



# Pitt Meadows Road and Rail Improvements Project

## Summer community update: Noise and vibration questions and answers

Since 2019, the Vancouver Fraser Port Authority has been studying existing noise levels and modelling future noise levels with BKL, an independent acoustical consultant.

In summer 2021, the City of Pitt Meadows engaged RWDI to complete a peer review of BKL's noise study. Since then, we have worked with BKL to consider and incorporate feedback from the community, the city, and RWDI.

The assessment by BKL was done in accordance with:

- For noise – [Health Canada's Guidance for Evaluating Human Health Impacts in Environmental Assessment](#) (2017)
- For vibration – [US Federal Transit Administration's Transit Noise and Vibration Impact Assessment Manual](#) (2018)

Please also refer to the following resources:

- [Environmental Noise and Vibration Assessment by BKL, June 2022](#)
- [Noise and vibration fact sheet](#)

For concerns or questions about current noise and vibration relating to rail operations, please contact CP at [community\\_connect@cpr.ca](mailto:community_connect@cpr.ca).

## Frequently asked questions

### 1. How do we know the port authority assessment with BKL was conducted properly?

Since 2019, we have been working with BKL, an independent acoustical consultant, to assess existing noise levels along a segment of the rail corridor and model future noise levels. The noise and vibration study area included the entire rail corridor from Kennedy Road to Golden Ears Way. The assessment captured the proposed changes to both the road network and traffic, as well as rail activity in the area, including the proposed separation of road from rail at both Harris Road and Kennedy Road.

The assessment included the following rail activity:

- Freight and commuter rail through traffic
- Shunting at the Vancouver Intermodal Facility
- Train building activity outside of the Vancouver Intermodal Facility
- Train whistling and rail crossing signals
- Road traffic on Harris Road and Kennedy Road

In summer 2021, BKL's assessment was also peer reviewed by RWDI, a consultant for the City of Pitt Meadows.

In November 2021, city staff shared the results of RWDI's peer review of BKL's noise and vibration assessment for the project.

Since the peer review in November 2021, we have worked with BKL to consider and incorporate the feedback from the community, the city, and RWDI. RWDI's peer review identified six key findings and 16 secondary findings. Key findings were defined as primary feedback, while secondary findings were questions, clarifications, or lower priority feedback. These primary and secondary findings were considered and incorporated into BKL's updated report. Further information is available on pages 10-15 of this Q&A.

More information about our work to date on noise and vibration mitigation is available at [portvancouver.com/pittmeadowsroadandrail](https://portvancouver.com/pittmeadowsroadandrail).

## 2. What methodology was used for the assessment?

BKL conducted their assessment in accordance with:

- For noise – [Health Canada's Guidance for Evaluating Human Health Impacts in Environmental Assessment](#) (2017)
- For vibration – [US Federal Transit Administration's Transit Noise and Vibration Impact Assessment Manual](#) (2018)

In 2019, the study area included 597 properties along the rail corridor in Pitt Meadows, between Kennedy Road and Golden Ears Way, to compare noise from current rail operations to noise from future rail operations. Six noise monitors were placed along the rail corridor between Kennedy Road and Golden Ears Way. These six locations were deemed representative of the locations within the community where the noise impacts would be the greatest. Health Canada does not stipulate the number of monitoring locations required but provides guidance on several approaches that can be used to estimate baseline noise.

Based on community feedback, BKL assessed noise conditions again in 2021 at six residences, including two monitors at repeat locations to compare to the noise data collected in 2019, for a total of 10 unique locations monitored between 2019 and 2021.

The re-assessment identified that the 2019 data is a valid representation of noise and vibration conditions in the community.

The methodology used is reflective of best practice. More information about the methodology can be found in [sections 4 and 7 of BKL's report](#).

## 3. What is the difference between warranted mitigation and supplementary mitigation?

Warranted mitigation is the mitigation required based on the established Health Canada and FTA criteria and outcomes of the project noise and vibration impact assessment. Introduced in 2007, the current Transport Canada and Health Canada guidelines suggests a noise and vibration assessment when there is a change to infrastructure. In this case, the project elected to undertake an assessment that was triggered specifically by the rail scope of the project.

