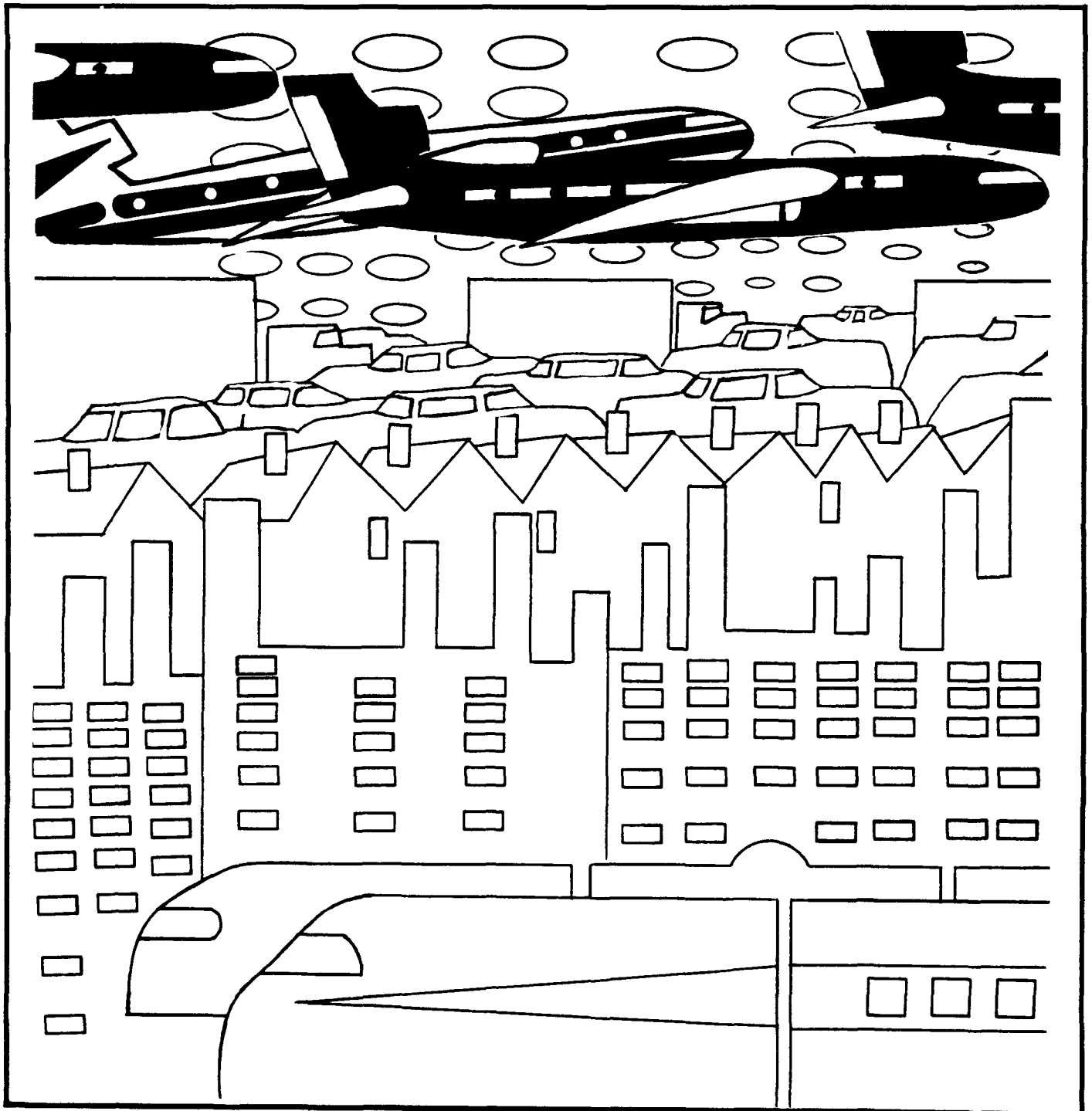




The Review Of Airport Project Environmental Impact Statements For Noise Concerns: A Brief Outline And Checklist



