5.1 NOISE

This section presents the results of the Federal Aviation Administration (FAA) noise analyses for each of the alternatives and presents the potential impacts of aircraft noise exposure to communities surrounding the T.F. Green Airport. The noise analysis includes determinations of noise exposure for the baseline year, 1998, and as forecast for the year 2003, for the No-Build/No-Action Alternative, Alternative 2, and Alternative 3. Aircraft related noise exposure is defined through noise contours prepared with the FAA's Integrated Noise Model (INM) and are presented in the Day-Night Sound Level (DNL) metric.

A review of the physics of noise, noise impacts on humans, social impacts of noise, and the data required to develop noise exposure contours is summarized in the following subsections. The noise analyses were conducted in accordance with FAA Order 1050.1D, *Policies and Procedures for Considering Environmental Impacts*. Section 5.2, *Land Use*, presents the impact of airport related noise levels upon the surrounding area in terms of population and sensitive land uses within the noise contours.

5.1.1 The Physics and Measurement of Noise

Noise may be defined as unwanted sound. Noise and sound are physically the same, the difference being in the subjective opinion of the receiver. A sound is produced by a source that has induced vibrations in the air. The vibration produces alternating bands of relatively dense and sparse particles of air, spreading outward in all directions from the source, much like ripples after a stone is thrown into the water. The result of the air movement is sound waves that radiate in all directions and may be reflected and scattered.

Sound is measured by its pressure or energy in terms of decibels (dB). The decibel is based on a logarithmic scale due to the range of sound intensities being so great that it is inconvenient to compress the scale linearly to include all the sounds that need to be measured. The human ear can perceive a wide range of sound, at the low end of the decibel scale, very faint sounds of less than 10 dB can be heard, yet at the high end of the decibel scale extremely loud sounds of more than 100 dB can also be heard. The decibel scale from zero to 120 covers most of the range of everyday sounds, as shown in **Exhibit 5.1-1**. An increase of 10 dB is usually perceived as being twice as loud. Sound pressures of two separate sounds are not directly additive. For example, if a sound of 60 dB is added to another sound of 60 dB, the total is a 3 dB increase to 63 dB, not a doubling to 120 dB.

5.1.2 Noise Descriptors

Though a particular sound may be measured in decibels, the noise emanating from airport operations rises, falls, and even ceases in many areas throughout the day. Various noise descriptors or metrics have been developed to reflect how people are affected by the time-varying noise exposure levels resulting from aircraft operations. The DNL metric is currently the standard noise descriptor specified by the Federal government for transportation noise sources. FAA Order 1050.1D, *Policies and Procedures for Considering Environmental Impacts*, and Order 5050.4A, *Airport Environmental Handbook*, require the use of the DNL noise metric in evaluating noise exposure in environmental assessments of Federal actions.

The DNL metric employs the equivalent sound level (Leq), a single numerical noise rating which, over a given period of time, would represent the same noise energy as the time-varying sound level. The DNL metric was derived to account for the greater annoyance caused by sound intrusion at night. It augments the equivalent sound level, occurring between 10:00 p.m. and 7:00 a.m., by 10 dB before being combined with the equivalent sound level for the period 7:00 a.m. to 10:00 p.m. The DNL provides a numerical description of the weighted 24-hour cumulative noise energy level using the A-weighted decibel scale, typically over a period of a year. The method of weighting the frequency spectrum, the A-weighted scale, was adopted by the FAA to describe environmental noise because it most closely mimics the receptivity of the human ear. A weighted decibels are abbreviated dBA.

5.1.3 Noise Impacts On Humans

Noise may have detrimental impacts on the human environment. To different degrees, it may interfere with activities such as face-to-face conversation, telephone use, radio and television use, and sleep. The social impact of unwanted sound is an area of great concern, and one that has received much attention, particularly around airports.

Many studies of human response to noise have been performed. Since human response to noise stimuli is based on human perception, it is very subjective and not easily submitted to objective testing. Consequently, noise impact assessments have been primarily in the form of social surveys at selected airports throughout the United States where the affected populace was asked to respond to noise impact questionnaires. **Table 5.1-1** presents some typical findings from such surveys. The table lists the percentage of people "highly annoyed" by aircraft noise by type of activity.

Table 5.1-1
TYPICAL PERCENTAGE OF PERSONS HIGHLY ANNOYED BY AIRCRAFT NOISE BY TYPE OF ACTIVITY

ACTIVITY TYPE	PERCENT ANNOYED
TV/Radio Reception	20.6
Conversation	14.5
Telephone	13.8
Relaxing Outside	12.5
Relaxing Inside	10.7
Listening to Records/Tapes	9.1
Sleep	7.7
Reading	3.3
Eating	3.5
Other	1.3

Source: *Information on levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety,* United States Environmental Protection Agency: Office of Noise Abatement and Control, March 1974.

The degree to which noise interferes with indoor speech depends not only on physical factors such as noise levels, distance between the speaker and listener, and room acoustics, but also on nonphysical factors such as the speaker's enunciation and the listener's interest in the familiarity with the topic. The effects of noise interference on normally voiced speech indoors are shown in **Exhibit 5.1-2**. As the exhibit shows, 45 dBA is the highest steady noise that allows normal conversation throughout an average room with 100 percent sentence intelligibility. The weatherproofing found in a typical cold climate home, with doors and windows closed, can reduce outdoor noise levels by approximately 20 dB or more. Therefore, in order to achieve 100 percent intelligible speech indoors, the preferred maximum outdoor steady noise level is 65 dB or less. The steady noise level would allow for 95 to 100 percent sentence intelligibility in a normally voiced indoor conversation in which speaker and listener are two meters (approximately six and one-half feet) or less apart. Residences located in areas receiving exterior steady noise exposure of 75 dBA to 80 dBA would incur interior speech intelligibility in the range of 97 percent to 99 percent (steady interior level of 55-60 dBA), which would allow normal conversations at a comfortable voice effort at typical conversational distances.[1]

As depicted above in Table 5.1-1, social surveys show that interference with sleep is noted as a contributor to annoyance for nearly eight percent of the people.

Physiological studies show that sleep interference can exist without a person being consciously awakened. Numerous studies on sleep interference have been conducted, with varying conclusions as to the effect of noise on sleep. One study[2] concludes that with adjustments for comparable measures of noise, it can be expected that approximately 30 percent of the people could be aroused or awakened if indoor levels reached 80 to 95 dBA, depending on window configuration (open or closed) and quality of construction.

5.1.4 Social Impact of Noise

As described in the previous section, aircraft noise may result in detrimental social impacts on residents and students in noise impacted areas. Since oral communication is an intrinsic part of our society, interference with it may have adverse social effects.[3]

Exhibit 5.1-2, compares different noise levels to impacts on communication. The exhibit shows that for noise levels of up to 35 dBA, communication is possible in a normal voice level up to a distance of 32 feet.

