

New Hampshire Department of Transportation

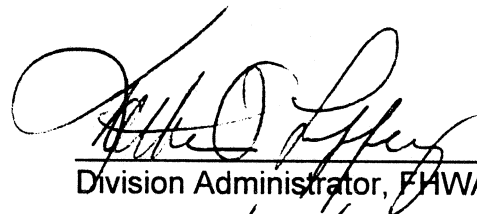
Policy and Procedural Guidelines
for the
Assessment and Abatement
of
Highway Traffic Noise
for
Type I Highway Projects

Approved By



Commissioner, NHDOT

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Division Administrator, FHWA - NH

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I. INTRODUCTION

The following are the New Hampshire Department of Transportation guidelines for assessing noise impacts and determining the need, feasibility, and reasonableness of noise abatement measures for proposed Type I highway construction and improvement projects. Highway noise impact assessment procedures, noise abatement procedures, coordination requirements, and noise abatement criteria contained herein are based on the Federal Highway Administration's (FHWA) Title 23 Code of Federal Regulations, Part 772. The Department does not have a Type II noise abatement program.

These Guidelines are applicable to Federally-aided, State and local matching, and 100% State funded highway projects.

The intent of this policy is to provide guidance for determining noise impacts and identifying appropriate noise abatement.

II. DEFINITIONS

Approach -- this term is defined as 1 decibel below the FHWA Noise Abatement Criteria.

Barrier -- a solid wall, earth berm, or wall/berm combination located between the roadway and a ground-level receiver location, which breaks the line-of-sight between the receiver and the roadway noise sources. All barriers should be designed as low as possible and still attain a noise reduction of 5 dBA to 10 dBA. The practical maximum height of a barrier will be 25 feet. Berm and berm/wall combinations are preferred where space and other environmental constraints permit.

dBA -- a weighted decibel unit used to measure noise that best corresponds to the frequency response of the human ear.

Date of Public Knowledge -- the date of approval of a Categorical Exclusion (CE), Finding of No Significant Impact (FONSI), or Record of Decision (ROD) for a Federally funded highway project, or when design approval is granted for a non-Federal project.

Design Year -- the future year used to estimate the probable traffic volume for which a highway is designed: a time, ten to twenty years, from the start of construction is usually used.

Existing Noise Levels -- the noise, resulting from the natural and mechanical sources and human activity, considered to be usually present in a particular area.

Impacted Receiver/Receptor -- any receiver/receptor which has a worst case noise hour Leq that approaches (within 1 dBA) or exceeds the Noise Abatement Criteria for the corresponding land use category, or whose future build noise level exceeds the existing noise levels by 15 dBA or greater.

Insertion Loss -- the amount of noise reduction provided by a noise barrier, normally 5-10 dBA.

Leq -- the equivalent steady-state sound level which, in a stated period of time, contains the same acoustic energy as a time-varying sound level during the same period.

Leq(h) -- the hourly value of Leq.

Noise Abatement Criteria (NAC) -- noise levels for various activities which represent the absolute levels at which abatement must be considered.

Activity Category	Leq (h)	Description of Activity Category
A	57 (exterior)	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B sports	67 (exterior)	Picnic areas, recreation areas, playgrounds, active areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals.
C	72 (exterior)	Developed lands, properties or activities not included in Category A or B above.
D	--	Undeveloped lands.
E	52 (interior)	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums.

Receiver/Receptor-- the precise ground level location on any property where frequent outdoor activity is found to occur.

Study Zone -- the area directly behind the barrier, extending 500 feet back from the edge of the right-of-way

Traffic Noise Impacts -- impacts which occur when the predicted traffic noise levels approach (within 1 decibel) or exceed the FHWA Noise Abatement Criteria, or when the predicted future build traffic noise levels exceed the existing noise levels by 15 dBA or more.

Type I Project -- a proposed highway project for the construction of a highway on new location or the physical alteration of an existing highway which significantly changes either the horizontal or vertical alignment or increases the number of through-traffic lanes.

Type II Project -- a proposed project for noise abatement on an existing highway where no highway improvements are programmed.

Unit -- a dwelling unit or an area of frequent human activity such as a church or school.

