MDOT Highway Noise Analysis and Abatement Handbook

Special Notes *are in Italics*

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7.0 STEP 7 – Reporting Results of Highway Traffic Noise Analyses

7.1 Environmental Clearance Reporting

It is the responsibility of the MDOT Region and Lansing Offices and the qualified professionals performing the highway traffic noise analyses to ensure that the results of the highway traffic noise analyses are accurately documented in all sections where it may apply within all the environmental clearance documents [Section 106, Section 4(f), Noise Analysis Report, and CE/EA/EIS] for that transportation improvement project. A separate noise analysis report will be required for any projects requiring a highway traffic noise analysis as part of a CE, EA, or EIS with a summary included as part of the main document.

The scope and magnitude of a noise analysis is determined by the extent of anticipated noise effects, not on the NEPA classification. A project may be classified as an EIS due to significant wetland impacts but have no noise-sensitive sites in the project area. In this case, no noise analysis would be required. Conversely, a CE project for a roadway widening within the existing right-of-way in an already noisy area may require a detailed noise analysis. Step 1 provides further direction on scoping the appropriate level of analyses. Refer to MDOT's "Document Preparation Process and Procedures Guide for NEPA Documents", June 2009 in preparing an EA or EIS.

7.1.1 Noise Analysis Report

A noise analysis report should adhere to the following outline, however, any additions, deletions or alterations to the document can be discussed with the MDOT Lansing Office.

7.1.1.1 Requirements for Noise Analysis Report

1. Executive summary
2. Purpose of the report
3. Project description
4. Discussion of basic traffic noise concepts
   - Discussion of basic acoustic concepts
   - Federal policies and guidelines
   - State rules and procedures
5. Discussion of methods used to analyze project
   - FHWA Traffic Noise Model (TNM)
   - Field measurement and model comparison
6. Discussion of traffic impacts for conditions analyzed (including traffic data)
   - Identification and description of each Common Noise Environment (CNE)
   - Existing conditions
   - Design year build alternative/s

7. Federal and State Mitigation Guidance
    - Feasibility and reasonableness
    - Mitigation strategies
8. Discussion of Mitigation
    - Identify modeled abatement
    - Identify feasible and reasonable abatement
9. Discussion of conclusions and recommendations
10. Statement of Likelihood (Page 30)
11. Discussion of construction impacts
12. References
13. Appendices
    - Field survey data
    - Ground view graphic showing noise barrier(s) with the heights of the panel sections

The TNM input/output data and files in electronic format should accompany the report.

NOTE - All discussions on background information (regulations, policy, guidance, noise basics, and analyses methodologies) should be the most basic information without elaboration.

7.1.1.2 Map Elements

A road map (without aerial imagery) showing the extent of the project should be included with the project description. Other maps should include all noise analysis information, but the complexity and extent of the project will determine if the information should be divided between one or two maps. The map should include the proposed alignment and lane configuration with all of the listed features (below) or could be separated to two types that have one map including the elements with one asterisk and the other with the two asterisks.

- Common Noise Environment boundaries*
- Field measurement locations*
- Receiver locations*
- Impacted receivers highlighted*
- Buffer on undeveloped land*
- All considered noise barrier locations (with recommended noise barriers highlighted)**
- The benefiting units for each noise barrier indicated (point symbols, not linear or area)**

7.1.1.3 Tables with column headings

The following are the suggested tables that should be included within the noise analysis report. The number does not indicate what the table number would be in the document. An added column indicating project alternatives should be included in the appropriate tables for alternative analyses. Variations on the table configurations can be discussed with MDOT.

1. *Noise Abatement Criteria* – Copied directly from Table 5 in FHWA's "Highway Traffic Noise: Analysis and Abatement Guidance" add a footnote defining MDOT noise impact definition and that MDOT does not use the L10 descriptor.
2. *Model Validation* - Monitor receiver ID, location description, Time of monitoring, Traffic numbers, Measured dB(A), Monitored dB(A), dB(A) difference
3. *Traffic* - Corridor section ID, Corridor extent description, Existing and predicted traffic (autos, medium and heavy trucks)
4. *Sound/Noise Levels* - Receiver ID, Location description (e.g.: address), Existing sound levels, Predicted sound levels, Difference in sound levels, and, within the table, the row of impacted receivers highlighted
5. *Barrier Description(s)* - Barrier ID, Location, Length, Average Height
6. *Barrier(s)* - Barrier ID, No. of -10 dB(A), -7dB(A) Attained (Y/N), Total Cost, No. of benefiting units, Cost per benefiting units, Feasible (Y/N), Reasonableness (Y/N)
7. *Appendix* - Barrier ID, Receiver ID, Existing (Level, Impacted [Y/N]), Predicted Noise Level - no Build (Level, Impacted [Y/N], Difference), Predicted Noise Level - Build (Level, Effectiveness [dB(A) +/-])

