

TO:	CHAIR AND MEMBERS CIVIC WORKS COMMITTEE MEETING ON SEPTEMBER 25, 2018
FROM:	KELLY SCHERR, P.ENG., MBA, FEC MANAGING DIRECTOR, ENVIRONMENTAL & ENGINEERING SERVICES AND CITY ENGINEER
SUBJECT:	ROAD TRAFFIC NOISE IMPACT STUDY HIGHBURY AVENUE FROM BRADLEY AVENUE TO THE THAMES RIVER

RECOMMENDATION

That, on the recommendation of the Managing Director, Environmental & Engineering Services and City Engineer, the following actions be taken with respect to the Road Traffic Noise Impact Study of Highbury Avenue from Bradley Avenue to the Thames River:

- (a) The residential rear yard noise measurements on the west side of Highbury Avenue from Bradley Avenue to the Thames River **BE RECEIVED** for information; and,
- (b) Civic Administration **BE DIRECTED** to undertake a review of comparator municipal noise abatement local improvement procedures to inform a potential update to the City of London administrative practices and procedures.

PREVIOUS REPORTS PERTINENT TO THIS MATTER
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- Environment and Transportation Committee - September 26, 2005 - Local Improvement Policy Amendment and Irving Place / Highbury Avenue Noise Wall
- Environment and Transportation Committee - April 03, 2006 - 2006 Highbury Avenue Noise Attenuation Barrier Irving Place
- Built and Natural Environment Committee - March 28, 2011 - Veterans Memorial Parkway & Highbury Avenue Noise Study
- Built and Natural Environment Committee - May 16, 2011 - Public Participation Meeting - Veterans Memorial Parkway & Highbury Avenue Noise Study
- Civic Works Committee, January 6, 2014 - Veterans Memorial Parkway Noise Attenuation Wall
- Civic Works Committee - November 21, 2017 - Hydro One Grant for Tree Planting

BACKGROUND

Purpose

In 2017, Hydro One Networks Inc. (HONI) undertook maintenance operations within their corridor which cleared the underbrush and trees adjacent to Highbury Avenue South. The corridor is between 90 and 100 m in width between Highbury Avenue and the rear of the residential properties on the west side. Part of Hydro One's corporate social responsibility includes a focus on environmental stewardship and working with communities to mitigate environmental impacts of their operations. A report to the Civic Works Committee (November 21, 2017) identified a \$5,000 grant for new tree plantings in the area. Council identified concerns as to the noise impact for the homes along Highbury Avenue resulting from the removal of trees in the area by HONI.

A council resolution passed on November 28, 2017 directed Civic Administration "*to investigate and report back on possible options to address the noise impacts being experienced by homes abutting Highbury Avenue resulting from the recent removal of trees by Hydro One, including the costs for implementing such options; it being noted that the Civic Administration would, as part of the investigation, review the City's policy on local improvements, as it relates to noise attenuation barriers, as well as past projects*". This report provides Committee and Council with the results of requested noise measurements.

POLICY REVIEW

City of London

EES Practices and Procedures

The most relevant City guidance for noise abatement for existing residential outdoor amenity areas receiving noise from a road source are found in the Environmental and Engineering Services Practices and Procedures associated with Local Improvements.

The Noise Attenuation Barriers administrative procedure applies to retrofit abatement on roads where adjacent residential development exists and where a road is not being widened. It specifies that the following project qualification criteria to be met:

- *A sufficient petition in accordance with the provisions of the Municipal Act;*
- *Adjacent to arterial roadways whose present traffic volume exceeds 10,000 vehicles per day;*
- *On a total block basis;*
- *On receipt of a sufficiently signed petition in conformity with the provisions of the Municipal Act.*

The Street Services Implementation and Financing identifies the cost sharing for local improvements. The cost of local improvement noise barriers are apportioned two thirds to the property owner and one third to the City.

The London Plan

The London Plan provides noise wall guidance. Clause 241 states that noise walls in association with road widenings are to be avoided where possible. Clause 1768 also encourages new development patterns to minimize noise walls and Clause 1769 refers to the canyon effect created by noise walls. The Plan states that where such walls are necessary, innovative design techniques will be used relating to the materials, texture, colour, lighting, variability and overall design composition to mitigate impacts on the pedestrian environment and streetscape. Clause 1767 refers to provincial and agency input to determine attenuation measures in the absence of a City guideline.