The Review of Airport Project Environmental
Impact Statements for Noise Concerns:
A Brief Outline and Checksheet

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PREFACE

The National Environmental Policy Act (NEPA) requires environmental impact considerations to be included in project planning along with technical and economic concerns. The thrust of NEPA, as well as The Council on Environmental Quality (CEQ) guidelines and numerous Federal agency procedures, is to ensure that balanced decision making occurs in the interest of public health and welfare. Towards that goal, section 102 of NEPA requires that environmental statements (EIS's) be prepared for "major Federal actions significantly affecting the quality of the human environment." The EIS's purpose is to notify the public and the various decision-making agencies of an action's environmental consequences by defining and evaluating the proposed actions environment effects. It also includes measures to avoid or mitigate the negative impacts.

Many useful sources of information have been developed to assist the people responsible for EIS preparation. However, almost no attention has been given to assisting the person who has to review one. It seems to be implied that the same material used for preparation of the document is adequate for its review. Unfortunately, as people who have had to review EIS's know, this is not quite the case. The different perspectives of the preparer and the reviewer require that they approach the EIS from different directions. If the EIS is well prepared, the reviewer's concerns will have been addressed; if the EIS has flaws, the reviewer must be able to ask the right questions to pinpoint the inadequacies.

In response to requests from both professional EIS reviewers and the public, the Region V Noise Program has assembled a list of concerns that it feels every EIS should address. This particular document is concerned with airport projects. It is our hope that, in spite of its brevity, it will be a basis from which a competent noise review can be effected.

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INTRODUCTION

Anyone who has reviewed very many Environmental Impact Statements (EIS) for noise consideration is certain to discover that there is no single set of questions that can be used to judge EIS adequacy. The reasoning for this conclusion is that each project (and the environment that the project impacts) is unique. What is a major concern for one project can often have minimal impact on another. However, this is not to say that there is no systematic way to evaluate an EIS.

After reviewing many EIS's for noise impact, the Region V Noise Program feels that there are five basic areas in which an EIS should provide information:

1. Site description
2. Project description
3. Existing and future noise levels
4. Noise impact caused by the project
5. Mitigation measures necessary to reduce noise impact to acceptable levels

To assist the reviewer in determining whether or not an airport related EIS has adequately addressed these concerns, an EIS Review Checksheet has been prepared. The purpose of this exercise is not to set standards, but only to provide a systematic list of concerns that the ideal EIS will address.

Therefore, there is no discussion on quantitative aspects of environmental review. There are no tables, graphs, or equations for predicting how much noise will be produced or how serious the noise impact will be. If the reviewer wants to corroborate this type of information, he must go to the other sources, such as those given in the references.

The checksheet consists of nine major questions relevant to the adequacy of the noise portion of an airport EIS. Associated with each question are a number of minor aspects which can be used to determine if the question is adequately addressed. It is suggested that the reviewer checkoff the minor aspects as he encounters them in the EIS. Those that are poorly discussed should be noted. For those aspects that are not discussed at all, the reviewer should determine if they are relevant to the particular project. Those that are not discussed but are relevant should be noted. After the adequacies and inadequacies of all of the minor aspects have been examined, the reviewer then uses the accumulated findings to determine how well the major question has been answered, i.e. has the EIS addressed the question adequately, adequately with reservations, or not adequately?

Those who are not familiar with environmental noise assessment may find the checksheet rather terse, therefore, a brief commentary dealing with each of the nine basic questions has been included. To obtain a more complete understanding of environmental noise impact assessment, the reviewer is encouraged to go to the literature.

AIRPORT EIS REVIEW CHECKSHEET

PROJECT _____

DATE _____

1. IS AN ADEQUATE VISUAL DESCRIPTION OF THE SITE PROVIDED?

Adequate Adequate with reservations Not adequate

Aerial Photograph Drawn schematic None

Map scale included

Identification of runways

Length of runways

Location of:

Taxiways

Engine run-up site

Terminals

Parking facilities

Roads

Residential areas

Specific noise sensitive sites

(churches, schools, hospitals, etc.)

