APPENDIX B
NOISE TECHNICAL REPORT

PREFACE TO APPENDIX B

Appendix B of the Final EIR incorporates changes and corrections to the version presented in the Draft EIR, as necessary to respond to agency and public comments received during the public review period and to make clarifications to minor errors recognized after publication of the Draft EIR. These revisions are indicated in the body of the document by underline text (<u>text</u>) for additions and strikethrough text (~~text~~) for deletions. None of the figures appearing in Appendix B have been changed in the Final EIR. However, it should be noted that blank pages have been added behind color figures in order to enable their legibility when the document is printed in hardcopy format. As a result, please note that pagination in Appendix B of the Final EIR may vary from that of the Draft EIR.

TABLE OF CONTENTS

Appendices

TABLES

Page

FIGURES

Follows Page

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NOISE ANALYSIS

1.0 Introduction

As discussed in Chapter 2, Project Description, the primary project objective is to reduce noise exposure around Van Nuys Airport (VNY) by gradually phasing out operations of noisier aircraft through a four-step lowering of a limit on departure noise levels as published in the current release of Federal Aviation Administration (FAA) Advisory Circular (AC) 36-3.[1]

The project would not involve any physical development or change in land use, and would not affect the manner in which operations are conducted at VNY (e.g., runway used, flight path followed, power settings, rates of climb or descent, or other factors that affect the noise exposure associated with a specific operation). Therefore, the only changes in noise exposure at VNY would result from changes in aircraft operations that aircraft operators make to comply with the limit. As discussed in Chapter 2.0, these responses would include cancelling operations, conducting operations at another regional airport, or substituting quieter aircraft that comply with the limit. Therefore, as this section presents, the project would decrease noise levels around VNY. Noise increases would occur at the airports to which operations are diverted; those increases are quantified and assessed.

This noise analysis documentation is presented in three primary steps:

Review of analysis and impact assessment requirements

- CEQA noise analysis requirements (compatible land use),
- Application of compatible land use and significance thresholds,

Description of analysis methods, assumptions, and data

- Noise analysis methodologies,
- VNY operations,
- Overflight operations,
- Potential diversions to other airports,
- Underlying operations at diversion airports ,

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[1] U.S. Department of Transportation, Federal Aviation Administration. 2002. *Estimated Airplane Noise Levels in A-weighted* Decibels. Advisory Circular (AC) 36-3H (the current release is "H"; the next release will be "I," "J," etc.). Office of Environment and Energy. Washington, DC.

Comparison of analytical results to impact assessment criteria

- Project analysis of CNEL exposure at VNY,
- Project analysis at diversion airports,
- VNY noise management program,
- Significant unavoidable impacts.

Several appendices to this document provide reference and explanatory information:

- B.1 – Noise terminology,
- B.2 – Aircraft noise effects,
- B.3 – Noise/land use compatibility,
- B.4 – Development of VNY noise contours, and
- B.5 – Existing noise management measures.

2.0 CEQA Noise Analysis Requirements

California regulations require use of a decibel (dB) -based measure called Community Noise Equivalent Level (CNEL) to describe cumulative noise exposure resulting from aircraft operations.[2] In very simple terms, CNEL is a measure of long-term noise exposure (usually for an entire year in environmental impact report [EIR] noise analyses) that includes adjustments for increased sensitivity to noise during the evening (7 p.m.–10 p.m.) and night (10 p.m.–7 a.m.) time periods. Appendix B.1 provides an introduction to CNEL and other noise-related terms used in this EIR.

In airport noise assessments, such as noise elements of EIRs, CNEL projections have two principal functions:

- to provide a quantitative basis for assessing land use compatibility with aircraft noise exposure, and
- to provide a means for determining the significance of changes in noise exposure that might result from changes in airport layout, operations, or activity levels.

Both of these functions require the application of objective criteria, as discussed below.

2.1 Determination of Compatible Land Uses

The federal government defers to local land use jurisdictions for determination of the noise exposure that is acceptable for any given land use. Despite that deference, most

[2] Title 21, California Code of Regulations, California Airport Noise Standards, Subchapter 6, Noise Standards, Article 1, General, Section 5001, Definitions, p 220.

local land use control jurisdictions and airport proprietors (including California, Los Angeles, and Los Angeles World Airports [LAWA]) base aircraft noise and land use compatibility decisions on federal guidelines set forth in Federal Aviation Regulation (FAR) Part 150.[3] Appendix B.3 presents the federal, state, city, and LAWA noise guidelines.

Table 1 in Appendix B.3 presents a detailed table of noise and land use compatibility criteria adopted by LAWA, which are consistent with City of Los Angeles, state, and federal guidelines and with all applicable California Environmental Quality Act (CEQA) requirements. At the most basic level, all of these government agencies consider all land uses to be compatible with cumulative noise exposure below 65 dB CNEL.

2.2 Identifying Significant Changes in Noise Exposure

The City of Los Angeles has adopted guidelines for conducting assessments of aircraft noise under CEQA, which define a "significance threshold" as follows: "A significant impact on ambient noise levels would normally occur if noise levels at a noise sensitive use attributable to airport operations exceed 65 dB and the project increases ambient noise levels by 1.5 dB CNEL or greater."[4]

This threshold is consistent with the FAA policies and procedures for compliance with the National Environmental Policy Act (NEPA) as they apply to noise-sensitive land uses:[5]

- A significant impact would occur if the project-related action will cause noise-sensitive areas already at or above CNEL 65 dB to experience an increase in noise of CNEL 1.5 dB or greater when compared to no action; and
- If noise-sensitive areas at or above CNEL 65 dB will have an increase of CNEL 1.5 dB or more, noise-sensitive areas lying between CNEL 60 and 65 dB should be examined to identify whether increases of CNEL of 3 dB or more occur due to the proposed action. If so, noise mitigation measures should be considered.

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[3] 14 Code of Federal Regulations (CFR) Part 150, *Airport Noise Compatibility Planning*.

[4] City of Los Angeles. 2006. *L.A. CEQA Thresholds Guide*. Environmental Affairs Department. Los Angeles, CA, p. I.4-3–I.4-5.

[5] Federal Aviation Administration. 2004. *Environmental Impacts: Policies and Procedures*. Order 1050.1E. Washington, DC. Appendix A, Section 14.4, p. A-61–A-63.

3.0 Application of Compatible Land Use and Significance Thresholds

Based on the preceding definitions of compatible land uses and thresholds of significance, CEQA guidelines require categorizing the calculated changes in noise exposure according to four categories: [6]

- Potentially significant impact,
- Less-than-significant impact with mitigation incorporation,
- Less-than-significant impact, and
- No impact.

The CEQA guidelines identify six specific questions to consider in assessing potential noise effects:

- Would the project result in exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance or applicable standards of other agencies?
- Would the project result in exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?
- Would the project result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?
- Would the project result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?
- For a project located within an airport land use plan or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?
- For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?

4.0 Noise Analysis Methodologies

Determining whether an action, such as the proposed project, will result in a significant change in noise exposure requires calculating CNEL values.

[6] California Code of Regulations (CCR). As amended July 27, 2007. Title 14, Chapter 3, *Guidelines for Implementation of the California Environmental Quality Act*. California Division of Aeronautics, Department of Transportation. Sacramento, CA. Appendix G, Environmental Checklist Form, p. 11.

City of Los Angeles CEQA guidelines require use of a recognized aircraft noise model to calculate CNEL.[7] The guidelines identify four candidate models. Two of the models apply to airports at which operations are dominated by helicopter or military operations. The other two models are the FAA's Area Equivalent Method (AEM) and the FAA's Integrated Noise Model (INM).[8] The INM is the most complex of these models and requires very extensive local data collection, processing, and entry. Appendix B.4 of this EIR provides a detailed description of the INM and data requirements.

The AEM model and associated user guide are available on the FAA web site.[9] The City of Los Angeles CEQA guidelines permit the use of this model "as a screening tool to determine whether the more sophisticated and time-consuming INM is warranted." This two-step process is consistent with the previously mentioned federal policies and procedures. Following these guidelines, the AEM was used as a screening tool at both VNY and the regional airports to which the phaseout would potentially cause certain operators to divert some flights (the "diversion" airports).

The AEM requires detailed information on airport operations (e.g., landings and takeoffs) for each scenario under consideration (e.g., proposed project or alternative and year). The INM requires more complex and detailed information on airport layout and physical aspects of operations (e.g., runway used, flight tracks followed, etc.). Since the scenarios considered in this EIR differ only in terms of airport activity, the other information is presented in Appendix B.4.

The following subsections describe the development of airport activity for VNY and the diversion airports, including baseline and forecast VNY operations (Section 5); overflight operations affecting the area around VNY (Section 6); VNY operations that might be diverted to other airports (Section 7); and baseline and forecast operations at the diversion airports unassociated with any diversions resulting from the VNY phaseout (Section 8).

Section 9 presents the noise analysis results for VNY. Section 10 presents the results for the diversion airports.

4.1 Analysis Years

As discussed in Chapter 2, the proposed project would affect operations at six airports: VNY and five regional airports to which it is anticipated some operations would be diverted, including Bob Hope Airport in Burbank (BUR), Camarillo

[7] Ibid. Appendix A, Section 14.4, p. A-61–A-63.

[8] Since the L.A. CEQA guidelines were updated in 2006, the FAA has released a version of the INM, which the federal government now requires for use in assessing noise associated with helicopter operations, even at airports where helicopter operations predominate. For that reason, today the AEM and INM meet federal guidelines for noise evaluations at all civil airports.

[9] Available: <http://www.faa.gov/about/office_org/headquarters_offices/aep/models/aem_model/>.

Airport in Camarillo (CMA), Chino Airport in Chino (CNO), Los Angeles International in Los Angeles (LAX), and William J. Fox Airfield in Lancaster (WJF). As further discussed in Chapter 2, the maximum anticipated effect on operations at four of these airports (VNY, BUR, CMA, and LAX) would occur in 2014. There would be less effect at these airports in preceding and succeeding years. There would be no effect at CNO and WJF until 2016. These effects on operations are quantified in Chapter 2 (Tables 2.2, 2.3, and 2.4) and in the discussions of forecast operations at VNY and of diversions to other airports in Sections 5 and 7.

To identify the maximum potential effect on noise exposure, 2014 was used as the forecast year for analysis of the proposed project and alternatives at VNY, BUR, CMA, and LAX, while 2016 was used at CNO and WJF.

5.0 VNY Baseline and Forecast Aircraft Operations

This section presents the 2007 baseline estimate and 2014 forecasts of aircraft operations at VNY. Forecasts are presented for the proposed project, for Alternative 1 (no project), and Alternative 2 (project with a Stage 3 and Stage 4 exemption). These forecasts provide the basis for the analysis of the effects of the proposed project and the two alternatives on VNY noise contours.

The forecast of aircraft operations is based on developed previously forecasts for the ongoing VNY FAR Part 161 study. For that study, a detailed analysis of VNY aircraft operations was performed for the 2004 base year, and operations were projected for future analysis years, 2009 and 2014. The Part 161 base year was updated to 2007, and the forecast for 2014 was adopted for the VNY Noisier Aircraft Phaseout EIR.

General aviation (GA) activity at VNY encompasses a wide range of users and aircraft types, from pilot training schools using single-engine fixed- or rotary-wing aircraft to corporate flight departments and fractional jet operators flying long-range, high-performance business jets. To reflect the trends and operating profiles associated with these varied user groups, aircraft operations were projected for six distinct categories of activity:

- Business jets,
- Turboprops,
- Pistons,
- Helicopters,
- Active military, and
- Touch-and-go training.

There is no single data source that provides all the information needed to develop the fleet inputs for the INM, which requires average daily arrivals and departures by aircraft type and by time of day. Therefore, it was necessary to use several available data sources to compile a base-year fleet mix with the required inputs for noise impact analysis. These data sources include (1) FAA air traffic control tower (FAA Tower) counts, (2) LAWA curfew counts at VNY, (3) FAA Automated Radar Terminal System (ARTS) data, (4) the Van Nuys Database System (VNDS), (5) FAA Enhanced Traffic Management System counts; (6) data from helicopter count surveys conducted at VNY in December 2005 and April 2006,[10] (7) the 2001 baseline fleet mix for the Part 150 study, and (8) the fleet mix used by LAWA to produce the 2002–2004 noise contours for VNY.