Noise Barrier Walls on Fanshawe Park Road West



Design Specifications and Requirements Manual

The Design Specifications and Requirements Manual provides design guidance. The Manual states that noise attenuation measures can be setbacks, building orientation, earthen berms, noise walls, or any combination necessary to achieve an acceptable noise level, based on MOE Criteria.

Provincial Policies

Noise mitigation policies vary between provincial authorities depending on the circumstances. Ministry of Transportation Ontario (MTO) Environmental Guide for Noise establishes the criteria for provincial highway widenings and retrofit situations. The MTO's Retrofit Policy is the most relevant criteria for the Highbury Avenue South corridor. It states that noise control measures should be considered along existing freeways where existing adjacent noise sensitive areas are experiencing 24-hour average daytime noise levels over 60 dBA.

For comparison, when planning new developments, the criteria specified by the Ministry of Environment, Conservation and Parks (MECP) takes precedent. The MOE Noise Assessment Criteria in Land Use Planning: Requirements, Procedures and Implementation document generally requires noise mitigation for new developments with predicated daytime (16 hour) outdoor amenity noise levels above 60 dBA. It requires a noise reduction of 5 dBA where technically, economically and administratively feasible. Application of a 16-hour criteria is more stringent than the 24-hour MTO criteria.

Other Ontario Municipalities

An initial cursory review of comparator Ontario municipalities indicates that retrofit situations implemented under local improvement processes are often subject to a minimum noise criteria. The value is typically consistent with the MTO noise threshold

of 60 dBA but using the 16-hour daytime measure. The municipal local improvement cost sharing ratios were variable.

REVIEW OF PAST PROJECTS

Many noise walls exist across the City of London, and they have been installed through various methods. The following is a list of several examples:

Road Widenings

When the City undertakes road widening projects, existing conditions are reviewed and the impacts of the proposed widening are assessed in an environmental study report as part of the municipal class environmental assessment process. In some cases, road widenings occur adjacent to residential areas that, at the time of development, were not subject to noise mitigation requirements. In these situations, the widening may increase noise levels in noise sensitive areas by bringing the noise source (road) closer to the outdoor living area of the adjacent dwellings. When this occurs, the City undertakes a noise impact assessment. Where mitigation is warranted, noise attenuation measures are included in the construction costs.

Examples of recent road widening projects where the City has constructed noise walls include:

- Sarnia Road from Wonderland Road North to Sleightholme Avenue
- Fanshawe Park Road East from Adelaide Street North to Highbury Avenue North
- Hyde Park Road from Oxford Street West to Fanshawe Park Road West
- Commissioners Road West from Wonderland Road South to Viscount Road

For City ROW installations, noise wall types that are approved for use on the provincial Designated Sources of Materials (DSM) list are used because of the product testing, known durability and lower ongoing operating costs. These walls tend to be precast concrete.

New Development

As part of all planning and development applications new developments are required to avoid side/rear yard amenity areas adjacent to existing arterial roadways. Where this is not possible the developer is required to conduct a noise impact assessment. If the appropriate warrants are met, the developer must provide attenuation at the development cost. Noise attenuation measures that are constructed as part of development are situated on private property and maintenance is the responsibility of the property owner. The wall types are variable and include precast concrete, wood and plastic.

Veterans Memorial Parkway

In 2005, Veterans Memorial Parkway was widened from two lanes to four. At the time of construction, noise walls were not implemented because the widening was easterly, away from the existing residential dwellings and therefore not predicted to increase noise levels in the westerly rear yard amenity areas located between Dundas Street and Trafalgar Street. In 2014, the City of London subsequently funded and installed a noise wall after additional noise monitoring detecting noise levels above 60 dBA and council direction. The Council direction included the noise wall type which was not identified on

the DSM and was a lower cost plastic wall alternative with lesser known life cycle maintenance costs.

Highbury Avenue North

In 2006, a noise attenuation barrier was the subject of a Local Improvement Program for residential dwellings on Irving Place where six rear yards are adjacent to Highbury Avenue North. Pursuant to the Municipal Act provisions (formerly the Local Improvement Act) and the City of London's Local Improvement Policy, the wall was constructed with the property owners paying for 50% of the implementation costs. The wall is shown below.

