

NOISE ABATEMENT POLICY

Alaska Department of Transportation and Public Facilities

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INTRODUCTION

The Federal Highway Administration's Environmental Policy Statement includes a commitment to ensure that all feasible and reasonable mitigation measures are incorporated into projects to minimize noise impacts and enhance the surrounding noise environment to the extent practicable. This commitment to minimize noise impacts and enhance the noise environment must be fulfilled through prudent application of FHWA's noise regulations - 23 CFR Part 772, which is the primary regulatory authority regarding noise abatement criteria. The guiding document for the analysis and abatement of highway traffic noise will be Highway Traffic Noise Analysis and Abatement - Policy and Guidance (FHWA- June, 1995). Additional relevant information describing the evaluation and abatement of traffic noise is presented in the document, "Guide on Evaluation and Abatement of Traffic Noise" (AASHTO - 1993).

23 CFR Part 772 requires that ..."before adoption of a final environmental impact statement or finding of no significant impact, the highway agency shall identify noise abatement measures which are reasonable and feasible and which are likely to be incorporated in the project"...

The Alaska Department of Transportation and Public Facilities (ADOT&PF) has adopted the following policy and criteria for providing noise abatement measures on federal-aid highway construction and improvement projects.

SCOPE OF COVERAGE

This policy will be applicable to only Type I proposed highway construction and improvement projects, where a highway is constructed on a new location or an existing highway is physically altered with substantial changes resulting to the horizontal or vertical alignments, or the number of through-traffic lanes are increased.

The Alaska Department of Transportation and Public Facilities (ADOT&PF) does not have a Type II (retrofit) program to provide noise abatement measures on existing state highways.

In an effort to prevent future traffic noise impacts on currently undeveloped lands, and to maintain compatibility between highways and future development,

ADOT&PF will inform local officials within whose jurisdiction the highway project is located of the best estimation of future noise levels for both developed and undeveloped properties in the immediate vicinity of the project. Information to be supplied to local officials will include completed copies of both the reconnaissance report and the environmental document.

APPROPRIATE LEVEL OF HIGHWAY TRAFFIC NOISE ANALYSIS CATEGORICAL EXCLUSION (CE), ENVIRONMENTAL ASSESSMENT/ FINDING OF NO SIGNIFICANT IMPACT (EA / FONSI), ENVIRONMENTAL IMPACT STATEMENT (EIS)

The level of analysis considered sufficient for a particular project scope shall be consistent with the FHWA guidelines promulgated in Part VI- Additional Information (A,B,Q of Highway Traffic Noise Analysis and Abatement - Policy and Guidance (FHWA- June, 1995), which is attached as Appendix A. Determination of existing and predicted noise levels shall be consistent with methodologies established in 23 CFR 772. Measurement locations and times will be selected so that the range of values obtained will be representative of the area(s) of interest. Noise sensitive areas, including schools, hospitals, residential areas, and other locations identified by citizen or agency participation, will be included in the study scope. Locations for existing noise level determinations will vary with the scope of the individual project, but in general will extend from the projected right-of-way line to a point of minimal noise impact.

TYPES OF NOISE ABATEMENT MEASURES CONSIDERED

Measures to provide noise abatement on projects may include the following: construction of noise barriers, traffic management, horizontal or vertical alignment shifts, elevation or depression of the roadway, and insulation of public buildings.

BACKGROUND - FEASIBILITY, SAFETY, MAINTENANCE, REASONABLENESS

The two relevant criteria to consider when identifying and evaluating noise abatement measures to be incorporated in a project are feasibility and reasonableness.

Feasibility deals primarily with engineering considerations (i.e. can a substantial noise reduction be achieved given the conditions of a specific location. Is the ability to achieve noise reduction limited by factors such as topography, access requirements for driveways or ramps, the presence of local cross streets, or other noise sources in the area ?) A proposed noise barrier which will not achieve a minimum of 5 decibels of attenuation (positive noise benefit) under given conditions is generally not considered to be feasible.

In addition, preliminary and final design consideration should be given to the elements of safety and maintenance, and should be consistent with the following general AASHTO design principles:

- (1) A noise barrier should be located beyond the recover zone of the traveled way. If a noise barrier is within 9 meters of the traveled way, a traffic barrier may be warranted.
- (2) A noise barrier should not block the line -of -sight between vehicles and intersecting roadways or on - off ramps.
- (3) Protrusions on a noise barrier near a traffic lane should be avoided.
- (4) Facings on a noise barrier which can become dislodged during an accident or facings which create excessive glare should be avoided.
- (5) Access should be provided to all sides of the noise barrier to allow for maintenance operations to take place.
- (6) Minimum set back distances and placement of noise barrier located at on/off ramps and intersections should be based upon stopping sight distance, which depends on driver reaction time and deceleration rate.
- (7) Maintenance factors relating to replacement of materials damaged by impact, cleaning the noise barrier, and maintenance associated with adjoining landscape should be considered when determining feasibility.

If a proposed noise barrier creates a safety hazard or poses potential maintenance complications, then it shall not be considered feasible.