At noise levels greater than 50 dBA people consciously raise their voice levels to compensate for the noise. Typically people will not communicate above a shout. Communication becomes impossible during events with levels of 70 dBA with speaker separation distance of 24 feet.

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1 Environmental Protection Agency, *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with and Adequate Margin of Safety*, March 1974.

2 Noise and Sleep, *Journal of the Acoustical Society of America*, Lukas, (Vol. 58(6), December 1975).

3 Environmental Protection Agency, *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety*, March, 1974.

5.1.5 Noise Contour Development

Noise contours presented in the following sections were generated using INM Version 5.2a. The INM is a state-of-the-art FAA-approved computer model that is used to predict the noise exposure levels from aircraft operations.

The INM computer program is a model for determining the impact of aircraft noise in and around airports. The impacts can be given in terms of DNL noise contours. The development of the DNL noise contours and their associated data requirements are presented in the following sections. The discussion of the 1998 existing conditions will be followed by a discussion of the 2003 alternative conditions.

5.1.6 Existing Conditions: 1998

The 1998 existing condition activity level and airport operational characteristics were evaluated to provide a basis of comparison with the proposed air traffic measures from the NCP Update and the Severe Weather Alternative Procedure (SWAP) route.

5.1.6.1 Data Sources and Assumptions

A variety of data from a number of sources is required in order to use the INM in the analysis of aircraft noise. This section presents the data employed in calculating the existing noise exposure.

Runway Definition: The existing airfield consists of a three-runway configuration. The two parallel runways, 5R/23L and 5L/23R, are oriented in a northeast southwest alignment. Runway 16/34 is oriented in a southeast/northwest alignment. Runways 5R/23L and 16/34 are the two runways that serve both commercial and general aviation aircraft. The existing runways and their nominal lengths are as follows:

Runway	Length
5R/23L	7,166 ft
16/34	6,081ft
5L/23R*	4,432 ft

* Runway 5L/23R was not operational during the baseline period. It was under reconstruction during this time.

Source: Landrum & Brown, 1999.

Definition of Stage 1, 2, and 3 Aircraft[4]: The FAA certifies aircraft based upon their noise emissions, as Stage 1, 2, or 3. Stage 1 aircraft, first introduced in the early 1960's, were designed and manufactured before the FAA established noise standards. Generally, the loudest jet aircraft, Stage 1 aircraft were phased out of service during the mid-1980's.

4 For additional information on the stage categories of aircraft based on noise emissions, see 14 CFR Part 36, *Noise Standards: Aircraft Type and Airworthiness Certification*.

Stage 2 aircraft, according to current FAA regulations, cannot account for more than 15 percent of the total U.S. fleet. However, in many cases they still produce the majority of the aircraft noise heard today. With engines having design treatments that satisfy earlier regulations, the Stage 2 category includes Boeing models 727-200 and 737-200 and the McDonnell Douglas DC-9. These aircraft are generally half as loud as Stage 1 aircraft of the same size. As of January 1, 2000, the Federal government has mandated the phase out of Stage 2 jet aircraft over 75,000 pounds. There have been no waivers granted to this requirement, therefore, the commercial aircraft fleet is now entirely Stage 3 at T.F. Green Airport.

Stage 3 aircraft are designed and manufactured using the latest noise reduction technology to satisfy the most stringent FAA certification regulations. Stage 3 aircraft operating at T.F. Green Airport include Boeing models 737-300/500/700 and 757-200 and the McDonnell Douglas MD-80 series. These aircraft are generally half as noisy as Stage 2 aircraft of the same size. Currently, Stage 3 aircraft use the best technology available to reduce noise. For 1998 baseline conditions, 70 percent of the jet aircraft fleet operating at T.F. Green Airport was certified Stage 3. This percentage includes aircraft retrofitted or hushkitted to meet Stage 3 standards, as well as manufactured Stage 3 aircraft. **Exhibit 5.1-3** shows the comparison of Stage 2 and Stage 3 aircraft noise footprints.

Runway End Utilization: Runway end utilization refers to the percent of time that a particular runway end is used for departures or arrivals. It is a principal element in the definition of the noise exposure pattern. Proportional use of a runway is based largely on conditions of wind direction and velocity. Arrival and departure runway end utilization was determined primarily from discussions with the Airport Traffic Control Tower (ATCT) and from an analysis of Automated Radar Terminal System (ARTS) radar data. **Table 5.1-2** presents the 1998 existing conditions runway utilization percentages. It also contains forecasted runway utilization for touch-and-go operations with the reopening of Runway 5L/23R.

Currently, jet aircraft land from the southwest (on Runway 5R) and take off to the northeast (on Runway 5R) approximately 42 percent of the time. Runway 23L traffic arrives from the northeast and departs to the southwest approximately 38 percent of the time. The remainder of the jet aircraft arrivals and departures utilize Runway 34 (northwest flow) approximately 15 percent of the time and Runway 16 (southeast flow) approximately five percent of the time. The prominent use of Runway 5R/23L is due to the length of this runway. Because of its greater length, jet aircraft pilots many times request Runway 5R/23L for departure when Runway 16/34 is designated as the preferred runway, based upon wind conditions.

Propeller aircraft do not significantly affect the location of the noise exposure pattern, except in areas where these are the only aircraft operated. Propeller aircraft are not normally the main contributor to noise exposure at commercial airports with primarily jet operations such as T.F. Green Airport. At T.F. Green Airport, propeller aircraft are more frequent users of Runway 16/34 than are jet aircraft. Propeller aircraft are not able to accept unfavorable wind directions and wind velocities as high as jet aircraft, thus forcing

Table 5.1-2
RUNWAY UTILIZATION PERCENTAGES - BASELINE CONDITIONS
T.F. Green Airport

		Percentage					
User Group	**Operation**	**5R**	**23L**	**16**	**34**	**5L***	**23R***
Commercial Jet	Arrival	41.5	36.4	2.1	20.0	n/a	n/a
	Departure	43.8	40.8	4.4	11.0	n/a	n/a
Cargo Jet	Arrival	46.1	32.8	1.1	20.0	n/a	n/a
	Departure	36.7	40.0	2.2	21.1	n/a	n/a
General Aviation/Prop	Arrival	32.0	26.7	4.2	37.1	n/a	n/a
	Departure	27.7	31.0	7.7	33.6	n/a	n/a
1998	Touch-and-Go	29.9	28.9	6.0	35.2	n/a	n/a
2003	Touch-and-Go	12.0	8.0	4.0	6.0	40.0	30.0

* Runway 5L/23R is used for propeller Touch-and-Go operations in the future baseline (2003) condition. It was not open during the current baseline period.
Source: Landrum & Brown and ATCT records, 1999.

a greater number of such operations to operate with the winds. An assessment of the wind conditions and radar data indicates the use of Runway 16/34 by approximately 42 percent of takeoffs and landings by propeller aircraft. The remaining propeller operations utilize Runway 5R/23L in much the same manner as jet aircraft.

