

IMPLEMENTATION OF NOISE CONTROL MEASURES

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Environmental noise control measures are intended to provide reasonable sound environments indoor and outdoor for residential, and commercial land uses. These measures flow from recommendations outlined in environmental noise studies which are usually required when there is a proposed change in land use. In Ontario, it is normal for noise studies to be:

- a) triggered by requirements imposed on the developer at the municipal planning level;
- b) conducted by noise consultants;
- c) required to conform to generally accepted provincial noise guidelines of the Ministry of the Environment & Energy (MOEE).

Greater emphasis is placed on residential land use and only a few municipalities require noise studies for commercial development.

Noise control measures fall into two categories:

Indoor measures address exterior building shell construction - walls, windows, roofs, doors; and mechanical ventilation to allow windows to remain closed for noise control purposes. **Exterior measures** usually address sound barrier construction and location.

Whether and how recommended noise control measures are being implemented into construction is increasingly of concern.

IMPLEMENTING NOISE CONTROL MEASURES:

Although the processes involved in recommending and implementing noise control measures vary from municipality to municipality, the general approach is:

- 1) Once the noise study is approved by the reviewing agencies, the study recommendations are incorporated into various agreements such as the subdivision, development and servicing agreements.
- 2) Prior to obtaining building permit, the building and site plans are reviewed for conformance with the measures recommended within the noise study.
- 3) Prior to obtaining an occupancy permit or prior to assumption of the development by the municipality, the construction is inspected to ensure the recommended mitigation is in place.

REVIEW OF ACTUAL MUNICIPAL PROCEDURES:

Municipal staff from a total of 14 Towns/Cities and Regions in Southwestern Ontario participated in a survey to determine how noise control measures were being implemented. Table 1 summarizes the overall results.

Applicable Standards:

Most municipalities require the use of Ontario Ministry of the Environment and Energy (MOEE) guidelines in noise studies and in determining noise control measures. A few municipalities, however, require their own "standard practice" measures be implemented. Examples include: sound barrier location with respect to municipal or private property; maximum air conditioner sound emission levels; and particular building shell construction.

Building Design & Site Plan Review:

Most municipalities require a noise consultant to review and certify that building design plans conform to municipal and noise study requirements, prior to issuance of site plan approval or building permits.

Final Clearance Inspections:

The final clearance inspection is the area of greatest variation and potential shortcoming. About a quarter of the municipal agencies reviewed do not have a requirement for a clearance inspection. Of those which did, the review depended on what is being inspected.

Actual building shell construction and ventilation are normally reviewed by the acoustical consultant.

The inspection procedures for sound barriers vary considerably. Some municipalities require no inspection. Most do, but inspections are conducted by noise consultants or by municipal staff and in one municipality, by the installer. Where barrier inspections are conducted by municipal staff, who does the inspection and what is inspected, varies. Building Departments, Engineering Departments and even Parks Departments get involved; each responsible for a particular aspect. Unfortunately, the relevant aspects of acoustics i.e. barrier densities, gaps, heights, and location relative to source and receivers, are often overlooked. Structural integrity, aesthetics and ensuring barriers are placed on private lands and compliance with applicable fence height by-laws are commonly the focus of the review.

About half of the municipalities which require inspections, indicate that they be done prior to occupancy for each housing unit. The remaining municipalities require inspections prior to assumption of the subdivision. This can lead to problems if physical changes are needed after most or all units are occupied.

Sound Barriers: Location, Control, Responsibility:

Most municipalities require sound barriers be placed on private lands. Maintenance and upkeep, therefore, become the responsibility of the homeowner. However so does control. Only a few municipalities maintain control by:

- a) ensuring all barriers are placed on municipal property, or
- b) having restrictive covenants preventing the homeowner from altering or removing noise barriers which are on private lands.

DEFICIENCIES:

Coordination:

The lack of coordination between various municipal departments sometimes results in developments being built without either a review of the building plans and/or final inspection. This occurs even within municipalities which require acoustical consultants to do both. As was evident in our review, it is quite common for one department to issue the requirement for building plan review, another the final clearance inspection. Several are often involved in various aspects of the inspection. Coordination and checkoff of items by each department therefore, become difficult.

Review of Construction Plans:

While the building design is usually reviewed, reviewing the sound barrier (particularly fence design), is often not required.

Wording on Subdivision Agreements often require certification to be in compliance with the Noise Study report. Often there are conflicting requirements resulting from this condition; for example where specific barrier heights have been indicated in the report but grading plans have changed after the report was approved.