Irving Place / Highbury Noise Barrier Wall



The petition for the Irving Place / Highbury Avenue wall was received in 1994, when the Local Improvement Policy stated that the construction cost portion to property owners was 50%. In 1995, the Local Improvement Policy was amended such that 100% of the construction costs would be borne by the property owner. Following the Highbury Avenue North (Irving Place) local improvement program, the City's Local Improvement Policy was amended again to the current rate of two-thirds property owner and one-third City.

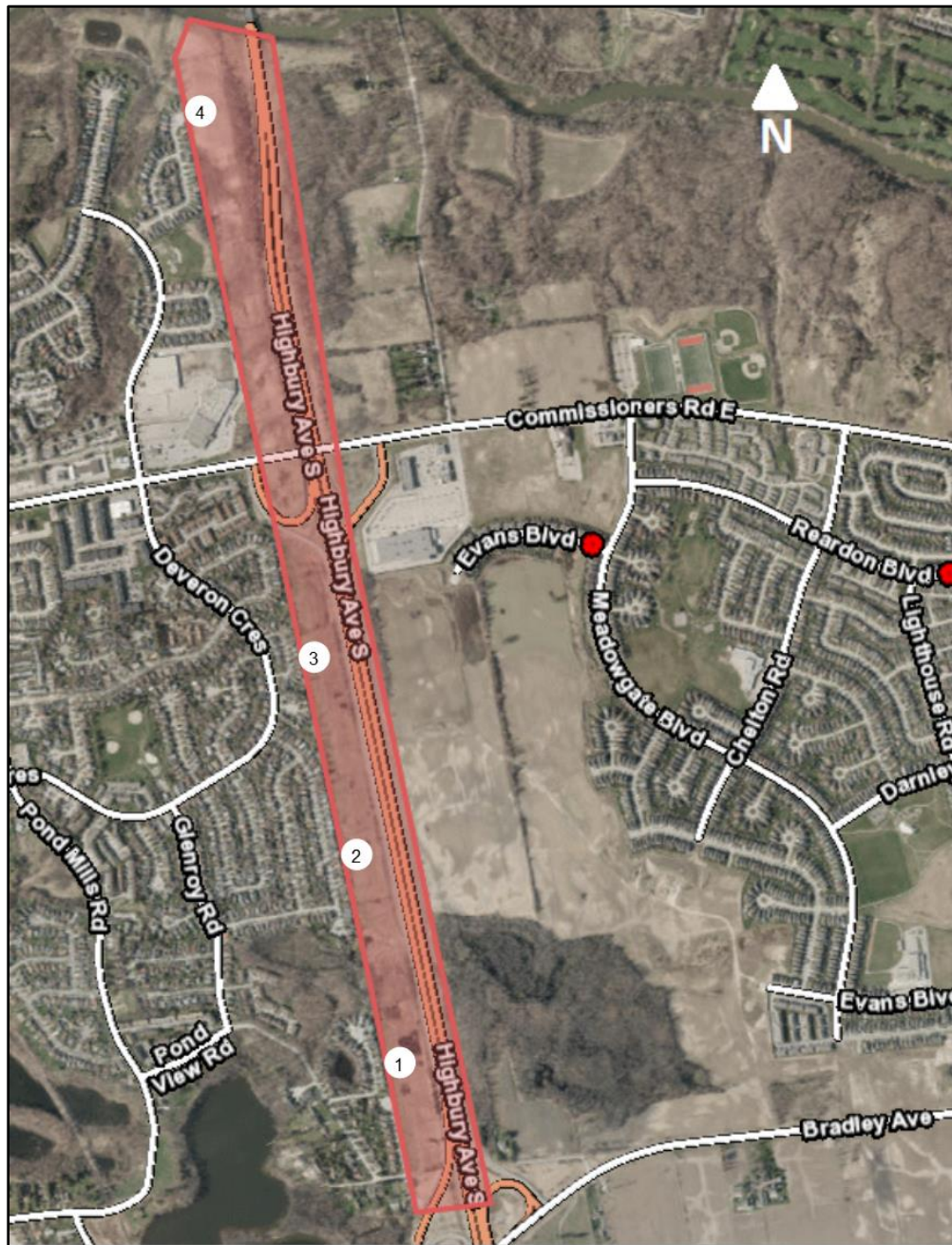
NOISE MONITORING

Valcoustics Canada Ltd. was retained to conduct a road traffic noise impact study along the west side of Highbury Avenue South between Bradley Avenue and the Thames River. The focus of the study was the noise levels experienced within the side and rear yard outdoor amenity areas of the dwellings located west of Highbury Avenue South on the west side of the HONI corridor. The consultant report, excluding its appendices, is attached as Appendix A.

