Lw 2k	Lw 4k	Lw 8k
Excavator	No	No	97.00	102.00	99.00	98.00	97.00	96.00	88.00	80.00
Loader	No	No	109.00	114.00	109.00	100.00	99.00	96.00	97.00	94.00
Loader	No	No	109.00	114.00	109.00	100.00	99.00	96.00	97.00	94.00
Screen	No	No	116.80	110.40	103.00	102.60	101.20	99.10	94.90	90.90
Truck	No	No	76.00	89.80	91.60	97.50	107.70	104.80	100.00	93.20