The location of air conditioning condenser units, where required, is often indicated on the registered plans as part of the building plan review by the noise consultant. Emphasis is on placement in noise insensitive areas. For requirements to allow provision for future addition of air conditioning, the specific location of

condenser units is usually not indicated on building plans and does not get incorporated into the registered plan. The potential exists for units installed in the future to affect neighbours adversely.

Final Clearance Inspection:

Inspection provides only a snapshot or sampling of the conditions which exist at the time of the inspection. While many aspects relating to the acoustical inspection cannot be readily verified (if at all), inspectors inherently assume liability for areas reviewed within their expertise. Due to professional liability issues, most noise consultants and municipal inspectors will be careful in restricting the responsibility of the items inspected to those which they can easily verify. For example, an acoustical consultant cannot verify the grading elevations without the aid of a surveyor. Therefore, only fence/wall heights and not top of barrier elevations are "inspected". Similarly, a municipal inspector, who may not be fully knowledgeable in the finer points of acoustics, may restrict inspections to structural integrity.

There are a number of factors and conditions, which depending on the timing of the inspections, make verification of acoustical considerations difficult.

Grading: Final grading of the subdivision is difficult to determine on site and the approved grading plans may not be readily available.

Theft of air conditioning units: Often results in A/C units being installed at or shortly before occupancy. This results in inspections at short notice and makes scheduling of inspections difficult.

Access post occupancy: Many homeowners will not allow access, making post-occupancy inspections difficult.

Verification of non-visible building shell components: Interior components of walls such as resilient channels are enclosed at early stages of the construction. Exterior glazing in multiple pane windows is often difficult to measure in multi-storey buildings.

Sound Barrier Construction: Inability to assess durability; post inspection settling resulting in gaps; and verifying the species of wood used in acoustical fences; are some of the difficulties inherent to spot inspections.

Sound Barriers: Control & Responsibility for Upkeep

Unlike other noise control measures, sound barriers provide mitigation which is shared by multiple residences. Deficiencies in a sound barrier at one location affects adjacent neighbours.

Of major concern in many municipalities is the control and responsibility for upkeep of sound barriers. Barriers placed on private property are often destroyed or damaged, for example, when backyard pools are installed. Decay of older barriers is increasingly a problem.

Maintenance of the sound barriers is usually low on priorities of homeowners who may not have the funds and/or expertise to do proper repairs.

SUMMARY & RECOMMENDATIONS:

- 1) There is too much inconsistency in verifying implementation of noise control measures. A more uniform approach is needed. Guidance could be provided by provincial bodies by issuing model municipal procedures analogous to that of the MOEE model municipal noise by-law.
- 2) Greater co-ordination between various municipal departments, and a streamlining of the process to ensure plans are certified and inspections are done, are needed.
- 3) Restrictive covenants placed on title are needed to prevent the destruction of noise barriers placed on private property. Alternatively, barriers can be placed on municipal property, if the municipality will assume maintenance and responsibility.
- 4) Methods of providing funds which the municipality can use to maintain noise barriers need to be investigated. Most homeowners will not have the funds, expertise or incentive to maintain noise barriers. The municipality should have responsibility and control of barrier maintenance.
- 5) National and/or industry standards need to be developed to address construction, durability and installation of sound barriers.
- 6) Spot inspections should be done during construction where non-visible or inaccessible finished components can be viewed. However, this will increase the cost and complexity of the process because of the extra time, and co-ordination required.
- 7) Ventilation and building shell noise control features should be inspected prior to occupancy to facilitate access and ensure all units affected by noise are inspected. Recognizing that final grading may not take place until after occupancy, noise barriers should be inspected prior to assumption. However, sound barriers should be installed prior to occupancy and sufficient funds withheld (e.g. letters of credit) until assumption, to ensure sound barriers are properly installed.
- 8) Locations of condenser units should be specified on the building permit certification where required, for both mandatory and provision for adding air-conditioning. Noise by-laws establishing maximum sound emission levels of air-conditioning units should be used to support conditions in the subdivision agreements.

TABLE I

SUMMARY OF MUNICIPAL PROCEDURES

Applicable Standards ⁽¹⁾	Building Design/Site Plan Review		Final Clearance Inspection ⁽²⁾		
			By	Pre-Occupancy	Assumption
MOEE 9	Municipal Staff	0	Municipal Staff	0	
Municipal 8	Consultant	10	Consultant	7	4 3
Rail/Other 4	Both Above	1	Both Above	2	2
	Other	0	Other	1	1
	Not Required	3	Not Required	4	

Notes:

1. Standards used for noise study and building design/site plan review.
2. All relevant acoustical aspects.