



STAFF REPORT ACTION REQUIRED

Amendments to Municipal Code Chapter 363: Vibration Control

Date:	April 24, 2008
To:	Planning and Growth Management Committee
From:	Chief Building Official and Executive Director, Toronto Building
Wards:	All
Reference Number:	BLD2008PGM003

SUMMARY

This report responds to Council direction for the Chief Building Official and Executive Director, Toronto Building to report to Planning and Growth Committee with amendments to Chapter 363 of the Toronto Municipal Code to regulate vibrations that result from construction activity. The previous report endorsed by Council (June 2007) recommended a proactive, rather than a complaints driven approach.

The proposed bylaw amends Chapter 363, under the authority of the Building Code Act to require building permit applicants to identify construction and demolition activities that may result in vibrations. When there is a likelihood of vibrations, the bylaw requires the applicant to develop a vibration monitoring program, hold a public meeting and conduct precondition surveys of buildings and structures within an identified “zone of influence”. The bylaw contains specific vibration control criteria to which construction must conform and sets out a notification and complaints protocol.

The bylaw does not replace the general nuisance bylaws, but will limit the potential for adverse impacts on buildings and infrastructure adjacent to sites where construction activity is taking place.

The bylaw reflects the public and Councillors’ comments Toronto Building received during a focused consultation.

RECOMMENDATIONS

The Chief Building Official and Executive Director, Toronto Building recommends that:

1. **City Council authorize the City Solicitor to introduce a Bill amending Chapter 363 of the City of Toronto Municipal Code as outlined in this report and largely in accordance with the attached draft bylaw (Attachment No. 1).**

Financial Impact

The recommendations will have **no** financial impact beyond what has already been approved in the current year's budget.

DECISION HISTORY

Planning and Growth Management Committee PG5.10: "Vibrations Caused by Construction Activity" (May 16, 2007)
<http://www.toronto.ca/legdocs/mmis/2007/pg/bgrd/backgroundfile-3920.pdf>

The Chief Building Official's recommendations to Planning and Growth Management Committee contained in the May 16, 2007 report were adopted by Council at its meeting of June 19, 20 and 22, 2007.

The report recommended that:

1. The Chief Building and Executive Director report to Planning and Growth Management Committee with the necessary amendments to Chapter 363 of the City of Toronto Municipal Code to require details and particulars from building permit applicants relating to the potential for construction vibrations, and where there is the potential for construction borne vibrations to require conformance with a set of vibration control criteria. These criteria will include but are not limited to precondition surveys, vibration monitoring and conformance with peak particle velocity measurements appropriate to the site.
2. Toronto Building conduct a focused consultation with the building industry and resident's representatives to establish a communications protocol in order to appropriately document all public complaints.

Notice of Motion J(5) "2195 Yonge Street – Minto Construction Activity"
[http://www.toronto.ca/legdocs/2004/agendas/council/cc041026/nomj\(5\).pdf](http://www.toronto.ca/legdocs/2004/agendas/council/cc041026/nomj(5).pdf)

November 5, 2004 Report "2195 Yonge Street – Minto Construction Activity"
<http://www.toronto.ca/legdocs/2004/agendas/council/cc041130/plr9rpt/cl003.pdf>

Notice of Motion J(26) "By-law to Regulate Vibrations Caused by Construction Activity"
[http://www.toronto.ca/legdocs/2004/agendas/council/cc041130/nomj\(26\).pdf](http://www.toronto.ca/legdocs/2004/agendas/council/cc041130/nomj(26).pdf)

ISSUE BACKGROUND

Regulating Construction Vibrations in Toronto

The May 16, 2007 report to Planning and Growth Management Committee provided an overview of the technical research conducted for Toronto Building on construction related vibration in the City of Toronto. The research concluded that the establishment of precise or universal criteria that define vibration thresholds is difficult. The approach recommended in the report, and adopted by Council was to implement a flexible system that would require professional engineers to take into account the site specific characteristics as part of submission requirements and inspection of building permit applications.

COMMENTS

The *Building Code Act, 1992*, permits the City to require plans, drawings and specifications, documents and other information to accompany building permit applications. Some of these requirements are already set out in Municipal Code Chapter 363, (Building Construction and Demolition). It is under this authority that the proposed amendments to the Municipal Code would be enforced. The following is an overview of the proposed bylaw.

AMENDMENTS TO CITY OF TORONTO MUNICIPAL CODE, CHAPTER 363-3.6 “CONSTRUCTION VIBRATIONS”

Vibration Control Form

The purpose of this section is to require that permit applicants complete a “Vibration Control Form” as part of a building permit application. The standard form will identify construction activities or methods that have the potential to cause vibrations and the applicant will indicate whether any of the activities or methods of construction apply to the intended application.