5.1 Estimation of Baseline Aircraft Operations

2004 VNY Activity

The first step in compiling the base-year fleet mix was to identify the actual number of aircraft that arrived or departed from VNY in the 2004 base year. The primary sources for this analysis were the FAA Tower counts, the LAWA curfew counts, and the helicopter count surveys. The FAA Tower counts provided the number of air taxi, GA itinerant, GA local, military itinerant, and military local operations at VNY for the hours when the tower is staffed, 06:00 to 22:45. The FAA Tower counts were supplemented with daily aircraft counts conducted by the LAWA operations department at VNY from 22:45 to 06:59 to estimate annual aircraft operations, including activity during the curfew period.

Overflights recorded by the FAA Tower were excluded from the base-year 2004 operation counts so that the base-year data would reflect only the number of aircraft arriving at or departing from the VNY airfield. The overflights recorded by the FAA included fixed-wing aircraft and helicopters, which are tracked by VNY tower personnel. The 2004 FAA Tower counts included 56,564 fixed-wing overflights.[11] The number of fixed-wing overflights was determined directly from daily FAA Tower logs.

The FAA does not keep separate counts of helicopters that overfly the VNY airfield and helicopters that land at or depart from VNY. Hence, the number of helicopter operations that were overflights was estimated using data collected from the two helicopter count surveys. The survey data indicate that 28% of the itinerant helicopter operations recorded by the FAA, or 16,949 overflights, were transiting and not arriving or departing at VNY.

Both the FAA Tower counts and the LAWA curfew counts include activity from 06:00–6:59. To avoid duplication, the estimated number of operations for that period was excluded from the FAA Tower counts. The daily FAA Tower logs were used to

[10] The December 2005 survey was conducted by VNY operations personnel, and the April 2006 survey was conducted by CommuniQuest.

[11] VNY air traffic control tower counts do not include overflights of aircraft flying to or from Bob Hope Airport in Burbank, CA.

estimate that the tower recorded 2,877 flights arriving at or departing from VNY from 06:00–06:59.

LAWA operations staff recorded 8,192 aircraft arrivals and departures between 22:45 and 06:59. These operations were added to the FAA Tower counts after adjustments for overflights and duplication, resulting in an estimated 380,483 aircraft operations at VNY in 2004. Table 1 shows the derivation of total arriving and departing aircraft operations at VNY in 2004.

Table 1. Total Aircraft Operations at VNY, 2004

Data Source	**Operations**
Counts (06:00–22:45)	448,681
Fixed Wing Overflights	(56,564)
Estimated Helicopter Overflights	(16,949)
Estimated Operations (06:00–06:59)	(2,877)
FAA Tower Counts (~~0:700~~07:00–22:45)	372,291~~1~~
LAWA Curfew Counts (22:45–06:59)	8,192
Total VNY Arriving and Departing Aircraft	**380,483**

2004 Operations by Aircraft Category

The next step in the base-year analysis was to estimate operations by aircraft category, which is shown in Table 2. Jets were estimated to account for 44,264 operations, or 11.6% of the 2004 total. Non-jet operations are the most prevalent, accounting for 42.5% of total activity. Approximately 15% of the non-jet activity is by single- or multi-engine turboprops, and 85% is by single- or multi-engine piston-powered aircraft. Total helicopter operations are estimated at 52,202, or 13.7% of total operations. Touch-and-go, or pilot training, operations accounted for nearly one-third of the airport's activity. Operations by military aircraft were estimated at 293.

Table 2. Estimated 2004 VNY Aircraft Operations by Aircraft Category

Aircraft Category	Operations			Share of Total		
	Itinerant	**Local**	**Total**	**Itinerant**	**Local**	**Total**
GA Jet	43,103	1,161	44,264	11.3%	0.3%	11.6%
GA Non-Jet	157,145	4,532	161,677	41.3%	1.2%	42.5%
Turboprop	24,197	677	24,874	6.4%	0.2%	6.5%
Piston	132,948	3,854	136,803	34.9%	1.0%	36.0%
Helicopter	45,228	6.974	52,202	11.9%	1.8%	13.7%
Military	247	46	293	0.1%	0.0%	0.1%
Touch and Go*	—	122,047	122,047	0.0%	32.1%	32.1%
Total	**245,723**	**134,760**	**380,483**	**64.6%**	**35.4%**	**100.0%**
* Each touch-and-go cycle is counted as two operations.						

In 2004, 64.6% of the operations at VNY were itinerant.[12] The number of itinerant jet operations was based on counts from the ARTS data, supplemented with data from the LAWA curfew counts. The number of itinerant helicopter operations equals the FAA Tower counts for helicopters less the estimated number of transiting helicopters plus helicopter operations from the LAWA curfew counts. Itinerant military operations are based on the FAA Tower counts. Itinerant operations by non-jet aircraft were determined by subtracting itinerant operations for the other aircraft categories from total itinerant operations. Of the non-jet operations, it was assumed that 85% were piston-powered aircraft and 15% were turboprop aircraft. This assumption is similar to the assumptions used in the VNY Part 150 study and by LAWA to prepare the 2002–2004 VNY noise contours.

The number of local operations, 134,760, is based on the FAA Tower counts. The number of local helicopter operations was determined directly from the daily FAA Tower logs. Local military operations were based on reported FAA Tower counts. Of the remaining fixed-wing local operations, 96% were assumed to be touch-and-go operations. This assumption was based on the estimated number of touch-and-go operations in the VNY Part 150 study compared to total local operations for the years 1998–2001. The remaining fixed-wing local operations were distributed among jets, turboprops, and pistons in proportion to their share of itinerant operations.

[12] Itinerant operations include aircraft that arrive from or depart to airports located beyond a 20-mile radius of the airport.

Aircraft Operation Trends: 2004 to 2007

Actual changes in aircraft operations were reviewed to update the 2004 base-year operations to 2007. Table 3 shows total VNY operations, compiled from FAA Tower Counts and LAWA curfew counts, for 2004, 2006, and January–September 2006 and 2007. Total VNY operations, including overflights, decreased by 12% between 2004 and 2006. For the first 9 months of 2007, operations declined by 4.8% over the same period in 2006. If the percent change for the first 9 months of 2007 is extrapolated to the calendar year, it is estimated that VNY operations, including overflights, declined by 16.2% from 2004 to 2007.

Table 3. Change in VNY Aircraft Operations, 2004–2007

	Tower Itinerant					Curfew (22:45–5:59) Itinerant					Tower Local			
Period	**Air Taxi**	**GA**	**Subtotal AT + GA**	**Mili-tary**	**Total Itin.**	**Jet**	**Non-Jet**	**Helo**	**Mili-tary**	**Total Curfew**	**GA**	**Mili-tary**	**Total Local**	**Total Itin. + Local**
Operations														
2004	16,016	297,658	313,674	247	313,921	2,761	991	2,320	—	6,072	134,714	46	134,760	454,753
2006	16,157	266,554	282,711	316	283,027	2,752	675	1,726	—	5,153	112,148	70	112,218	400,398
Jan–Sep 2006	12,163	202,642	214,805	213	215,018	1,992	518	1,286	—	3,796	85,104	70	85,174	303,988
Jan–Sep 2007	12,257	188,188	200,445	200	200,645	2,248	632	1,360	—	4,240	84,572	24	84,596	289,481
Percent Change														
2004–2006	0.9%	-10.4%	-9.9%	27.9%	-9.8%	-0.3%	-31.9%	-25.6%	0.0%	-15.1%	-16.8%	52.2%	-16.7%	-12.0%
Jan-Sep 06–07	0.8%	-7.1%	-6.7%	-6.1%	-6.7%	12.9%	22.0%	5.8%	0.0%	11.7%	-0.6%	-65.7%	-0.7%	-4.8%
Est. Pct. Change 2004–2007	1.7%	-16.8%	-15.9%	20.1%	-15.9%	12.5%	-16.9%	-21.3%	0.0%	-5.2%	-17.3%	-47.8%	-17.3%	-16.2%
Est. 2007 Operations	16,282	247,541	263,811	297	264,108	3,106	824	1,825	—	5,756	111,447	24	111,456	381,320

Note: "GA Itinerant" includes fixed-wing and helicopter overflights. "GA Local" includes fixed-wing and helicopter local operations.

Source: LAWA.

Estimated 2007 Baseline Aircraft Operations

The estimated 2007 FAA Tower counts and LAWA curfew counts were then used to develop the 2007 baseline level of operations by aircraft category using methodology and assumptions similar to those used to develop the 2004 baseline fleet mix. Table 4 presents the 2007 baseline activity levels by aircraft category and the estimated percent change from 2004. In 2007, there were an estimated 314,000 aircraft arriving or departing from the VNY airfield. Aircraft operations declined by an estimated 17.5% between 2004 and 2007. The overall decline masks an underlying change in the mix of activity at VNY. While total activity fell between 2004 and 2007, jet aircraft operations grew by 8.8%, to 48,143, accounting for 15% of VNY's operations. The sectors of activity that are most sensitive to rising fuel prices experienced steep declines. Operations by turboprop and piston aircraft fell by more than 30%, and touch-and-go training operations were 19% lower.

Table 4. Estimated 2007 VNY Aircraft Operations by Aircraft Category

Aircraft Category	2004	2007	Percent Change	Average Annual Percent Change
GA Jet	44,264	48,143	8.8%	2.8%
Turboprop	24,874	15,728	-36.8%	-14.2%
Piston	136,273	89,143	-34.6%	-13.2%
Helo	52,202	61,298	17.4%	5.5%
Military	293	321	9.4%	3.0%
Private Military	659	659	0.0%	0.0%
Training	121,918	98,715	-19.0%	-6.8%
Total	**380,483**	**314,007**	**-17.5%**	**-6.2%**

5.2. Baseline (2007) Activity

This section provides an overview of 2007 baseline aircraft activity levels at VNY, including activity by aircraft category, time of day, and INM aircraft type.

Operations by Aircraft Category

Table 5 shows annual and average daily operations at VNY by aircraft category for the 2007 baseline. Non-training operations in light general aviation aircraft, turboprops, and pistons represented one-third of total operations. Touch-and-go training operations accounted for 31% of total aircraft activity. An estimated 20% of operations was performed by helicopters. Business jets conducted 48,000 operations at VNY, approximately 15% of total aircraft activity. Less than 1% of total operations were by active or private military aircraft.

Table 5. Baseline 2007 Operations by Aircraft Category

Aircraft Category	Annual	Average Daily	Percent of Total
Business Jets	48,143	131.9	15%
Turboprop	15,728	43.1	5%
Piston	89,143	244.2	28%
Helicopter	61,298	167.9	20%
Military	321	0.9	0%
Private Military	659	1.8	0%
Touch and Go	98,715	270.5	31%
Total	**314,007**	**860.3**	**100%**

Operations by Time of Day and Direction

Table 6 presents baseline operations by aircraft category and by time of day. The majority of the activity, 88.1%, was conducted during the day (07:00–18:59). The evening period (19:00–21:59) accounted for 8.4% of operations, and 3.5% of the activity occurred during the night period (22:00–06:59).