The study involved placing noise monitoring equipment at four locations along the corridor as shown below. Based on the distance between the dwellings and the noise source being approximately 120 metres (i.e. from the west edge of the travelled roadway to the rear property line) and the typical shallow depth of rear yards, it was determined that equipment setup at the edge of the Hydro One corridor, adjacent to the property line would provide an accurate measurement with a negligible variance in the

results (0.3 dBA) from not being installed within the amenity areas and would minimize the potential for extraneous noise.

Locations (1 to 4) of the Noise Monitoring Equipment



The noise monitoring equipment shown in the figure below was installed on June 19, 2018 and left in place for almost two weeks; being removed on June 28, 2018. The equipment actively recorded the entire time.

Noise Monitoring Equipment Setup



The analysed data has been provided in the table below.

Measured Sound Levels

Date	Location 1 <i>L_{eq Day}</i> (dBA)	Location 2 <i>L_{eq Day}</i> (dBA)	Location 3 <i>L_{eq Day}</i> (dBA)	Location 4 <i>L_{eq Day}</i> (dBA)
19 June 2018	60	61	60	57
20 June 2018	61	62	60	55
21 June 2018	63	66	64	62
22 June 2018	64	67	66	58
23 June 2018	60	62	62	57
24 June 2018	61	62	60	64
25 June 2018	62	64	61	58
26 June 2018	63	66	64	57
27 June 2018	61	63	62	57
28 June 2018	61	60	59	57
Average	62	63	62	58

* *L_{eq Day}* is the average energy sound exposure level for daytime 16-hours (0700 to 2300)

Locations 1, 2 and 3 are representative of rear-lotted residential rear yards adjacent to the HONI corridor south of Commissioners Road. Location 4 is representative of rear yards on Eula White Place adjacent to the HONI corridor. Rear yards on Phair Crescent are protected by existing wood noise walls so would have lower noise levels and were not assessed.

Part of the noise impact study is to compare these actual sound level results with the predicted sound levels for the amount of traffic on the corridor. Standard practice for new developments is to simulate sound levels using the Ministry of Environment, Conservation and Parks (MECP) computerized road traffic prediction modeling software, ORNAMENT (Ontario Road Noise Analysis Method for Environment and Transportation). The model predicted levels based on current Highbury Avenue traffic counts are close to the actuals and validate the data. A comparison of the predictions to the measured sound levels indicates that the measured sound levels are marginally higher than the predictions. This could be due to a variety of factors including traffic travelling faster than the posted speed, wet road conditions, wind, etc.

The removal of the HONI corridor vegetation created concerns from several residents. Noise measurements in 2011 identified typical average daytime sound levels of 56 dBA

in the side/rear yard amenity areas of the residential dwellings along the west side of Highbury Avenue South between Commissioners Road East and Bradley Avenue. This indicates that noise levels have increased since 2011. While difficult to definitively explain, it does appear that the HONI vegetation removal contributed to increased noise levels in combination, to a lesser extent, with incremental traffic volume growth.

Mitigation Options

The City of London local improvement procedures has no noise criteria. With consideration of comparator provincial policies, the daytime sound levels at dwellings represented by Locations 1, 2 and 3 are noted as being higher than 60 dBA and could be considered for a local improvement sound barrier retrofit by applying the MTO criteria.

