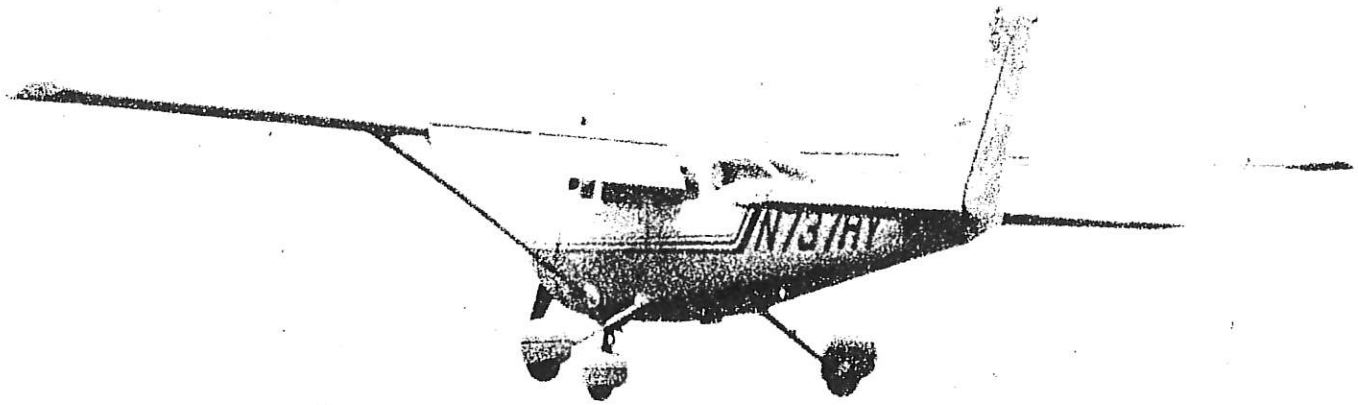

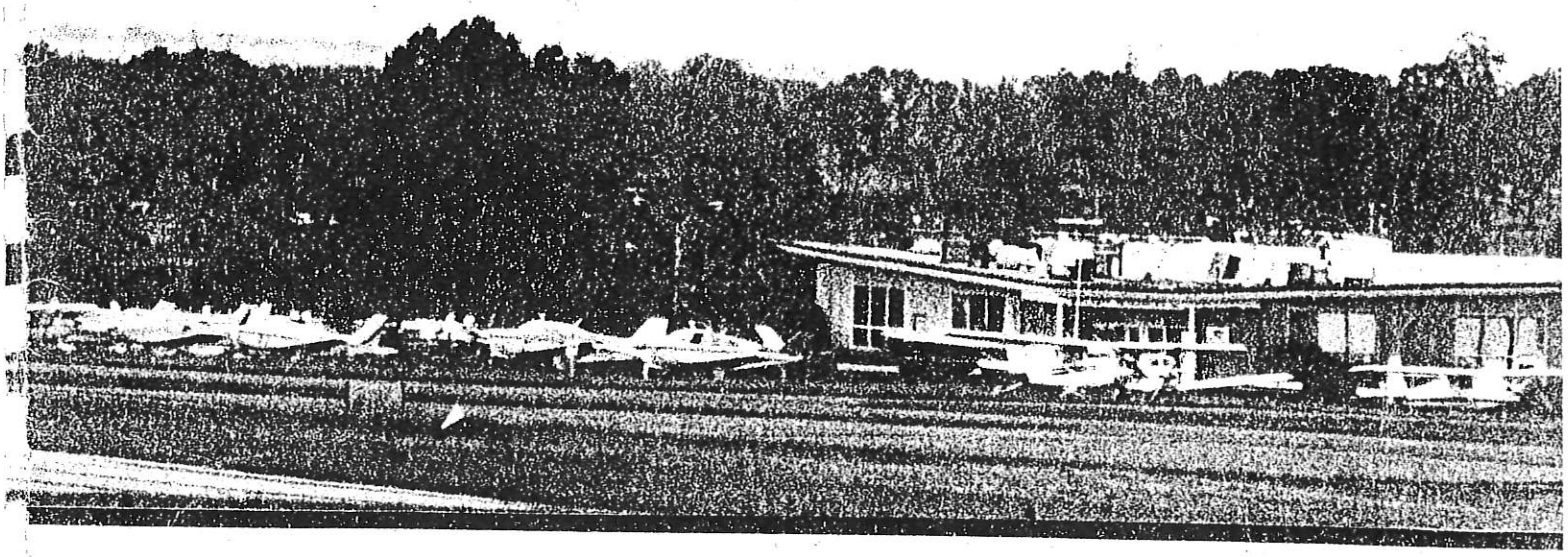

Volume 1: Noise Exposure Map

Montgomery County Airpark Noise Compatibility Program

Montgomery County Revenue Authority

Submitted Under Federal Aviation Regulations, Part 150

Submitted to: Federal Aviation Administration

Submitted by: Montgomery County Revenue Authority

Prepared by: Harris Miller Miller & Hanson Inc.
The LPA Group, Inc.
Hanifin Associates, Inc.

MONTGOMERY COUNTY AIRPARK
FAR PART 150 DOCUMENTATION

Prepared under Federal Aviation Regulations, Part 150

Volume 1: NOISE EXPOSURE MAP

March 1991

Submitted to:

Federal Aviation Administration
Washington Airports District Office
900 S. Washington Street, Room 200
Falls Church, VA 22046

Submitted by:

Montgomery County Revenue Authority
211 Monroe Street
Rockville, MD 20850

DRAFT

CERTIFICATION

This is to certify that the Noise Exposure Map and associated documentation, developed in conjunction with the Noise Compatibility Program for the Montgomery County Airpark, and submitted in this report to the Federal Aviation Administration under Federal Aviation Regulations Part 150, Subpart B, Section 150.21, are true and complete under penalty of 18 U.S.C. Part 1001. In addition, this is to certify that adequate and reasonable "consultation and opportunity for public comment" has been given to interested parties.

By: _____

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1. INTRODUCTION AND EXECUTIVE SUMMARY

This volume presents the Noise Exposure Map and related information that comprise the first volume of required documentation for an FAR Part 150 submission for the Montgomery County Airpark (GAI)[1]. The documentation has been developed under the provisions of Federal Aviation Regulations, Part 150; it addresses the specific requirements of Part 150, Subpart B, Section 150.21, as well as Appendix A of the regulation. The work reported here provides the foundation for the Airport Noise Compatibility Program, which is presented separately in Volume 2. Appendix A of this report presents a copy of the Part 150 regulation.

This chapter provides an introduction to the objectives and requirements of FAR Part 150 (Section 1.1), describes the GAI project organization (1.2), summarizes the development of this volume (1.3), outlines the balance of the report (1.4), and presents an executive summary.

1.1 FAR Part 150

Part 150 of the Federal Aviation Regulations (FAR Part 150) sets forth a process for airport proprietors to follow in developing, documenting, and obtaining FAA approval of programs to reduce or eliminate incompatibilities between airport-generated noise and surrounding land uses. Part 150 prescribes specific standards and systems for:

- measuring noise;
- estimating cumulative noise exposure using computer models;
- describing noise exposure (including instantaneous noise levels, single event levels and cumulative exposure);
- coordinating noise compatibility program development with local land use planning officials and other interested parties;
- documentation of the analytical process and results, and of compatibility program development;
- submission of documentation to the FAA;
- FAA and public review processes; and
- FAA approval or disapproval of the submission.

Part 150 also sets forth guidelines for identifying land uses that normally are compatible with various levels of noise exposure.

Formal FAA acceptance of the Part 150 submission does not eliminate requirements for formal environmental assessment of any proposed actions pursuant to requirements of the National Environmental Policy Act (NEPA). However, acceptance of the submission is a prerequisite to application for funding of implementation actions.

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[1] GAI is the FAA's official 3-letter designation for the Montgomery County Airpark.

The Part 150 submission consists of two basic elements: (1) a Noise Exposure Map (NEM), and associated documentation, and (2) a Noise Compatibility Program (NCP). The Noise Exposure Map is a graphic depiction of existing and future noise exposure resulting from aircraft operations, and of land uses in the airport environs. Documentation must accompany the NEM that describes the data collection and analysis undertaken in its development.

The Noise Compatibility Program is, in fundamental terms, a list of the actions the airport proprietor proposes to undertake to minimize existing and future noise/land use incompatibilities. Its documentation must describe the development of the program, including a description of all measures considered, the reasons that individual measures were accepted or rejected, how measures will be implemented and funded, and predicted effectiveness of individual measures and the overall program. That material is presented in Volume 2.

1.2 Project Organization and Execution

The consulting firm Harris Miller Miller & Hanson Inc. (HMMH), in association with the LPA Group Inc. (LPA), Hanifin Associates Inc (HAI), and Lindgren Design Associates (LDA), conducted the Part 150 study that is the basis of the material presented in this volume. HMMH has undertaken this study for, and under the direction of, the Montgomery County Revenue Authority, the proprietor of GAI. The airport is managed by the Airport Manager who currently is licensed by the State of Maryland. The Airport Manager does not report to the Revenue Authority. Consultants to the Revenue Authority monitored project progress for consistency with their policies. An Advisory Committee monitored the progress of the study and provided technical input, as described in Chapter 15. The study commenced in October 1990 and is scheduled to be completed by January 1992.

1.3 Development of this Volume

This volume is based on the aggregation of data collected by HMMH of which the majority has been presented in two Advisory Committee Meetings and one Community Workshop/Public Meeting. Comments as a result of the aforementioned meetings and from other sources have been reviewed and integrated into this document such that they can address Part 150 requirements in an organized fashion. The one major additional area addressed is the Chapter 15 documentation summarizing the public participation process, in accordance with Part 150, Subpart B, paragraphs 150.21 (b) and (e).

1.4 Organization of Volume 1

The NEM requirements in the Part 150 regulations specify more than a simple "map" to provide all the information requested. In addition to graphics; tabulated information and text discussion are required. At most

airports, even the graphic information required is too extensive to present on a single sheet.

The FAA has distributed an implementation memorandum which includes a checklist of required items associated with the NEM. To assist readers in reviewing this document, Table 1.1 presents this checklist, and indicates the location(s), in this document, of each required item. Section 1.5 presents an executive summary of the NEM. The basic NEM graphic requirements are presented in a single graphic, and each of the FAA checklist items are addressed in a concise fashion.

Chapters 2 through 15 present this information in greater detail, along with discussion of its development, supporting data, and data sources.

1.5 Executive Summary of the Noise Exposure Map

This section consolidates all of the Part 150 NEM requirements on a single graphic, Figure 1.1, to the fullest extent feasible. This includes all items that can be depicted on a map, and information that can be summarized in concise tabular form. A limited number of items require discussion. These items cannot be addressed in a graphic or tabular form, and are discussed below.

An inventory of the information contained in Figure 1.1, with respect to the FAA checklist, is presented below.

1. Base map developed using INM or approved equivalent.

The U.S. Air Force NOISEMAP computer model was utilized in developing the GAI noise contours. NOISEMAP is one of two models approved by the FAA's Office of Environment and Energy for use in Part 150 studies.

a. Land uses identified.

Figure 1.1 depicts the different classes of land use in the GAI environs, based on local municipal zoning and land use maps. Figure 14.1 also presents the land use in the area of GAI.

b. Scale not less than 1 inch = 8,000 feet.

Figure 1.1 is presented at a scale of 1 inch = 2,000 feet, larger than the minimum requirement. Different scale maps are used only when it is necessary to "zoom in" or "out" to provide the proper level of detail in a limited number of situations. No figures are at a scale of less than 1" to 8,000'.

c. Runway locations and alignments.

The figure depicts the operational runway at GAI, 14/32.

Table 1.1
Part 150 Noise Exposure Map Checklist

Checklist Item:	Part 150 Reference:	Location(s) in this Volume:
1. Base map developed using INM or approved equivalent.	A150.103(a)	Chapter 1
a. Land uses identified.	A150.101(a)	Fig. 1.1, Chapter 14
b. Scale not less than 1 inch = 8,000 feet.	A150.103(b)	NEM at 1"=2000'
c. Runway locations and alignments.	A150.101(e)	Fig. 1.1, Chapter 5
d. Airport boundaries.	A150.101(e)	Fig. 1.1, Chapter 5
e. Flight tracks.	A150.101(e)	Fig. 1.1, Chapter 7
2. Continuous noise for Ldn 65, 70, and 75.	A150.101(a)	Fig. 1.1, Chapter 12/13
a. Total area in square miles within each contour.	A150.101(e)	Fig. 1.1, Chapter 14
b. Estimates of numbers of people residing within each contour.	A150.101(e)	Fig. 1.1, Chapter 14
3. Depiction and identification of each public and/or planning agency having jurisdiction within the Ldn 65 contour.	A150.105(a)	Fig. 1.1, Chapter 14
4. Brief analysis of the types of land use controls available to the identified agencies.	A150.105(b/c)	Chapter 14
5. Incompatible land uses identified within the Ldn contours using Table 1 of Part 150 and based on self-generated noise (ambient).	A150.101(a/b)	Fig. 1.1, Chapter 14
6. Location of noise sensitive public buildings (schools, hospitals, etc.).	A150.101(e)	Fig. 1.1, Chapter 14
7. Locations of noise monitoring sites.	A150.101(e)	Fig. 1.1, Chapter 4
8. Projected aircraft operations for the current year and fifth calendar year.	150.21(a)	Fig. 1.1, Chapter 10/11
9. Consultations with public, users, and other agencies.	150.21(b/e)	Chapter 15
10. Certified as true and complete.	150.21(e)	page ii

Figure 1.1
Noise Exposure Map Summary

To Be Included At A Later Date

d. Airport boundaries.

The airport boundaries are clearly delineated; off-airport property is shaded, airport property is not. This technique was used to minimize the number of lines in the graphically congested area immediately around the airport. Figure 5.2 presents an enlargement of the airport property with the property lines clearly marked.

e. Flight tracks.

Flight tracks are depicted. Figures 7.1 thru 7.3 of Chapter 7 present the flight track definitions in greater detail.

2. Continuous noise for Ldn 65, 70, and 75.

Figure 1.1 depicts the 55, 60, and 65 dB Ldn noise exposure contours for the current year and fifth calendar year, based on reasonable assumptions. These are also presented in Figures 12.1 and 13.1.

a. Total area in acres within each contour.

The table inset into the upper right corner of Figure 1.1 summarizes this information. The information is also presented in Table 14.2 and 14.3.

b. Estimates of numbers of people residing within each contour.

The table inset into the upper right corner of Figure 1.1 summarizes this information. The information is presented in Section 14.1.

3. Depiction and identification of each public and/or planning agency having jurisdiction within the Ldn 65 contour.

Montgomery County has jurisdiction over all land area within the 55 dB Ldn contour.

The corporate boundaries of local municipalities are depicted on Figure 1.1. More information is included in Chapter 14.

4. Brief analysis of the types of land use controls available to the identified agencies.

Montgomery County has land use planning and control authority within their boundaries through zoning, subdivision controls, building codes, and capital improvement programs. Chapter 14 presents additional information on this topic.

5. Incompatible land uses identified within the Ldn contours using Table 1 of Part 150 and based on self-generated noise (ambient).

There are no incompatible land uses within the GAI environs, using the Part 150 Table 1 definitions or any other accepted noise/land use compatibility standards or guidelines. Chapter 14 discusses this issue in detail.

6. Location of noise sensitive public buildings (schools, hospitals, etc.).

Figure 1.1 indicates residential areas and the locations of sensitive receptors in the GAI environs. More information is included in Chapter 14.

7. Locations of noise monitoring sites.

Figure 1.1 depicts the 13 locations at which measurements were conducted during the preparation of the NEM. See also Chapter 4.

8. Projected aircraft operations for the current year (1991) and fifth calendar year (1996).

The table inset at the upper left corner of Figure 1.1 summarizes this information. See also Chapter 10 and 11 for a discussion of the basis for estimating current and fifth calendar year operations, particularly the Section 10.4 discussion of the relationship between the base case analysis period (1989/1990) and the existing 1991 case.

9. Consultations with public, users, and other agencies.

An extensive public involvement program was undertaken in the development of the GAI NEM, which included consultations with each of these groups. This consultation process is described in detail in Chapter 15.

10. Certified as true and complete.

The required certification is provided on page ii of this document.

2. INTRODUCTION TO NOISE METRICS

FAR Part 150 is based largely on a description of airport noise exposure using Day-Night Average Sound Level (Ldn) noise contours. This study also involves the use of several other noise metrics, where Ldn does not provide the proper basis for quantifying a specific situation.

To assist reviewers in interpreting these complex noise metrics used in evaluating airport noise, we present below an introduction to relevant fundamentals of acoustics and noise terminology (2.1), a discussion on the effects of airport noise on people (2.2), and an overview of currently accepted noise and related land use compatibility guidelines (2.3).

2.1 Introduction to Acoustics and Noise Terminology

Five acoustical descriptors of noise are introduced here in increasing degree of complexity:

- Decibel, dB;
- A-weighted decibel, dBA;
- Sound Exposure Level, SEL;
- Equivalent Sound Level, Leq; and
- Day-Night Sound Level, Ldn.

These noise metrics form the basis for the majority of noise analysis conducted at most airports throughout the U.S.

2.1.1 Decibel, dBA

All sounds come from a sound source -- a musical instrument, a voice speaking, an airplane passing overhead. It takes energy to produce sound. The sound energy produced by any sound source is transmitted through the air in sound waves -- tiny, quick oscillations of pressure just above and just below atmospheric pressure. These oscillations, or sound pressures, impinge on the ear, creating the sound we hear.

Our ears are sensitive to a wide range of sound pressures. The loudest sounds that we hear without pain have about one million times more energy than the quietest sounds we hear. But our ears are incapable of detecting small differences in these pressures. Thus, to better match how we hear this sound energy, we compress the total range of sound pressures to a more meaningful range by introducing the concept of sound pressure level.

Sound pressure level is a measure of the sound pressure of a given noise source relative to a standard reference pressure: either 0.0002 microbars, 0.00002 Newtons/square meter, or 20 micropascals -- all ways to express the same basic quantity. This reference pressure is typical of the quietest sound that a young person with good hearing is able to detect.

Sound pressure levels are measured in decibels (or dB). Decibels are logarithmic quantities reflecting the ratio of the two pressures, the numerator being the pressure of the sound source of interest, and the denominator being the reference pressure (the quietest sound we can hear).

The logarithmic conversion of sound pressure to sound pressure *level* (SPL) means that the quietest sound we can hear (the reference pressure) has a sound pressure level of about 0 dB, while the loudest sounds we hear without pain have sound pressure levels of about 120 dB. Most sounds in our day-to-day environment have sound pressure levels on the order of 30 to 100 dB.

Because decibels are logarithmic quantities, they do not always behave like regular numbers with which we are more familiar. For example, if two sound sources each produce 100 dB operating individually and they are then operated together, they produce only 103 dB -- not the 200 decibels we might expect. Four equal sources operating simultaneously produce another 3 dB of noise, resulting in a total sound pressure level of 106 dB. In fact, for every doubling of the number of equal sources, the sound pressure level goes up another 3 dB. A tenfold increase in the number of sources makes the sound pressure level go up 10 dB. A hundredfold increase makes the level go up 20 dB, and it takes a thousand equal sources to increase the level 30 dB!

It is also true that if one source is much louder than another, the two sources operating together will produce the same sound pressure level (and sound to our ears) as if the louder source were operating alone. For example, a 100 dB source plus an 80 dB source produce 100 dB of noise when operating together. The louder source "masks" the quieter one. But if the quieter source gets louder, it will have an increasing effect on the total sound pressure level such that, when the two sources are equal, as described above, they produce a level 3 dB above the sound of either one by itself.

A simple procedure for adding decibels from different sources is shown in Table 2.1. When using it for more than two sources, always start by adding the lowest two sources together first, then the higher sources in increasing order.

From these basic concepts, note that one hundred 80-decibel sources will produce a combined level of 100 dB; if a single 100-dB source is then added to the group, they will produce a total sound pressure level of 103 dB. Clearly, the loudest source has the greatest effect on total noise. Conveniently, people also hear in a logarithmic fashion. Two useful rules of thumb to remember when comparing sound pressure levels are: (1) most of us perceive a 6 to 10 dB increase in the sound pressure level to be about a doubling of loudness, and (2) changes in sound pressure level of less than about 3 dB are not readily detectable outside of a laboratory environment.

Table 2.1
Decibel Addition

When two decibel values differ by:	Add the following amount to the higher value:
0 or 1 dB	3 dB
2 or 3 dB	2 dB
4 to 8 dB	1 dB
9 dB or more	0 dB

2.1.2 A-Weighted Decibel, dBA

Another important characteristic of sound is its frequency, or "pitch". This is the rate of repetition of the sound pressure oscillations as they reach our ear. Formerly expressed in cycles per second, frequency is now expressed in units known as Hertz (Hz).

When analyzing the total noise of any source, acousticians often break the noise into frequency components (or bands) to determine how much is low-frequency noise, how much is middle-frequency noise, and how much is high-frequency noise. This breakdown is important for two reasons:

(1) People react differently to low-, mid-, and high-frequency noise levels. This is because our ear is better equipped to hear mid and high frequencies but is quite insensitive to lower frequencies. Thus, we find mid- and high-frequency noise to be more annoying. High frequency noise is also more capable of producing hearing loss.

(2) Engineering solutions to a noise problem are different for different frequency ranges. Low-frequency noise is generally harder to control.

The normal frequency range of hearing for most people extends from a low frequency of about 20 Hz to a high frequency of about 10,000 to 15,000 Hz. People respond to sound most readily when the predominant frequency is in the range of normal conversation, typically around 1,000 to 2,000 Hz. Psycho-acousticians have developed several filters which match this sensitivity of our ear and thus, help us to judge the relative loudness of various sounds made up of many different frequencies. The so-called "A" filter does this best for most environmental noise sources. Sound pressure levels measured through this filter are referred to as A-weighted levels (measured in A-weighted decibels, or dBA).

The A-weighted filter significantly de-emphasizes those parts of the total noise that occur at lower and lower frequencies (those below about 500 Hz)

and also at very high frequencies above 10,000 Hz where we do not hear as well. The filter has very little effect, or is nearly "flat", in the middle range of frequencies between 500 and 10,000 Hz where we hear just fine. Because this filter generally matches our ears' sensitivity, sounds having higher A-weighted sound levels are judged to be louder than those with lower A-weighted sound levels, a relationship which otherwise might not be true. It is for this reason that A-weighted sound levels are normally used to evaluate environmental noise sources.

Because of the correlation with our hearing, the A-weighted level has been adopted as the basic measure of environmental noise by the U.S. Environmental Protection Agency (EPA) and by nearly every other agency concerned with community noise throughout the United States.

Figure 2.1 presents typical A-weighted sound levels of several common environmental sources.

An additional dimension to environmental noise is that A-weighted levels vary with time. For example, the sound increases as an aircraft approaches, then falls and blends into the background as the aircraft recedes into the distance (though even the background varies as birds chirp or the wind blows or a vehicle passes by). This is illustrated in Figure 2.2.

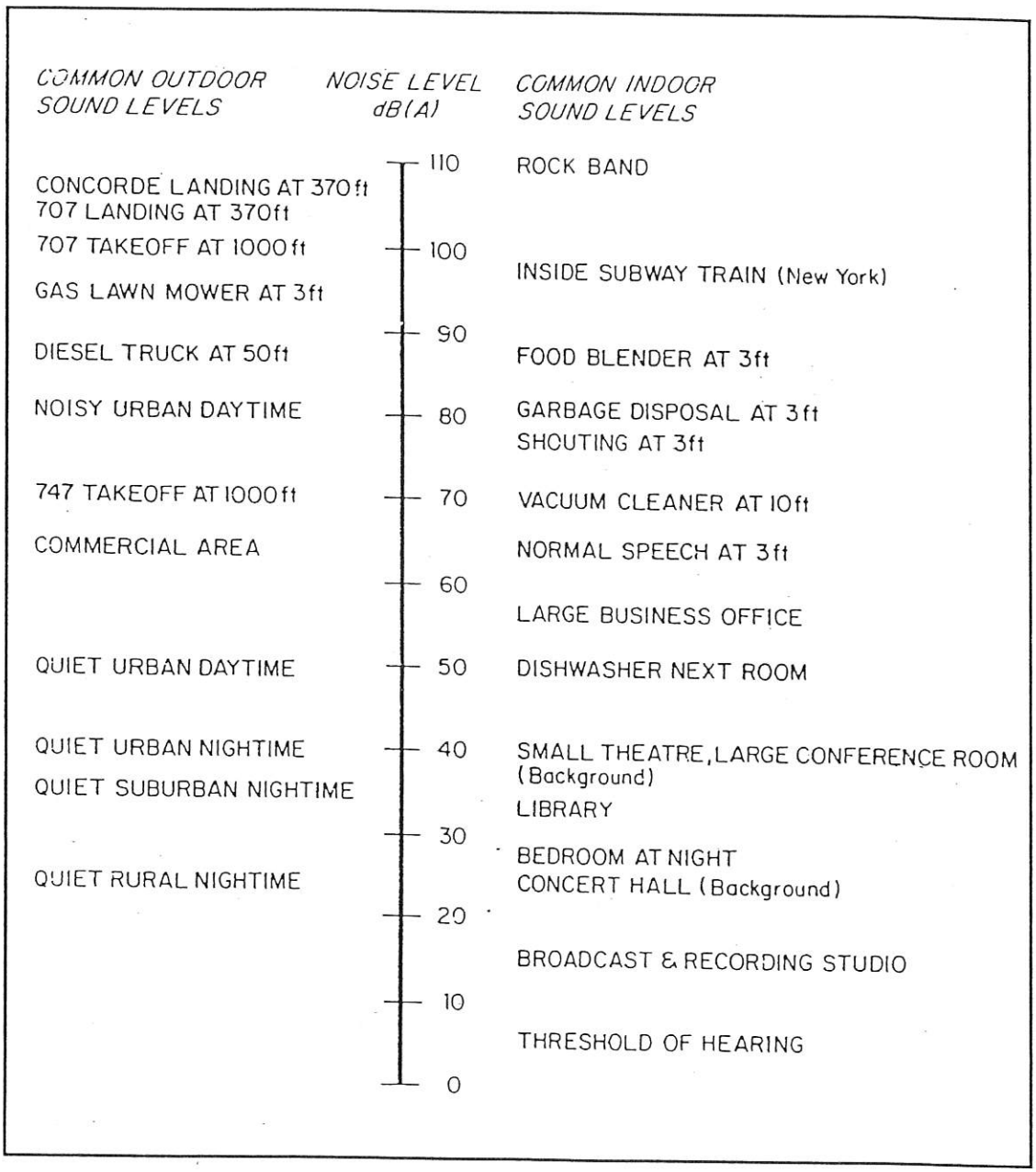
Because of this variation, it is often convenient to describe a particular noise "event" by its maximum sound level, abbreviated as Lmax. In Figure 2.2, it is approximately 85 dBA. However, the maximum level describes only one dimension of an event; it provides no information on the cumulative noise exposure generated by a sound source. In fact, two events with identical maximums may produce very different total exposures. One may be of very short duration, while the other may continue for an extended period and be judged much more annoying. The next section introduces a measure that accounts for this concept of a noise "dose".

2.1.3 Sound Exposure Level, SEL

The measure of cumulative noise exposure for a single aircraft flyover is the Sound Exposure Level, or SEL. It may be thought of as an accumulation of the sound energy over the duration of an event, where duration is defined as the time when the A-weighted sound level first exceeds a threshold level (normally just above the background or ambient noise) to the time that the sound level drops back down below the threshold.

The lightly shaded area in Figure 2.3 illustrates that portion of the sound energy included in this dose. But to account for the variety of durations that occur among different noise events, the dose is normalized (standardized) to a one-second duration. This "revised" dose is the SEL; it is shown as the darkly shaded area in Figure 2.3. It has exactly the same sound energy as the longer event though it is presumed to last for a much shorter period.

Figure 2.1
Common Environmental Sound Levels, in dBA[2]



[2] Harris, A.S., and Miller, R.L., Airport Noise Seminars, documentation prepared for the Airports Division, Southern Region, Federal Aviation Administration, November 1977.

Figure 2.2
Variation in the A-Weighted Sound Level over Time

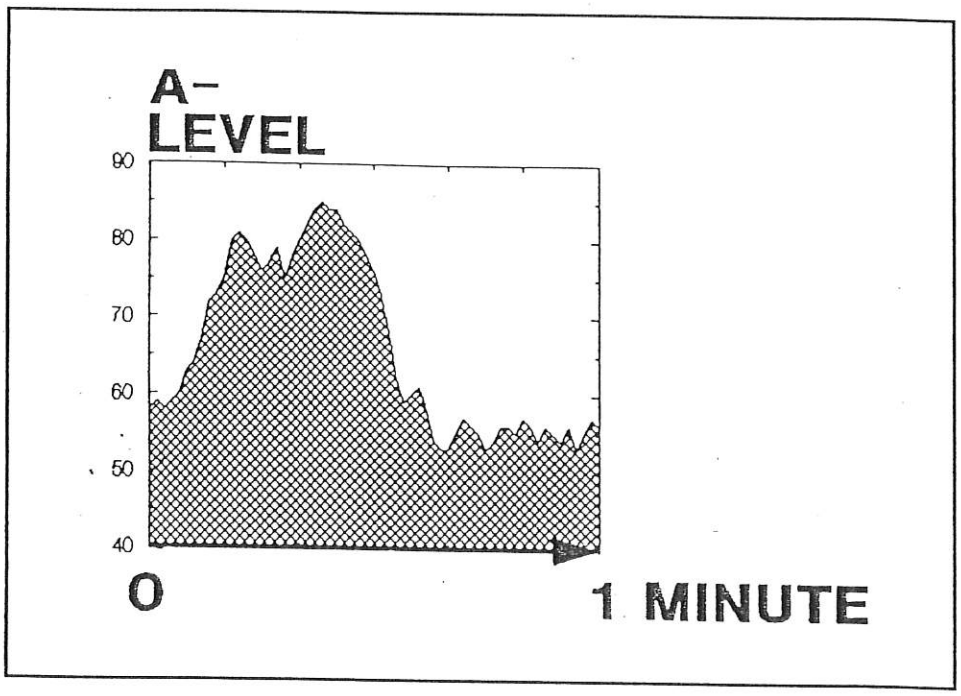
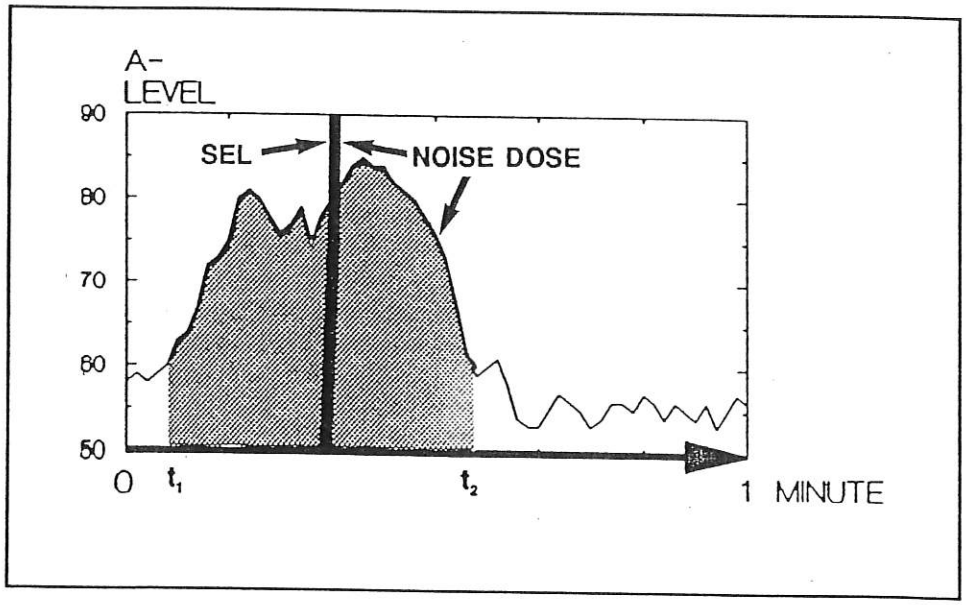


Figure 2.3
Sound Exposure Level



Note that because the SEL is normalized to one second, it will almost always be larger in magnitude than the maximum A-weighted level for the event. In fact, for most aircraft overflights, the SEL is on the order of 7 to 12 dB higher than the Lmax. Also, the fact that it is a cumulative measure means that not only do louder flyovers have higher SELs than do quieter ones, but also flyovers that stretch out longer in time have greater SELs than do shorter ones.

With this metric, we now have a basis for comparing noise events that generally matches our impression of the sound -- the higher the SEL, the more annoying it is likely to be. Second, SEL provides a comprehensive way to describe a noise event for use in modeling noise exposure.

2.1.4 Equivalent Sound Level, Leq

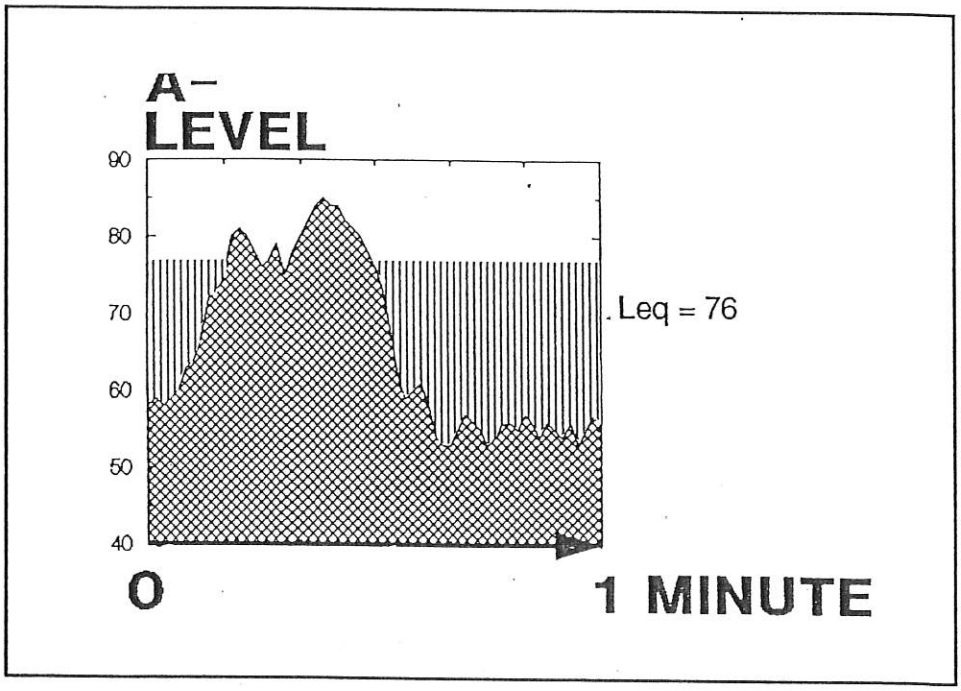
We tend to think of maximum A-weighted levels and SELs as measures of the noise associated with individual events. The remaining two metrics in this introduction describe longer-term cumulative noise exposure that often include many events.

The first, the Equivalent Sound Level, abbreviated Leq, is a measure of the exposure resulting from the accumulation of A-weighted sound levels over a particular period of interest -- for example, an hour, an eight hour school day, nighttime, or a full 24-hour day. However, because the length of the period can be different depending on the time frame of interest, the applicable period should always be identified or clearly understood when discussing the metric. Such durations are often represented as, for example Leq(24).

Conceptually, Leq may be thought of as a constant sound level over the period of interest that contains as much sound energy as the actual time-varying sound level with its normal peaks and valleys. This is illustrated and presented in Figure 2.4. It is important to recognize, however, that the two signals (the constant one and the time-varying one) would sound very different from each other if compared in real life. Also, be aware that the "average" sound level suggested by Leq is not an arithmetic value, but a logarithmic, or "energy-averaged" sound level. Comparable to the addition of decibels, this means that higher A-weighted sound levels receive greater emphasis than lower values. For example, if the sound level is 50 dBA for 30 minutes, followed by 100 dBA for the next 30 minutes, then the Leq for the entire hour is 97 dBA -- not the 75 dBA that we might expect. Thus, loud events clearly dominate any noise environment described by the metric.

As for its application to airport noise issues, Leq is often presented for consecutive one-hour periods to illustrate how the hourly noise dose rises and falls throughout a 24-hour period as well as how certain hours are significantly affected by a few loud aircraft.

Figure 2.4
Example of a 1-Minute Equivalent Sound Level



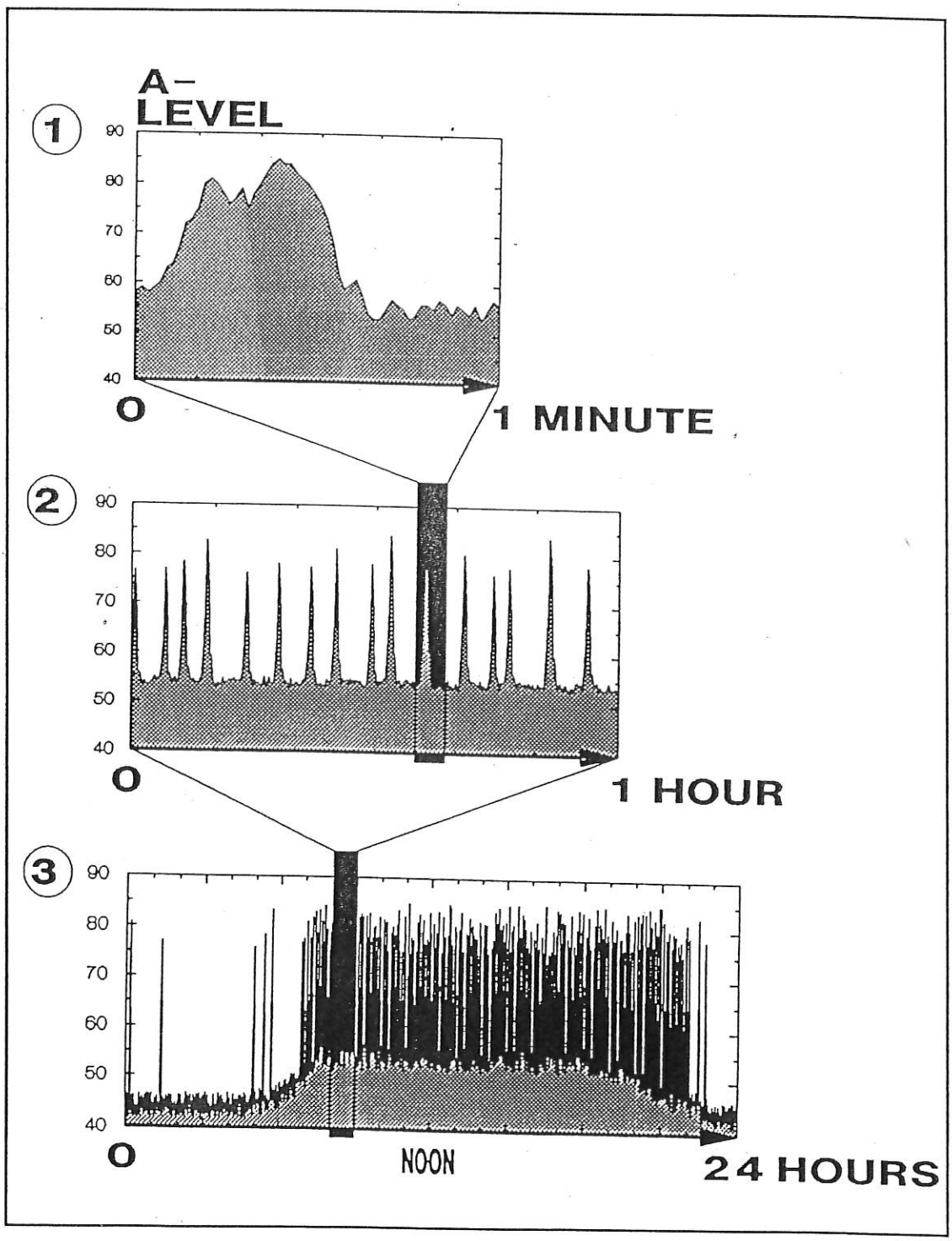
2.1.5 Day-Night Sound Level, Ldn

In the previous sections, we have been addressing noise measures that account for the moment-to-moment or short term fluctuations in A-weighted levels as sound sources come and go affecting our overall noise environment. Now, the Day-Night Sound Level (or Ldn) represents a concept of noise dose as it occurs over a 24-hour period.