Table 6. Baseline 2007 Operations by Aircraft Category and Time of Day

Aircraft Category	Operations by Time of Day				Percent of Total 24 Hours		
	Day	Evening	Night	Total	Day	Evening	Night
Business Jets	38,496	4,931	4,717	48,143	80.0%	10.2%	9.8%
Turboprop	13,628	1,206	894	15,728	86.6%	7.7%	5.7%
Piston	81,305	7,552	286	89,143	91.2%	8.5%	0.3%
Helicopter	49,679	6,592	5,026	61,298	81.0%	10.8%	8.2%
Military	305	16	—	321	95.1%	4.9%	0.0%
Private Military	621	34	5	659	94.2%	5.1%	0.7%
Touch and Go	92,518	6,197	—	98,715	93.7%	6.3%	0.0%
Total	**276,551**	**26,528**	**10,927**	**314,007**	**88.1%**	**8.4%**	**3.5%**

The time of day profile varies significantly by aircraft category. Business jets and helicopters had the highest percentage of operations during the evening and night periods, 20% and 19%, respectively. Business jets tend to have higher nighttime usage than other fixed-wing aircraft for many reasons. A key motivation for using private jet transportation services is the convenience and the ability to make a same-day business trip, which may require an early morning (i.e., before 07:00) departure and/or an evening or nighttime return. In addition, jet aircraft pilots have more training and are more experienced at nighttime operations than non-jet, fixed-wing pilots. The time-of-day profile for the helicopters is largely driven by the nature of the helicopter activity that occurs at VNY, particularly public safety operations and news and traffic reporting.

Non-jet, fixed-wing aircraft had lower percentages of evening and night operations than jet and rotary-wing aircraft. For turboprops, which may also be used for business travel, 13.4% of operations occurred during the evening and night periods. Pistons, which are mainly used for recreational flying, had an even lower percentage of operations during the evening and nighttime periods, 8.8%.

Only 6.3% of touch-and-go training operations occurred during the evening period, and none were conducted during the night period. VNY noise abatement regulations currently prohibit touch-and-go operations from 22:00–06:59 from June 21 to September 15 and from 21:00–06:59 from September 16 to June 20.

Table 7 shows the type of operation (i.e., arrival or departure) by time of day. Base-year operations during the day were almost evenly divided between arrivals and departures. In contrast, arrivals made up the majority of activity during the evening and night periods. Arrivals accounted for 56.7% of evening activity and 53.7% of night activity. Evening and night activity by business jets was even more heavily weighted toward arrivals. More than two-thirds of evening business jet operations were arrivals, and 57.7% of nighttime business jets operations were arrivals.

Table 7. Baseline 2007 Operations by Aircraft Category, Time of Day, and Direction

Aircraft Category	**Day**		**Evening**		**Night**	
	Arrivals	**Departures**	**Arrivals**	**Departures**	**Arrivals**	**Departures**
Business Jets	46.7%	53.3%	68.1%	31.9%	57.7%	42.3%
Turboprops	48.2%	51.8%	70.7%	29.3%	49.6%	50.4%
Piston	48.7%	51.3%	63.4%	36.6%	53.7%	46.3%
Helicopter	50.7%	49.3%	44.0%	56.0%	50.7%	49.3%
Military	48.3%	51.7%	82.5%	17.5%	—	—
Private Military	48.9%	51.1%	76.5%	23.5%	3.0%	97.0%
Touch and Go	50.0%	50.0%	50.0%	50.0%	—	—
Total	**49.2%**	**50.8%**	**56.7%**	**43.3%**	**53.7%**	**46.3%**

Operations by INM Type

Table 8 shows annual and average daily operations by aircraft category and INM type. The LEAR35 was used to model nearly 32% of business jet operations; it is the most prevalent INM type for the business jet category. In the turboprop category, the DHC6 and the CNA441 INM types represent more than 57.8% of turboprop operations. More than 96% of the piston operations are modeled as the BEC58P. Several INM types were used to model helicopter operations, including the SA350D, B206L, H500D, and R22, which collectively account for 83% of the 2007 baseline helicopter operations. The A3, which reflects the military aircraft operated by Raytheon at VNY, is the most prevalent INM type in the military category. Three types were used to model the touch-and-go training operations, the BEC58P, GASEPF, and GASEPV.

Table 8. Baseline 2007 Operations by INM Type

Aircraft Category	INM Type	Annual	Average Daily	Percent of Aircraft Category	Percent of Total
Business Jet	LEAR35	15,381	42.139	31.9%	4.9%
Business Jet	MU3001	6,510	17.835	13.5%	2.1%
Business Jet	GIV	6,250	17.122	13.0%	2.0%
Business Jet	CL600	3,401	9.318	7.1%	1.1%
Business Jet	CNA500	2,539	6.957	5.3%	0.8%
Business Jet	CNA750	2,533	6.939	5.3%	0.8%
Business Jet	GII	2,202	6.033	4.6%	0.7%
Business Jet	IA1125	2,153	5.897	4.5%	0.7%
Business Jet	GIIB	1,972	5.404	4.1%	0.6%
Business Jet	GV	1,862	5.101	3.9%	0.6%
Business Jet	FAL50	830	2.275	1.7%	0.3%
Business Jet	737700	659	1.806	1.4%	0.2%
Business Jet	CIT3	528	1.448	1.1%	0.2%
Business Jet	FAL900	513	1.406	1.1%	0.2%
Business Jet	LEAR25	461	1.262	1.0%	0.1%
Business Jet	FAL20	129	0.353	0.3%	0.0%
Business Jet	EMB145	123	0.336	0.3%	0.0%
Business Jet	CNA55B	33	0.092	0.1%	0.0%
Business Jet	727EM2	28	0.077	0.1%	0.0%
Business Jet	727EM1	17	0.046	0.0%	0.0%
Business Jet	737800	7	0.020	0.0%	0.0%
Business Jet	CL601	7	0.020	0.0%	0.0%
Business Jet	DC93LW	5	0.013	0.0%	0.0%
Subtotal		***48,143***	***131.899***	***100.0%***	***15.3%***
Turboprop	DHC6	9,095	24.918	57.8%	2.9%
Turboprop	CNA441	4,338	11.884	27.6%	1.4%
Turboprop	SD330	1,157	3.170	7.4%	0.4%
Turboprop	GASEPF	857	2.347	5.4%	0.3%
Turboprop	CNA210	144	0.396	0.9%	0.0%
Turboprop	HS748A	90	0.248	0.6%	0.0%
Turboprop	GASEPV	35	0.095	0.2%	0.0%

Aircraft Category	INM Type	Annual	Average Daily	Percent of Aircraft Category	Percent of Total
Turboprop	DHC830	10	0.026	0.1%	0.0%
Turboprop	CVR580	2	0.005	0.0%	0.0%
Subtotal		***15,728***	***43.090***	***100.0%***	***5.0%***
Piston	BEC58P	85,927	235.417	96.4%	27.4%
Piston	PA31	2,407	6.595	2.7%	0.8%
Piston	PA30	677	1.854	0.8%	0.2%
Piston	DC3	132	0.362	0.1%	0.0%
Subtotal		***89,143***	***244.227***	***100.0%***	***28.4%***
Helicopter	SA350D	22,874	62.668	37.3%	7.3%
Helicopter	B206L	13,485	36.945	22.0%	4.3%
Helicopter	H500D	7,781	21.318	12.7%	2.5%
Helicopter	R22	6,670	18.273	10.9%	2.1%
Helicopter	BO105	4,016	11.004	6.6%	1.3%
Helicopter	S76	2,137	5.855	3.5%	0.7%
Helicopter	SA355F	1,701	4.660	2.8%	0.5%
Helicopter	A109	1,171	3.208	1.9%	0.4%
Helicopter	EC130	1,086	2.974	1.8%	0.3%
Helicopter	S65	145	0.396	0.2%	0.0%
Helicopter	SA341G	75	0.206	0.1%	0.0%
Helicopter	B222	71	0.194	0.1%	0.0%
Helicopter	B212	39	0.106	0.1%	0.0%
Helicopter	CH47D	38	0.103	0.1%	0.0%
Helicopter	SA330J	10	0.028	0.0%	0.0%
Subtotal		*61,298*	*167.940*	*100.0%*	*19.5%*
Military	A3	270	0.739	84.1%	0.1%
Military	C130	23	0.064	7.3%	0.0%
Military	F-18	10	0.028	3.1%	0.0%
Military	LEAR25	8	0.023	2.6%	0.0%
Military	F16PW9	5	0.014	1.6%	0.0%
Military	HS748A	2	0.006	0.7%	0.0%
Military	F15E29	2	0.005	0.5%	0.0%
Subtotal		***321***	***0.879***	***100.0%***	***0.1%***

Aircraft Category	INM Type	Annual	Average Daily	Percent of Aircraft Category	Percent of Total
Private Military	DC3	420	1.150	63.7%	0.1%
Private Military	GASEPV	129	0.353	19.6%	0.0%
Private Military	T-38A	97	0.265	14.7%	0.0%
Private Military	T34	9	0.024	1.3%	0.0%
Private Military	F5AB	5	0.013	0.7%	0.0%
Subtotal		***659***	***1.806***	***100.0%***	***0.2%***
Touch and Go	BEC58P	49,410	135.369	50.1%	15.7%
Touch and Go	GASEPF	29,646	81.221	30.0%	9.4%
Touch and Go	GASEPV	19,659	53.861	19.9%	6.3%
Subtotal		*98,715*	*270.452*	*100.0%*	*31.4%*
TOTAL		**314,007**	**860.292**		**100.0%**

Jet Operations by Noise Stage Type

Stage 2 business jets accounted for approximately 10% of business jet operations at VNY in 2007 (see Table 9). The number of Stage 2 business jet operations has been declining as older Stage 2 aircraft are retired from the fleet. In the 2004 baseline fleet estimated for the VNY Part 161 study, Stage 2 business jets accounted for 15% of total business jet operations.

Table 9. Baseline 2007 Jet Operations by Noise Stage, Direction, and Time of Day

Noise Stage	Arrivals				Departures				Total Arrivals and Departures
	Day	Evening	Night	Total	Day	Evening	Night	Total	
Stage 2	1,708	390	284	2,382	2,146	219	16	2,382	4,764
Stage 3	16,283	2,968	2,438	21,690	18,358	1,353	1,978	21,690	43,379
Total	**17,991**	**3,358**	**2,722**	**24,072**	**20,504**	**1,572**	**1,995**	**24,072**	**48,143**
Percent of Total									
Stage 2	3.5%	0.8%	0.6%	4.9%	4.5%	0.5%	0.0%	4.9%	9.9%
Stage 3	33.8%	6.2%	5.1%	45.1%	38.1%	2.8%	4.1%	45.1%	90.1%
Total	**37.4%**	**7.0%**	**5.7%**	**50.0%**	**42.6%**	**3.3%**	**4.1%**	**50.0%**	**100.0%**

The time-of-day profile for Stage 2 and Stage 3 business jets is very similar. Of the Stage 2 jet operations, 19.1% occurred during the evening or night hours compared to 20.1% for Stage 3 operations. Because the VNY noise abatement and curfew regulations prohibit night departures by aircraft with estimated takeoff noise levels exceeding 74 dBA, almost no Stage 2 business jets depart during the night period. The small number of Stage 2 night departures that was estimated for 2007, fewer than 0.05 per day, represents exempted operators, violators of the noise policy, or minor differences in how departures are recorded in the ARTS data, which were the primary source for business jet activity by time period.

5.3 Historic and Forecast Growth in VNY Aircraft Operations

Growth assumptions for each of the major categories of aircraft activity at VNY were developed based on a review of historic trends at VNY and the outlook for the United States general aviation industry. This section discusses actual trends at VNY based on historic activity and the growth assumptions underlying the forecast of future activity.

Historic Aircraft Operation Trends: 1995 to 2004

Historic data on VNY aircraft operations by aircraft category is limited. To assess historic trends, operations data from 1995 to 2004 were compiled from two sources, the VNY Part 150 study and the INM input files developed by LAWA to produce the 2002–2004 airport noise contours. These data are shown in Table 10. The operations shown for 2004 differ from the estimated 2004 baseline activity levels for several reasons. The analysis conducted for the Part 161 study utilized different data sources, excluded overflights, and employed a more detailed approach to estimating activity levels by aircraft category. Nevertheless, the data provide a reasonable basis for analyzing historic trends in aviation activity at VNY.