Supplementary mitigation is any additional mitigation, above and beyond what is warranted by Health Canada. The port authority is proposing both warranted mitigation, to meet the Health

Canada guidelines, and supplementary mitigation because we recognize noise mitigation is a top priority for the community.

Further work during the design phase will help evaluate and determine the best combination of wall locations, lengths, and heights to help mitigate the most amount of noise for the highest quantity of receivers. Final wall locations and heights will be determined in consultation with the city to maximize community benefit.

**4. Did the follow-up assessment reveal any significant changes compared to BKL's report in 2020?**

Warranted mitigation increased slightly from the 2020 assessment due to changes in predicted noise impacts. This was largely due to the adjustment of the future road alignment (i.e., the underpass shifting west of its current alignment) compared to the previously completed assessment.

In summary, the key takeaways of the re-assessment are:

- That the 2019 data is a valid representation of noise and vibration conditions in the community
- That up to \$1.5 million of noise and vibration mitigation is warranted along the corridor to comply with both Health Canada and FTA guidelines

**5. Have you assessed noise and vibration from existing conditions in the project area?**

In accordance with Health Canada's relevant guidance, the objective is to assess noise and vibration impacts associated with the project. To do this, BKL's report documents existing noise and vibration and compares the predicted noise and vibration environment both with and without the project in 2030.

To document existing noise, BKL conducted baseline noise and vibration measurements at six residences near the project in 2019. Based on community feedback, BKL assessed noise conditions again in 2021 at six residences, including two monitors at repeat locations to compare to the noise data collected in 2019, for a total of 10 unique locations monitored between 2019 and 2021.

The re-assessment identified that the 2019 data is a valid representation of noise and vibration conditions in the community.

**6. What rail activity was included in the baseline assessment and modelling?**

The noise and vibration study area included the entire rail corridor from Kennedy Road to Golden Ears Way. The study captured the proposed changes to both the road network and traffic, as well as rail activity in the area, including the proposed separation of road from rail at both Harris Road and Kennedy Road.

The assessment included the following rail activity:

- Freight and commuter rail through traffic
- Shunting at the Vancouver Intermodal Facility
- Train building activity outside of the Vancouver Intermodal Facility
- Train whistling and rail crossing signals
- Road traffic on Harris Road and Kennedy Road

More information is available in [section 7.1.1 and 7.1.2 of the Environmental Noise and Vibration Assessment by BKL](#).

**7. Did the assessment consider shunting noises specific to CP's Vancouver Intermodal Facility?**

Yes, the assessment did consider shunting noises specific to the Vancouver Intermodal Facility (VIF). In the revised assessment, based on public feedback, shunting sources were modelled and calibrated based on shunting measurements conducted by BKL at baseline measurement location (N4). The locations of the baseline noise monitors are shown in [section 6.1 of BKL's report](#).

**8. Would data collection during the holiday season and during COVID-19 have had any impacts on the assessment outputs?**

The rail movements and activities during the initial assessment period (December 11 and 23, 2019, before the COVID-19 pandemic), including train building activities, are reflective of average rail movements throughout the year. This means the assessment period is a valid representation of noise conditions along the corridor.

This conclusion was also re-validated through additional noise and vibration monitoring in October 2021 in response to community feedback and provides confidence that the 2019 data collected is a valid representation of existing conditions.

**9. Can more noise monitoring be conducted to validate data and include more monitors on the south side of the tracks?**

In response to community feedback provided during our spring 2021 update, we conducted additional noise monitoring at six locations. This included:

- Two monitors on the south side of the tracks
- Two monitors at repeated locations to compare against the 2019 data collected

2021 noise levels were observed to be lower than noise levels captured in 2019. To ensure a conservative approach, the previously collected data in 2019 will continue to be referenced in the analysis. The locations of the baseline noise monitors are shown in [section 6.1 of BKL's report](#).

**10. How did you identify the existing walls and/or barriers shown in the study?**

For our initial baseline assessment, due to the limitations imposed by the COVID-19 pandemic, we mainly relied on aerial imagery and site observations to provide an indication of the existing barriers and walls along the rail corridor.