Flight Tracks and Utilization***:*** A flight track is the path over the ground that an aircraft flies to or from the airport. The flight tracks at T.F. Green Airport have been created and verified from ARTS radar data, interviews with air traffic controllers, and discussions with RIAC staff. Currently, there are no formally defined flight corridors, including noise abatement flight corridors, in use at the airport. This has resulted in departure corridors that are spread over wide areas.

The radar data gathered for a sample period during 1998 was used to develop a series of consolidated flight tracks which are representative of the corridors used by aircraft as they land at or depart from T.F. Green Airport. **Exhibit 5.1-4** depicts the location of consolidated flight tracks representative of departure operations utilizing Runway 5R/23L and **Exhibit 5.1-5** depicts departure flight tracks for Runway 16/34. The tracks are composed of both backbone[5] and sub-tracks that account for the dispersion of operations across a corridor of flight, rather than along a single constrained path. This is most useful at airports that have wide flight corridors like T.F. Green Airport. The use of sub-tracks for the definition of baseline noise patterns allows a more definitive description of overall operating characteristics where ARTS data is available.

5 The FAA's INM v5.2a uses a backbone and sub-track system to represent dispersed flight corridors. A backbone and sub-tracks are a set of flight tracks that represent a wide corridor (with the backbone track being the centermost track in the corridor), allowing the user to define a percentage of use for each sub-track. The use of this tool results in more accurately modeled flight corridors.

Exhibit 5.1-6 presents arrival flight tracks for Runway 5R/23L and **Exhibit 5.1-7** presents arrival flight tracks for Runway 16/34. **Table 5.1-3** indicates the 1998 distribution of traffic on each flight track for large jets, general aviation, and propeller aircraft.

Flight Procedures and Takeoff Profiles: As part of the modeling effort, noise monitoring was conducted in the communities surrounding the airport in 1998. The monitoring was designed to help validate the aircraft data contained within the INM regarding standard approach and departure profiles. The results of the evaluation found that the measured data generally reflected the noise levels within the INM database for those aircraft operated by jet operators at T.F. Green Airport. For a more complete discussion of noise monitoring see Appendix C.

The NCP Update recommended the use of Noise Abatement Departure Procedures (NADPs) for use when departing off all runway ends at the airport. Prior to completion of the NCP Update, RIAC requested that each of the airlines implement their "Close-In" NADP as guided by FAA Advisory Circular 91-53A. Some of the carriers have since implemented the NADP procedures, however a number of the carriers have requested more information before implementing the procedures. Since this request occurred after the NCP Update was initiated, the use of NADP procedures by the jet operators was not included in the 1998 baseline condition. Refer to the Chapter Three, *Alternatives*, for more information regarding the recommended measures.

Activity Levels and Fleet Mix: The average numbers of daily aircraft arrivals and departures during the current baseline period are presented in **Table 5.1-4** for the categories of aircraft that operate at T.F. Green Airport. **Table 5.1-5** details the operations by individual aircraft types, by day and night, for an average annual day. The number of operations and their distribution during the day are derived from:

- 1997 operating records from the ATCT
- 1997/8 landing fee reports from RIAC
- Flight Strip Records from the ATCT
- Discussions with the ATCT and the Rhode Island Airport Corporation

Total annual operations for the baseline period were approximately 147,095. Commercial jet and cargo operations accounted for 30 percent of the total operations. Commuter operations accounted for 19 percent of the total operations during the baseline period. General aviation and military operations made up the remaining 51 percent of all baseline period operations. The operational counts collected from the ATCT and other sources were found to be representative of year-end 1998 operations.

Table 5.1-3
FLIGHT TRACK UTILIZATION PERCENTAGES - 1998 EXISTING CONDITIONS
T.F. Green Airport

	DAYTIME				NIGHTTIME			
	Jet Aircraft		Propeller Aircraft		Jet Aircraft		Propeller Aircraft	
Track	Arrival	Departure	Arrival	Departure	Arrival	Departure	Arrival	Departure
A1S1	2.7%	-	4.2%	-	2.6%	-	4.6%	-
A2S1	12.9%	-	0.3%	-	16.8%	-	-	-
A2S3	12.9%	-	0.3%	-	16.8%	-	-	-
A2S4	5.2%	-	17.8%	-	1.6%	-	18.3%	-
A2S5	2.5%	-	8.4%	-	0.8%	-	8.7%	-
A3E1	3.0%	-	9.5%	-	-	-	6.2%	-
A3S1	14.0%	-	0.3%	-	18.0%	-	-	-
A3S2	8.0%	-	27.0%	-	3.2%	-	30.9%	-
A5S1	38.8%	-	32.2%	-	40.4%	-	31.4%	-
D1E1	-	0.7%	-	4.3%	-	0.7%	-	7.9%
D1N1	-	1.5%	-	-	-	2.5%	-	-
D1N2	-	1.5%	-	-	-	2.5%	-	-
D1N3	-	0.3%	-	1.4%	-	-	-	-
D1S1	-	0.4%	-	-	-	-	-	-
D1S2	-	1.2%	-	2.0%	-	-	-	-
D2E1	-	-	-	1.5%	-	-	-	-
D2N1	-	18.9%	-	0.7%	-	29.2%	-	-
D2N2	-	4.0%	-	11.9%	-	2.7%	-	7.7%
D2S1	-	10.1%	-	-	-	7.4%	-	-
D2S2	-	4.4%	-	6.7%	-	-	-	-
D2W1	-	0.4%	-	10.8%	-	-	-	23.2%
D3E1	-	-	-	1.6%	-	-	-	-
D3N1	-	7.5%	-	0.4%	-	10.5%	-	-
D3N2	-	2.9%	-	12.7%	-	3.0%	-	23.1%
D3N3	-	1.4%	-	4.8%	-	-	-	-
D3S1	-	0.5%	-	-	-	-	-	-
D3S2	-	0.5%	-	-	-	-	-	-
D3S3	-	2.6%	-	4.2%	-	-	-	-
D3W1	-	2.6%	-	8.9%	-	-	-	10.5%
D5E1	-	1.2%	-	5.0%	-	-	-	-
D5N1	-	19.8%	-	0.6%	-	31.2%	-	-
D5N2	-	2.4%	-	6.6%	-	2.5%	-	6.9%
D5N3	-	-	-	0.3%	-	-	-	-
D5S1	-	10.9%	-	-	-	7.8%	-	-
D5S2	-	3.5%	-	5.0%	-	-	-	-
D5W1	-	0.8%	-	10.6%	-	-	-	20.7%
Total %	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Total Ops	49.0	50.0	134.0	132.0	12.0	10.0	8.0	8.0

Daytime – 7:00 a.m. – 9:59 p.m. / Nighttime – 10:00 p.m. – 6:59 a.m.
Source: Landrum & Brown, 1999.