Worst Case Noise Hour -- a period of sixty (60) minutes throughout a twenty-four (24) hour day that reflects the peak noise hour, usually associated with the peak traffic hour but not in every instance.

III. TYPE I NOISE ABATEMENT GUIDELINES

Purpose and Scope

The NHDOT will perform noise impact assessments during the Preliminary Design Phase of the highway project development process. The noise impact assessments will determine the noise impact of the proposed highway project on the community and will include the following:

- Identification of impacted receptors
- Examination of potential mitigation measures
- The incorporation of feasible and reasonable noise mitigation measures
- Coordination with local officials to provide helpful information on compatible land use planning and control

Identification of Impacted Receptors

Noise assessments performed during the Preliminary Design Phase of the highway project will determine impacts for all receptors in proximity to the project and along other routes which may be impacted due to changes in traffic volume, composition, or patterns resulting from the proposed project. In some cases, lands that are undeveloped during project development may be under consideration for future development. Any such lands which are "planned, designed, and programmed" and which may be impacted by noise from the proposed highway project, will be considered potential receptor locations and included in the noise assessment. The Department considers future development to be planned, designed and programmed when a noise sensitive land use such as a residence, school, church, etc., has received final approval from the local planning body at the time of the noise analysis.

The current FHWA approved noise model/barrier design program shall be used to predict existing and future noise levels and to determine insertion loss of a proposed barrier. Predictions will normally be made for the worst case noise hour of the day occurring on a regular basis.

All noise avoidance techniques will be evaluated, refined, and objectively considered during the preliminary design process. Should avoidance not be possible, then every attempt will be made to minimize noise impacts.

An area is considered for protection when the **exterior, ground level, worst hour**, design year noise level (Leq(h)) either (1) approaches (within 1 dBA) or exceeds the Noise Abatement Criteria for the corresponding land use category, or (2) exceeds the existing worst case hour noise level by 15 dBA or more.

Examination of Potential Mitigation Measures

As previously stated, when considering mitigation for traffic noise impacts, primary consideration will be given to exterior, ground level areas where frequent human use occurs and where a lower noise level would be of benefit.

The following measures should be considered when noise analyses indicate the need for abatement:

- Traffic management measures,
- Alteration of horizontal and vertical alignments,
- Acquisition of property rights for construction of noise barriers or acquisition of buffer zones,
- Construction of noise barriers, and
- Noise insulation of public use or non-profit institutional structures.

Mitigation measures will be determined on a site by site basis to obtain the most cost effective abatement, consistent with design and community related factors.

When noise abatement measures are considered to be warranted, every reasonable effort shall be made to achieve a 5 dBA to 10 dBA noise reduction. A 5 dBA reduction is clearly noticeable.

It is the Department's policy that the final decision on the implementation of noise abatement measures will be made only after careful and thorough consideration of the feasibility and reasonableness of proposed noise abatement measures, including coordination with the affected property owners.

The Incorporation of Feasible and Reasonable Noise Mitigation Measures

Feasibility

Feasibility deals with engineering and safety considerations (e.g. can a barrier be built given the existing geometry and topography, can a 5 dBA or greater noise reduction be achieved, etc.). Cross streets, ramps, driveways, and other noise sources will influence the amount of noise reduction that can be achieved. Safety and environmental impacts are important considerations in determining whether a barrier is feasible.

Every effort should be made to attain a 10 dBA (or greater) insertion loss (IL) at first row receivers. However, for a barrier to be included in a Type I study, a majority of the first row receivers must get a minimum of a 5 dBA insertion loss. Safety factors that should be considered in the design of the barrier include: maintaining a clear recovery zone, redirection of errant vehicles, adequate sight distance, and fire/emergency vehicle access. The design of the barrier should also consider potential environmental impacts to wetlands, historic properties, park lands, etc.

It is the Department's policy that construction of a noise barrier is NOT FEASIBLE if at least a 5 dBA noise reduction cannot be achieved.

Reasonableness

Reasonableness implies that common sense and good judgment have been applied in arriving at a decision. The overall noise abatement benefits must outweigh the overall adverse social, economic, and environmental effects and the costs of the abatement measures. Reasonableness will be based on a number of factors with regard to the specific needs of the project.