Land use and zoning districts

2. IS SUFFICIENT QUANTITATIVE INFORMATION ON THE SLIE PRESENTED?

- Adequate Adequate with reservations Not adequate
- Runways: Identification, length, location
- Taxiways: Location, length
- Engine run-up sites: Location, usage and times
- Terminal and other buildings: Location, identification of associated noise sources, proximity to noise sensitive areas
- Parking facilities: Location, proximity to noise sensitive areas
- Road system: Location, proximity to noise sensitive areas
- Residential areas: Location, population
- Specific noise sensitive sites: Location, identification

3. IS THE PRESENT OPERATIONAL PROFILE OF THE AIRPORT ADEQUATELY DESCRIBED?

- Adequate Adequate with reservations Not adequate
- Hours of operation of airport
 - Breakdown of fleet mix by model
 - Commercial freight Jet
 - Passenger Jet
 - Business Jet
 - Large and small propeller
 - Military
 - Helicopter
 - Number of flights for above classes of aircraft
 - Maximum hourly number
 - Daily average number
 - Night flight number (between 10 p.m. and 7 a.m.)

- Normal flight path description for each runway
- Average runway usage for each class of aircraft
for both take-off and landing
- Sensitivity of runway usage to changes in wind patterns
- Usage pattern for engine run-up sites

4. IS THE SCOPE OF THE PROPOSED PROJECT ADEQUATELY DESCRIBED?

- Adequate Adequate with reservations Not adequate
- Physical description of project
- Description of alternate plans considered but not chosen
- Description of relocations of roads, railroad tracks, etc.
that could cause non-aircraft related noise impacts on community
- Description of the ultimate development plan of airport

5. IS THE FUTURE OPERATIONAL PROFILE OF THE AIRPORT ADEQUATELY DESCRIBED?

- Adequate Adequate with reservations Not adequate
- Changes from present profile (Question 3) described
 - At completion of project
 - 10 to 20 years after completion of project
- "Reasonableness" of predictions
- Potential for increased operations not covered in EIS

6. ARE ADEQUATE (QUANTITATIVE) NOISE LEVEL PREDICTIONS PROVIDED?

- | | | | |
|--------------------------|----------------------------|--|--|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Adequate | Adequate with reservations | | Not adequate |
| Present | Future | | |
| <input type="checkbox"/> | <input type="checkbox"/> | Noise Contour maps provided | |
| <input type="checkbox"/> | <input type="checkbox"/> | Levels predicted at noise-sensitive sites | |
| <input type="checkbox"/> | <input type="checkbox"/> | Descriptors Adequate | |
| | | <input type="checkbox"/> | Day-night equivalent sound levels |
| | | <input type="checkbox"/> | Maximum A-weighted sound levels |
| | | <input type="checkbox"/> | Other |
| <input type="checkbox"/> | <input type="checkbox"/> | Noise levels agree with verifying calculations
by the reviewer | |
| <input type="checkbox"/> | <input type="checkbox"/> | Actual noise measurements provided | |
| | | <input type="checkbox"/> | Adequate site selection |
| | | <input type="checkbox"/> | Adequate time of day and duration of
measurements |
| <input type="checkbox"/> | <input type="checkbox"/> | Sensitivity of noise level values to changes in
operational parameters. | |
| | | <input type="checkbox"/> | Noise level predictions for alternatives other than
the preferred one |

7. IS THE NOISE IMPACT ADEQUATELY DISCUSSED?

- | | | |
|--------------------------|---|--------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Adequate | Adequate with reservations | Not adequate |
| <input type="checkbox"/> | Discussion of noise measures and their relation to impact | |
| <input type="checkbox"/> | Definitions of sound levels, $L_{eq}(h)$ L_{dn} , etc. discussed | |
| <input type="checkbox"/> | Relation of noise levels to degree of hearing loss and
annoyance explained | |