Table 5.1-4
AVERAGE DAY OPERATIONS * - JANUARY 1997 TO DECEMBER 1997
T.F. Green Airport

	Arrivals		Departures		Total	
User Group	Day	Night	Day	Night	Day	Night
Air Carrier	46	10	46	11	92	21
Cargo	3	0	4	1	7	1
Commuter	36	5	33	2	69	7
GA/Military	98	5	99	4	197	9
Total	183	20	182	18	365	38

* Data rounded to the nearest whole operation.
Day = 7:00 a.m. to 9:59 p.m.
Night = 10:00 p.m. to 6:59 a.m.
Source: Landrum & Brown, 1999.

Because INM uses an average day to calculate DNL noise levels, the number of annual operations are reduced and assigned to specific aircraft types in accordance with their distribution throughout the period.

Boeing 737-200/300/400/500 aircraft made up 58 percent of the commercial jet operations during the baseline period. The remainder of the commercial jet fleet was distributed among MD82/83, DC9, Fokker 100, and Boeing 727 aircraft. Cargo aircraft included Boeing 727, Boeing 757, DC-9, and propeller aircraft. Stage 3 aircraft comprised approximately 70 percent of the commercial/cargo jet operations. Military operations were distributed between the C-130 cargo aircraft and the C-9 medical evacuation aircraft. Business jets and single/twin engine turboprop and prop aircraft made up the rest of the fleet during the baseline period.

The time of day in which operations occur is as important as input into the INM due to the penalty imposed against nighttime flights. INM applies a 10 dB penalty to all nighttime (10:00 p.m. to 7:00 a.m.) operations. For the baseline condition, approximately 9.4 percent of the total operations occurred during nighttime hours.

Table 5.1-5
FLEET MIX DISTRIBUTION - 1998 EXISTING CONDITIONS
T.F. Green Airport

User Group & INM Type	Part 36 Stage	Aircraft Type	Arrivals Day	Arrivals Night	Departures Day	Departures Night	Total Day	Total Night
Air Carrier Jets								
727Q15	2	Boeing 727-200	3	0	3	0	6	0
737300	3	Boeing 737-300	11	2	11	2	22	4
737400	3	Boeing 737-400	3	1	3	1	6	2
737500	3	Boeing 737-500	5	0	5	0	10	0
737D17/QN	2	Boeing 737-200	6	1	7	2	13	3
737N9	3	Boeing 737-200 (retrofit)	2	1	2	1	4	2
DC950	2	DC-9 50 Series	0	1	1	0	1	1
DC9Q9	2	DC-9 30 Series	4	1	4	1	8	2
DC9QR	3	DC-9 30 Series (retrofit)	4	1	3	0	7	1
F10065	3	Fokker 100	2	1	2	1	4	2
MD82	3	MD-80 20 Series	1	0	1	0	2	0
MD83	3	MD-80 30 Series	5	2	4	2	9	4
Subtotal			46	11	46	10	92	21
Cargo								
727Q7	2	Boeing 727-100	0	1	1	0	1	1
757RR	3	Boeing 757-200	1	0	1	0	2	0
DC9Q9	2	DC-9 30 Series	1	0	1	0	2	0
DC9QR	3	DC-9 30 Series (retrofit)	1	0	1	0	2	0
Subtotal			3	1	4	0	7	1
Commuter								
DHC6	N/A	Beech 1900	14	0	11	3	25	3
DHC8	N/A	ATR-42	6	1	7	0	13	1
SF340	N/A	SAAB 340	12	2	11	1	23	3
CNA441	N/A	Cessna 440	4	0	4	0	8	0
Subtotal			36	3	33	4	69	7
GA/Military								
GASEPV	N/A	Single Engine Prop	33	0	33	0	66	0
CNA441	N/A	Light Turboprop	26	3	27	2	53	5
BEC58P	N/A	Twin Engine Prop	14	1	14	1	28	2
LEAR 25	2	Lear Business Jet	5	0	5	0	10	0
LEAR 35	3	Lear Business Jet	5	0	5	0	10	0
MU3001	3	Mitsubishi Diamond	3	0	3	0	6	0
CNA500	3	Cessna Citation	7	1	7	1	14	2
C130	N/A	C-130 Transport	1	0	1	0	2	0
DC9Q7	2	Life Flight DC-9	1	0	1	0	2	0
DHC6	N/A	Dash-6	3	0	3	0	6	0
Subtotal			98	5	99	4	197	9
Grand Total			**183**	**20**	**182**	**18**	**365**	**38**

Source: Landrum & Brown, 1999.

5.1.6.2 Existing Conditions: 1998 - Noise Contours

Exhibit 5.1-8 presents the 1998 Existing Conditions noise exposure contours. The area within each noise exposure band is shown in **Table 5.1-6**. Section 5.2, *Land Use*, discusses the noise impacts to residential structures and noise-sensitive facilities. The noise contours do not represent the noise levels present on any specific day, but, rather, represent the energy-average of all 365 days of operation during the year. The noise contour pattern extends from the airport along each runway end, reflective of the flight tracks used by all aircraft. The relative distance of the contours from the airport along each route is a function of the frequency of use of each runway for total arrivals and departures, as well as its use at night, and the type of aircraft assigned to it.

The noise pattern presented on Exhibit 5.1-8 includes 3.89 square miles within the 65 DNL contour. The 65 DNL contour represents the outer boundary of the area considered, under FAA environmental guidelines, to be exposed to significant levels of noise, if the land use is noise-sensitive (residential, schools, churches, etc.). Less sensitive land uses, such as commercial or industrial property or vacant lands, are considered to be compatible with higher levels of aircraft noise exposure. (See the FAA compatibility information in Section 5.2, *Land Use*, in Table 5.2.2.)

The 1998 existing noise exposure contour indicates that the distribution of noise within the community follows the routes of flight and is larger to the southwest and northeast of the airport than to the southeast or northwest, owing to more frequent use of Runway 5R/23L by jet aircraft. The contour pattern extending from each runway end is symmetrically shaped, reflecting the wide dispersion of flight paths for departing aircraft.