Earlier, we illustrated the A-weighted sound level due to an aircraft fly-over as it changed over time. The example is repeated in the top frame of Figure 2.5 on the following page. The level increases as the aircraft approaches, reaching a maximum of 85 dBA, and then decreases as the aircraft passes by. The ambient A-weighted level around 55 dBA is due to the background sounds that dominate after the aircraft passes. The shaded area reflects the noise dose that a listener receives during the one minute period of the sample.

The center frame of Figure 2.5 includes this one-minute interval within a full hour. Now the shaded area represents the noise dose during that hour when sixteen aircraft pass nearby, each producing a single event dose represented by an SEL. Similarly, the bottom frame includes the one-hour

Figure 2.5
A-Weighted Level Fluctuations and Noise Dose



interval within a full 24 hours. Here the shaded area represents the listener's noise dose over a complete day. Note that several overflights occur at night, when the background noise drops some 10 decibels, to approximately 45 dBA.

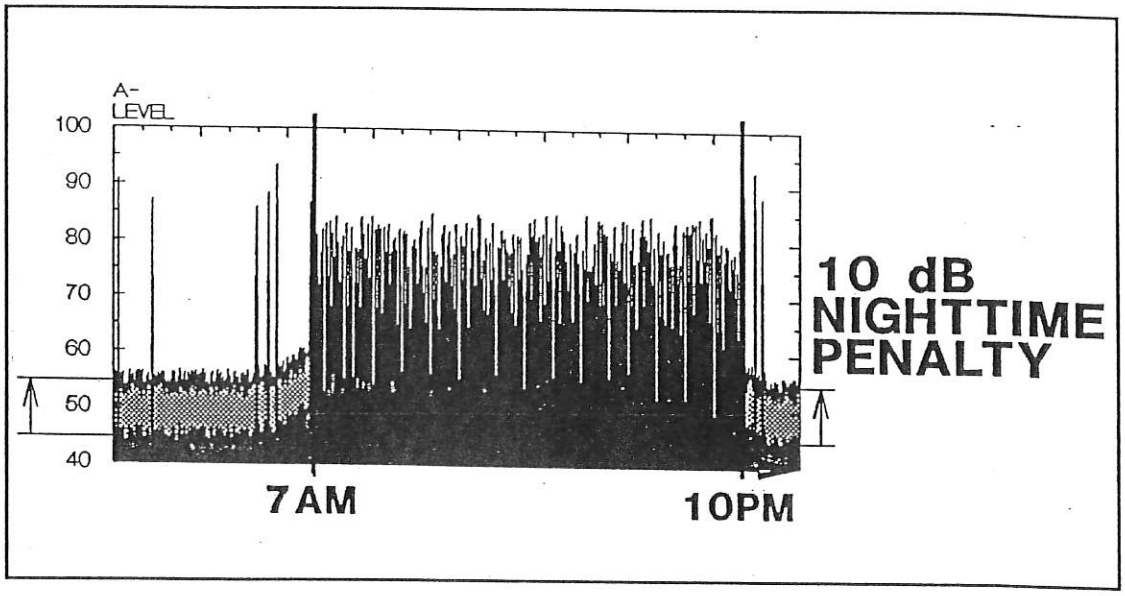
An analogy is helpful here to relate the dose in this bottom frame to the Day-Night Sound Level. The 24-hour noise dose, shaded in the figure, is analogous to 24 hours of rain falling on a garden. The "rain dose" is the total accumulation of rain over 24 hours, just as the noise dose is the total accumulation of noise. Note that every shower increases that 24 hours' rain dose. Also, strong showers increase the dose more than do light ones, and longer showers increase the dose more than do shorter ones. The same is true for noise: (1) every aircraft increases that 24 hours' noise dose; (2) loud aircraft increase the dose more than do quieter ones; and (3) aircraft flyovers that stretch out longer in time increase the dose more than do shorter ones.

One important exception to this analogy is that the Day-Night Sound Level treats nighttime noise differently from daytime noise. In determining Ldn, it is assumed that the A-weighted levels occurring at night (defined very specifically as 10:00 p.m. to 7:00 a.m. the next morning) are 10 decibels louder than they really are. This 10-dB penalty is applied to account for our greater sensitivity to nighttime noise, plus the fact that events at night are often more intrusive because nighttime ambient noise is less. The 10-dB penalty is illustrated in Figure 2.6, and its effect on the noise dose defined by Ldn is always included.

Values of Ldn are normally measured with standard monitoring equipment or are predicted with computer models. Measurements are practical only for obtaining Ldn values for relatively limited numbers of points, and, in the absence of a permanently installed monitoring system, only for relatively short time periods. Thus, most airport noise studies utilize computer-generated estimates of Ldn, determined by accounting for all of the SELs from individual events which comprise the total noise dose at a given location on the ground. This principle is used in all airport noise modelling.

Computed values of Ldn are often depicted as noise contours reflecting lines of equal exposure around an airport (much as topographic maps indicate contours of equal elevation). The contours usually reflect long-term (annual average) operating conditions, taking into account the average flights per day, how often each runway is used throughout the year, and where over the surrounding communities the aircraft normally fly. Alternative time frames representing a single day or a typical seasonal day may also be helpful in understanding shorter term aspects of a noise environment.

Figure 2.6
10 dB Nighttime Penalty



Representative values of Ldn in our environment range from a low of 40 to 45 decibels in extremely quiet, isolated locations, to highs of 80 or 85 decibels immediately adjacent to a busy truck route or off the end of a runway at an active Air Force base. More typical values would be in the range of 50 or 55 decibels for a quiet residential community to 60 or 65 decibels in an urban residential neighborhood. Figure 2.7 gives some examples of Ldn values measured in different areas across the U.S.

Why is Ldn used to describe noise around airports? The U.S. Environmental Protection Agency identified the measure as the most appropriate means of evaluating airport noise based on the following considerations:

(1) The measure should be applicable to the evaluation of pervasive long-term noise in various defined areas and under various conditions over long periods of time.

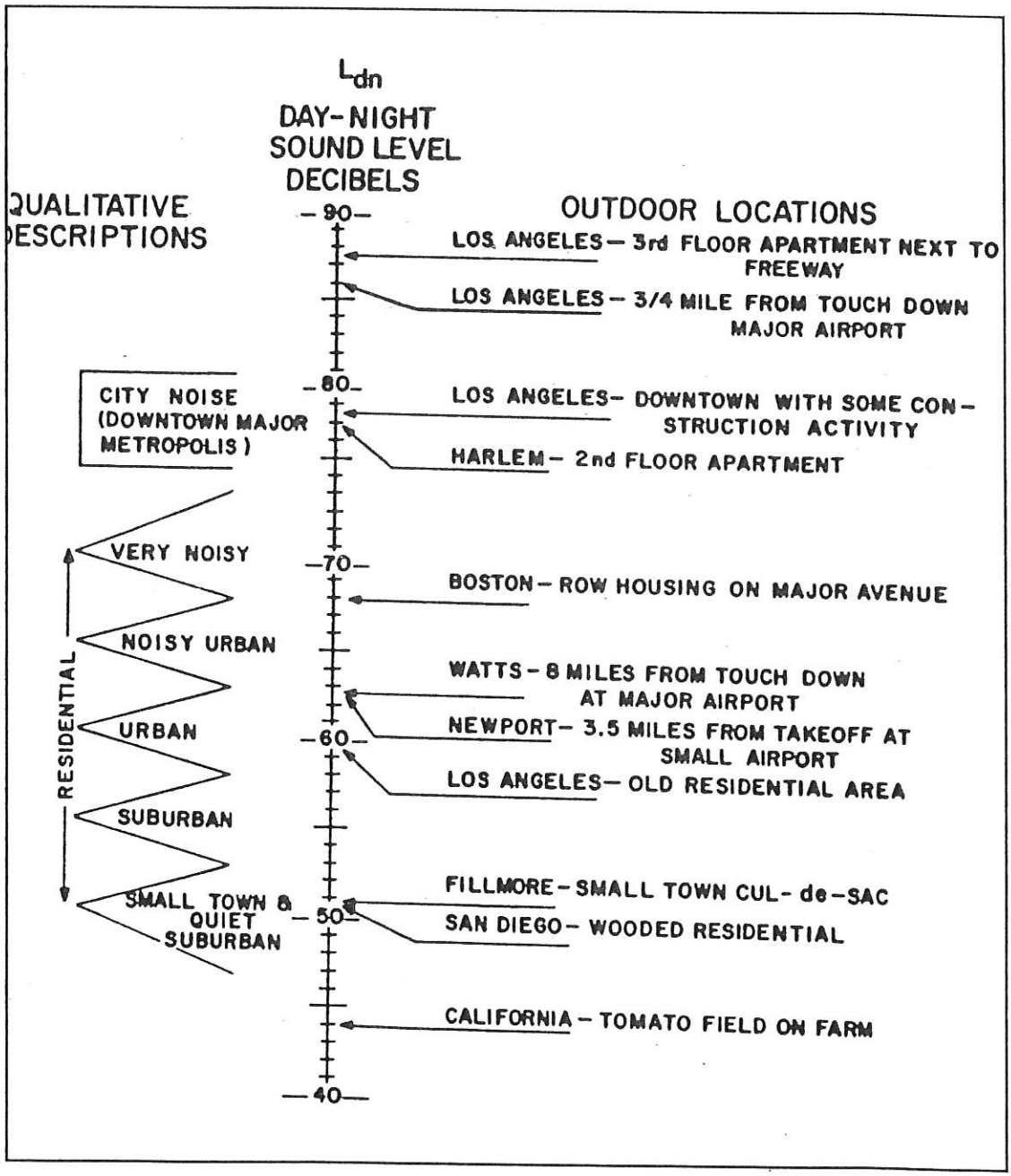
(2) The measure should correlate well with known effects of the noise environment and on individuals.

(3) The measure should be simple, practical and accurate. In principal, it should be useful for planning as well as for enforcement or monitoring purposes.

(4) The required measurement equipment, with standard characteristics, should be commercially available.

(5) The measure should be closely related to existing methods currently in use.

Figure 2.7
Representative Examples of Measured Day-Night Sound Levels (Ldn)



(6) The single measure of noise at a given location should be predictable, within an acceptable tolerance, from knowledge of the physical events producing the noise.

(7) The measure should lend itself to small, simple monitors which can be left unattended in public areas for long periods of time[3].

Now, most other public agencies dealing with noise exposure, including the Federal Aviation Administration (FAA), the Department of Defense, and the Department of Housing and Urban Development (HUD), also have adopted Ldn in their guidelines and regulations..

2.2 The Effects of Airport Noise on People

To residents around commercial and even general aviation airports, aircraft noise can be an annoyance and a nuisance. It can interfere with conversation and listening to television, it can disrupt classroom activities in schools, and it can disrupt sleep. Relating these effects to specific noise metrics helps in the understanding of how and why people react to their environment. This section addresses the various ways we are affected by airport noise.

2.2.1 Speech Interference

One of the primary effects of aircraft noise is its tendency to drown out or "mask" speech, making it difficult or impossible to carry on a normal conversation without interruption. Outdoors, the sound level of speech decreases as distance between a talker and listener increases. As the level of speech decreases in the presence of background noise, it becomes harder and harder to hear. Figure 2.8 presents typical distances between talker and listener for satisfactory outdoor conversations in the presence of different steady A-weighted background noise levels for three degrees of vocal effort: raised, normal, and relaxed. As the background level increases, the talker must raise his/her voice, or the individuals must get closer together to continue their conversation.

As indicated in the figure, "satisfactory conversation" does not always require hearing every word; 95% intelligibility is acceptable for many conversations. This is because a few unheard words can be inferred when they occur in a familiar context. However, in relaxed conversation, we have higher expectations of hearing speech and require complete 100% intelligibility. Any combination of talker-listener distances and background noise that falls below the bottom line in Figure 2.8 (thus

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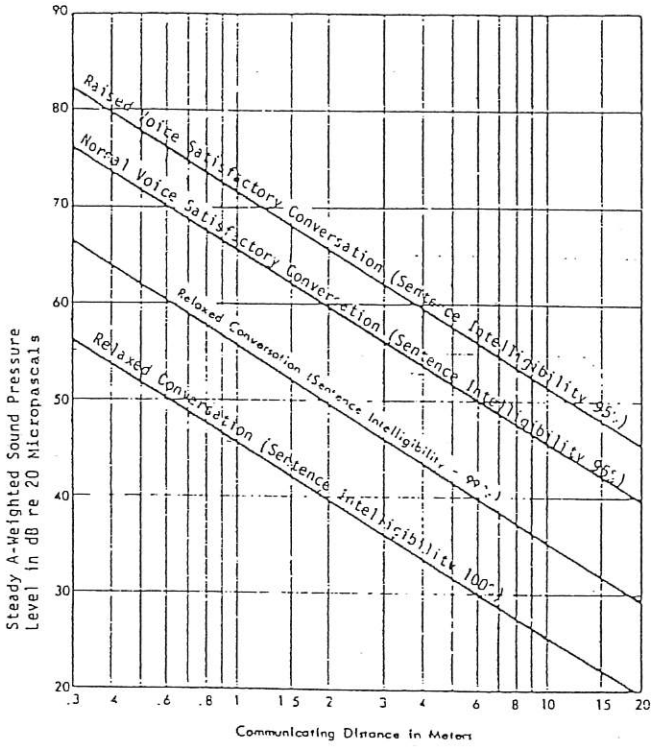
[3] "Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety", EPA Report No. 550/9-74-004, March 1974.

Figure 2.8
Outdoor Speech Intelligibility



assuring 100% intelligibility) represents an ideal environment for outdoor speech communication and is considered necessary for acceptable indoor conversation as well.

One implication of the relationships in Figure 2.8 is that for typical communication distances of 3 or 4 feet (1 to 1.5 meters), acceptable outdoor conversations can be carried on in a normal voice as long as the background noise outdoors is less than about 65 dBA. Indoors, the interior background level must be less than about 45 dBA. If the noise were to exceed either of these levels, as might occur when an aircraft passes overhead, intelligibility would be lost unless vocal effort were increased or communication distance were decreased.

A second implication of these relationships is that an acceptable background level of 60 to 65 dBA *outdoors* does not guarantee an acceptable background level *indoors*. This is because, with windows open, most housing construction typically provides about 15 decibels of sound

attenuation (reduction) from outside to inside the building. Thus, only if the outdoor sound level is 60 dBA or less is there a reasonable chance that the resulting indoor sound level will afford acceptable conversation inside.

It follows, then, that the amount of time per day that aircraft noise exceeds either 60 or 65 dBA outdoors is indicative of the time during which speech interference can be expected. The U.S. EPA has used these same relationships to identify an outdoor criterion of Ldn 60 as requisite to protect against speech interference indoors, and a criterion level 5 decibels less than that to provide for an additional "margin of safety"[4].

2.2.2 Sleep Interference

Much of the past research on sleep disruption from noise has led to widely varying observations. In part, this is because (1) sleep can be disturbed without causing awakening, (2) the deeper the sleep the more noise it takes to cause arousal, (3) the tendency to awaken increases with age, and other factors. However, under Congressional mandate, the FAA has reviewed literature on sleep disruption in a study of soundproofing hospitals where sleep is an important factor in patient care. That study[5] identified a level of 40 dBA as a conservative threshold of sleep disturbance. Separately, the EPA identified 35 dBA as a threshold of sleep disruption in the presence of steady noise, with maximum levels of 40 dBA resulting in a 5% probability of awakening[6]. Figure 2.9 shows a summary of laboratory findings on the topic.

Assuming an interior threshold level of 40 dBA requisite to maintain sleep and 15 decibels of outside-to-inside noise reduction, this means that levels exceeding about 55 dBA outdoors have the potential to cause arousal[7].

2.2.3 Community Annoyance

It has long been clear from social survey data that individual reactions to noise vary widely for a given noise level. Nevertheless, as a group, people's aggregate response to factors such as speech and sleep interference and desire for an acceptable environment is predictable and relates well to measures of cumulative noise exposure such as Ldn. Figure 2.10 shows the most widely recognized relationship between noise and the

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[4] Op. Cit., EPA Report No. 550/9-74-004, March 1974.

[5] Wyle Labs, "Study of Soundproofing Public Buildings Near Airports", FAA Report No. DOT-FAA-AEQ-77-9, April 1977.

[6] Op. Cit., EPA Report No. 550/9-74-004, March 1974.

[7] Newman S.J., and Beattie, K.R., "Aviation Noise Effects", FAA Report No. FAA-EE-85-2, March 1985.

Figure 2.9
Sleep Interference

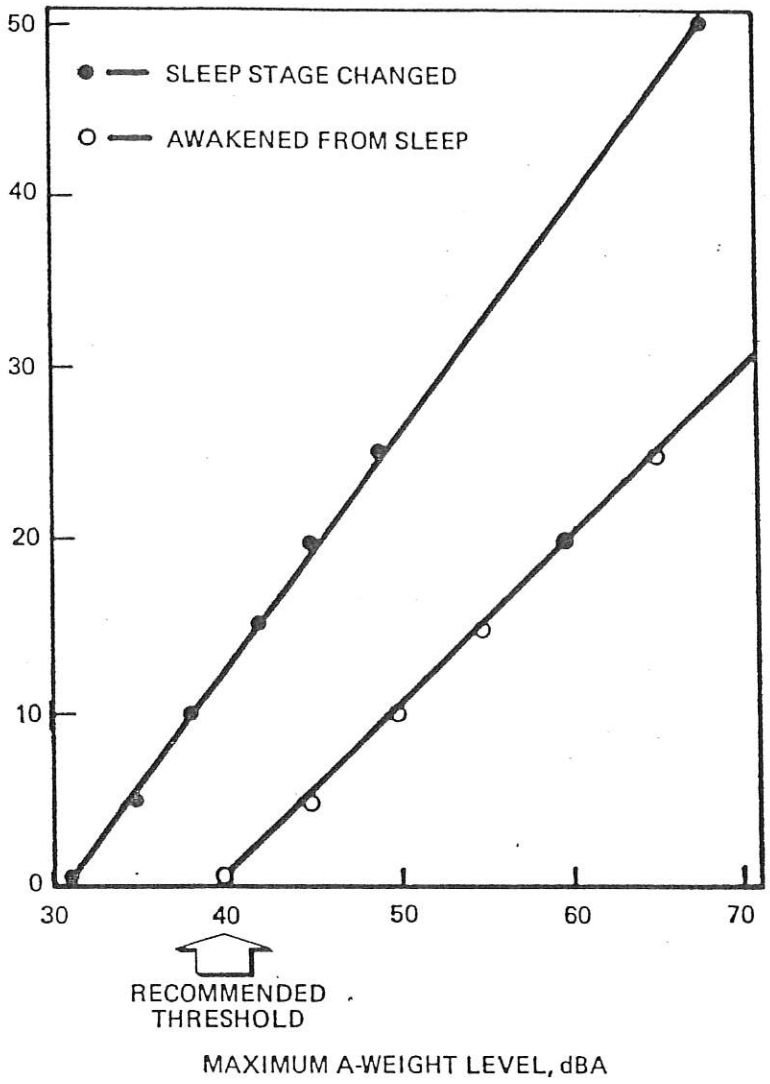
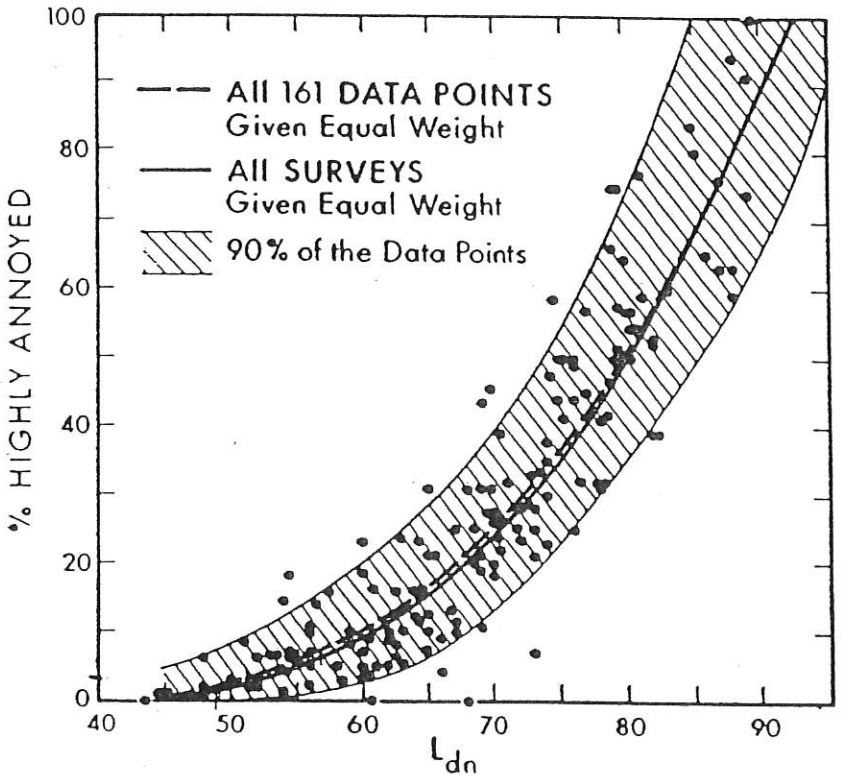


Figure 2.10
Percentage of People Highly Annoyed



percentage of people highly annoyed by it regardless of the noise source.

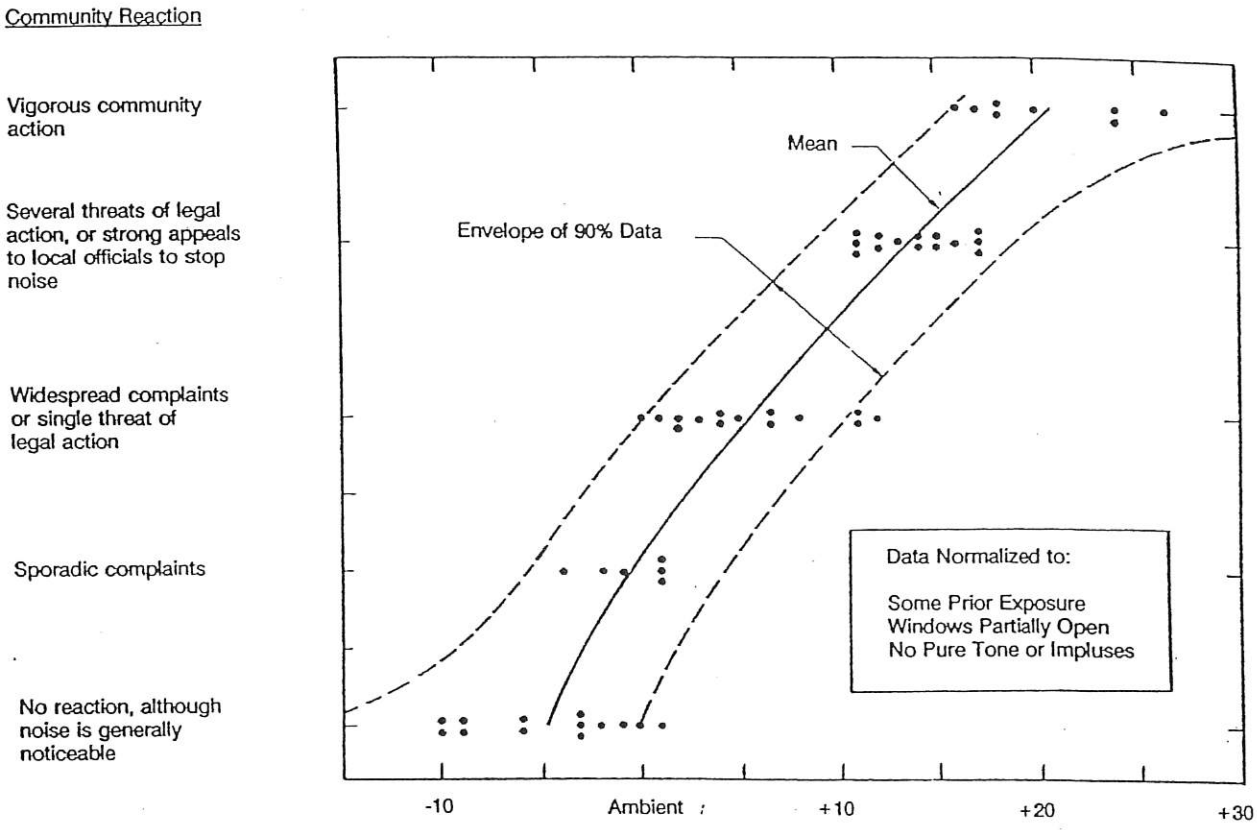
Based on data from 18 surveys conducted worldwide, the curve indicates that at levels as low as Ldn 55, approximately 5 percent of the people will still be highly annoyed, with the percentage increasing more rapidly as exposure increases above Ldn 65[8].

Separate work by the EPA has shown that overall community reaction to a noise environment is also dependent on Ldn. This relationship is shown in Figure 2.11. Levels have been normalized to the same set of exposure conditions to permit valid comparisons between ambient noise environments.

From the previous figure, little reaction would be expected for intrusive noise levels 5 decibels *below* the ambient, while widespread complaints can

[8] Schultz, T.J., "Synthesis of Social Surveys on Noise Annoyance", Journal of the Acoustical Society of America, Vol. 64, No. 2, August 1978.

Figure 2.11
Community Reaction as a Function of Outdoor Ldn



be expected as intruding noise *exceeds* background levels by about 5 dB. Vigorous action is likely when the background is exceeded by 20 dB.

2.3 Noise and Land Use Compatibility Guidelines

Based on these relationships between noise and the collective response of people to their environment, Ldn has become accepted as a standard for evaluating community noise exposure and as an aid in decision-making regarding the compatibility of alternative land uses.

In their application to airport noise in particular, Ldn projections have two principal functions:

(1) To provide a means for comparing existing noise conditions with those that might result from the

implementation of noise abatement procedures and/or from forecast changes in airport activity; and

(2) To provide a quantitative basis for identifying and judging potential noise impacts.

Both of these functions require the application of objective criteria. Government agencies dealing with environmental noise have devoted significant attention to this issue, and thus have developed noise/land use compatibility guidelines to help Federal, state, and local officials with this evaluation process.

- **FAA Regulations and Guidelines**

In FAR Part 150, which defines procedures for developing airport noise compatibility programs, the FAA has established Ldn as the official cumulative noise exposure metric for use in airport noise analyses, and has developed recommended guidelines for noise/land use compatibility evaluation. These guidelines are reproduced in Table 2.2.

They represent a compilation of extensive scientific research into noise-related activity interference and attitudinal response. However, reviewers of Ldn contours should recognize the highly subjective nature of response to noise and the special circumstances that can either increase or decrease individuals' tolerance. For example, a high non-aircraft background or ambient noise level (such as from traffic) can reduce the significance of aircraft noise. Alternatively, residents of areas with unusually low background levels may find relatively low levels of aircraft noise very annoying. Response may also be affected by expectation and experience. People often get used to a level of noise exposure that guidelines suggest may be unacceptable, and similarly, *changes* in exposure may generate response that is far greater than that which the guidelines might suggest.

Finally, the cumulative nature of Ldn means that the same level of noise exposure can be achieved in an essentially infinite number of ways. For example, a reduction in a small number of relatively noisy operations may be counterbalanced by a much greater increase in relatively quiet flights, with no net change in Ldn. Residents of the area may become highly aroused by the increased frequency of operations, despite the apparent status quo of the noise.

With these cautions in mind, the FAA's guidelines for compatible land use can be combined with Ldn contours indicating points of equal exposure to

Table 2.2
FAA Noise / Land Use Compatibility Guidelines

Yearly day-night average sound level, Ldn, in decibels

	Below 65	65-70	70-75	75-80	80-85	Over 85
Residential Use						
Residential other than mobile homes and transient lodgings	Y	N	N	N	N	N
Mobile home park	Y	N	N	N	N	N
Transient lodgings	Y	N	N	N	N	N
Public Use						
Schools	Y	N	N	N	N	N
Hospitals and nursing homes	Y	25	30	N	N	N
Churches, auditoriums, and concert halls	Y	25	30	N	N	N
Governmental services	Y	Y	25	30	N	N
Transportation	Y	Y	Y	Y	Y	Y
Parking	Y	Y	Y	Y	Y	N
Commercial Use						
Offices, business and professional	Y	Y	25	30	N	N
Wholesale and retail--building materials, hardware and farm equipment	Y	Y	Y	Y	Y	N
Retail trade--general	Y	Y	25	30	N	N
Utilities	Y	Y	Y	Y	Y	N
Communication	Y	Y	25	30	N	N
Manufacturing and Production						
Manufacturing general	Y	Y	Y	Y	Y	N
Photographic and optical	Y	Y	25	30	N	N
Agriculture (except livestock) and forestry	Y	Y	Y	Y	Y	Y
Livestock farming and breeding	Y	Y	Y	N	N	N
Mining and fishing, resource production and extraction	Y	Y	Y	Y	Y	Y
Recreational						
Outdoor sports arenas and spectator sports	Y	Y	Y	N	N	N
Outdoor music shells, amphitheaters	Y	N	N	N	N	N
Nature exhibits and zoos	Y	Y	N	N	N	N
Amusements, parks, resorts and camps	Y	Y	Y	Y	Y	Y
Golf courses, riding stables and water recreation	Y	Y	25	30	N	N

Key to Table 2.2

Y(Yes)	= Land use and related structures compatible without restrictions
N(No)	= Land use and related structures are not compatible and should be prohibited
25, 30, or 35	= Land use and related structures generally compatible; measures to achieve outdoor-to-indoor Noise Level Reduction of 25, 30, or 35 dB must be incorporated into design and construction of structure.

(There are special provisions pertaining to many of the compatibility designations that are not included here. Please refer to FAR Part 150, (Appendix A), Table 1 for details).

Note: FAR Part 150 guidelines are presented in Appendix A.

identify the potential types and locations of land uses and the degree of their incompatibility. Measurement of the land areas involved can provide a quantitative measure of impact that allows a comparison of at least the gross effects of existing or forecast operations.

Note that by these guidelines, all land uses are considered compatible with aircraft noise at exposure levels below Ldn 65. This does not mean that people will not complain or otherwise be disturbed by aircraft noise at lower levels (as has been shown earlier), nor does it preclude individual communities or other jurisdictions from adopting lower standards to meet local needs.

- **Housing and Urban Development (HUD) Guidelines**

The U.S. Department of Housing and Urban Development (HUD) has promulgated regulations (set forth in Part 51 of the Code of Federal Regulations (24 CFR Part 51) that establish criteria for the eligibility of a site to qualify for Federal funds supporting construction. Like the FAA's, those criteria are defined in terms of Ldn and also utilize Ldn 65 as the threshold of acceptability. They are summarized in Table 2.3 below.

Table 2.3
HUD Site Acceptability Standards

Category	Ldn in dB	Special Requirements
Acceptable	Not exceeding 65 dB	None
Normally Acceptable	Above 65 dB but not exceeding 75 dB	5 to 10 dB additional attenuation required
Unacceptable	Above 75 dB	Approval with additional attenuation on a case-by-case basis

3. NOISE MODELING METHODOLOGY

The Federal Aviation Administrations (FAA) Office of Environment and Energy approves the use of two computer models for use in Part 150 studies. The two models include the U. S. Force NOISEMAP, Version 5.2 and the FAA's Integrated Noise Model (INM) Version 3.9. The NOISEMAP computer model was used in developing the Ldn contours for GAI. The model incorporates a comprehensive set of computer routines for calculating noise exposure contours around airports.

Use of the NOISEMAP computer model requires data in two principal categories: (1) aircraft noise and performance data, and (2) aircraft operational data.

3.1 Noise and Performance Data

The noise curves and performance profiles of the various aircraft types from the Version 3.9 data base data base were used to generate the Sound Exposure Levels (SELs) of individual aircraft operations. The noise data is used to identify how loud specific aircraft types are at different distances from the point of concern -- these distances range from 200 to 25,000 ft. Data are provided for typical thrust settings used on takeoff, landing, level flight and when conducting the different portions of patterns or touch-and-go training operations. The performance data used by the model define the length of the takeoff roll, the climb rate, and speeds for each flight segment.

The final computation of Ldn values produced by the operations at GAI was accomplished with NOISEMAP 5.2. This program computes Ldn values at individual grid points around the facility using the noise data and aircraft profiles from the Version 3.9 data base. Separate plotting software is used to generate the Ldn contours from the grid of the computed noise exposure levels.

3.2 Operations Data

NOISEMAP also requires the operational data as one of its input sources. Operational inputs describe activity at the airport during the period of interest. Required operational inputs include the following:

- description of the runways;
- number of aircraft operations;
- aircraft fleet mix;
- day-night split of operations;
- runway utilizations rates;
- typical flight track descriptions; and
- flight track utilization rates.

The process of collecting and refining these inputs is summarized in Chapters 5 through 11. Chapters 12 and 13 present the noise exposure contours.

4. NOISE MEASUREMENT PROGRAM

A noise measurement program in the GAI environs was a major element of the data collection phase of the study. This chapter provides an overview of the measurement program (Section 4.1) and its results (Section 4.2). Section 4.3 summarizes the history of aircraft noise complaints at GAI.

4.1 Overview of Measurement Program

This section describes the objectives of the program, its design and execution.

4.1.1 Objectives of the Noise Measurement Program

The noise measurement program had three main objectives:

(1) Acquire sufficient information on the noise of individual aircraft events to have confidence in the prediction of their noise levels under possible future operational alternatives.

(2) Document actual aircraft noise levels at typical noise-sensitive sites in the community and compare those with other individual noise sources which comprise the total noise environment at those locations.

(3) Observe aircraft operations to become acquainted with their flight tracks and use, and to identify specific problem areas.

When met, these objectives permit a quantitative evaluation of the effects of individual aircraft noise levels on factors such as speech interference and annoyance. They also help to provide credibility to estimates of the noise resulting from various noise abatement strategies.

In addition to the program objectives, the measurement program allowed for the collection of operations data and discussions with personnel familiar with the operation of GAI.

4.1.2 Noise Measurement Program Design and Site Selection

In order to achieve the measurement objectives, noise measurements were undertaken at thirteen sites. Two types of measurement sites were selected; long-term or primary sites where noise monitoring equipment was set up for the entire duration of the survey period, and short-term or secondary sites where noise monitoring equipment was set up only when personnel were at the sites. The sites were also selected to simultaneously satisfy as many of the following four basic criteria as possible:

(1) The sites were located near frequently used runways and under major flight corridors to maximize the number of operations measured.

(2) Sites were sought near typical residential neighborhoods, schools, and other identified noise-sensitive areas.

(3) Sites were selected to provide information on noise levels produced in each major type of flight activity, including elements of a typical touch-and-go pattern (takeoff, crosswind, downwind, base, and final) and for non-pattern activity such as takeoffs, landings, and overflight.

(4) Sites were selected to provide representative data on areas from which noise complaints are regularly received, and for which Advisory Committee members or other interested parties expressed concern.

An initial list of eleven recommended sites was presented to the Advisory Committee on 9 October 1990. Several site locations were altered and additional sites were added based on comments and suggestions offered by the Advisory Committee. On the basis of site surveys undertaken at the outset of the noise measurement program, the final locations of the sites were adjusted to fit the aforementioned criteria. Figure 4.1 depicts the final noise measurement locations. The three long-term (primary) locations are identified as Sites 1 through 3 on Figure 4.1. The short-term (secondary) locations are noted on Figure 4.1 as Sites 4 through 13.

4.1.3 Execution of Noise Measurements

The noise measurements were initially undertaken beginning on 10 October and ending on 15 October, 1990. Due to some unforeseen weather conditions during several days of the monitoring period, additional measurements were scheduled for period 26 October through 29 October 1990. The locations, dates, and times at which measurements were conducted at each site are listed in Table 4.1.

To maximize the effectiveness of the measurement field trip, several other types of data were collected simultaneously. Staff conducting the measurements observed and recorded information on aircraft flight paths, and used a photographic technique to record the "slant distance" from the microphone to the aircraft.

4.2 Noise Measurement Results

Three types of noise level information were collected:

(1) First, information on noise levels produced by single aircraft events were measured in the form utilized in the noise modeling process; i.e., the sound exposure level, SEL.

MONTGOMERY COUNTY AIRPARK

FAR PART 150 STUDY

MONTGOMERY COUNTY REVENUE AUTHORITY

FIGURE 4.1

NOISE MEASUREMENT LOCATIONS

■ LONG-TERM LOCATION
● SHORT-TERM LOCATION

N

2000 1000 0 2000

SCALE IN FEET

HARRIS MILLER MILLER & HANSON INC.

THE LPA GROUP INCORPORATED

HANIFIN ASSOCIATES, INC.