Table 10. Historic Aircraft Operations at VNY, 1995–2004

Year	Jets	Non-Jet: Turbo-props	Non-Jet: Pistons	Non-Jet: Touch and Go	Non-Jet: Pistons + Touch and Go	Non-Jet: Total Non-Jet	Helos	Total Airport
1995	17,051	52,036	237,613	140,787	378,400	430,436	52,618	500,105
1996	18,778	58,382	229,760	140,796	370,556	428,938	52,643	500,359
1997	19,351	59,144	235,050	143,611	378,661	437,805	53,750	510,906
1998	22,157	69,206	236,675	148,972	385,647	454,853	56,066	533,076
1999	24,736	66,226	263,735	161,612	425,347	491,573	60,693	577,002
2000	30,985	51,006	221,692	137,247	358,939	409,945	51,729	492,659
2001	30,779	34,148	220,328	129,725	350,053	384,201	48,685	463,665
2002	35,560	52,447	na	na	365,679	418,126	52,207	505,893
2003	33,374	50,728	na	na	335,647	386,375	48,490	468,238
2004	41,021	52,382	na	na	314,682	367,064	47,188	455,274
Percent Change over Prior Year								
1996	10.1%	12.2%	-3.3%	0.0%	-2.1%	-0.3%	0.0%	0.1%
1997	3.1%	1.3%	2.3%	2.0%	2.2%	2.1%	2.1%	2.1%
1998	14.5%	17.0%	0.7%	3.7%	1.8%	3.9%	4.3%	4.3%
1999	11.6%	-4.3%	11.4%	8.5%	10.3%	8.1%	8.3%	8.2%
2000	25.3%	-23.0%	-15.9%	-15.1%	-15.6%	-16.6%	-14.8%	-14.6%
2001	-0.7%	-33.1%	-0.6%	-5.5%	-2.5%	-6.3%	-5.9%	-5.9%
2002	15.5%	53.6%	na	na	4.5%	8.8%	7.2%	9.1%
2003	-6.1%	-3.3%	na	na	-8.2%	-7.6%	-7.1%	-7.4%
2004	22.9%	3.3%	na	na	-6.2%	-5.0%	-2.7%	-2.8%
Average Annual Growth								
1995 to 2004	10.2%	0.1%	na	na	-2.0%	-1.8%	-1.2%	-1.0%

na = Not Available

Notes:
Includes fixed-wing and helicopter overflights.
Helicopter operations are estimates and not actual operation counts. In the Part 150 study, helicopter operations were estimated at 10% of total FAA Tower counts plus LAWA curfew counts (22:45–05:59).

Sources:
1995–2001: Van Nuys Airport Part 150 Study, January 2003, Table 4.
2002–2004: LAWA Noise Management Department, Van Nuys Operations for INM Modeling, except for helicopter operations, which are estimated using the Part 150 study methodology.

Over the 10-year period, total aircraft operations fell at an average annual rate of 1%. Operations by non-jet fixed-wing aircraft declined at a faster rate of 1.8% per year. However, operations by jet aircraft increased at an average annual rate of 10.2%. As a result, jet aircraft account for an increasing share of total aircraft activity at VNY. Declining activity by light GA aircraft, particularly pistons, and strong growth in jet aircraft operations is consistent with historic trends in the United States general aviation industry.

Forecast Growth Rate Assumptions

Table 11 presents the growth rate assumptions underlying the forecast of 2014 aircraft operations at VNY. Growth rate assumptions were based on a review of historical trends at VNY, including actual operations for 2005 and 2006 (January to May), the general outlook for different segments of the GA market, assumptions regarding fuel prices, and the FAA's forecast for the United States general aviation market.

Table 11. Forecast Average Annual Growth in Aircraft Operations at VNY by Aircraft Category, 2004–2014

Aircraft Category	Van Nuys	FAA Industry*
Business Jets	6.5%	10.5%
Turboprops	0.8%	1.3%
Pistons	-2.8%	1.3%
Helicopters	4.6%	4.6%
Military	0.0%	-0.5%
Private Military	0.0%	na
Touch and Go	-3.0%	1.5%
*FAA, Aerospace Forecasts Fiscal Year (FY) 2006–FY 2017, March 2006.		

Business Jets

The business jet segment has been the fastest growing segment of activity at VNY and within the United States general aviation industry. Increases in business jet operations have been driven by growing demand for private jet transportation services by businesses and wealthy individuals. Most of the growth in the business jet market has come from fractional jet ownership programs, jet card membership programs, and business aircraft charters rather than traditional corporate flight departments.

Fractional jet programs allow individuals to buy a share of an aircraft that is managed and operated by the fractional jet company, and in return, the fractional owner is entitled to fly a specified number of hours per year in that aircraft model. With jet card programs, users prepay for a specified number of flight hours and are guaranteed access to business jet aircraft services for those allotted hours.

The business jet segment is expected to continue to grow over the forecast period through growth in these services as well as a new private transportation product, on-demand air taxi. The introduction of new technology, very light jets (VLJs), has led to the development of on-demand air taxi services, which is expected to stimulate growth in business jet operations over the forecast period. VLJs, also known as microjets, are small jet aircraft priced between $1.5 million and $2 million that can operate at cruising speeds of 325–375 miles per hour (mph) and a maximum altitude of close to 40,000 feet. They have an operating range of approximately 500 miles and can land and take-off from runways as short as 3,000 feet. In essence, the VLJs can achieve nearly the same performance as a small business jet but at a fraction of the cost. So far, the largest on-demand air taxi services utilizing VLJs are operating on the East Coast. DayJet has the largest fleet of Eclipse 500 VLJs and serves markets throughout Florida, Alabama, Georgia, and South Carolina.

At VNY, jet operations are forecast to increase at an average rate of 6.5% per year between 2004 and 2014, which is slower than the historic trend at VNY and slower than the FAA's projection of 10.5% per year for the United States market. This assumes that the rate of increase in jet operations slows significantly between 2004 and 2008 as a result of continued increases in the price of fuel but resumes the long-term historic trend of 10% per year in 2009 as fuel prices are assumed to moderate and decline slightly.

Turboprops

Turboprop operations at VNY are forecast to increase by 0.8% annually from 2004 to 2014. This is slower than the FAA forecast for the United States, which projects hours flown in turboprop aircraft to increase by 1.2% per year through 2015. A slower rate of growth at VNY reflects recent historical data that show an actual decline in turboprop operations between 1999 and 2004 and the high and rising cost of fuel over the past few years.

Pistons

Activity by piston-powered aircraft at VNY is projected to continue to decline over the forecast period by 2.8% per year. This assumes steep declines through 2007 as a result of high fuel prices, with modest growth resuming in 2008 and increasing to 1.2% per year in 2009.

Helicopters

The forecast assumes that helicopter operations at VNY increase over the forecast period (2004–2014) by 4.6% per year. This assumption reflects annual growth of 5.5% through 2009, which was determined from interviews of operators based at VNY. From 2009 to 2014, helicopter operations are assumed to grow at the industry average rate projected by the FAA.

Military

The A3 Sky Warrior accounts for the majority of the military flights at VNY. The A3 Sky Warriors, which are owned by the U.S. Navy, are flown by Raytheon to support avionics hardware testing and development for the U.S. Department of Defense. The forecast assumes that this activity will continue at VNY at a constant level over the forecast period.

Private Military

Privately owned former military aircraft at VNY accounted for 659 operations in 2004. The forecast assumes that this level of activity remains constant over the forecast period.

Training Operations

Touch-and-go training operations at VNY have been declining for a number of years, consistent with a general decline in fixed-wing pilot training activities nationwide. The decline accelerated in recent years as the price of oil and aviation fuel skyrocketed. Over the forecast period, touch-and-go training operations are projected to decline at an average annual rate of 6.8%. This assumes steep declines through 2007 as a result of high fuel prices, with modest annual growth of 1.2% resuming in 2009.

5.4 Forecast (2014) Activity—Project

This section describes the level and type of aircraft operations forecast for 2014 with the proposed noisier aircraft phaseout at VNY and compares forecast activity levels with the 2007 baseline activity.

Operations by Aircraft Category

Table 12 compares forecast aircraft operations by aircraft category for 2014 under the project to activity levels for the 2007 baseline. Under the project, 386,433 aircraft are forecast to land or take off from the VNY in 2014. This represents a 23% increase in activity over the 2007 baseline. The mix of aircraft operations is forecast to change, with the business jet share growing from 15% in the baseline to 20% in 2014. Touch-and-go training activity, performed with piston aircraft, is projected to decline over the forecast period and account for only 23% of total 2014 aircraft operations.

Table 12. Forecast 2014 Operations by Aircraft Category under the Proposed Project

Aircraft Category	Baseline 2007	Percent of Total	Project Forecast 2014	Percent of Total
Business Jets	48,143	15%	83,101	22%
Turboprops	15,728	5%	26,835	7%
Piston	89,143	28%	102,979	27%
Helicopter	61,298	20%	82,212	21%
Military	321	0%	293	0%
Private Military	659	0%	659	0%
Touch and Go	98,715	31%	90,354	23%
Total	**314,007**	**100%**	**386,433**	**100%**

Operations by Time of Day and Direction

As shown in Table 13, both the absolute number and the share of operations occurring during the night period increases with the proposed project in 2014. Total nighttime operations increase by 56%, from approximately 11,000 in the 2007 base year, to approximately 17,000 in 2014. The growth in night operations is primarily the result of growth in the number of jet and helicopter operations, which have a high proportion of activity during the night hours. As a result, the share of total VNY operations occurring during the night increases from 3.5% in the base year to 4.4% in 2014 with the proposed noisier aircraft phaseout.

Table 13. Forecast 2014 Operations by Aircraft Category and Time of Day under the Proposed Project

	Operations by Time of Day				Percent of Total 24 Hours		
Aircraft Category	**Day**	**Evening**	**Night**	**Total**	**Day**	**Evening**	**Night**
Business Jets	66,405	8,304	8,392	83,101	79.9%	10.0%	10.1%
Turboprop	23,252	2,058	1,525	26,835	86.6%	7.7%	5.7%
Piston	93,858	8,788	334	102,979	91.1%	8.5%	0.3%
Helicopter	66,629	8,842	6,741	82,212	81.0%	10.8%	8.2%
Military	279	14	—	293	95.1%	4.9%	0.0%
Private Military	621	34	5	659	94.2%	5.1%	0.7%
Touch and Go	84,681	5,672	—	90,354	93.7%	6.3%	0.0%
Total 2014 Project	**335,725**	**33,712**	**16,996**	**386,433**	**86.9%**	**8.7%**	**4.4%**
Total 2007 Baseline	***276,551***	***26,528***	***10,927***	***314,007***	***88.1%***	**8.4%**	***3.5%***

The forecast overall arrival and departure mix by time of day under the project is similar to the 2007 baseline mix, as shown in Table 14. Operations during the day are almost evenly divided between arrivals (49.1%) and departures (50.9%), whereas 58% of evening operations and 53% of night operations are arrivals. Business jets have a slightly different profile than the overall airport average. Departures account for a greater share of business jet operations during the day, and evening and night activity by business jets is more heavily weighted toward arrivals. More than two-thirds of the forecast business jet operations during the evening are arrivals, and 56% of the forecast business jet operations during the night hours are arrivals.

