Protection of Community and Neighbourhood Characteristics: Noise Impact Assessment

This document provides an overview of the noise impact analysis completed to date as part of the Detroit River International Crossing (DRIC) Environmental Assessment.

Noise is generally described as unwanted sound. However, noise and sound are sometimes used interchangeably. The unit used for measuring sound is the decibel (dB). To better reflect the response of human receptors to sounds measured by instruments, "*weighting scales*" are used. The "*A weighted scale*" is used to duplicate the human response to the audible frequency range. Sound levels so adjusted are referred to as "*A weighted decibels*" and assigned the unit abbreviation dBA.

Purpose of the Noise Impact Assessment

The Ontario Ministries of Transportation (MTO) and the Environment (MOE) have developed a specific protocol for establishing noise impacts from transportation projects. In general terms, the noise impact is determined by comparing the noise specifically caused by the project, with the existing noise experienced by sensitive receptors in the vicinity of the project. Where the project noise exceeds the background/existing noise levels by five or more decibels (dB) mitigation measures including sound barriers are to be considered for the project.

How the Analysis was Done

The methodology for estimating noise levels consisted of the following key steps:

1. Traffic data was established for the current year, as well as for future years (2015, 2025 and 2035), representing baseline conditions and for each access road alternative. For each alternative, certain key information was determined, including Annual Average Daily Traffic (AADT), percentage of automobiles, percentage of heavy and medium trucks, speed limit, road elevation, local topography, surrounding ground conditions, etc.
2. Sensitive noise receptors were identified. The receptors selected for assessment were those that were most potentially impacted by the various alternatives. Multiple receptors were selected to capture the anticipated variations in exposure to noise from traffic based on the alignment of existing roads, the alignment of the Practical Alternatives, and variations in traffic volumes. On this basis, a total of 35 receptors were selected.
3. For the year 2035, baseline ("no-build") and project noise levels were estimated at each of the receptors identified for each access road alternative, using the MOE's STAMSON traffic noise model. The key inputs to the STAMSON noise model are: traffic volume, percentage of automobiles, percentage of heavy and medium trucks, posted speed limit, road gradient, road surface type, local topography, surrounding ground surface cover, noise source height, receptor height and source to receptor distance.
4. The CADNA-A noise model was used to estimate receptor noise levels for each of the four plaza and corresponding crossing alternatives. This model, approved by the MOE, can be used to predict noise levels from both stationary and mobile noise sources. The modelling approach considered vehicle queuing, idling and acceleration. The key inputs to this model included maximum hourly vehicular traffic (cars and trucks), plaza layout, vehicle sound levels, locations of vehicles at plaza sites.

Results to Date

1. In general, in comparison with at-grade alternatives (1A and 2A), the depressed alternatives (1B and 2B) seem to generate lower noise levels at the receptor locations. Of all the alternatives, Alternative 2B had the least occurrences where the project sound levels exceeded the background sound levels by greater than five dB. Noise mitigation is to be considered whenever the project sound levels exceed the receptor background sound levels by greater than five dB.
2. The route segment extending from Malden Road to Pulford Street showed increases in sound levels beyond the future base case ("do nothing" alternative)) with both the at-grade and depressed alternatives. The increases in

this route segment were often greater than five dB at the receptors; therefore, noise mitigation measures are to be considered.

3. In cases along the access roads where receptors were estimated to receive greater than a five dB increase in sound levels, additional assessment was undertaken. For each segment where such exceedance was predicted, the effect of a 5 m (16 ft) high noise barrier was estimated for either the receptor with the highest estimated exceedance, or the area within the segment with the highest cluster of homes. In all cases, the noise barrier was effective in reducing the predicted project noise to within five dB of the estimated baseline noise levels.
4. Receptors along the crossing approach roadway from Matchette Road to Malden Road, which connects to the Plaza B, B1 and C alternatives, are likely to experience a high noise impact from all access road alternatives (i.e. greater than 10 dB increase above background receptor sound levels). The impact is expected to be highest near the Matchette Road/E.C. Row Expressway intersection, due to the proximity of the closest receptor to the roadway right-of-way (~50 m or 164 ft), the roadway elevation (8 m or 26 ft above grade), and high traffic volumes. The effectiveness of implementing noise mitigation measures in this area is currently being assessed.
5. The noise from the plaza locations will not result in significant noise level increases at the receptors closest to the plazas. In most cases, the receptors are more than 50 m (164 ft) away from the plazas. However, a high noise impact (greater than 10 dB above background receptor sound levels) is anticipated for receptors adjacent to all crossings. Noise mitigation measures are to be considered for these crossings.

Remaining Activities

The assessment of the changes to noise levels associated with the tunnel alternative (Alternative 3) will be completed. This will include consideration of noise emanating from the portal areas as well as the ventilation buildings. In addition, the noise impact assessment for all alternatives will be completed for the 2015 and 2025 traffic scenarios.

Once completed, this work will be incorporated into the assessment of Practical Alternatives.