Table 5.1-6
AREA EXPOSED TO VARIOUS NOISE LEVELS (IN SQUARE MILES)
1998 EXISTING CONDITIONS NOISE CONTOURS
T.F. Green Airport

Noise Level	1998 Existing Condition
65-70 DNL	2.29
70-75 DNL	0.92
75+ DNL	0.68
65+ DNL	3.89

Contour: 97BS01
Source: Landrum & Brown, 1999.

To the northwest and the southeast of the airport, the noise pattern falls largely over land uses that are inherently compatible or have been made compatible through noise mitigation programs established by the 1986 NCP. To the southwest and the northeast, the area located within the 65 - 70 DNL contours is mostly incompatible residential land uses. These areas have been recommended for mitigation in the 1999 NCP Update.

5.1.7 Future Conditions: 2003 Alternatives

The following section will provide the input data and methodology used for preparing the future condition noise exposure contours. Three alternative conditions are evaluated: Alternative 1, 2003 Baseline (No-Build/No-Action); Alternative 2, 2003 with NCP Air Traffic Actions; Alternative 3, 2003 with NCP Air Traffic Actions and Utilization of SWAP Route (Proposed Action). All of the 2003 alternative conditions assume the same number of annual operations and fleet mix. In addition, none of the 2003 alternative conditions propose a change in the existing runway layout.

5.1.8 Alternative 1: 2003 Baseline Condition (No-Build/No-Action)

Alternative 1 represents the 2003 baseline condition in which none of the proposed air traffic actions are implemented. The following provides a summary of the operational assumptions for Alternative 1.

5.1.8.1 Data Sources and Assumptions

Runway Definition: No change from 1998 existing condition.

Runway End Utilization: No change from 1998 existing condition (See Table 5.1-2, which represents the baseline conditions carried forward from 1998 to 2003). Runway utilization is not a function of increases in operations, but rather how the runways operate in an average condition.

Flight Tracks and Utilization: No change from 1998 existing condition (See Exhibits 5.1-5, 5.1-6, 5.1-7, 5.1-8 and Table 5.1-3). (Table 5.1-2 represents the baseline conditions as carried forward from 1998 to 2003.)

Activity Levels and Fleet Mix: Operational growth was forecasted by RIAC, supplemented by specific information provided to this study by the airline operators. Average daily operations are anticipated to increase by 32 percent by the year 2003, bringing the total average daily operations to 532. The forecasted growth is presented in **Table 5.1-7**.

Table 5-1.7
AVERAGE DAY OPERATIONS * - 2003 FUTURE CONDITIONS
T.F. Green Airport

	Arrivals		Departures		Total		
User Group	**Day**	**Night**	**Day**	**Night**	**Day**	**Night**	**Combined Total**
Air Carrier	74	13	76	11	150	24	174
Cargo	5	2	7	0	12	2	14
Commuter	61	3	58	6	119	9	128
GA/Military	103	5	104	4	207	9	216
Total	243	23	245	21	488	44	532

* Data rounded to the nearest whole operation.
Day = 7:00 a.m. to 9:59 p.m.
Night = 10:00 p.m. to 6:59 a.m.
Source: Landrum & Brown, 1999.

In addition to an increase in operations, it is anticipated that the fleet mix will change by the year 2003, as well. This change in fleet mix will be the result of the mandatory Stage 2 phase-out by January 1, 2000 and as a response to airline needs. **Table 5.1-8** presents the average daily operations by aircraft type for the 2003 conditions.

Boeing 737-200/300/400/500/700/800 aircraft are anticipated to make up 70 percent of the commercial jet operations by the year 2003. The remainder of the commercial jet fleet will be distributed among MD80/88, Boeing 757, and retrofitted DC9 and Boeing 727 aircraft. Cargo aircraft will include Boeing 757, Airbus 310, and retrofitted Boeing 727 and DC-9 aircraft. Military operations will continue to use the C-130 cargo aircraft and the C-9 medical evacuation aircraft. Business jets and single/twin engine turboprop and prop aircraft will make up the rest of the fleet during the future baseline period. Overall, the entire fleet at T.F. Green Airport will be nearly 100 percent Stage 3 by the year 2003. The main exceptions will be military aircraft and general aviation aircraft, both of which are not subject to the Stage 2 phase out.

5.1.8.2 Future Conditions: 2003 Alternative 1 Noise Contours

Exhibit 5.1-9 presents the 2003 Baseline Condition (Alternative 1) noise exposure contours. The 2003 Alternative 1 noise contour retains the shape of the 1998 baseline contour, but is smaller despite a 32 percent increase in operations. Its size is moderated by the completion of a transition from mixed 14 CFR Part 36, Stage 2 and Stage 3 aircraft to one composed entirely of Stage 3 aircraft. Stage 3 aircraft are either manufactured to meet the mandated noise certification levels for aircraft specified in 14 CFR Part 36, or Stage 2 aircraft are retrofit/hushkitted or otherwise equipped to bring them into compliance with Stage 3 requirements. As of January 1, 2000 all aircraft operating at T.F. Green Airport are Stage 3 compliant. The all Stage 3 fleet for future conditions at the airport contributes significantly to the reduction of noise exposure, because of the improved flight characteristics and noise reduction capabilities of those aircraft.

