

# MDOT Highway Noise Analysis and Abatement Handbook

**Special Notes** *are in Italics*

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## 1.0 STEP 1 – Initial Project Level Scoping and Determining the Appropriate Level of Noise Analysis

The need for highway traffic and construction noise analyses are initially discussed during the planning and environmental scoping of the Early Preliminary Engineering (EPE) phase of the transportation improvement project's development process. This is done to assess the potential for future highway traffic noise impacts of the proposed transportation improvement project on the sensitive receptors in the study area. No receptor unit or community shall be denied the consideration of highway traffic noise mitigation or denied full and fair participation in the decision-making process on the basis of its national origin, color, race, or income. Such scoping assessments are generally qualitative in nature, performed at the Region level in coordination with the Lansing Office, and focus on noise-sensitive sites and communities in close proximity to the proposed improvements.

It is MDOT's policy to assess the highway traffic noise impacts of a transportation improvement project and to give consideration to the appropriate avoidance, minimization, and/or mitigation measures for those projects with noise impacts identified. Projects are classified based on the scope of the improvements, and the appropriate level of noise analysis, as outlined below, should be performed.

**Type I Project** – The construction of a highway on a new location or the physical alteration of an existing highway. Type I projects include:

- Substantial horizontal or vertical alteration
- Addition of a through-traffic lane, inc. HOT, HOV, bus lane, truck climbing lane,
- Addition of an auxiliary lane, except turn lanes
- Addition or relocation of interchange ramps added to a quadrant to complete an existing partial interchange
- Restriping for the purposes of adding a traffic through-lane or auxiliary lane
- Adding a new or substantially altering a weigh station, rest area, ride-share lot or toll plaza

**Type II Project** – The construction of noise barriers on an existing highway not associated with a major highway project. This is a voluntary federal-aid program in which MDOT has participated. See Appendix C for details. **MDOT's Type II noise abatement program is suspended indefinitely due to budget constraints.**

**Type III Project** – These Federal or Federal-aid highway projects are those not classified as a Type I or Type II. Often these projects fall under the Categorical Exclusion (CE) guidelines and do not require a noise analysis. These can include rehabilitation of an existing highway (non-capacity improvements), online bridge replacements/rehabilitations, non-through lane intersection improvements (i.e., turning lanes), etc.

**NOTE - Substantial Horizontal or Vertical Alteration**

Definition from: FHWA's *Highway Traffic Noise: Analysis and Abatement Guidance*:

“Changes in vertical alignment cover a variety of scenarios that are not limited to physical changes to the roadway. Changes to side slopes or other terrain features may also result in a Type I project. A project that exposes a receptor to a new noise source due to a vertical change or includes vertical changes that expose the receptor(s) to previously a shielded traffic source(s) is a Type I project. For example, a project that involves cutting back a slope that exposes a receptor to an existing highway is a Type I project. Similarly, a project that changes at grade intersection to an overpass is a Type I project, because it substantially alters the vertical alignment of the roadway, exposes receptors to a new noise source and the operational improvements likely result in increase speeds and more noise.

Changes in the horizontal alignment that reduces the distance between the source and receiver by half or more result in a Type I project.”

**NOTE - Noise Analysis and Abatement Process Summary Tables** are a quick view of the noise analysis processes for EA and EIS through the Early Preliminary Engineering and Preliminary Engineering Phases and are available as a separate document. A separate Categorical Exclusion (CE) flowchart is included in Appendix B.

## 1.1 Avoidance Techniques

Typical highway traffic noise avoidance techniques should be preliminarily discussed during the scoping portion of all Type I projects, where practical. The avoidance techniques may include placing the design below grade or in cut (i.e., lowering highway profile) and/or moving proposed roadway away from noise-sensitive receptor(s). Although these are only examples of applicable techniques, it is important that avoidance techniques be considered in order to eliminate or minimize the potential for highway traffic noise impacts wherever practical. It is recognized that highway traffic noise is not the only factor being considered during the EPE phase. All potential avoidance techniques should be incorporated into the early preliminary engineering scope of work for detailed analysis.

## 1.2 Determination of the Need for a Noise Analysis

The determination of the need for a noise analysis for a Type I project depends on the presence of noise sensitive land uses in proximity to the proposed project. Land uses that are sensitive to transportation noise impacts are identified in Table 1, found on page 10. The determination of the need for a noise analysis is not dependent on the length of the project corridor or the NEPA class of action.

**NOTE** – Controversy related to non-noise issues does not, in itself, dictate that a noise study is required.

## *1.2.1 Two Determinations for Noise Abatement Analysis*

### **1.2.1.1 Noise Abatement Analysis is Not Required**

Type I projects where there are no noise sensitive land uses approximately within a 500 foot buffer are not required to conduct a noise analysis. However, the 500 foot measure is a rule-of-thumb determination and should not be taken as an absolute, particularly in urban and suburban areas. The Lansing Office and FHWA should be consulted if there are questions.

Type III projects are exempt from noise analysis. Type III projects include:

- Modernization of a highway by resurfacing, restoration, rehabilitation, reconstruction, or adding shoulders
- In kind bridge rehabilitation, reconstruction, or replacement
- Auxiliary lanes that are turn lanes
- Improvements to existing rest areas and truck weigh stations that do not add capacity or move traffic closer to sensitive receivers
- Rideshare activities, except new rideshare lots or expanded ride share lots that meet the definition of Type I project.

### **1.2.1.2 Noise Abatement Analysis is Required**

As stated before, the presence of noise sensitive land use in proximity to a Type I project requires a noise analysis to determine if there are any noise impacts and, if so, is noise abatement warranted. A noise analysis involves field measurements for TNM comparison, computer noise modeling using TNM, and abatement analyses when impacts have been identified. The analysis is a three-phased approach aimed at answering and addressing the following questions (refer to pages 19-30 for a detailed description).

1. Are there traffic related noise impacts on noise sensitive land uses as a result of the project?
2. Is it feasible to provide highway traffic noise abatement from an engineering and acoustical standpoint?
3. Is it reasonable from a public desire, cost/benefit, and noise attenuation benefit consideration to provide highway traffic noise abatement?
4. Will highway construction noise affect nearby properties? (pages 35-36)

The magnitude of the project and the complexity of the noise-related issues involved will determine the extent of the documentation and public involvement. If any part of a project meets the criteria for a Type I project, the entire project is a Type I project. The identification of a noise sensitive land use(s), whether isolated or spread out, require that the noise analysis be done for the entire project. It may be necessary for the larger, more complicated project to plan to have a periodic highway traffic noise analysis data file review throughout the project's lifespan. This quality-control measure will prevent and/or identify any highway traffic noise analysis issues during the early stages of the proposed transportation improvement project. Coordination with the Transportation Service Center (TSC), Region Office, Lansing Office, and

FHWA personnel is critical during the early stages to ensure the proper level of noise analysis is conducted.

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