Reasonableness is a more subjective criterion than feasibility. It implies that common sense and good judgment were applied in arriving at a decision. Reasonableness should be based on a number of factors, not just one criteria.

A determination of reasonableness for noise barriers shall be based upon a number of factors, and shall include the following:

1. Amount of noise reduction provided
2. Number of people protected
3. Cost of abatement
4. Views of impacted residents
5. Future absolute traffic noise levels
6. Difference between the future traffic noise levels and the existing noise levels
7. Difference between future traffic noise levels for the build and the no-build alternative
8. Amount of development that occurred before and after the initial construction of the highway
9. Extent to which zoning or land use is changing
10. Effectiveness of land use controls implemented by local officials to prevent incompatible development

PURPOSE FOR CRITERIA

Good program management supports the need for highway traffic noise abatement decision making criteria and procedures. The decision on whether or not to provide a noise abatement measure must not be arbitrary or capricious, and its reasoning should be available and supportable, particularly if the answer is "no" and the affected residents want a measure to be constructed. The decision must be based upon consistent, uniform application of established criteria and procedures to determine feasibility and reasonableness. This will result in reasonable standards being utilized, while maintaining a degree of flexibility in the decision making process.

CRITERIA

1. Noise barriers will only be considered where noise impacts have been identified. 23 CFR 772 defines noise impacts as.. "impacts which occur when the predicted traffic noise levels approach or exceed the noise abatement criteria (NAC)(Table 1), or when the predicted traffic noise levels (design year) substantially exceed the existing noise levels". The Department considers a predicted noise level of 2 decibels within the NAC as sufficient to satisfy the condition of approach. The Department considers a 10 decibel increase in noise as substantial. The 10 dBA increase range reflects the generally accepted range of increase which is likely to foster sporadic to widespread complaints.

2. Noise barriers will not be constructed for Land Use Categories C and D which include but are not limited to industrial and commercial uses and undeveloped lands unless it is necessary to protect adjacent sensitive uses (Land use Categories A and B). Undeveloped lands will include those lands for which a building permit has not been obtained by the date that the environmental document is signed. Existing building permits may be considered to address this criteria during the preparation of the environmental document.

3. Noise barriers will not be constructed where land use is changing rapidly and there is no local zoning or ordinances to control the new development of noise sensitive land uses adjacent to transportation corridors. An exception would be considered for areas with long-term established sensitive uses (i.e. residential subdivisions, etc.) where the local government has agreed in writing to implement measures to prohibit the development of non-sensitive land uses within and adjacent to those sensitive land uses.

4. Noise barrier construction is not feasible if a minimum 5 dBA noise reduction cannot be achieved. Noise abatement measures which do not achieve at least a 5 dBA reduction in noise to most protected receivers are not prudent expenditures of public funds as any less of a reduction is not easily perceived in a field situation.

5. Noise barrier construction is not feasible if it creates a safety hazard or presents potential maintenance complications. The degree of non-feasibility will be considered when deciding whether or not the noise barrier will be constructed.

6. Once the construction of a noise barrier has been determined feasible, then the Department will determine whether its construction is reasonable by thoroughly considering a wide range of criteria as stated below. The ADOT&PF Noise Abatement Measure Recommendation Checklist will be completed and a decision of reasonableness documented in the project file. Noise barriers will only be constructed by the Department if they have been determined reasonable. The decision to recommend or not recommend that a noise barrier be implemented will normally be the responsibility of the Regional Environmental Coordinator with concurrence from design personnel. Reasonableness will be determined based on the following factors:

(A) The noise barrier cost is no more than \$25,000 per residence. This is determined by counting all residences (including owner-occupied, rental units, mobile homes) benefitted by the noise barrier in any subdivision and/or given development, and dividing that number into the total cost of the noise abatement measure. A "benefitted" residence is defined as any residence which receives a minimum positive noise benefit of 5 decibels, regardless of whether or not they were identified as impacted. Each unit in a multi-family building will be counted as a separate residence. Actual barrier cost will be provided by the preliminary or final design engineers. This cost determination shall be applicable to cases where a "substantial" noise impact (10 dBA increase or 2 dBA approach to NAC) will occur.

In the event that the noise barrier cost is greater than \$25,000 per residence, the cost will be considered to be reasonable only if it can be demonstrated that a "severe" noise impact will occur. In order to satisfy this criteria, it must be shown that either a predicted (design year) increase of at least 15 dBA over existing noise levels will occur, or that predicted build noise levels will exceed predicted no-build noise levels by at least 5 dBA.

(B) "Most" residents that would be impacted by traffic noise from the project, and benefitted from the noise barrier construction want a noise barrier. The Department shall consider that most impacted residents want a noise barrier if the local government and/or community council provides written documentation of such. "Impacted residences" would be those residences in a subdivision or a development where traffic noise approaches or exceeds the noise abatement criteria or where there is a substantial increase in noise as a result of the project. For the purposes of definition, "most" will be defined as at least 60 %. It may be necessary to

conduct door to door, mail, or telephone surveys to determine whether "most" impacted residents desire a noise barrier. This would be done only in the absence of such a determination from the local government, community council, homeowner associations, or other entities which represent the residential development, or when deemed necessary by the Regional Environmental Coordinator.