NOTE - Maps and tables should be placed immediately following the text describing their subject.
Tables for Barrier Description(s) and Barrier(s) could be combined if space allows.

7.1.2 Noise Analysis Summaries

The sections within the EA/EIS documents the noise analysis sections need to provide introductory material in brief and focus primarily on the analysis. The synopsis of the analysis should center on the essential elements that lead to the noise analysis conclusions and refer readers to the noise analysis report for more detailed information. The mitigation section should identify only the barriers that meet feasibility and reasonableness, a statement on the Context Sensitive Solutions (CSS) process, construction noise (and vibration, if necessary) and include the Statement of Likelihood.

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7.1.3 NEPA Reevaluations

The purpose of a NEPA re-evaluation process is to determine if the project and environmental information developed to date is still valid. Any NEPA documentation or decision must be reevaluated if there are changes to the project design/concept/scope, applicable regulations, surrounding environment, impacts or proposed mitigation that were not previously addressed.

The following is the text from 23 CFR 771.129:

a) A written evaluation of the draft EIS shall be prepared by the applicant in cooperation with the Administration if an acceptable final EIS is not submitted to the Administration within three years from the date of the draft EIS circulation. The purpose of this evaluation is to determine whether or not a supplement to the draft EIS or a new draft EIS is needed.

b) A written evaluation of the final EIS will be required before further approvals may be granted if major steps to advance the action (e.g., authority to undertake final design, authority to acquire a significant portion of the right-of-way, or approval of the plans, specifications and estimates) have not occurred within three years after the approval of the final EIS, final EIS supplement, or the last major Administration approval or grant.

c) After approval of the ROD, FONSI, or CE designation, the applicant shall consult with the Administration prior to requesting any major approvals or grants to establish whether or not the approved environmental document or CE designation remains valid for the requested Administration action. These consultations will be documented when determined necessary by the Administration.

[52 FR 32660, Aug. 28, 1987; 53 FR 11066, Apr. 5, 1988, as amended at 74 FR 12530, Mar. 24, 2009]

7.1.4 Highway Traffic Noise Analysis Data File

A highway traffic noise analysis data file shall be prepared using the data obtained from the EPE highway traffic noise analysis. The highway traffic noise analysis data file shall serve as a guide in the analysis of highway traffic noise impacts during the PE Phase of the transportation improvement project when final alignments have been established and engineering data are available for final detailed analysis of predicted highway traffic noise levels, impacts, and abatement features. The highway traffic noise analysis data file shall contain a discussion of the methodology and computer program(s) utilized and all relevant data used to arrive at the recommendations in the environmental document.

The highway traffic noise analysis data file shall collected into an electronic format and contain all data collected and analyzed to perform the highway traffic noise analysis such as:

- project number, project description, date of FHWA approved environmental document
- highway traffic noise monitoring field data sheets;
- all inputs for highway traffic noise computer analyses;

- all final outputs of computer analysis including noise barrier optimization analyses;
- list of software and their versions used for noise analysis, graphic illustration, and document creation;
- maps used to lay out the highway traffic noise analysis input parameters, including receptors and highway segments plotted along with their coordinates;
- proposed noise barrier type, size, and location data; and
- public comments, coordination, and responses related to noise issues.

The highway traffic noise analysis data file shall be compiled following the completion of the EPE Phase and one copy shall be sent to the project manager for inclusion in the Region or Transportation Service Center (TSC) Offices project file and two to the Lansing Office (one to each: the Environmental Section and the Construction and Technology Division). Since several of the above items could possibly generate large documents, electronic storage (i.e., CD-R, or DVD-R) is recommended. The project number, project name, date of FHWA approved environmental document should included on the electronic storage label and accompanying memo. The memo should also include the list of software and their versions used for noise analysis, graphic illustration, and document creation.