Table 4.1
Summary of Noise Measurement Locations

Site No.	Location/Neighborhood	Start/End Dates and Times
1	Ridge Heights Drive Hunters Woods	Start: 10 October, 1990 @ 1100 End: 15 October, 1990 @ 1100 Start: 26 October, 1990 @ 1500 End: 28 October, 1990 @ 1100 Total Hours of Monitoring: 164 Hours of Observation: 8.5
2	Filbert Terrace Hadley Farms	Start: 10 October, 1990 @ 1500 End: 15 October, 1990 @ 1300 Total Hours of Monitoring: 118 Hours of Observation: 1.0
3	Gaithersburg-Laytonville Rd. Farmer Fulks Greenhouse	Start: 10 October, 1990 @ 1200 End: 15 October, 1990 @ 1300 Start: 28 October, 1990 @ 1100 End: 29 October, 1990 @ 1400 Total Hours of Monitoring: 148 Hours of Observation: 2.5
4	Bell Bluff Road Prathertown	Start: 15 October, 1990 @ 0930 End: 15 October, 1990 @ 1100 Start: 27 October, 1990 @ 1700 End: 27 October, 1990 @ 1730 Start: 29 October, 1990 @ 1115 End: 29 October, 1990 @ 1215 Total Hours of Monitoring/Observation: 3.0
5	Bramble Bush Drive Hunters Wood	Start: 15 October, 1990 @ 1030 End: 15 October, 1990 @ 1130 Total Hours of Monitoring/Observation: 1.0
6	Beaver Ridge Road East Village	Start: 14 October, 1990 @ 1600 End: 14 October, 1990 @ 1700 Start: 27 October, 1990 @ 1000 End: 27 October, 1990 @ 1200 Total Hours of Monitoring/Observation: 3.0
7	Warfield Road Goshen Elementary School	Start: 14 October, 1990 @ 1130 End: 14 October, 1990 @ 1230 Total Hours of Monitoring/Observation: 1.0

Table 4.1 (cont'd)
Summary of Noise Measurement Locations

Site No.	Location/Neighborhood	Start/End Dates and Times
8	Lochhaven Drive Goshen	Start: 14 October, 1990 @ 1630 End: 14 October, 1990 @ 1830 Start: 27 October, 1990 @ 1500 End: 27 October, 1990 @ 1700 Total Hours of Monitoring/Observation: 4.0
9	Giant Step Terrace Ashford	Start: 14 October, 1990 @ 0930 End: 14 October, 1990 @ 1030 Total Hours of Monitoring/Observation: 1.0
10	Snouffer School Road Green Park	Start: 14 October, 1990 @ 0845 End: 14 October, 1990 @ 0945 Total Hours of Monitoring/Observation: 1.0
11	Gaithersburg-Laytonville Rd. End of Runway 32	Start: 12 October, 1990 @ 0930 End: 12 October, 1990 @ 1200 Start: 14 October, 1990 @ 0845 End: 14 October, 1990 @ 0945 Total Hours of Monitoring/Observation: 3.5
12	Muncaster Mill Road Rock Creek Stream Valley Park	Start: 12 October, 1990 @ 1500 End: 12 January, 1990 @ 1600 Start: 14 October, 1990 @ 1130 End: 14 January, 1990 @ 1230 Total Hours of Monitoring/Observation: 2.0
13	Airpark Road Lindbergh Center Business Park	Start: 14 October, 1990 @ 1530 End: 14 January, 1990 @ 1600 Total Hours of Monitoring/Observation: 0.5

(2) Second, single event data were measured in terms of the maximum A-weighted sound level, Lmax. This measure provides the most basic and easily understood description of single event noise levels.

(3) Third, overall noise exposure was measured in terms of the hourly equivalent level, Leq, and the Day-Night Average Sound Level, Ldn.

Each type of noise level information serves a specific purpose in this study. The SEL data provides a basis for developing modeling inputs that accurately represent the flying procedures used at GAI. The SEL data address the first of the measurement objectives identified in Section 4.1.1 above. The Lmax data provides a basis for estimating the disruptive potential of individual aircraft events. The Leq and Ldn data help in understanding the general acceptability of the overall noise environment. These Lmax, Leq, and Ldn data address the second measurement objective identified in Section 4.1.1.

The measurement goal was a period of approximately five days (120 hours) at each of the primary sites and up to four hours at each of the secondary sites. As summarized in Table 4.1, the three primary sites underwent 430 hours of monitoring or an average of 143 hours per location. The secondary locations underwent over 20 hours of monitoring with an average of approximately two hours per site.

Section 4.2.1 presents the Lmax and SEL measurement results. The results of the Leq and Ldn measurements are presented in Section 4.2.2.

4.2.1 Single Event Aircraft Measurements

Lmax and SEL information was collected on numerous aircraft types. However, the predominant aircraft was the single engine piston-powered propeller aircraft. A summary of all SEL and Lmax measurements are presented in Appendix B.

Other monitored aircraft include the following:

- "Corporate Jets" - generally smaller, twin-engine jet-powered aircraft.
- "Twin Piston" - twin-engine, propeller driven aircraft with piston (reciprocating) engines.

The twin turboprop aircraft also operates at GAI, however, none were observed during the monitoring program. The turboprop is a twin-engine, propeller driven aircraft with turbine engines. It is used primarily as corporate aircraft or by air taxi companies.

There are four basic types of operations observed: (1) takeoffs or departures, (2) landings or arrivals, (3) pattern operations, and (4) overflights.

"Patterns" are local training operations rather than arrivals or departures which are destined to, or originate from, other airports. The most common type of pattern operation is a "touch-and-go", which is a closed loop operation consisting of a takeoff from a given runway end, a series of connected turns which bring the aircraft around to line up with

the runway end again, and a landing. Pilots often conduct a number of touch-and-go patterns in series, reapplying power for takeoff as soon as the aircraft touches down, and never coming to a full stop. A standard touch-and-go pattern includes an initial takeoff or "upwind" leg, a 90° turn to a relatively short "crosswind" leg, a second 90° turn to the "downwind" leg (which is parallel to the runway being used), a third turn to the "base" leg, and a fourth turn to "final".

"Overflights" are aircraft transiting the area. They often are associated with a local arrival or departure, but were recorded in areas where the aircraft was not on initial departure or on final approach.

- Lmax

Maximum A-weighted sound levels, Lmax, were measured for most aircraft types and types of operations. These data provide a basis for comparing single event noise levels for aircraft and non-aircraft sources, and for common environmental sounds in general. They also provide a convenient basis for comparing noise levels from site to site.

Figures 4.2 through 4.4 present the measured maximum A-weighted levels of individual aircraft events at the three long-term measurement sites (Sites 1 - 3). For categories of aircraft events with numerous data points, the figures show the range of observed levels, the median[9] level, and the number of observations. Each figure includes discussion summarizing key information about the measurement site and the data collected at it. The measured levels are grouped by the type of operation: which runway was in use and the type of activity monitored. They are further divided by aircraft types. The figures also include typical values for common environmental sounds on the left hand side of the page.

Site 1 was located in the sideyard of a residence at 19613 Ridge Heights Drive in the Hunters Woods area of Montgomery County. The site was located in a relatively quiet residential neighborhood and was dominated by aircraft noise, with only occasional traffic noise on Snouffer School Road. Approximately 164 hours of monitoring was undertaken on Ridge Heights Drive. The monitoring site was attended approximately 8.5 of these hours - that is, a project staff member was at the site logging noise-producing activity.

Site 1 was located approximately 7,400 feet from the brake release point for Runway 32 departures (takeoff to northwest) and 3,200 feet from the landing threshold of Runway 14 (landing to southeast). The site was located 150 feet southwest of the extended centerline of the runway.

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[9] The median level is the level that splits the sample in half. That is, half the observations are higher and half are lower. It is not an arithmetic average, which would tend to skew the average toward any unusually low or high levels.

Figure 4.2
Maximum A-Weighted Levels at Site 1

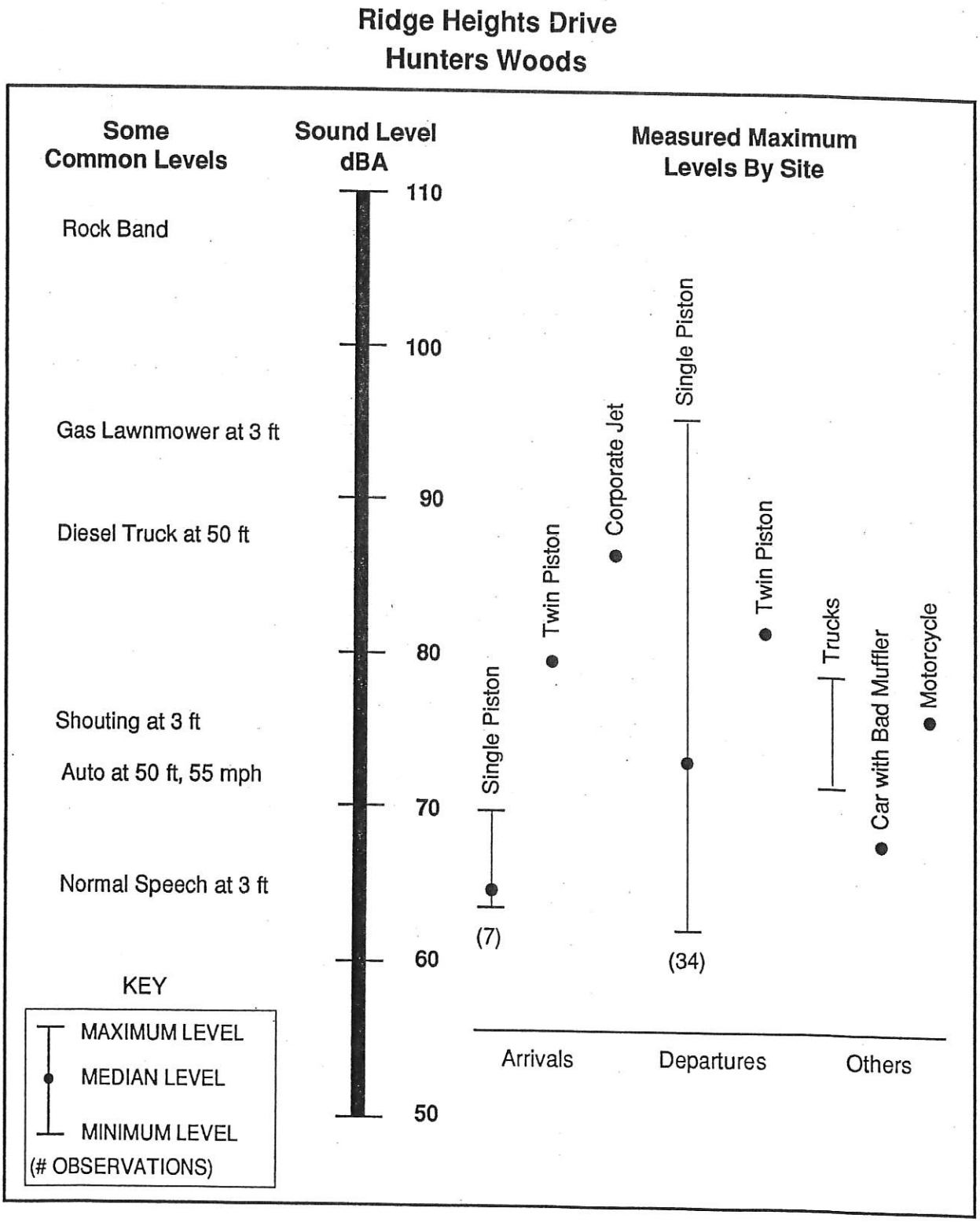


Figure 4.3
Maximum A-Weighted Levels at Site 2

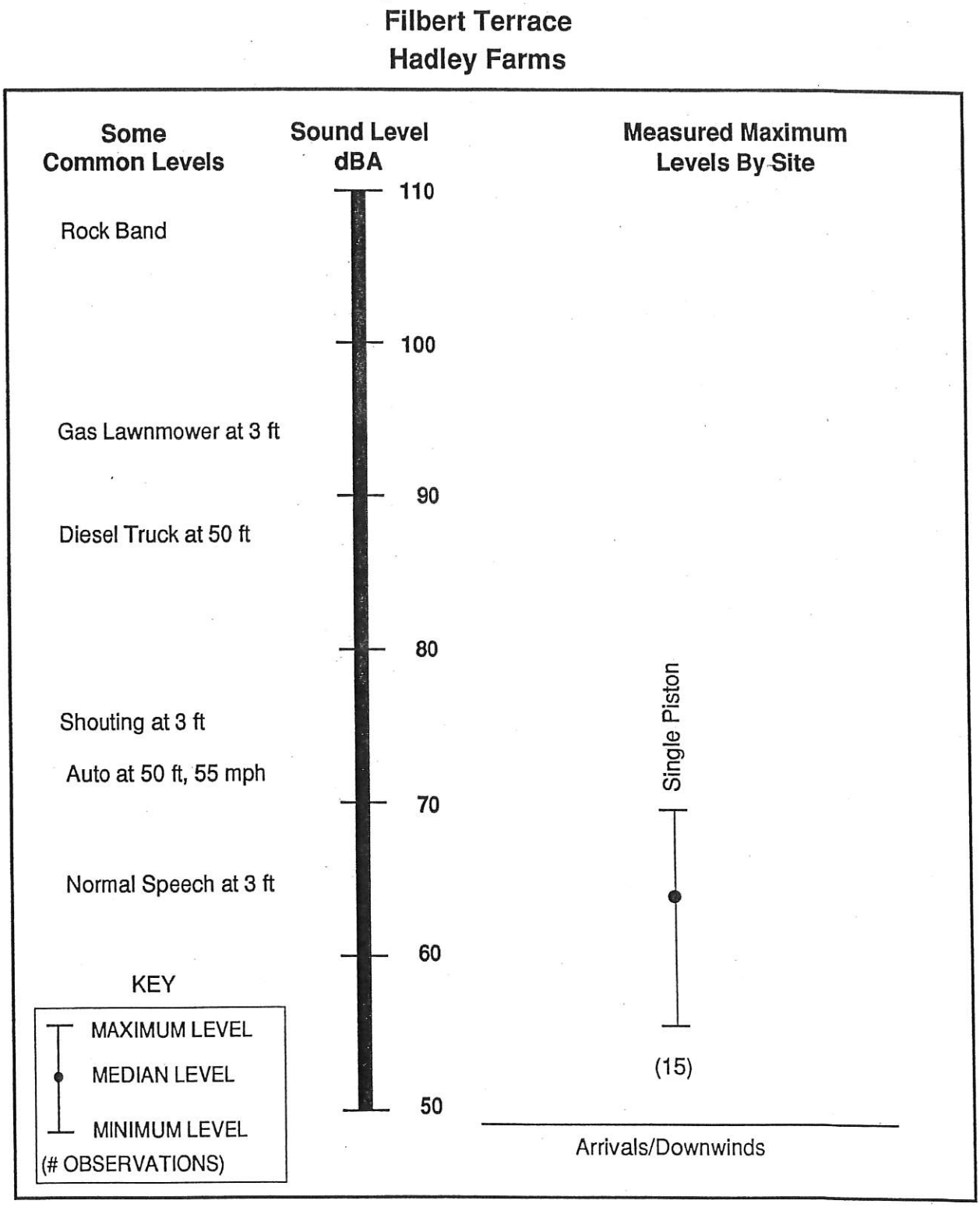
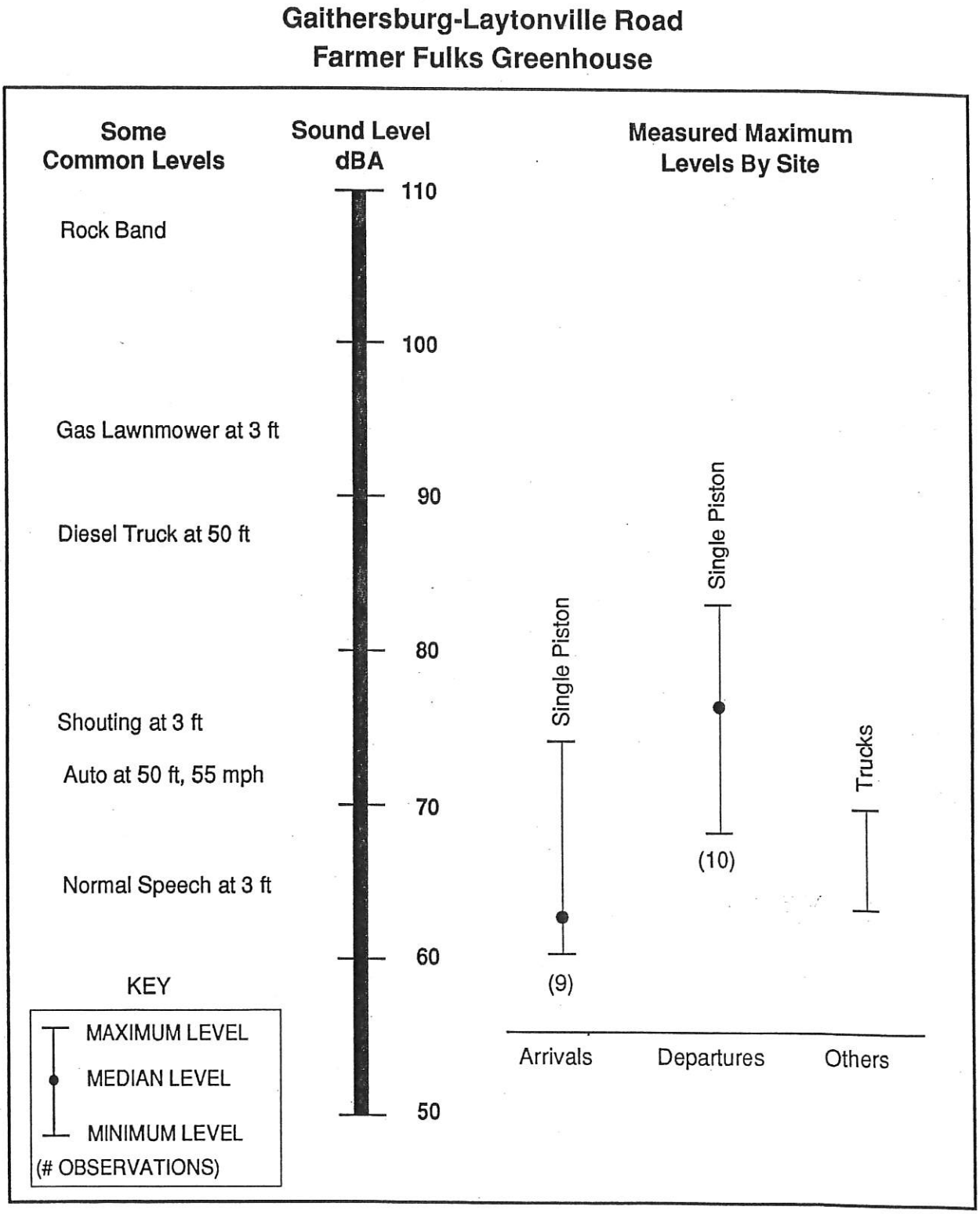


Figure 4.4
Maximum A-Weighted Levels at Site 3



Departures on Runway 32 and arrivals to Runway 14 fly almost directly overhead this location. Over 40 aircraft operations were visually logged at Site 1. These included 35 departures and 9 arrivals of primarily single-engine piston propeller aircraft. Lmax departure noise levels ranged from a high of 94 dBA to a low of 62 dBA all from single-engine piston aircraft. A single twin-piston departure was logged at 82 dBA, while the only corporate jet departure was logged at 86 dBA. Arrival aircraft events were logged at a high of 79 dBA for a twin-piston aircraft to a low of 63 dBA for a single-engine aircraft. Several other Lmax noise levels were logged at Site 1. These included trucks, motorcycles, and an automobile with a defective muffler. Lmax noise levels ranged from a high of 79 dBA for a truck to a low of 68 dBA for the auto.

Judgments of disruptive potential can be made by comparing the measured maxima on the right of Figure 4.2 with the normal speech level shown on the left and also by comparison with Figure 2.8. Note that almost all of the noise levels from aircraft operations, as well as the levels from the other modes of transportation, monitored at Site 1 exceed this level. This implies that all operations at this location would interrupt outdoor conversation.

Site 2 was located in the backyard of a residence on Filbert Terrace in the Hadley Farms area. The area is a very quiet residential neighborhood. The noise levels at the site are, however, dominated by aircraft noise undertaking touch-and-go operations or overflying the area on approach to the airpark. Approximately 118 hours of monitoring was undertaken at this location, with the monitoring attended for about one of those hours.

Site 2 was located northeast of the airpark, approximately 5,500 feet lateral distance from runway. The site was affected by aircraft in the downwind for pattern operations to either Runway 14 or 32.

Over two dozen aircraft arrivals/downwinds were logged at Site 2. Noise levels ranged from a high of 70 dBA to a low of 56 dBA, all from single-engine piston aircraft. The measurement site was in a very quiet residential backyard and was not impacted by any extraneous vehicular traffic. However, air conditioner noise seemed to dominate nighttime noise levels.

Judgments of disruptive potential can be made by comparing the measured maxima on the right of Figure 4.3 with the normal speech level shown on the left and also by comparison with Figure 2.8. Note that approximately half of the aircraft arrivals monitored, exceed this level. Overall, the monitoring would imply that some of the aircraft operations would interrupt outdoor conversations.

Site 3 was located at the rear of Farmer Fulks Greenhouse on Gaithersburg-Laytonville Road in Montgomery County. The site was located well off the main road, but was impacted by heavy truck traffic on Gaithersburg-

Laytonville Road and truck traffic using Lindbergh Road in the industrial park. The site is clearly dominated by aircraft departing Runway 14, but aircraft arriving on Runway 32 are as much a contributor to the overall noise environment as are trucks on the local streets. Approximately 148 hours of monitoring was undertaken at this location, with the monitoring attended for almost three of those hours.

Site 3 was located approximately 5,000 feet from the brake release point for Runway 14 departures (takeoff to southeast) and 800 feet from the landing threshold of Runway 32 (landing to northwest). The site was located approximately 600 feet northeast of the extended centerline of the runway. Departures on Runway 14 and arrivals to Runway 32 fly almost directly over this location.

Almost 20 single-engine piston aircraft operations were logged at Site 3. Noise levels on departures ranged from a high of 83 dBA to a low of 69 dBA, while noise levels from arrivals ranged from 61 to 75 dBA. Additional measured noise levels resulted from trucks on adjacent roadways and ranged from 60 to 70 dBA.

Figure 4.4 presents the judgments of disruptive potential, by comparing the measured maxima with the normal speech level shown on the left. This comparison can also be made with Figure 2.8. Note that all of the aircraft departures, half of the arrivals and all truck noise levels monitored, exceed this level. Overall, the monitoring would imply that almost all events at this location, except for half of the aircraft arrivals would, almost certainly, interrupt outdoor conversations.

- **SEL**

Noise measurements of aircraft events were made at all of the locations shown on Figure 4.1. For each aircraft overflight, both the sound exposure level, SEL, and the distance to the aircraft was measured. A photograph of each aircraft was taken, and the closest point of approach was measured photographically. The image length of the aircraft in each photograph was measured, and the distance between the camera and the aircraft was determined by knowing the focal length of the lens.

The SEL and slant distance data permit a comparison with the computer model. As discussed in Section 3.1, development of noise contours requires noise data for each aircraft type. The standard U.S. Department of Transportation data base[10] provides noise data for most civil aircraft types, and is widely used to develop noise contours. Two distinct noise curves (i.e. noise versus distance relationships) are required to accurately model all aircraft operating at GAI. These noise curves

[10] Incorporated in Version 3.9 of the Integrated Noise Model (INM 3.9).

roughly correspond to two fundamental flight domains: (1) climb out or departure, and (2) level flight and descent or arrivals.

Three SEL versus slant distance curves are presented in Figures 4.5 through 4.7: single-engine piston arrivals and departures, and twin-engine piston departures. The single- and twin-engine piston aircraft are not the noisiest aircraft operating at GAI, in terms of their SEL. However, they account for almost 98 percent of the total operations at GAI.

The vertical axis in the figures is the SEL in dBA. The horizontal axis is the "slant range" or distance in feet from the measurement site to the aircraft at the aircraft's point of closest approach. Each figure shows the empirically derived ("least squares") noise curve and the individual data points on which the curves were based.

At GAI, over 95 percent of all of the existing average daily operations are conducted in single-engine piston aircraft. This class of aircraft encompasses a great variety of aircraft types, with significant variation in noise emissions and flight characteristics. The standard modeling data available for this aircraft type are relatively limited. They are available for fixed-pitch propeller, variable-pitch propeller, and a composite "national average" single-engine piston aircraft. Since the single-engine aircraft accounts for such a large portion of all existing operations at GAI it is important to "fit" the correct noise curve to the aircraft. Based upon analysis of the three single engine aircraft noise curves, the fixed-pitch propeller curve correlated best with the measured data at GAI, and thus was used in the modelling to represent all singles. Figures 4.5 and 4.6 reveal that the average of the measured noise levels (least squares curve) is 1.7 dB less than the data base noise levels for the fixed-pitch propeller departures and 2.0 dB less than the data base for arrivals. INM, therefore, slightly overpredicts the noise levels from single-engine piston aircraft, which would result in a conservatively high estimate of the noise exposure.

The measured SEL data and the resulting least squares curve for the twin-engine piston departures (see Figure 4.7) is also within 2.7 dB of the data base curve used in the computer model. Therefore, the INM computer model slightly overpredicts the twin-engine piston departures.

Since the focus of much of the noise abatement analysis will be detailed evaluation of relatively small changes in standard operating procedures, the input data must be valid for the specific airport, in order to accurately reflect the effects of the changes.

Other aircraft operations, including twin-engine piston arrivals and corporate jet departures, were measured at GAI during the monitoring period. However, the data is somewhat limited and an SEL versus slant distance curve was not generated. However, based on the measurements

Figure 4.5
SEL VS. Slant Distance
Single-Engine Piston Departures

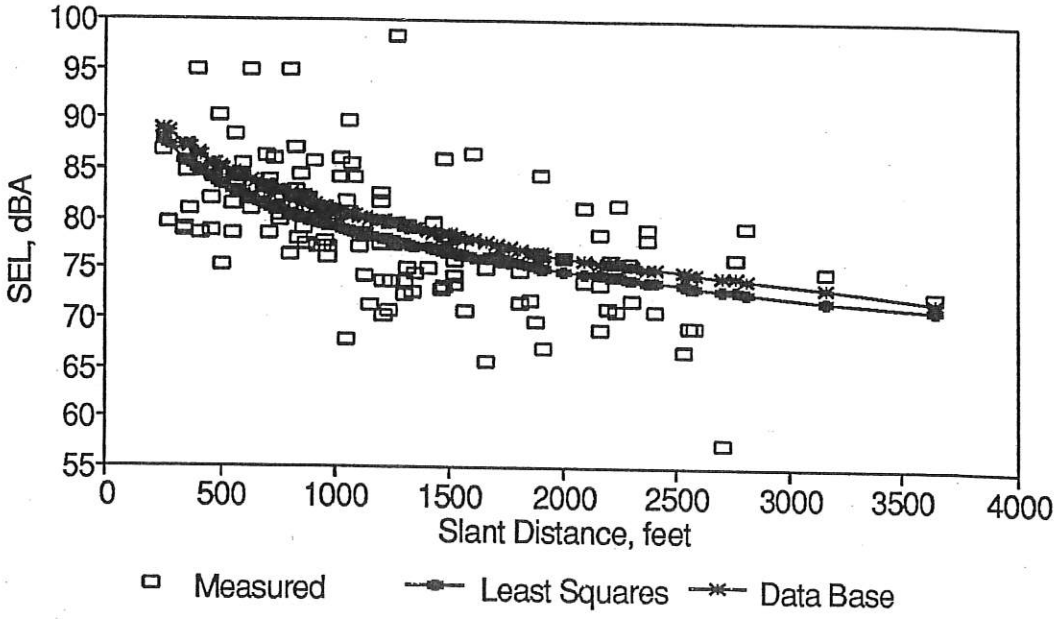


Figure 4.6
SEL VS. Slant Distance
Single-Engine Piston Arrivals

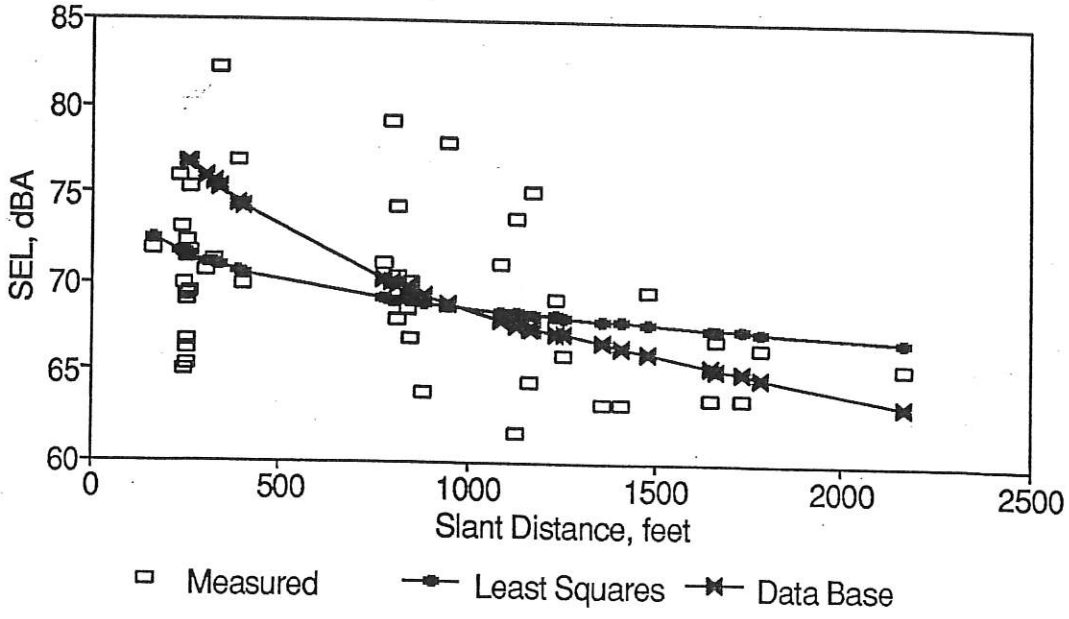
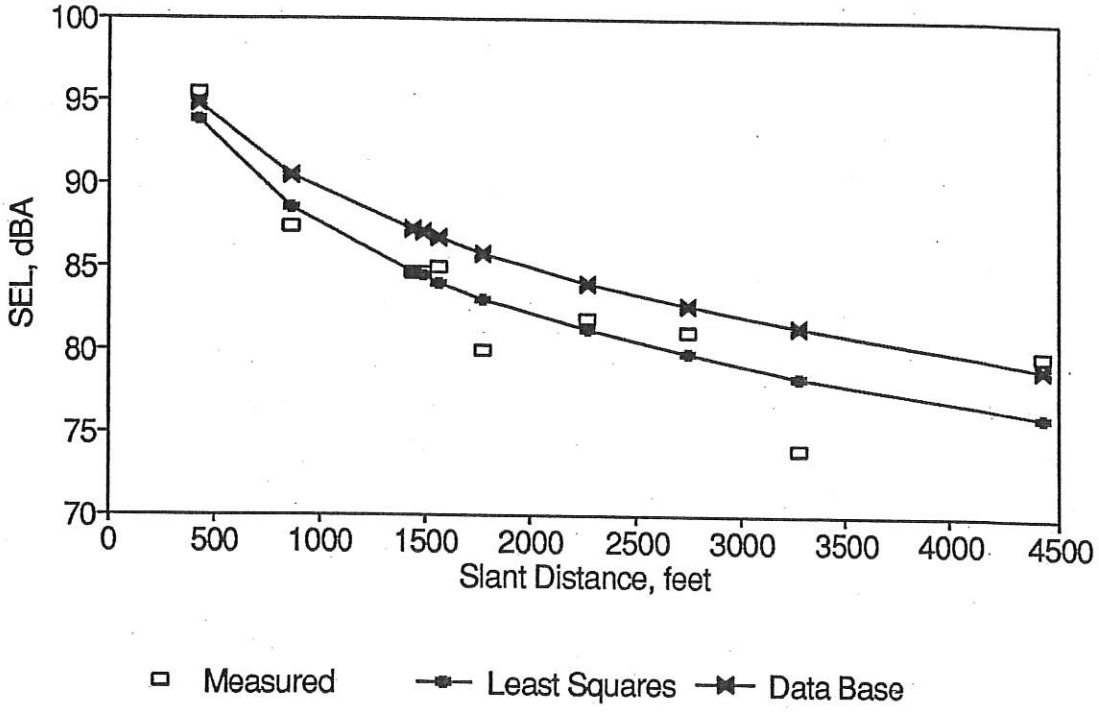


Figure 4.7
SEL VS. Slant Distance
Twin-Engine Piston Departures



undertaken for this study, the curves indicate that other aircraft types in the GAI fleet may be quieter than the data base aircraft. This indicates that the INM computer model would tend to slightly overpredict the noise from these aircraft types, resulting in a conservatively high estimate of the noise exposure.

4.2.2 Cumulative Noise Measurements

Tables 4.2 to 4.4 present the measured hourly noise levels, Leq, for each of the three primary locations (Sites 1 to 3). A total of 116 hours of Leq measurements were undertaken at each of the three sites, although a somewhat smaller number may actually be presented due to equipment malfunctions. Leq measurements were not conducted at Sites 4 through 12 because the relatively short measurement periods precluded meaningful data

Table 4.2
Measured Hourly Noise Levels From Site 1

Hour	10-Oct (wed) Hourly Noise Level	11-Oct (thu) Hourly Noise Level	12-Oct (fri) Hourly Noise Level	13-Oct (sat) Hourly Noise Level	14-Oct (sun) Hourly Noise Level	15-Oct (mon) Hourly Noise Level	26-Oct (fri) Hourly Noise Level	27-Oct (sat) Hourly Noise Level	28-Oct (sun) Hourly Noise Level
1		48.2	43.7	48.2	44.2	43.8		47.6	48.1
2		53.2	41.7	46.7	43.7	43.2		44.7	47.7
3		45.4	43.7	46.1	44.8	42.5		44.4	49.5
4		46.3	44.3	46.5	42.2	41.4		43.8	46.3
5		46.9	45.2	44.2	44.5	42.5		43.9	47.8
6		51.0	47.9	45.8	44.7	45.5		46.0	45.3
7		53.4	49.7	46.5	42.8	49.2		47.1	46.9
8		58.1	51.8	51.0	45.8	56.3		51.9	53.9
9		57.9	53.4	49.5	55.5	55.2		64.2	62.7
10		60.0	52.6	50.7	59.2	61.5		61.2	65.7
11		52.4	51.5	51.3	57.6	56.1		67.2	65.7
12	62.8	51.4	53.4	50.3	63.7			62.9	62.9*
13	53.5	54.7	57.3	53.1	61.1			63.7	63.7*
14	51.5	53.7	57.1*	60.6	57.1*			64.6	64.6*
15	53.7	56.0	53.7*	48.2	53.7*			65.1*	65.1*
16	55.8	51.1	58.3*	51.9	63.1		65.0	65.7	
17	57.2	56.1	55.1	54.3	59.0		56.8	60.4	
18	58.8	51.9	56.2	57.5	60.4		62.5	63.7	
19	56.1	57.3	54.3	55.7	57.1		60.6	55.8	
20	52.9	56.1	54.5	51.2	58.5		55.7	52.1	
21	52.1	55.9	51.5	47.4	49.5		50.0	50.4	
22	51.6	48.3	47.8	46.7	50.6		48.0	50.4	
23	50.6	48.8	49.7	45.6	47.1		47.3	50.9	
24	48.8	42.8	49.0	44.4	48.3		48.3	50.4	
Ldn (Calculated)		58.5	55.0	55.7	54.8	58.1		61.1	61.5

NOTES: (1) All measurements obtained during calendar year 1990.
(2) Sound levels include aircraft and community noise sources.
(3) Ldn = Day/Night Average Sound Level.
(*) Calculated by energy averaging similar hours from other measured days.

Table 4.3
Measured Hourly Noise Levels From Site 2

Hour	10-Oct (wed) Hourly Noise Level	11-Oct (thu) Hourly Noise Level	12-Oct (fri) Hourly Noise Level	13-Oct (sat) Hourly Noise Level	14-Oct (sun) Hourly Noise Level	15-Oct (mon) Hourly Noise Level
1		54.1	50.9	52.4	51.9	52.1
2		52.4*	50.4	54.1	52.5	51.8
3		53.4	51.2	54.6	52.8	50.9
4		54.3	52.0	54.1	52.4	49.1
5		54.0	51.9	53.8	51.4	46.3
6		54.9	51.7	52.7	50.4	45.6
7		55.2	50.4	50.1	48.6	45.6
8		57.1	49.3	52.9	46.9	50.1
9		55.2	49.4	52.4	50.0	53.8
10		55.2	53.4	49.8	53.7	57.3
11		53.3	55.9	48.9	51.3	52.9
12		52.9	56.0	46.1	54.3	56.0
13		51.5	51.8	56.6	54.3	55.3
14		51.9	58.0	52.7	53.7	54.8*
15		49.1	55.5	48.1	54.1	56.9*
16	57.4	47.8	54.8	51.2	54.7	
17	57.0	51.0	53.7	50.0	53.4	
18	52.8	51.4	53.7	52.5	56.1	
19	54.5	52.2	52.5	53.6	53.9	
20	53.8	54.3	53.2	53.2	53.7	
21	53.5	54.4	53.5	52.1	51.8	
22	54.1	51.1	51.6	52.9	51.3	
23	57.8	51.9	53.3	52.7	50.6	
24	53.6	50.8	51.8	52.4	52.7	
Ldn (Calculated)		58.1	55.2	55.7	56.3	57.2

NOTES: (1) All measurements obtained during calendar year 1990.
(2) Sound levels include aircraft and community noise sources.
(3) Ldn = Day/Night Average Sound Level.
(*) Calculated by energy averaging similar hours from other measured days.

Table 4.4
Measured Hourly Noise Levels From Site 3

Hour	10-Oct (wed) Hourly Noise Level	11-Oct (thu) Hourly Noise Level	12-Oct (fri) Hourly Noise Level	13-Oct (sat) Hourly Noise Level	14-Oct (sun) Hourly Noise Level	15-Oct (mon) Hourly Noise Level	28-Oct (sun) Hourly Noise Level	29-Oct (mon) Hourly Noise Level
1		54.1	50.1	54.9	55.6	52.1		44.9
2		52.5	50.2	54.2	53.9	52.1		44.0
3		55.2	52.4	54.3	53.2	52.5		44.2
4		55.0	52.7	53.9	53.8	52.1		49.5
5		56.6	54.6	55.5	54.5	50.6		47.6
6		57.9	55.8	56.2	53.7	54.0		52.1
7		57.8	59.1	54.0	54.5	57.0		56.6
8		60.4	57.9	58.0	53.5	62.1		59.9
9		59.9	62.7	56.0	52.3	60.1		58.4
10		60.7	63.5	56.7	55.8	58.9		59.3
11		60.3	58.2*	56.0	54.0	57.7		60.0
12		58.0*	60.5	55.8	55.4	59.0	56.8	
13	64.9	57.8	55.8	57.0	54.5	58.8	57.5	
14	59.1	58.1	57.5	55.8	54.8		56.2	
15	60.3	59.9	59.2	55.4	56.2		55.9	
16	61.3	57.2	60.9	55.9	57.2		56.5	
17	61.3	57.7	57.4	56.1	52.6		56.1	
18	58.3	56.1	58.6	55.0	54.4		55.2	
19	61.5	56.0	56.0	54.3	53.7		54.6	
20	57.6	54.9	53.3	53.1	54.4		54.7	
21	52.3	54.0	54.3	52.2	54.6		52.0	
22	53.3	53.0	53.0	54.4	54.0		50.6	
23	53.3	52.1	53.9	54.9	54.0		46.4	
24	53.2	50.3	54.0	55.1	52.8		45.7	
Ldn (Calculated)		63.0	61.6	61.5	60.9	60.5		57.7

NOTES: (1) All measurements obtained during calendar year 1990.
(2) Sound levels include aircraft and community noise sources.
(3) Ldn = Day/Night Average Sound Level.
(*) Calculated by energy averaging similar hours from other measured days.

collection. The Leq values are for the hour ending at the times indicated. Calculated Ldn values are shown wherever 24 hours of data were available.