(C) The sensitive receivers predated initial highway construction - "most" impacted homes were built before initial construction of the highway. The date of development is an important part of the determination of reasonableness. More consideration is given to developments that were built before the highway. For the purposes of definition, "most" will be defined as at least 50 %.

(D) The sensitive receivers have been in place for at least 10 years - "most" impacted homes have existed for at least 10 years. More consideration is given to residents who have experienced traffic noise impacts for long periods of time. For the purposes of definition, "most" will be defined as at least 50 %.

(E) The future build noise levels are at least 65 dBA. More consideration should be given to areas with higher absolute traffic noise levels. Absolute noise levels typically found along highways, 60-75 dBA, are deemed undesirable and cause complaints from adjacent residents. In general, the higher the absolute noise, the more complaints.

(F) The future build noise levels are at least 5 dBA greater than the existing noise levels. More consideration is given to areas with larger increases over existing noise levels. This gives greater consideration to projects for highways on new location and major reconstruction than it does to projects of smaller magnitude. A 3 dBA increase is barely perceptible, a 5 dBA increase is readily perceptible, and a 10 dBA increase doubles the perceived loudness of the noise.

(G) The future build noise levels are at least 3 dBA greater than the future nobuild noise levels. More consideration to areas where larger changes in traffic noise levels are expected to occur if the project is constructed than if it is not.

The decision to recommend or not recommend that a noise barrier be implemented will normally be the responsibility of the Regional Environmental Coordinator with concurrence from design personnel. The recommendation to provide a noise barrier shall be made in writing in the appropriate environmental document, which will be forwarded to FHWA for review and approval.

CONSTRUCTION NOISE

Noise reduction during construction activities should primarily address the considerations of having all construction equipment properly maintained with mufflers in acceptable working condition. Construction noises from drilling, blasting, and grinding operations should be limited to certain hours of operation, and may require additional noise attenuation devices. In addition, consideration should be given to the identification of noise-sensitive areas while the project is in the preliminary and final design phases so that noise impacts may be minimized. Early coordination with project designers can identify operations such as compressors, stockpile operations, and haul roads; so that these types of operations may be located in less noise sensitive areas.

In the event that construction noise complaints occur during the course of construction activities, measures should be taken by the resident engineer. These would include locating stationary construction equipment as far from nearby noise sensitive properties as possible, shutting off idling equipment, rescheduling construction operations to avoid periods of noise annoyance, notifying nearby residents whenever extremely noisy operations will be occurring, and installing permanent or portable acoustic barriers around stationary construction noise sources.

ALASKA DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES
NOISE ABATEMENT RECOMMENDATION CHECKLIST

Project Name:
Project No:

Preparer:

Receiver Name /Description

1. Does a noise impact exist or is one predicted to occur in the Design Year?

Yes _____ No _____

If no, then noise abatement is not recommended. Proceed to decision segment of form.

2. Is the receiver a use typically defined within Land Use Category A and/or B in the FHWA noise abatement criteria?

Yes _____ No _____

If no, then noise abatement is not recommended. Proceed to decision segment of form.

3. Is the receiver in a area of development where rapidly changing land use is occurring?

Yes _____ No _____

If yes, then noise abatement is not recommended. Proceed to decision segment of form.

4. Can effective noise barriers be constructed which provide a minimum 5 dBA reduction in noise levels?

Yes _____ No _____

If no, abatement measures are not feasible and are not recommended at this site. Proceed to decision segment of this form.

5. Can effective noise barriers be constructed without creating a safety hazard to users and residents, and interfering with operations and maintenance of the highway facility?

Yes _____ No _____

If no, abatement measures are not feasible and are not recommended at this site. Proceed to decision segment of this form. If yes, then continue filling in the form to determine the reasonableness of abatement measures.

REASONABLENESS DETERMINATION

Reasonableness Factors	YES	NO
(A) Cost Per Benefitted Residence	_____	_____
Total Barrier Cost -- #of benefitted residences > \$ 25,000	_____	_____
If yes, go to I below		
If no, go to II and continue analysis		
I. Severe Noise Impact		
(a) noise increase at least 15 dBA	_____	_____
(b) build at least 5dBA > no build	_____	_____
If either (a) or (b) is yes, go to II, continue analysis. If not, noise abatement measures are not considered reasonable, go to decision		
II. Additional Factors	_____	_____
(B) Residents' Desires	_____	_____
(C) Development vs. Timing	_____	_____
(D) Development existence	_____	_____
(E) Build level 65 dBA	_____	_____
(F) Build level 5 dBA greater than existing	_____	_____
(G) Build level 3 dBA greater than no build	_____	_____

ADDITIONAL CONCERNS:

DECISION

Are Abatement Measures feasible?

Yes _____

No _____

Are Abatement Measures reasonable?