In June 2021, with relaxations in pandemic protocols, follow-up site surveys were conducted to confirm locations, heights and conditions of existing barriers and walls. This in-field work identified that certain discrete locations had different wall conditions that were not identifiable through aerial imagery (such as wall type, height, and continuity). Our consultant, BKL, has updated their assessment to reflect this new information to ensure the model accurately depicts existing conditions.

**11. Did you assess existing barriers and specifically those with no mitigation value, such as chain-link fences?**

In 2021, following relaxation of pandemic protocols, more in-depth site surveys were conducted to visually inspect existing walls and identify areas where barriers may not be continuous (and hidden from aerial imagery). Multiple survey points were taken in the field to check wall alignments and condition photos were taken of the walls. The survey identified some locations with chain-link fences under vegetation overgrowth, as opposed to continuous wood or concrete. BKL has updated their modeling to incorporate these gaps.

Please refer to [Appendix D2 of BKL's report](#).

**12. If the model assumes a continuous wall, how were existing barriers with gaps and/or composed of different materials (i.e., mesh fencing) addressed in the assessment?**

Any identified walls without significant observable gaps (i.e., small holes) were modelled with the assumption that they are solid and continuous, as this is a function of general asset conditions and maintenance. Any fencing that is acoustically transparent (e.g., chain-link fencing) or with significant observable gaps (i.e., a panel missing) were not modelled. Refer to Appendix D2 of BKL's report.

A 0.1 to 0.6 meter discrepancy was identified in noise wall height at a few locations. However, the new data generally had little effect on the noise predictions. This is because most receivers were modelled at the second-floor height (i.e., 4.3m high) where the existing fences would have little shielding effect irrespective of the height.

For the two homes on Nikola Street where walls were removed from the model due the field survey identifying chain-link fencing, the predicted existing and future noise levels did increase and this is reflected in the updated assessment.

**13. Will the port authority conduct a post-construction noise and vibration study?**

The project will collect post construction noise and vibration data to compare with the BKL assessment, and if large discrepancies exist, opportunities to address them will be discussed between the project partners.

**14. How will noise and vibration be monitored during construction?**

The port authority will work with its contractor to ensure that construction activities comply with relevant industry requirements, as it relates to construction-related noise and vibration.

It is expected that construction related noise and vibration considerations and mitigation will be developed and progressed through the balance of 2022. Details of this construction-related noise and vibration plan will be shared with the city and in future community updates prior to construction starting.

**15. Why were standard soil conditions assumed for modelling existing conditions?**

General geotechnical work is a standard part of any large-scale infrastructure project like this one. As part of this process, the port authority continues relevant ground investigation for the project.

Completed geotechnical work shows that the water table is high and that standard ground conditions are typical of this area. Further geotechnical work is planned throughout 2022 to inform

technical designs and construction planning. As this supplemental information is collected, the BKL assessment and recommendations may be updated accordingly to capture any significant changes to assumed soil and site conditions where applicable.

In addition, BKL found a good correlation between the site measurements and predicted vibration levels assuming standard soil conditions through their modelling work. Therefore, this study has assumed standard soil conditions for the purposes of assessment.

**16. Is structural damage and/or cracking expected based on vibration measurements and modelling?**

The noise and vibration assessment by BKL for the Pitt Meadows Road and Rail Improvements Project followed the guidelines and criteria set out by Health Canada (for noise) and the US Federal Transit Administration (for vibration).

The US Federal Transit Administration (FTA) guidelines state that: “Building damage is not a factor for typical transportation projects, but in extreme cases, such as during blasting or pile-driving during construction, vibration could cause damage to buildings. A vibration level that causes annoyance is well below the damage risk threshold for typical buildings.”

For operational vibration, the assessment indicates very little change in the future scenarios for vibration when compared to today.

For construction vibration, as mentioned previously in Q13, the port authority will work with its contractor to ensure that construction activities comply with relevant industry requirements, as it relates to construction-related noise and vibration.

BKL has also recommended a site-specific detailed vibration analysis during the detailed design phase of any mitigation where large project impacts are identified.

**17. Where will the future noise walls be located and what will they look like?**

Over the next few months, we will be working with the City of Pitt Meadows and CP to finalize details such as materials, aesthetics, and exact locations of the noise walls. We are progressing this work with the objective of avoiding locating walls on private residential property, where possible.

