

Table of Contents

<u>Section</u>		<u>Page</u>
19.1	NOISE ANALYSIS FOR NDOT PROJECTS	19.1-1
	Activity No. 1: Determine if Project is Type I.....	19.1-3
	Activity No. 2: Conduct Preliminary Evaluation.....	19.1-4
	Activity No. 3: Determine Existing Noise Levels	19.1-5
	Activity No. 4: Obtain Geometric and Traffic Data	19.1-6
	Activity No. 5: Run Traffic Noise Model	19.1-7
	Activity No. 6: Identify Noise Abatement Locations	19.1-8
	Activity No. 7: Identify Noise Abatement Measures.....	19.1-9
	Activity No. 8: Determine Reasonableness and Feasibility	19.1-10
	Activity No. 9: Inform Local Officials	19.1-11
19.2	NOISE ANALYSIS FOR COMPLAINTS	19.2-1
	Activity No. 1: Identify Location of Complaint	19.2-3
	Activity No. 2: Conduct On-Site Visit	19.2-4
	Activity No. 3: Perform On-Site Monitoring	19.2-5
	Activity No. 4: Prepare Monitoring Results	19.2-6
	Activity No. 5: Submit Results to Complainant	19.2-7

List of Figures

<u>Figure</u>	<u>Page</u>
Figure 19.1–A — NDOT NOISE ANALYSIS PROCEDURES	19.1-2
Figure 19.2–A — NDOT NOISE ANALYSIS PROCEDURES	19.2-2

Chapter 19

NOISE

19.1 NOISE ANALYSIS FOR NDOT PROJECTS

In the development of a project, it is necessary to identify and evaluate the potential noise impacts of the project. A traffic noise analysis includes the following:

- identification of existing conditions and activities that may be affected by noise from the highway,
- determination of existing noise levels,
- prediction of traffic noise levels,
- determination of traffic noise impacts, and
- examination and evaluation of alternative noise abatement considerations to mitigate the predicted noise impacts.

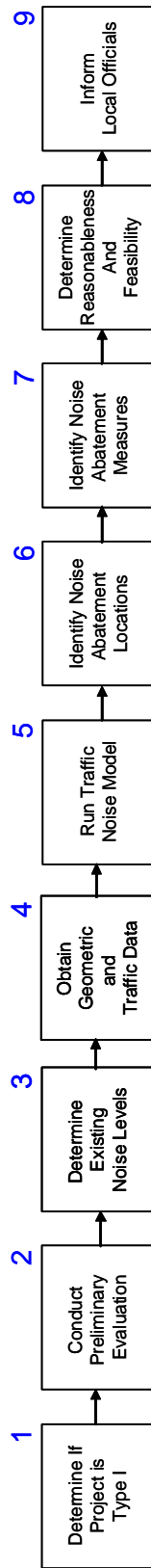


Figure 19.1-A— NDOT NOISE ANALYSIS PROCEDURES (Projects)

PROJECT ACTIVITY

Activity Title: Determine if Project is Type I

Activity No.: 1

Activity Description:

After a project is programmed, the engineer will evaluate the proposed project to determine if it qualifies as a Type I project (i.e., consistent with 23 CFR Part 772 and the [NDOT Traffic and Construction Noise Abatement Policy](#)). In accordance with 23 CFR Part 772.5(h), the NDOT considers a Type I project to be a proposed Federal or Federal-aid highway project for the construction of a highway on new location or the physical alteration of an existing highway that changes either the horizontal or vertical alignment, or increases the number of through-traffic lanes.

Type I highway projects are required to undergo an analysis of traffic noise impacts and an evaluation of alternative noise abatement considerations, as necessary for developed land and for land that is planned for development (see [Activity 7](#)).

On a case-by-case basis, the noise engineer will evaluate other projects that may create a traffic noise impact but that do not qualify as Type I projects to determine the need for a traffic noise analysis and evaluation of alternative noise abatement considerations.

Regulations and Guidance

23 CFR 772 "Procedures for Abatement of Highway Traffic Noise and Construction Noise"
Highway Traffic Noise Analysis and Abatement Policy and Guidance, FHWA
[NDOT Traffic and Construction Noise Abatement Policy](#)

PROJECT ACTIVITY

Activity Title: Conduct Preliminary Evaluation

Activity No.: 2

Activity Description:

The noise engineer will conduct a preliminary evaluation to identify existing activities, developed lands and undeveloped lands for which development is planned, designed and programmed that may be affected by noise from the highway or from construction of the project. The preliminary evaluation will assess the feasibility of providing noise abatement measures for affected receptors, should they be determined necessary.

Regulations and Guidance

23 CFR 772 "Procedures for Abatement of Highway Traffic Noise and Construction Noise"
Highway Traffic Noise Analysis and Abatement Policy and Guidance, FHWA
[NDOT Traffic and Construction Noise Abatement Policy](#)

PROJECT ACTIVITY

Activity Title: Determine Existing Noise Levels

Activity No.: 3

Activity Description:

The preferred method for determining existing noise levels for NDOT projects is through field measurements for developed land uses and activities that will be affected by the project. When making existing noise measurements, factors to consider include:

- time of day (e.g., peak hour);
- day of week;
- time of year (e.g., tourist season); and
- how well the measured noise levels represent the worst case existing noise conditions.

The noise measurement yields the highest hourly noise level generated from noise sources for that area. The period with the highest sound levels may not be the peak traffic hour but may occur during a period when traffic volumes are lower but vehicle speeds are higher or there are a greater number of trucks.

Noise measurements will be made at representative locations (e.g., residential areas, commercial and industrial areas, parks, churches, schools, hospitals, libraries). Measurements are normally restricted to exterior areas of frequent human use; interior measurements are made when there are no outside activities (e.g., churches, hospitals, libraries). Measurements are taken in one of three exterior locations:

- at or near the highway right-of-way line,
- at or near buildings in residential or commercial areas,
- at a point between the R/W line and the location where frequent human activity occurs.

Regulations and Guidance

23 CFR 772 "Procedures for Abatement of Highway Traffic Noise and Construction Noise"
Highway Traffic Noise Analysis and Abatement Policy and Guidance, FHWA

[NDOT Traffic and Construction Noise Abatement Policy](#)

FHWA PD-96-046 "Measurement of Highway-Related Noise"

PROJECT ACTIVITY

Activity Title: Obtain Geometric and Traffic Data

Activity No.: 4

Activity Description:

The noise engineer will request geometric data for the project to establish potentially impacted areas.

The noise engineer will request data from the NDOT Traffic Division necessary for the noise analysis (e.g., percent of large trucks, buses, vehicle mix). In predicting noise levels and assessing noise impacts, traffic characteristics that yield the worst hourly traffic noise impact on a regular basis for the design year will be used. The noise engineer will compile selected data needed from the electronic design files to input into the traffic noise model. At a minimum, the noise engineer will compile the following data:

- roadway geometry coordinates (3-D);
- ramps;
- retaining walls;
- barrier walls;
- roadway profile changes (e.g., grade separations, bridges);
- topography beyond the right-of-way;
- existing privacy walls;
- receptor sites (e.g., backyards, school yards, parks); and
- existing noise walls.

Regulations and Guidance

23 CFR 772 "Procedures for Abatement of Highway Traffic Noise and Construction Noise"
Highway Traffic Noise Analysis and Abatement Policy and Guidance, FHWA
[NDOT Traffic and Construction Noise Abatement Policy](#)

PROJECT ACTIVITY

Activity Title: Run Traffic Noise Model

Activity No.: 5

Activity Description:

The noise engineer will run the traffic noise model to predict the noise levels expected to occur as a result of the proposed project. The NDOT is required to use the FHWA Traffic Noise Model (FHWA TNM) or any other model determined by the FHWA to be consistent with the methodology of the FHWA TNM. Prior to running the traffic noise model, the noise engineer will ensure the following has been completed:

1. Check Data Input. Run the input check feature to identify any errors.
2. Create Sub-Files. Divide the master file into sub-files using interchanges as points of separation.

Upon running the traffic noise model, it will calculate and compare the predicted noise levels of the proposed project with the ambient noise levels at each receptor site. Note that the TNM will be run for each reasonable and feasible alternative of the proposed project.

Regulations and Guidance

23 CFR 772 "Procedures for Abatement of Highway Traffic Noise and Construction Noise"
Highway Traffic Noise Analysis and Abatement Policy and Guidance, FHWA
[NDOT Traffic and Construction Noise Abatement Policy](#)

PROJECT ACTIVITY

Activity Title: Identify Noise Abatement Locations

Activity No.: 6

Activity Description:

The noise engineer will compare the predicted design year noise levels (see [Activity 5](#)) with the Noise Abatement Criteria (i.e., 23 CFR Part 772, Table 1) and the existing noise levels (see [Activity 3](#)) to identify areas where noise abatement may be warranted. For NDOT projects, noise abatement is considered where the predicted noise levels for the design year:

- approach or exceed the Federal Noise Abatement Criteria (NDOT defines “approach” as 1 dBA less than the Noise Abatement Criteria); or
- the predicted noise levels will substantially exceed (i.e., by 15 dBA or more) the existing noise levels.

Regulations and Guidance

23 CFR 772 “Procedures for Abatement of Highway Traffic Noise and Construction Noise”
Highway Traffic Noise Analysis and Abatement Policy and Guidance, FHWA
[NDOT Traffic and Construction Noise Abatement Policy](#)

PROJECT ACTIVITY

Activity Title: Identify Noise Abatement Measures

Activity No.: 7

Activity Description:

The noise engineer will work together with the Project Management Team in identifying and evaluating reasonable and feasible abatement measures for consideration that will mitigate the noise impacts predicted for the proposed highway project. When noise abatement measures are being considered, every reasonable effort will be made to obtain substantial noise reductions. For noise barriers, the NDOT defines a “substantial reduction” as at least a 5 dBA decrease in the traffic noise levels for the first row of residents and a 3 dBA decrease in the traffic noise levels for the second row of residents. Possible abatement measures could include the following:

- construction of noise barriers;
- prohibition of certain vehicle types;
- time use restrictions for certain vehicle types;
- modified speed limits;
- exclusive lane designations;
- traffic control devices;
- alteration of horizontal and vertical alignments;
- acquisition of real property or interests therein (predominantly unimproved property) to serve as a buffer zone;
- noise insulation of public use or nonprofit institutional structures;
- use of a low-noise roadway surface type; and/or
- a combination of the above measures.

For construction noise, the noise engineer will identify measures recommended for inclusion in the Construction Contract Documents to minimize or eliminate adverse construction noise impacts on the community. Some examples include:

- work hour limits;
- equipment muffler requirements;
- use of “sound curtains” on certain equipment;
- limiting the duration of the contract period (calendar date of completion); or
- imposing limits on construction during special events (e.g., outdoor events).

Regulations and Guidance

23 CFR 772 “Procedures for Abatement of Highway Traffic Noise and Construction Noise”
[NDOT Traffic and Construction Noise Abatement Policy](#)
Highway Noise Barrier Design Handbook, FHWA

PROJECT ACTIVITY

Activity Title: Determine Reasonableness and Feasibility

Activity No.: 8

Activity Description:

The noise engineer is responsible for determining the reasonableness and feasibility of the noise abatement measures identified in [Activity 7](#) based on a range of criteria that includes the following:

- amount of noise level reduction provided;
- cost/benefit ratio;
- views of impacted residents;
- absolute noise level and change in noise level;
- land development; and
- feasibility.

Once the analysis of reasonable and feasible noise abatement measures has been completed, the Department will document in the appropriate environmental document (see [Chapters 6, 7 and 8](#)) the results of the noise analysis, including construction noise impacts, as applicable, and reasonable and feasible abatement measures to be implemented on the project.