Table 14. Forecast 2014 Operations by Aircraft Category, Time of Day, and Direction under the Proposed Project

	Day		Evening		Night	
Aircraft Category	**Arrivals**	**Departures**	**Arrivals**	**Departures**	**Arrivals**	**Departures**
Business Jets	46.9%	53.1%	68.6%	31.4%	55.8%	44.2%
Turboprops	48.2%	51.8%	70.7%	29.3%	49.6%	50.4%
Piston	48.7%	51.3%	63.4%	36.6%	53.7%	46.3%
Helicopter	50.7%	49.3%	44.0%	56.0%	50.7%	49.3%
Military	48.3%	51.7%	82.5%	17.5%	—	—
Private Military	48.9%	51.1%	76.5%	23.5%	3.0%	97.0%
Touch and Go	50.0%	50.0%	50.0%	50.0%	—	—
Total 2014 Project	49.1%	50.9%	57.8%	42.2%	53.1%	46.9%
Total 2007 Baseline	*49.2%*	*50.8%*	*56.7%*	*43.3%*	*53.7%*	*46.3%*

Operations by INM Type

Forecast 2014 aircraft operations by INM under the proposed project are presented in Table 15. The most significant changes over the 2007 baseline involve aircraft types that are phased out by the proposed project. For example, there are no forecast operations by the LEAR25, 727EM1, or 727EM2 types in 2014 because these types meet or exceed the 80 dBA noise limit established by the proposed noisier aircraft phaseout. While Gulf IIs (GII) and Gulf IIIs (GIIB) also meet or exceed the 80 dBA limit, 260 operations by these types are forecast for 2014 because they are exempted by the provision that allows aircraft to continue to operate to and from VNY for maintenance purposes. The GII and GIIB types accounted for 4,174 operations in the 2007 baseline compared to a forecast of 260 in 2014 with the proposed project.

Other notable changes in the business jet fleet that result from the proposed project include the LEAR35 and GLF3 HK INM types. LEAR35 operations are forecast to increase from 4.9% of the total operations in 2007 to 7.3% in 2014. The disproportionate increase in operations by the LEAR35 reflects aircraft substitution that results from the proposed project. With the noisier aircraft phaseout in place, some regular operators of LEAR25 aircraft are forecast to replace their older Stage 2 Lears with similar-size Stage 3 Lears, represented by the LEAR35 INM type. Likewise, some operators of GIIB aircraft are expected to outfit their aircraft with hushkits to be in compliance with the new regulation, which results in 1,262 operations with the GLF3 HK INM type in 2014.

Table 15. Forecast 2014 Operations by Aircraft Category and INM Type under the Proposed Project

Aircraft Category	INM Type	2007 Baseline Operations	Percent of Total	2014 Project Operations	Percent of Total
Business Jet	LEAR35	15,381	4.9%	28,082	7.3%
	GIV	6,250	2.0%	12,423	3.2%
	MU3001	6,510	2.1%	11,489	3.0%
	CL600	3,401	1.1%	6,524	1.7%
	CNA750	2,533	0.8%	4,629	1.2%
	CNA500	2,539	0.8%	4,427	1.1%
	IA1125	2,153	0.7%	3,934	1.0%
	GV	1,862	0.6%	3,701	1.0%
	FAL50	830	0.3%	1,518	0.4%
	737700	659	0.2%	1,310	0.3%
	GLF3 HK	—	0.0%	1,262	0.3%
	CNA55B	33	0.0%	1,217	0.3%
	FAL900	513	0.2%	1,020	0.3%
	CIT3	528	0.2%	966	0.2%
	EMB145	123	0.0%	224	0.1%
	GII	2,202	0.7%	130	0.0%
	GIIB	1,972	0.6%	130	0.0%
	FAL20	129	0.0%	77	0.0%
	737800	7	0.0%	15	0.0%
	CL601	7	0.0%	14	0.0%
	SABR80	—	0.0%	7	0.0%
	DC93LW	5	0.0%	3	0.0%
	727EM1	17	0.0%	0	0.0%
	727EM2	28	0.0%	0	0.0%
	LEAR25	461	0.1%	0	0.0%
Business Jet Total		*48,143*	*15.3%*	*83,101*	*21.5%*
Turboprop	DHC6	9,095	2.9%	15,518	4.0%
	CNA441	4,338	1.4%	7,401	1.9%
	SD330	1,157	0.4%	1,974	0.5%
	GASEPF	857	0.3%	1,462	0.4%
	CNA210	144	0.0%	246	0.1%

Aircraft Category	**INM Type**	**2007 Baseline Operations**	**Percent of Total**	**2014 Project Operations**	**Percent of Total**
	HS748A	90	0.0%	154	0.0%
	GASEPV	35	0.0%	59	0.0%
	DHC830	10	0.0%	16	0.0%
	CVR580	2	0.0%	3	0.0%
Turboprop Total		*15,728*	*5.0%*	*26,835*	*6.9%*
Piston	BEC58P	85,927	27.4%	99,227	25.7%
	PA31	2,407	0.8%	2,826	0.7%
	PA30	677	0.2%	794	0.2%
	DC3	132	0.0%	132	0.0%
Piston Total		*89,143*	*28.4%*	*102,979*	*26.6%*
Helicopter	SA350D	22,874	7.3%	30,678	7.9%
	B206L	13,485	4.3%	18,086	4.7%
	H500D	7,781	2.5%	10,436	2.7%
	R22	6,670	2.1%	8,945	2.3%
	BO105	4,016	1.3%	5,387	1.4%
	S76	2,137	0.7%	2,866	0.7%
	SA355F	1,701	0.5%	2,281	0.6%
	A109	1,171	0.4%	1,570	0.4%
	EC130	1,086	0.3%	1,456	0.4%
	S65	145	0.0%	194	0.1%
	SA341G	75	0.0%	101	0.0%
	B222	71	0.0%	95	0.0%
	B212	39	0.0%	52	0.0%
	CH47D	38	0.0%	51	0.0%
	SA330J	10	0.0%	14	0.0%
Helicopter Total		*61,298*	*19.5%*	*82,212*	*21.3%*
Military	A3	270	0.1%	247	0.1%
	C130	23	0.0%	21	0.0%
	F-18	10	0.0%	9	0.0%
	LEAR25	8	0.0%	8	0.0%
	F16PW9	5	0.0%	5	0.0%

Aircraft Category	INM Type	2007 Baseline Operations	Percent of Total	2014 Project Operations	Percent of Total
	HS748A	2	0.0%	2	0.0%
	F15E29	2	0.0%	2	0.0%
Military Total		*321*	*0.1%*	*293*	*0.1%*
Private Military	DC3	420	0.1%	420	0.1%
	GASEPV	129	0.0%	129	0.0%
	T-38A	97	0.0%	97	0.0%
	T34	9	0.0%	9	0.0%
	F5AB	5	0.0%	5	0.0%
Private Military Total		*659*	*0.2%*	*659*	*0.2%*
Touch and Go	BEC58P	49,410	15.7%	45,241	11.7%
	GASEPF	29,646	9.4%	27,145	7.0%
	GASEPV	19,659	6.3%	17,968	4.6%
Touch-and-Go Total		*98,715*	*31.4%*	*90,354*	*23.4%*
Grand Total		314,007	100.0%	386,433	100.0%

Jet Operations by Noise Stage

Table 16 compares level and mix of Stage 2 and Stage 3 business jet operations forecast for 2014 under the project to the 2007 base-year conditions. Operations in Stage 2 business jet aircraft are forecast to decline by 93%, from 4,764 in the base year to 344 in 2014 with the proposed project. Stage 3 jet operations are forecast to increase by 91%, from 43,379 to 82,757. Under the proposed project, Stage 2 jet aircraft would account for 0.4% of business jet operations in 2014 compared to 9.9% in 2007.

Table 16. Forecast 2014 Project Jet Operations by Noise Stage

Noise Stage	Baseline 2007		Forecast 2014 Project		Percent Change 2007–2014
	Operations	Percent Share	Operations	Percent Share	
Stage 2	4,764	9.9%	344	0.4%	-92.8%
Stage 3	43,379	90.1%	82,757	99.6%	90.8%
Total	48,143	100.0%	83,101	100.0%	72.6%

5.5 Forecast (2014) Activity—Alternative 1

This section compares forecast activity for 2014 for the proposed project to Alternative 1, which represents status quo conditions, or no project, at VNY.

Operations by Aircraft Category

As shown in Table 17, if the proposed project to phase out noisier aircraft at VNY were not implemented, there would be 348 additional business jet operations at the airport in 2014. Under Alternative 1, forecast activity by all other aircraft categories is the same as the levels projected under the project.

Table 17. Forecast 2014 Operations by Aircraft Category, Project and Alternative 1

Aircraft Category	Forecast 2014		Alternative 1 vs. Project
	Project	Alternative 1	
Business Jets	83,101	83,449	348
Turboprops	26,835	26,835	—
Piston	102,979	102,979	—
Helicopter	82,212	82,212	—
Military	293	293	—
Private Military	659	659	—
Touch and Go	90,354	90,354	—
Total	386,433	386,781	348

Operations by Time of Day and Direction

Table 18 presents forecast 2014 operations by type (i.e., arrival or departure) and time of day for Alternative 1 and the project. Almost two-thirds of the additional business jet activity forecast under Alternative 1 occurs during the day time period. The majority of the 231 additional business jet operations forecast during the day are departures. During the evening hours, 78 additional business jet operations are forecast under the status quo. Night activity increases by 39 jet operations. Arrivals make up the majority of the additional activity forecast during the evening hours and nearly all of the additional operations forecast during the night period.

Table 18. Forecast 2014 Operations by Type and Time of Day, Project and Alternative 1

Direction and Time of Day	Forecast 2014		Alternative 1 vs. Project
	Project	Alternative 1	
Total Operations	386,433	386,781	348
Day	335,725	335,956	231
Evening	33,712	33,790	78
Night	16,996	17,036	39
Arrivals	193,217	193,391	174
Day	164,696	164,784	88
Evening	19,489	19,541	51
Night	9,031	9,066	35
Departures	193,217	193,391	174
Day	171,028	171,172	144
Evening	14,223	14,249	26
Night	7,965	7,969	4

Operations by INM Type

A comparison of the forecast 2014 fleet mix by INM aircraft type under Alternative 1 and the project is shown in Table 19. There are several key differences in the business jet fleet mix between Alternative 1 and the project. If the project were not implemented, there would be 1,956 additional operations in Stage 2 business jets, including GIIs, GIIBs, and Lear 24/25/28s (LEAR25s). The reduction of operations in these Stage 2 aircraft types under the project is a direct result of the proposed noisier aircraft phaseout. Under the project, 260 operations in GII and GIIB aircraft types remain in 2014 because they are exempted by the provision that allows aircraft to continue to operate to and from VNY for maintenance purposes.

There would also be 32 additional operations in large narrowbody jet aircraft types, represented by the INM types 727EM1 and 727EM2. While these are Stage 3 aircraft types, their noise levels equal or exceed the 80 dBA limit established by the VNY noisier aircraft phaseout for 2014. Therefore, operations by these aircraft would occur under Alternative 1 but would not occur under the project scenario.

Under Alternative 1, there are also fewer operations in certain Stage 3 business jets. For example, there are 1,262 fewer operations by hushkitted GIIBs and 379 fewer operations by LEAR35s. Activity in these aircraft is greater under the project because some operators would choose to hushkit their GIIBs or upgrade from LEAR25s to LEAR35s if the project were implemented.

Table 19. Forecast 2014 Business Jet Operations by INM Type, Project and Alternative 1

INM Type	Forecast 2014		Alternative 1 vs. Project
	Project	Alternative 1	
727EM1	0	12	12
727EM2	0	20	20
737700	1,310	1,310	0
737800	15	15	0
CIT3	966	966	0
CL600	6,524	6,524	0
CL601	14	14	0
CNA500	4,427	4,427	0
CNA55B	1,217	1,217	0
CNA750	4,629	4,629	0
DC93LW	3	3	0
EMB145	224	224	0
FAL20	77	77	0
FAL50	1,518	1,518	0
FAL900	1,020	1,020	0
GII	130	766	636
GIIB	130	922	792
GIV	12,423	12,423	0
GLF3 HK	1,262	—	(1,262)
GV	3,701	3,701	0
IA1125	3,934	3,934	0
LEAR25		528	528
LEAR35	28,082	27,703	(379)
MU3001	11,489	11,489	0
SABR80	7	7	0
Total	83,101	83,449	348

Jet Operations by Noise Stage

Table 20 summarizes forecast 2014 jet operations by noise stage for the project and Alternative 1. Stage 2 jets are forecast to perform 2,301 operations in 2014 under

Alternative 1. This represents almost 2,000 additional operations in Stage 2 jets compared to the project scenario. With the project in place, some operators of Stage 2 jets are expected to replace their aircraft with Stage 3 aircraft and continue operating at VNY. As a result, 1,609 fewer operations in Stage 3 jets are forecast under Alternative 1 compared to the project. The net result is an additional 348 business jet operations forecast at VNY in 2014 if the project is not implemented.