7.1.5 Section 106 Evaluations

Highway traffic noise analysis for a Section 106 evaluation shall be identified as a part of the overall transportation improvement project. The highway traffic noise analysis will focus on the question of whether there is a noise impact on a Section 106 property. If there is a noise impact on a Section 106 property, the Michigan State Historical Preservation Office (SHPO) will make the decision on the effects finding using the information gained from the highway traffic noise analysis. FHWA will make the final determination on whether the noise impact is an Adverse Effect. Contact MDOT Lansing Office Cultural Resource Staff for proper Section 106 procedures.

7.1.6 Section 4(f) Evaluations

Highway traffic noise analysis for a Section 4(f) evaluation shall be identified as a part of the overall transportation improvement project. The highway traffic noise analysis will focus on the question of whether there is a constructive use of a Section 4(f) property. If a constructive use is determined, the noise analysis then becomes directly related to the subject Section 4(f) analysis, documentation, and resulting legal mitigation commitments which must be carried out. The determination of constructive use as it pertains to noise impacts on a Section 4(f) property is made by FHWA by reviewing the information from the highway traffic noise analysis. FHWA will make the determination based on whether the increased highway traffic noise levels interfere substantially with the use and enjoyment of a noise-sensitive receptor protected by Section 4(f), such as hearing the performance at an outdoor amphitheatre, the sleeping area of a public campground, the enjoyment of a historic site where a quiet setting is a generally recognized feature or attribute of the site's significance, or the enjoyment of an urban park where serenity and quiet are significant attributes. Also, the Section 4(f) document and mitigation commitments must be referenced in the Final Design Highway Traffic Noise Report. Contact MDOT Lansing Office Section 4(f) specialist for proper Section 4(f) procedures.

According to the following sections of 23 CFR 774.15(f), FHWA states that a constructive use does not occur in the following situations:

> "(2) The impact of projected traffic noise level of the proposed highway project on a noise-sensitive activity do not exceed the FHWA noise abatement criteria as contained in Table 1 in part 772 of this chapter, or the projected operational noise levels of the proposed transit project do not exceed the noise impact criteria for a Section 4(f) activity in the FTA guidelines for transit noise and vibration impact assessment.
>
> (3) The projected traffic noise levels exceed the relevant threshold in paragraph (f)(2) of this section because of high existing noise, but the increase in the projected noise levels if the proposed project is constructed, when compared with the projected noise levels if the project is not built, is barely perceptible (3 dB(A) or less). "

As stated in the above regulation, Section 4(f) places a higher threshold for highway traffic noise as it pertains to constructive use impacts as compared to the general highway traffic noise thresholds. Therefore, in order for highway traffic noise levels to be considered to have a constructive use under Section 4(f), there must be:

> a. a future highway traffic noise level that approaches or exceeds an Leq(h) of 67 dB(A), or
>
> b. existing noise levels which approach or exceed 67 dB(A) and a predicted increase with the future build alternative greater than 3 dB(A) or more above the predicted No-Build Alternative noise level.

As already stated, FHWA will make the determination of constructive use as it pertains to noise impacts on a Section 4(f) property.

The noise barrier itself could be determined to have a constructive use as described in 23 CFR 774.15(e)(2) where:

> "The proximity of the proposed project substantially impairs aesthetic features or attributes of a property protected by Section 4(f), where such features or attributes are considered important contributing elements to the value of the property."

This situation is more likely to occur with historic properties in which case the State Historic Preservation Office (SHPO) will be brought into consultation with MDOT and FHWA.

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NOTE – *Cultural and Section 4(f) Resource Coordination*:

Consultation and coordination with those responsible for the resource must be carried out and documented in the Environmental Clearance and Final Design Highway Traffic Noise Reports.

7.1.7 Title VI and Environmental Justice

When assessing highway traffic noise, Title VI and Environmental Justice must be adhered to. No one, on the basis of national origin, color, race (and, for Environmental Justice, minority and low income), should be denied the benefits of highway traffic noise abatement, and fair participation will be provided (during the public involvement process) in the decision-making process. Further information can be obtained regarding Title VI and Environmental Justice from the following FHWA website: http://www.fhwa.dot.gov/environment/ejustice/facts. For further assistance on this issue, contact the Lansing Office Project Planning Division.