- Discussion of impact on the area in general
 - Numbers of people affected at various noise levels
 - Land-use zones affected at various noise levels
 - Discussion of areas with significant impact
- Discussion of impact on specific noise sensitive activities
 - Schools
 - Churches
 - Hospitals
 - Nursing homes
 - Parks, zoos, nature preserves, and other activities requiring low noise levels
 - Agricultural activities
 - Other
- Comments from the public included and discussed
- Discussion of relative impacts between alternatives

8. ARE MITIGATION MEASURES ADEQUATELY CONSIDERED?

- Adequate Adequate with reservations Not adequate
- Areas expecting serious noise impacts explicitly documented
- Specific mitigation measures detailed
 - Operational procedures
 - Night curfews
 - Usage restrictions on aircraft
 - Flight path restrictions
 - Fines for noise level exceedence
 - Other

- Zoning and land use restrictions
- Soundproofing
- Relocation
- Other
- Effectiveness of proposed mitigation measures
- Commitment to use of mitigation measures

9. ARE NON-AIRCRAFT NOISE SOURCES ADEQUATELY DISCUSSED?

- Adequate Adequate with reservations Not adequate
- Construction noise
 - Adequately described
 - Assessment of impact
 - Mitigation measures
- Airport related motor vehicle traffic noise
 - Adequately discussed
 - Assessment of impact
 - Mitigation measures
- Noise from terminal activities other than aircraft
 - Adequately described
 - Assessment of impact
 - Mitigation measures
 - Other

Brief Commentary on Checksheet Concerns

1. IS AN ADEQUATE VISUAL DESCRIPTION OF THE SITE PROVIDED?

An EIS should provide an overview of the site. A pictorial representation seems to be the best choice to meet this need. It should be of sufficient scale and clarity to provide unambiguous information about the concerns listed in the Checksheet. It will be used in corroborating the EIS noise predictions and in pinpointing areas where noise problems could surface.

Although blueprints and other drawn graphics can provide much needed information, the aerial photograph is by far the most useful tool. It allows the reviewer an independent look at the site. There have been many instances where a perusal of an aerial photograph has located potential noise problems that were not discussed in the EIS. Close scrutiny of this photograph should always be made if one is provided. In particular, the reviewer should strive to identify those individual noise sensitive sites that could be affected by the airport operations. The superior EIS will have this information superimposed on the photograph itself.

2. IS SUFFICIENT QUANTITATIVE INFORMATION ON THE SITE PRESENTED?

The EIS should provide the detailed information specified in the checksheet on those on those facilities and operations in the vicinity of the site that are likely either to cause noise disturbances or to be victims of these disturbances. This information provides a more comprehensive discussion of the material covered in the overview of the site discussed in Question 1. Quantitative data is especially needed by the reviewer when making his own calculations to corroborate the noise level predictions given in the EIS.

3. IS THE PRESENT OPERATIONAL PROFILE OF THE AIRPORT ADEQUATELY DISCUSSED?

The information with which this question is concerned serves two main purposes. First, it provides airport operations data which is needed by the reviewer in making calculations to corroborate the noise levels presented in the EIS. Secondly, it provides the base from which the incremental noise impact due to the project can be ascertained. The checksheet provides a listing of the information that is required.

4. IS THE SCOPE OF THE PROPOSED PROJECT ADEQUATELY DESCRIBED?

A description of the physical changes that are proposed for the airport proper is adequately presented in virtually all EIS's. However, there are additional aspects which are sometimes neglected. The alternative development plans which were not chosen should be detailed well enough that a reviewer has sufficient data to judge their relative impact compared to the chosen one. Specific descriptions of the residences, roads, railroad tracks, etc. that will be relocated should be included. Finally, the EIS should make clear whether the envisioned ultimate development of the airport ends with this project, or whether more work is anticipated. If the latter situation is the case, the reviewer must investigate the possibility that a number of small changes to an airport, each relatively minor in its own noise impact, could add together to cause major problems.