Table 5.1-8
2003 AVERAGE DAY OPERATIONS BY AIRCRAFT TYPE
T.F. Green Airport

User Group & INM Type	Part 36 Stage	Aircraft Type	Arrivals Day	Arrivals Night	Departures Day	Departures Night	Total Day	Total Night
Air Carrier Jets								
727EM2	3	Boeing 727-200 (retrofit)	2	0	2	0	4	0
737300	3	Boeing 737-300	17	3	17	3	34	6
737400	3	Boeing 737-400	3	2	4	1	7	3
737500	3	Boeing 737-500	9	0	9	0	18	0
737700	3	Boeing 737-700	13	1	13	1	26	2
737N17/N9	3	Boeing 737-200 (retrofit)	12	2	13	1	25	3
757PW	3	Boeing 757-200	2	0	2	0	4	0
757RR	3	Boeing 757-200	2	1	3	0	5	1
DC9QR	3	DC-9 30 Series (retrofit)	3	2	4	1	7	3
F10065	3	Fokker 100	2	1	2	1	4	2
MD82	3	MD-80 20 Series	1	0	1	0	2	0
MD83	3	MD-80 30 Series	8	1	6	3	14	4
Subtotal			74	13	76	11	150	24
Cargo								
727EM1	3	Boeing 727-100 (retrofit)	1	1	2	0	3	1
727QF	3	Boeing 727-100 (re-engine)	1	0	1	0	2	0
757RR	3	Boeing 757-200	1	0	1	0	2	0
DC9QR	3	DC-9 30 Series (retrofit)	2	0	2	0	4	0
A310	3	Airbus 310	0	1	1	0	1	1
Subtotal			5	2	7	0	12	2
Commuter								
DHC6	N/A	Beech 1900	17	0	14	3	31	3
DHC8	N/A	ATR-42	4	0	4	0	8	0
SF340	N/A	SAAB 340	17	1	15	3	32	4
HS748A	N/A	ATR-72	8	0	8	0	16	0
CL601	3	Canadair Regional Jet	3	2	5	0	8	2
CNA441	N/A	Cessna 440	12	0	12	0	24	0
Subtotal			61	3	58	6	119	9
GA/Military								
GASEPV	N/A	Single Engine Prop	34	0	34	0	68	0
CNA441	N/A	Light Turboprop	29	3	30	2	59	5
BEC58P	N/A	Twin Engine Prop	15	1	15	1	30	2
LEAR 25	2	Lear Business Jet	5	0	5	0	10	0
LEAR 35	3	Lear Business Jet	5	0	5	0	10	0
MU3001	3	Mitsubishi Diamond	3	0	3	0	6	0
CNA500	3	Cessna Citation	7	1	7	1	14	2
C130	N/A	C-130 Transport	1	0	1	0	2	0
DC9Q7	2	Life Flight DC-9	1	0	1	0	2	0
DHC6	N/A	Dash-6	3	0	3	0	6	0
Subtotal			103	5	104	4	207	9
Grand Total			**243**	**23**	**245**	**21**	**488**	**44**

Source: Landrum & Brown, 1998.

The area within each noise exposure band is shown in **Table 5.1-9**. Section 5.2, *Land Use*, discusses the noise impacts to residential structures and noise-sensitive facilities.

Table 5.1-9
AREA EXPOSED TO VARIOUS NOISE LEVELS (IN SQUARE MILES)
1998 BASELINE AND 2003 ALTERNATIVE 1 NOISE CONTOURS
T.F. Green Airport

Noise Level	1998 Baseline	2003 Alternative 1
65-70 DNL	2.29	1.59
70-75 DNL	0.92	0.58
75+ DNL	0.68	0.53
65+ DNL	3.89	2.70

Contours: 97BS01, 03BS01
Source: Landrum & Brown, 1999.

5.1.9 Alternative 2: 2003 with NCP Air Traffic Actions

The Alternative 2 condition assumes that the air traffic procedures and other NCP measures from the 1999 NCP Study Update have been implemented. Chapter Two provides a detailed discussion of the elements of the NCP air traffic actions. The following provides a summary of the operational assumptions used for developing the 2003 Alternative 2 condition.

5.1.9.1 Data Sources and Assumptions

Runway Definition: No change from 1998 existing condition.

Runway End Utilization: No change from 1998 existing condition (See Table 5.1-2, which represents the baseline conditions carried forward from 1998 to 2003). Runway utilization is not a function of increases in operations, but rather how the runways operate in an average condition.

Flight Tracks and Utilization: The 1999 NCP Update recommended eight air traffic recommendations to reduce the number of homes impacted by excessive noise levels around the airport. These recommendations included the definition of departure corridors off each runway end and an arrival corridor to Runway 34. All of the flight corridors were designed to take advantage of naturally occurring, compatible corridors around the airport. **Exhibit 5.1-10** and **Exhibit 5.1-11** depict the recommended departure and arrival flight tracks/corridors from the 1999 NCP Update. **Table 5.1-10** summarizes the flight track utilization for the Alternative 2 condition. Noise abatement flight corridors have been identified with shading.

A comparison of the flight track utilization from the 1998 existing condition and the 2003 Alternative 2 condition shows that the commercial jet and cargo jet operations would follow the 1999 NCP recommended flight corridors. The smaller jet and turboprop aircraft would continue to follow divergent headings at the discretion of the air traffic controllers.

Activity Levels and Fleet Mix: No change from 2003 Alternative 1 condition (See Tables 5.1-7 and 5.1-8).

5.1.9.2 Future Conditions: 2003 Alternative 2 Noise Contours

Exhibit 5.1-12 presents the 2003 with NCP air traffic actions and other NCP noise abatement measures (Alternative 2) noise exposure contour. The Alternative 2 noise contour reflects the implementation of the NCP air traffic actions, focusing aircraft onto defined flight corridors that overfly more compatible areas. **Exhibit 5.1-13** compares the Alternative 2 and Alternative 1 noise contours, and shows the noise increases and decreases which result. There are three notable differences in the shape of the 2003 Alternative 2 noise contour when compared to the 2003 Alternative 1 noise contour.

North of the airport, there is an area of increased noise on the left side of the contour due to the consolidation of the northbound and westbound jet departures from Runway 5R into the corridor overflying Elmwood Avenue (Route 1A). Likewise, there is an area of decreased noise to the right of and along the extended centerline of Runway 5R, because the departure traffic has been consolidated into flight corridors over the more compatible areas. Along the extended centerline of Runway 34, to the northwest, the Alternative 2 contour is slightly larger and shifted south over non-residential lands due to the consolidation of the flight corridors. The final difference in the shape of the Alternative 2 contour is the reduction in its length, found to the southwest along the extended centerline of Runway 23L. Consequently, a slight increase in noise levels is found along the sides of the Alternative 2 contour. This is primarily the result of consolidating the departing jet aircraft into two corridors going either northwest or southeast. The area within each noise exposure band is shown in **Table 5.1-11**. Section 5.2, *Land Use*, discusses the noise impacts to residential structures and noise-sensitive facilities.

5.1.10 Alternative 3: 2003 Proposed Action

The Proposed Action condition assumes that the air traffic recommendations from the 1999 NCP Update have been implemented, as well an increase in the utilization of a SWAP route down the east coast to the Baltimore-Washington Airport (BWI). Chapter Two, *Purpose and Need*, provides a detailed discussion of the elements of the NCP air traffic actions and Section 3.0 provides a summary of the SWAP route. The following provides a summary of the operational assumptions used to develop the 2003 Alternative 3 condition.

