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February 27, 2023

CN
c/o WSP
1600 Boulevard Rene-Levesque West, 11th Floor
Montreal, Quebec
H3H 1P9

Attention: Mr. Ashkan Matlabi/Ms. Saadia Jamil

VIA E-MAIL
proximity@cn.ca

Re: Noise and Vibration Impact Study
Peer Review
Proposed Residential Development
121 Vansitmart Avenue
City of Hamilton
Our File: 17-142

As requested, we have reviewed the *Noise and Vibration Impact Study*, dated November 28, 2022, prepared by Thornton Tomasetti on behalf of Urban Solutions.

Peer review comments were previously provided to the proponent in November, 2017 regarding the *Environmental Noise and Vibration Impact Study* dated June 2017, prepared by dBA Acoustical Consultants Inc. In addition, peer review comments dated March 16, 2022, were provided regarding the *Environmental Noise and Vibration Impact Study* dated January, 2021, also prepared by dBA Acoustical Consultants.

We have reviewed the report with respect to noise/vibration issues related to rail traffic and CN. Other sources of noise/vibration have not been evaluated as part of this peer review. The CN, the Federation of Canadian Municipalities (FCM) and Railway Association of Canada (RAC) "Guidelines for New Development in Proximity to Railway Operations" (RAC/FCM guidelines) and the Ministry of the Environment, Conservation and Parks (MOE) guidelines have been used in this review. Only sources associated with CN facilities have been reviewed. No original analyses have been conducted.

The proposed development is comprised of four back-to-back townhouse residential buildings. No outdoor amenity areas are proposed for this development. The site is located north of Vansitmart Avenue between Cope Street and Tragina Avenue North in the City of Hamilton. The CN Guelph Subdivision right-of-way (ROW) is located to the north of the proposed development. The CN Parkdale Yard is located 75 m to the north of the CN Guelph Subdivision. The report should provide confirmation of the distance between the proposed buildings and the CN ROW.

The CN Parkdale Yard is used for transloading of steel between rail cars and trucks. The yard operates 24-hours per day. The yard operations included:

- Train movements in the yard;
- Offloading/loading of steel;
- Shunting of railcars to make up trains;
- Coupling of locomotives to railcars; and
- Idling of locomotives.

We find that the November 2022 report has not appropriately assessed the acoustic environment with respect to the guidelines. Our comments are provided below.

Noise

1. The analysis conducted with respect to the rail yard is not complete. We acknowledge that the consultant has contacted CN on several occasions to obtain information regarding the rail operations. This information was not provided to the consultant. As a result, the consultant has relied on sound measurements conducted of the rail yard. We have now confirmed the operations in the Parkdale Yard, as summarized above. Additional details regarding the yard operations are provided in this peer review for use in updating the acoustic model.

   While conducting sound measurements is appropriate to supplement the analysis, in many cases it is not sufficient to represent the full or future operations.

2. The peer review comments dated March 16, 2022, did indicate that idling locomotives should be included in the analysis. This activity has not been included in the assessment. This type of activity occurs regularly in a rail yard, is a significant noise source, particularly at the low frequencies, and needs to be assessed.

3. The report indicates that sound measurements were conducted of the yard operations but that the consultant was not able to identify the specific steady noise that was measured. They were able to identify the impulsive noise.

4. The RAC/FCM guidelines and MOE guidelines indicate that no residential development should occur within 300 m of a rail yard. However, if it is found that residential development within 300 m is permitted, the numerical limits of NPC-300 need to be achieved. As the rail yard is a stationary source of noise, the numerical limits need to be met at the façades of the residential dwellings as there are no indoor sound level limits for stationary sources. Therefore, upgraded windows and upgraded exterior walls and inclusion of central air conditioning are not sufficient to meet the MOE guidelines and are not considered "on-building or receptor based" mitigation in the context of NPC-300 and stationary sources. This method of mitigation is referenced in various sections of the report and will need to be corrected.

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5. If it is not feasible to meet the sound level limits at the façades of the proposed dwellings, different built forms such as blank walls, no windows into habitable spaces and/or single-loaded corridors may need to be considered.

6. The notes to Table 15 assess the acoustic impact assuming that only two impulses would occur per hour for some of the rail operations. This is not accurate. As this is a rail yard, there is no accurate way to determine the number of impulses that do or can occur in any hour. Therefore, it should always be assumed that frequent impulses (9 or more) can occur in any hour.

7. MOE does permit the use of Enclosed Noise Buffers (ENBs) if the development is designated as a Class 4 development. It should be noted that Class 4 does not benefit CN as CN does not require provincial approval (ECA) to operate. However, the designation of the site as Class 4 does permit on-building mitigation as described in NPC-300. Therefore, CN would need to consider if the use of Class 4 within 75 m of the rail yard is acceptable.

8. If ENBs are to be used, the Class 4 sound level limits apply at the "interior" wall of the ENB not at the exterior wall adjacent to the source.

9. A Class 4 designation is proposed for this development. However, the recommendations included in the noise report are not permitted to be used to meet the stationary source requirements and need to be modified as noted in the points above. These comments were also included in our March 16, 2022 peer review letter.

10. The City of Hamilton will need to confirm if the site will be designated Class 4 as it will impact the permitted mitigation measures.

11. The report discusses ENBs as a possible mitigation solution but does not provide any details regarding the design or implementation of this mitigation measure. As NPC-300 does not permit the mitigation measures outlined in Section 6.5.1 of the noise report, the only viable options to consider are ENBs, or the options outlined in Item 5 of this letter. The buildings will need to be redesigned to incorporate the ENBs or alternative mitigation as discussed in Item 5 of this letter.