7.2 Final Design Highway Traffic Noise Report: Format, Content, and Processing

The Final Design Highway Traffic Noise report is meant to document the final noise abatement design, the public involvement process and results, any maintenance agreements between the local officials, and any construction noise mitigation activities.

7.2.1 Final Design Highway Traffic Noise Report Format and Content

The Final Design Highway Traffic Noise Report should include, at least, the information presented in the following outline. Although the intent is to provide statewide uniformity for all Final Design Highway Traffic Noise Reports, there is the understanding that, in many cases, additional information and variations to the following outline may be necessary due to project specifics.

1. Executive Summary
   - A synopsis of the project and proposed noise abatement commitments
2. Introduction
   - Background, design year, and specific details of the project, including the preferred alternative and side road improvements
   - Regional and project location maps
   - EPE noise abatement results and commitments summary
   - Date of public knowledge
3. Discussion of Methods used to Analyze Project
   - Monitoring and modeling methodology used
   - Years considered
   - Field measurement and model comparison

4. Discussion of traffic impacts for conditions analyzed (including traffic data)
   - Identification and description of each Common Noise Environment (CNE)
   - Any alignment or elevation changes since EPE Phase
   - Existing conditions
   - Design year build conditions

5. Discussion of noise abatement
   - Modeled noise abatement
   - Confirm feasibility and reasonableness
   - Noise barrier matrix indicating the height of the noise barriers at each location where the height changes (i.e., barrier profile) and whether the barrier is ground-mounted or on structure.

6. Construction noise consideration and abatement opportunities
   - Identification and discussion of construction noise impacts and possible abatement opportunities and recommendations

8. Public involvement process
   - Discussion of public involvement efforts during the NEPA clearance process and include any public comments concerning the preliminary noise abatement commitments
   - Discussion of public involvement efforts during the PE Phase and voting results related to desire for a barrier (including community meetings, individual meetings, and special coordination)
   - Voting results for the barrier's location/color and texture
   - Abatement commitments: acoustic profiles and aesthetics

Appendices:
   - List of preparers and reviewers

The following information should be included with the report in electronic format:
   - FHWA TNM input and output data and files, traffic data used in the analysis, pertinent correspondence
   - Supporting CAD files
   - Copy of the highway traffic noise portion of the NEPA clearance document (if determined to be necessary)

NOTE – *Final Design Highway Traffic Noise Report Graphics*:

The entire Final Design Highway Traffic Noise Report should follow the guidance in Section 7.1.1.2 *Map Elements*.

7.2.2 Final Design Highway Traffic Noise Report Processing

Upon completion of a draft Final Design Highway Traffic Noise Report and prior to any public meeting(s), the appropriate Region Office or TSC, under its letterhead and signature, shall

forward three copies to the MDOT Lansing Office: one each for the Environmental Section, the Construction and Technology Division, and the Roadside Development (CSS) Unit for review. After this review, if comments are provided, the draft report will be returned to the project manager at the Region Office or TSC for revisions before Lansing Office approval. Once revised and approved, one draft report will be forwarded to FHWA for its review and concurrence. It is MDOT's practice to provide error-free documents (including grammatical and typographical errors) to FHWA. However, concurrent review by MDOT and FHWA may be required due to schedule limits. The comments will be returned to the project manager for revision of the draft Final Design Highway Traffic Noise Report. In the letter transmitting the comments to the Region Office, FHWA shall determine the appropriate processing for the revised document and indicate when it should be released for public review and comment.

NOTE – *FHWA Review Requirements*:

Type I and Type II projects utilizing federal funds for noise barriers must be reviewed by FHWA.

Once it has been determined that the draft Final Design Highway Traffic Noise Report is in an acceptable form, the Region Office or TSC may make it available for public and local agency review and conduct the necessary public meeting(s). After receipt of the public and agency review comments on the draft Final Design Highway Traffic Noise Report, the Lansing and Region Office or TSC shall analyze the comments and determine if:

- Additional noise impact assessment is required to address comments; and
- Noise abatement measure commitments have changed.

Once these have been considered, the final version of the Final Design Highway Traffic Noise Report shall be submitted to the Lansing Office. The final version of the Final Design Highway Traffic Noise Report shall be processed in the same manner as the draft version of the document.

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