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**SS WILSON ASSOCIATES**

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*Consulting Engineers*

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September 13, 2019

David Welwood  
Principal Planner  
Planning, Development and Legislative Services  
Region of Waterloo, 150 Frederick Street, Kitchener, ON

By e-mail: [dwelwood@regionofwaterloo.ca](mailto:dwelwood@regionofwaterloo.ca)

Dear David,

**Re: Peer Review – Noise Impact Assessment of Above Water Extraction  
Shantz Station Pit Proposed Gravel Pit, Township of Breslau,  
Regional Municipality of Waterloo.  
SSWA File No.: WA19-031**

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SS Wilson Associates (SSWA) was retained by the Region of Waterloo to undertake a Peer Review of the Noise Impact Assessment prepared by Valcoustics Canada Limited (VLC), dated May 10, 2019 submitted to the Township on behalf of German Tract Company. The following are our Peer Review comments to address the requirements as stated in the proposal dated June 11, 2019.

### **1. Purpose/Introduction**

The objective of VLC's study is to undertake an analysis of the potential noise impact at sensitive receptors neighbouring the proposed Shantz Station Gravel Pit resulting from the proposed gravel pit extraction.

As part of the peer review work, SSWA completed several activities, which are summarized below:

1. Detailed technical review of VLC's Noise Impact Study for above water gravel pit extraction dated May 10, 2019.
2. Undertaken sample calculations and predictions of the expected noise impacts based on comparable data available to SSWA for comparison with VLC's noise study.
3. Conducted a site visit at the proposed gravel pit to observe the general noise environment, verify that all Receptors have been included, and to view the overall topography of the areas of concern.
4. Reviewed all the necessary details for the noise control measures recommended by VLC to attenuate the sound levels.

### **2. Stationary Noise Methodology**

The stationary noise model for the aggregate pit operations allows for the pit to be running with above water extraction equipment. The following procedures were followed to examine the noise impacts at the near-by noise sensitive receptors:

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**SSWA INC. 15 Wertheim Court, Suite 211, Richmond Hill, Ontario, L4B 3H7**

**Tel: (905) 707-5800 Fax: (905) 707-5801 e-mail: [info@sswilsonassociates.com](mailto:info@sswilsonassociates.com)**

**[www.sswilsonassociates.com](http://www.sswilsonassociates.com) & [www.noisetraining.com](http://www.noisetraining.com)**

- The noise prediction software CadnaA (Version 2018 MR1) was used to assess the impact of the pit operations on all the worst-case ground level and façade receptors.
- The selected receptors were verified in terms of the MECP NPC-300 guidelines sound level limits in Class 2 and Class 3 areas.
- The draft guidelines for Landfill Guideline was used to assess the noise impacts from trucks traveling to and from the site along the off-site haul route.
- The extraction gravel pit and processing can occur simultaneously.
- The above water gravel pit extraction will occur through five phases as per the Operational Plan prepared by MHBC.
- An assumed worst case of 9.2 loads of material to be shipped from the site in an hour.
- The noise impact on the nearby selected receptors were verified using the equipment running at full throttle for full hour. For the selected receptors where the MOECC sound level limits were exceeding, appropriate noise mitigation such as berms with the recommended heights by VCL were used to verify the sound levels.

It is our professional opinion that the assumptions used to calculate the stationary source noise impact are acceptable.

### **3. Assessment Criteria**

#### NPC-300

The choice of the applicable sound level criteria, based on the Ministry of the Environment and Climate Control (MOECC) NPC-300 sound level criteria is acceptable. In addition, the sample ambient (due to Cedar Creek Road traffic) sound level measurements are acceptable.

VCL assumes Receptors 02, 03, 04, and 09 are to be considered a Class 3 area, and Receptors 01, 05 to 08, 10, and 11 as Class 2 areas. The classifications of these receptors is acceptable, as the receptors have characteristics of their respective designated classification area and have sound levels above the minimum MOECC exclusion limits during the proposed operating hours for the project.

#### Haul Route

VCL assesses the Haul Route noise source based on a qualitative rating along with the draft MECP Noise Guidelines for Landfill Sites. This method of assessing the noise impact from the haul route was found to be partly acceptable by SSWA, however, the directions from the MNR regarding haul routes were not acknowledged nor implemented as outlined below.

The policies developed by the Ministry of Natural Resources (MNR) require the following matters be given consideration by the proponent respecting haul routes leading towards an aggregate site.

Firstly, while no specific sound level criteria are given by the MNR for haul route noise, the direction from the MNR is simple in that it requires selection of the haul routes with the least noise impact. The responsibility for generating such data related to the best haul route rests with the consultants submitting various reports to the Region. Specifically, for noise, the haul route that creates the least impact for noise will be the one to be considered as part of the overall noise assessment.