The following criteria shall be considered collectively to determine the reasonableness of a barrier. ("Yes" means construction of a barrier is reasonable. "No" means construction of a barrier is not reasonable. "High" and "Low" indicate differences in importance.)

1. Cost Effectiveness

A Cost Effectiveness Index (CEI) should be calculated for each barrier. CEI is measured as: \$\$/unit.

Where:

\$\$ = total barrier cost.
unit = number of dwelling units protected in the study zone.

All receivers in the study zone attaining at least a 5 dBA IL, regardless of whether or not they were identified as impacted, will be counted as "protected" and included in the cost effectiveness calculation. All noise barriers shall be designed to protect ground level exterior activity. In general, only the first floor dwellings of multi-family homes shall be included in a cost effectiveness calculation. However, if it can be clearly demonstrated that a multi-family dwelling provides ground level exterior activity for residents that occupy other levels of the structure, then those dwelling units may be included in the cost effectiveness calculation.

For the purpose of developing the CEI, calculations shall be based on the square foot cost of the most recently constructed noise barrier of the same material. If actual barrier costs are not available, a cost of \$20.00 per square foot will be used; realizing that actual costs will vary. Every effort should be made to keep the cost under \$30,000/unit.

<u>\$\$/Unit</u>	<u>Reasonableness</u>
< \$25,000	High Yes
\$25,000 - \$30,000	Low Yes
> \$30,000	No

It should be noted that, if a noise barrier is not reasonable based on its anticipated cost but a developer or the community expresses a desire to pay the difference above the allowable costs (\$30,000/unit), this option will be further explored and considered to be a viable option. No barrier will be funded by the Department, regardless of contribution sharing, which does not meet the "Feasibility Requirements."

2. Development vs. Highway Timing

Due consideration will be given to impacted receptors that predate initial highway construction. They have experienced traffic noise impacts longer than those that came in after the highway was constructed and they did not anticipate the highway noise impacts when they constructed their homes.

<u>% homes prior to initial construction</u>	<u>Reasonableness</u>
> 80	High Yes
50 - 80	Low Yes
< 50	No

3. Land Use

The Department will not generally consider noise abatement for areas zoned industrial or commercial. In areas that have mixed zoning AND are clearly evolving from residential to commercial or industrial uses, the Department will not generally consider it reasonable to mitigate for noise impacts. At least 50 % of the properties in the study zone should be non-commercial for a barrier to be considered.

<u>% of residential properties in mixed zoning</u>	<u>Reasonableness</u>
> 75	High Yes
50 - 75	Low Yes
< 50	No

More consideration for noise abatement will be given to areas which have demonstrated efforts at the local level to control incompatible growth and development along existing highways.

4. Future Noise Levels Greater Than or Equal to 66 dBA

<u>Future noise level dBA Leq(h)</u>	<u>Reasonableness</u>
≥ 66	Yes
< 66	No*

5. Build vs. No-Build Noise Levels

<u>Increase in noise level (dB)</u>	<u>Reasonableness</u>
≥ 15	Yes
< 15	No*

(* a No for both 4. and 5. is sufficient justification to eliminate an area for consideration of noise abatement, regardless of the responses to 1., 2., and 3.)

6. Views of the Impacted Receptors.

Once it has been determined that it is feasible to construct a noise barrier, meetings will be held with the impacted receptors to discuss the proposed mitigation. The Department must have communication with the first row property owners indicating whether they want the barrier or not.

<u>% property owners in favor</u>	<u>Reasonableness</u>
> 90	High Yes
75 - 90	Low Yes
< 75	No**

(** a No in this case is sufficient justification in itself to eliminate an area for consideration.)

7. Unusual Circumstances

An unusual circumstance means any unforeseen situation that may arise on an individual project due to its sensitivity to noise and its importance or value to the community. Noise abatement may be warranted even though the CEI or other criteria contained in the NHDOT Type I guidelines are not met. Unusual circumstances will be considered on an individual project basis. Decisions will be made by the Department and the FHWA, where appropriate.