Yes _____

No _____

REASONS FOR DECISION,

TABLE I

FHWA NOISE ABATEMENT CRITERIA
(Hourly A-Weighted Sound Level - decibels (dB))

Activity Category	L eq	L 10 -	Description of Activity Category
A	57 (Exterior)	60 (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	67 (Exterior)	70 (Exterior)	Picnic areas, recreation areas, playgrounds, active sports areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals.
C	72 (Exterior)	75 (Exterior)	Developed lands, properties, or activities not included in Categories A or B above. Undeveloped lands.
E	52 (Interior)	55 (Interior)	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums.

APPENDIX A

APPROPRIATE LEVEL OF NOISE ANALYSIS FOR CE, EA/FONSI, AND EIS

VI. ADDITIONAL INFORMATION'

A. Appropriate Level of Highway Traffic Noise Analysis for CE, EA/FONSI, and EIS

Purpose

Highway traffic noise analysts often ask "how much analysis is sufficient?" for a project which will require the use of Federal-aid highway funds.' The following discussion is meant to assist in answering that question.

Background

Two different laws control the evaluation of highway traffic noise impacts: NEPA and the Federal-aid Highway Act 'of 1970, which added Section 109(i) to Title 23 of the U.S. Code of Federal Regulations. They require environmental evaluation of Federal or Federal-aid highway projects, and reasonable and feasible mitigation of identified impacts. The FHWA regulations for mitigation of highway traffic noise in the planning and design of federally-aided highways are contained in 23 CFR 772, "Procedures for *Abatement of Highway Traffic Noise and Construction Noise.

The FHWA noise regulations require, during the planning and design of all Type I highway projects, the following: (1) identification of traffic noise impacts; (2) examination of potential mitigation measures; (3) the incorporation of reasonable and feasible noise mitigation measures into the highway project; and (4) coordination with local officials to provide helpful information on compatible land use planning and control. Type I highway projects are those that involve ". . . 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."

The regulations contain noise abatement criteria, which represent the upper limit of acceptable highway traffic noise for different types of land uses and human activities. The regulations do not require that the noise abatement criteria be met in every instance. Rather, they require that every reasonable and feasible effort be made to provide noise mitigation when the noise abatement criteria are* approached or exceeded, or when the predicted traffic noise levels substantially exceed the existing noise levels (these two conditions are defined as traffic noise impacts). Compliance with the noise regulations is a prerequisite for the granting of Federal-aid highway funds for construction or reconstruction of a highway.

General guidance related to the format, content, and processing of NEPA and Section 4(f) studies and documents describes the three classes of actions which prescribe the level of documentation required in the NEPA process.

These classes of actions are the following:

I. Categorical Exclusion (CE)

A Categorical Exclusion is for an action that does not individually or cumulatively have a significant environmental impact.

II. Environmental Assessment/Finding of No Significant Impact (EA/FONSI)

An Environmental Assessment is for an action in which the significance of the environmental impact is not clearly established. A Finding of No Significant Impact is a written document incorporating the EA and any other appropriate environmental documents and in which the, Federal Agency agrees that there is no significant impact.

III. Environmental Impact Statement (EIS)

An EIS is for an action that will significantly affect the environment.

Noise Analysis

The level of detail and effort for the traffic noise analysis required on each alternative of a proposed project should be commensurate with the type of project and the impacts and/or issues with which it is associated.

The general content of a traffic noise analysis is discussed in Paragraph 772.9b of 23 CFR 772 (see page 11).

Categorical Exclusion

In considering traffic noise analysis for a CE, it is necessary to make a distinction between two cases. These are (a) CEs which are not Type I projects as defined in 23 CFR 772 (the vast majority of CEs will not be Type I projects) and (b) CEs which are Type I projects.

Projects that are not Type I: No analysis of any kind is required, except for the extremely rare instance in which the project itself is expected to create a noise impact. Such projects must be dealt with on a case by case basis in accordance-with NEPA.

Projects that are Type I: Noise analysis is required by 23 CFR 772 although none may be necessary to demonstrate NEPA compliance. The analysis should include:

- (1) identification of existing activities, developed lands, and undeveloped lands for which development is planned, designed and programmed, which may be affected by noise from the highway;
- (2) determination of existing levels by measurement or by use of a simple application of the FHWA model;
- (3) prediction of traffic noise levels using a simple (e.g. , nomograph, hand-held calculator, microcomputer*, etc..) application of the FHWA Highway Traffic Noise Prediction Model (FHWA model) or, if a more accurate prediction is required, a detailed application of the FHWA model;
- (4) determination of traffic noise impacts using the two impact criteria in 23 CFR 772. If no impacts exist, a brief explanation of the basis for no traffic noise impacts should be given (e.g. , the project is 90 meters from the nearest receptor) .

End of Analysis.

- (5) if traffic noise impacts exist, determine if there are any reasonable and feasible measures which will abate the impacts.

As an example of how steps (1), (2), (3), (4) and (5) might be performed, suppose a highway is to be relocated about 150 meters from its existing alignment. There are currently 400 autos/hour, 20 medium trucks/hour, and 32 heavy trucks/ hour in the noisiest hour and all vehicle speeds are about 88 km/h. The general terrain is flat and grassy (i.e., acoustically soft). Future traffic is expected to double. There are nine residences near the relocation alignment, five which are 60 meters from the relocation alignment, and four which are 30 meters from 'the relocation alignment. Existing noise level near these residences is 60 dBA L., during PM peak hour.