**18. When will the noise walls be built?**

Construction timing for noise mitigation remains to be determined. Over the next few months, we will be working with the City of Pitt Meadows and CP to determine these construction details.

**19. How were wall heights determined?**

Wall heights were determined by BKL using internationally or nationally recommended standards implemented in predictive software, following the noise mitigation objectives listed in Table 10-1 of the revised assessment:

Mitigation Scope	Mitigation Objectives
Warranted	<ul style="list-style-type: none"> <li>• Achieve sufficient noise benefit to avoid noise impacts <i>created by the project</i> (i.e., to avoid having any new additional receivers exceed any of the established project noise criteria due to the project);</li> <li>• Include additional potential impacts identified in the sensitivity analysis; and,</li> <li>• Where feasible, achieve minimum 5 dBA benefit at the impacted residences.</li> </ul>
\$3M Investment	<ul style="list-style-type: none"> <li>• Achieve the objectives of the Warranted Scenario; and</li> <li>• Where feasible and most cost-effective given the allotted \$3M investment:                             <ul style="list-style-type: none"> <li>○ reduce <math>L_{dn}</math> noise levels at <i>any</i> dwellings predicted to exceed 75 dBA in the future with-project scenario to a level below 75 dBA; and</li> <li>○ achieve minimum 5 dBA benefit at majority of residences directly behind any new noise barrier.</li> </ul> </li> </ul>
\$5M Investment	<ul style="list-style-type: none"> <li>• Achieve the objectives of the Warranted Scenario;</li> <li>• Where feasible and most cost-effective given the allotted \$5M investment:                             <ul style="list-style-type: none"> <li>○ reduce <math>L_{dn}</math> noise levels at <i>any</i> dwellings predicted to exceed 75 dBA in the future with-project scenario to a level below 75 dBA;</li> <li>○ reduce noise levels at dwellings with higher predicted <math>L_d</math> and <math>L_n</math> levels; and,</li> <li>○ achieve minimum 5 dBA benefit at majority of residences directly behind any new noise barrier.</li> </ul> </li> </ul>

Further work will occur during the design phase to further evaluate and determine the best combination of wall location, length, and height to mitigate the most amount of noise for the highest quantity of receivers within funding limits. Final wall locations and heights will be determined in consultation with the city to maximize community benefit. Please refer to [section 10 of BKL's report](#).

**20. How effective would a segmented wall be compared to a continuous wall?**

There are many factors we considered when determining the locations for the mitigation required by Health Canada. Based on the results of the noise and vibration study and by applying the Health Canada guidelines, the segmented walls were identified and proposed specifically because BKL, as acoustical engineering experts, determined they will be effective. Mitigation is effective for receivers directly behind walls.

**21. Will segmented walls make locations without noise walls worse?**

No, they would not based on BKL's detailed noise modelling. BKL's modelling considers physical characteristics of proposed walls including heights and propagation around end of the segmented walls. Non-continuous segmented walls will not make noise levels worse. Residences without noise walls do not experience higher noise levels or "negative noise benefit" through the proposed segmented wall mitigation. Please refer to [section 10 of BKL's report](#) for more information.

## 22. The entire corridor is noisy. Could more mitigation be implemented?

While it is a busy and noisy corridor, it is important to recognize that noise and vibration associated with rail activity cannot be eliminated altogether. Railways operate 24 hours per day, 365 days per year, to enable Canada's trade objectives and move goods to support the needs of Canadian businesses and consumers. CP is obligated under the Canada Transportation Act to:

- Provide service
- Build infrastructure
- Conduct operations to accommodate all traffic offered

Even with modern technology and operational best practices, rail operations are inherently noisy and induce vibrations, as large locomotives move heavy freight cars through a corridor.

There are many factors we're considering when determining the locations for noise mitigation.

To recap the Health Canada guidelines:

- **Warranted mitigation** – based on what our assessment identified and by applying the Health Canada guidelines
- **Supplementary mitigation** – above and beyond what is required by the Health Canada guidelines, where we looked at what would bring the most meaningful solution when considering the additional cost and the benefit to residents. We have doubled our investment for noise and vibration mitigation to \$3M at no cost to the city, with an opportunity to obtain an additional \$1 million in project funding if the city matches \$1 million, for a combined total of \$5 million that may be allocated to noise and vibration mitigation. Final wall locations and heights will be determined in consultation with the city to maximize community benefit.