Coordination With Local Officials

The prevention of future impacts is one of the most important aspects of noise control. Local development and highways can co-exist, but local government officials need to know what noise levels to expect from a highway and what type of development will be compatible with it.

To prevent future traffic noise impacts, the Department shall compile noise analysis information and make it available to local planning officials within whose jurisdiction the highway project is located. This information will include the following:

- The best estimation of future noise levels (for various distances from the highway improvement) for both developed and undeveloped lands or properties in the immediate vicinity of the project, and
- Information that may be useful to local communities to protect future land development and land use changes from becoming incompatible with anticipated highway noise levels.

The Federal Highway Administration and the New Hampshire Department of Transportation are responsible for all noise abatement considerations up until the "Date of Public Knowledge" of the project. After this date, the Department is still responsible for analyzing changes in traffic noise impacts, when appropriate, but the Department is no longer responsible for providing noise abatement for new development which occurs adjacent to the proposed highway project. Provision of such noise abatement becomes the responsibility of local communities and private developers.

Based on this information, local governments should use their power to regulate land development in such a way that noise sensitive land uses are either prohibited from being

located adjacent to a highway, or developments are planned, designed and constructed in such a way that noise impacts are minimized.

IV. COMMUNITY INVOLVEMENT

Coordination with neighborhoods directly impacted by highway project noise is another very important aspect of the highway development process. The degree and type of neighborhood involvement and coordination may vary from project to project. For projects requiring consideration of abatement, the neighborhood involvement activities will allow for formal and informal presentation and discussion of noise impacts related to the project.

The Department will meet with residents of impacted neighborhoods during project development. At any time during this process, the impacted neighborhood may decide it does not want abatement measures. If this is the case, the neighborhood's decision not to accept the abatement will be documented and the process will end.

The neighborhood will be asked for its input based on the proposed location, type, height, and length of the noise abatement feature. The mitigation design will be refined to include the neighborhood comments, when practicable, keeping in mind acoustic, economic, engineering, environmental, and safety considerations.

V. NOISE BARRIER COMMITMENTS IN ENVIRONMENTAL DOCUMENTS (CE, EA, EIS)

At the time the environmental documentation is being finalized, noise studies will have determined if the proposed project will result in traffic noise impacts. If no traffic noise impacts are identified, noise abatement will not be required. If traffic noise impacts are identified but there are no apparent solutions available to mitigate these impacts, it will be documented and noise abatement will not be included as part of the project. If traffic noise impacts are identified and it appears that noise abatement can be provided (although it is unlikely that exact layout, material type, right-of-way requirements, etc. will be available at this stage of project development), a statement similar to the following will be included in the environmental document:

"Based on the studies so far completed, the NH Department of Transportation is committed to the construction of feasible and reasonable noise abatement measures at _____
_____. These preliminary indications of likely abatement measures are based upon preliminary design for a barrier cost of \$ _____ that will reduce the noise level by ___ dBA for ___ residents. If it is subsequently found during final design that these conditions have substantially changed, the abatement measure(s) might not be provided. A final decision on the installation of the abatement measure(s) will be made during the final design process following the completion of public involvement."

VI. CONSTRUCTION NOISE

Effective control of highway construction noise will be achieved by design considerations, sequence of operations, source control, site control, time and activity constraints, and community awareness, as practicable.

Noise Barrier Feasibility and Reasonableness Checklist

Project Name: _____

Proposed Barrier Location: _____

Feasibility

	YES	NO
Any safety or engineering problems associated with the barrier, which preclude construction?	_____	_____
Can a 5 dBA insertion loss be achieved?	_____	_____
Serious environmental impacts (wetlands, 4(f), 6(f), etc.)?	_____	_____

Reasonableness

REASONABLENESS FACTORS	YES		NO
	High	Low	
Cost Effectiveness Index	_____	_____	_____
Relative Age of the Highway	_____	_____	_____
Land Use	_____	_____	_____
Future Noise Levels	_____	_____	_____
Build vs. No-Build	_____	_____	_____
Residents Desires	_____	_____	_____

Additional Considerations:

Decision

Is the Barrier Feasible?	Yes _____	No _____
Is the Barrier Reasonable?	Yes _____	No _____

Reasons for Decision: