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## Environmental Noise Control Study - Stationary Noise Component

Proposed Residential Development  
The Meadows - Phases 7 and 8  
Greenbank Road - Ottawa

Prepared For

Tamarack (Nepean) Corporation

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## 1.0 Introduction

Paterson Group (Paterson) was commissioned by Tamarack (Nepean) Corporation to conduct a Stationary Noise Review to supplement the Noise Feasibility study prepared by IBI Group for Phases 7 and 8 of the proposed The Meadows development to be located at Greenbank Road, in the City of Ottawa. A Report entitled Noise Feasibility Report - The Meadows In Half Moon Bay - Phase 5 dated December 2018 prepared by IBI Group for the subject site. The report prepared by IBI Group 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, however, there will be no outdoor living areas associated with the stacked townhouse blocks. Local roadways and landscaped areas are also anticipated.

It is further understood that The Meadows will be constructed in phases, with Phase 7 being completed prior to Phase 8. Therefore, the analysis has been subdivided per phase. It is further understood that the Costello Pit may cease all operations prior to the construction of Phase 7 or Phase 8. If this is the situation, then the stationary noise source would have been eliminated and all noise attenuation recommendations for Phase 7 and Phase 8 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 ENGCG, meaning “a suburban areas of the City outside of the busy core where the urban hum is evident but within the urban boundary.”

<b>Table 1 - Guidelines for Stationary Noise - Class 2</b>		
<b>Time of Day</b>	<b>Outdoor Point of Reception</b>	<b>Pane of Window</b>
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:

<b>Table 2 - Warning Clauses for Sound Level Exceedances</b>	
<b>Warning Clause</b>	<b>Description</b>
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 3 and Figure 6 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.

Upon review of the proposed phasing plan, it is understood that there will be some stacked townhouses on the eastern portion of the development, both in Phase 7 and Phase 8 that will not include any outdoor living areas. A reception point was included in this proximity in order to determine the levels at the pane of glass. Otherwise, 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.

Upon review of the surface transportation noise study, it is understood that a 2.2 m or a 2.5 m high sound barrier placed along the proposed Greenbank Road realignment and behind a portion of Block 51. These sound barriers have been included in the analysis.

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. Ten (10) reception points were selected within the 300 m proximity radius in both Phase 7 and Phase 8 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 southernmost houses within Phase 8 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 Phase 7 or Phase 8. Therefore, if the Costello Pit is no longer in operation, all recommendations provided in this report are no longer valid and should be disregarded.

### Phase 7

An analysis was completed for Phase 7, taking into consideration the lot layouts and approximate dwelling alignment. An initial analysis of Phase 7 was performed with no sound mitigation measures. This analysis resulted in a maximum value of 63.5 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.

<b>Table 3 - Noise Control Measures for New Development in Proximity to Stationary Noise Sources</b>	
<b>Primary Mitigation Measure in order of Preference</b>	<b>Proposed Mitigation Measure</b>
Insertion of noise insensitive land uses between the source and sensitive receptor	Phase 7 includes lots that are the furthest from the existing Costello Pit noise sources
Orientation of buildings to provide quiet zones in rear yards, interior spaces and amenity areas	side walls and rear yards are exposed to the stationary noise source.
construction techniques, enhanced construction quality	Exceedances for outdoor living areas - standard construction techniques are considered acceptable for the proposed dwellings.
earth berms	not proposed
acoustic barriers	proposed to protect the back yards of the proposed residential buildings.

If the residences are to be constructed within Phase 7 while the aggregate pit is in operation, it is recommended that a 2.2 m high sound barrier, such as a residential sound wall, be constructed along the southern property lines of Lot 1, 28, 29, 48, and Block 132. 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/m<sup>2</sup>. This sound barrier will limit all noise in the outdoor living areas to a maximum value of 58 dBA at reception point 1-2 (back yard for Lot 48) and 58.7 dBA at receptor point 1-10 (back yard to Lot 27). This is considered acceptable with the understanding that the Costello Pit will be a temporary noise source.

While there are exceedances within the rear yards, standard construction building materials are anticipated to be sufficient. However, Lots 1, 2, 47, 48, 29, 30, 27, 28 and Block 132 should have a provision to include the use of a central air conditioner, to ensure that windows will not need to be opened.

### **Phase 8**

An analysis was completed for Phase 8, taking into consideration the lot layouts and approximate dwelling alignment. An initial analysis of Phase 8 was performed with no sound mitigation measures. This analysis resulted in a maximum value of 61.4 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.

<b>Table 4 - Noise Control Measures for New Development in Proximity to Stationary Noise Sources</b>	
<b>Primary Mitigation Measure in order of Preference</b>	<b>Proposed Mitigation Measure</b>
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	no 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 3.5 m high earth berm is proposed along Block 163 through Block 171, adjacent to the Costello Pit
acoustic barriers	proposed to protect the back yards of the proposed residential buildings at Lots 76 through 82.

It is understood that there is a 30 m development setback from the southern property line, that will include Blocks 163 through 171. Once the Costello Pit ceases mineral extraction operations, those blocks can be constructed.