The SHA uses the following definitions:

“...approach...” means within 1 or 2 dBA or the noise levels shown in TABLE 1 of 23 CFR 772, depending on the specific circumstances (e.g., the amount of human use, the location relative to commercial activity).

“...substantially exceeds existing noise levels....” means an increase of 15 dBA Leq or more.

“...feasible...” means it is structurally and acoustically possible to provide 6 dBA of abatement.

“...reasonable...” means that the SHA believes mitigation is prudent 'upon consideration of the following conditions:

1. The neighborhood desires for abatement (this can be ascertained based on written correspondence of the individuals in the neighborhood or on such correspondence with a local responsible official).
2. The extent to which the agency with responsibility for approval of development has demonstrated the control (or has agreed to control) of land use to encourage noise compatible development.
3. The relationship between how long the people who would benefit from the abatement have lived in their residences and the date of the final environmental report on the project, if it is on new alignment, or the date of initial construction of the existing highway, if the project is a lane addition.

4. The cost of the abatement (normally such costs should not exceed \$20,000 per residence, including any safety and drainage features included specifically due to the abatement measures).
5. The amount of noise reduction provided (normally at least 6 dBA).
6. The extent to which the "build" noise levels exceed the "no build" noise levels.
7. The extent to which the "build" noise levels exceed the existing noise levels.
8. The extent to which the "build" noise levels approach or exceed the NAC.

The above is a fictitious example and must not be construed as containing recommended definitions. A more thorough discussion of reasonableness and feasibility may be found in the discussion on "Reasonableness and Feasibility (see pp. 50-66)." The particular use of the factors noted above, while consistent with this discussion is only one example of an application for decision making.

Application of the nomographs to estimate future noise levels at a distance of 15m gives levels of 66, 65 and 71 dBA for autos, medium trucks, and heavy trucks respectively (using future traffic volumes which are double existing volumes) or a combined level of 73 dBA using decibel addition rules. Applying the adjustment for doubling distance from a noise source at a soft site (4.5 decibel decrease for every doubling of distance), the five sites 60 meters from the road would each receive about 64 dBA (PM peak) in the future. Since the existing noise levels are about 60 dBA, this is not a substantial increase. The 64 dBA also does not approach the Noise Abatement Criterion of 67 dBA for a residence. Therefore, given the SHA's definitions of ". . . substantially exceeds existing noise levels. . ." and ". . . approach or exceed there is no traffic noise impact at these five sites.

At the four residences closest to the highway, we apply the adjustment for doubling distance from a noise source at a soft site. This results in the conclusion that this site would receive about 68 dBA from the road in the future. Therefore, there is a noise impact at the site and abatement must be considered as follows:

1. Letters have been received from all four households and the mayor expressing strong concern about noise impacts and a desire for a noise barrier.
2. The local zoning & approval board has agreed in writing to submit future development plans to the SHA for review and comment.
3. The residences preceded the FEIS by many years.
4. & 5. Assume a barrier is the only feasible abatement measure. Assume further that a barrier sufficient to provide 6 dBA of abatement for these residences would be about 270 meters long and 3 meters high. If it would cost \$108 per square meter for construction (including safety and drainage work), the total cost would be about \$87,000, or about \$22,000 per residence.
6. & 7. The increase from both existing conditions and those of the "no build" conditions to the "build" condition is 8 dBA.
8. The noise levels in the "build" condition is 1 dBA higher than the NAC. In addition to these considerations, the mayor has offered to use \$3,000 in city funds to landscape the barrier if the SHA agrees to build it.

Given all of the above, the SHA considers abatement to be reasonable at this site even though the cost of the barrier slightly exceeds the SHA's cost/receptor criterion.

End of Analysis

Environmental Assessment/Finding of No Significant Impact

In considering traffic noise analysis for an EA/FONSI, it is desirable to distinguish between three cases. These are (a) EA/FONSIs for projects that are not Type I, (b) EA/FONSIs for projects on low volume roads, and (c) EA/FONSIs for projects on high volume roads. The SHA should define low volume roads. Both low and high volume roads may occur in rural, suburban or urban areas.

Projects that are not Type I: The analysis requires only that an explanation be provided as to whether the project itself will create a noise impact. The few instances-where the project will have an impact on noise levels will have to be examined on a case-by-case basis in accordance with NEPA.

Projects that are Type I and are on Low Volume Roads:

The analysis requires the same steps as in the case of CEs for Type I projects, except that each alternative under consideration (including the "no build" alternative) requires a separate analysis. This, thus, includes:

- (1) identification of existing activities, developed lands, and undeveloped lands for which development is planned, designed and programmed, which may be affected by noise from the highway;
- (2) determination of existing levels by measurement or by use of a simple application of the FHWA model;
- (3) prediction of traffic noise levels using a simple application of the FHWA Model;
- (4) determination of traffic noise impacts using the two impact criteria in 23 CFR 772. If no impacts exist, a brief explanation of the basis for no traffic noise impacts should be documented;

End of Analysis.