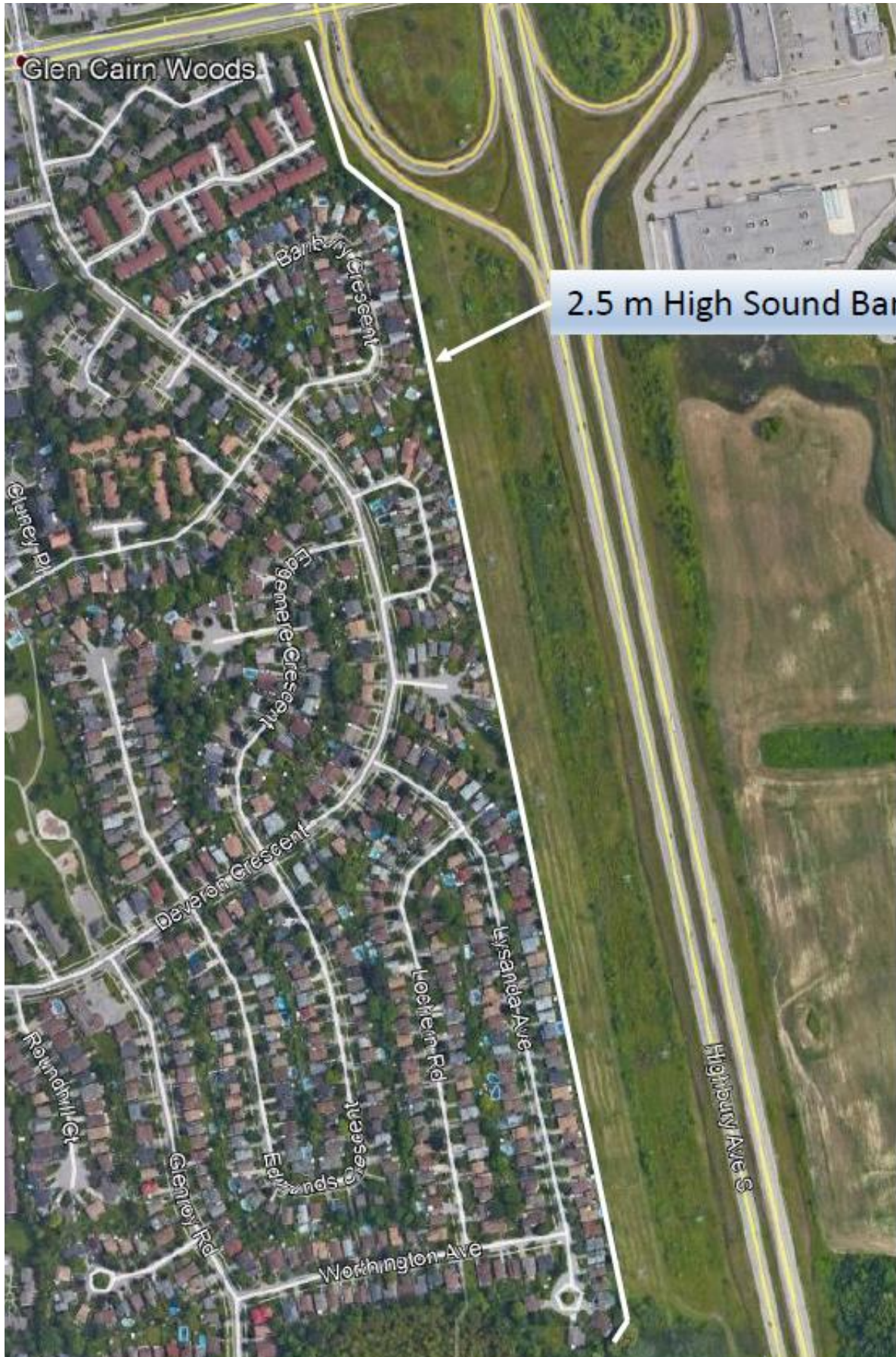
The installation of sound barriers along the private/HONI property line is predicted to be the most effective. Residential properties backing onto the HONI corridor and Highbury Avenue between Commissioners Road and Bradley Avenue would require a 2.5 m high sound barrier along the property line, adjacent to the HONI corridor. In this location, the barrier is predicted to provide about 5.8 dBA of sound attenuation and lower the typical average daytime sound levels to 55.8 dBA. The potential locations are shown in the following figures.

