

Vibrations during construction of the Réseau express métropolitain

The Réseau express métropolitain (REM) is the largest public transit project launched in Québec in the last 50 years. The construction work, which will be spread out along a 67-km route, will enable an electric light rail system to be installed in a dedicated corridor and 26 stations to be built.

Our objective during the work:
prevent impacts on local residents, or mitigate impacts
as much as possible, by implementing appropriate measures

Vibrations during construction work

During the construction phase, vibrations may be generated by blasting, heavy machinery traffic, drilling of girders for REM structures, and other types of operations.

The NouvLR Limited Partnership (NouvLR), the consortium in charge of building REM infrastructure, will be required to comply with vibration thresholds. The thresholds are consistent with Federal Transit Administration (FTA) guidelines. These vibration thresholds are established in a very conservative manner, so as to ensure the integrity of buildings and structures during the construction work.

The thresholds presented here are vibration velocities, expressed in the logarithmic unit VdB (decibels of vibration). A logarithmic unit is used to express the ratio between two values of the same nature/unit (in this case, mm/s). To obtain the vibration thresholds presented here, a reference vibration velocity (VdB ref) is required. This reference vibration velocity represents the "zero" or "starting point" (0 VdB) of the logarithmic unit.

It is important to note that the human body can feel vibrations from a measurement of 0.5 mm per second. Human beings are therefore much more sensitive to vibrations than structures are.

Construction vibration thresholds for building protection (FTA)

Type of building	Vibration threshold	
	mm/s	VdB
Reinforced concrete, steel or timber (without plaster)	12.7	102
Concrete or masonry (no plaster)	7.6	98
Timber and masonry buildings	5.1	94
Buildings susceptible to vibration damage	3.1	90

(VdB ref. 25.4×10^{-6} mm/s)*

* U.S. FTA reference 1×10^{-6} in./sec. converted to metric system

Underground municipal pipelines (such as water mains) and the metro tunnel are also vibration-sensitive infrastructures; they have other types of criteria which apply.

Vibration control

During the work, NouvLR will maintain a strict control on vibrations. The vibrations propagated in the ground are attenuated with distance. Based on the sensitivity of the buildings and installations present in the construction zone's area of influence, NouvLR will identify those which require vibration monitoring during the construction and will select work methods that minimize the transmission of vibrations to the ground.

In sensitive areas, measurements will also be done before construction work begins, so as to determine the level of ambient vibration. Pre- and post-site inspections of buildings located in sensitive areas will also be carried out.

During construction work performed near sensitive areas, vibration monitoring will be done with seismographs positioned at the borders of the construction zone. The results will be analyzed in real time and the working methods will be adjusted immediately as necessary.

Planned mitigation measures

In addition to ensuring tight control of vibrations before and during construction, the REM project office, in cooperation with NouvLR, aims to minimize disturbances during construction by implementing a series of mitigation measures:

- Work schedule planned according to the constraints of the slated work and to sensitivity receptors
- Different construction methods selected to limit the impact of vibrations
- Program for monitoring and supervising vibration levels in sensitive areas

Nearby residents will also be proactively and regularly informed, through several different channels, of construction work before it takes place. A rigorous complaints management procedure is also in place.

To contact us and stay informed about the construction

- For complete information on upcoming work, visit **rem.info/en**
- **1 833 rem-info (736-4636)**
- **Info@rem.info**