Research Need for Environment Technical Advisory Group

Effective/Updated: August 14, 2015

ISSUE: Alternative Noise Barrier Approvals

SUMMARY OF PROBLEM: Multiple approvals are required for the proposed installation of a noise barrier that does not meet pre-approved specifications. Nevertheless, the use of non-specificed noise barriers may be desired for certain situations in transportation projects. What might be the best and most timely method for the necessary approvals by the various IDOT parties involved? Are there lessons to be learned from other state DOTs on these issues?

Current IDOT policy states: Noise barriers have been constructed of earth, masonry, concrete, and composite materials. These barrier materials must meet certain transmission loss characteristics.

- Density: Earth berms, owing to their inherent thickness and material, are sufficiently dense to effectively reduce sound transmission. Other types of noise barrier materials must be of sufficient density (at least four pounds per square foot minimum) to be able to effectively reduce sound transmission through the barrier. Because density varies for different materials, the transmission loss characteristics of a material must be tested before a further testing protocol required by IDOT is considered.

- Transmission Loss: Transmission loss is the sound-level reduction provided by a material as sound passes through it. Noise wall materials are required to achieve a sound transmission loss equal to or greater than 20 dB in all one-third octave bands from 100 hertz to 5,000 hertz, inclusive. Noise wall manufacturers are required to provide this data to IDOT before a further testing protocol is considered. Specialty items and materials that are not covered by ASTM, AASHTO, or other IDOT specifications must have the prior approval of the Illinois Highway Development Council (IHDC). Contact the Engineer of Technical and Product Studies at the IDOT Bureau of Materials and Physical Research for additional information on the IHDC process.

- Noise Reduction Coefficient (NRC): Noise walls are typically identified as either absorptive or reflective (non-absorptive). The absorptive capacity of the wall material is specified by the NRC, which can range from 0.00 to 1.00, with 1.00 representing 100 percent absorption. To be considered absorptive by IDOT, the NRC must be at least 0.80 on the roadway side of a noise wall and at least 0.65 on the side of the wall away from the roadway.
EXPECTED IMPLEMENTABLE OUTCOME: IDOT desires a “policy analysis paper” that (1) describes the current IDOT practice for alternative noise barrier approvals, (2) describes any hurdles or gaps in the current practice, along with opportunities for improvement, (3) evaluates pertinent policies and procedures of FHWA and a sample of state DOTs, and (4) synthesizes this information into recommendations for IDOT policy and procedures.

To submit a research idea for consideration at the spring 2016 Executive Committee meeting, prepare and submit a Proposed Research Idea form to IDOT (DOT.BMPR.RESEARCH@illinois.gov) no later than October 1, 2015.