- (5) if impacts exist, determine if there are any reasonable and feasible measures which will abate the impacts.

Projects that are Type I and are on High Volume Roads: The analysis should include for each alternative under consideration (including the "no build" alternative):

- (1) identification of existing activities, developed lands, and undeveloped lands for which development is planned, designed and programmed, which may be affected by noise from the highway;
- (2) determination of existing levels. Measurement is required to verify the presence/absence of non-highway noise sources. Noise measurements should, however, only be necessary at a few areas representing sensitive locations;
- (3) prediction of traffic noise levels using either a simple or, if a more accurate prediction is required, a detailed application of the FHWA model;
- (4) determination of traffic noise impacts using the two impact criteria in 23 CFR 772. This requires quantification of noise levels. If no impacts exist, a brief explanation of the basis for no traffic noise impacts should be documented;

End of Analysis.

- (5) if impacts exist, determine if there are any reasonable and feasible measures which will abate the impacts'. Abatement benefits and costs should be quantified to the extent possible. The ' final EA and accompanying FONSI should indicate which abatement measures are "-likely" to be incorporated in the project and identify impacts for which no prudent solution is reasonably available.

Environmental Impact Statements

Projects that are not Type 1:

Occasionally, an EIS is done for a project that is not Type I (e.g. , a turning lane. which brings traffic close to some critical environmental resource). However, these instances are unusual and must be dealt with on a case-by-case in accordance with NEPA.

Projects that are Type 1:

For all Type I projects, noise analysis is required by both NEPA and. 23 CFR 772. The analysis should include the following for each alternative under detailed study (including the "no build" alternative):

- (1) identification of existing activities, developed lands, and undeveloped lands for which development is planned, designed and programmed, which may be affected by noise from the highway. Each noise sensitive area should be

briefly described (residences, businesses, schools, parks, etc.), including information on the number and types of activities which may be affected;

- (2) determination of existing levels. Measurement is required to verify the presence/absence of non-highway noise sources. Noise measurements should, however, only be necessary at a few areas representing sensitive locations. In some cases (e.g. highly congested facilities where trucks avoid peak automobile travel periods), both a peak traffic period and a non-peak period noise measurement may be required to verify the worst hour noise levels;
- (3) prediction of traffic noise levels using either a simple or, if a more accurate prediction is required, a detailed application of the FHWA model;
- (4) determination of traffic noise impacts using the two impact criteria in 23 CFR 772. This requires quantifying the extent of the impact (in decibels) at each sensitive area. Use of a table to compare the predicted levels with the project, the predicted levels without the project, the existing levels, and the noise abatement criteria in 23 CFR 772. is recommended for clarity. If no impacts exist, a brief explanation of the basis for no traffic noise impacts should be given.

End of Analysis.

- (5) if impacts exist, determine if there are any reasonable and feasible measures which will abate the impacts. The final EIS should indicate the estimated costs and decibel reductions and should provide a description of the non-barrier abatement measures considered and the reasons why such measures are or are not considered reasonable and-feasible. The FEIS should indicate which abatement measures are "likely" to be incorporated in the project and should identify impacts for which no prudent solution is reasonably available.

Design of the Project:

Effort is also needed during the design of the highway project. one of the best engineering practices is the use of multidisciplinary design teams. The incorporation of a highway traffic noise specialist, a landscape architect, a maintenance engineer, a highway safety engineer, a hydraulic engineer, and a structural engineer should help produce noise mitigation that is functional, practical and aesthetically pleasing.

PS&E Review:

When a highway project is being reviewed by the FHWA Division Office, the environmental document should be used to check for noise mitigation required on the project. Either the CE determination, the FONSI, or the EIS Record of Decision (ROD) should be reviewed to determine the suggested location of noise barriers that have been determined to be reasonable and feasible. Project files should clearly document the reasons why any noise mitigation listed as likely to be implemented in the environmental document has been found not to be reasonable and feasible during the design process.

B. Noise-Analysis for Highway Lane Addition Projects

Introduction

The procedures and requirements contained in 23 CFR 772 constitute the noise standards mandated by 23 U.S.C. 109(i). All applicable Federal-aid highway projects must conform to these standards. 23 CFR 772 specifically applies to any project defined as a Type I project - - 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 which significantly changes either the horizontal or vertical alignment or increases the number of through-traffic lanes. This discussion is meant to address the FHWA requirements for highway traffic noise analyses related to Federal-aid highway projects which increase the number of through-traffic lanes (hereafter referred to as lane addition projects).

Environmental Processing

If a project is not a Type I project as defined by 23 CFR 772, a noise analysis is not required except in the extremely rare incidence in which the project itself is expected to create a noise impact. Such projects must be, dealt with on a case by case basis in accordance with NEPA. The addition of a through-traffic lane is specifically defined as a Type I project and must be analyzed as discussed below. A noise analysis must be done for Type I projects. This analysis may range from a simple screening process utilizing a nomograph to the use of computer software depending on the complexity of the project.