A 3.5 m high soil berm is proposed to cross the Blocks 163 through 171, in order to provide noise mitigation to the remainder of Phase 8. In addition, a 2.2 m high sound barrier is to be constructed along the side yard of Lot 76 and across the rear yards of Lots 76-82. 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/m<sup>2</sup>. With these noise mitigation measures in place, the maximum value of 57.7 dBA will still be encountered at reception point 1-1, at the rear of Block 154. 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 Phase 7 and 8 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 either Phase 7 or Phase 8. Therefore, noise mitigation measures for the stationary noise source have been recommended with respect to the individual Phase. 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 Phase 7, it is recommended that a 2.2 m high sound barrier be constructed along the rear of Lots 1 and 2, and along the side lots of Lot 28, 27 and 48 in addition to Block 132. Additionally, Lots 1, 2, 47, 48, 29, 30, 27, 28 and Block 132 should have a provision to include the use of a central air conditioner, to ensure that windows will not need to be opened.

If the Costello Pit is in operation for the construction of Phase 8, it is understood that there will be a hold on Blocks 163-171, and a 3.5 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 side of Lot 76 and along the Rear of Lots 76-82.

Due to the proximity of the Costello Pit, a Warning Clause should be on the deed of sale of the units within Phase 7 and Phase 8. 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 Tamarack (Nepean) Corporation 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:

- Tamarack (Nepean) Corporation (3 copies)
- Paterson Group (1 copy)

# **APPENDIX 1**

**FIGURE 1 - PHASE 7 ONLY WITH NO NOISE BARRIER (TABLE OF RESULT)**

**FIGURE 2 - PHASE 7 ONLY WITH NOISE MITIGATION MEASURES (TABLE OF RESULT)**

**FIGURE 3 - MODEL OF PHASE 7**

**FIGURE 4 - PHASE 8 ONLY WITH NO NOISE BARRIER (TABLE OF RESULT)**

**FIGURE 5 - PHASE 8 ONLY WITH NOISE MITIGATION MEASURES (TABLE OF RESULT)**

**FIGURE 6 - MODEL OF PHASE 8**

**ITEM PROPERTIES**

With No Noise Barrier

Report: Table of Results  
Model: Phase 7 only  
LAeq: total results for receivers  
Group: (main group)  
Group Reduction: No

Name						
Receiver	Description	Height	Day	Evening	Night	Lden
REC 1-1_A		1.50	60.1	60.1	60.1	66.5
REC 1-10_A		1.50	60.1	60.1	60.1	66.5
REC 1-2_A		1.50	63.0	63.0	63.0	69.4
REC 1-3_A		1.50	62.5	62.5	62.5	68.9
REC 1-4_A		1.50	63.5	63.5	63.5	69.9
REC 1-5_A		1.50	50.1	50.1	50.1	56.5
REC 1-6_A		1.50	52.7	52.7	52.7	59.1
REC 1-7_A		1.50	55.7	55.7	55.7	62.1
REC 1-8_A		1.50	62.3	62.3	62.3	68.7
REC 1-9_A		1.50	59.3	59.3	59.3	65.7

All shown dB values are A-weighted

Phase 7  
With Noise Mitigation Measures - Barrier Height - 2.2 m

Report: Table of Results  
Model: - Phase 7 only  
LAeq: total results for receivers  
Group: (main group)  
Group Reduction: No

Name				
Receiver	Description	Height	Day	Night
REC 1-1_A		1.50	56.4	56.4
REC 1-10_A		1.50	58.7	58.7
REC 1-2_A		1.50	58.0	58.0
REC 1-3_A		1.50	57.5	57.5
REC 1-4_A		1.50	58.3	58.3
REC 1-5_A		1.50	50.1	50.1
REC 1-6_A		1.50	52.7	52.7
REC 1-7_A		1.50	55.6	55.6
REC 1-8_A		1.50	57.5	57.5
REC 1-9_A		1.50	55.7	55.7

All shown dB values are A-weighted



Figure 3 - Model of Phase 7



Phase 7 only

Paterson Group -

Canada



Phase 7 and 8  
No Noise Mitigation Measures

Report: Table of Results  
Model: - Phase 8  
LAeq: total results for receivers  
Group: (main group)  
Group Reduction: No

Name				
Receiver	Description	Height	Day	Night
REC 1-1_A		1.50	61.4	61.4
REC 1-10_A		1.50	48.6	48.6
REC 1-2_A		1.50	51.4	51.4
REC 1-3_A		1.50	53.8	53.8
REC 1-4_A		1.50	51.2	51.2
REC 1-5_A		1.50	50.8	50.8
REC 1-6_A		1.50	53.6	53.6
REC 1-7_A		1.50	57.5	57.5
REC 1-8_A		1.50	44.9	44.9
REC 1-9_A		1.50	41.4	41.4

All shown dB values are A-weighted



Phase 7 and 8  
With Noise Mitigation Measures - Barrier Height - 2.2 m

Report: Table of Results  
Model: - Phase 8  
LAeq: total results for receivers  
Group: (main group)  
Group Reduction: No

Name				
Receiver	Description	Height	Day	Night
Park_A		1.50	54.4	54.4
REC 1-1_A		1.50	57.7	57.7
REC 1-10_A		1.50	48.5	48.5
REC 1-2_A		1.50	50.3	50.3
REC 1-3_A		1.50	54.3	54.3
REC 1-4_A		1.50	51.0	51.0
REC 1-5_A		1.50	50.8	50.8
REC 1-6_A		1.50	53.7	53.7
REC 1-7_A		1.50	53.2	53.2
REC 1-8_A		1.50	44.7	44.7
REC 1-9_A		1.50	41.4	41.4

All shown dB values are A-weighted





5015800



## Item Properties

## Phase 7 and 8

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Model: Copy of initial model  
version of Drummond Pit - Drummond 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