5. IS THE FUTURE OPERATIONAL PROFILE OF THE AIRPORT ADEQUATELY DESCRIBED?

The well-prepared EIS will provide a projection of how future airport operations can be expected to differ from the existing situation. Information will be presented both for the period immediately after completion of the project, and for a period of 10 to 20 years into the future.

Reviewing this aspect of the EIS can be difficult since no one can be certain what changes in demand or operations will actually occur in the future. The reviewer must use a test of "reasonableness". By "reasonableness" we mean that the scope of the project is commensurate with the expected usage of the airport. Thus the reviewer should relate the new capacity of the airport to the expected usage. If it turns out that the predicted usage seems to leave the airport underutilized, he should investigate the impact that expanded usage would cause.

Sometimes an EIS will leave gaps in the information needed for the corroboration of future noise predictions. The reviewer should not hesitate to fill these gaps with his best estimates of the parameters. Of course, if the reviewer's results are reported, they should be prefaced with the stipulation that they are based on the reviewer's assumptions.

6. ARE ADEQUATE (QUANTITATIVE) NOISE LEVEL PREDICTIONS PROVIDED?

Determining whether or not the noise level predictions in the EIS are reasonable is the most technically difficult part of the EIS review. If all of the previous questions have been answered satisfactorily, the reviewer has all of the data needed to assess this concern. The references in the Appendix 1 provide the methods of calculating the noise levels. Generally a corroboration of the entire set of noise levels presented in the EIS is not necessary. A set of calculations of noise levels at some of the more important noise-sensitive sites is usually adequate. If the reviewer's results are within roughly 3 decibels of the reported values, agreement can be assumed. Differences of more than 5 decibels are cause for concern.

How should the EIS present quantitative noise level predictions? The predominant method in use today is by the use of noise contour maps. A noise level contour is a line drawn on a map of the site area, along with a particular noise level, such that the land within the contour will experience noise levels greater than or equal to the given level. A complete noise contour map consists of a set of contours (each separated by either 5 or 10 dB) superimposed on a site map, usually down to the 40 or 45 dBA level. It is analogous to a topographic map where points at a specific height are all connected to make a height contour, only in this case it is equal noise level points that are connected.

Most contours today are given in terms of the day-night equivalent sound level (L(dn)). This descriptor is used to provide an energy-average sound level over a 24-hour period, with a 10 decibel penalty assessed on all noise occurring between the hours of 10 p.m. and 7 a.m. (The complete definition can be found in reference 1.) USEPA has correlated annoyance and hearing loss to L(dn) values, which makes L(dn) useful in assessing noise impact. Maximum noise level contours caused by the loudest aircraft using the airport would also be useful, but are seldom included in EIS's.

Some EIS documents provide noise contours in terms of Noise Exposure Forecast (NEF) values. To convert NEF values to L(dn) values a good rule of thumb is add 35 decibels to the NEF value.

Other EIS's include estimates of the number of minutes per day that the noise exceeds a single decibel level (e.g. 20 minutes over 65 dBA). This measure is not particularly useful since it provides no information about the time of day of occurrence of the events or the amount above the base level that is exceeded. As an example, an eight minute daily exceedance of 85 dBA might mean that noise levels of exactly 85 dBA were produced for two minutes four times during an afternoon, or it could also mean that noise levels of 100 dBA were produced eight times for only one minute each between the hours of 1 a.m. and 4 a.m. The impact on the public is enormously different between these two extreme cases.

Noise contours should be provided for all of the important scenarios: present conditions, the preferred alternative, the no-build alternative, and any of the other alternatives that have a chance of being chosen.

The reviewer should make an estimate of how sensitive the contours are to unforeseen changes in operational parameters, such as are considered in question 5. The introduction of jet aircraft, an increase in jet aircraft operations, and restriction of flight paths are the three most prevalent inclusions that are likely to cause problems.