## 23. Why have the supplementary wall locations changed from the 2021 locations?

Some supplementary walls became part of the warranted scope due to changes in predicted noise impacts associated with the new Harris Road underpass alignment (i.e., the underpass shifting west of its current alignment).

Overall wall heights have also changed with the updated assessment, so the total wall length was changed to fit within the same mitigation budgets. Updates in noise modelling also had some effect on wall locations. This tweak in proposed mitigation length and height of walls is expected as key project elements change and the design work progresses (e.g. the change in alignment for Harris Road).

## 24. Did the study area change between the 2019 and 2022 modelling?

No, the study area did not change as this was not necessary. Increasing the study area would not identify more receivers that could potentially exceed the study criteria due to the project.

## 25. Existing noise levels already exceed the criteria – are you addressing this?

As outlined in the spring 2021 update, the Pitt Meadows Road and Rail Improvements Project (in applying Health Canada guidelines for noise) focuses on the incremental impact a project might bring to noise conditions *based on changes associated with new infrastructure*.



Any mitigation proposed as part of this project does not preclude other parties from installing additional noise walls along the corridor in the future.

For concerns or questions about current noise and vibration relating to rail operations, please contact CP at [community\\_connect@cpr.ca](mailto:community_connect@cpr.ca).

**26. How were the city's peer review findings incorporated into the assessment?**

Please refer to the below table for information about how the peer review findings have been incorporated into the updated assessment.

**27. How much mitigation will the project be implementing?**

The project now proposes a \$3 million investment commitment for noise and vibration mitigation at no cost to the city.

There is an additional opportunity to expand this mitigation to a cumulative investment of \$5 million if the city contributes \$1 million in funding (with the other \$1 million contribution provided by other parties), with further details outlined in the project partnering agreement.

Final wall heights and locations would be determined in collaboration with the city to maximize community benefit.

**28. Does the assessment include any recommendations for noise mitigation for the new rail bridge, above the Harris Road underpass (i.e., concrete vs. steel superstructure, rail ties directly supported by the superstructure vs. supported by a prism of ballast, surface material, superstructure steel bearings vs. elastomeric ones)?**

Design is ongoing and if major components of the underpass and rail bridge (i.e., alignment) are changed then the report will be updated accordingly where applicable.

## How the RWDI peer review was considered and incorporated

RWDI peer review – Key findings	How it was considered or incorporated
<p>The severity of health effects associated with speech interference, sleep disturbance and low frequency noise should be discussed and evaluated. Existing conditions should be considered when assessing the potential for investigating mitigation to minimize such effects.</p>	<p>Per the Health Canada Guidelines, the purpose of BKL’s assessment was to discuss and evaluate the severity of project-related health effects associated with speech interference, sleep disturbance and low frequency noise. The focus was to assess the potential changes and differences between a future both with – and without – project scenarios, and using today’s existing conditions as a key input into the modelling exercise.</p> <p>While the existing conditions were measured and reported, assessing potential health effects associated with existing conditions or non-project-related road and rail traffic growth was outside the scope of the assessment.</p>
<p>Since the 70 dB (L<sub>LF</sub>) “rattle criterion” is exceeded, Health Canada may suggest the implementation of feasible mitigation measures. There is evidence that noise-induced rattles are very annoying, and this annoyance may be independent of the number or duration of events.</p>	<p>BKL’s interpretation of the Health Canada Guidance for Evaluating Human Health Impacts in Environmental Assessment: Noise (the Guideline) was to assess project-related impacts only. They followed Section 6 of the Guidelines which outlines the main steps in assessing potential health impacts of changes in noise associated with a project.</p>
<p>It is typical for the 75 dBA (L<sub>dn</sub>) threshold to be considered absolute and mitigation would be recommended at a minimum to all residences predicted to exceed it. This application of this threshold within the Study appears to be a deviation from the Health Canada guidelines.</p>	<p>BKL is working with the port authority, the city and CP to develop potential mitigation options to consider and address the identified impacts deemed warranted by Health Canada’s guidelines, along with additional supplementary mitigation.</p>
<p>Additional mitigation should be considered within the study area to minimize potential health effects associated with high levels of speech interference, sleep disturbance, and low frequency noise.</p>	<p>BKL incorporated this recommendation into their revised assessment modelling different mitigation investment options. See Section 10 of their report.</p>
<p>A community communication plan and complaint resolution process should be recommended as part of a mitigation plan.</p>	<p>BKL incorporated this recommendation into their revised assessment. See Section 13 of their report.</p>
<p>Feasible mitigation for vibration should be considered at dwellings that are currently not in excess of the FTA threshold for ‘infrequent’ event activity but are predicted to be for ‘occasional’ event activity for the with- and without-Project scenario threshold.</p>	<p>Forecast existing annual average events are 38 including freight and commuter traffic; hence, the threshold for “occasional events” was used for the existing scenario. Further details are included in Appendix D.8.</p> <p>It should be noted however that BKL’s collection of data including the number of trains on a particular day is a</p>

