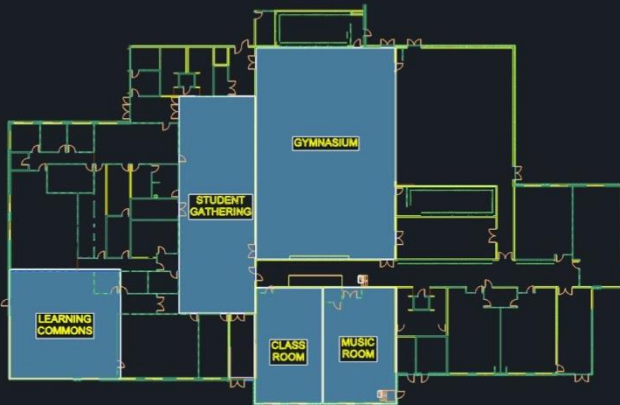# > CASESTUDY

SCHOOL ARCHITECTURAL ACOUSTIC ASSESSMENT

FOCUS AREA
School Acoustics

SECTOR
Architecture

SERVICE
Acoustical Assessment

➡ CHALLENGE

An environment that is conducive to learning is one that enables teachers and students to excel. A noisy learning space produces distractions and stress, which can limit both the teacher's ability to teach and the student's ability to learn, and can lead to frustration for both parties.

To ensure a conducive learning environment, Patching Associates Acoustical Engineering Ltd. was retained by a leading Architecture and Interior Design consulting firm to conduct an acoustic assessment of one of two identical schools. The goal was to implement recommendations in both of the twin proposed schools in Alberta.

The schools were to be constructed using composite construction systems, which included cross laminated timber floors, glulam columns, along with precast concrete and wood framed walls. This non-typical building construction created a new and unique design challenge as the use of these construction systems had yet to be confirmed in terms of their acoustic performance. Nevertheless, the final design of the school needed to adhere to prescribed acoustic metrics such as reverberation time (RT60), speech transmission Index (STI), Clarity (C50), and background noise (RC).

In addition to these metrics, the noise transmission or noise intrusion between adjoining rooms was examined to determine the combined acoustic performance of the non-typical construction systems as they behave in interdependent systems.

> A full 3D model was built to highlight problematic areas through generated grid maps and single / multi point responses to allow for more detailed analysis and specific recommendations without over design.

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SOLUTION

To focus efforts and limit the cost of the assessment, the learning commons, student gathering space, gymnasium, music room and a typical classroom were chosen for acoustic analysis.

A full 3D model was built using the 50% working drawings, material specifications, and the calculated background noise. This model was then used to run simulations in Odeon®, an architectural acoustics assessment and simulation software package. Where available, manufacturer acoustic specifications were used to more closely represent what would actually be constructed.

One of the main advantages of the 3D model is highlighting problematic areas through generated grid maps and single/multi point responses for more detailed analysis. This allowed for specific recommendations without over design.

RESULT

Patching Associates was able to accurately pinpoint acoustically problematic areas in the design using the 3D model created. Targeted recommendations were provided early in the design process, allowing for more freedom in execution of recommended design changes.

Moreover, the model allowed for analysis of the acoustic performance of non-typical construction systems and how they performed in combination with each other.

The grid maps and single/multi point responses, when combined with the report, gave the client the means to interpret the impact of the acoustic recommendations on the RT60, STI and C(50).

This insight gave the client the ability to adapt solutions to the design challenges and create an environment conducive to learning.

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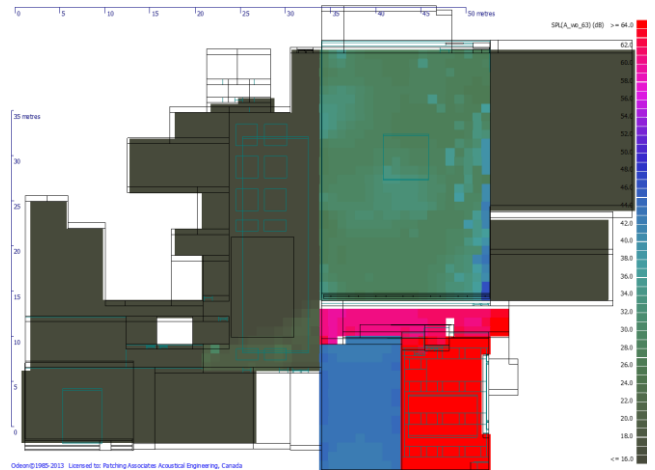
RECOMMENDATIONS

▶ Amount and placement of additional acoustically absorbent materials to decrease reverberation times, and increase the speech transmission index and clarity.

▶ Specific acoustic criteria for fan coil selection and duct linings to reduce the background noise to meet both the level and spectrum criteria.

▶ Extending walls to full height and increasing STC of building assemblies in specific areas to reduce noise intrusion between adjoining spaces.

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