If there is the potential for vibration producing activity, the applicant would be required to have a professional engineer identify the area of land that includes buildings and structures that may potentially be impacted by vibrations beyond the construction site. This area is called the “zone of influence”. For the purposes of defining the zone of influence, the bylaw defines the zone as the area where the peak particle velocity measured at the point of reception will reach or exceed 5 mm/sec. While the intent of the bylaw, under the authority of the Building Code Act, is to regulate the adverse effects of vibrations on buildings and structures, the 5mm/sec criteria for defining the zone of influence is considered in the technical literature as the point at which vibrations may become “annoying”.

The professional engineer would also be required to give consideration to site specific factors such as soil conditions, presence of heritage buildings and weather conditions that may require a larger zone of influence than that which would be determined strictly by the 5mm/sec value as defined in the bylaw.

Where the zone of influence extends beyond the boundaries of the construction site, the additional requirements, including monitoring, public notice and preconstruction surveys take effect.

Pre-Construction Consultation and Monitoring Program

The bylaw does not dictate that a particular method of construction be used to limit vibrations, as there is no authority to do this. The bylaw, however, has been structured to make the applicant aware of the potential for vibrations as a result of construction activity prior to permit issuance and require that the professionals take into account site conditions and consideration of alternative techniques. This includes identification of mitigation measures to reduce the impacts of construction related vibrations within the zone of influence. A more reactive approach, with strict maximum levels would not provide such protections.

As part of the permit application, the developer will be required to develop and submit a monitoring program to ensure that the vibration levels do not exceed the limits defined in the bylaw. The bylaw requires the professional engineer developing the monitoring program to advise that lower vibration thresholds be used where it is prudent to do so.

In order to determine the appropriate vibration levels for the particular site, the bylaw requires that the survey identify ambient vibrations within the zone of influence and undertake a pre-construction inspection of adjacent buildings and structures.

A public pre-construction meeting for all property owners and occupants within the zone of influence is required. This meeting is an opportunity to inform residents of the construction and provide notice of the potential for construction vibrations, discuss the methodology and inform residents of the limits to vibration levels under the bylaw.

The applicant is also obligated to offer preconstruction inspections to residents and property owners within the zone of influence. The inspection would identify existing cracks in walls, floors and the exterior cladding of the first two storeys above grade and interior finishes of all storeys below grade. The purpose of the survey is to determine susceptibility to disruption and inform the development of the monitoring program.

Monitoring During Construction

The proposed bylaw requires that monitoring take place during construction, in accordance with the established monitoring program. To ensure permanent technical data and records at all times, the bylaw requires onsite monitoring of vibrations.

The May 2007 report to Planning and Growth Management Committee included a table with the frequency based limits for peak particle velocity recommended to Toronto Building by the technical consultant. These limits have been used in the draft bylaw to define the prohibited construction vibrations.

Table 1.0 “Prohibited Construction Vibrations”

Frequency (Hz)	Peak Particle Velocity (mm/sec)
<4	8
4-10	15
>10	25

The bylaw provides a mechanism for the Chief Building Official to require that an applicant submit and implement a vibration monitoring program if the construction activity is producing vibrations but was not identified at the time of permit issuance.

Public Communications and Complaint Protocol

In addition to the initial public meeting, a key component of the proactive structure of the bylaw is the requirement that the applicant notify owners and occupants of the properties within the zone of influence of the scheduled construction activity. The bylaw specifies the contents of the notice and serves to inform the public and the local councillor about the construction and provide key contact information. Toronto Building is developing a standard notice for use by applicants that will also contain information about the bylaw and outlines the frequency based limits for the public.

The complaint protocol contained in the bylaw stipulates that in the event of a complaint the applicant must perform measurements at the complainant’s location and provide the results of the monitoring to the complainant and the Toronto Building inspector. If the measurements are found to exceed the limits for peak particle velocity, the construction activity causing vibrations must cease until mitigation measures are implemented.

CONSULTATION ON AMENDMENTS

In response to Council direction, Toronto Building held two focused public consultation sessions on the proposed bylaw and provided an opportunity for input. The first session was attended by representatives from the development industry, engineering and vibration monitoring firms. Resident representatives from wards where monitoring of vibration on construction sites had taken place were invited to attend the second session. While residents registered, no residents actually attended the consultation session. However, further comments were received from Councillors' offices from the affected wards.

The City Solicitor and staff from Municipal Licensing and Standards and Technical Services were consulted in the preparation of the bylaw.

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SIGNATURE

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Attachments:

Attachment 1: Draft Bylaw 363-3.6 Construction Vibrations