Figures 4.8 to 4.10 present, in graphical format, the measured hourly noise levels at Sites 1 to 3. This format permits a comparison on a day-to-day and hour-by-hour basis at each site. Shading is used to indicate the different days of the monitoring period.

A review of the Leq data in the graphs reveals a consistency with trends which one would expect at GAI and most other airports. In general, nighttime hours are quieter than the daytime, as both aircraft and non-aircraft noise-producing activity are typically reduced at night. In addition, relationships between the runway in use and the noise levels can also be seen.

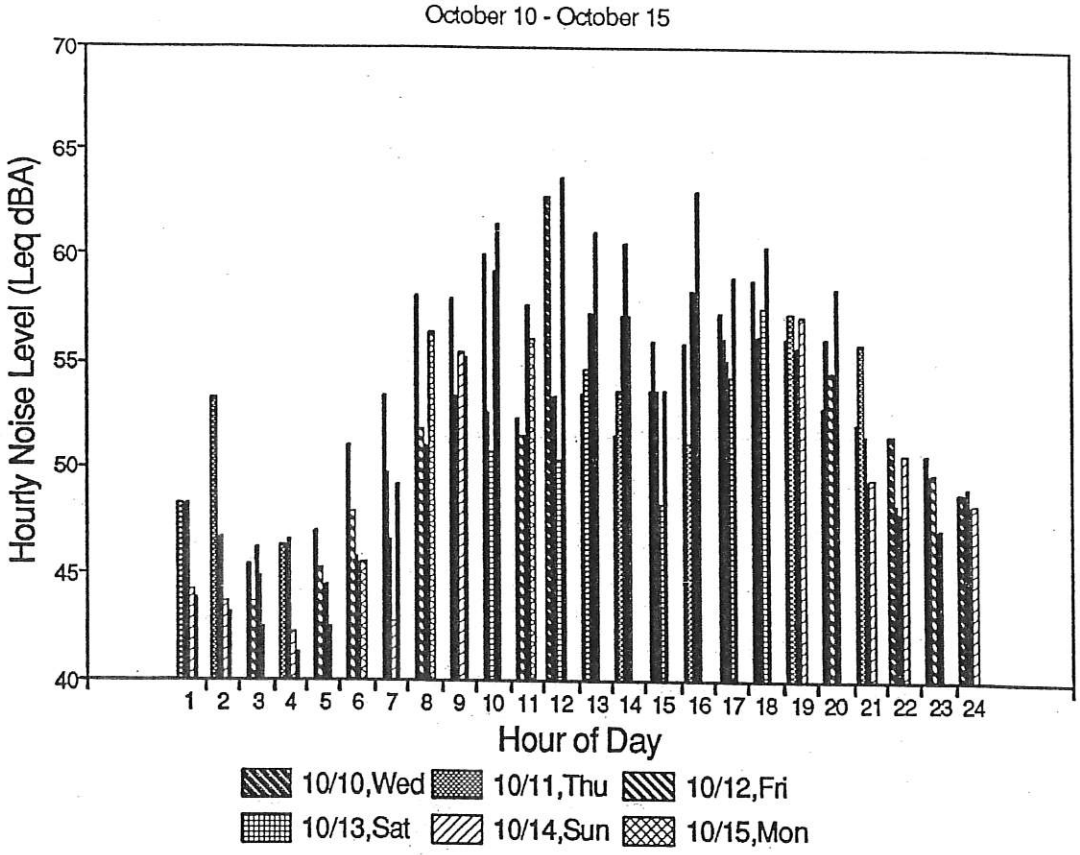
Site 1 is presented in Figure 4.8. The first graph presents the hourly Leq noise levels from the first measurement period (10 October to 15 October 1990). The second graph presents the hourly noise levels from the second period (26 October to 28 October 1990). In addition, the second graph presents the hourly average noise levels (solid line) from the first measurement period.

The first graph reveals some very distinctive trends. The lower nighttime Leq noise levels in the hours ending 0100 to 0600 are reflected in the lack of activity at night. The morning departure peak occurs between 0700 and 1200, with a slight lull at 1100. The activity drops off slightly in the early afternoon between 1300 and 1500 hours. The evening peak occurs between 1600 and 2000, before dropping off around 2100 to 2200 hours.

The second graph presents the monitoring undertaken during the second measurement period. The higher hourly noise levels during the 0900 to 1900 period is a direct result of the extremely high winds during the second measurement period. Therefore, pilots had to use more power and took longer to fly over a measurement site than what is considered normal. Therefore, the SELs for aircraft on that weekend were higher as would be the resulting hourly Leq and daily Ldn levels.

Figure 4.9 presents the measurement data at Site 2. The site was affected primarily by aircraft on the downwind of touch-and-go patterns. The Leq noise levels remain fairly constant during all hours of the day. The constant noise levels are a result of; (1) the relatively quiet background noise levels of the measurement location and the lack of extraneous noise sources, (2) the relatively quiet nature of the aircraft events over Site 2, (3) the steady cyclical nature of the noise levels from the air conditioner/heat pump units in the back yard of the areas houses, and (4) the steady nighttime noise levels created by insects during warmer months.

Figure 4.8
Measured Hourly Noise Levels From Site 1



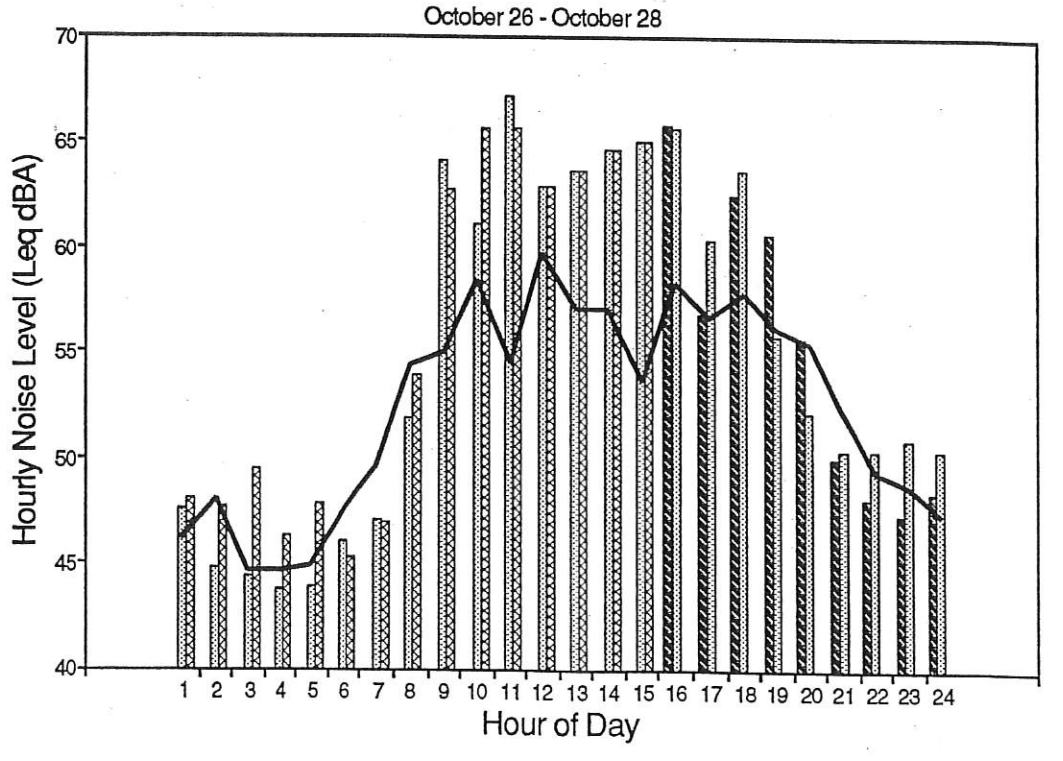


Figure 4.9
Measured Hourly Noise Levels From Site 2

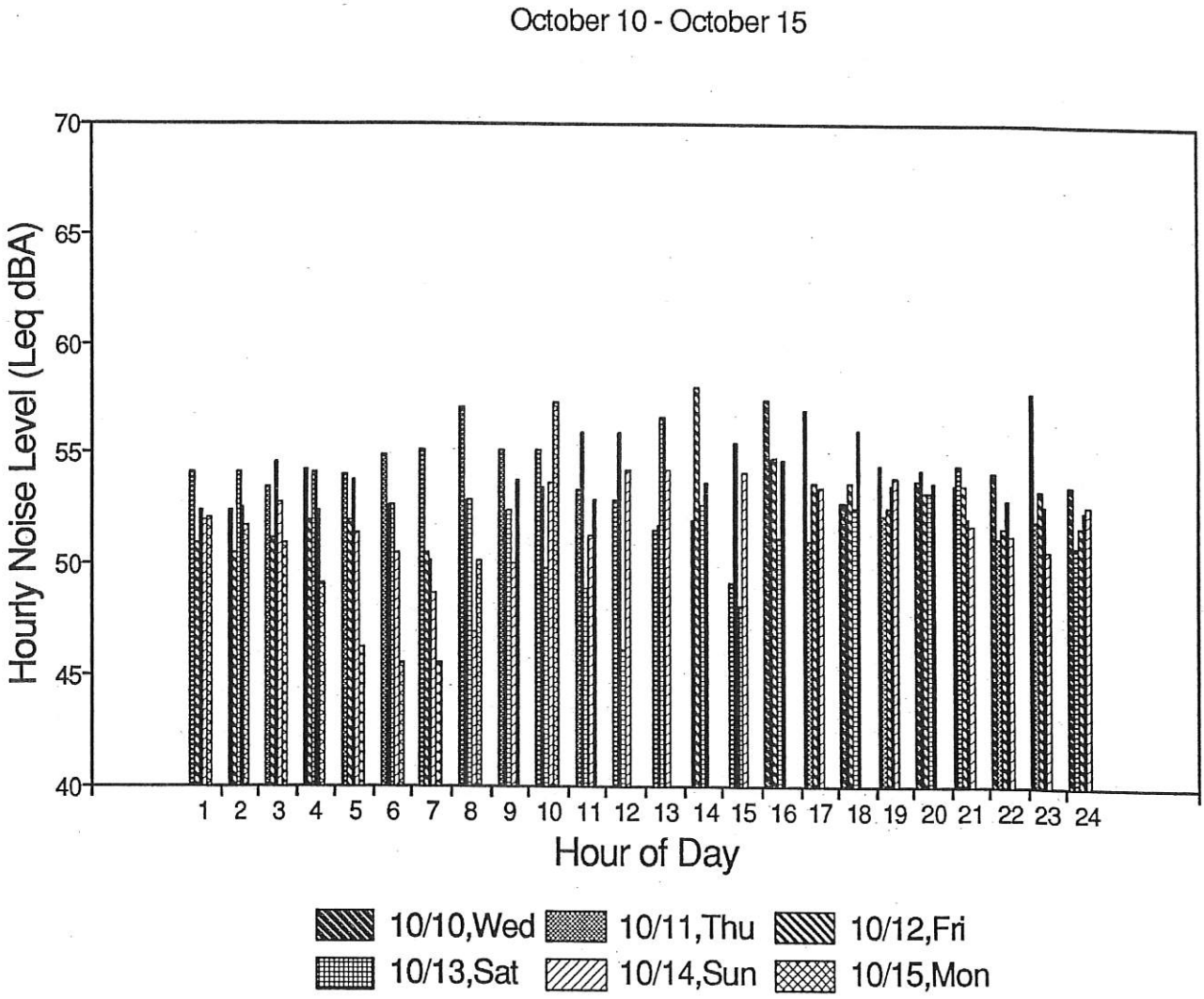
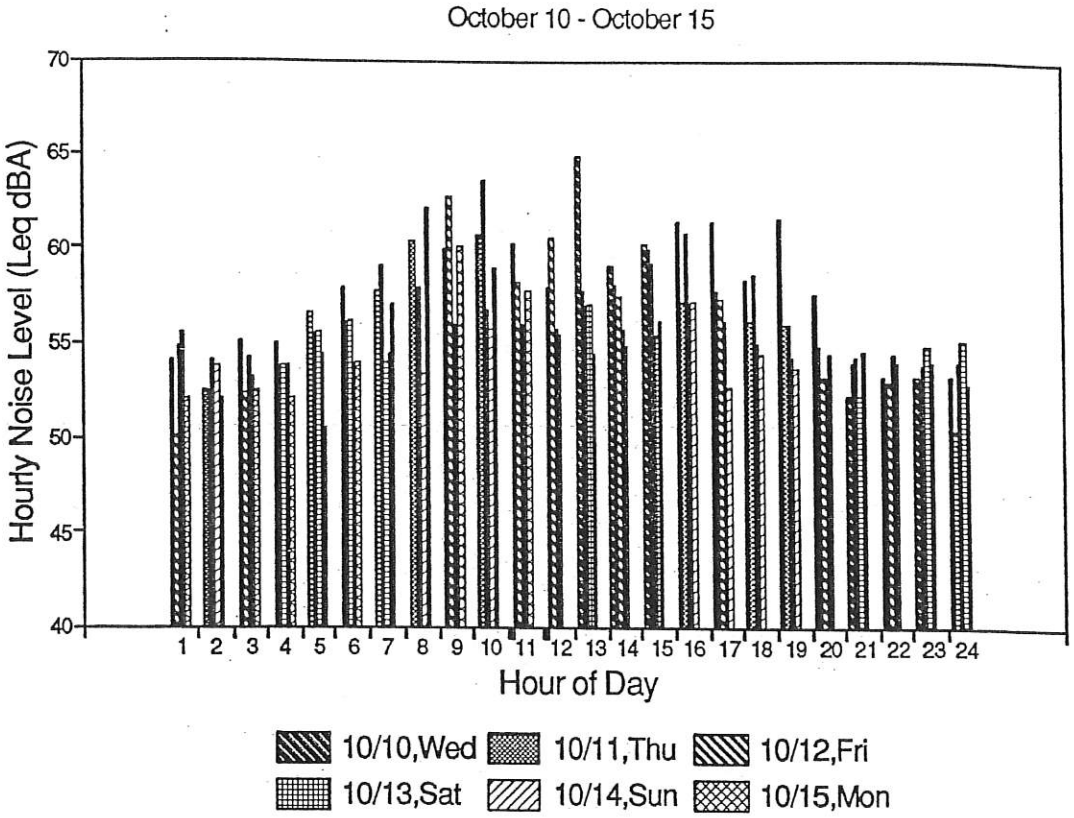
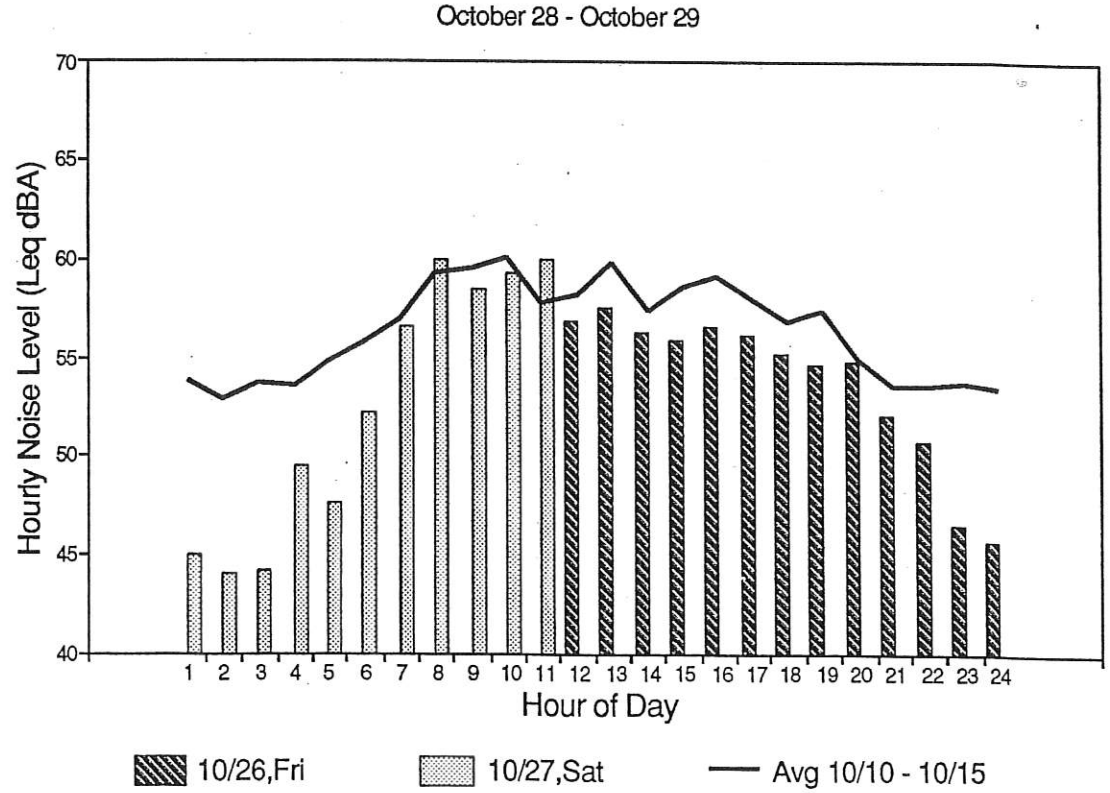


Figure 4.10
Measured Hourly Noise Levels From Site 3





Site 3 measurement data is presented in Figure 4.10. The first graph presents the hourly Leq noise levels from the first measurement period (10 October to 15 October 1990). The second graph presents the hourly noise levels from the second period (28 October to 29 October 1990). In addition, the second graph presents the hourly average noise levels (solid line) from the first measurement period.

Daily airpark operating trends are clearly evident in the figures. In the first graph the lower nighttime Leq noise levels are clearly evident between 0100 and 0600. As daily activity, including airpark operations, increase the noise levels increase (0700 to 1000). Noise levels and operations decrease somewhat during the noon hour period between 1100 and 1300 before increasing during the mid-afternoon (1400 to 1700). During the early evening (after 1700) the operations begin to decrease before leveling off after 2100 hours.

The second graph presents the monitoring undertaken during the second measurement period. The lower levels at night, during the second measurement period, are most likely the result of much lower ambient temperatures during that period. Air conditioning units from the nearby industrial park would not likely have been operating on a regular basis. In addition, the much cooler temperatures during the second period would have a tendency to decrease the insect noise noticeable on warm summer evenings.

Table 4.5 presents a summary of the measured daily Ldn values at the three primary measurement sites. The measured Ldn values are then energy-averaged to obtain a combined Ldn value for each site.

Site 1 had an average measured Ldn of 58.6 dB. The site is heavily influenced by departures on Runway 32 and arrivals on Runway 14. The average measured Ldn at Site 2 was 56.6 dB. The Ldn for Site 2 was influenced only by overflights and aircraft on the downwind of pattern operations. Therefore, it is reasonable to see the lowest noise levels at this location since it is the furthest site from the airpark and is not directly influenced by operations to Runway 14/32. Site 3, which had an Ldn of 61.1 dB, was influenced by arrivals on Runway 32 and departures to Runway 14. It is reasonable to see the highest noise levels recorded at this location, since it is much closer to the runway threshold than Site 1 and it is also impacted by local truck noise.

One *must* keep in mind that the measured noise levels represent the Ldn from only the five to seven day measurement program and do not necessarily represent the actual annual Ldn. A comparison of the averaged measured Ldn to the computed annual average day Ldn will be undertaken in Section 12.

Table 4.5
Cumulative Noise Measurement Summary

Site/Location	Day/Date	Calculated Ldn[1)]	Average Ldn[2)]
1 - Ridge Heights Dr./ Hunters Woods	Wed 10/10/90 - Thu 10/11/90	58.5	
	Thu 10/11/90 - Fri 10/12/90	55.0	
	Fri 10/12/90 - Sat 10/13/90	55.7	
	Sat 10/13/90 - Sun 10/14/90	54.8	
	Sun 10/14/90 - Mon 10/15/90	58.1	
	Fri 10/26/90 - Sat 10/27/90	61.1	
	Sat 10/27/90 - Sun 10/28/90	61.5	
			58.6
2 - Filbert Terrace/ Hadley Farms	Wed 10/10/90 - Thu 10/11/90	58.1	
	Thu 10/11/90 - Fri 10/12/90	55.2	
	Fri 10/12/90 - Sat 10/13/90	55.7	
	Sat 10/13/90 - Sun 10/14/90	56.3	
	Sun 10/14/90 - Mon 10/15/90	57.2	
			56.6
3 - Gaithersburg-Laytonville Rd./ Farmers Fulks Greenhouse	Wed 10/10/90 - Thu 10/11/90	63.0	
	Thu 10/11/90 - Fri 10/12/90	61.6	
	Fri 10/12/90 - Sat 10/13/90	61.5	
	Sat 10/13/90 - Sun 10/14/90	60.9	
	Sun 10/14/90 - Mon 10/15/90	60.5	
	Sun 10/28/90 - Mon 10/29/90	57.7	
			61.1

NOTES: (1) Calculated from measured hourly noise levels.
(2) Energy Averaged

As demonstrated in the discussion of single engine aircraft noise levels, all sites are exposed to single aircraft overflights that can disrupt speech outdoors (A-weighted noise levels of 65 dBA). Thus, even locations conforming to Ldn based standards or guidelines with an Ldn of less than 65 Ldn, should not always be thought of as having no noticeable adverse noise exposure. The implication for the Part 150 study is that single event noise levels may provide a necessary method for assessing the effects of various noise abatement measures. Conversely, noise abatement measures may result in lowering of exposure in terms of Ldn, but such improvements should not be expected to make aircraft noise inaudible; an abatement measure that lowers Ldn from 60 dB to 55 dB produces a noticeable reduction, but almost certainly will not make aircraft undetectable.

4.3 Summary of Noise Complaints

There is no formal process to log noise complaints at the office of the Airpark Manager. However, noise complaints seem to occur approximately on a once-per-month basis, although there are exceptions. Complaints dropped off considerably after the departure from the airpark of a based Lear corporate jet and of a European military training jet. Both aircraft were older and noisier models. In addition, complaints seem to peak in the late-spring with the annual undertaking of the Gypsy Moth spraying. Numerous complaints seem to be verbalized to airpark and Revenue Authority officials, but are not officially logged.

5. AIRPORT PHYSICAL DESCRIPTION

This chapter presents the physical description of the airport, including a general description of the airport facilities (Section 5.1) and specific noise modelling inputs (Section 5.2).

The general description of the airport is provided for reviewers of this document who may be unfamiliar with the airport. The other items are fundamental inputs to the noise model, used to define a coordinate system for the computations. The fundamental source of these data is the Airport Master Plan and associated the Airport Layout Plan[11].

5.1 General Description of the Airport

Montgomery County Airpark (GAI) is located three miles northeast of the City of Gaithersburg, Maryland, centrally located in Montgomery County and approximately 15 miles north-northwest of Washington D.C. The airpark is located at an elevation of 539 feet above sea level and covers approximately 165 acres.

The airpark is bounded on the north by commercial properties and the Montgomery County Airpark Industrial Park. To the east of the airpark is located Gaithersburg-Laytonville Road (State Route 124), commercial properties, the Lindbergh Center Industrial Park and the Rock Creek Stream Valley Park. Snouffer School Road is located to the south and west of the airpark. Additional commercial and industrial properties are located adjacent to the airpark to the south, while Green Park and agricultural area is located to the west. Figure 5.1 presents a general location map for GAI.

The airpark has a single paved runway, designated 14/32. The runway is 4235 feet long and 75 feet wide and has a corresponding parallel taxiway system that ends 130 feet from the approach end of Runway 14 and 220 feet from the approach end of Runway 32. There are also itinerant and local aircraft parking areas.

GAI is located in an area of very busy airspace. Three major air carrier airports and a major military airfield are located within 25 miles of GAI; Baltimore-Washington International Airport (BWI) to the east, Washington National Airport (DCA) to the south-southeast, Dulles International Airport (IAD) to the southwest, and Andrews Air Force Base to the southeast. In addition, three smaller general aviation airports are located within 20 miles of GAI; Davis Airport (W50) to the north, Leesburg Municipal Airport (W09) to the west-southwest, and Frederick Municipal Airport (FDK) to the north-northwest.

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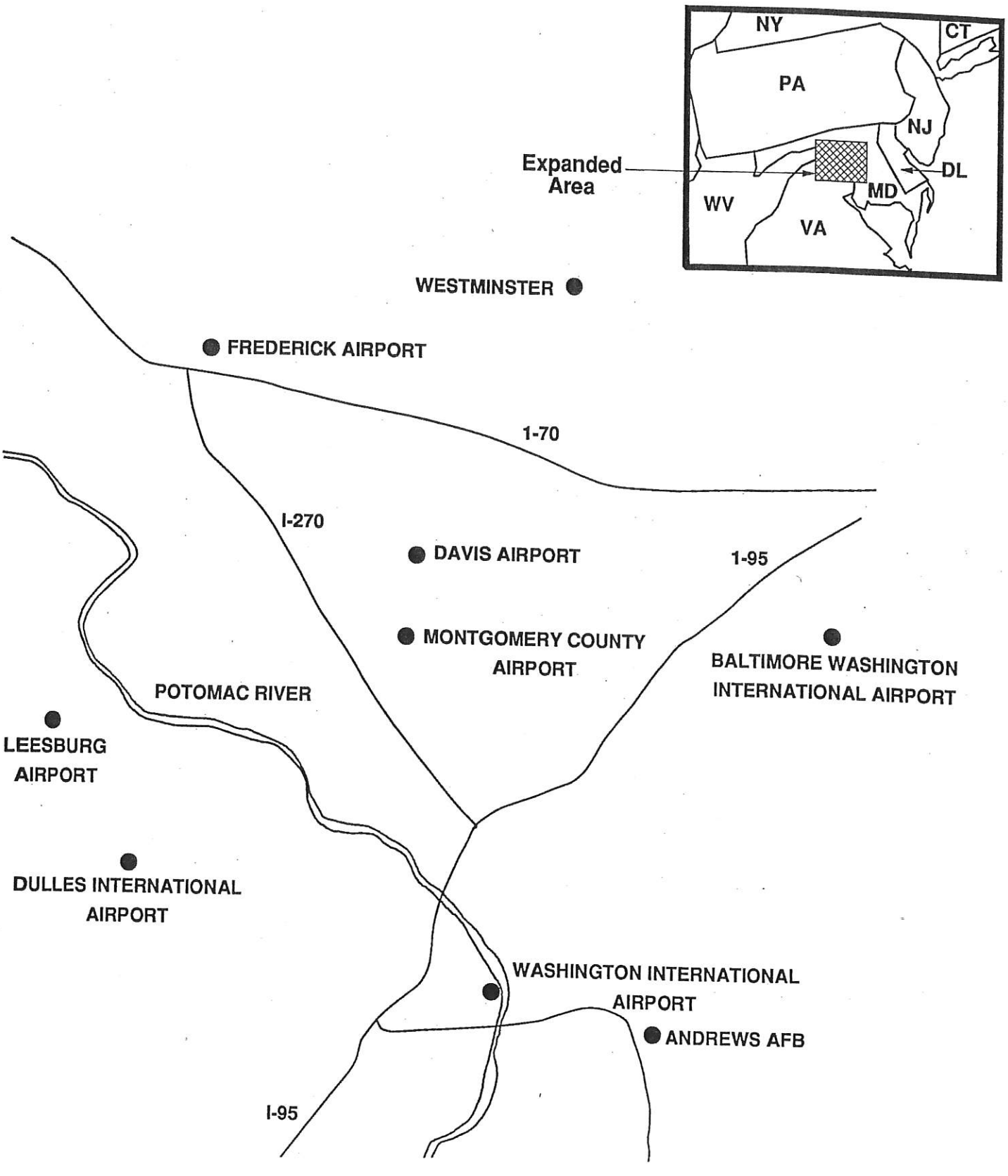
[11] Draft "Montgomery County Airpark: Airport Layout Plan Report", Dynaplan International Corporation, September 1989.

Figure 5.1
Airport Location Map



The airpark does not have a FAA Air Traffic Control Tower (ATCT). However, the FAA ATCT at BWI provides radar separation (Baltimore Approach Control) on all instrument flight rule (IFR) aircraft within the Air Route Surveillance Area (ARSA). All radar facilities are located at BWI. Ground control of aircraft at GAI is performed by the individual pilot. All separation of visual flight rule (VFR) aircraft are also performed by the pilot.

The airpark facilities are all located on the northwest side of the property. The terminal facilities include the airport administration building, aircraft storage and maintenance hangars, and transient/based aircraft parking facilities. The main administration building contains facilities for general aviation pilots, a restaurant, offices of the airpark management, and offices for several aviation-related businesses. Miscellaneous structures at the airpark include the aircraft fueling facilities.

Local lighting and visual aids at GAI include Medium Intensity Runway Lights (MIRL) on the runway, as well as Medium Intensity Taxiway Lights (MITL) on the adjacent taxiway. Runway lighting is controlled at all times by air-to-ground radio control. Approach lighting systems include Visual Approach Slope Indicators (VASI) at the approach end of Runway 14 and unidirectional Runway End Identifier Lights (REIL) at each end of Runway 14/32. There is also a rotating beacon at GAI.

There are numerous military facilities in the Washington D.C. area, as well as sensitive historical and political areas. Therefore, GAI has numerous restricted, prohibited, warning, or military operating areas within its airspace, the closest being within approximately 15 miles of the airpark. No Federal airways radiate to/from GAI. GAI has three published Instrument Approach Procedures (IAP) to the airpark. However, only two procedures are operational at this time. The two operational non-precision approaches include the very high frequency omnidirectional range (VOR) approach to Runway 14 and the radio navigation (RNAV) approach to Runway 14. The non-directional radio beacon (NDB) approach is presently not operational.

A VOR is a Very High Frequency Omni Range navigation aid that transmits a signal in all directions. Aircraft equipped with the necessary receiver can use this signal to navigate. A VOR is used for enroute navigation of VFR and IFR aircraft as well as for non-precision instrument approaches. A TACAN uses the ultra high frequency range and is use primarily by military aircraft. A VORTAC is a VOR and TACAN located together. An aircraft equipped with Distance Measuring Equipment (DME) can also receive information from a VOR if it has a TACAN or a DME located with the VOR. A non-directional beacon is a navigational aid that sends out a broad signal. This aid is considered less accurate than a VOR.

The VOR approach uses the Frederick VOR which is located approximately 20

miles north-northwest of the airpark. It allows straight-in approaches to Runway 14 with minimums of 1180 feet MSL (640 feet above touchdown) with one mile visibility. The RNAV approach uses the Westminster VORTAC which is located approximately 25 miles north-northeast of the airpark. This approach allows straight-in approaches to Runway 14 with minimums of 1160 feet MSL (620 feet above touchdown) with one mile visibility. The NDB approach allows a circling approach to the airpark with minimums of 1480 feet MSL (940 feet above touchdown) with one and a quarter mile visibility. The VOR, RNAV and the NDB approach provide guidance to the airport. A copy of the three published IAP's are presented in Appendix C.

5.2 Noise Modelling Inputs

The specific noise modelling inputs include:

- runway orientations;
- runway lengths;
- start-of-takeoff-roll points on each runway;
- landing touchdown points on each runway; and
- airfield elevation.

Figure 5.2 depicts key airfield layout parameters.

5.2.1 Runway Designations and Orientations

GAI has a single paved bidirectional runway which is designated 14/32. The pairs of numbers correspond to the names of the runway ends. Because aircraft can land and takeoff in either direction on a given runway, each end has a unique name. The numbers are a shorthand notation which indicates the runway's geographic orientation: the compass heading of the runway, rounded to the nearest ten degrees, with the trailing zero dropped. For example, the magnetic heading of Runway 14 is about 136 degrees. The number is rounded to 140, and finally to 14 with the zero dropped; hence, Runway 14. Simple geometry requires that the difference between the designation of each end equals 18 (that is, 180 degrees); hence, Runway 32.

- **Runway Dimensions**

Runway 14/32 is 4,235 feet long and 75 feet wide.

- **Takeoff Thresholds**

Aircraft start-of-takeoff-roll, brake release, or takeoff threshold points are assumed to be at the physical end of both runways. However, the taxiway system at GAI is such that end of the taxiways occur 130 feet from the approach end of Runway 14 and 220 feet from the approach end of Runway 32. This results in aircraft having to "back taxi" the remaining distance

Figure 5.2
Airport Layout Plan

TO BE INCLUDED AT A LATER DATE

to the runway end to benefit the most from the full runway length on takeoff. It has been estimated by airpark personnel that 80 percent of all corporate jet aircraft, 50 percent of all multi-engine aircraft, and 30 percent of all single-engine aircraft back-taxi for departures on Runway 14 and 32.

- **Landing Thresholds**

The landing thresholds (the first points at which aircraft can legally touchdown on the pavement in non-emergency conditions) are not displaced on the Runway 32 approach end at GAI. However, the approach to Runway 14 is displaced approximately 200 feet. Since the approach end to Runway 14 is preceded by a ravine, the displacement is there to provide a safety area should aircraft land short of the touchdown point on the runway. The thresholds are noted in Figure 5.2. The NOISEMAP computer model used in this study assumes a standard threshold crossing height of 50 feet on arrival.

- **Airfield Elevation**

The official elevation of GAI is 540 feet above mean sea level (MSL). The airpark is located in gently rolling terrain with elevations ranging up to 1200 feet MSL (320 feet above ground level) to the north of the airpark. Reviewers of this document should note whether altitudes are being discussed in terms of MSL or above ground level (AGL).

6. RUNWAY UTILIZATION

The next six chapters describe the airport operational parameters and how these are used in the noise modelling process. As discussed in Chapter 3, the NOISEMAP computer model is the analytical tool that was used in this study in developing cumulative noise exposure estimates in terms of the Day-Night Average Sound Level, Ldn. That chapter provides a description of the model and its required input.

A major input to the noise modeling process is average annual runway utilization: that is, the percentage use of each runway end. Runway utilization depends on several factors, including wind conditions, runway length and heading, aircraft type and performance, flight purpose (origin/destination), and terrain. More specifically:

(1) In general, pilots prefer to take off and land into the wind. Generally, lighter aircraft are more susceptible to wind effects. The stronger the wind is, the more it has to be taken into account.

(2) Aircraft performance can be an issue when aircraft have operational requirements that some runway ends do not meet. For example, in hot weather the air is less dense and aircraft require a greater runway length to takeoff.

(3) Flight origins and destinations can affect runway selection to the extent that one runway end offers a shorter flight and/or ground taxi time. Flight purpose can be an issue if the tower segregates one or more types of activity, such as touch-and-go training operations.

(4) Darkness or poor visibility (instrument flight rules) may dictate which runways are used due to the nature of the terrain surrounding the airpark.

(5) The aircraft's pilot has ultimate decision-making authority over which runway, out of all operational runways, he or she will use.

Development of the runway utilization rates were based on the wind rose data and from interviews with airpark management and pilots at GAI. The wind rose data from Dulles International Airport, whose weather has been determined to be representative of GAI, was analyzed to determine actual runway use[12]. The All-Weather Wind Rose for GAI is presented in Appendix C. The analysis and discussions resulted in the utilization rates presented in Table 6.1.

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[12] U.S. Department of Commerce, National Oceanic and Atmospheric Administration, Dulles International Airport, January 1965 - December 1974.

7. FLIGHT TRACK DESCRIPTIONS AND UTILIZATION

Flight tracks represent the ground projection of "average" paths flown by aircraft at an airport. The development of a set of flight tracks, which provide a reasonable description of the broad range of operations and conditions actually operating on the annual average day, is a complex task at an airport.

The objective of this chapter is the definition of prototypical flight tracks and the development of utilization rate which are both reasonable and manageable for the modelling program. Section 7.1 describes the assumptions behind the development of the flight track geometry. Section 7.2 discusses the utilization rates.

7.1 Flight Track Geometry

A flight track is the ground projection of flight path flown by an aircraft for a given operation. Aircraft operations at GAI fall into three basic classes of flight tracks: (1) departures, (2) arrivals, and (3) touch-and-go "patterns." The first two of these classes do not require definition. The patterns flown at GAI are discussed below.

The touch-and-go pattern is a sequence of turns and straight segments which form a rectangular or oval "box". Aircraft which fly the complete pattern are said to be executing a "touch-and-go". Patterns have a direction associated with them. A "left-hand" pattern means that all turns are to the pilot's left. Departing and arriving aircraft will most often leave or enter the pattern at or near one of the turns.

Each airport specifies a set of operating procedures which dictate how the pattern is flown. Patterns may vary from runway to runway. At GAI, a typical touch-and-go pattern on each runway would have the following common elements:

- climb straight out on runway heading;
- turn 90 degrees onto the "crosswind" leg of the pattern;
- continue climbing to pattern altitude;
- upon reaching pattern altitude of 800 feet above ground level (AGL) or 1340 feet above mean sea level (MSL) or at a designated area (with the specific location varying from runway to runway), turn 90 degrees onto the "downwind" leg;
- maintain pattern altitude (800 ft. AGL) over the downwind leg until abeam of the landing threshold of the runway being used or until another designated landmark is passed (once again specific instructions vary with the runway being used) and then initiate descent;
- turn 90 degrees towards the airport (to the "base" leg) when a line from the aircraft to the runway end is at approximately a 45 degree angle from the runway centerline;

- make turn to "final" when the aircraft is in line with the runway end;
- descend to land on specified runway.

Flight tracks were developed for GAI based on the results of field observation of actual aircraft operations and from interviews with airport management and with corporate pilots. Observation by field personnel provided confirmation of flight corridors over particularly sensitive areas. Personnel familiar with operations at the airport provided information on major departure, arrival, and pattern corridors. A principal source of flight track information is usually the FAA's Automated Radar Terminal System (ARTS). However, since GAI is a non-towered airport, radar information was not available.

Since each runway has a unique orientation and set of associated procedures, the flight tracks associated with each are discussed individually below. The tracks are depicted in Figures 7.1, 7.2, and 7.3, with appropriate labels and arrows indicating direction of flight. Figure 7.1 depicts the departure tracks on the 2,000 feet-to-the-inch scale base map that is the basis of most figures in this document. Figure 7.2 depicts the arrival tracks, while the touch-and-go patterns are presented in Figure 7.3.

A standard nomenclature has been adopted to clarify the tables and figures in this Chapter. Each track is assigned a four character name. The first two characters are numbers that designate the runway used by the flight track (14 or 32); the next character are letters that describe the type of operation. Arrival tracks use the letter "A", departure tracks use a "D" and touch-and-go tracks use "T". The last digit distinguishes that track from other arrival, departure or touch-and-go tracks on that particular runway.