Table 5.1-10
FLIGHT TRACK UTILIZATION PERCENTAGES
2003 ALTERNATIVE 2 CONDITIONS
T.F. Green Airport

	DAYTIME				NIGHTTIME			
	Jet Aircraft		Propeller Aircraft		Jet Aircraft		Propeller Aircraft	
Track	Arrival	Departure	Arrival	Departure	Arrival	Departure	Arrival	Departure
A1S1	2.5%	-	4.2%	-	2.5%	-	4.6%	-
A2S1	14.6%	-	0.2%	-	17.1%	-	-	-
A2S3	14.6%	-	0.2%	-	17.1%	-	-	-
A2S4	3.5%	-	17.9%	-	1.1%	-	18.3%	-
A2S5	1.7%	-	8.5%	-	0.5%	-	8.7%	-
A3E1	0.4%	-	10.0%	-	-	-	6.2%	-
A3S2	2.1%	-	26.6%	-	2.1%	-	30.8%	-
A3SA	20.9%		0.3%		18.8%	-		-
A5S1	39.7%	-	32.1%	-	40.8%	-	31.4%	-
D1E1	-	0.4%	-	4.2%	-	0.7%	-	7.9%
D1N1	-	1.7%	-	-	-	2.4%	-	-
D1N2	-	1.7%	-	-	-	2.4%	-	-
D1N3	-	0.2%	-	1.7%	-	-	-	-
D1S2	-	-	-	1.7%	-	-	-	-
D1SA	-	1.1%	-	-	-	-	-	-
D2E1	-	-	-	3.5%	-	-	-	-
D2N1	-	-	-	0.5%	-	-	-	-
D2N2	-	-	-	9.5%	-	-	-	6.8%
D2NA	-	25.8%	-	-	-	29.3%	-	-
D2SA	-	12.9%	-	-	-	10.2%	-	-
D2S2	-	-	-	5.8%	-	-	-	-
D2W1	-	-	-	11.9%	-	-	-	24.1%
D3E1	-	-	-	3.7%	-	-	-	-
D3N1	-	-	-	0.3%	-	-	-	-
D3N2	-	-	-	13.1%	-	-	-	22.4%
D3N3	-	-	-	3.8%	-	-	-	-
D3NA	-	13.3%	-	-	-	13.2%	-	-
D3S3	-	-	-	3.4%	-	-	-	-
D3SA	-	2.6%	-	-	-	-	-	-
D3W1	-	-	-	9.1%	-	-	-	11.2%
D5E1	-	-	-	5.9%	-	-	-	-
D5N1	-	-	-	0.5%	-	-	-	-
D5N2	-	-	-	5.4%	-	-	-	6.1%
D5N3	-	-	-	0.3%	-	-	-	-
D5NA	-	26.5%	-	-	-	31.0%	-	-
D5S2	-	-	-	4.1%	-	-	-	-
D5SB	-	13.8%	-	-	-	10.8%	-	-
D5W1	-	-	-	11.6%	-	-	-	21.5%
Total %	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Total Ops	79.0	83.0	164.0	162.0	15.0	11.0	8.0	10.0

Daytime = 7:00 a.m. - 9:59 p.m. / Nighttime = 10:00 p.m. - 6:59 a.m.
Note: The shaded flight tracks indicate the proposed noise abatement tracks/corridors.
Source: Landrum & Brown, 1999.

Table 5.1-11
AREA EXPOSED TO VARIOUS NOISE LEVELS (IN SQUARE MILES)
2003 ALTERNATIVE 1 & 2 NOISE CONTOURS
T.F. Green Airport

Noise Level	2003 Alternative 1	2003 Alternative 2
65-70 DNL	1.59	1.52
70-75 DNL	0.58	0.59
75+ DNL	0.53	0.53
65+ DNL	2.70	2.64

Contours: 03BS01, 03al15
Source: Landrum & Brown, 1999.

5.1.10.1 Data Sources and Assumptions

Runway Definition: No change from 1998 existing condition.

Runway End Utilization: No change from 1998 existing condition (See Table 5.1-2, which represents the baseline conditions carried forward from 1998 to 2003). Runway utilization is not a function of increases in operations, but rather how the runways operate in an average condition.

Flight Tracks and Utilization: The 1999 NCP Update recommended eight air traffic procedures to reduce the number of homes impacted by excessive noise levels around the airport. These recommendations included the definition of departure corridors off each runway end and an arrival corridor to Runway 34. All of the flight corridors were designed to take advantage of naturally occurring, compatible corridors around the airport. Exhibits 5.1-11 and 5.1-12 depict the recommended departure and arrival flight corridors from the 1999 NCP Update.

In addition to the recommended NCP air traffic actions, the Proposed Action assumes increased utilization of the SWAP route. This procedure would divert up to 22 jet departures a day to a southbound heading rather than a northbound heading. The aircraft using the SWAP route would continue to follow the 1999 NCP Update recommended noise abatement flight tracks/corridors. **Table 5.1-12** presents the flight track utilization changes that result from the utilization of the recommended noise abatement flight corridors and the SWAP route. The noise abatement corridors have been highlighted with shading.

Table 5.1-12
FLIGHT TRACK UTILIZATION PERCENTAGES
2003 ALTERNATIVE 3 CONDITIONS
T.F. Green Airport

	DAYTIME				NIGHTTIME			
	Jet Aircraft		Propeller Aircraft		Jet Aircraft		Propeller Aircraft	
Track	**Arrival**	**Departure**	**Arrival**	**Departure**	**Arrival**	**Departure**	**Arrival**	**Departure**
A1S1	2.5%	-	4.2%	-	2.5%	-	4.6%	-
A2S1	14.6%	-	0.2%	-	17.1%	-	-	-
A2S3	14.6%	-	0.2%	-	17.1%	-	-	-
A2S4	3.5%	-	17.9%	-	1.1%	-	18.3%	-
A2S5	1.7%	-	8.5%	-	0.5%	-	8.7%	-
A3E1	0.4%	-	10.0%	-	-	-	6.2%	-
A3S2	2.1%	-	26.6%	-	2.1%	-	30.8%	-
A3SA	20.9%		0.3%		18.8%	-		-
A5S1	39.7%	-	32.1%	-	40.8%	-	31.4%	-
D1E1	-	0.4%	-	4.2%	-	0.7%	-	7.9%
D1N1	-	1.7%	-	-	-	2.4%	-	-
D1N2	-	1.7%	-	-	-	1.0%	-	-
D1N3	-	0.2%	-	1.7%	-	-	-	-
D1S2	-	-	-	1.7%	-	-	-	-
D1SA	-	1.1%	-	-	-	1.4%	-	-
D2E1	-	-	-	3.5%	-	-	-	-
D2N1	-	-	-	0.5%	-	-	-	-
D2N2	-	-	-	9.5%	-	-	-	6.8%
D2NA	-	22.3%	-	-	-	23.0%	-	-
D2SA	-	16.4%	-	-	-	16.5%	-	-
D2S2	-	-	-	5.8%	-	-	-	-
D2W1	-	-	-	11.9%	-	-	-	24.1%
D3E1	-	-	-	3.7%	-	-	-	-
D3N1	-	-	-	0.3%	-	-	-	-
D3N2	-	-	-	13.1%	-	-	-	22.4%
D3N3	-	-	-	3.8%	-	-	-	-
D3NA	-	9.7%	-	-	-	7.5%	-	-
D3S3	-	-	-	3.4%	-	-	-	-
D3SA	-	6.2%	-	-	-	5.7%	-	-
D3W1	-	-	-	9.1%	-	-	-	11.2%
D5E1	-	-	-	5.9%	-	-	-	-
D5N1	-	-	-	0.5%	-	-	-	-
D5N2	-	-	-	5.4%	-	-	-	6.1%
D5N3	-	-	-	0.3%	-	-	-	-
D5NA	-	23.5%	-	-	-	24.3%	-	-
D5S2	-	-	-	4.1%	-	-	-	-
D5SB	-	16.8%	-	-	-	17.5%	-	-
D5W1	-	-	-	11.6%	-	-	-	21.5%
Total %	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Total Ops	79.0	83.0	164.0	162.0	15.0	11.0	8.0	10.0

