Acoustical Requirements for Noise Barriers

The specification for noise barriers should include requirements for structural integrity, long-term durability, drainage considerations, and other non-acoustical contractual issues that should be specified by a qualified civil engineer. Aesthetics is another consideration that does not necessarily affect the acoustical performance but should be covered in the specification. The BC Ministry of Transportation and Infrastructure has a “Recognized Products List” with sections for sound reflecting and sound absorbing wall systems. The acoustical requirements to be included in the barrier specification are relatively straight forward and are listed below:

1. The barriers shall consist of reinforced concrete, aluminum or steel posts, panels, and cap rail. Alternative materials such as acrylic or wood could be considered provided that the panels have a minimum surface weight of 20 kg/m^2. Note that this weight requirement is based on acoustical needs only. The actual weight and thickness should be increased as necessary for durability and wind resistance, etc. In particular, panels shall be sufficiently thick and strong to prevent damage which could result in gaps or openings in the barrier and in the event of damage, replacement panels should be readily available from the manufacturer and easily installed.

2. The base panels shall be connected to the structure without any gaps or, if mounted on ground, stripped of topsoil and backfilled with nominal 20 mm crush for a minimum width of 500 mm centred under the panel. Once installation is complete, the ground on (at least) one side of the panels will be loaded with additional 20 mm crush to a minimum depth of 75 mm up from the bottom of the panel.

3. If drains are required at some locations to permit storm runoff from one side of the barrier to the other, they shall consist of grates and drain pipe passing beneath the barrier rather than by removing above-grade sections of the panels.

4. The panels forming the barriers shall be designed and installed so that they mate together forming an airtight joint in order to prevent leakage of sound. This may require both tongue & groove joints and acoustic caulking or gasketing. Joints between the panels and the cap rail and also between the planks and the vertical posts shall be designed and installed in a similar manner to prevent sound leakage.

5. Where sound absorptive barriers are specified, the side of the barriers that will face the source of noise shall be provided with a sound absorptive facing which will provide a Noise Reduction Coefficient (NRC) of at least 0.80 when tested in accordance with ASTM C423 using Type “A” mounting per ASTM E795-92. The sound absorptive facing shall be suitable for long-term exposure to the climatic conditions at the site.

6. The barrier manufacturer/installer shall supply shop and installation drawings including details that indicate how airtight joints will be achieved between the various elements of the barriers and with the mounting surface.