	<p>particular moment in time. Train volumes fluctuate and hence observations onsite outside of the dates where BKL collected their data, may slightly differ.</p> <p>BKL is working with the port authority, the city and CP to identify any potential vibration mitigation options that consider and address the identified impacts created by the project that exceed the FTA thresholds (if any).</p>
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RWDI peer review – Secondary findings	How it was considered or incorporated
<p>The Canadian Transportation Agency (CTA) guidelines should be considered in addition to Health Canada and the U.S. FTA.</p>	<p>The CTA documents referenced in RWDI’s memo do not address project-related noise as they relate to existing conditions. They only address noise and vibration disputes with regards to existing railway infrastructure or facilitates. The Health Canada Guideline has been used to perform the project noise impact assessment based on the proposed new infrastructure.</p> <p>CTA guidelines can be utilized by organizations or groups where this is a concern with existing conditions related to railway infrastructure. However, this is not a consideration that is necessary for project related impacts.</p>
<p>Health Canada complaint criteria should be part of the Study, and mitigation should be considered where such criteria are exceeded.</p>	<p>BKL’s approach initially did not include the noise complaints criteria in the assessment since the Health Canada Guideline mentions that “<i>the relationship between noise levels and high annoyance is stronger than any other self-reported measure, including complaints</i>” and that “<i>reliance on noise complaints may only provide a partial indication of a noise problem...</i>”.</p> <p>However, BKL has revised their report to include these results.</p>
<p>The sleep disturbance criterion (72 dBA LFmax) assumes a closed residential window, but should consider a partially open window (60 dBA LFmax) consistent with Health Canada recommendations.</p>	<p>Since the assessment focuses on project-related impacts only and maximum noise levels are not predicted to change, using the partially open window criteria would not affect the assessment results. For transparency, however, BKL included the partially open window criteria results in the revised report. See Table 4-1 and 10-3.</p>