7.2 Flight Track Utilization Rates

Tables 7.1, 7.2 and 7.3 present the departure, arrival, and touch-and-go flight track utilization assumed in the 1989/1990 base case (1991 existing) and the 1996 future case noise contours. The utilization percentages are based on estimates provided by airport management and corporate pilots.

Essentially all touch-and-go pattern operations are assumed to be performed by student pilots or pilots maintaining proficiency training. Therefore, only single- and twin-piston propeller aircraft were modelled flying full patterns. Multiple patterns arise from some very early turns and some very late turns. This variation results in a general uniform density of tracks over a broad area. This variation in pattern dimension results in pilots flying a relatively broad flight corridor rather than on a concentrated single, narrow path.

MONTGOMERY COUNTY AIRPARK

FAR PART 150 STUDY

MONTGOMERY COUNTY REVENUE AUTHORITY

FIGURE 7.1

DEPARTURE FLIGHT TRACKS

N

2000 1000 0 2000

SCALE IN FEET

HARRIS MILLER MILLER & HANSON INC.

THE LPA GROUP INCORPORATED

HANIFIN ASSOCIATES, INC.

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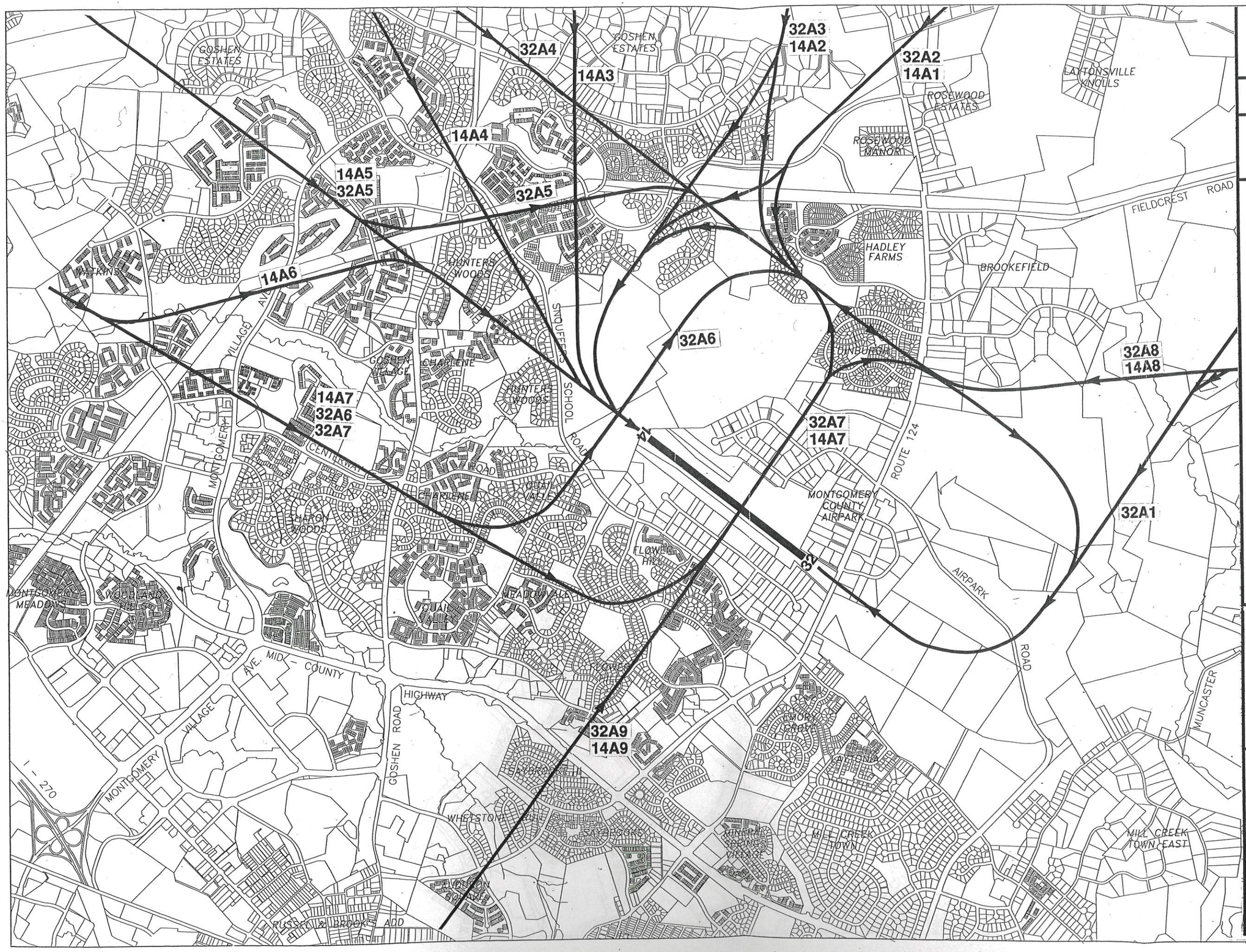


MONTGOMERY COUNTY AIRPARK

FAR PART 150 STUDY

MONTGOMERY COUNTY REVENUE AUTHORITY

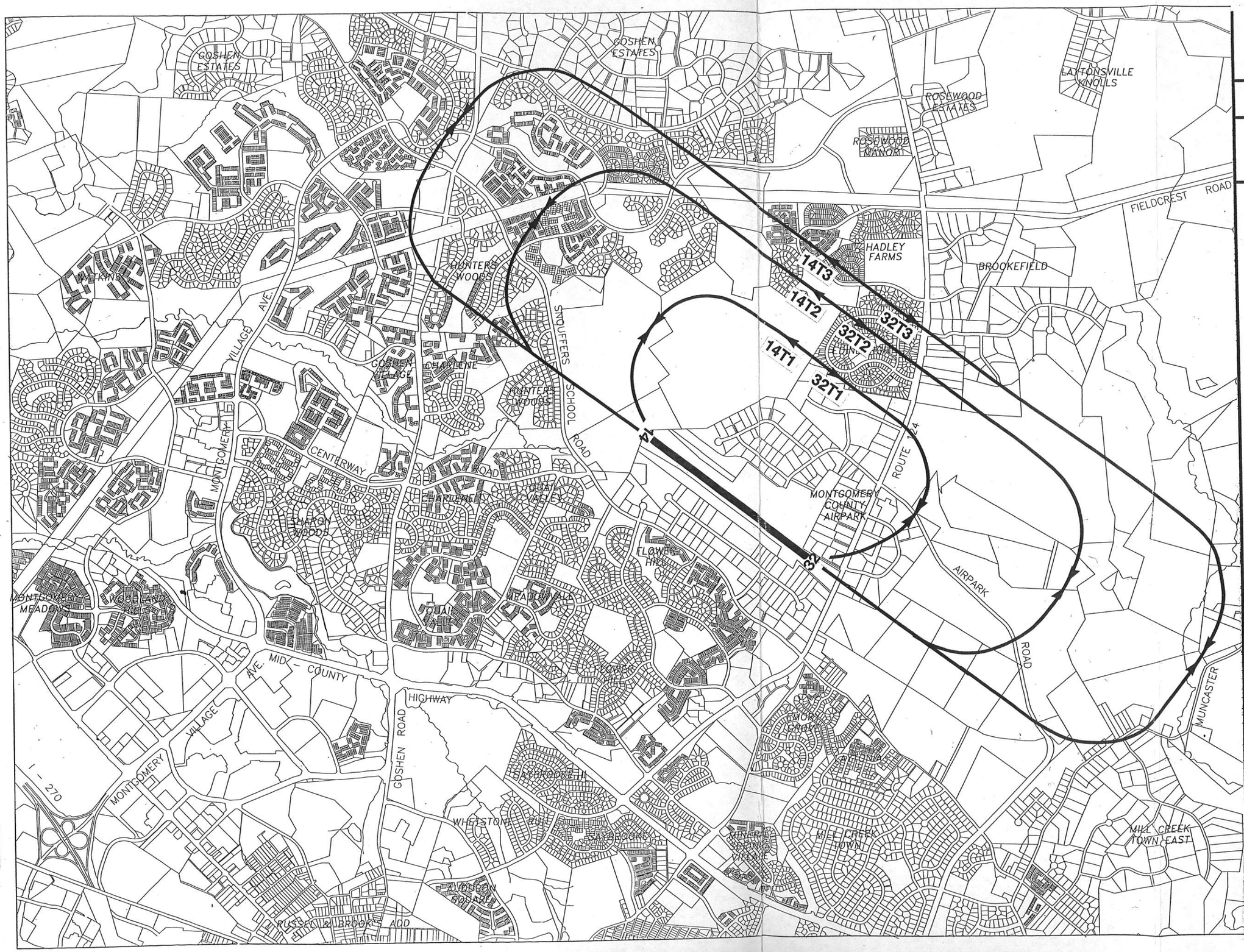
FIGURE 7.2

ARRIVAL FLIGHT TRACKS

HARRIS MILLER MILLER & HANSON INC.

THE LPA GROUP INCORPORATED

HANIFIN ASSOCIATES, INC.



MONTGOMERY COUNTY AIRPARK

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FIGURE 7.3

TOUCH-AND-GO FLIGHT TRACKS

N

2000 1000 0 2000

SCALE IN FEET

HARRIS MILLER MILLER & HANSON INC.

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Table 7.1
Departure Flight Track Utilization By Percent

		Departures			
Runway	Track Name	Single-Engine	Multi-Engine	Corporate Jet	Helicopter
14	14D1	33	33	0	33
	14D2	33	33	49	33
	14D3	1	1	1	1
	14D4	32	32	49	32
	14D5	1	1	1	1
	Total:	100	100	100	100
32	32D1	10	10	10	10
	32D2	10	10	10	10
	32D3	10	10	10	10
	32D4	50	50	50	50
	32D5	20	20	20	20
	Total:	100	100	100	100

Table 7.2
Arrival Flight Track Utilization By Percent

		Arrivals			
Runway	Track Name	Single-Engine	Multi-Engine	Corporate Jet	Helicopter
14	14A1	20	20	20	20
	14A2	20	20	20	20
	14A3	5	5	5	5
	14A4	5	5	5	5
	14A5	5	5	5	5
	14A6	5	5	5	5
	14A7	5	5	5	5
	14A8	30	30	30	30
	14A9	5	5	5	5
	Total:	100	100	100	100
32	32A1	10	10	10	10
	32A2	10	10	10	10
	32A3	10	10	10	10
	32A4	10	10	10	10
	32A5	10	10	10	10
	32A6	10	10	10	10
	32A7	10	10	10	10
	32A8	20	20	20	20
	32A9	10	10	10	10
	Total:	100	100	100	100

Table 7.3
Touch-and-Go Flight Track Utilization By Percent

Touch and Go Operations		
Runway	Flight Track Name	Single/Twin Piston
14	14T1	33
14	14T2	34
14	14T3	33
32	32T1	33
32	32T2	34
32	32T3	33

In order to calculate the number of operations to model on each track for a given aircraft, the percent use for each track was applied to the number of daily operations by that aircraft type, multiplied by the annual runway use.

7.3 Flight Track Description

The following discussion provides information on the distribution and utilization of each of the flight tracks.

7.3.1 Departure Flight Tracks

A total of 10 departure tracks were modelled for both the existing and future case as presented in Figure 7.1.

- **Runway 14**

There were five departure tracks modelled from Runway 14. After departing on Runway 14, tracks 14D1 and 14D2 turn left and proceed north toward the Westminster VOR, while tracks 14D3 and 14D5 turns right and proceeds south toward IAD and DCA. Some of the traffic, track 14D4, makes a slight left turn and proceeds toward BWI and the coast. Most traffic turns to the north or towards the coast (98%), while only two percent turns to the south. All aircraft, except corporate jets, were modelled using all five departure tracks. Corporate jet aircraft were assumed to make a later turn to the north and would use only track 14D2.

- **Runway 32**

Runway 32 was also modelled using five departure flight tracks. After departing, tracks 32D1, 32D2, and 32D3 turn north, while track 32D4 continues on runway heading. Track 32D5 turns east toward BWI and the coast. All aircraft were assumed to use all tracks, with the majority of the traffic

(50%) turning east. Since corporate jets contain a higher proportion of itinerant aircraft (not based at GAI), it was assumed that a higher percentage of the corporate jet operations were unable, unwilling, or unaware of the request to turn right after departure. The remaining fifty percent of the aircraft are assumed to be split almost evenly between the right turns and the straight out departure on runway heading.

7.3.2 Arrival Flight Tracks

The arrival flight tracks are presented in Figure 7.2. Eighteen arrival tracks were modelled for the existing and the future case.

- **Runway 14**

Nine tracks were used to model arrivals on Runway 14. Track 14A1 utilizes the approach from the northeast over the water tanks on Gaithersburg-Laytonville Road. Track 14A2 is an approach from the Westminster VOR. Tracks 14A3, 14A4, and 14A5 are approaches from the Frederick VOR, while the approaches from IAD and DCA utilize tracks 14A6, 14A7, and 14A9. Aircraft from BWI and the coast use track 14A8. All aircraft are assumed to use all tracks, with the majority of the arrivals on tracks 14A1, 14A2, and 14A8 (70%). The remaining thirty percent of the traffic is evenly distributed over the other tracks.

- **Runway 32**

Arrivals on Runway 32 were also modelled using nine tracks. Track 32A1 is an approach from the BWI area. Track 32A2 approaches from the northeast over the water tanks on Gaithersburg-Laytonville Road, while track 32A3 approaches from the Westminster VOR. Tracks 32A4 and 32A5 approach from the Frederick VOR, while tracks 32A6, 32A7, and 32A9 approach from the IAD/DCA area. Track 32A8 approaches from BWI and the coast. All aircraft are assumed to use all tracks, with the traffic almost evenly distributed over all the tracks.

7.3.3 Touch-and-Go Flights Tracks

Standard touch-and-go tracks at GAI, as presented in Figure 7.3, include left-hand patterns on Runway 14 and right-hand patterns on Runway 32. On busy days, pattern lengths can be extended because of increased occupancy of the pattern and the need for sufficient spacing between aircraft. Due to the corridor defined by the pattern operations observed during the field measurement program and from discussions from corporate pilots, three touch-and-go tracks have been defined for each runway. In order to model the even distribution of aircraft across the corridor, flight tracks were evenly spaced across the area. Operations on each track are assumed to be equal.

8. FLIGHT PROFILES

Similar to the way a flight track shows the horizontal ground projection of the path followed by an aircraft during an operation, the flight profile provides information on the vertical dimension (the altitude at any point along the flight path). Data on flight profiles is not specifically collected during the field measurements. Instead, the FAA's computer model data base (Version 9) assumes standard departure and arrival profiles for each individual aircraft. Discussions with pilots at GAI confirmed that the pattern altitude at GAI is 1,340 feet mean sea level (MSL) or 800 feet above ground level (AGL).

9. EXISTING NOISE ABATEMENT PROCEDURES

The Montgomery County Airpark has several noise abatement procedures published as part of their "Airport Regulations"[13]. These regulations are presented in Appendix D. The regulations specifically set forth a number of procedures to address concerns identified within the GAI environs. The procedures cover traffic patterns, approach and departure routes, altitudes, noise abatement procedures, ground operating rules, rotorcraft operations, disabled aircraft, accidents, and insurance. Several policies refer specifically to, or are related to noise abatement and include instructions for pattern altitudes and locations, a departure turn on Runway 32, and restrictions nighttime operations by noisier aircraft.

The first procedure sets pattern altitude at 1,340 feet MSL or 800 feet AGL (Section II.A.(1)). Turns on Runway 32 patterns shall be to the right and for Runway 14 they shall be to the left (Section II.B.(3)). Most aircraft seem to comply with this regulation.

The next procedure assigns jet aircraft departing on Runway 32 a right turn and a heading of 340 degrees (Section III.A.). Most based aircraft seem to comply with the regulation, while itinerant aircraft tend to ignore the regulation.

The last procedure prohibits aircraft operations between the hours of 11:00 p.m. and 7:00 a.m. if their FAA AC 36-3E noise levels exceed 90 dBA in landing and 82 dBA in takeoff (Section III.D.). This regulation was never approved by the County Council and, therefore, never put into effect. It also has no legal or technical basis and probably would not be approved by the FAA.

The airpark also has an airside sign used for noise abatement purposes. The sign, located near the departure end of Runway 32, reminds pilots to turn right after departures on Runway 32. The sign reads: "Noise Abatement - Runway 32, turn right to at least 340 degrees, refrain from night use of Runway 32".

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[13] Montgomery County Airpark, Airport Regulations, November 1, 1989

10. BASE CASE AIRPORT ACTIVITY

The number of daytime and nighttime operations conducted at GAI by each aircraft type (the "fleet mix") is the final operational input to the model.

In order to address the most current situation possible, the base case was defined to be the 12 months immediately preceding the start of the inventory phase of this project: October 1989 through September 1990. Section 10.4 provides a discussion of the rationale for basing the "current year" 1991 analysis on the data for that period.

10.1 Data Sources Used in Developing the Base Case Fleet Mix

Data for the base case fleet were obtained from an aircraft activity study undertaken by the Maryland Aviation Administration (MAA) at GAI. In addition, discussions with airport personnel and pilots presented additional information to the overall fleet mix. The use of this source is discussed below, followed by a summary of the overall approach taken to the fleet mix development (Section 10.2) and the resulting breakdown into the annual and average daily operations (Section 10.3).

10.1.1 Aircraft Activity Counts

Since GAI is a non-towered airport, records of aircraft operations at the airpark are virtually non-existent. Therefore, over the last year the MAA has undertaken a study to determine the annual operations at the airpark. Using what is called an aircraft activity counter (AAC), personnel from the MAA set up equipment for approximately two weeks during each of the four seasons through out a one year period. The AAC is an accurate means of obtaining a count of aircraft movements at small non-towered airports. The resulting data is accurate within a 95 percent confidence level.

The data from the AAC presented annual takeoffs at GAI at 54,164 or annual operations (takeoffs and landings) of 108,328 within the 95 percent confidence level (±12.27%). The operations, which can be broken down into daily and hourly counts, provide four categories of aircraft, as follows:

- single-engine propeller;
- multi-engine propeller;
- jet; and
- helicopter.

The hourly traffic counts from the AAC also provided data which accounts for the day/night percents needed for the noise analysis.

10.2 Overall Approach Taken to Fleet Mix Development

The overall approach to the fleet mix development consisted of the following steps:

- derive total annual operations from the MAA report using the AAC;
- develop single-engine, multi-engine, jet, and helicopter fleet mixes through analysis of AAC daily counts;
- analyze daily counts to adjust the fleet mix to account for nighttime operations;
- develop annual breakdown of the four counted aircraft categories into specific aircraft types for noise modelling purposes through discussions with airport management and FBO's; and
- divide totals by 365 to arrive at annual average day values as required by Part 150.

10.3 Aircraft Operations

The AAC logged, during the 1989/1990 period, a total of 108,328 annual operations. These operations are accurate within a 95 percent confidence interval (±12.27%). The operations are summarized and presented as annual operations in Table 10.1. In addition to the MAA counts, the helicopter operations were increased by 325 to account for annual helicopter operations that do not use the runway for departures or arrivals and, therefore, would not have been logged by the AAC. These estimates were provided by airpark management. The table also presents the general fleet mix and the day/night breakdown for each of the aircraft categories.

Table 10.1
1991 Annual Operations

Aircraft Fleet	Total		Day		Night	
	%	Ops.	%	Ops.	%	Ops.
Single-Engine	94.7	102,912	96.9	99,722	3.1	3,190
Multi-Engine	3.3	3,575	94.9	3,393	5.1	182
Corporate Jet	1.0	1,083	91.9	995	8.1	88
Helicopter	1.0	1,083	98.1	1,062	1.9	21
Total	100.0	108,653		105,172		3,481

The resulting base case average daily fleet mix is presented in Table 10.2. The mix is disaggregated into four aircraft categories and numerous other aircraft types. These aircraft types represent classes with common noise and performance characteristics. To clarify the classification scheme, brief discussions of the classes are presented below.

- **Single-Engine**

This aircraft type is by far the most common operating at GAI, accounting for almost 95 percent of the total operations with 281.951 average daily operations. While these aircraft are generally the quietest class operating at the airport, the volume of activity that they represent cause them to be a source of noise in the airport's environs that cannot be overlooked. All single-engine piston aircraft are modelled using the fixed-pitch single-engine piston aircraft in the data base.

- **Multi-Engine**

This aircraft category represents both the recreational and corporate aircraft using twin-piston propeller aircraft and the corporate and air taxi operators using turbine powered propeller (turbo-prop) aircraft. The twin-engine aircraft comprise over three percent of the aircraft operations (9.795 average daily operations) at GAI. Approximately 60 percent are the twin-engine piston aircraft which are similar to the Beechcraft Baron 58. The twin-engine turboprop aircraft generally are split between the Beechcraft King Air 90/100/200 (20%) and the Cessna 441 Conquest (20%).

- **Corporate Jet**

Although corporate jet activity accounts for less than one percent of the operations, or 2.967 average daily operations at GAI, it is also the noisiest and therefore the most disturbing aircraft operating at the airpark. Six types of corporate jets are identified as the most common aircraft operating at GAI. The based Israel Aircraft Industries Westwind 1124 which accounts for 40 percent of the jet operations, the Cessna Citation II/III with 30 percent of the operations, the Beechcraft Beechjet 400 with 15 percent, the British Aerospace 125-800 with 14 percent, and the Dassault Falcon 50 with one percent of the total jet operations.

- **Helicopters**

Helicopters account for less than one percent of the total operations or 2.967 average daily operations at GAI. Through discussions with airpark personnel the specific helicopter types can be defined. A based Robinson R22 Alpha accounts for approximately 60 percent of the helicopter operations, while the remaining 40 percent is split

Table 10.2
1991 Annual Average Daily Operations

Aircraft Type	% of Fleet	Arrivals Day	Arrivals Night	Departures Day	Departures Night	Touch-and-Goes Day	Touch-and-Goes Night	Total Daily Operations
Single-Engine	94.7	81.963	2.622	81.963	2.622	109.398	3.383	281.951
					Total Single-Engine:			281.951
Beechcraft Baron 58	2.0	2.649	0.142	2.649	0.142	0.295	0.000	5.877
Beechcraft KingAir	0.7	0.930	0.050	0.929	0.050			1.959
Cessna 441 Conquest	0.7	0.930	0.050	0.929	0.050			1.959
					Total Multi-Engine:			9.795
IAI Westwind 1124	0.4	0.545	0.049	0.545	0.048			1.187
Beechjet 400	0.1	0.204	0.019	0.204	0.018			0.445
Cessna Cit. II/III	0.3	0.409	0.036	0.409	0.036			0.890
British Aero. 125-800	0.1	0.191	0.017	0.191	0.016			0.415
Dassault Falcon 50	0.1	0.014	0.001	0.014	0.001			0.030
					Total Corporate Jet:			2.967
Robinson R22 Alpha	0.7	0.838	0.016	0.838	0.016	0.427	0.000	2.135
Bell 206 JetRanger	0.1	0.204	0.004	0.204	0.004			0.416
Sikorsky S-76 Spirit	0.1	0.204	0.004	0.204	0.004			0.416
					Total Helicopter:			2.967
					TOTAL DAILY OPERATIONS:			297.680

between the Bell 206 JetRanger and the Sikorsky S-76 Spirit. Due to the specific lack of concern about helicopter noise, the small levels of activity and the relatively quiet nature of the helicopter, when compared to jet and turboprop aircraft, no helicopter activity was modelled at this time.

10.4 Comparison of Base Year to Current Year (1991)

Part 150 regulations call for the Noise Exposure Map (NEM) to present noise contours for the current year and the fifth calendar year which follows. The current year is usually defined as the year the NEM is submitted. The 1989/1990 base case conditions discussed above are assumed to be representative of current 1991 conditions because activity at the airpark is expected to undergo only a minor growth in activity in the immediate planning period. Therefore, the contours presented throughout this document for the base year, 1989/1990, can be thought of as depicting current or existing year conditions (1991).

11. FORECAST OF AIRPORT ACTIVITY

FAR Part 150 requires that the Noise Exposure Map (NEM) include estimated noise exposure contours for a forecast year, five years from the year of submittal of the NEM. As discussed in Chapter 10, the base case year studied was 1989/1990. However, submittal of the Noise Exposure Maps will not be undertaken until 1991, resulting in 1991 being used as the current or submittal year (see discussion in Chapter 10). FAA allows the year of submittal to be different from the base year if operations increase less than 15 percent. This would result in an actual future or forecast year of 1996.

Operations for GAI in the year 1996 were evaluated from several different sources. The most recent System Plan for GAI presented 195,700 existing 1990 operations and projected 244,900 annual operations by the year 2000[14]. Interpolating the operations to 1995 results in 220,300 annual operations. The Terminal Area Forecasts (TAF) from FAA presents 194,000 existing (1990) operations and projected operations of 232,000 by 1995[15]. A comparison of the operational forecasts are presented in Table 11.1 The existing operations from the System Plan and the TAF's are all much higher than the existing operations provided by the MAA. Therefore, these future operations forecasts are unreasonably high.

Table 11.1
Operational Forecasts

Year	System Plan Forecasts	FAA Forecasts	MAA Operations
1990	195,700	194,000	108,653
1995	220,300[1)]	232,000	122,310[2)]
2000	244,900	---	

1) Interpolated between 1990 and 2000.
2) Forecasted using annual growth rate in System Plan forecasts.

14 "System Plan Summary - Montgomery County", Dynaplan International Corporation, December 1989.

15 "Terminal Area Forecasts FY 1990-2005", Federal Aviation Administration, July 1990

The actual operational forecast uses the same pattern of growth that was used in the System Plan. The System Plan forecasts a growth rate of 12.57 percent over five years or a growth rate of 2.396 percent per year. This growth rate applied to the existing operations of 108,653 results in a forecasted level of total operations in 1996 of 122,310. An analysis of the System Plan and discussions with Airpark and County officials reveals that no major improvements are planned at the airpark within the next five years. This would result in different aircraft using the airpark and, ultimately, result in a change in the future fleet mix.

Therefore, the forecasts assume that the fleet mix would not change and that all aircraft categories would experience increased operations by the year 1996. Table 11.2 presents the resulting annual average day operations for 1996, by aircraft category, and compares them to the actual 1991 annual operations. The resulting future 1996 average annual day operations are presented in Table 11.3. The mix is disaggregated into four aircraft categories and represent classes of aircraft types with common noise and performance characteristics. To clarify the classifications, brief discussions of the classes are presented below.

- **Single-Engine**

This aircraft type would still be the most common operating at GAI in 1996, accounting for almost 95 percent of the total operations with 317.393 average daily operations. This would be modelled using the fixed-pitch single-engine piston aircraft in the data base.

- **Multi-Engine**

This aircraft type, which comprises the twin-engine piston and turbine-powered propeller (turbo-prop) aircraft, accounts for over three percent of the aircraft operations (11.024 average daily operations) at GAI. This aircraft is modelled using the twin-engine piston Beechcraft Baron 58 and the twin-engine turboprop Beechcraft King Air 90/100/200 along with the Cessna 441 Conquest.

- **Corporate Jet**

The corporate jet activity in 1996 accounts for less than one percent of the operations, or 3.340 average daily operations at GAI. The aircraft is modelled using the Israel Aircraft Industries Westwind 1124, Cessna Citation II/III, Beechcraft Beechjet 400, British Aerospace 125-800, and the Dassault Falcon 50.

- **Helicopters**

Helicopters account for less than one percent of the total operations or 3.340 average daily operations at GAI. The specific helicopter types include the Robinson R22 Alpha, Bell 206 JetRanger, and the Sikorsky S-76 Spirit. However, as a result of the small levels of activity and the relatively quiet nature of the helicopter, no helicopter activity was modelled at this time.

Table 11.2
Operational Comparison

Aircraft Type	Annual Average Operations 1991 Existing Case	% of Total	1996 Future Case	% of Total
Single-Engine	102,912	94.7	115,848	94.7
Multi-Engine	3,575	3.3	4,024	3.3
Corporate Jet	1,083	1.0	1,219	1.0
Helicopter	1,083	1.0	1,219	1.0
Annual Total	108,653	100.0	122,310	100.0
Daily Total	297.680	---	335.097	---

Table 11.3
1996 Annual Average Daily Operations

Aircraft Type	% of Fleet	Arrivals Day	Arrivals Night	Departures Day	Departures Night	Touch-and-Goes Day	Touch-and-Goes Night	Total Daily Operations
Single-Engine	94.7	92.266	2.952	92.266	2.952	123.149	3.808	317.393
					Total Single-Engine:			317.393
Beechcraft Baron 58	2.0	2.982	0.160	2.982	0.160	0.332	0.000	6.616
Beechcraft KingAir	0.7	1.046	0.056	1.046	0.056			2.204
Cessna 441 Conquest	0.7	1.046	0.056	1.046	0.056			2.204
					Total Multi-Engine:			11.024
IAI Westwind 1124	0.4	0.613	0.055	0.613	0.055			1.336
Beechjet 400	0.1	0.230	0.021	0.230	0.021			0.502
Cessna Cit. II/III	0.3	0.460	0.041	0.460	0.041			1.002
British Aero. 125-800	0.1	0.215	0.019	0.215	0.019			0.468
Dassault Falcon 50	0.1	0.015	0.001	0.015	0.001			0.032
					Total Corporate Jet:			3.340
Robinson R22 Alpha	0.7	0.942	0.018	0.942	0.018	0.480	0.000	2.400
Bell 206 JetRanger	0.1	0.230	0.005	0.230	0.005			0.470
Sikorsky S-76 Spirit	0.1	0.230	0.005	0.230	0.005			0.470
					Total Helicopter:			3.340
					TOTAL DAILY OPERATIONS:			335.097

12. EXISTING NOISE EXPOSURE

This chapter presents the noise contours as developed from the existing operations data. These contours, as explained in Section 10.4 are representative of the current year 1991 conditions.

12.1 Noise Exposure Contours

This section presents the noise exposure contours for the 1991 existing period. The noise metric utilized is the Day - Night Average Sound Level, Ldn. Ldn is the metric which Part 150 requires be used in depicting cumulative exposure. Chapter 2 introduces Ldn.

Figure 12.1 presents the 1991 Ldn noise exposure contours during an average annual day in the current year.

12.2 Comparison With Measured Levels

As detailed in Chapter 4, measurement periods of approximately six to nine days were undertaken at the three long-term measurement sites. Table 12.1 presents the comparison of the measured versus computed Ldn for these three sites. The measured Ldn, as presented previously in Table 4.5, is the energy average of each day's Ldn during the measurement period. The computed Ldn is the annual average day Ldn calculated using the NOISEMAP computer model, for the 1991 existing noise contours presented in Figure 12.1.

Table 12.1
Measured Versus Computed Ldn

Measurement Site	Computed Ldn	Measured Ldn	Difference in Ldn[1)]
1	55.5	58.6	-3.1
2	45.0	56.6	-11.6
3	53.5	61.1	-7.6

1) Computed - Measured Ldn.

Reviewers should recall that the computed Ldn values are an estimate of cumulative aircraft noise exposure for operations on the average annual day. Given the relatively short measurement durations, approximately six to nine days, and the fact that operations during the measurements were not equal to those on the average annual day, one would expect differences between computed and measured levels. Additionally, lower levels of aircraft noise (levels below about 60 dB Ldn) are difficult to measure

accurately in suburban neighborhoods where non-aircraft noise levels are typically in the mid-50's (Ldn).

At Site 1, the computed level was about three decibels lower than the measured average. Site 1 is located in a residential area off the approach end to Runway 14. The area is affected by traffic noise on neighboring streets. During the measurement period, Runway 32 was the active runway for departures approximately 57 percent of the time. This compares well with the modelled runway use of 65 percent on Runway 32.

An analysis of Tables 4.2 or 4.5 reveals noise levels on the last two days of the measurements were 3.0 to 6.3 dB higher than on the previous five days. The last two days actually occurred during a separate measurement trip. Field observations revealed high wind conditions during that period. During this two day period, small single-engine piston powered aircraft had very high SEL's, since the high winds restricted their forward movement and delayed their flight time over a specific point. As a result, the Ldn levels recorded on the last two days are not considered typical of the annual average conditions. If the average Ldn is calculated on only the first five days, the average Ldn is reduced to 56.7, or only 1.1 dB greater than the computed values. Site 1 also had some background noise levels which tended to increase the measured Ldn values. This included the traffic on Snouffer School Road and the nearby residential streets.

The computed level at Site 2 was almost 12 decibels lower than the average measured level. Site 2 is located in a quiet residential area, located away from the nearest traffic noise source.

The measured Leq noise levels remain fairly constant during all hours of the day. The constant noise levels are a result of; (1) the relatively quiet background noise levels of the measurement location and the lack of extraneous noise sources, (2) the relatively quiet nature of the aircraft events over Site 2, (3) the steady cyclical nature of the noise levels from the air conditioner/heat pump units in the back yard of the areas houses, and (4) the steady nighttime noise levels created by insects during warmer months.

At Site 2 the measured hourly noise levels, with aircraft, were typically one to three dB higher than the background hourly noise levels. Therefore, it is difficult to accurately compare measured and modelled aircraft noise at levels below 60 Ldn, which are approaching the background noise levels of a quiet residential neighborhood. Site 2 and its residential location with neighboring houses all had outdoor air conditioning/heat pump units. These units seemed to be in regular operation at night which contributed to a higher nighttime noise level. In addition, insect noise creates a steady background level on warmer evenings. As a result, noise levels at night seemed to be in the range of six to ten dB higher than the nighttime noise levels at Site 1. If

nighttime levels at Site 2 had been comparable to levels at Site 1, measured Ldn values would have been approximately two dB less than previously measured.

In addition, a new residential development was under construction adjacent to the rear of Site 2. Noise levels during the day were higher than would normally be recorded at this location.

Site 2 is impacted by aircraft on arrival to the airpark and on the downwind of a touch-and-go pattern. However, traffic over this measurement site is widely scattered and does not have the narrower field-of-flight afforded Site 1 and 3, which are located relatively close to the ends of the runways. Due to the widely scattered nature of the observed flight tracks, only one touch-and-go pattern track and none of the arrival tracks were located directly over this site. The lack of overhead flight tracks would also contribute to the result that computed levels are less than modelled levels.

At Site 3, the computed levels are about eight decibels less than measured levels. One factor primarily accounts for this underprediction; the noise levels from traffic on Gaithersburg-Laytonville Road and in the Lindbergh Center Business Park on Lindbergh Drive contributed to the measured levels. In addition, the noise levels from construction sites in the Industrial Park and nighttime insect noise contributed to the overall measured noise levels at Site 3.

The measured hourly noise levels at Site 3, with aircraft, were typically one to three dB higher than the background hourly noise levels, it is difficult to accurately compare measured and modelled aircraft noise at levels below 60 Ldn, which are approaching the background noise levels of a quiet residential neighborhood.

The computer model reflects only aircraft noise, therefore, noise levels obtained during the measurement period would be expected to be higher than the noise level obtained from the model.

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FIGURE 12.1

Ldn CONTOURS FOR EXISTING (1991) ANNUAL AVERAGE DAY OPERATIONS

N

2000 1000 0 2000

SCALE IN FEET

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13. FUTURE NOISE EXPOSURE

This chapter presents the noise exposure contours as developed from the future operations data. The 1995 forecast activity data is discussed in Chapter 11.

13.1 Noise Exposure Contours

Figure 13.1 presents the Ldn noise exposure contours during an annual average day for the forecast year 1996. As discussed in Chapter 11, these contours are a technically sound basis for the estimated five year forecast contours (1996) required for the NEM.

Figure 1.1 presents a direct comparison of the existing 1991 and the future 1996 noise exposure contours. The contours are almost exactly the same with only a slight increase in size due to the 12.57 percent increase in the operations.

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FIGURE 13.1

Ldn CONTOURS FOR FUTURE (1996) ANNUAL AVERAGE DAY OPERATIONS

N

2000 1000 0 2000

SCALE IN FEET

HARRIS MILLER MILLER & HANSON INC.

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14. NOISE/LAND USE COMPATIBILITY

Once the noise exposure areas have been defined, the next step in the airport noise compatibility planning process is to evaluate off-airport land use within the noise contours. The objective of this evaluation is to identify any developed areas in the airport environs that are considered incompatible with airport-generated noise. Federal Aviation Regulations (FAR) Part 150 delineates the guidelines for noise/land use incompatibility around airports.

The FAA-mandated means for describing noise exposure associated with airport operations is in terms of the Day-Night Average Sound Level (Ldn), which delineates noise in 5-decibel increments known as Ldn noise contours. Previous sections of this document have presented existing and future contours for GAI. This chapter presents land use information for the airport environs (Section 14.1), and information on land use planning and control authority required in the Noise Exposure Map (Section 14.2). It also tabulates the potential incompatibilities indicated by the three way comparison of noise, land use, and compatibility guidelines information (Section 14.3).

According to FAR Part 150, all land uses are compatible with a noise exposure level of less than Ldn 65, however, the land area within the 65-Ldn contours is virtually non-existent. Therefore, for purposes of this study impacted areas within the 55-Ldn noise contours, outside of airport property, will be discussed. Section 14.3 also presents information that reviewers might find useful in interpreting the noise/land use comparison, including a discussion of the relevance of considering noise/land use compatibility where Ldn is below the Part 150 lower limit of 65 dB in its published guidelines.

Noise impacts on land uses off the Airport were identified by means of the noise exposure maps depicting the existing (1991) noise contours and the future (1996) scenario. The development of these noise exposure maps was discussed in previous sections of this document. The off-airport land use analysis focused on the areas located within the boundaries of the areas identified on the two noise exposure maps.

14.1 Land Use in the GAI Environs

A comprehensive inventory of off-airport land use within Montgomery County in the environs of Montgomery County Airpark was conducted. The most current and reliable information that was available to identify existing land use on a county-wide basis were property maps prepared by Montgomery County. These maps were obtained from Montgomery County in October, 1990 and digitized into a computer format. In order to validate the property Maps, an on-site windshield survey of the study area was conducted in October, 1990. The information obtained through this land use inventory process is presented in the existing land use map in Figure 14.1 and in

Figure 14.1
Land Use In The GAI Environs

TO BE INCLUDED AT A LATER DATE

the following discussion of land use in the area surrounding Montgomery County Airpark.

FAR part 150 suggests that various general categories of off-airport land use (i.e. residential, commercial, industrial, etc.) be catalogued within the noise exposure area; Ldn 65 and above. Part 150 has set forth guidelines for noise and land use compatibility based on various levels of noise exposure. These guidelines are presented in Table 14.1. In addition, FAR Part 150 also suggests that noise sensitive receptors (i.e. schools hospitals, churches) within the noise exposure area be identified. Any noise sensitive sites are identified in this section. Montgomery County is the government jurisdiction with areas impacted by the noise contours generated by aircraft at Montgomery County Airpark.

