

# PRACTICAL CONSIDERATIONS OF ONTARIO'S TARION BUILDER BULLETIN 19 ACOUSTICAL REVIEWS FOR NEW CONDOMINIUM BUILDINGS

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## 1 Introduction

Under the Ontario New Home Warranties Act Plan, all new condominium projects must be registered with the Tarion Warranty Corporation under the Builder Bulletin 19 (B19) program. The program is intended to ensure building design and construction meet required standards to protect both the buyer and Tarion as the warranty holder. Apart from the legal requirements of meeting Ontario Building Code (OBC), B19 certification further requires that design and construction meet good architectural and engineering practice in specific risk areas outlined by Tarion.

Acoustics are included in the B19 risk areas with sound transmission and mechanical sound/vibration being major areas of concern. Successfully implementing these acoustical requirements for condominium projects involves careful coordination with the entire design team and the builder. Even with recent updates to the B19 documents that highlight acoustics as a separate risk area, these items still remain an afterthought for many architects, developers and builders.

In this paper, we discuss some of the challenges raised by the B19 process for the acoustical consultant during the design process including ambiguity in the design requirements and acoustical approvals. Common areas of concern identified during the design reviews and typical solutions for resolving issues which satisfy both the owner and the acoustical consultant are also presented.

The B19 process also involves field reviews and proof of performance tests to confirm the design requirements have been adhered to. We present prevalent issues which are identified during field review site visits, the consequences of these deficiencies in as-built configurations, and proven remedial approaches where non-compliance is found.

## 2 Design criteria discussion

### 2.1 Building performance

Acoustical requirements for the Ontario Building Code (OBC) and National Building Code of Canada (NBCC) are only provided for sound isolation and only then for STC ratings for demising walls between suites and other suites, corridors, common areas, and garbage chutes.

The B19 program expands the acoustical design requirements through the newly updated Risk Area 11 – Acoustics [1] to include sound transmission between suites and other common areas, mechanical sound and vibration transmission, and electrical components such as generators

and transformer noise which can affect other units in the same building, or off-site receptors / residences.

The B19 program only identifies these as “Risk Areas” without imposing specific criteria or constraints on their evaluation. Responsibility for establishing criteria, defining and meeting best practices, and implementing appropriate design solutions for these areas rests with the acoustical consultant who has increased control of the overall acoustical design of the project, but also has increased liability for any potential issues that arise.

### 2.2 Environmental noise

A consideration often overlooked during the design process are the impacts of noise generated by the building on the building itself. These issues are typically addressed as environmental noise concerns during site plan approval by generalized statements and reviews since the full mechanical systems have not been designed / selected at that stage. However, if not addressed in the building design, mechanical plant – (e.g., HVAC plant, emergency generators) self-contamination can impact residential units within the development. This can be especially prevalent when separate consultants are retained for SPA and for B19. In either case, environmental noise is a critical design consideration which must be included in all B19 reviews.

## 3 Common design oversights

Key commonly overlooked design aspects within some of the broadly defined B19 acoustical risk areas are discussed in the following sections.

### 3.1 Sound isolation

- **Adjacency and space planning** – Careful space planning during early design to promote compatible space usages greatly reduces the need for acoustical controls.
- **Partition caulking** – Acoustical caulking details at partition joints (e.g., wall /floor) should be shown on design drawings and acceptable products included in project specifications.
- **Penetrations** – All penetrations need to be fully sleeved and sealed in all acoustically rated walls.
- **Value engineering** – Cut backs to marginally meet acoustical design criteria especially in critical areas do not allow for normal construction deficiencies, resulting in poor performance.
- **Substitutions** – (e.g. structural studs vs 25 ga. studs).

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### 3.2 Mechanical services

- **Vibration isolation** – OEM isolation does not consider floor spans, contiguous space sensitivities and is often insufficient.
- **Sanitary stacks** – Horizontal pipe runs can be very disruptive. Cast iron stacks should be used wherever possible. Horizontal runs should be acoustically lagged or fully enclosed in acoustically rated bulkheads.
- **Garage doors** – Rigid mounting of motors and rails generate structure-borne noise to structurally coupled suites.

### 3.3 Amenity spaces and retail

- **Unique amenities** – Golf simulators, squash courts, and movie rooms all have specific unique challenges ideally addressed through separation from suites and space-planning.
- **Retail tenants** – Acoustic controls depend on anticipated retail tenants. A high STC base construction with tenant covenants for additional acoustic controls is often a sufficient approach.

## 4 In-situ construction reviews

Field reviews during various stages of construction identify potential issues and corrective action before issues promulgate through the entire building. The first reviews occur at the first completion of key elements (e.g., when drywall boarding occurs at the lowest floors of a high-rise), when the most critical acoustical items have not yet been fully completed and can be reviewed at an early stage. Typical issues identified in construction reviews include:

- Incorrect application / lack of acoustical caulking
- Sanitary runs in contact with bulkheads and ceilings
- Debris in gap between garbage chutes and slab
- Tie holes in concrete construction not filled
- Acoustical ceilings rigidly connected to perimeter walls

## 5 Proof of performance testing

The final role of the acoustical consultant in the B19 process is to conduct proof of performance testing to verify as-built performance of the building meets OBC requirements and the intended level of acoustical performance of the design.

### 5.1 Acceptable performance levels

The 2015 edition of the National Building Code of Canada (NBCC) [2] proposes changing the sound isolation rating between residential suites from a minimum STC 50 for the wall or floor/ceiling assembly to a minimum ASTC 47 value. This change from a design based criteria to a performance based criterion places more emphasis on the proof-of-performance testing by the acoustical consultant. The 3-point difference between laboratory and apparent performance is in line with typical field ratings observed by Novus in hundreds of STC tests and indicates good construction practices were used. It is anticipated that this requirement will be adopted by the OBC and has been

applied as the absolute minimum acceptable field performance criteria in B19 projects.

### 5.2 Field deficiency mitigation

When proof-of-performance testing indicates an assembly has not met the minimum field requirements mitigation is required prior to sign-off from the acoustical engineer. While it is often simple to identify the root cause of the acoustical deficiency (poor detailing, omitted elements, incorrect installations) the critical step is to develop a mitigation solution which is cost effective, simple to implement, and most importantly provides the required level of acoustical performance. A selection of unique mitigation solutions successfully implemented in projects is provided below.

**Case 1:** Resilient channel was omitted from the ceiling construction in wooden floor joist separation of stacked townhomes.

**Solution:** As shown in Figure 1, instead of removing the entire GWB ceiling to install the channel, holes were cut in the drywall to allow air movement. Resilient channel was then installed over the existing layers and a new drywall ceiling was added. Performance tests showed expected ASTC levels for the base configuration were met.

**Case 2:** Draining the kitchen sink was a unit was clearly audible throughout the entire living room of the unit below.

**Solution:** Investigation on-site found gypcrete poured above spilled into the bulked head below, rigidly connecting the PVC sanitary stack with the living room bulkhead as shown in Figure 2. This acted as a large plate radiator, with every drop amplified for the tenants below.



**Figure 1:** RC channel installed with holes for air



**Figure 2:** Gypcrete rigidly tying stack to bulkhead

## References

- [1] Builder Bulletin 19R - Condominium Projects, Design and Field Review Reporting: Tarion Warranty Corporation, 2016.
- [2] Quirt, D. and Zeitler, B. (2014) *A New Approach To Building Acoustics Regulation In Canada*, Canadian Acoustics, Vol. 42, No.3.