<p>The reference velocity (re 1nm/s) used to calculate VdB is not standard within the FTA manual referenced. The result of this deviation from the FTA manual is that the criteria levels provided (in VdB) do not align with the criteria levels provided in the Vibration Impact Analysis (Section 6) portion of the FTA manual. This change could be confusing for readers.</p>	<p>A clarification on the reference velocity used was added to the revised assessment. See the footnote in section 4.3.</p>
<p>The criteria presented for the Study is for occasional freight locomotive pass-by events (i.e. 30- 70 events per day; 103 VdB threshold) per the FTA manual (with re 1 nm/s). This event frequency is consistent with future forecasted freight traffic and does not appear to be consistent with existing traffic levels. Existing freight traffic volumes equate to infrequent events (i.e. less than 30 per day; 108 VdB threshold). This shift to a stricter criterion due to changes in event frequency was not acknowledged in the Study and demonstrates the need for more careful consideration.</p>	<p>At site N4, BKL counted 27-30 freight train pass-by events plus 8-10 commuter train pass-bys per day. Further details are included in Appendix D.8.</p>
<p>A Dutch propagation model (SRM II) was chosen to predict rail propagation. Generally, a North American rail model such as U.S. FTA/FRA would be chosen. Evidence as to why the chosen model is representative of North American rail noise propagation should be provided.</p>	<p>BKL revised modelling to use U.S. FTA/FRA model instead of SRM II for rail noise predictions. See Section 7.1 of BKL's report.</p>
<p>An expanded assessment boundary for noise modelling would have created a more complete picture to the extent of potential health effects within the City of Pitt Meadows. Although the worst-case receptors are captured within the chosen assessed boundary, the magnitude of the existing and future issues is not represented. Expanding the assessment boundary would likely demonstrate that there are more dwellings which experience noise levels in excess of HC criteria (i.e. have the potential to cause health effects) than indicated in the study.</p>	<p>Since the assessment is focused on project-related impacts, the study area was chosen to include all noise and vibration locations along the rail corridor between Kennedy Road and Golden Ears Way that could potentially have significant adverse effects from noise and vibration caused by the project. If any impacts were identified beyond the study area, it was expanded to include the impacted receivers.</p>
<p>It's unclear from the study if the model was calibrated to measure train pass-by events and/or any overall measured average sound metrics.</p>	<p>Freight rail through traffic was calibrated to measure pass-by events and overall sound metrics. BKL included this clarification in the revised assessment. See section 7.1.1.1.</p>
<p>The study does not appear to address that future sound levels only consider rail and road traffic and</p>	<p>BKL did not identify any other significant noise sources within the study area to include. Growth in</p>

<p>not the cumulative change in all other noise sources. A clear rationale should be provided as to why cumulative sound levels were not considered.</p>	<p>future rail traffic (based on doubling in 2030 compared to 2019) and traffic increases were included when evaluating noise. A clarification was added in the revised assessment. See section 7.1</p>
<p>There seems to be a discrepancy between the traffic volume used within the Study and actual traffic volumes based on RWDI's 2021 monitoring program. The Study includes 28 trains per day while RWDI counted on average 18 trains per day. If the baseline rail volumes are overstated, the change to the future expansion conditions may be under-stated.</p>	<p>BKL identified an average of 40 trains (freight and commuter) per day during our baseline monitoring period in December 2019 and 35 trains (freight and commuter) in October 2021. These observations are consistent with separate data collected by the port authority which includes our follow up monitoring along the rail corridor in 2021. Further details are included in Appendix D.8.</p> <p>It should be noted however that BKL's collection of data including the number of trains on a particular day is a particular moment in time. Train volumes fluctuate and hence observations onsite outside of the dates where BKL collected their data, may slightly differ</p>
<p>For vibration modelling, where ground conditions are unknown, it would be more typical to use 'worst-case' soil conditions to generate conservative results.</p>	<p>BKL found a good correlation (i.e., within 1 dB or over predicting by 2-3 dB) between the site measurements and predicted levels assuming standard soil conditions. Therefore, standard soil conditions have been used in the vibration level predictions.</p>
<p>Table 6-12 of the FTA manual, a 3-4 storey masonry building results in a recommended 10 dB reduction; however, within the Study, a 12 dB reduction was applied to the Keystone building which was described as a '3-4 storey masonry building'. It is unclear why there is a discrepancy here from the FTA manual.</p>	<p>A 2 dB attenuation was applied for Keystone building receivers to account for floor-to-floor attenuation for units on suspended floors to be consistent with the FTA manual.</p>
<p>LFmax freight pass-by noise levels and RMS vibration levels presented in Table 6-1 of the Study are based on the average of six freight pass-by events from a single day over the entire monitoring period. There is no indication of how these six events were chosen.</p>	<p>The FTA guidelines suggests measuring 4 to 10 train passbys to obtain representative existing conditions. BKL considers their random sample of six freight passby events to be representative of typical pass-by noise and vibration levels.</p>
<p>A noise adjustment of +5 dB to account for impulsive noise for VIF rail yard activity and train building was applied; however, this activity may be considered</p>	<p>This recommendation has been incorporated. Please refer to section 7.1.3.</p>