Therefore, Valcoustics responsibility should be to provide the necessary information related to the background traffic noise and how the proposed quarry added truck traffic would affect the results for various possible alternatives. The selection of the proposed haul route would then be left up to the decision makers.

#### **4. Noise Sources**

The report correctly identifies the following equipment as the noise sources for the gravel pit extraction:

- Front End Loader (2)
- Haul Trucks (18)
- Processing Plant (1)
- Portable Crusher (1)
- Screening Plant (1)
- Conveyor (1)

All equipment was assumed to operate continuously during a predictable worst-case hour of daytime operations. The sound levels for the above noise sources are consistent with the noise levels in the SSWA database; therefore, the assumed gravel pit extraction equipment sound levels are acceptable.

#### **5. Analysis and Results**

VCL used an acceptable noise prediction software<sup>1</sup> to assess the stationary noise impact from the gravel pit equipment.

One of the most concerns about the noise study is the fact that the extraction process and associated noise is “dynamic” in terms of the working cell location(s), associated equipment, truck and equipment movements within the gravel pit depending on the phase and the timing. This appears not to have been covered at all in this study. Essentially, VCL should divide each quarry phase into “work cells” and assign equipment locations, mobile equipment path, etc. and calculate the sound levels at the various points of reception based on which the necessary mitigation strategy be predicted and documented. The parameters that must be addressed for the site specific and phase specific operations of this project include the following:

- Location of the equipment relative to the Points of Reception (the longer distance means lower sound levels).
- Ground elevation of the equipment (the lower the ground elevation, the lower the sound level at the receptor depending on the relative grade difference).
- Presence of natural ground shielding or deliberately constructed sound barriers (berms and/or walls) can greatly affect the acoustic efficiency of such structures depending on the relevant locations of the sources and the barriers. Therefore, it is important for the assessment to consider numerous location iterations throughout the entire site.
- The possibility of the changes to the equipment used for extraction must also be assessed.
- Of particular importance is the aggregate truck operations IN and OUT of the site as the path of such vehicles is likely to change every meter in terms of location and ground elevations.

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<sup>1</sup> CadnaA (Version 2018 MR1)

Therefore, it is our opinion that such work influences the extent and details of the required noise mitigation.

SSWA performed several calculations based on the assumptions made by VCL within their stationary model. Although the majority of the calculations were in line with VCL's stationary model, a few noise level calculations differed significantly. For example, Figure A5 within VCL's Noise Study notes the following predicted sound levels for POR08:

- Day: 54 dBA
- Night: 41 dBA
- OLA: 51 dBA

SSWA had calculated much higher sound levels due to the close proximity of the receptor location to the noise sources for both the façade and OLA. The discrepancy could be due to the grade elevations at the various phases of the gravel pit extraction. Therefore, we request that additional calculations be undertaken for several other phases to confirm the inputs made by VCL. Due to the large size of the computerized output calculations, they could be excluded from the report and included in a supplementary document.

## **6. Mitigation Measures**

The respective barrier and berm heights recommended by VCL were reasonable with regards to the respective predicted sound levels at the receptor points.

Figures A9, A10, A11, A12, and A13 detail the recommended noise mitigation measures, which include barrier and berm heights. In reviewing the figures, the outlines provided illustrate all berms to be of the same width, regardless of the height of the berm. The project drawings submitted by VCL show a recommended 11m high berm around the processing plant and screening plant within Phase 1. It should be noted that the maximum acceptable slope for a berm is typically 2:1, which means that the base of the recommended 11m high berm would be 44m + 1m top for stability and reduced erosion. Such berm is "massive" and will require extensive space that is not shown to any reasonable scale on the drawing and such base may impede equipment movements within the property. VCL should be required to re-examine the details of such conceptual berm and provide a realistic depiction on the various phases of the project drawings.

## **7. General Comments**

Overall the assumptions used for the stationary model, assessment criteria, and assumed equipment sound levels are acceptable to SSWA.

It is recommended that VCL undertake the following added assessments and resubmit the Noise Study to the Region:

1. Revise the Noise Study to account for the **dynamic** process of the gravel pit extraction activities with the use of working cells throughout the extraction areas. The objective would be to predict the resulting sound levels without and with the recommended noise control measures.

2. Include more sample calculations to support the sound level predictions as indicated by the figures within the appendix
3. VCL should re-examine the details of such conceptual berms and provide a realistic depiction on the various phases of the project drawings.

If you have any questions, please contact our office.

Prepared by;



Derek Ly, B.Eng., E.I.T.  
Acoustics Analyst

Reviewed By,



Hazem Gidamy, M.Eng., P.Eng.  
Principal