Table 20. Forecast 2014 Jet Operations by Noise Stage, Project and Alternative 1

Noise Stage	2014 Project		2014 Alternative 1		Alternative 1 vs. Project
	Operations	Percent Share	Operations	Percent Share	
Stage 2	344	0.4%	2,301	2.8%	1,957
Stage 3	82,757	99.6%	81,148	97.2%	(1,609)
Total	83,101	100.0%	83,449	100.0%	348

5.6 Forecast (2014) Activity—Alternative 2

This section compares forecast activity for 2014 for the proposed project to Alternative 2, which includes the proposed noisier aircraft phaseout with an exemption for Stage 3 and Stage 4 aircraft.

Operations by Aircraft Category

Table 21 summarizes forecast aircraft operations at VNY for the project and Alternative 2. If Stage 3 and Stage 4 aircraft were exempted from the noisier aircraft phaseout, there would be 32 additional business jet operations at VNY in 2014 compared to the project. Under Alternative 2, forecast activity by all other aircraft categories is the same as the levels projected under the project.

Table 21. Forecast 2014 Operations by Aircraft Category, Project and Alternative 2

Aircraft Category	Forecast 2014		Alternative 2 vs. Project
	Project	**Alternative 2**	
Business Jets	83,101	83,133	32
Turboprops	26,835	26,835	—
Piston	102,979	102,979	—
Helicopter	82,212	82,212	—
Military	293	293	—
Private Military	659	659	—
Touch and Go	90,354	90,354	—
Total	**386,433**	**386,465**	**32**

Operations by Time of Day and Direction

As shown in Table 22, three-fourths of the additional business jet operations under Alternative 2 would occur during the day time period. Business jet operations during the evening hours would increase by six operations, and night activity would only increase by two operations in 2014.

Table 22. Forecast 2014 Operations by Direction and Time of Day, Project and Alternative 2

Direction and Time of Day	Forecast 2014		Alternative 2 vs. Project
	Project	**Alternative 2**	
Total Operations	386,433	386,465	32
Day	335,725	335,749	24
Evening	33,712	33,718	6
Night	16,996	16,998	2
Arrivals	193,217	193,233	16
Day	164,696	164,708	11
Evening	19,489	19,493	4
Night	9,031	9,032	1
Departures	**193,217**	**193,233**	**16**
Day	171,028	171,042	13
Evening	14,223	14,224	2
Night	7,965	7,967	1
Note: Numbers may not add due to rounding.			

Operations by INM Type

Table 23 presents forecast business jet operations by INM for the project and Alternative 2. All of the additional business jet operations forecast under Alternative 2 would be use large narrowbody jet aircraft types, represented by the INM types 727EM1 and 727EM2. While the noise levels associated with these aircraft types equal or exceed the 80 dBA limit established by the VNY noisier aircraft phaseout for 2014, they would be exempt from the regulation under Alternative 2.

Table 23. Forecast 2014 Business Jet Operations by INM Type, Project and Alternative 2

INM Type	Forecast 2014		Alternative 2 vs. Project
	Project	Alternative 2	
727EM1	—	12	12
727EM2	—	20	20
737700	1,310	1,310	—
737800	15	15	—
CIT3	966	966	—
CL600	6,524	6,524	—
CL601	14	14	—
CNA500	4,427	4,427	—
CNA55B	1,217	1,217	—
CNA750	4,629	4,629	—
DC93LW	3	3	—
EMB145	224	224	—
FAL20	77	77	—
FAL50	1,518	1,518	—
FAL900	1,020	1,020	—
GII	130	130	—
GIIB	130	130	—
GIV	12,423	12,423	—
GLF3HK	1,262	1,262	—
GV	3,701	3,701	—
IA1125	3,934	3,934	—
LEAR25			—
LEAR35	28,082	28,082	—
MU3001	11,489	11,489	—
SABR80	7	7	—
Total	83,101	83,133	32

Jet Operations by Noise Stage

All of the additional aircraft operations resulting from the exemption included in Alternative 2 are by definition Stage 3 aircraft. Since Alternative 2 results in only 32 additional Stage 3 operations compared to the project, the overall mix of Stage 2 and Stage 3 aircraft is the same for the project and Alternative 2, as shown in Table 24.

Table 24. Forecast 2014 Jet Operations by Noise Stage, Project and Alternative 2

	2014 Project		2014 Alternative 2		
Noise Stage	**Operations**	**Percent Share**	**Operations**	**Percent Share**	**Alternative 2 vs. Project**
Stage 2	344	0.4%	344	0.4%	0
Stage 3	82,757	99.6%	82,789	99.6%	32
Total	83,101	100.0%	83,133	100.0%	32

6.0 Overflight Operations

Overflight operations were included in the 2004 FAA Tower counts and are shown in Table 25**.** In addition to those operations, there were also overflights arriving on Runway 8 at Bob Hope Airport in Burbank, California. Those operations were approximated by using the FAA Enhanced Traffic Management System counts. Assuming the traffic flows at Bob Hope Airport and VNY were similar (i.e., when VNY was arriving and departing to the south, Bob Hope Airport was arriving to the east and departing to the south), the number of jet aircraft arrivals to Bob Hope Airport Runway 8 and fleet mix were determined for the base year, 2004. Table 25 shows the overflights by category for 2004 and the forecast years. The overflights were assumed to be unaffected by the project or alternatives.

Table 25. Baseline and Forecast Overflights of VNY

Overflight Category	**2004**	**2007**	**2014**
Fixed-Wing	56,564	56,904	62,490
Helicopter	16,949	20,052	26,693
BUR Arrivals	32,267	35,731	48,796
Total	105,780	112,687	137,939

6.1 Forecast Methodology

The methodology for developing the overflight forecast included assumptions based on aircraft type, time of day, and growth rates within each general aircraft category:

- Fixed-wing overflights were assumed to consist of only piston aircraft;
- The aircraft fleet mix and operation time of day for piston overflights were assumed to be the same as VNY operations;

- Growth in piston overflights was based on the FAA Terminal Area Forecast (TAF) for Whiteman Airport due to its proximity to VNY and primary piston-aircraft operations;
- Growth in helicopter overflights was assumed to be the same as growth in VNY helicopter operations; and
- For Bob Hope Airport overflights, jet aircraft were grouped into three categories: Commercial Jet, GA Stage 2 Jet, and GA Stage 3 Jet. Commercial jets were forecast based on the FAA TAF for Bob Hope Airport, while GA Stage 2 and Stage 3 jets used the growth rate assumed for VNY GA Stage 2 and Stage 3 jet operations.
- The resulting growth rate assumptions for the overflights during two 5-year time periods are shown in Table 26.

Table 26. VNY Overflight Growth Assumptions

Overflight Category	**2004–2009**	**2009–2014**
Fixed-Wing	0.2%	1.9%
Helicopter	5.5%	3.8%
BUR Arrivals	3.1%	5.2%
Total	2.0%	3.4%

6.2 Baseline (2007) and Forecast (2014) Activity

Table 27 shows the annual and daily operations by aircraft category and INM type for the 2007 baseline and 2014 forecast.

Table 27. Van Nuys Overflight Operations by INM Type

Aircraft Category	INM Type	2007		2014	
		Annual	Average Daily	Annual	Average Daily
Fixed-Wing	BEC58P	54,145	148.3418	59,460	162.9038
Fixed-Wing	DC3	721	1.9753	792	2.1691
Fixed-Wing	PA30	447	1.2250	491	1.3455
Fixed-Wing	PA31	1,591	4.3592	1,747	4.7874
Subtotal		56,904	155.9014	62,490	171.2058
Helicopter	A109	356	0.9741	473	1.2966
Helicopter	B206L	4,140	11.3416	5,511	15.0977
Helicopter	B212	10	0.0284	14	0.0377
Helicopter	B222	5,545	15.1905	7,381	20.2211
Helicopter	BO105	1,259	3.4491	1,676	4.5910
Helicopter	CH47D	10	0.0276	13	0.0366
Helicopter	EC130	332	0.9090	442	1.2103
Helicopter	H500D	2,305	6.3160	3,069	8.4077
Helicopter	R22	1,999	5.4771	2,661	7.2911
Helicopter	S65	40	0.1106	54	0.1474
Helicopter	S76	625	1.7120	832	2.2791
Helicopter	SA330J	23	0.0621	30	0.0824
Helicopter	SA341G	20	0.0550	27	0.0731
Helicopter	SA350D	2,875	7.8778	3,827	10.4866
Helicopter	SA355F	513	1.4066	683	1.8723
Subtotal		20,052	54.9376	26,693	73.1307
BUR Arrivals	727EM2	23	0.0619	26	0.0724
BUR Arrivals	737300	10,900	29.8617	12,739	34.9020
BUR Arrivals	737400	410	1.1229	479	1.3125
BUR Arrivals	737500	2,408	6.5965	2,814	7.7100
BUR Arrivals	737700	5,696	15.6051	6,657	18.2391
BUR Arrivals	737800	20	0.0546	23	0.0637
BUR Arrivals	737N17	5	0.0149	6	0.0174
BUR Arrivals	757PW	250	0.6842	292	0.7997

Aircraft Category	INM Type	2007		2014	
		Annual	**Average Daily**	**Annual**	**Average Daily**
BUR Arrivals	767300	1	0.0025	1	0.0029
BUR Arrivals	A30062	442	1.2097	516	1.4139
BUR Arrivals	A310	52	0.1438	61	0.1680
BUR Arrivals	A319	293	0.8032	343	0.9388
BUR Arrivals	A320	462	1.2667	540	1.4806
BUR Arrivals	BAC111	169	0.4632	78	0.0058
BUR Arrivals	CIT3	105	0.2884	195	4.2070
BUR Arrivals	CL600	191	0.5238	355	1.1908
BUR Arrivals	CL601	3,138	8.5964	5,821	2.9235
BUR Arrivals	CNA500	267	0.7327	496	0.2129
BUR Arrivals	CNA750	461	1.2617	854	0.0346
BUR Arrivals	DC93LW	2	0.0053	4	0.3936
BUR Arrivals	EMB145	2	0.0050	2	0.4031
BUR Arrivals	FAL20	27	0.0752	13	0.1391
BUR Arrivals	FAL900	376	1.0290	697	0.5349
BUR Arrivals	GII	313	0.8563	144	0.9716
BUR Arrivals	GIIB	320	0.8767	147	15.9481
BUR Arrivals	GIV	1,125	3.0815	2,087	1.3593
BUR Arrivals	GV	1,405	3.8486	2,606	2.3407
BUR Arrivals	IA1125	595	1.6294	1,103	0.0098
BUR Arrivals	LEAR25	110	0.3025	51	5.7168
BUR Arrivals	LEAR35	2,447	6.7053	4,540	7.1398
BUR Arrivals	MD81	1,314	3.5995	1,536	3.0228
BUR Arrivals	MD82	372	1.0188	435	12.4395
BUR Arrivals	MD83	913	2.5013	1,067	5.6579
BUR Arrivals	MU3001	1,113	3.0498	2,065	1.9089
BUR Arrivals	T-38A	6	0.0154	3	0.0071
Subtotal		*35,731*	*97.8933*	*48,796*	*133.6885*
Total		**112,687**	**308.7323**	**137,939**	**378.0250**
Numbers may not add directly due to rounding.					

7.0 Potential Diversions to Other Airports

7.1 Impact of Project on GA Jet Operations at VNY

The project will affect a small number of VNY jet operations in 2009 and 2011 as well as an estimated 1,989 operations in 2014 and 1,886 in 2016. Table 28 shows the number of operations that would be affected by type of aircraft. “Other” includes operations by early model Sabreliners and Hawkers.