In addition to contours, noise level predictions should be provided for specific noise sensitive activities in the vicinity of the site. Levels at schools, hospitals, nursing homes, zoos, etc. can be provided either by stating the expected levels or by locating the activities on the noise contour map.

Occasionally EIS's include actual noise measurements made around the site. Most reported measurements usually turn out to be inadequate in that they are taken at too few locations and for not long enough periods of time. Because of the variability in flight operations during the day, noise measurements need to be taken over long periods to obtain meaningful results.

7. IS THE NOISE IMPACT ADEQUATELY DISCUSSED?

A discussion of noise impact involves more than simply providing noise levels. The EIS should discuss how the noise measures used in the EIS relate to hearing loss and annoyance. General relations between noise levels and the degree of impact on people (e.g. noise levels vs percent of people annoyed) can be obtained from the literature and should be included. The annoyance aspects are most important since there are very few airports at which operations will be so loud to cause physical hearing damage.

The EIS should discuss the degree of overall noise impact on the area surrounding the site. The land use zones and the number of people (or residences) exposed to various levels of noise should be identified and the magnitude of the impact stated. The previously listed noise sensitive activities should be discussed in detail with respect to potential noise impact. If no significant impact is expected at a particular site, that fact should be stated.

It should be noted that "the degree of impact" is a relative concept. If ambient noise levels are low to begin with, the impact of a project could be significant in spite of the fact that the new noise levels might not exceed normal standards.

For example, consider an airport built in a rural area which originally experiences L(dn) noise levels in the 40 decibel range. If the post project levels turn out to be 10 dB greater, they would still be acceptable for most residential areas. To the people living in the area, however, the new levels would be subjectively twice as loud as they originally were.

For our considerations of noise impact, we generally feel that outdoor L(dn) levels of 55dB or less are quite reasonable for residential areas, while levels above 65-70dB are definitely excessive. In term of identifiable changes in impact, a 3-4 dB increase in L(dn) is noticeable, while increases greater than 7-8dB are considered major.

Good sources for locating potential noise problems are letters from the public and governmental agencies. They are usually printed in an appendix associated with public comments. The EIS should provide specific replies to their concerns.

8. ARE MITIGATION MEASURES DETAILED?

Most EIS's make some mention of noise mitigation measures. Many only pay lip-service to their need for implementation, and dismiss them on the grounds of cost. The good EIS documents the areas needing mitigation, lists the methods available, and then either states which measures will be used or provides a verbal commitment to implement those that are needed to reduce the noise impact to acceptable levels.

9. ARE NON-AIRCRAFT NOISE SOURCES ADEQUATELY DISCUSSED?

Associated with the airport are various non-aircraft noise sources. Construction noise can be a short-term problem if noise sensitive activities are located close to the airport. If terminals, hangars, and other supporting facilities are located close to these sites long term problems from air-handling equipment, loading operations, and other similar activities could occur. It is also possible that a large increase in air traffic could cause motor vehicle noise problems from the traffic going to and from the airport. Any potential problems such as these should be adequately described, assessed in terms of impact, and mitigation measures described.

Appendix 1 - References

1. Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare With an Adequate Margin of Safety, U.S. Environmental Protection Agency, Washington, D.C. 20460, 550/9-74-004 March 1974
2. Calculation of Day-Night Levels Resulting from Civil Aircraft Operations, U.S. Environmental Protection Agency, EPA 550/9-77-450 January 1977
3. Guidelines for Preparing Environmental Impact Statements on Noise, Committee on Hearing, Bioacoustics, and Biomechanics, National Research Council, National Academy of Sciences, Washington, D.C. 1977
4. Aircraft Noise Impact Planning Guidelines for Local Agencies, U.S. Department of Housing and Urban Development. TE/NA - 472 November 1972
5. Design Guide for Reducing Transportation Noise in and Around Buildings, U.S. Department of Commerce, National Bureau of Standards, 003-003-01687-0, 1978