If noise impacts as defined by 23 CFR 772 are not identified, no further analysis is necessary regardless of whether the project is advanced as a CE, EA/FONSI or an EIS. However, if noise impacts are identified, additional analysis must be done to determine the significance of the impacts. This determination of significance should be based on consideration of the context and intensity of the impacts as discussed in the Council on Environmental Quality (CEQ) Regulation (40 CFR, Part 1508.27). In analyzing highway traffic noise impacts, context should consider the extent of the noise impact. Is the impact on an isolated residence? If noise impacts occur for 50 people, is it in a village with a population of 100, in a town of 5,000, or in a city of 50,000? Intensity should consider the noise levels associated with the impact. Are the predicted absolute noise levels 60 dBA, 70 dBA, or 80 dBA? Is the predicted increase over existing noise levels only 1 or 2 dBA, or is it 10 dBA, 20 dBA, or 30 dBA?

Highway traffic noise is only one area to be considered in the environmental processing of a proposed highway project. The significance of identified traffic noise impacts should be used to help decide whether to process the project with a CE, a Finding of No Significant Impact (FONSI), or an EIS. If project impacts, including noise impacts, are deemed not to be significant, the project may be processed with a CE or a FONSI. However, if noise impacts are determined to be significant, the project must be processed with an EIS. 23 CFR 772 states that a traffic noise impact occurs when predicted traffic noise levels substantially exceed the existing noise levels. In documenting the increase in existing noise levels in the environmental processing of a project, care should be taken to avoid the use of the phrase "significant increase" due to the CEQ definition of "significance." The phrase "substantial increase" should always be used to address this type of potential traffic noise impact.

Noise Impacts

Analysis for lane addition projects must follow the procedures outlined in 23 CFR 772. These procedures require: (1) identification of existing activities, (2) determination of existing noise levels, (3) prediction of future traffic noise levels, and (4) determination of traffic noise impacts. Traffic noise impacts occur when the future traffic noise levels approach or exceed the NAC contained in 23 CFR 772 or when the future traffic noise levels substantially exceed the existing noise levels. For lane addition projects, the definition of traffic noise impact in 23 CFR 772 applies to the total noise level of the facility being expanded rather than to just the incremental noise level increase caused by the added lanes.

Many lane addition projects will result in a small, imperceptible increase of future noise levels over existing noise levels (1-3 dBA). This is almost always the case if the lanes are added in the median of an existing multi-lane divided highway or on the outside of an existing highway which is at grade or on fill. A slightly larger, but still small, increase in noise may occur if lanes are added on the outside of an existing highway in cut where additional cutting of sideslopes must be done thereby reducing some of the noise, shielding provided by the cut. An exception to this may occur when two-lane highways are expanded to four or more lanes since this modification will substantially increase the traffic capacity of the facility and potentially move the noise source closer to a receiver. Projects of this last type, therefore, may substantially increase the future traffic noise levels over the existing noise levels.

Most traffic noise impacts occur on a lane addition project when future total noise levels near the expanded facility approach or exceed the NAC. In most, urban locations where lanes need to be added, existing noise levels along the facility already approach or exceed the NAC. Thus, receptors near the facility are experiencing a traffic noise impact even before the new lanes are added and the traffic capacity is increased. - Obviously, in this situation, a traffic noise impact will almost certainly occur in the analysis of the lane addition project even though the added lanes do not increase (or substantially increase) future traffic noise levels over the existing noise levels or the future traffic noise levels for the "no-build" alternative. Nevertheless, as defined in 23 CFR 772, a traffic noise impact occurs in this situation, and it must be identified.

From the above discussion, it can be seen that the incremental noise increase caused by the added lanes is usually not the governing factor for identifying a traffic noise impact on a lane addition project. Rather, it is the total noise level for the final facility that usually determines whether or not a traffic noise impact will be identified. This is not to say that the incremental noise increase from the added lanes is unimportant. It in fact is one of the factors that should be considered in determining whether or not a proposed abatement measure is reasonable (see the discussion following in the noise abatement section). For this reason, the traffic noise analysis should include a comparison between the future traffic noise levels for the expanded facility and the "no-build" alternative for the design year.

Noise Abatement

23 CFR 772 also requires that noise abatement measures be considered if a traffic noise impact is identified for a Type I project. Abatement consideration should weigh the abatement benefits, costs, and overall social, economic, and environmental effects. Abatement measures which are found to be reasonable and feasible must be incorporated in the project. If a traffic noise impact is identified for a lane addition project as discussed above, abatement must be considered as a part of the project being proposed. Such

consideration cannot be delayed to a future date or be made part of a Type II program - - an entirely voluntary State program for addressing traffic noise impacts along existing highways.

When considering noise abatement measures, every reasonable effort should be made to obtain a substantial noise reduction (defined by typical State practice to be a reduction of 5 dBA or more). All the abatement measures listed in 23 CFR 772 should be considered. However, for a lane addition project, measures such as traffic management, alteration of alignment, or purchase of land for use as a buffer zone usually either do not provide a substantial noise reduction or are found to be not reasonable and feasible due to cost, right-of-way requirements, or project purpose. Thus, noise barriers are the abatement measure most often associated with the concept of noise abatement on lane addition projects. The consideration of noise abatement must result in a determination of reasonableness and feasibility.