- **Existing Land Use**

Based on the comprehensive evaluation of off-airport land use that was undertaken, it was determined that approximately 182 acres are located within the existing noise exposure area, exclusive of airport property. Most of the surrounding area affected by aircraft noise is within the Ldn 55 to 60 noise contour. Table 14.2 provides information on the quantity of land, presented by general land use category, exposed to various levels of aircraft noise. Figure 14.2 provides a graphic illustration of the various land uses in the existing noise exposure area. As such, this figure represents the Noise Exposure Map for the existing scenario. As can be seen from Table 14.2 and Figure 14.2, there is little developed land located within the noise exposure area.

Further examination of Table 14.2 and Figure 14.2 indicates that the majority of land located within the noise exposure area is undeveloped vacant land. However, there is a small area encompassed by the Ldn 55 contour that is currently being utilized for residential purposes (single family homes, multi family homes, congregate living facilities). The commercial land use and industrial use categories also represent a portion of the affected land use, however, they are considered compatible uses.

A comprehensive evaluation of residential land uses within the existing noise exposure area was conducted. This evaluation revealed that there are some residential land uses that are potentially incompatible with airport operations. This evaluation indicated that at the present time, there are 6 dwelling units located within the noise exposure area. Based on US Bureau of Census information, it has been estimated that there are approximately 18 residents located within the noise exposure area.

The commercial development which is located mainly south of the airport, consists primarily of office buildings with related business and a

Table 14.1
FAA Noise/Land Use Compatibility Guidelines

Yearly day-night average sound level, Ldn, in decibels

	Below 65	65-70	70-75	75-80	80-85	Over 85
Residential Use						
Residential other than mobile homes and transient lodgings	Y	N	N	N	N	N
Mobile home park	Y	N	N	N	N	N
Transient lodgings	Y	N	N	N	N	N
Public Use						
Schools	Y	N	N	N	N	N
Hospitals and nursing homes	Y	25	30	N	N	N
Churches, auditoriums, and concert halls	Y	25	30	N	N	N
Governmental services	Y	Y	25	30	N	N
Transportation	Y	Y	Y	Y	Y	Y
Parking	Y	Y	Y	Y	Y	N
Commercial Use						
Offices, business and professional	Y	Y	25	30	N	N
Wholesale and retail--building materials, hardware and farm equipment	Y	Y	Y	Y	Y	N
Retail trade--general	Y	Y	25	30	N	N
Utilities	Y	Y	Y	Y	Y	N
Communication	Y	Y	25	30	N	N
Manufacturing and Production						
Manufacturing general	Y	Y	Y	Y	Y	N
Photographic and optical	Y	Y	25	30	N	N
Agriculture (except livestock) and forestry	Y	Y	Y	Y	Y	Y
Livestock farming and breeding	Y	Y	Y	N	N	N
Mining and fishing, resource production and extraction	Y	Y	Y	Y	Y	Y
Recreational						
Outdoor sports arenas and spectator sports	Y	Y	Y	N	N	N
Outdoor music shells, amphitheaters	Y	N	N	N	N	N
Nature exhibits and zoos	Y	Y	N	N	N	N
Amusements, parks, resorts and camps	Y	Y	Y	Y	Y	Y
Golf courses, riding stables and water recreation	Y	Y	25	30	N	N

Key to Table 14.2

Y(Yes) = Land use and related structures compatible without restrictions
N(No) = Land use and related structures are not compatible and should be prohibited
25, 30, or 35 = Land use and related structures generally compatible; measures to achieve outdoor-to-indoor Noise Level Reduction of 25, 30, or 35 dB must be incorporated into design and construction of structure.

(There are special provisions pertaining to many of the compatibility designations that are not included here. Please refer to FAR Part 150, Appendix A, Table 1 for details).

Note: FAR Part 150 guidelines are presented in Appendix A.

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FIGURE 14.2

EXISTING CASE (1991)
Ldn CONTOURS OVER THE
GAI LAND USE MAP

- RESIDENTIAL
- COMMERCIAL
- PUBLIC USE (CHURCHES, SCHOOLS, CEMETERIES, ETC.)
- RECREATIONAL
- INDUSTRIAL
- OPEN SPACE

N

2000 1000 0 2000

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Table 14.2
Existing (1991) Land Areas
Exposed To Aircraft Noise

Land Use Category	Acres Exposed To Noise Levels Ldn Noise Level (in dB) 55-60	60-65	65-70	Total
Residential	0.9	0.0	0.0	0.9
Commercial	34.1	8.6	0.4	43.1
Industrial	7.3	0.2	0.0	7.5
Recreation	20.4	13.9	0.0	34.3
Open Space	93.5	2.7	0.0	96.2
Total	156.2	25.4	0.4	182.0

Note: Information on noise levels less than 65 Ldn are used for planning purposes only and are not defined as impacted areas based on FAA criteria.

scattering of small retail establishments. In terms of noise sensitive sites, that are no such sites located within the noise exposure area.

- **Future Land Use**

The 1996 noise contours encompass a slightly larger area than the existing contours, largely due to the increased levels of aircraft activity in the future time frame. The 1995 noise exposure area consists of approximately 205.5 acres, which is 23.5 acres greater than the existing area. The expansion of the noise contours is on both ends of the contours. The noise contours remained essentially the same to each side (east and west) of the airfield. Table 14.3 provides information on the acreage amounts of each contour level by land use type. Figure 14.3 depicts the noise exposure area under the 1996 conditions superimposed on the existing land use map. Thus, this graphic represents the 1996 Noise Exposure Map.

The composition of off-airport land use impacted by future airport operations is essentially the same as the existing scenario. However, as can be seen in Figure 14.3 and in Table 14.3 the number

Table 14.3
Future (1996) Land Areas
Exposed To Aircraft Noise

Land Use Category	Acres Exposed To Noise Levels Ldn Noise Level (in dB) 55-60	60-65	65-70	Total
Residential	2.2	0.0	0.0	2.2
Commercial	33.9	10.6	0.4	44.9
Industrial	8.6	0.6	0.0	9.2
Recreation	18.9	18.5	0.2	37.6
Open Space	108.1	3.5	0.0	111.6
Total	171.7	33.2	0.6	205.5

Note: Information on noise levels less than 65 Ldn are used for planning purposes only and are not defined as impacted areas based on FAA criteria.

of impacted dwelling units increases. There are 8 dwelling units (approximately 24 people), located in the Ldn 55 contour, impacted in the future noise exposure area.

It should be noted that a portion of the undeveloped land is zoned residential. This has the potential to create future incompatible land use problems and will be addressed in the Noise Compatibility Program.

14.2 Land Use Planning and Control Jurisdictions

Only one municipality has land use planning and control jurisdiction in the GAI environs: Montgomery County. The County has the following land use control authorities identified by FAR Part 150:

- acquisition and disposition of land;
- regulatory (police) power;
- capital improvement programs;
- monetary and fiscal policy; and
- contractual agreements.

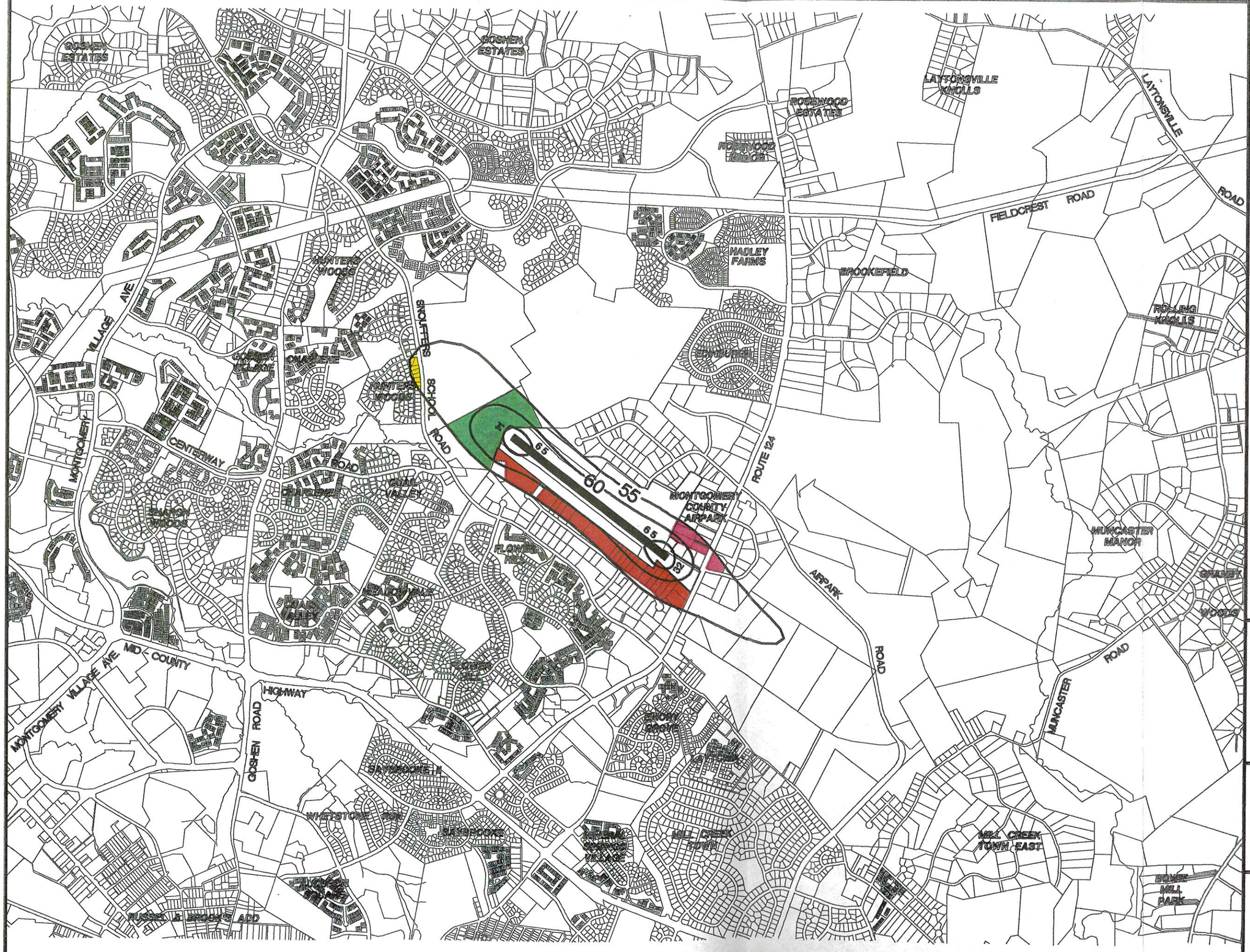

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FIGURE 14.3

FUTURE CASE (1996) Ldn CONTOURS OVER THE GAI LAND USE MAP

- RESIDENTIAL
- COMMERCIAL
- PUBLIC USE (CHURCHES, SCHOOLS, CEMETERIES, ETC.)
- RECREATIONAL
- INDUSTRIAL
- OPEN SPACE

N

2000 1000 0 2000

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FAR Part 150 calls for specific identification of planning and control jurisdictions within the 65 Ldn contour. This area falls totally within the jurisdiction of Montgomery County. The County government exercises control over the land area outside the airpark property such that the airpark operator, the Revenue Authority, is subject to the overall development policy and zoning regulations of the County.

Within Montgomery County, the Planning Board handles planning issues. To ensure full coordination, a representative of the County Planning Commission is a member of the study's Advisory Committee.

14.3 Noise / Land Use Compatibility

Based on the land use analysis discussed in this section and review of Table 14.1, which sets forth guidelines for noise and land use compatibility, a determination can be made on conflicts between off-airpark land use and aircraft noise.

According to FAR Part 150, residential development is normally considered incompatible within noise exposure levels of the Ldn 65 and above. Thus, according to FAR Part 150, criteria there are no incompatible land uses located within the existing or future noise exposure areas. Although the Ldn 55 and Ldn 60 contours are depicted, in terms of existing development, land uses located within the contours are not considered to be incompatible. However, the NCP will address the limiting the development of some potentially incompatible uses such as residential uses on undeveloped land within the Ldn 55, 60, and 65 noise contours.

Table 14.1 also indicates that all commercial development is compatible with aircraft noise exposure in the Ldn 65-70 range. It should be noted that there are no local variations to the noise/land use compatibility guidelines displayed in Table 14.1. However, as previously indicated measures to address noise-land use compatibility problems within the Ldn 55 contour will be developed. The identification and analysis of potential measures will be provided in subsequent reports with the preferred noise abatement measures provided as part of the Noise Compatibility Program (NCP).

14.3.1 Interpretation of Guidelines

The Part 150 guidelines suggest Ldn 65 as the upper limit for noise compatibility for all uses. However, a footnote to the Part 150 compatibility table (Table 14.1) notes that "FAA determinations ... are not intended to substitute federally determined land uses for those determined to be appropriate by local authorities in response to locally determined needs and values in achieving noise compatible land uses." Many widely accepted studies and compatibility guidelines have suggested that Ldn 55 or 60 be considered the upper limit for compatibility in some situations.

The FAA has published a report which documents the source material for the Part 150 compatibility guidelines table[16]. This document compares the Part 150 guidelines to a noise/land use compatibility comparison presented on an informational basis only by the American National Standards Institute (ANSI) in a report titled "Sound Level Descriptors for Determination of Compatible Land Use"[17]. This ANSI comparison is reproduced in Figure 14.4.

In general, the ANSI "guidelines" correlate well with those in Part 150. One principal difference is that the ANSI table indicates areas of marginal compatibility rather than showing a distinct compatibility/incompatibility break. For residential uses, the 55 to 65 Ldn range falls into this marginally compatible range. For schools, it is between 60 and 65 dB. A second major source discussed in the FAA report is the EPA's "Levels Document"[18]. That report identifies an Ldn of 55 dB as the level "requisite to protect the public health and welfare with an adequate margin of safety" for "Outdoors in residential areas and farms and other outdoor areas where people spend widely varying amounts of time and other places in which quiet is a basis for use"[19]. The report defines an "adequate margin of safety" to be five decibels.

These three sets of guidelines (Part 150, ANSI, and EPA) are based upon compilation and consideration of the results of extensive research into human response to noise and into noise exposure levels that may interfere with human activities. None of the three are proposed as regulatory goals or absolute criteria. However, they provide justification from three respected sources for at least considering noise/land use compatibility down to 60 Ldn.

---

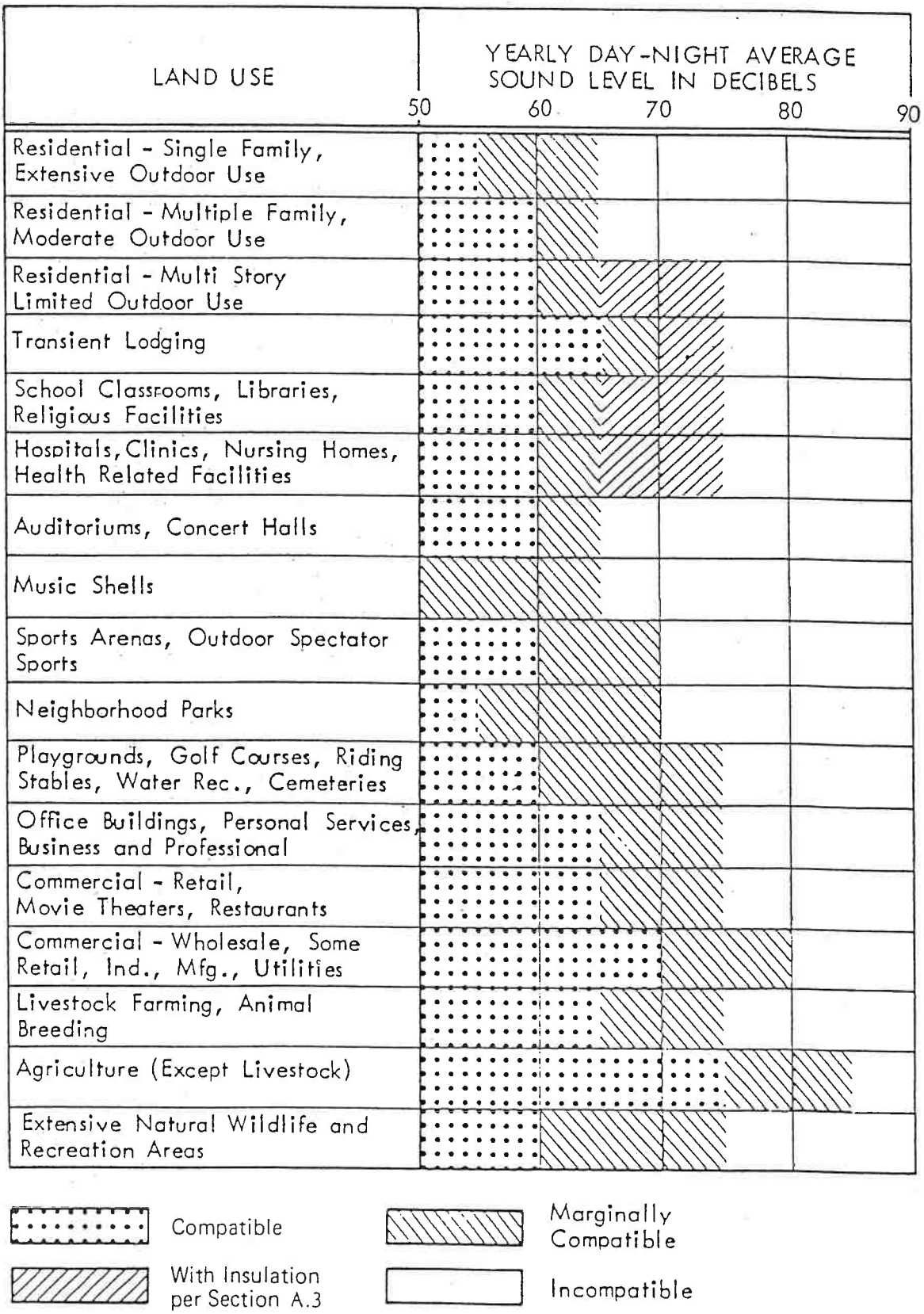
16 Harris, Richard L., Arnold, Norman W., and Shepherd, George J,; "Land Use Compatibility Study: Aircraft Noise and Land Use"; FAA Report No. FAA-EE-84-16; Office of Environment and Energy; Washington, D.C.; June, 1984.

17 ANSI S3.23 - 1980.

18 United States Environmental Protection Agency, Office of Noise abatement and Control; "Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety"; EPA Report No. 550/9-74-004; March, 1974.

19 Ibid., p. 3.

Figure 14.4
ANSI Noise/Land Use Compatibility Comparison



15. CONSULTATIONS WITH PUBLIC, USERS, AND OUTSIDE AGENCIES

The development of this Noise Exposure Map was undertaken with extensive consultation with all members of the airport public - including airport users, the interested general public, and local, state, and federal officials. Four principal mechanisms were utilized in conducting this consultation:

(1) The Part 150 Airport Noise Advisory Committee; including written and oral presentations on, and discussions of, study progress;

(2) Informational newsletters distributed to approximately 300 households and institutions within the airport environs;

(3) Informational meetings/workshop open to the general public;

(4) Communication throughout the study process with officials of government agencies having jurisdiction over land in the airport environs, and over airport operation.

Each of these elements is discussed briefly below.

15.1 Part 150 Study Advisory Committee Process

A GAI Airport Noise Advisory Committee was formed for the purpose of reviewing every phase of technical work undertaken in the Montgomery County study. This committee includes comprehensive representation from every component of the aviation "public" including airpark, local, State, and Federal officials. Other representatives include neighborhood groups, airpark users, and airpark businesses. The official membership list is presented in Table 15.1.

The GAI Noise Exposure Map (NEM) and Noise Compatibility Program (NCP)[20] were developed in a series of technical phases. The Advisory Committee was generally provided with appropriate background information in printed form, prior to a meeting at which Harris Miller Miller & Hanson Inc. (HMMH), The LPA Group Inc. (LPA), and Hanifin Associates Inc. (HAI) made a verbal presentation. The meetings presented the information and allowed input and comments from the Committee members.

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[20] The Noise Compatibility Program (NCP) is documented separately, in Volume 2.

Table 15.1
Membership Of The GAI Airpark Part 150 Noise Advisory Committee

Organization Represented	Name/Title	Address
1. Montgomery County Revenue Authority	F. Stuart Kenney - Executive Director	Montgomery County Revenue Authority 211 Monroe Street Rockville, MD 20850
2. FAA Eastern Regional Office	Frank Squeglia -	FAA Eastern Regional Office Planning and Program Branch, AEA 610 Fitzgerald Federal Bldg. JFK International Airport Jamaica, NY 11430
3. FAA Air Traffic Control Tower - Baltimore	Mr. Michael Sarli - Manager	FAA Air Traffic Control Tower BWI Airport, MD 21240
4. Flight Resources Inc.	Mr. Doug McNeeley - General Manager	Flight Resources Inc. 7940 Airpark Road Gaithersburg, MD 20879
5. Maryland Aviation Administration	Mr. Robert Talbert - Manager, Aviation Noise Program	Maryland Aviation Administration, 1'st Floor Terminal Bldg. BWI Airport, MD 21240
6. Montgomery County Department of Transportation	Mr. John Clark - County Executive Representative	Montgomery County Department of Transportation, 101 Monroe Street Rockville, MD 20850
7. Montgomery County Department of Environmental Protection	Mr. Tom Ogle - Director, Noise Programs	Montgomery County Department of Environmental Protection 101 Monroe Street Rockville, MD 20850
8. Consultant to Montgomery County Revenue Authority	Mr. Norm Arnold - Aviation Consultant	TAMS Consultants Inc. 2101 Wilson Blvd. Arlington, VA 22201

Table 15.1 (continued)
Membership Of The GAI Airpark Part 150 Noise Advisory Committee

Organization Represented	Name/Title	Address
9. Montgomery County Council	Mr. Ralph D. Wilson Legislative Analyst/County Council Representative	Montgomery County Council 100 Maryland Avenue Rockville, MD 20850
10. Montgomery County Planning Board	Ms. Nellie Maskal/Ms. Melissa Banach - Planning Board Representative	Montgomery County Planning Board 8787 Georgia Avenue Silver Spring, MD 20910
11. Upcounty Citizens Advisory Board	Ms. Nancy Shenk - Advisory Board Representative	Upcounty Citizens Advisory Board 8720 Lochaven Drive Gaithersburg, MD 20879
12. Montgomery County Airpark Users Association	Mr. Robert Baumann - Users Association Representative	Montgomery County Airpark Users Association 8005 River Falls Drive Potomac, MD 20854
13. Gaithersburg & Upper Montgomery Chamber of Commerce, Inc.	Mr. Eugene S. Casey - Commercial Representative	Gaithersburg & Upper Montgomery Chamber of Commerce 9 Park Avenue Gaithersburg, MD 20877
14. Airpark Leaseholders	Mr. James E. Richardson - Leaseholder Representative	4315 Bill Moxley Road Mt. Airy, MD 21771
15. Airpark Business Interest	Mr. Peter Greenberg - Attorney	4400 Jenifer Street N.W. Suite 380 Washington, DC 20015
16. Neighborhood Representative	Ms. Anne B. Swain	20653 Beaver Ridge Road Gaithersburg, MD 20879
17. Neighborhood Representative	Ms. Rosemary Arkoian	20816 Bell Bluff Road Gaithersburg, MD 20879
18. Neighborhood Representative	Mr. Harry R. Schulte	24517 Etchison Drive Gaithersburg, MD 20882

Table 15.1 (continued)
Membership Of The GAI Airpark Part 150 Noise Advisory Committee

Organization Represented	Name/Title	Address
19. Neighborhood Representative	Mr. Dominick L. Alberti	18708 Rocky Way Derwood, MD 20855
20. Neighborhood Representative	Mr. Howard P. Layer - President	Mill Creek Towne Civic Association 17600 Wheat Fall Drive Derwood, MD 20855
Non-Members		
21. Consultant Part 150 Study	Mr. Nicholas P. Miller - President Mr. Alan G. Hass - Senior Consultant	Harris Miller Miller & Hanson Inc. 429 Marrett Road Lexington, MA 02173 (617) 863-1401
22. Consultant - Part 150 Study	Ms. Linda M. Hanifin - President	Hanifin Associates, Inc. 14105 Yardarm Way Suite 1101 Laurel, MD 20707 (301) 317-9025
23. Consultant - Part 150 Study	Mr. Paul Puckli - Director of Airport Planning	The LPA Group Inc. 151 S. Warner Road Suite 307 Wayne, PA 19087 (215) 975-0960

The first two Advisory Committee meetings dealt principally with the development of the Noise Exposure Maps (Volume 1). Items discussed included noise measurements, aircraft operations, flight tracks, and noise exposure contours. A draft of this NEM was mailed to Advisory Committee members in advance of each meeting. Comments and concerns related to the technical analysis were received from committee members at each of the meetings and were noted and the resulting changes were incorporated into the final Volume 1.

Appendix F presents copies of meeting notices, agenda, minutes, attendance lists, and other materials distributed prior to, and following the two Advisory Committee meetings that were held during the NEM development phase of the study.

All future meetings deal with the development of the Noise Compatibility Program. The agenda, minutes, and attendance lists for those meetings are presented in the NCP documentation (Volume 2).

The meeting minutes document verbal comments received from Committee

members. Written comments received from the members on any issues after the meetings are also included.

15.2 Newsletters

HMMH prepared and published a newsletters in the development process of the Noise Exposure Map (NEM). The newsletter was distributed to approximately 300 residences or interested parties in the airpark environs. The mailing list was developed from several sources, including:

(1) All members of the Advisory Committee were included;

(2) All the names of any potentially interested parties submitted by the Montgomery County Revenue Authority or local governments were included;

(3) All mailing lists supplied by the business, user, and community groups represented on the Advisory Committee; the street addresses of the group mailing lists in the airpark environs was used to develop the bulk of the list;

(4) The newsletter itself was the fourth and final basis for developing the mailing list. The recipients were encouraged to inform their neighbors of the newsletters and that they could be added to the mailing list by contacting HAI.

A copy of the first project newsletter is presented in Appendix G. Future newsletters will deal with the Noise Compatibility Program issues and are presented in Volume 2.

15.3 Community Workshops/Public Meetings

A first of three informational community workshops/public meetings was held on ** April 1991 at the ********** beginning at 7:30 p.m. The purpose of the meeting was to introduce the study team, to outline the Part 150 process, and to present to the public the results of the data collection phase of the project. After a short presentation, the meeting switched to an open workshop format, where HMMH, LPA, and HAI staff were available to answer questions on a one-on-one basis, with the assistance of appropriate graphics materials and handouts. After the presentation, goals and comments were solicited from the attendees.

This meeting was announced in the first newsletter and through advertisements in the local newspapers: the **********.
The newspaper advertisement, minutes and sign-in sheets from that meeting are reproduced in Appendix H.

Approximately ** individuals registered for the meeting. Individuals and groups attending the meeting were encouraged to submit written comments.

Written comments were received from ** individuals. These comments are reproduced in Appendix H.

15.4 Official Communications

Throughout the study process, HMMH, LPA, and HAI staff had numerous formal and informal contacts with officials representing a wide range of private and public entities who had potential interest in the Part 150, who had information that was of use in the study process, and who had jurisdiction over the operation of the airpark.

The Advisory Committee membership lists include responsible officials representing all of the institutions that Part 150 requires the Noise Exposure Map's preparer(s) to contact, including:

(1) Local officials of land use planning agencies with authority over land uses within the 65 Ldn contour. This includes representatives from Montgomery County, the municipality most affected by the airpark;

(2) Airpark Businesses and Users. The representatives included airpark officials, air taxi operators, aviation users, and maintenance concerns at the airpark. These individuals represented both users and businesses;

(3) Other Agencies. Other major agencies contacted and included in the study process included FAA Air Traffic Control Tower personnel at BWI, and the Maryland Aviation Administration.

APPENDIX A

FAR Part 150 Airport Noise Compatibility Planning

U.S. Department
of Transportation
Federal Aviation
Administration

Federal Aviation Regulations

Part 150
Airport Noise Compatibility Planning

Revised
OCTOBER 25, 1989

Part 150—Airport Noise Compatibility Planning

Contents

Revision of Part 150
Airport Noise Compatibility Planning

Adopted: December 13, 1984 **Effective: January 18, 1985**

(Published in 49 FR 49260, December 18, 1984)

SUMMARY: This final rule revises, and makes final, the FAA's interim rule that prescribes requirements for airport operators who choose to submit noise exposure maps and develop airport noise compatibility planning programs to the FAA. This regulation is needed to implement portions of the Aviation Safety and Noise Abatement Act of 1979, as amended (49 USC 2101 *et seq.*). It amends the interim rule adopted on January 19, 1981 (46 FR 8316). The revisions reflect, in part, comments invited and received following promulgation of the interim rule.

Comments must be received on or before June 14, 1985.

ADDRESSES: Send comments on the rule in duplicate to:

Federal Aviation Administration,
Office of the Chief Counsel,
Attn: Rules Docket (AGC-204), Docket No. 18691,
800 Independence Avenue, SW.,
Washington, DC 20591;

OR deliver comments in duplicate to:

FAA Rules Docket, Room 916,
800 Independence Avenue, SW.,
Washington, DC.

Comments may be examined in the Rules Docket, weekdays except Federal Holidays, between 8:30 a.m. and 5:00 p.m.

FOR FURTHER INFORMATION CONTACT:

Mr. Richard Tedrick, Noise Policy and Regulatory Branch (AEE-110), Noise Abatement Division, Office of Environment and Energy, Federal Aviation Administration, 800 Independence Avenue, SW., Washington, DC 20591; telephone (202) 755-9027.

SUPPLEMENTARY INFORMATION:

The purpose of these regulations is to implement portions of Title I of the Aviation Safety and Noise Abatement Act of 1979 as amended (49 USC 2101 *et seq*, the "ASNA Act"). These final regulations amend and make final the interim regulations promulgated January 19, 1981 (published in 46 FR 8316, January 26, 1981). That interim rule was issued in order to meet the statutory deadline to prescribe regulations by February 28, 1981. Although the interim rule was based largely on Notice No. 76-24 (41 FR 51522), full implementation of the statutory dictates required certain provisions in the rule that varied in some respects from those proposed in the Notice. Accordingly, comments were invited on the interim rule based on the rule text and experience under the rule. A number of interested persons submitted written comments to the public regulatory docket. All comments received have been reviewed and considered in the issuance of this final rule. They are discussed below.

COMMENTS INVITED

The FAA has determined that it is appropriate to adopt this revision of Part 150 without additional public notice and comment on the text thereof. In view of the fact that the FAA has already received comments on the interim rule and that, except for a shift of certain review functions within the FAA, the changes in Part 150 are all either editorial or clarifying in nature, notice and public procedure are unnecessary. In addition, the FAA has been ordered by the United States Court of Appeals for the District of Columbia Circuit (*People of the State of Illinois* v. *Langhorne Bond*, No. 81-1317, September term,

The Regional Director (or designee) conducts the necessary evaluations of noise compatibility programs and, within the prescribed time period, recommends to the Administrator whether to approve or disapprove the program. The region is provided broad discretion to conduct the evaluation and to follow the necessary procedures to ensure that the decision will be made efficiently and on a well-informed and reasoned basis. Some of the evaluation criteria are prescribed under § 104 of the ASNA Act, but in other situations, such as those relating to flight procedures or affecting the safe and efficient use of the navigable airspace, the FAA will apply appropriate policy and program criteria to the matters presented by the program. The FAA considers only one program at a time for any specific airport; if a program is already under review, it will have to be revised or withdrawn by the applicant before the FAA will review another program. Except for specific situations, each revised program will be considered under the proposed rule as a new program. Under prescribed conditions, an approval may be revoked or modified for cause after notice to the airport operator. Determinations become effective upon issuance and continue until revoked or modified.

In framing the ASNA Act, the Congress reaffirmed the FAA's responsibilities to review local actions for flight safety and for economic burden. Under ASNA, the proposal of restrictions or other actions under a noise compatibility program is entirely discretionary on the part of the airport operator; however, review of the operator's proposal by the FAA for safety and economic burden is not optional. Once submitted to the FAA, each noise compatibility program must be scrutinized and be approved or disapproved under all of the criteria in § 104 of the ASNA Act.

ADMINISTRATIVE PROCESS

This rule describes the revised administrative process the FAA will follow when it receives a noise exposure map or airport noise compatibility program (and their revisions) in accordance with the requirements of the ASNA Act. As previously indicated, the Director of the FAA Region in which the airport is situated has, through delegation from the Administrator, the primary responsibility for administering the Part 150 airport noise compatibility planning program. The FAA Region will evaluate the submission and will coordinate any aspects of the noise program affecting other agency programs.

The process provides for notice to the public of the receipt of each airport "noise exposure map" and "noise compatibility program" by publication in the *FEDERAL REGISTER* when, based on a preliminary review, the requirements for those submissions are satisfied. It provides a means for timely and thorough evaluation by the FAA of the measures presented in each program to ensure an informed and reasoned determination on whether that program should be approved. That decision is based on the program itself, information presented or developed during the evaluation, and other information available to the agency.

The administrative process does not include adversary pleadings or proceedings in which interested persons submit their complaints, evidence, or arguments for a "record" of hearing as the sole basis upon which the Administrator's determination on a program will be made. Instead, Section 103(a)(1) of the ASNA Act provides that, before a Noise Exposure Map is submitted to the FAA, it be prepared "in consultation with any public agencies and planning agencies in the area surrounding the airport". FAA's role is then simply to approve or disapprove a subsequent program within the 180-day time set by Congress. Section 104(b) of the ASNA Act requires the Administrator to approve or disapprove each program submitted in accordance with the Act (except those measures relating to flight procedures) within 180 days after it is received or, upon failure to do so, the program is "deemed" to be approved. Except for those measures relating to flight procedures, the Administrator must approve a program if the measures to be undertaken under the program, (1) Would not create an undue burden on interstate or foreign commerce, (2) are reasonably consistent with obtaining the goal of reducing existing noncompatible land uses and preventing the introduction of additional noncompatible land uses, and (3) the program provides for its revision made necessary by a revised noise

The comments received in public Docket No. 16729 are discussed below. They are grouped by broad categories of issues.

SAFETY REVIEWS

One commenter was concerned with the scope of safety reviews of actions that may be proposed by airport proprietors under FAR Part 150. A trade association of U.S. airlines asserted that the present text restricts the safety reviews to "flight procedures." It was suggested that safety involves other areas, such as displaced thresholds, reverse thrust usage, and glide slopes.

The FAA certainly agrees that the matters listed by the commenter are deserving of safety reviews if and when such actions are proposed for implementation. However, it should be noted that they are already included in FAR Part 150. The definition of flight procedures in § 150.7 includes "any requirements, limitations, or other actions affecting the operation of aircraft in the air or on the ground." This final rule continues the use of the general definition of flight procedures in order to avoid inserting a list of specific actions. Such lists tend to be exclusionary and need more frequent revision.

AIRCRAFT OPERATIONAL CONTROLS VS. LAND USE CONTROLS

This docket received several comments regarding the emphasis that should be placed on aircraft operational controls or limitations relative to emphasis on land use controls. One commenter stated that "greater emphasis should be placed on flight procedures which diminish aircraft noise at its source or lessen its impact on noise sensitive areas." Another commenter stated that land use controls and off-airport construction techniques with limited aircraft operational modifications would be acceptable but remained opposed to aircraft noise restrictions beyond those already required by FAR Part 36. The commenter continued that "it would be a serious error on the part of FAA to adopt a policy that encourages local airport operators to establish additional noise restrictions and thus adversely impact the fleet transition process." This final rule will not limit, in any way, FAA's close review of proposed operating restrictions with respect to the impact of such proposals or the fleet transition process.

It is not the intent of the FAA through FAR Part 150 to encourage one noise abatement alternative over another but through the very process set forth in Part 150 to provide a reasonable planning and implementation approach to ensure that maximum noise abatement benefits are derived in a manner that does not place an undue burden on air commerce, is not discriminatory, and does not adversely affect the safe and efficient use of airspace. The Part 150 process provides a voluntary avenue for airport proprietors to gain Federal approval of noise abatement proposals.

LEVEL OF FEDERAL INVOLVEMENT IN LOCAL PLANNING

One commenter observed that most airports serving air transportation have been in existence for a long time with known incompatible land uses in the airport environs. The commenter believes that there are few situations where political, social, and financial conditions would permit conversion of these uses to compatible ones. Two commenters expressed concern about the degree of Federal involvement as stated in the interim regulation and the effect it may have on diminishing local responsibilities relative to noise controls. One of these, the American Association of Airport Executives, complained that attempts by local proprietors to protect the citizens from noise have run afoul of Federal action through the courts or otherwise citing restraint of trade or discrimination. On the other hand, the Air Transport Association (ATA) argued for the establishment of its proposed national aircraft noise abatement program which would preclude FAA approval of plans which unduly affect interstate commerce, jeopardize safety, unjustly discriminate or interfere with safe and efficient use of airspace. ATA's proposal would allow for local involvement by initiation of a plan by the local proprietor and opportunity for public review.

manner that, with minor modification, the resultant plans would qualify for submission under Part 150. There are provisions in this rule to waive certain requirements of the rule for those locations which began their studies prior to the end of the fiscal year in which the interim rule was issued.

In summary, the ASNA Act and Part 150 set forth an appropriate means of defining the noise problem, determining the wide range of affected interests, ensuring broad public and aeronautical participation, and, finally, balancing all of these interests to assure a reasonable, nonarbitrary, and nondiscriminatory result. That result must be consistent with the airport proprietor's broad duties under the constitution and its specific duties under applicable airport development grants.

RELATION TO AIRPORT PROPRIETOR'S RESPONSIBILITY

As stated above, Part 150, like the ASNA Act itself, does not place a duty on airport operators to submit noise compatibility programs to the FAA, or to refrain from implementing programs unless they are approved by the FAA. In this sense, the provisions of Part 150 are not mandatory. However, the FAA believes that the provisions of Part 150, like those in the ASNA Act, are essential to the attainment of an adequate weighing and balancing of air transportation and air commerce objectives against the myriad of social, community, and other real interests that may be affected by airport noise. In addition, it is clear from the legislative history of the Act that the Congress intended to establish a standardized framework for ensuring that localized airport noise restrictions are based on a broad base of information and are thus reasonable, fair, and responsive to the needs of both air commerce and the community.