<p>highly impulsive which carries a +12 dB adjustment during the activity.</p>	<p>The presence of these characteristics was evaluated using noise data and audio recording captured at the baseline sites. The following adjustments are applied to this project based on guidance from the Health Canada document:</p> <p>A +12 dB highly impulsive adjustment is applied to all VIF rail yard activity and train building activity between Harris Road and Golden Ears Way</p> <p>A +5 dB tonal adjustment is applied to the rail whistling at Kennedy Road crossing and the rail crossing signal at Harris Road crossing</p>
<p>The study did not appear to confirm that the train building time is doubled for the future with and without- Project scenarios. Sound and vibration effects from all phases of the Project should be considered, including construction, maintenance, and decommissioning. It is important that there is strong and consistent communication with the public regarding what to expect and for how long.</p>	<p>Train building activity time was assumed to increase in proportion to the projected freight rail through-traffic increase, which is approximately doubled in the future. This clarification is included in section 7.1.1.3.</p>
<p>The study does not appear to address that future sound levels only consider rail and road traffic and not the cumulative change in all other noise sources. A clear rationale should be provided as to why cumulative sound levels were not considered.</p>	<p>BKL did not identify any other significant noise sources within the study area to include. Growth in future rail traffic (based on doubling in 2030 compared to 2019) and traffic increases were included when evaluating noise. A clarification was added in the revised assessment. See section 7.1</p>
<p>There seems to be a discrepancy between the traffic volume used within the Study and actual traffic volumes based on RWDI's 2021 monitoring program. The Study includes 28 trains per day while RWDI counted on average 18 trains per day. If the baseline rail volumes are overstated, the change to the future expansion conditions may be under-stated.</p>	<p>BKL identified an average of 40 trains (freight and commuter) per day during our baseline monitoring period in December 2019 and 35 trains (freight and commuter) in October 2021. These observations are consistent with separate data collected by the port authority which includes our follow up monitoring along the rail corridor in 2021. Further details are included in Appendix D.8.</p> <p>It should be noted however that BKL's collection of data including the number of trains on a particular day is a particular moment in time. Train volumes fluctuate and hence observations onsite outside of</p>

	the dates where BKL collected their data, may slightly differ.
For vibration modelling, where ground conditions are unknown, it would be more typical to use 'worst-case' soil conditions to generate conservative results.	BKL found a good correlation (i.e., within 1 dB or over predicting by 2-3 dB) between the site measurements and predicted levels assuming standard soil conditions. Therefore, standard soil conditions have been used in the vibration level predictions.
Table 6-12 of the FTA manual, a 3-4 storey masonry building results in a recommended 10 dB reduction; however, within the Study, a 12 dB reduction was applied to the Keystone building which was described as a '3-4 storey masonry building'. It is unclear why there is a discrepancy here from the FTA manual.	A 2 dB attenuation was applied for Keystone building receivers to account for floor-to-floor attenuation for units on suspended floors to be consistent with the FTA manual.
LFmax freight pass-by noise levels and RMS vibration levels presented in Table 6-1 of the Study are based on the average of six freight pass-by events from a single day over the entire monitoring period. There is no indication of how these six events were chosen.	The FTA guidelines suggests measuring 4 to 10 train passbys to obtain representative existing conditions. BKL considers their random sample of six freight passby events to be representative of typical passby noise and vibration levels.
A noise adjustment of +5 dB to account for impulsive noise for VIF rail yard activity and train building was applied; however, this activity may be considered highly impulsive which carries a +12 dB adjustment during the activity.	<p>This recommendation has been incorporated. Please refer to section 7.1.3.</p> <p>The presence of these characteristics was evaluated using noise data and audio recording captured at the baseline sites. The following adjustments are applied to this project based on guidance from the Health Canada document:</p> <ul style="list-style-type: none"> <li>• A +12 dB highly impulsive adjustment is applied to all VIF rail yard activity and train building activity between Harris Road and Golden Ears Way.</li> <li>• A +5 dB tonal adjustment is applied to the rail whistling at Kennedy Road crossing and the rail crossing signal at Harris Road crossing.</li> </ul>
The study did not appear to confirm that the train building time is doubled for the future with and without- Project scenarios. Sound and vibration effects from all phases of the Project should be considered, including construction, maintenance, and	Train building activity time was assumed to increase in proportion to the projected freight rail through-traffic increase, which is approximately doubled in the future. This clarification is included in section 7.1.1.3.

decommissioning. It is important that there is strong and consistent communication with the public regarding what to expect and for how long	
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