See [Section 2.3 “Preparing An Administrative Record”](#)

Regulations and Guidance

23 CFR 772 “Procedures for Abatement of Highway Traffic Noise and Construction Noise”
Highway Traffic Noise Analysis and Abatement Policy and Guidance, FHWA
[NDOT Traffic and Construction Noise Abatement Policy](#)
[FHWA Technical Advisory T 6640.8A](#)

PROJECT ACTIVITY

Activity Title: Inform Local Officials

Activity No.: 9

Activity Description:

The noise engineer will be responsible for ensuring that local officials (within whose jurisdiction the highway project is located) are kept informed of potential traffic noise impacts to land adjacent to the project. The noise engineer will use environmental documents, noise study reports and public meetings to provide information to the local officials that will assist in promoting zoning and land use planning decisions to prevent future traffic noise impacts on undeveloped lands. Information that will be provided to the local officials includes:

- approximate design year noise levels (for various distances from the highway project) for lands or properties in the immediate project vicinity (i.e., noise contours, etc.); and
- information that may be useful to local communities to protect future land development from becoming incompatible with anticipated highway noise levels.

Regulations and Guidance

23 CFR 772 "Procedures for Abatement of Highway Traffic Noise and Construction Noise"
Highway Traffic Noise Analysis and Abatement Policy and Guidance, FHWA
[NDOT Traffic and Construction Noise Abatement Policy](#)

19.2 NOISE ANALYSIS FOR COMPLAINTS

The public may submit a complaint regarding noise impacts. Typically, these complaints are prompted by perceived problems from traffic and/or construction noise, and inquiries about noise walls.

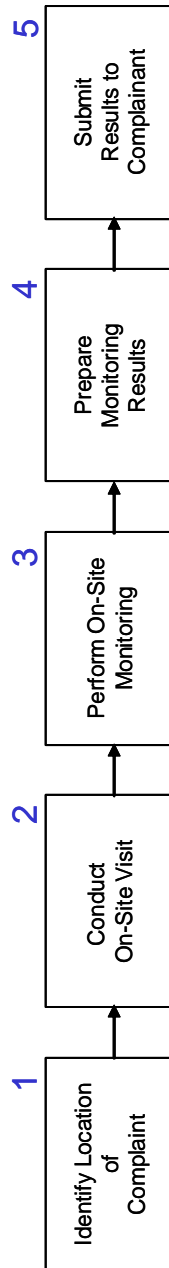


Figure 19.2-A — NDOT NOISE ANALYSIS PROCEDURES (Complaints)

PROJECT ACTIVITY

Activity Title: Identify Location of Complaint

Activity No.: 1

Activity Description:

The noise engineer will identify the location of the complaint. As a part of this Activity, the noise engineer will investigate activities in the vicinity of the complaint, including jurisdictional authority and whether NDOT construction activities are taking place and noise abatement measures for the location were provided as a part of a previous NDOT project.

PROJECT ACTIVITY

Activity Title: Conduct On-Site Visit

Activity No.: 2

Activity Description:

The noise engineer will conduct an on-site visit to meet with and discuss the concerns of the complainant. At a minimum, the noise engineer will document the following during this Activity:

- date of visit;
- name of complainant;
- address of complainant;
- concerns of complainant;
- location of noise impact/concern;
- proximity of NDOT facilities; and
- proximity of various other noise generators (i.e. airports, railroads, etc.).

PROJECT ACTIVITY	
<u>Activity Title:</u>	Perform On-Site Monitoring
<u>Activity No.:</u>	3
<u>Activity Description:</u>	
<p>The noise engineer will conduct on-site noise monitoring to assess potential noise impacts. Depending on the nature of the complaint, this may involve short-term noise monitoring or monitoring for a 24-hour period.</p>	

PROJECT ACTIVITY	
<u>Activity Title:</u>	Prepare Monitoring Results
<u>Activity No.:</u>	4
<u>Activity Description:</u>	
<p>The noise engineer will prepare a report to provide the results of either short-term or 24-hour monitoring. The report will include photos and maps, as necessary.</p>	

PROJECT ACTIVITY

Activity Title: Submit Results to Complainant

Activity No.: 5

Activity Description:

The noise engineer will prepare and transmit to the complainant a letter that provides the monitoring results and explains the findings regarding the complaint. As appropriate, the cover letter will include information regarding the applicability of the NDOT "Freeway Noise Mitigation Retrofit Policy".

See [Section 2.3 "Preparing An Administrative Record."](#)