The FAA, therefore, views Part 150, or a process similar to it (whether or not the process is approved by the FAA), as setting forth the kind of rational decision-making procedure that is appropriate to meet the test of reasonableness set forth by the United States Court of Appeals for the Second Circuit in *British Airways Board, et al.* v. *Port Authority of New York and New Jersey,* 558 F.2d 2075 (1977). In that case, the Court noted that the Federal government conceded that it may not preempt airport proprietors from promulgating their own noise regulations (as is also stated in Part 150), but then went on to consider what limits, if any, apply to the airport proprietor who seeks to restrict the use of its airport for noise purposes. The Court noted the pervasive scheme of FAA regulation of aircraft operation and noise abatement, and set the stage for its conclusion as follows: "Implicit in the Federal scheme of noise regulations, which accords to local airport proprietors the critical responsibility for controlling permissible noise levels in the vicinity of their airports, is the assumption that their responsibility will be exercised in a fair, reasonable and nondiscriminatory manner." (558 F.2d 82). The Court considered both the airport proprietor's liability for noise damages flowing from *Griggs* v. *Allegheny County,* 369 U.S. 84 (1962) and the wide range of air commerce responsibility and activities that are covered by the protective mantle of preemption (citing *City of Burbank* v. *Lockheed Air Terminal, Inc.,* 411 U.S. 624, (1973)), and then struck a reasoned accommodation between each of these conflicting interests. Accordingly, the Court held that the Port Authority ". . . is vested only with the power to promulgate reasonable, nonarbitrary and nondiscriminatory regulations that establish acceptable noise levels for the airport and its immediate environs. Any other conduct by an airport proprietor would frustrate the (aviation) statutory scheme and unconstitutionally burden the commerce Congress sought to foster." (588 F.2d 84).

The Court also noted that the duty to act reasonably is further stated in Federal airport development grants which, pursuant to 49 U.S.C. 1718(a) (1), provide that the Federally funded airport will be "available for public use on fair and reasonable terms and without unjust discrimination" (558 F.2d 84).

In summary, the ASNA Act and Part 150 set forth an appropriate means of defining the noise problem, determining the wide range of affected interests, ensuring broad public and aeronautical participation, and, finally, balancing all of these interests in a manner that is needed to assure a reasonable, nonarbitrary, and nondiscriminatory result that is

reflects the provisions in the law as regards those items which are exempt from the automatic approval provisions (i.e., items related to flight procedures).

FUNDING AVAILABILITY FOR NOISE PLANNING

Several commenters indicated the strong need for noise abatement funding. One respondent made the point that a positive step of encouragement of sponsor participation in the Part 150 program would be the attractiveness or probability of funding through the Federal grant program. Another commenter said that, without the good prospect of funding, many of these plans would be counterproductive and even frustrating to the public. This would include loss of credibility to the aviation industry because of the real possibility that the Part 150 process would generate public expectations of noise relief with no guarantees of the funding to implement the measures that would produce that relief.

There is no commitment within Part 150 to provide for the funding of particular projects, nor is there any guarantee that any part of an approved compatibility program will be funded on the Federal level. There is nothing in Part 150 that prohibits local or state funding of projects recommended in approved compatibility programs.

LAND USE COMPATIBILITY TABLE

One commenter stated a belief that land uses are not inherently incompatible with specific noise levels. It should be noted that there is no intent to preempt local determinations concerning land use compatibility for noise purposes. We believe that the Land Use Compatibility Table used in the interim regulation, and retained in the final rule, is fair, that it represents the best available information on the subject, and that it fully meets the requirements of the ASNA Act. Like other parts of the rule, it is not intended to replace site specific determinations by local authorities or to supplant other appropriate criteria for use in local programs. Instead, the Table identifies consistent national guidelines for the resolution of airport noise compatibility problems and for needs arising out of the ASNA Act.

The FAA appreciates the intent of another commenter's suggestion that certain changes be made to Part 150 Land Use Compatibility Guidelines to make them more consistent with the Federal Interagency Committee on Urban Noise guidelines. Specifically, the commenter requested that the Table pick up a note in the Guidelines that states in part that "although local conditions may require residential use, it is discouraged (between L_{dn} 65 and 70 dB) and strongly discouraged (between L_{dn} 70 and 75 dB)." While it is FAA policy to advise against new residential development within the L_{dn} 65 dB contour, the purpose of the Table is to set a clear unambiguous national guidance for the purpose of potential funding of subsequent projects. Since the proposed language would make it less clear as to which situations meet the guidelines and which do not, the note has not been accepted.

BACKGROUND NOISE

Two comments were received on the impact of other (nonairport) noise sources on airport noise compatibility programs. The Arizona Department of Transportation expressed the view that where other noise sources are causing problems in conjunction with airport noise, the airport noise compatibility program should take this into account. They point out that some land uses are incompatible with major arterial streets or with certain industries, as well as with some airport noise levels. In the FAA's opinion, this fact is, or should be, a major consideration in the development of any airport noise compatibility program. No airport is conceived in a vacuum or operated in isolation. Rather, each airport is designed and operated to serve the unique needs of the communities around it. This is historically a major goal of responsible noise planning. Instead, such planning ideally seeks to integrate the airport with its environs by employing land uses that complement airport activities but which are not disturbed by normal airport operations. Obviously, at some airports compatible land uses could include

there is the potential for serious noise impacts, and, if not, to produce contours for general aviation airports. The method lacks flexibility and is overly conservative (i.e., tends to overpredict impact). Because of the flexibility which is required to analyze noise abatement procedures fully and the degree of accuracy desired under Part 150, use of this particular handbook method would not be acceptable as an equivalent.

Another commenter noted that the interim rule does not recognize that there may be prior local or state requirements that conflict with the new regulation. He cited the example of one state that required the preparation of DNL noise contours for certain airports. According to the commenter, these maps "have been developed using a variety of methods more-or-less different from the INM of the rule." He suggested that FAR Part 150 should be amended to allow for continued use of these other methods for consistency.

The FAA disagrees with this suggestion and believes that continued use of methods which do not reflect the state-of-the-art in noise prediction is undesirable and would work to the airport operator's detriment since older models tend to overpredict noise contours when compared to newer models. However, the FAA recognizes the burden involved in requiring work to be redone as new models come on line and, therefore, proposes to accept as an "FAA-approved equivalent" the use of a noise methodology which represented an equivalent to the INM state-of-the-art at the time the noise exposure maps and noise compatibility programs were prepared, provided that the contours are shown using DNL. One of the primary thrusts of Title I of the ASNA Act was to require the FAA to standardize the methodology used in the reporting and evaluation of aircraft and airport noise. Although participation in the FAR Part 150 noise compatibility planning process is, under ASNA, voluntary on the part of airport proprietors, the establishment of "a single system for determining the exposure of individuals to noise which results from the operations of an airport" is not discretionary for the FAA. Instead, the FAA is required to establish this single system by regulation for the purpose of approval of noise compatibility proposals, even though no person is required to apply for, or have, such approval. Thus, the requirement is not just to compute or calculate contours in standardized units of L_{dn} but to compute or calculate those contours in a consistent and uniform manner and to compare the land uses within those contours against a national guideline.

REVISION OF NOISE EXPOSURE MAP

Several commenters expressed confusion regarding the contents of the submittal documentation of the noise exposure map, especially the 1985 or 5-year map. They further indicated that it was unclear when a map must be revised. A primary point of confusion was in the definition of "substantial new noncompatible land use" in Section 103 of ASNA and that of "significant" in Section 107 of the same Act. The FAA agrees that these points were unclear and need further explanation.

As indicated in Section 103 of ASNA, a noise exposure map is required to be revised when any change in airport operation would create any substantial new noncompatible use in any area surrounding the airport. "Substantial new noncompatible use" is now defined in § 150.21(d). Another comment questioned whether the requirement for revision applies to the current map, the 1985 or 5-year map, or both. Section 150.21(d) indicates that, so long as the change in airport operation does not exceed the 1985 or 5-year forecast map to the extent that it would create a substantial new noncompatible use (as defined therein) with respect to that map, no revision is necessary. The 1985 or 5-year map remains in submitted status even after the year 1985 or subsequent year has passed, until it is required to be revised because of a substantial new noncompatible use with respect to that map.

Sections 150.21(g) and (h) have been added to clarify the relationship of Section 107 of ASNA to the process described in Part 150. The term "significant" in Section 107(a) of ASNA is defined in relationship to the revision of the noise exposure map.

Section (a) (1) is changed to reflect the passing of the 1982 calendar year and now requires the future data forecast for the fifth calendar year beginning after the date of submission. Additional technical changes are made to both subsections (1) and (2) to clarify the information actually needed.

Section 150.21(b) is changed to clarify the existing requirements for consultation in the preparation of noise exposure maps and to require submission of basic documentation of that consultation. Some of these requirements were previously included in subsection 150.21(e).

Section 150.21(c) is changed to reflect the new administrative procedures and for clarification.

Section 150.21(d), which indicates the circumstances under which an acceptable map must be revised because of changes in airport operations that would create any substantial, new noncompatible land uses, has been expanded to more clearly delineate these circumstances.

For purposes of Part 150, a change in airport operation which creates a substantial new noncompatible use is an increase in the yearly day-night average sound level of L_{dn} 1.5 dB or greater as a result of aircraft operations which either cause a land area to become noncompatible for the first time or increases the noncompatibility of a previous noncompatible area. The requirement in § 150.21(d) for revision of the noise exposure map is related to the definition of "significant" changes in Section 107(a) of ASNA. When an airport realizes a "significant" change in the type or frequency of aircraft operations, in airport layout, in flight patterns, or in nighttime operations which either individually or cumulatively results in a L_{dn} 1.5 dB increase in noncompatibility, that change would create a "substantial new noncompatible use" and triggers this need for a map revision. This, of course, leaves the responsibility for monitoring these factors on the airport operator.

A revised map is not required if the changes increase the contours of the existing map but are still within the parameters of either the 1985 or 5-year forecast map so that, while the contours may be larger than or different from the map of existing conditions, they are not larger than or different from the forecast conditions. The FAA believes that this situation reflects the fact that the noise contours are changing just as the airport operator had forecast and that this forecast map has been available for public review; therefore, no revision is necessary. It is only when changes in airport operations (i.e., type and/or frequency of aircraft operations, number of nighttime operations, flight patterns, or airport layout) would cause the noise contours to increase in a way that is larger than or different from the forecast conditions and on an order of magnitude that could create a "substantial", (again, defined as an increase of L_{dn} 1.5 dB or more) new noncompatible use as defined in Part 150 definitions that a revised map is required. Changes in land uses or demographics in the area around the airport do not automatically require the submission of a revised map. At some point in the future, when the forecast year has been reached or passed, no revised map is necessary until changes in airport operations create substantial, new noncompatible uses. Comments are invited on whether revised noise exposure maps should be required when local ambient noise levels are substantially changed or the changes result in new noncompatible uses. The FAA will review comments on this issue and will consider further action, if appropriate. Revised noise exposure maps are treated the same, both substantively and procedurally, under Part 150 as initial submissions of maps.

Section 150.21(f) has been renumbered 150.21(e).

Section 150.21(f) has been added to reflect Section 107 of ASNA which deals with circumstances under which a person who acquires a property interest in an area surrounding an airport for which a noise exposure map has been submitted shall be entitled to recover damages with respect to noise attributable to the airport.

In new § 150.21(g) the term "significant", in Section 107(a) of ASNA is defined for Part 150 in relation to a change or increase that would result in a substantial, new noncompatible use. This serves to tie together the requirement to revise the noise

done prior to Part 150, and have responsibility for the airport grant program which may provide funding for noise planning and noise projects. The region will send two copies of each program which has been accepted on the basis of preliminary review to FAA headquarters. Detailed internal FAA guidance or orders will be issued to the regional offices establishing criteria for approval of noise compatibility programs. Specific overview is to be retained by FAA headquarters offices to assure overall quality and uniformity of the reviews and a uniform high quality for approved programs. Approval of a program must be by the Administrator (Section 150.35(b)). Any headquarters comments will be sent to the region to incorporate in its review. The Regional Director (or designee) may, to the extent considered necessary, confer with other officials, persons, and agencies which may have responsibilities or information pertinent to the issues.

Section 150.35 governs the issuance of determinations on noise compatibility programs. Section 150.35(a) now includes the provision that no conditional approvals be given and clarifies the program items which are not subject to the 180-day rule. Section 150.35(d) clarifies the criteria for revision of a program. It also incorporates former § 150.23(c). Sections 150.35(d) through (f) are renumbered. Section 150.35(d) is changed to add two conditions under which an FAA approval of a program or a portion thereof may be rescinded: when a term or condition of the program or its approval is violated, and when a flight procedure or other FAA action upon which the approved program is dependent is subsequently disapproved or rescinded by the FAA. Section 150.35(e) is revised for clarification.

Appendix A—Noise Exposure Map Development

Appendix A to Part 150 contains the technical description and standards constituting the methodology for developing acceptable airport noise exposure maps. Section A150.5(b) and its accompanying Table 1, "Tolerances Allowed on the A-Weighting Characteristics for Type 2 Meters," were redundant and have been deleted. Section A150.5(c) has been renumbered (b) and technical corrections have been made. This section is also changed to clarify that the computer based noise prediction program used must be either the FAA's Integrated Noise Model (INM) or an FAA approved equivalent. Additional technical corrections have been made to Sections A150.1(b) and A150.3(b). Section A150.5(a) is changed to clarify the types of sound measuring equipment which must be used.

Section A150.101 prescribes the content requirements for noise exposure maps, while Sections A150.101(a) and (b) have technical corrections. Section A150.101(c) is changed for clarification. Section A150.101(e) is changed for clarification, subsection (8) which was redundant is deleted, and subsection (9) is renumbered. A new subsection (9) has been added to clarify the scale and graphic quality of the maps. Location of historic preservation sites, which had been previously overlooked, has been added to the items in subsection (6).

New section A150.101(f) excepts noise exposure maps prepared in connection with studies which were either Federally funded or Federally approved and commenced before October 1, 1981, from having to be modified in certain specific respects to comply with Part 150. Such studies include Airport Noise Control and Land Use Compatibility (ANCLUC) studies, airport master plans, site selection studies, and environmental impact statements and findings of no significant impact. The date October 1, 1981, reflects the FAA's intention to apply this exception to studies begun before the end of the fiscal year in which the interim Part 150 was issued.

As previously noted, Appendix A, Table 1, identifies the land uses which are normally compatible with the various exposure levels of individuals to noise. The table has been changed to give schools their own subcategory, to recognize their usual close relationship to residential areas and to not appear to encourage their location in a noisier environment than for residential. The footnote to Table 1 has been changed to clarify the local responsibility in determining the relationship between specific properties and specific noise contours. Technical changes have been made to the key and notes to the table for clarification.

Section A150.105 has been simplified for clarity.

ENVIRONMENTAL ANALYSIS

Pursuant to Department of Transportation "Policies and Procedures for Considering Environmental Impacts" (FAA Order 1050.1D), a Finding of No Significant Impact has been made. The changes incorporated in this final rule (which are primarily organizational, administrative, and clarifying), do not significantly affect the quality of the human environment.

PAPERWORK REDUCTION ACT

Information collection requirements contained in this regulation (sections 9d, 12, and 20) have been approved by the Office of Management and Budget under the provisions of the Paperwork Reduction Act of 1980 (P.L. 96-511) and have been assigned OMB control number 2120-0517.

CONCLUSION: All but one of these amendments are either editorial or clarifying in nature. One amendment is administrative and shifts responsibility for certain review functions within the FAA. For these reasons the FAA has determined that this document involves a regulation which is not major under Executive Order 12291. However, since this document concerns a matter on which there is substantial public interest, it is considered to be significant under DOT Regulatory Policies and Procedures (44 FR 11034; February 26, 1979). Since the amendments are editorial, clarifying and administrative, resulting in no substantial costs or cost savings, it is certified that under the criteria of the Regulatory Flexibility Act this final rule will not have a significant economic impact on a substantial number of small entities. A copy of the regulatory evaluation may be examined in the regulatory docket or obtained by contacting the person identified under the caption "FOR FURTHER INFORMATION CONTACT."

THE FINAL RULE

Accordingly, the Federal Aviation Regulations (14 CFR Parts 11 and 150) are amended, effective January 18, 1985.

(Secs. 301(a), 307, 313(a), 601, and 611, Federal Aviation Act of 1958, as amended (49 U.S.C. §§ 1341(a), 1348, 1354(a), 1421, and 1431); 49 U.S.C. 106(g) (Revised, Pub. L. 97-449, January 12, 1983); Secs. 101, 102, 103(a), and 104(a) and (b), Aviation Safety and Noise Abatement Act of 1979, as amended (49 U.S.C. §§ 2101, 2102, 2103(a), and 2104(b)); 49 CFR 1.47(m); and Airport and Airway Improvement Act of 1982 (49 U.S.C. 2201 et seq.).)

Amendment 150-1

Expansion of Applicability of Part 150 to Heliports

Adopted: March 10, 1988 **Effective: March 16, 1988**

(Published in 53 FR 8722, March 16, 1988)

SUMMARY: This rule expands the applicability of the rules governing the airport noise compatibility planning process to include free-standing public-use heliports and allows operators of those heliports to benefit from the Airport Improvement Program (AIP). The rule expansion is needed because the current rule only includes heliports that are located on public-use airports used by fixed-wing aircraft.

FOR FURTHER INFORMATION CONTACT: Mr. Robert B. Hixson, Noise Policy and Regulatory Branch (AEE-110), Noise Abatement Division, Office of Environment and Energy, Federal Aviation Administration, 800 Independence Avenue, SW., Washington, D.C. 20591; telephone (202) 267-3565.

SUPPLEMENTARY INFORMATION:

Background

Part 150 of the Federal Aviation Regulations (14 CFR Part 150) contains standards for airport operators who volunteer to submit noise exposure maps and airport noise compatibility planning programs to the FAA. Operators of airports whose maps have been found to be in compliance with the applicable requirements of Part 150 and whose programs have been approved by the FAA in accordance with the provisions set forth under Part 150 are then eligible to apply for noise control project funding under the AIP. The Aviation Safety and Noise Abatement Act of 1979, as amended, (49 U.S.C. 2101 *et seq*, "the ASNA Act") also provides certain legal protections for airport proprietors whose maps have been accepted by the FAA.

Operators of public-use airports have been able to avail themselves of the benefits of Part 150 since its original adoption on an interim basis on January 19, 1981 (46 FR 8316, January 26, 1981). However, in that interim rule and in the final rule adopted December 13, 1984 (49 FR 49260, December 18, 1984), access to Part 150 was denied to the operators of public-use heliports used exclusively by helicopters, "free-standing public-use heliports." The restriction was imposed because there were relatively few free-standing public-use heliports and because adequate computational tools for drawing noise contours around heliports were not available at that time. The recent opening of several prototype public-use heliports and the FAA's development of a Heliport Noise Model (HNM) computer program have prompted expansion of Part 150 to include free-standing public-use heliports.

Discussion of the Comments and the Amendment.

On November 4, 1986, FAA issued a notice of proposed rulemaking (NPRM) to expand Part 150 to include free-standing public-use heliports. Interested parties were afforded the opportunity to participate in the development of this final rule by submitting written comments to the public regulatory docket on or before February 3, 1987. Six comments were received in response to Notice No. 86-17 (51 FR 40037, November 4, 1986) and all have been duly considered in promulgating this amendment. All of the comments supported expansion of the applicability of Part 150 to include free-standing public-use heliports. However, three of the comments also included specific suggestions about one or more of the FAA's proposed amendments.

The comments received in response to the notice were grouped by broad categories of issues and are discussed below.

1. *Applicability of Rule*

Based on his understanding that Part 150, the ASNA Act, and the Airport Improvement Program are related to "public airports" rather than "public-use airports," one commenter suggested that the expanded Part 150 program will not result in significant benefits to the public since the majority of heliports are privately owned and will not be eligible for funds through the ASNA Act and Part 150, even if these heliports are made available for public use.

REGULATORY EVALUATION

The FAA evaluated the regulatory impact of removing the Part 150 restrictions which apply to the operators of heliports. It was determined that this rule is consistent with the objectives of Executive Order 12291 as part of the President's Regulatory Reform Program to reduce regulatory burdens on the public. Since Part 150 is a voluntary program, heliport operators, like other airport operators, will participate only when it is in their best interests. Since the new rule only increases the number of airport operators eligible to apply for Federal matching grants under the Airport Improvement Program (AIP) by one-tenth of one percent, the incremental administrative costs to the FAA will be insignificant. Grant funds come from the AIP in which an 8% set-aside is held for noise mitigation purposes. AIP funding is derived from an 8% tax on passenger tickets and a general aviation fuel tax, as mandated by Congress. The expansion of the program to include heliports is not expected to adversely impact current AIP funding. In addition, this rule will have no impact on trade opportunities for U.S. firms doing business overseas or for foreign firms doing business in the United States.

Regulatory Flexibility Analysis

As explained in the background section, this amendment to Part 150 to include free-standing public-use heliports will broaden access to a voluntary Federal program. Heliport operators who submit maps or programs under the amendment will do so voluntarily and on the basis of self-interest. Since Part 150 is a voluntary program, this amendment will have no significant economic impact, either positive or negative, on a substantial number of small entities under the criteria of the Regulatory Flexibility Act. Moreover, as of June 1986, only six heliports would be eligible to participate in the Part 150 program; none are small entities.

Environmental Analysis

Pursuant to Department of Transportation "Policies and Procedures for Considering Environmental Impacts" (FAA Order 1050.1D), a Finding of No Significant Impact has been made. This amendment to Part 150 does not significantly affect the quality of the human environment.

Reporting and Recordkeeping

In accordance with the Paperwork Reduction Act of 1980 (Pub. L. 96-511), the reporting and recordkeeping provisions in this regulation will be submitted for approval to the Office of Management and Budget (OMB). Participation in the voluntary noise compatibility planning process is estimated by the FAA to affect only six heliports and the reporting and recording impact is minimal. Submission to OMB of the reporting and recording provisions will be made as an amendment to the existing OMB approval for Part 150 (OMB control number 2120-0517). The revised reporting and recordkeeping provisions are not effective until OMB approval has been obtained and notice of the approval is published in the *Federal Register*. Pending OMB approval, FAA will review any submission from an eligible heliport in accordance with the regulations implementing the provisions of the Paperwork Reduction Act of 1980. 5 CFR Part 1320.

Federalism Implications

The regulations proposed herein would not have substantial direct effects on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government. Thus, in accordance with Executive Order 12612, preparation of a Federalism Assessment is not warranted.

CONCLUSION

The only costs associated with this amendment are (1) the voluntary costs incurred by a heliport operator for the initial preparation and submission of a noise exposure map and compatibility program and (2) the minimal FAA administrative costs. Therefore, the FAA has determined that this amendment involves a regulation that is not major under Executive Order 12291 or significant under the Department of Transportation Regulatory Policies and Procedures (44 FR 11034, February 26, 1979). Since no

Amendment 150-2

Organizational Changes and Delegations of Authority

Adopted: September 15, 1989 **Effective: October 25, 1989**

(Published in 54 FR 39286, September 25, 1989)

SUMMARY: This amendment adopts changes to office titles and certain terminology in the regulations that were affected by a recent agencywide reorganization. These changes are being made to reflect delegations of authority that were changed, as well as offices that were renamed or abolished and replaced with new office designations. These changes are necessary to make the regulations consistent with the current agency structure.

FOR FURTHER INFORMATION CONTACT: Jean Casciano, Office of Rulemaking (ARM-1), Federal Aviation Administration, 800 Independence Ave., SW., Washington, DC 20591; Telephone (202) 267-9683.

SUPPLEMENTARY INFORMATION

Background

On July 1, 1988, the FAA underwent a far-reaching reorganization that affected both headquarters and regional offices. The most significant change is that certain Regional Divisions and Offices, which formerly reported to the Regional Director, are now under "straight line" authority, meaning that these units within each Regional Office report to the appropriate Associate Administrator (or Chief Counsel) in charge of the function performed by that unit.

Within Part 11 of the Federal Aviation Regulations (FAR), various elements of the FAA have been delegated rulemaking authority by the Administrator. These delegations need to be updated. In addition, throughout the Federal Aviation Regulations references are made to offices that have been renamed or are no longer in existence as a result of reorganization.

Title 14 of the Code of Federal Regulations must therefore be amended to reflect the reorganizations and changes that have taken place.

Paperwork Reduction Act

The paperwork requirements in sections being amended by this document have already been approved. There will be no increase or decrease in paperwork requirements as a result of these amendments, since the changes are completely editorial in nature.

Good Cause Justification for Immediate Adoption

This amendment is needed to avoid possible confusion about the FAA reorganization and to hasten the effective implementation of the reorganization. In view of the need to expedite these changes, and because the amendment is editorial in nature and would impose no additional burden on the public, I find that notice and opportunity for public comment before adopting this amendment is unnecessary.

Federalism Implications

The regulations adopted herein will not have substantial direct effects on the states, on the relationship between the National government and the states, or on the distribution of power and responsibilities among the various levels of government. Therefore, in accordance with Executive Order 12612, it is determined that this final rule does not have sufficient federalism implications to warrant the preparation of a Federalism Assessment.

Conclusion

The FAA has determined that this document involves an amendment that imposes no additional burden on any person. Accordingly, it has been determined that: The action does not involve a major rule under Executive Order 12291; it is not significant under DOT Regulatory Policies and Procedures

Part 150—Airport Noise Compatibility Planning

Subpart A—General Provisions

§ 150.1 Scope and purpose.

This part prescribes the procedures, standards, and methodology governing the development, submission, and review of airport noise exposure maps and airport noise compatibility programs, including the process for evaluating and approving or disapproving those programs. It prescribes single systems for—(a) measuring noise at airports and surrounding areas that generally provides a highly reliable relationship between projected noise exposure and surveyed reaction of people to noise; and (b) determining exposure of individuals to noise that results from the operations of an airport. This part also identifies those land uses which are normally compatible with various levels of exposure to noise by individuals. It provides technical assistance to airport operators, in conjunction with other local, State, and Federal authorities, to prepare and execute appropriate noise compatibility planning and implementation programs.

§ 150.3 Applicability.

This part applies to the airport noise compatibility planning activities of the operators of "public use airports," [including heliports] , as that term is used in Section 101(1) of the ASNA Act as amended (49 U.S.C. 2101) and as defined in § 503(17) of the Airport and Airway Improvement Act of 1982 (49 U.S.C. 2202).

§ 150.5 Limitations of this Part.

(a) Pursuant to the ASNA Act (49 U.S.C. § 2101 et seq.), this part provides for airport noise compatibility planning and land use programs necessary to the purposes of those provisions. No submittal of a map, or approval or disapproval, in whole or part, of any map or program submitted under this part is a determination concerning the acceptability or unacceptability of that land use under Federal, State, or local law.

(b) Approval of a noise compatibility program under this part is neither a commitment by the FAA to financially assist in the implementation of the program, nor a determination that all measures covered by the program are eligible for grant-in-aid funding from the FAA.

(c) Approval of a noise compatibility program under this part does not by itself constitute an FAA implementing action. A request for Federal action or approval to implement specific noise compatibility measures may be required, and an FAA decision on the request may require an environmental assessment of the proposed action, pursuant to the National Environmental Policy Act (42 U.S.C. § 432 *et seq.*) and applicable regulations, directives, and guidelines.

(d) Acceptance of a noise exposure map does not constitute an FAA determination that any specific parcel of land lies within a particular noise contour. Responsibility for interpretation of the effects of noise contours upon subjacent land uses, including the relationship between noise contours and specific properties, rests with the sponsor or with other state or local government.

§ 150.7 Definitions.

As used in this part, unless the context requires otherwise, the following terms have the following meanings:

"Airport" means any public use airport, [including heliports], as defined by the ASNA Act, including: (a) Any airport which is used or to be used for public purposes, under the control of a public agency, the landing area of which is publicly owned; (b) any privately owned reliever airport; and (c) any privately owned airport which is determined by the Secretary to enplane annually 2,500 or more passengers and receive scheduled

§ 150.11 Identification of land uses.

For the purposes of this part, uses of land which are normally compatible or noncompatible with various noise exposure levels to individuals around airports must be identified in accordance with the criteria prescribed under Appendix A of this part. Determination of land use must be based on professional planning criteria and procedures utilizing comprehensive, or master, land use planning, zoning, and building and site designing, as appropriate. If more than one current or future land use is permissible, determination of compatibility must be based on that most adversely affected by noise.

§ 150.13 Incorporations by reference.

(a) *General.* This part prescribes certain standards and procedures which are not set forth in full text in the rule. Those standards and procedures are hereby incorporated by reference and were approved for incorporation by reference by the Director of the Federal Register under 5 U.S.C. § 552(a) and 1 CFR Part 51.

(b) *Changes to incorporated matter.* Incorporated matter which is subject to subsequent change is incorporated by reference according to the specific reference and to the identification statement. Adoption of any subsequent change in incorporated matter that affects compliance with standards and procedures of this part will be made under 14 CFR Part 11 and 1 CFR Part 51.

(c) *Identification statement.* The complete title or description which identifies each published matter incorporated by reference in this part is as follows:

International Electrotechnical Commission (IEC) Publication No. 179, entitled "Precision Sound Level Meters," dated 1973.

(d) *Availability for purchase.* Published material incorporated by reference in this part may be purchased at the price established by the publisher or distributor at the following mailing addresses:

IEC publications:

(1) The Bureau Central de la Commission Electrotechnique, Internationale, 1, rue de Varembe, Geneva, Switzerland.

(2) American National Standards Institute, 1430 Broadway, New York, NY 10018.

(e) *Availability for inspection.* A copy of each publication incorporated by reference in this part is available for public inspection at the following locations:

(1) FAA Office of the Chief Counsel, Rules Docket, [AGC-10], Federal Aviation Administration Headquarters Building, 800 Independence Avenue, SW., Washington, D.C. 20591.

(2) Department of Transportation, Branch Library, Room 930, Federal Aviation Administration Headquarters Building, 800 Independence Avenue, SW., Washington, DC. 20591.

(3) The respective Regional Offices of the Federal Aviation Administration as follows:

(i) New England Regional Office, 12 New England Executive Park, Burlington, Massachusetts 01803.

(ii) Eastern Regional Office, Federal Building, John F. Kennedy (JFK) International Airport, Jamaica, New York 11430.

(iii) Southern Regional Office, 3400 Norman Berry Street, East Point, Georgia (P.O. Box 20636, Atlanta, Georgia) 30320.

(iv) Great Lakes Regional Office, 2300 East Devon, Des Plaines, Illinois 60018.

(v) Central Regional Office, 601 East 12th Street, Kansas City, Missouri 64106.

(vi) Southwest Regional Office, 4400 Blue Mound Road, (P.O. Box 1689), Fort Worth, Texas 76101.

(vii) Northwest Mountain Regional Office, 17900 Pacific Highway, South, C-68966, Seattle, Washington 98168.

(viii) Western Pacific Regional Office, 15000 Aviation Boulevard, Hawthorne, California (P.O. Box 92007, Worldway Postal Center, Los Angeles) 90009.

(ix) Alaskan Regional Office, 701 "C" Street, Box 14, Anchorage, Alaska 99513.

(xi) European Office, 15, Rue de la Loi (3rd Floor) B1040 Brussels, Belgium.

(4) The Office of the Federal Register, Room 8401, 1100 "L" Street, NW, Washington, D.C.

(e) Each map, or revised map, and description of consultation and opportunity for public comment, submitted to the FAA, must be certified as true and complete under penalty of 18 U.S.C. § 1001.

(f) (1) The ASNA Act provides, in Section 107(a) (49 U.S.C. 2107(a)), that: no person who acquires property or an interest therein after the date of enactment of the Act in an area surrounding an airport with respect to which a noise exposure map has been submitted under Section 103 of the Act shall be entitled to recover damages with respect to the noise attributable to such airport if such person had actual or constructive knowledge of the existence of such noise exposure map unless, in addition to any other elements for recovery of damages, such person can show that—

(i) A significant change in the type or frequency of aircraft operations at the airport; or

(ii) A significant change in the airport layout; or

(iii) A significant change in the flight patterns; or

(iv) A significant increase in nighttime operations; occurred after the date of the acquisition of such property or interest therein and that the damages for which recovery is sought have resulted from any change or increase.

(2) The Act further provides in Section 107(b), (49 U.S.C. 2107(b)): That for this purpose, "constructive knowledge" shall be imputed, at a minimum, to any person who acquires property or an interest therein in an area surrounding an airport after the date of enactment of the Act if—

(i) Prior to the date of such acquisition, notice of the existence of a noise exposure map for such area was published at least three times in a newspaper of general circulation in the country in which such property is located; or

(ii) A copy of such noise exposure map is furnished to such person at the time of such acquisition.

(g) For this purpose, the term "significant" in paragraph (f) of this section means that change or increase is one or more of the four factors which results in a "substantial new noncompatible use" as defined in § 150.21(d), affecting the property in issue. Responsibility for applying or interpreting this provision with respect to specific properties rests with local government.

§ 150.23 Noise compatibility programs.

(a) Any airport operator who has submitted an acceptable noise exposure map under § 150.21 may, after FAA notice of acceptability and other consultation and public procedure specified under paragraphs (b) and (c) of this section, as applicable, submit to the [Regional Airports Division Manager] five copies of a noise compatibility program.

(b) An airport operator may submit the noise compatibility program at the same time as the noise exposure map. In this case, the [Regional Airports Division Manager] will not begin the statutory 180-day review period (for the program) until after FAA reviews the noise exposure map and finds that it and its supporting documentation are in compliance with the applicable requirements.

(c) Each noise compatibility program must be developed and prepared in accordance with Appendix B of this part, or an FAA approved equivalent, and in consultation with FAA regional officials, the officials of the state and of any public agencies and planning agencies whose area, or any portion of whose area, of jurisdiction within the L_{dn} 65 dB noise contours is depicted on the noise exposure map, and other Federal officials having local responsibility for land uses depicted on the map. Consultation with FAA regional officials shall include, to the extent practicable, informal agreement from FAA on proposed new or modified flight procedures. For air carrier airports, consultation must include any air carriers and, to the extent practicable, other aircraft operators using the airport. For other airports, consultation must include, to the extent practicable, aircraft operators using the airport.

(d) Prior to and during the development of a program, and prior to submission of the resulting draft program to the FAA, the airport operator shall afford adequate opportunity for the active and direct participation of the states,

(2) The availability of the program for examination in the offices of the [Regional Airports Division Manager] and the airport operator.

(3) That comments on the program are invited and, will be considered by the FAA.

(d) The date of signature of the published notice of receipt starts the 180-day approval period for the program.

§ 150.33 Evaluation of programs.

(a) The FAA conducts an evaluation of each noise compatibility program and, based on that evaluation, either approves or disapproves the program. The evaluation includes consideration of proposed measures to determine whether they—

(1) May create an undue burden on interstate or foreign commerce (including unjust discrimination);

(2) Are reasonably consistent with obtaining the goal of reducing existing noncompatible land uses and preventing the introduction of additional noncompatible land uses; and

(3) Include the use of new or modified flight procedures to control the operation of aircraft for purposes of noise control, or affect flight procedures in any way.

(b) The evaluation may also include an evaluation of those proposed measures to determine whether they may adversely affect the exercise of the authority and responsibilities of the Administrator under the Federal Aviation Act of 1958, as amended.

(c) To the extent considered necessary, the FAA may—

(1) Confer with the airport operator and other persons known to have information and views material to the evaluation;

(2) Explore the objectives of the program and the measures, and any alternative measures, for achieving the objectives.

(3) Examine the program for developing a range of alternatives that would eliminate the reasons, if any, for disapproving the program.

(4) Convene an informal meeting with the airport operator and other persons involved in developing or implementing the program for the purposes of gathering all facts relevant to the determination of approval or disapproval of the program and of discussing any needs to accommodate or modify the program as submitted.

(d) If requested by the FAA, the airport operator shall furnish all information needed to complete FAA's review under (c).

(e) An airport operator may, at any time before approval or disapproval of a program, withdraw or revise the program. If the airport operator withdraws or revises the program or indicates to the [Regional Airports Division Manager], in writing, the intention to revise the program, the [Regional Airports Division Manager] terminates the evaluation and notifies the airport operator of that action. That termination cancels the 180-day review period. The FAA does not evaluate a second program for any airport until any previously submitted program has been withdrawn or a determination on it is issued. A new evaluation is commenced upon receipt of a revised program, and a new 180-day approval period is begun, unless the [Regional Airports Division Manager] finds that the modification made, in light of the overall revised program, can be integrated into the unmodified portions of the revised program without exceeding the original 180-day approval period or causing undue expense to the government.

§ 150.35 Determinations; publication; effectivity.

(a) The FAA issues a determination approving or disapproving each airport noise compatibility program (and revised program). Portions of a program may be individually approved or disapproved. No conditional approvals will be issued. A determination on a program acceptable under this part is issued within 180 days after the program is received under § 150.23 of this part or it may be considered approved, except that this time period may be exceeded for any portion of a program relating to the use of flight procedures for noise control purposes. A determination on portions of a program covered by the exceptions to the 180-day review period for approval will be issued within a reasonable time after receipt of the program.

Appendix A

Noise Exposure Maps

PART A—GENERAL

§ A150.1 Purpose.

(a) This Appendix establishes a uniform methodology for the development and preparation of airport noise exposure maps. That methodology includes a single system of measuring noise at airports for which there is a highly reliable relationship between projected noise exposure and surveyed reactions of people to noise along with a separate single system for determining the exposure of individuals to noise. It also identifies land uses which, for the purpose of this Part are considered to be compatible with various exposures of individuals to noise around airports.

(b) This Appendix provides for the use of the the FAA's Integrated Noise Model (INM) or an FAA approved equivalent, for developing standardized noise exposure maps and predicting noise impacts. Noise monitoring may be utilized by airport operators for data acquisition and data refinement, but is not required by this Part for the development of noise exposure maps or airport noise compatibility programs. Whenever noise monitoring is used, under this Part, it should be accomplished in accordance with Sec. A150.5 of this Appendix.

§ A150.3 Noise descriptors.

(a) *Airport Noise Measurement.* The A-Weighted Sound Level, measured, filtered and recorded in accordance with Sec. A150.5 of this Appendix, must be employed as the unit for the measurement of single event noise at airports and in the areas surrounding the airports.

(b) *Airport Noise Exposure.* The yearly day-night average sound level (YDNL) must be employed for the analysis and characterization of multiple aircraft noise events and for determining the cumulative exposure of individuals to noise around airports.

§ A150.5 Noise measurement procedures and equipment.

(a) Sound levels must be measured or analyzed with equipment having the "A" frequency weighting, filter characteristics, and the "slow response" characteristics as defined in International Electrotechnical Commission (IEC) Publication No. 179, entitled "Precision Sound Level Meters" as incorporated by reference in Part 150 under § 150.11. For purposes of this Part, the tolerances allowed for general purpose, type 2 sound level meters in IEC 179, are acceptable.

(b) Noise measurements and documentation must be in accordance with accepted acoustical measurement methodology, such as those described in American National Standards Institute publication ANSI 51.13, dated 1971 as revised 1979, entitled "ANS—Methods for the Measurement of Sound Pressure Levels"; ARP No. 796, dated 1969, entitled "Measurement of Aircraft Exterior Noise in the Field"; "Handbook of Noise Measurement," Ninth Ed. 1980, by Arnold P. G. Peterson; or "Acoustic Noise Measurement," dated Jan., 1979, by J. R. Hassell and K. Zaveri. For purposes of this Part, measurements intended for comparison to a State or local standard or with another transportation noise source (including other aircraft) must be reported in maximum A-weighted sound levels (L_{AM}); for computation or validation of the yearly day-night average level (L_{dn}), measurements must be reported in sound exposure level (L_{AE}), as defined in Sec. A150.205 of this Appendix.