Daytime = 7:00 a.m. - 9:59 p.m. / Nighttime = 10:00 p.m. - 6:59 a.m. Note: The shaded flight tracks indicate the proposed noise abatement tracks/corridors.

Source: Landrum & Brown, 1999.

Activity Levels and Fleet Mix: No change from 2003 Alternative 1 condition (See Tables 5.1-7 and 8).

5.1.10.2 Future Conditions: 2003 Alternative 3 Noise Contours

Exhibit 5.1-14 presents the 2003 Proposed Action (Alternative 3) noise exposure contours with the 2003 Baseline (Alternative 1) contours. **Exhibit 5.1-15** highlights the areas of increased and decreased noise between the 2003 Proposed Action (Alternative 3) and the 2003 Baseline (Alternative1). The Proposed Action noise contour reflects the implementation of the NCP air traffic actions, focusing aircraft onto flight corridors that overfly more compatible areas, as well as the increased use of the SWAP route. This results in increased noise levels along the west side of the noise contour north of the airport along the extended centerline of 5R. This is an area of residential and open space. Farther north on the Runway 5R extended centerline and to the east side of the contour, areas of residential and open space would experience decreased noise levels. To the south, along the extended centerline of Runway 23L, two small areas of increased noise are present along both sides of the contour. There are decreases in noise levels on the west side and along the centerline of the contour. To the northwest, along the Runway 34 flight tracks/corridor; increased noise levels would fall over non-residential lands, while decreases in noise would be experienced over residential areas.

When compared to the Proposed Action contours, the Alternative 2 (air traffic noise abatement actions) and the Proposed Action noise contours are very similar in shape and size. **Exhibit 5.1-16** shows the two noise contours together. North of the airport, a slight bulge on the west side of the contour is smaller under the Proposed Action condition due to more aircraft turning to a southern heading rather than to a northern heading. Consequently, the right side of the Proposed Action noise contour is slightly larger.

To the southwest of the airport, a similar result is found. The Proposed Action noise contour is slightly smaller to the west and slightly larger to the east than the Alternative 2 noise contour. Overall, the noise contour is not significantly changed as a result of the increased utilization of the SWAP route due to the small number of jet departures potentially affected on a daily basis. The area within each noise exposure band is shown in **Table 5.1-13**. Section 5.2, *Land Use*, discusses the noise impacts to residential structures and noise-sensitive facilities. **Exhibit 5.1-17** shows a comparison of the three noise contours resulting from the alternatives.

Table 5.1-13
AREA EXPOSED TO VARIOUS NOISE LEVELS (IN SQUARE MILES)
2003 ALTERNATIVE 1, 2, & 3 NOISE CONTOURS
T.F. Green Airport

Noise Level	2003 Alternative 1	2003 Alternative 2	2003 Alternative 3
65-70 DNL	1.59	1.52	1.51
70-75 DNL	0.58	0.59	0.59
75+ DNL	0.53	0.53	0.53
65+ DNL	2.70	2.64	2.63

Contours: 03BS01, 03al15
Source: Landrum & Brown, 1999.

5.1.11 Noise Considerations of Aircraft Over 3,000 AGL

A supplemental analysis was conducted to determine if procedural changes and/or changes in the numbers of operations or altitude on a route between 3,000 and 18,000 feet Above Ground Level (AGL) would result in a five decibel A-weighted (dBA) change in noise to communities underlying the changes. A change of five dBA is considered to be potentially controversial and should be disclosed to the public. This analysis was performed using the criteria outlined in Air Traffic Noise Screening Model (ATNS) *Noise Screening Procedure for Certain Air Traffic Actions Above 3,000 Feet AGL*.

The ATNS provides instruction and guidelines for determining whether a proposed air traffic procedure will result in a five dBA increase in overall community noise exposure. The first step is to determine the number of jet aircraft (weighing over 75,000 pounds) that would be performing the new air traffic procedure. The criterion in ATNS Decision Table 1[6] states that between 3,000 and 4,000 feet AGL a minimum of five departing large jet aircraft or 129 arriving large jet aircraft must be performing the new procedure for a five dBA change to occur. At altitudes of 4,000 to 18,000 feet, AGL the numbers increase dramatically. The Proposed Action in this EIS involves routing aircraft onto new flight tracks/corridors as a result of the 1999 NCP Update and changing the northbound versus southbound percentages due to the implementation of the SWAP route.

The ATNS step two evaluates whether the action will introduce large jet airplanes over residential areas that are not routinely exposed to jet aircraft noise. To evaluate if that will occur, the user must determine what distance the new flight tracks/corridors will be from the original flight tracks. The ATNS sets lateral minimums at which the user can assume that the Proposed Action does not introduce large jet airplanes over residential areas not routinely exposed to jet aircraft noise. The lateral minimums are:

- Between 3,000 and 6,000 feet AGL, if the new tracks are within one nautical mile of the original tracks, then no further analysis is required.

- Between 6,000 and 12,000 feet AGL, if the tracks are within two nautical miles of the original tracks, then no further analysis is required.

6 Air Traffic Noise Screening Model, Version 2.0 User Manual, January 1999.

- Above 12,000 feet AGL, if the new flight tracks/corridors are within three nautical miles of the original tracks, then no further analysis is required.

The Proposed Action does not introduce jet airplanes over residential areas not routinely exposed to jet aircraft noise. In fact, the air traffic procedures will actually take aircraft away from some of the most impacted areas, especially during nighttime operations.

Based on the nature of the air traffic actions evaluated in this study, and the analysis conducted with the ATNS, it was determined that there will not be a five dBA increase created in new areas by aircraft over 3,000 feet above ground level. Appendix D contains the results of the ATNS screening.

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