Table 28. VNY Jet Operations Affected by the Project

Aircraft Type	2009	2011	2014	2016
Boeing 727	38	35	32	19
Learjet 24, 25, 28	—	—	522	435
Gulfstream II/III	—	—	1,428	1,358
Falcon 20	—	—	—	63
Other	—	7	7	11
Total	38	42	1,989	1,886
Source: SH&E analysis.				

The frequency with which individual noisy jets operate at VNY will affect the responses to the project. Table 28 shows the number of flights per year that individual noisy jets flew at VNY in 2006, based on FAA Aircraft Situation Display to Industry (ASDI) data.[13] Of the 342 noisy GA jet aircraft that were identified at VNY, 205 aircraft had only one or two VNY flights, 87 had 3 to 11 flights, and 50 noisy jets flew 12 or more flights at VNY.

In order to estimate how the affected operators would respond to the phaseout, LAWA consultants conducted a series of nine interviews in spring 2007 with charter aircraft operators and fixed base operators at VNY who may be affected by the proposed noise restriction. The consultants also interviewed representatives at CMA, CNO, and Santa Monica to discuss the potential for those airports to attract project-related diversion activity. During the operator interviews, the operators stated strong opinions regarding VNY’s positive identity as a business jet center and VNY’s favorable reputation as a popular airport for operating Gulfstream aircraft, certain types of which would be affected by the proposed phaseout. The interviewed operators also expressed uncertainty about what the future would bring in terms of the economy, fuel prices, noise restrictions at other airports, and maintenance requirements that may be instituted for certain aircraft, all of which are factors that

[13] Aircraft Situation Display to Industry (ASDI) includes near real-time flight data for all instrument flight rule (IFR) aircraft receiving radar services within the National Airspace System, filtered to remove military and other sensitive operations.

would affect future operational activity for business jets. Given these uncertainties, operators were not able to definitively specify how they would react to the future project-related restrictions were they to be implemented. This led LAWA's consultants to use their professional judgment to develop a reasonable assumption regarding which owners would install hushkits and which would divert their operations to other airports. Based on the operators' strong affinity for operating at VNY, as expressed in the interviews, and considering the expenses associated with installing hushkits, LAWA's consultants assumed that ~~Owners~~ operators of the 50 noisy aircraft that flew 12 or more flights in 2006 (24 or more operations) are expected to replace or hushkit their aircraft so they can continue to operate at VNY. Aircraft owners who operate less frequently at VNY are expected to shift to other airports in the region that have less-stringent noise limits to avoid the cost of replacing or hushkitting their aircraft.

Table 29. VNY Flights by Individual Noisy Jet Aircraft in 2006

	1 to 2 per Year	**3 to 5 per Year**	**6 to 11 per Year**	**12 or More per Year**	**Total**
Boeing 727	1	2	1	—	4
Learjet 24, 25, 28	47	11	2	7	67
Gulfstream II/III	124	41	22	41	228
Other	33	6	2	2	43
Total	205	60	27	50	342
Share	60%	18%	8%	15%	100%
Source: SH&E analysis of FAA ASDI database.					

The data show that a small number of noisy jets that operate frequently at VNY account for most of the noisy operations. The 50 jets that had 12 or more flights accounted for 73% of the noisy jet operations in 2006, while 205 noisy jets that had one or two flights at VNY in 2006 accounted for only 9% of the total noisy jet operations.

ASDI data also indicate that 78% of the Gulfstream II and 72% of the Gulfstream III operations at VNY are by aircraft with 12 or more flights a year at VNY. These frequent operators are expected to replace or modify their aircraft so they can continue to operate at VNY, while Gulfstream II/III owners who fly less than once a month to VNY are expected to shift operations to other airports in the region. Interviews with Gulfstream operators indicate that it is not a good investment to hushkit Gulfstream II aircraft but that a hushkitted Gulfstream III can be expected to operate cost effectively for many years. As a result, Gulfstream III owners are expected to hushkit their aircraft, and Gulfstream II owners who want to continue operating at VNY are expected to replace their current aircraft with hushkitted Gulfstream IIIs.

ASDI data also show that 73% of the LEAR24/25 operations at VNY involve aircraft flying to and from VNY at least 12 times a year. Owners of these aircraft are expected to replace these aircraft with LEAR35s that meet the project noise limits, while LEAR24/25 owners who are infrequent operators at VNY are expected to shift operations to other airports.

A small number of GA jet operations in Boeing 727, Hawker 125-600A, Sabre 60, and LEAR28 aircraft will also be affected by the project noise limits. These aircraft operate infrequently at VNY; these operations are expected to shift to other airports.

7.2 Identifying Potential Diversion Airports

The diversion analysis began by identifying a set of 19 Los Angeles area airports that are within roughly 60 driving miles of VNY (see Table 30). These included facilities as far east as Ontario, south to John Wayne Airport, and north to the Antelope Valley area. The characteristics of each airport were reviewed to screen out airports that are unlikely to accommodate displaced VNY business jet operations. The screening criteria included runway length and width, the current level of GA jet aircraft activity, the availability of jet fuel for the potentially diverted aircraft, driving distance and travel time from VNY, and the existence of any noise restrictions that would preclude diverted VNY aircraft from operating at the respective airports.

Eight of the 19 airports were eliminated as potential candidates because their main runways are less than 5,000 feet long or under 100 feet wide or because they had fewer than 500 GA jet operations in 2006.[14] These include Brackett, Cable, Corona, El Monte, Fullerton, Palmdale, Torrance, and Whiteman. In addition, Santa Monica was eliminated as a candidate for flights diverted from VNY because its noise rules prohibit operations by the types of aircraft that the project would exclude from VNY.

[14] Runway length of 5,100 feet and width of 100 feet are the preferred minimums for Gulfstream jet operations.

Table 30. Nineteen Los Angeles Area Airports

Airport	Code	Road Miles from VNY	Main Runway	Noise Restrictions	2006 GA Jet Operations
Brackett	POC	50	4,839 x 75	None	321
Bob Hope	BUR	9	6,886 x 150	Voluntary airline curfew 2200–0700	19,857
Cable	CCB	52	3,864 x 75	None	na
Camarillo	CMA	39	6,013 x 150	Departure curfew 2400–0500	4,650
Chino	CNO	61	7,000 x 150	None	1,480
Corona	AJO	67	3,200 x 60	None	Na
El Monte	EMT	34	3,995 x 75	None	30
Fox Field	WJF	60	7,201 x 150	None	500
Fullerton	FUL	42	3,120 x 75	None	29
Hawthorne	HHR	20	4,956 x 100	None	546
Long Beach	LGB	41	10,000 x 200	Noise budget, airline curfew 2200–0600	12,322
Los Angeles	LAX	22	12,090 x 150	None	20,250
Ontario	ONT	61	12,198 x 150	None	6,892
Oxnard	OXR	47	5,950 x 100	None	1,741
Palmdale	PMD	52	12,002 x 150	None	81
Santa Monica	SMO	16	4,973 x 150	Night departure curfew, voluntary night arrival curfew, aircraft noise limits	19,267
John Wayne	SNA	61	5,701 x 150	Airline night curfew, GA aircraft noise limits	32,176
Torrance	TOA	32	5,001 x 150	None	439
Whiteman	WHP	10	4,120 x 75	None	4
Source: AirNav, Boeing airport noise web site, individual airport web sites.					

Table 31 shows the distance and driving times to the nine airports that pass the first screening. Because the Los Angeles metropolitan area is the most congested large urban area in the nation,[15] highway driving time under normal and congested conditions represents an important measure of accessibility, as does highway distance.

[15] The 2007 Urban Mobility Report, Texas Transportation Institute, Texas A&M University, September 2007.

Table 31. Distance and Driving Times from Van Nuys to Nine Selected Los Angeles Area Airports

Potential Diversion Airport	Code	Distance (miles)	Normal Driving Time	Congested Driving Time
Bob Hope	BUR	9	0:25	0:30
Los Angeles International	LAX	22	0:33	1:20
Camarillo	CMA	39	0:47	0:55
Long Beach	LGB	41	0:48	1:50
Oxnard	OXR	47	0:59	1:10
Fox Field	WJF	60	1:04	1:30
John Wayne	SNA	61	1:05	2:10
Ontario	ONT	61	1:06	2:20
Chino	CNO	61	1:10	3:10
Source: Google Maps.				

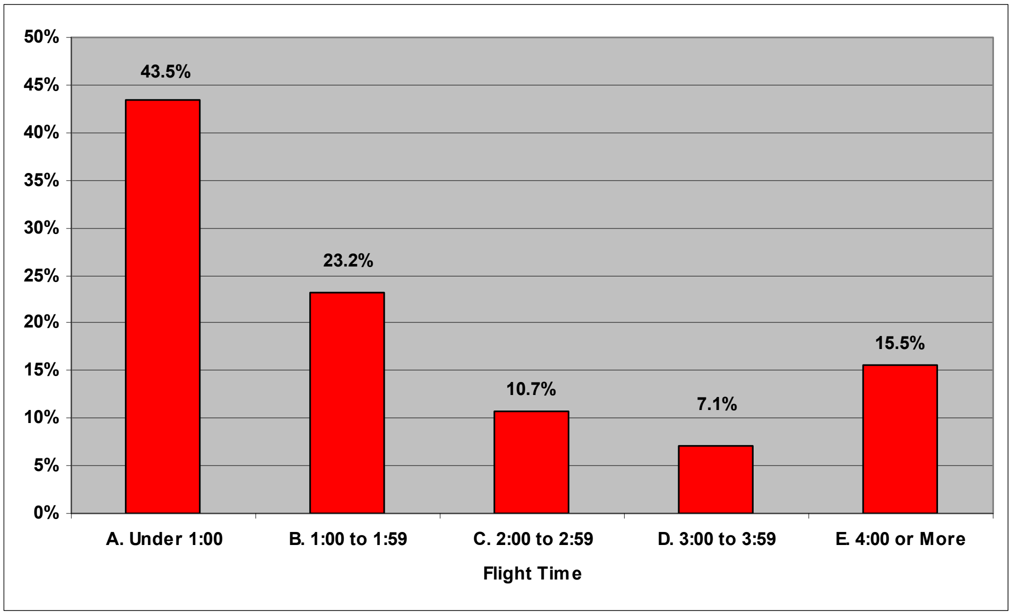
Bob Hope Airport offers the shortest driving time under both normal and congested driving conditions. At 33 minutes, the estimated driving time to LAX under normal driving conditions is slightly longer than the driving time to Bob Hope Airport, but driving time to LAX increases to 1 hour 20 minutes under congested conditions.[16] Camarillo is 47 minutes away under normal driving conditions, increasing by only 8 minutes when traffic is congested.

Driving to Long Beach takes only slightly longer than Camarillo under normal conditions, but driving time to Long Beach increases sharply under congested conditions. Oxnard is 12 to 15 minutes beyond Camarillo, and there is no apparent reason why an aircraft operator would bypass Camarillo for a similar facility farther away. Driving time to the remaining airports is more than an hour under normal driving conditions, and it can take 2 to 3 hours to drive to John Wayne, Ontario, or Chino when highways are congested.

Driving time to potential alternative airports should be viewed in the context of typical flight times. Figure 1 shows the shares of 2006 operations at VNY by flight time for the noisy jets that will be affected by the project. More than 43% of the flights in noisy GA jets were under 1 hour, with an additional 23% of the flights lasting 1 to 2 hours. Aircraft owners are unlikely to switch operations to airports where the driving time to the airport equals or exceeds typical flight times. For this reason, driving time is a critical factor in determining which airports receive the flights diverted from VNY.

[16] The Urban Mobility Report estimates that “rush hour” congestion in the Los Angeles area lasts 8 hours a day.

Figure 1. Duration of 2006 VNY Flights in Noisier Jets



Source: FAA ASDI data.