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12. The report references Table C-9 of NPC-300 as the applicable guidelines for rail noise. This is not correct. These guidelines are considered supplementary guidelines and only apply to transportation sources, not stationary sources. The applicable guidelines for stationary sources are provided in Tables C-5 to C-8, inclusive. For transportation sources, the correct guidelines are in Table C-2.

13. As the site is proposed to be designated Class 4, all dwellings are required to be provided with mandatory central air conditioning as per NPC-300. In addition, a Class 4 warning clause, similar to Type F warning clause in NPC-300 will be needed.

14. The STAMSON calculations account for the proposed 2.5 m high berm. The potential attenuation provided by the berm is typically not included in the assessment of the façade sound levels to determine the mitigation measures. In this situation the inclusion of the 2.5 m high berm does not impact the results due to the receptor height.

15. Based on the CN requirements, the north, east and west façades of Block 1 will need to have exterior walls constructed of brick veneer or masonry to address the through trains. This needs to be corrected in various sections of the report.

16. Table 7 of the report indicates that the "Equivalent STC" of the exterior walls can be STC 40. The reference to STC 40 for the north, east and west façades of Block 1 should be deleted and replaced with "brick veneer or masonry equivalent".

17. The following comments apply to the STAMSON analysis:

    - The analysis shows 4 freight trains at night. Based on the CN rail data, there are no freight trains at night;

- the number of trains, both for freight and GO trains is not consistent in each segment; and
- the speed used for the GO trains is not consistent with the information provided by Metrolinx;

Acoustic Model Updates re Stationary Sources in the Rail Yard

1. Source identified as SNS-1 should be assessed as an area source encompassing the polygon outlined in Figure 5. The following inputs should be used:
   - PWL as measured for SNS-01;
   - spectrum measured for SNS-01;
   - source height of 2.0 m.
2. The coupling impulses and slack/stretching impulses should be treated as an area source, within the polygon area shown on Figure 5. The following inputs should be used:
   - PWL to be used should be the LIm of the measured data for INS-01 and INS-02;
   - spectrum measured for the INS-02; and
   - source height of 2.0 m.
3. While locomotives do not idle for protracted periods of time on a daily basis, they can occur as trains are waiting to leave the yard. Therefore, idling locomotives should be assessed, accounting for:
   - three idling locomotives;
   - 30 minutes each (in any hour);
   - PWL of 106 dBA per locomotive;

- locomotives should be placed at the location marked as INS-01 (as three point sources) on Figure 5 of the report.

The following spectrum should be used for the idling locomotives:

Freq (Hz)	31.5	63	125	250	500	1K	2K	4K	8K	A	Linear
	117.4	113.1	109.0	97.1	103.6	102.0	98.8	92.2	89.3	106.3	119.5

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Vibration

The vibration measurements conducted by TT, indicate that there is no exceedance above the RAC/FCM guidelines. However, the dBA Acoustical Consultants report indicated exceedances and recommended vibration mitigation. In addition, the difference between the dBA and TT measurements is significant.

We do note that the train speeds provided by CN used in the dBA Acoustical Consultants report are higher than those provided by CN to TT for their report. This difference in speed may contribute to the difference in measured vibration velocities.

The dBA measurements were conducted at 30 m from the property line which represented the closest building façade.

It is not clear from the TT report the distance to the vibration measurement locations relative to the CN property line. In addition, the measurements conducted by TT are at one location at the closest proposed building. However, based on the TT report there are no exceedances and vibration mitigation is not required.

The following is required to confirm/validate the vibration measurements:

1. Drawing indicating the distance between the vibration measurement locations and the CN property line in the TT report; and

2. Additional measurements parallel to the tracks, in line with the façade of Block 1. We would suggest that measurements be conducted at three (3) locations parallel to the CN ROW.

Conclusion/Recommendations

Based on our review, the report has not fully assessed the rail yard. In addition, there are some inconstancies in the transportation source analysis. Therefore, we cannot conclude that the report has demonstrated that the RAC/FCM guidelines or MOE guidelines have been met.

1. We recommend that the analyses be updated to incorporate comments included in this peer review and that the mitigation measures required to meet NPC-300 be determined.

2. We recommend that the acoustic model be updated to incorporate the operational information for the Parkdale Rail Yard and sound power data as provided in this peer review letter.

3. In addition to any other required mitigation measures required to meet the guidelines, due to the proximity of the development to the rail yard, all dwellings should be constructed of brick veneer or acoustically equivalent masonry.

4. The standard CN warning clause will be needed for all dwellings within 1,000 m of the Parkdale Rail Yard.

5. Confirmation should be obtained from the City of Hamilton regarding the Class 4 designation as it will impact the type of mitigation measures that can be used to meet NPC-300.

6. If the Class 4 designation is approved by the City of Hamilton, a Class 4 warning clause, similar to Warning Clause "F" in NPC-300 and mandatory central air conditioning will be required for all dwellings.

7. Clarification and additional measurements are required regarding the vibration assessment.

8. The noise and vibration report should be updated to address these peer review comments.

The report indicates that a 2.5 m high berm will be built along the north property line. As this berm is not required to meet the sound level limits, CN should be contacted to confirm if the extent of the berm is appropriate and if any returns are required to satisfy the safety requirements.

Once the report has been updated, it should be circulated to CN for review.

If there are any questions or if additional information is required, please call.

Yours truly,

JADE ACOUSTICS INC.

Per:

Dalila C. Giusti, P.Eng.

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