The final determination of reasonableness of noise abatement should be made only after a careful and thorough consideration of a wide range of criteria. The importance that a State places on any one criterion can vary depending on the specific circumstances for a particular project. For example, on a lane addition project where (1) there is little if any difference between the future traffic noise levels for the expanded facility and the future traffic noise levels for the "no-build" alternative, and (2) a majority of the development along the highway occurred after initial construction of the highway, the State may decide that these criteria are very important in determining the *reasonableness* of noise abatement. While the remaining criteria for determining reasonableness (e.g. noise reduction, cost, community support, etc.) under this scenario may individually be less important, they should still be evaluated since, on balance, they may offset the negative aspects of the first two criteria. On another project, for example, where a majority of the adjacent development occurred prior to initial construction of the highway, other criteria, such as noise reduction, cost, etc., may take on added importance.

Summary

A proposed Federal-aid highway project which increases the number of through-traffic lanes is defined by 23 CFR 772 as a Type I project. A noise analysis must be done for this type of project to identify any potential noise impacts as defined by 23 CFR 772. The level of analysis required can vary based upon the anticipated *noise impacts associated with the project. If noise impacts are identified, the significance of these impacts must be determined. The project must be processed with a CE, a FONSI, or an EIS, as appropriate, based on the significance of noise-impacts as well as other environmental impacts. Furthermore, if noise impacts are identified, noise abatement measures must be considered and if they are found to be reasonable and feasible, they must be incorporated into the project. The determination of reasonableness and feasibility should be based on a careful and thorough consideration of many factors and not on any one criterion.

C. Traffic Noise Analysis for Proposed Projects Involving Interchanges, Ramps, or "Lane Widening"

These types of projects must be classified as Type I projects as defined by 23 CFR 772. The- addition of interchanges/ramps/auxiliary lanes/ truck climbing lanes, etc. to existing highways can certainly create significant changes in alignment and/or add through-traffic lanes, and SHAs have a responsibility to ensure that all reasonable and feasible mitigation measures are incorporated into the projects to minimize noise impacts and enhance the surrounding environment to the extent practicable.

Similarly, the addition of high-occupancy vehicle (HOV) lanes to highways are also Type I projects, whether added in the median or on the outside of the existing highway, since they add through-traffic lanes. Traffic noise analysis is required for both sides of the highway, even when HOV lanes are only being added on one side of the highway. Frequently, HOV projects cause little or no change in the existing or future noise environment. However, traffic noise impacts occur since existing noise levels already approach or exceed FHWA noise abatement criteria. In these instances, abatement must be considered and implemented if found to be reasonable and feasible.

Noise analyses are only required for Federal-aid highway projects that are Type I projects or that create a noise impact as a result of the project. No noise analysis is required for widenings of less than one through-traffic lane width, unless there is a significant change in either the horizontal or vertical alignment or the project itself is expected to create a noise impact. Noise analyses are required in all instances where a through-traffic lane is added to a highway. Two different laws control the evaluation of highway traffic noise impacts: NEPA and the Federal-aid Highway Act -of 1970.

The FHWA noise regulations require noise analyses for all Type I projects, defined as projects that involve 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. Such analyses must be done to meet FHWA and Title 23 requirements.

If a project does not meet the definition of a Type I project, no noise analysis is required, except for the extremely rare incidence in which the project itself is expected to create a noise impact. A traffic noise impact occurs when the predicted traffic noise levels approach or exceed FHWA's NAC or when the predicted traffic noise levels substantially exceed the existing noise levels. If the project itself is expected to create a noise impact (i.e., the predicted no-build noise levels do not approach or exceed the ' NAC and the predicted build noise levels either approach or exceed the NAC or substantially exceed the no-build noise levels), a noise analysis must be done to meet the requirements of NEPA.

NOTE: A commonly held viewpoint is that noise analyses should not be necessary for projects that will not change the noise environment - that is, not change the noise levels from those that exist today or not change the noise levels from those that will exist in the future if no project is implemented (e.g., 70 dBA existing and 70 dBA in the future, with or without the project). However, the FHWA noise regulations were developed to specifically address the improvement of situations where existing noise levels are already high (i.e., a traffic noise impact already exists). Thus, noise analyses are required for all Type I projects, even when there is no change in the surrounding noise environment. A parallel can be drawn with highway projects where substandard safety features are upgraded or improved even though the overall goal of the project is not specifically safety-related.

D. Reasonableness and Feasibility of Noise Abatement

Introduction:

It is FHWA's policy to ensure that all reasonable and feasible mitigation measures are incorporated into projects to minimize noise impacts and enhance the surrounding 'noise environment to the extent practicable. This commitment to minimize noise impacts and enhance the noise environment must be fulfilled through prudent application of FHWA's noise regulations - 23 CFR 772.