Potential Local Improvement Noise Barrier

Milan Place



Potential Local Improvement Noise Barrier
Banbury Cres, Sundridge Cres & Ct, Lysanda Ave & Ct



Mitigation alternatives such as a noise barrier wall and earth berms along the Highbury Avenue Right-of-Way adjacent to HONI property, would need to be much taller and longer to effectively reduce noise levels. In addition, the continuous barrier would limit HONI access to the corridor from Highbury Avenue South.

Land ownership is an issue for noise abatement suggested along the private/HONI property line. The City does not own land for construction and maintenance. Future implementation would be subject to HONI approval of a construction and maintenance access easement. It is anticipated that an earth berm would not be acceptable to HONI because it would impede hydro tower maintenance equipment and a wall would be required if approved.

The MOE requirements state that sound barriers are to be of solid construction with no holes, gaps or cracks and must have a minimum face density of 20 kg/m². Materials used for noise mitigation construction can include: wood, vinyl, masonry, glass, acrylic, earth berms or a combination of these materials. The City typically constructs noise wall types for City ROW installations that are approved for use on the provincial Designated Sources of Materials (DSM) list due to the established quality control, known durability and lower ongoing operating costs. These walls tend to be precast concrete.

Cost Estimate for Potential Mitigation Option

Assuming HONI approval, a preliminary cost estimate was created. Based on the recommended lengths noted in the study by Valcoustics, an estimate for placing a noise attenuation wall in conformance with City requirements would be:

1500m of 2.5m wall @ \$1200/m	\$1,800,000
1750m of 4.0m gravel access roadway	\$ 150,000
Engineering incl. Geotechnical & Surveying	\$ 140,000
Contingency	\$ 200,000
Estimated Total	<u>\$2,300,000 + HST</u>

The above cost estimate is for a noise wall type listed on the DSM which is the approach applied to City ROW installations. The City would require HONI easements for construction access and maintenance. The nature of the access requirements and associated costs are unknown at this time. The estimate does not consider any costs arising from negotiations with Hydro One for easements or any special measures for restoration through HONI land. Any costs arising from the negotiations that are directly related to the construction of noise mitigation measures would also be subject to the costing agreement under the local improvement process.

CONCLUSION

A recent Road Traffic Noise Impact Study along Highbury Avenue South from Bradley Avenue to the Thames River has measured existing average daytime 16 hour noise levels of 58 to 63 dBA.

London's local improvement procedure would apply to the installation of noise attenuation along existing residential development where no road widening is planned. London's procedure has no consideration of noise levels. However, a cursory review of other municipal and provincial policies indicates 60 dBA as a common trigger for

installation. Application of the 60 dBA criteria that is found in provincial guidelines and some municipal comparators suggest that the back lotted rear yards adjacent to the HONI corridor between Bradley Avenue and Southdale Road could qualify for application of the noise barrier local improvement process.

The installation of a 2.5 m high noise attenuation wall along the edge of the HONI ROW could reduce the sound in the rear yard amenity areas by approximately 5 dBA. The estimated cost of this noise wall is in the order of \$2.3 M plus any associated HONI realty and restoration costs. Initiation of a project would be subject to the receipt of a sufficiently signed petition. Implementation would then be subject to approval of Hydro One Networks Inc. since the City of London does not own the property adjacent to the residential rear yards and access for installation and maintenance would be required.

The local improvement procedure is infrequently used for the installation of new noise mitigation measures for retrofit situations. The procedure has no consideration for noise levels. Additionally, an initial review of municipal comparators indicates variable cost sharing arrangements. It is recommended that a thorough policy review of other Ontario municipalities be undertaken and modifications to the City of London local improvement procedures be considered as determined appropriate. This review would consider noise level warrants considering costs and urban design considerations, cost sharing ratios and wall types.

After the policy review and any changes to the relevant procedures, the measured noise level data would be communicated to relevant homeowners along the HONI corridor with supplementary information regarding the local improvement process as appropriate.

Acknowledgements

This report was prepared with the assistance of Karl Grabowski, P.Eng., Transportation Design Engineer and Matt Davenport, EIT, Engineer in Training of the Transportation Planning & Design Division.

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Appendix A: Road Traffic Noise Impact Study; Highbury Avenue, Bradley Avenue to the Thames River, London, Ontario (excluding appendices)

c: J. Emeljanow, P.Eng. – Valcoustics Canada Ltd.