TABLE 1

LAND USE COMPATIBILITY* WITH YEARLY DAY-NIGHT AVERAGE SOUND LEVELS

Land Use	*Yearly Day-Night Average Sound Level (L_{dn}) in Decibels*					
	Below 65	*65-70*	*70-75*	*75-80*	*80-85*	*Over 85*
Residential						
Residential, other than mobile homes and transient lodgings	Y	N(1)	N(1)	N	N	N
Mobile home parks	Y	N	N	N	N	N
Transient lodgings	Y	N(1)	N(1)	N(1)	N	N
Public Use						
Schools	Y	N1)1	N(1)	N	N	N
Hospitals and nursing homes	Y	25	30	N	N	N
Churches, auditoriums, and concert halls	Y	25	30	N	N	N
Governmental services	Y	Y	25	30	N	N
Transportation	Y	Y	Y(2)	Y(3)	Y(4)	Y(4)
Parking	Y	Y	Y(2)	Y(3)	Y(4)	N
Commercial Use						
Offices, business and professional	Y	Y	25	30	N	N
Wholesale and retail—building materials, hardware and farm equipment	Y	Y	Y(2)	Y(3)	Y(4)	N
Retail trade—general	Y	Y	25	30	N	N
Utilities	Y	Y	Y(2)	Y(3)	Y(4)	N
Communication	Y	Y	25	30	N	N
Manufacturing And Production						
Manufacturing, general	Y	Y	Y(2)	Y(3)	Y(4)	N
Photographic and optical	Y	Y	25	30	N	N
Agriculture (except livestock) and forestry	Y	Y(6)	Y(7)	Y(8)	Y(8)	Y(8)
Livestock farming and breeding	Y	Y(6)	Y(7)	N	N	N
Mining and fishing, resource production and extraction	Y	Y	Y	Y	Y	Y
Recreational						
Outdoor sports arenas and spectator sports	Y	Y(5)	Y(5)	N	N	N
Outdoor music shells, amphitheaters	Y	N	N	N	N	N
Nature exhibits and zoos	Y	Y	N	N	N	N
Amusements, parks, resorts and camps	Y	Y	Y	N	N	N
Golf courses, riding stables and water recreation	Y	Y	25	30	N	N

Numbers in parentheses refer to notes.

* The designations contained in this table do not constitute a Federal determination that any use of land covered by the program is acceptable or unacceptable under Federal, State, or local law. The responsibility for determining the acceptable and permissible land uses and the relationship between specific properties and specific noise contours rests with the local authorities. FAA determinations under Part 150 are not intended to substitute federally determined land uses for those determined to be appropriate by local authorities in response to locally determined needs and values in achieving noise compatible land uses.

KEY TO TABLE 1

SLUCM	Standard Land Use Coding Manual.
Y (Yes)	Land Use and related structures compatible without restrictions.
N (No)	Land Use and related structures are not compatible and should be prohibited.
NLR	Noise Level Reduction (outdoor to indoor) to be achieved through incorporation of noise attenuation into the design and construction of the structure.
25, 30, or 35	Land used and related structures generally compatible; measures to achieve NLR or 25, 30, or 35 dB must be incorporated into design and construction of structure.

number of daily operations based on an annual average, and the duration in minutes of the hover operation shall be identified. The other information required in paragraph (b) shall be furnished in a form suitable for input to the HNM other FAA approved methodology or computer program.]

Sec. A150.105 Identification of public agencies and planning agencies.

(a) The airport proprietor shall identify each public agency and planning agency whose jurisdiction or responsibility is either wholly or partially contained within the L_{dn} 65 dB boundary.

(b) For those agencies identified in (a) that have land use planning and control authority, the supporting documentation shall identify their geographic area of jurisdiction.

PART C—MATHEMATICAL DESCRIPTIONS

Sec. A150.201 General.

The following mathematical descriptions provide the most precise definition of the yearly day-night average sound level (L_{dn}), the data necessary for its calculation, and the methods for computing it.

Sec. A150.203 Symbols.

The following symbols are used in the computation of L_{dn}:

Measure (in dB)	*Symbol*
Average Sound Level, During Time T	L_T
Day-Night Average Sound Level (individual day)	L_{dni}
Yearly Day-Night Average Sound Level	L_{dn}
Sound Exposure Level	L_{AE}

Sec. A150.205 Mathematical computations.

(a) Average sound level must be computed in accordance with the following formula:

$$L_T = 10 \log_{10}\left[\frac{1}{T}\int_0^T 10^{L_A(t)/10}\,dt\right] \quad (1)$$

where T is the length of the time period, in seconds, during which the average is taken; $L_A(t)$ is the instantaneous time varying A-weighted sound level during the time period T.

(1) Note: When a noise environment is caused by a number of identifiable noise events, such as aircraft flyovers, average sound level may be conveniently calculated from the sound exposure levels of the individual events occurring within a time period T:

$$L_T = 10 \log_{10}\left[\frac{1}{T}\sum_{i=1}^{n} 10^{L_{AEi}/10}\right] \quad (2)$$

where L_{AEi} is the sound exposure level of the i-th event, in a series of n events in time period T, in seconds.

(2) Note: When T is one hour, L_T is referred to as a one-hour average sound level.

(b) Day-night average sound level (individual day) must be computed in accordance with the following formula:

$$L_{dn} = 10 \log_{10}\left[\frac{1}{86400}\left(\int_{0000}^{0700} 10^{[L_A(t)+10]/10}\,dt + \int_{0700}^{2200} 10^{L_A(t)/10}\,dt + \int_{2200}^{2400} 10^{[L_A(t)+10]/10}\,dt\right)\right] \quad (3)$$

Time is in seconds, so the limits shown in hours and minutes are actually interpreted in seconds. It is often convenient to compute day-night average sound level from the one-hour average sound levels obtained during successive hours.

(c) Yearly day-night average sound level must be computed in accordance with the following formula:

$$L_{dn} = 10 \log_{10}\left[\frac{1}{365}\sum_{i=1}^{365} 10^{L_{dni}/10}\right] \quad (4)$$

Appendix B

Noise Compatibility Programs

§ B150.1 Scope and purpose.

(a) This Appendix prescribes the content and the methods for developing noise compatibility programs authorized under this Part. Each program must set forth the measures which the airport operator (or other person or agency responsible) has taken, or proposes to take, for the reduction of existing noncompatible land uses and the prevention of the introduction of additional noncompatible land uses within the area covered by the noise exposure map submitted by the operator.

(b) The purpose of a noise compatibility program is:

(1) To promote a planning process through which the airport operator can examine and analyze the noise impact created by the operation of an airport, as well as the costs and benefits associated with various alternative noise reduction techniques, and the responsible impacted land use control jurisdictions can examine existing and forecast areas of noncompatibility and consider actions to reduce noncompatible uses.

(2) To bring together through public participation, agency coordination, and overall cooperation, all interested parties with their respective authorities and obligations, thereby facilitating the creation of an agreed upon noise abatement plan especially suited to the individual airport location while at the same time not unduly affecting the national air transportation system.

(3) To develop comprehensive and implementable noise reduction techniques and land use controls which, to the maximum extent feasible, will confine severe aircraft YDNL values of L_{dn} 75 dB or greater to areas included within the airport boundary and will establish and maintain compatible land uses in the areas affected by noise between the L_{dn} 65 and 75 dB contours.

§ B150.3 Requirement for noise map.

(a) It is required that a current and complete noise exposure map and its supporting documentation as found in compliance with the applicable requirements by the FAA, per § 150.21(c) be included in each noise compatibility program:

(1) To identify existing and future noncompatible land uses, based on airport operation and off-airport land uses, which have generated the need to develop a program.

(2) To identify changes in noncompatible uses to be derived from proposed program measures.

(b) If the proposed noise compatibility program would yield maps differing from those previously submitted to FAA, the program shall be accompanied by appropriately revised maps. Such revisions must be prepared in accordance with the requirements of Sec. A150.101(e) of Appendix A and will be accepted by FAA in accordance with § 150.35(f).

§ B150.5 Program standards.

Based upon the airport noise exposure and noncompatible land uses identified in the map, the airport operator shall evaluate the several alternative noise control actions and develop a noise compatibility program which—

(a) Reduces existing noncompatible uses and prevents or reduces the probability of the establishment of additional noncompatible uses;

(b) Does not impose undue burden on interstate and foreign commerce;

(c) Provides for revision in accordance with § 150.23 of this Part.

(3) The categorization of alternatives pursuant to Sec. B150.7(a), although the persons responsible for implementation of each measure in the program must still be identified in accordance with § 150.23(e) (8).

(4) Use of ambient noise to determine land use compatibility.

(b) Previously prepared noise compatibility program documentation may be supplemented to include these and other program requirements which have not been excepted.

APPENDIX B

Summary of Single Event Measurements

Table B-1
Single Event Measurement Summary

Site	Date	Runway	Operation	Aircraft	SEL	Lmax
1	10/12/90	14	Arrival	Single	77.0	70.9
				Single	70.0	63.3
				Single	71.5	64.3
				Single	71.9	64.9
				Single	69.4	63.3
				Twin	84.3	79.3
				Single	76.9	69.2
				Single	70.7	63.8
				Single	82.3	76.3
				Single	71.3	63.5
	10/14/90	32	Departure	Single	82.2	71.4
				Single	80.9	71.8
				Single	88.4	82.7
				Single	68.8	61.6
				Single	85.5	74.4
				Single	83.2	72.7
				Single	78.7	71.7
				Single	81.8	75.0
				Single	94.8	89.8
				Single	82.9	73.1
				Single	82.0	72.7
				Single	83.8	76.5
				Single	76.6	68.4
				Single	80.7	71.8
				Single	77.2	68.7
				Single	79.2	70.9
				Single	77.3	69.9
				Single	84.5	76.8
				Single	83.9	74.6
				Single	79.8	71.7
				Single	80.9	73.2
				Single	80.1	71.8
	10/15/90			Single	85.9	79.4
				Single	77.6	68.1
				Single	84.2	77.8
				Single	80.4	70.2
				Single	82.5	76.3
				Single	78.7	72.8
				Single	80.5	72.3
				Single	74.1	65.3
				Single	75.9	69.3
				Single	86.2	79.7
				Single	84.3	69.3
	10/26/90			Single	81.1	81.5
				Twin	98.3	93.6
	10/29/90			Jet	91.0	86.2

Table B-1 (cont'd)
Single Event Measurement Summary

Site	Date	Runway	Operation	Aircraft	SEL	Lmax
2	10/14/90	32	Downwind	Single	72.2	66.6
				Single	67.3	56.7
				Single	75.1	63.9
				Single	67.1	55.6
				Single	78.6	69.6
				Single	78.0	68.7
				Single	73.7	64.8
				Single	74.9	64.1
				Single	71.3	60.1
				Single	76.0	65.5
				Single	74.2	65.2
				Single	67.4	57.4
				Single	77.5	68.5
				Single	69.1	58.0
				Single	71.6	64.3
				Single	73.0	64.9
3	10/10/90	14	Departure	Single	83.6	76.1
				Single	83.2	75.8
				Single	84.1	76.9
				Single	77.7	59.8
				Twin	87.3	81.8
				Single	87.0	80.6
				Single	89.8	83.6
				Single	75.4	68.8
				Single	85.9	76.0
	10/14/90	32	Arrival	Single	66.9	63.4
				Single	70.1	63.6
				Single	63.9	60.5
				Single	71.1	64.5
				Single	68.5	63.9
				Single	70.4	63.4
				Single	68.0	64.9
				Single	74.3	68.0
	10/28/90			Single	79.2	74.5
4	10/15/90	32	Departures	Single	74.8	66.7
	10/27/90			Single	74.9	68.4
	10/29/90			Single	65.9	60.8
				Single	72.4	65.3
5	10/15/90	32	Departures	Single	71.8	69.0
				Single	82.6	68.2
				Single	73.8	68.1
				Single	76.1	61.0
				Single	69.2	56.2
				Single	70.8	67.5
				Single	80.3	74.4

Table B-1 (cont'd)
Single Event Measurement Summary

Site	Date	Runway	Operation	Aircraft	SEL	Lmax
5	10/15/90	32	Departures	Single	73.6	69.0
				Single	79.3	75.4
				Twin	85.0	79.2
				Single	73.4	66.4
				Single	69.0	64.5
6	10/14/90	32	Departure	Single	73.0	70.5
				Single	76.2	68.8
				Single	86.4	79.6
				Single	69.7	66.1
				Single	77.2	67.8
				Single	74.1	69.0
	10/27/90			Single	77.5	70.2
				Single	75.3	69.5
				Single	75.8	70.1
				Twin	81.9	74.9
				Single	76.1	74.5
				Single	85.9	79.9
				Single	77.1	71.2
				Single	80.6	74.6
				Single	84.4	79.4
				Twin	84.5	76.8
				Single	75.8	66.8
				Single	73.5	69.6
7	10/14/90	32	Departure	Single	66.7	67.8
				Twin	77.0	69.5
				Single	79.6	70.4
				Single	73.2	67.1
				Twin	80.0	69.3
				Single	81.6	76.0
				Twin	71.5	66.4
				Single	79.3	72.7
				Single	79.7	74.5
				Single	85.7	81.5
8	10/14/90	32	Departure	Single	79.1	71.0
				Single	70.8	63.8
				Single	67.1	60.7
				Single	76.0	66.6
				Single	73.7	66.5
				Single	75.2	66.9
				Single	75.6	64.4
				Single	57.5	60.5
				Single	75.1	70.7
				Twin	74.0	67.3
				Twin	84.5	77.7
				Single	76.8	69.2

Table B-1 (cont'd)
Single Event Measurement Summary

Site	Date	Runway	Operation	Aircraft	SEL	Lmax
8	10/14/90	32	Departure	Twin	79.8	74.6
				Single	71.6	62.9
				Single	70.7	65.3
				Single	82.1	77.5
				Single	65.6	58.8
				Single	71.3	64.7
				Single	77.9	74.3
				Single	66.4	62.9
				Single	67.7	67.7
				Single	78.0	70.0
				Single	71.1	62.5
9	10/14/90	32	Departure	Single	70.3	67.4
				Single	78.0	71.6
				Single	81.6	76.0
				Single	72.0	68.0
				Single	81.3	73.5
				Single	76.5	69.5
				Single	77.2	69.4
				Single	76.1	67.4
				Single	77.3	70.5
				Single	75.0	66.6
				Single	74.7	69.3
				Single	75.8	68.4
				Single	74.0	67.7
10	10/14/90	32	Departure	Single	78.6	69.3
				Single	73.7	64.2
				Single	72.6	65.8
				Single	77.4	69.2
				Single	72.3	63.8
				Single	78.3	71.8
				Single	74.3	67.7
				Single	73.7	64.3
				Single	75.0	68.4
				Single	73.7	58.8
				Single	81.7	75.1
				Single	84.0	79.4
				Single	82.3	75.7
11	10/12/90	14	Departure	Single	90.2	75.7
				Single	95.5	91.5
				Single	78.8	70.2
				Single	78.6	70.1
				Single	78.9	71.6
				Single	83.7	77.4
				Single	79.1	71.4
				Single	79.6	72.7

Table B-1 (cont'd)
Single Event Measurement Summary

Site	Date	Runway	Operation	Aircraft	SEL	Lmax
11	10/12/90	14	Departure	Single	81.9	72.7
				Single	78.4	70.9
				Single	80.8	73.9
				Single	94.7	91.8
				Single	84.7	79.8
				Single	86.7	79.8
	10/14/90	32	Arrival	Single	66.0	69.8
				Single	68.5	71.5
				Single	65.1	66.1
				Single	73.1	70.5
				Single	66.3	62.8
				Single	69.3	63.6
				Single	75.9	75.5
				Single	75.4	66.7
				Single	72.3	68.4
				Single	71.8	63.5
				Single	66.8	61.2
				Single	69.1	63.1
				Single	65.4	60.8
				Single	70.0	64.5
12	10/14/90	32	Arrival	Single	63.6	58.6
				Single	63.6	57.1
				Single	66.9	63.6
				Helicopter	76.7	65.7
				Single	69.6	63.9
				Single	65.4	63.9
	10/12/90	32	Arrival	Single	70.9	70.3
13	10/14/90	32	Arrival	Twin	70.8	60.2
				Single	66.0	58.8
				Single	67.7	55.7
				Single	63.2	56.5
				Single	63.3	55.6
				Single	71.1	61.0
				Single	69.2	57.8
				Single	64.5	57.0
				Single	61.6	54.0

APPENDIX C

GAI Instrument Approach Procedures

RNAV Runway 14

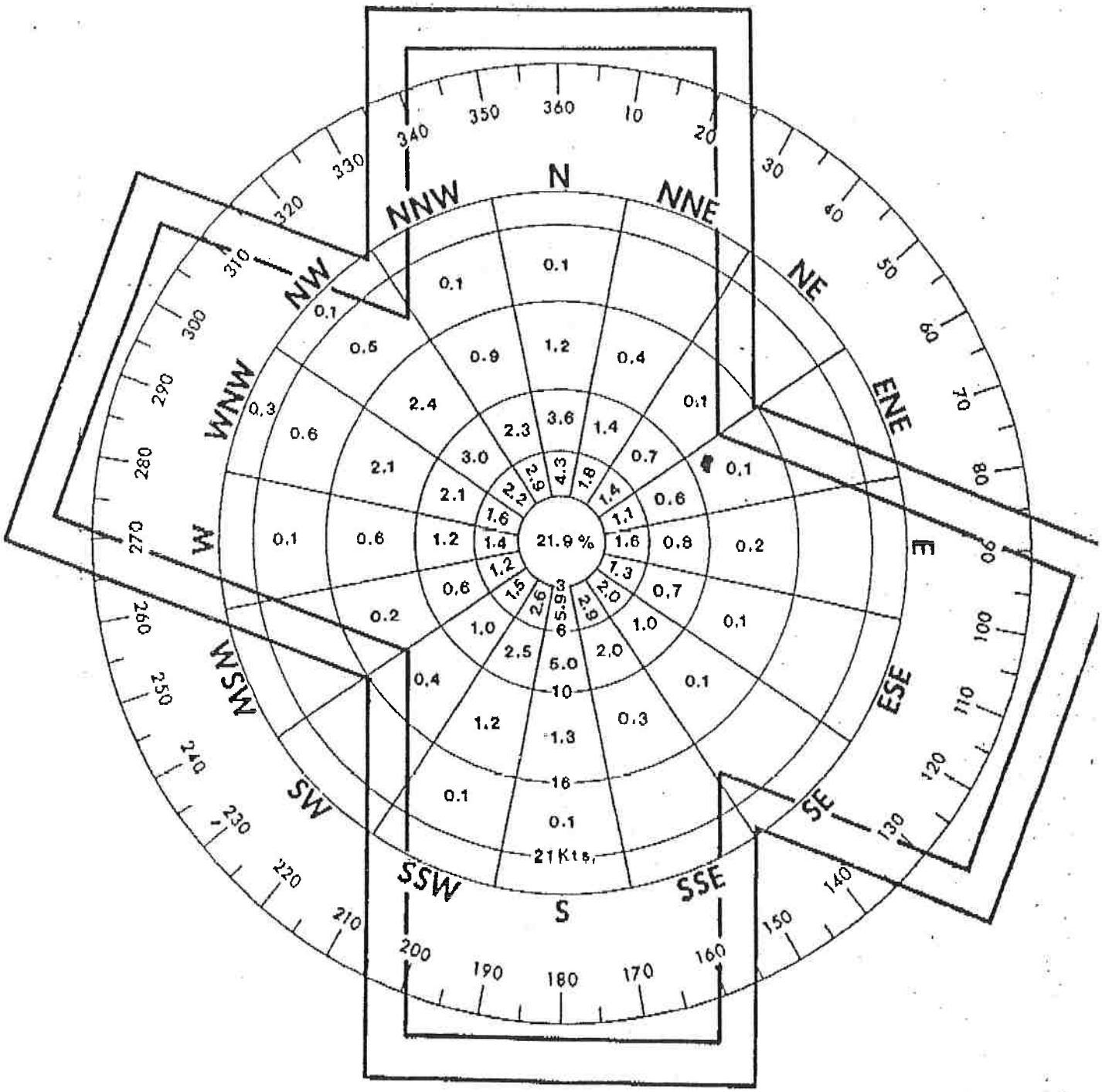
VOR Runway 14

NDB-A

APPENDIX D

GAI All-Weather Wind Rose

ALL-WEATHER WIND ROSE



Period: January 1965 - December 1974
Source: U.S. Department of Commerce

APPENDIX E

GAI Airport Regulations

MONTGOMERY COUNTY AIRPORT (KGAI)
7910-7950 AIRPARK ROAD
GAITHERSBURG, MARYLAND 20879-4160

AIRPORT REGULATIONS

Effective Date: November 1, 1989
(except as otherwise noted herein)

The following Airport Regulations regarding airport ground operations, traffic pattern, and noise abatement procedures are issued and posted in accordance with Section 5-805 of the Transportation Code of Maryland (Code of Maryland Regulations ("COMAR") 11.03.04.07C(5)) and may be enforced under Section 5-1101 et seq. of the Maryland Transportation Code at COMAR 11.03.04.04A et seq..

The original core regulations were last amended on June 15 and November 1, 1985 by publication for comment and review by Users during the Spring, 1985. These revised Regulations were presented for comment to a public meeting of the Users' Assn. and FAA publicized Flight Instructor Safety Meeting held on September 6, 1989 and a public meeting (FAA Announced for all pilots and interested parties) on September 20, 1989. In addition comment has been solicited from the UpCounty Citizens Advisory Board, Montgomery County Revenue Authority, East Village Association (public meeting of August 31, 1989), Montgomery County Department of Environmental Protection, State & Federal Aviation Administrations, Airport Operator(s), and others.

The Noise Assessment, substantially prepared by the State Aviation Administration and the Environmental Planning Staff of the Maryland National Capital Park & Planning Commission, was published after public hearings by both the Montgomery County Council and the Maryland National Capital Park & Planning Commission in 1984 and 1985.

The Regulations incorporated the Noise Assessment (contours of noise impacts and projections) approved and adopted in the Gaithersburg Vicinity Master Plan by the Legislative body of Montgomery County, Maryland (Montgomery County Council; Resolution 10-1083) and the Maryland National Capital Park and Planning Commission (Resolution 85-2) on January 9, 1985 after public hearing(s) in accordance with Article 28 of the Annotated Code of Maryland and in substantial compliance with Section 5-806(b) of the Transportation Code. The Noise Abatement Procedures consider items necessary to comply with 5-805 of the Maryland Transportation Code and 14 CFR 150.21, where applicable.

The preceeding Regulations were incorporated into the State Airport License application(s) for a Commercial - Public Use Airport with presumed Class IV runway(s), under which the airport is or may be licensed by the State of Maryland, notwithstanding and without prejudice to the Basic Transport designation in the Maryland State Aviation System Plans of 1978 and 1986 and the Transport and Reliever designations in the National Plan of Integrated Airport Systems (NPIAS). It is recognized that Runway 32 is not utilized solely for visual approaches since a circling Instrument Approach Procedure has been published for that runway since at least 1964 and there are planned straight-in approach(es).

I. DEFINITIONS:

The following terms are used herein:

A. Airport Traffic Area: Airspace between 500 A.G.L. (Above Ground Level) and up to 2,000 M.S.L. (Mean Sea Level), and the Final Approach areas, within the following distance(s) from the runway(s), for both VFR and IFR traffic:

Aircraft Category	Vso* or (Speed/1.3)	Distance (n.m.)
A	< 70 kts	1.3
B	70-93 kts	1.5
C	94-108 kts	1.7
D	109-127 kts	2.3
E	128-up	4.5

*Vso = Stall Speed or minimum steady flight speed ~~(/1.3)~~ in Landing Configuration, or actual speed utilized when circling or landing, whichever is greater. (14 C.F.R. 1.1 & 1.2). (÷1.3)

B. Final Approach: An area within the Airport Traffic Area AND within 30 degrees plus or minus of the extended runway centerline, above the floor of the Navigable Airspace and below 1,140 M.S.L., and for IFR and IMC to include the IFR Final Approach Course until the Missed Approach Point or compliance with 14 CFR 91.116 (or 91.91.175 after Aug. 18, 1990); Final Approach when under IFR and IMC below published IFR Minima is the same as above for VFR (Visual Flight Rule) traffic.

C. Approach Area: An area within 5 n.m. of the airport or within the Transition Areas defined by 14 C.F.R. 71.13, between 1,140 MSL and 2,000 MSL (or the IFR and IMC minimum approach procedure altitudes plus 300 feet).

D. Traffic Pattern Altitude (T.P.A.): For other than Rotorcraft, an altitude of 1,340 M.S.L. (800 A.G.L.), except when on extended downwind, base, final approach, or on takeoff prior to entering a downwind leg. Rotorcraft utilize 1,140 MSL (600 AGL).

E. Airport Navigable Airspace: Airspace at or above the lower of the following, except where obstruction(s) are identified by way of a Notice to Airmen (NOTAM), Instrument Approach Procedure Chart, FAA or State Airport Facility Directory, on file with the FAA National Flight Data Center (NFDC), or other publication available in compliance with 14 CFR 91.5 (or 91.103 after 8/18/90) and where there is no taking of private interests actually in use (also see 14 C.F.R. 101):

(1) The surfaces defined for the airport (as listed in the National Plan of Integrated Airport Systems (NPIAS), or the Maryland Aviation System Plan (MASP)), by 14 CFR 77; or

(2) The Obstruction surfaces defined in the Transportation Code of Maryland and the Code of Maryland Regulations (COMAR 11.03.05.04) for the Airport and Runway, as hereby may be extended, without a taking, pursuant to Sec. 5-104 of the Md. Transportation Code; or

(3) At or above the minimum altitudes prescribed in 14 CFR 91.79 (or 91.119 after 8/18/90);

F. CONSTRUCTIONS OF TERMS:

(1) For the purposes of these regulations, IFR (Instrument Flight Rules) shall be the time when on an active FAA IFR Flight Plan; the term IMC (Instrument Meterological Conditions) shall be the time at which the cockpit visibility is less than 3 miles above 700 AGL within the Airport Traffic Area or 1 nautical mile otherwise.

(2) Any other terms or necessary qualifications of the above terms where plain language is insufficient, derive their meaning from the Md. Transportation Code, Code of Maryland Regulations, Federal Statute(s), the Code of Federal Regulations, and FAA Advisory Circular(s) and Airman's Information Manual. Federal guidance may be persuasive when and where differences of substance and intent conflict and where a Federal Law or Regulation is more restrictive than these regulations or than the State Law or Regulation(s).

II. TRAFFIC PATTERN and/or APPROACH/DEPARTURE ROUTES & ALTITUDES:

A. GENERAL:

(1): Except in a bona-fide emergency or when on Final Approach, Base leg, extended Downwind leg (beyond a point abeam the runway threshold), takeoff or climb within the Airport Navigable Airspace, or takeoff or landing under IFR and IMC within the Navigable Airspace of the Airport, the published Traffic Pattern Altitude (TPA) shall be 1,140 M.S.L. for Rotorcraft, or 1,340 M.S.L. for others or small or non-turbine powered multiengine aircraft, or 1,540 M.S.L. for large or turbine powered multiengine airplanes (ref: 14 CFR 91.195, or 91.515 after 8-18-90); and

(2): Except in an Emergency, when operating below 1,000 A.G.L. within the Traffic Patten of the Airport the following minimum altitudes shall apply:

(a) General: At an altitude of at least 500 A.G.L., except when within 30 degress plus or minus of the extended runway centerline within the Airport Traffic Area, in which case an altitude within the Airport's Navigable Airspace clear of obstructions; and

(b) IFR or IMC: At or above the Circling Minima for the Approach Procedure(s) and Aircraft Category for that runway (or MDA or DH for Straight-In Procedures (within 30 degrees of th extended centerline)) unless otherwise in compliance with 14 CFR 91.116 (or 91.175 after 8/18/90); and

(NOTE: IMC above 700 AGL within the Transition Area and above 1,200 AGL outside that Area is visibility less than 3 n.m.; IMC below these areas from the ground up is less than 1 mile visibility for airplanes; note that IMC at the published Pattern Altitude (800 AGL) is any visibility less than 3 n.m.).

(c) OTHER THAN IFR or IMC: Except in an Emergency requiring immediate action, at an altitude not less than the floor of the Navigable Airspace; operations below the Navigable Airspace raises a rebuttable presumption of careless and/or reckless operation when involving any other violation of these regulations, Title 14 or 49 of the Code of Federal Regulations, or of Maryland State law or Regulations;

(NOTE: The Runway extended centerline 34:1 obstruction surface at Snouffer's School Road North-NorthWest of the airport is approximately 558 M.S.L. or 65 feet HAT (Height Above Touchdown), with a minimum glidepath of approximately 1.68 degrees from a point 200 feet prior to the threshold within 10,200 feet of the Threshold.)

((The recommended normal glidepath is 3.0 degrees (613 MSL at Snouffer's School Rd. north, or at or above the operating VASI for large or turbine powered multiengine aircraft)(maximum of 3.5 degrees for large aircraft)). However, aircraft load conditions, visibility or weather, engine temperature, and other factors may require a glidepath between 1.68 and 3.0 degrees.)). Nothing herein shall authorize a taking or trespass and all conditions are subject to Section 5-104 of the Maryland Transporation Code.).

(NOTE. The gradient for Runway 14 is + 0.9 % uphill with a Touchdown Zone Elevation (TDZE) of 521 MSL at 3,000 feet from the Threshold, and a TDZE of 508-510 MSL at 2,100 feet from the Threshold for both Runways. A glidepath above 3.5 degrees for large or turbine multiengine aircraft is not recommended for Runway 32 (downhill -0.9 % gradient average));

B. APPROACH AND LANDING ROUTES AND ALTITUDES:

(1) Approach Area: Approach the Airport Traffic Pattern below 2,000 M.S.L. and at or above the appropriate Traffic Pattern Altitude (T.P.A.) for the Category of Aircraft;

(2) VFR or (IFR above IMC): When executing a Traffic Pattern (a pattern as outlined in the FAA Airman's Information Manual is recommended), fly a route at all times as follows within the Traffic Pattern area:

(a) Upwind: A track parallel the runway at or above 1,000 A.G.L. in the direction of landing until abeam the end of the landing runway;

(b) Crosswind: A track perpendicular to the runway, crossing off the end of the active runway as close as is practicable and safe at or above the published traffic pattern altitude and below 2,000 M.S.L.;

(c) Downwind: A track parallel the runway opposite the direction of landing at the published traffic pattern altitude until abeam the runway threshold;

(d) Extended Downwind: A track parallel the runway, opposite landing, from a point abeam the landing runway threshold until entering a Base leg,

(e) Base: A track perpindicular to and on the side of the landing runway, from the completion of any extended downwind leg, above 500 A.G.L. until within 30 degrees of the extended runway centerline (Final Approach);

(f) Final: A track within 30 degress plus or minus of the extended runway centerline at or above the Airport Navigable Airspace free and clear of obstructions, at a distance within the Airport Traffic Area; Rotorcraft are encouraged to utilize a Final to the West side of the extended runway centerline;

(3) Turns other than under IFR and IMC: Except in an Emergency requiring immediate action, turns to Runway 32 shall be Right and to Runway 14 Left, except for track adjustments of less than 30 degrees when executing the traffic pattern for the landing runway (Rt Ry 32, Left Ry 14) or when established East of and on the Final approach. Except for Rotorcraft approaching from the SouthWest, Final approaches without a prescribed base leg from any point West of the extended runway centerline are not authorized.

C. OBSTRUCTIONS

No person may fly a kite or moor a baloon, nor place or construct any other object which may cause a hazard to aircraft in flight, at any point within the Navigable Airspace, nor in violation of 14 CFR 101 or COMAR 11.03; the person shall be presumed careless and reckless if that person knowingly and willfully creates such a hazard within the Final Approach to a runway. A pilot striking an object below the Navigable Airspace shall have a rebuttable presumption that he/she was careless and/or reckless;

III. NOISE ABATEMENT PROCEDURE:

A. TAKEOFF RUNWAY 32: Aircraft shall turn right to at least a heading of 340 degrees magnetic as soon as is safe and practicable, utilizing the aircraft or engine manufacturer's recommended noise reduction procedures for that aircraft or engines where consistent with the Airplane Flight Manual (AFM) and Pilot's Operating Handbook (POH), or generally accepted National industry standard/specification;

Where there is no published noise reduction procedure, utilize a climb speed of less than Va (Maneuvering Speed) and greater than or equal to Vy or Vyse (best rate(s) of climb) where safe and applicable until reaching 500 AGL or the limits of the Airport Traffic Area for that aircraft, whichever occurs first; left turns on departure from Runway 32 or right turns from Ry 14 are not authorized until reaching 1,000 AGL or the Airport Traffic Area limits from the runway end, whichever occurs later;

B. TAKEOFF 11PM to 7AM: Except for Air Ambulance Flights, utilize Runway 14 for takeoff whenever the Balanced Field Length or Accelerate-Stop Distance under prevailing conditions (load, wind, temperature, gradient, etc.) is less than 4,200 feet (NOTE: Ry 14 gradient is + 0.9 % uphill, and obstructions exist west of the extended runway centerline (check NOTAMS));

C. TURBINE OR HEAVY OR LARGE AIRCRAFT PREFERRED RUNWAY 7AM - 11PM: Due to runway gradient,the preferred runway for takeoff is Ry 32 for large, turbine, or heavy aircraft, and for landing Ry 14;

D. NIGHT OPERATIONS: Except for bona-fide Air Ambulance ("Lifeguard" call-sign) flights, no person may takeoff or land an aircraft designated by the Federal Aviation Administration (14 CFR 36, or FAA AC 36-3E as amended from time to time) or the Manufacturer(s) as generally producing noise in excess of 90 dBA landing or 82 dBA takeoff between the hours of 11PM local time and 7AM LT; this provision takes effect when supported or enacted by Resolution by the Montgomery County Council or incorporated in the County's noise Code, unless found to be discriminatory and not reasonable by the Administrator, State Aviation Administration and the Federal Aviation Administration, by final Administrative/Judicial Order.

IV. GROUND OPERATING RULES:

A. OPERATIONS SUNSET TO SUNRISE:

(1) No person may start or continue operation of a propeller or rotor blade or taxi or fly on or about the airport without operating position lights and/or rotating red beacon, whether or not for the purpose of air navigation;

(2) No person may operate or park any ground vehicle within 250 feet of the runway centerline or within the primary runway surface or below a primary approach path (14 C.F.R. 77.25) without a yellow flashing or rotating beacon operating visible from

the Traffic Pattern and Runway (unless licensed by the Airport Manager as an Airport Inspection or Maintenance Vehicle).

B. No person may start or operate an aircraft unless the aircraft is securely tied down and chocked or there is at the controls in the cockpit an FAA certificated pilot or mechanic.

C. No person may taxi an aircraft nor start an aircraft engine in a careless or reckless manner so as to endanger the life or property or limb ("'clear' before starting") of another.

D. Ground vehicles may not be operated in excess of 15 m.p.h. on the airport aircraft wearing surfaces or parking areas, or 25 m.p.h. otherwise;

V. ROTORCRAFT OPERATIONS:

Additionally, no person may engage rotors, taxi, hover, or fly a Rotorcraft on or about the airport unless:

A. There is a clear area of at least 50 feet from the outer tip of each rotor for off-ground operations, or 20 feet on an approved Heliport, Helipad, or Helistop, or other than flight; and

B. If taxiing with the wheels are on the ground; and

C. There is an FAA certificated pilot (or mechanic if the rotorcraft does not leave the ground) with a Rotorcraft Class Rating at the controls in the cockpit with seat belt secured; and

D. The pilot avoids the flow of fixed wing aircraft, unless Air Taxiing across the runway centerline on the airport at right angles to or in the direction of fixed wing traffic (after notice by radio on 122.7 MHz. (UNICOM));

VI. DISABLED OR UNOCCUPIED AIRCRAFT OR VEHICLES:

The owner or Operator of a Disabled or Unoccupied Aircraft or Vehicle must move that vehicle or aircraft immediately from within at least 20 feet from any taxiway or aircraft parking or "tie-down" space or hangar entrance, and at least 250 feet from any runway, unless assigned to that space or an adjoining space in the leasehold of and by that Airport Operator. A vehicle must be parked only in authorized and designated public parking areas or specifically authorized parking areas within an Airport Operator's leasehold by that Airport Operator.

VII. ACCIDENTS OR INCIDENTS:

An aircraft owner and/or operator and/or pilot must report all accidents and incidents to the airport Manager which otherwise are reportable under 49 CFR 830.5, 14 CFR 135.65/135.415, 121.563, 121.703-5, or which block or inhibit the runway use(s), and which occur on or about the airport. A copy of the final FAA or NTSB report shall suffice. Incidents or accidents or spills involving any Regulated Materials or Hazardous, Biological, or Nuclear Materials must be reported immediately to the Airport Manager in writing.

VIII. INSURANCE:

A. All aircraft based (parked for period(s) of substantially 28 days or more) at the airport must carry in force at least not-in-motion coverages as listed in Section 5-1002 of the Maryland Transportation Code (whether required under that Statute or not), and if ever in motion (whether or not in Air Navigation) the liability limits and coverages in Section 5-1002. This regulation applies to all aircraft and ultralights. If the law requires coverage then the coverages are required regardless of the length of stay or visit.

Note: The limits as of 1988 are listed as:

1) $ 50,000 Bodily Injury per individual;
2) $ 100,000 Bodily Injury per accident; and
3) $ 50,000 Property Damage Protection

Please consult with current law for any changes.

B. All persons offering a service (including mechanic, flight instructor, repairman, rigger, or other service) or product on or about the airport for consideration, compensation, or hire, shall carry liability insurance in such form and sufficiency as is usual and customary in aviation, however shall include, but not be limited to, Products, Negligent Instruction, Industrial Aid, Air Taxi, Commuter, Completed Operations, Premises, Sudden Environmental (Claims Made or otherwise) if required by State or Federal law, Personal Injury or medical for passengers and crew, and Workmen's Compensation and Unemployment as applicable.

C. Each aircraft owner based or hangared at Montgomery County Airport shall report annually in writing to the Airport Operator (on policy renewal) the following information:

(1) The "N" number, type, and model of aircraft;
(2) The name and address of the owner and operator of the aircraft and the period of time it has been based or hangared at the airport;
(3) The liability insurance policy or binder number;
(4) The name of the insurance company shown on the policy; and
(5) The name of the agent or broker.

Richard C. Bartel
Airport Manager
P.O. Box 2146
Gaithersburg, Md. 20886
(301) 330-6755

APPENDIX F

Agenda, Minutes, and Mailing Lists for Advisory Committee Meetings Dealing With the Development of the Noise Exposure Map

APPENDIX G

Copy of First Informational Newsletter

Project Newsletter No.1 - page 1

Project Newsletter No.1 - page 2

APPENDIX H

Sign-In Sheets and Comments From First Public Meeting