7.3 Forecast of Aircraft Shifted from VNY to Other Airports

Three airports represent the most likely alternatives for aircraft shifted from VNY: Bob Hope, Camarillo, and LAX. The shares that would shift to each of these alternatives will depend largely on two factors: driving time and convenience of aircraft operations.

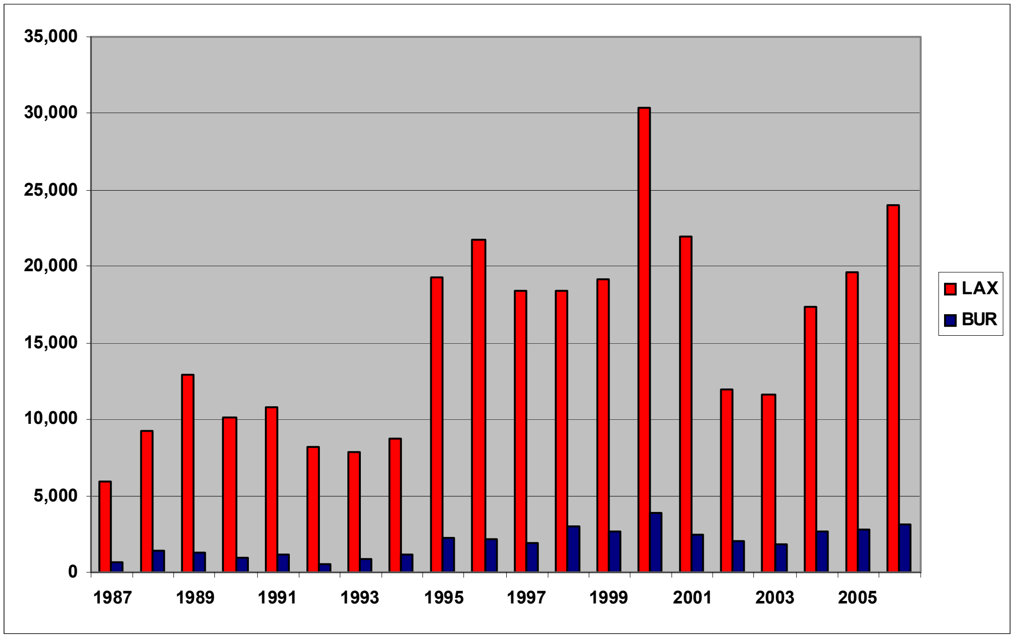
Driving times to the alternative airports will have an inverse effect on the number of operations shifted to these airports. For example, if Airport A is 40 minutes away from VNY and Airport B is 60 minutes away, Airport A would have an attraction factor of 1/40 and Airport B an attraction factor of 1/60. In this case, Airport A would attract 60% of the operations that shift from VNY, and Airport B would attract 40%.

The driving time analysis is based on the average time under normal and congested conditions. Los Angeles highways are congested approximately 8 hours a day, and 8 hours represents half of the time period when most aircraft departures take place, from 0600 to 2200. If driving time is the sole consideration, Bob Hope Airport would attract 50% of the operations that shift from VNY, LAX would attract 24%, and Camarillo 26%.

Operating convenience at the alternative airports will also play an important role in determining where operations are shifted. Camarillo, exclusively a general aviation airport, is expected to offer operating convenience equal to VNY. Bob Hope Airport and LAX are both commercial service airports where general aviation operators can expect to face some inconvenience.

Departure delays at these airports provide a measure of the inconvenience that general aviation operators can face at large commercial airports. Figure 2 shows annual departure delays of 30 minutes or more reported at Bob Hope Airport and LAX from 1987 through 2006.

Figure 2. Annual Departure Delays of 30 Minutes or More



Source: USDOT, BTS, Airline On-Time Performance Data.

In 2006, scheduled airlines at LAX reported more than 24,000 departure delays of 30 minutes or more compared to 3,142 at Bob Hope Airport. Since 2002, departure delays have been rising rapidly at LAX but much more slowly at Bob Hope Airport.

Weighting factors were developed to reflect the potential impact of departure delays and other operating challenges at the alternative airports. A factor of 1.0 was assigned to Camarillo based on the view that general aviation operators will face no special difficulties at this airport. A factor of 0.9 was assigned to Bob Hope Airport, reflecting minor inconveniences associated with general aviation operations at this airport. A factor of 0.3 was assigned to LAX, indicating that general aviation operators can expect to face substantial operating inconveniences at this airport, particularly at times of peak activity. Although the value assigned to the weighting factors is subjective, sensitivity analysis shows that moderate changes upward or downward in these factors has relatively little impact on the overall results.

The forecast shift in operations from VNY to alternative airports is based primarily on the combined impact of driving time and operating inconvenience factors. Using this approach, Bob Hope Airport would attract 57% of the business jet operations shifted from VNY, Camarillo would attract 34%, and LAX would attract 9%. Boeing 727s that have been converted to GA use represent an exception to this rule. All 727 operations at VNY are expected to shift to LAX where this aircraft type operates frequently and can be more readily serviced.

Table 32 shows the forecast of GA jet operations shifted from VNY to Bob Hope, Camarillo, and LAX in 2014. GA jet operations at Bob Hope Airport would increase by 0.5 operations per day, with smaller increases at Camarillo and LAX.

Table 32. GA Jet Operations Shifted from VNY in 2014

Aircraft Type	To BUR	To CMA	To LAX
GLF2	22	13	3
GLF3	73	44	12
LJ25	75	45	12
LJ24	17	10	3
B727	—	—	15
B721	—	—	12
B722	—	—	5
H25A	2	1	—
SBR1	2	1	—
LJ28	1	1	—
Total	~~192~~193	115	62
Per Day	0.5	0.3	0.2
Source: SH&E analysis.			

Table 33 shows the day-evening-night distribution of departures and arrivals that would shift from VNY to Bob Hope Airport, assuming that the aircraft would continue to operate at the alternative airports at the same times they operate at VNY.

Table 33. 2014 Business Jet Operations Shifted from VNY to BUR

Aircraft Type	Day	Evening	Night	Total
Departures				
GLF3	30	6	0	37
GLF2	10	1	0	11
LJ25	33	4	0	38
LJ24	7	1	0	9
All Other	2	0	0	3
Total	83	12	1	96
Arrivals				
GLF3	26	6	4	37
GLF2	8	2	1	11
LJ25	31	4	3	38
LJ24	7	1	1	9
All Other	2	0	0	3
Total	*75*	*13*	*8*	*96*
Grand Total	**158**	**25**	**9**	**~~192~~193**

Note: Totals may not equal sum of columns due to rounding.

Source: FAA ASDI data, SH&E analysis.

The VNY phaseout would increase Bob Hope Airport activity in 2014 by 158 day operations, 25 evening operations, and nine night operations, with arrivals accounting for almost all night activity.

Table 34 shows the increase in GA jet operations at Camarillo.

Table 34. 2014 Business Jet Operations Shifted from VNY to CMA

Aircraft Type	Day	Evening	Night	Total
Departures				
GLF3	18	4	0	22
GLF2	6	1	0	7
LJ25	20	2	0	23
LJ24	4	1	0	5
All Other	1	0	0	2
Total	*50*	*7*	*0*	*58*
Arrivals				
GLF3	16	4	2	22
GLF2	5	1	1	7
LJ25	19	2	2	23
LJ24	4	0	0	5
All Other	1	0	0	2
Total	*45*	*8*	*5*	*58*
Grand Total	**94**	**15**	**5**	**115**

Note: Totals may not equal sum of columns due to rounding.

Source: SH&E analysis.

The VNY phaseout would increase Camarillo activity in 2014 by 94 day operations, 15 evening operations, and five night operations. There would be only one additional night departure at Camarillo, with the 0000 to 0500 night departure curfew assumed to remain in effect.

Table 35 shows the increase in annual GA jet operations at LAX.

Table 35. 2014 Business Jet Operations Shifted from VNY to LAX

Aircraft Type	Day	Evening	Night	Total
Departures				
GLF3	5	1	0	6
GLF2	1	0	0	2
LJ25	5	1	0	6
LJ24	1	0	0	2
All Other	14	1	1	16
Total	*27*	*3*	*1*	*31*
Arrivals				
GLF3	4	1	1	6
GLF2	1	0	0	2
LJ25	5	1	0	6
LJ24	1	0	0	2
All Other	13	2	1	16
Total	*24*	*4*	*2*	*31*
Grand Total	**51**	**8**	**3**	**62**

Note: Totals may not equal sum of columns due to rounding.

Source: SH&E analysis.

The VNY phaseout would increase LAX activity in 2014 by 69 day operations, 11 evening operations, and four night operations.

Table 36 summarizes the differences in 2014 operations at the three alternative airports under the project and Alternative 1 scenarios.

Table 36. 2014 Business Jet Operations at BUR, CMA, and LAX

Scenario	**BUR**	**CMA**	**LAX**
Project			
Stage 2	~~563~~ 564	217	~~1,010~~ 658
Stage 3	32,373	8,662	~~27,537~~ 27,890
Total	*~~32,936~~ 32,937*	*8,879*	*~~28,516~~ 28,548*
Stage 2 Percentage	**1.7%**	**~~2.5~~ 2.4%**	**~~3.5~~ 2.3%**
Alternative 1			
Stage 2	371	102	596
Stage 3	32,373	8,662	27,858
Total	*32,744*	*8,764*	*28,454*
Stage 2 Percentage	**1.1%**	**1.2%**	**2.1%**
Source: SH&E analysis.			

Compared to Alternative 1, the project would increase the Stage 2 share of business jet operations at Bob Hope Airport from 1.1% to 1.7%, the share at Camarillo from 1.2% to 2.5%, and the share at LAX from 2.1% to 3.5%. In addition, the number of annual general aviation 727 operations at LAX would increase by 32. Except for the 727s at LAX, the number of Stage 3 business jet operations at these airports would not be affected.

Under Alternative 2 which exempts all Stage 3 operations from the phaseout, the general aviation 727 operations at VNY would not shift to LAX. Except for this, there is no difference in diversion between the Project and Alternative 2.

The proposed phaseout has the greatest impact on noisy jet operations at Bob Hope Airport, Camarillo, and LAX in 2014, but it will also affect operations in 2016 at Fox Field and Chino when exemptions on noisy aircraft maintenance activity and privately owned military jet operations at VNY expire. Table 37 shows the shift in operations from VNY to Fox Field in 2016.

Table 37. 2016 Maintenance-Related Operations Shifted to WJF

Aircraft Type	Day	Evening	Night	Total
Departures				
GLF3	65	0	0	65
GLF2	65	0	0	65
Total	*130*	*0*	*0*	*130*
Arrivals				
GLF3	65	0	0	65
GLF2	65	0	0	65
Total	*130*	*0*	*0*	*130*
Grand Total	**260**	**0**	**0**	**260**
Source: SH&E analysis.				

A total of 260 annual operations are expected to shift to Fox Field, based on 65 maintenance visits with one arrival, one departure, and one test flight per visit. The maintenance activity is expected to involve Gulfstream II and Gulfstream III aircraft, and all operations are expected to occur during daytime hours.

Privately owned military jets that cannot operate at VNY in 2016 are expected to shift to Chino, which is a center for military aircraft restoration. Table 38 shows the expected shift in operations, a total of 100 annual operations.

Table 38. 2016 Privately Owned Military Jet Operations Shifted to CNO

Aircraft Type	Day	Evening	Night	Total
Departures				
F5	2	0	0	2
L39	25	4	0	29
T38	15	0	4	19
Total	42	4	4	50
Arrivals				
F5	2	0	0	2
L39	29	0	0	29
T38	19	0	0	19
Total	50	0	0	50
Grand Total	**92**	**4**	**4**	**100**
Source: SH&E analysis.				

The types of military jets are expected to include United States-made T38 and F5 aircraft and Czech L39 Albatros trainers. Given current usage patterns at VNY, most operations are expected to occur during daytime hours, with a small number of evening and night flights.

8.0 Underlying Operations at Displacement Airports

This section describes the methodology for developing forecast operations at the diversion airports and presents the 2007 baseline and 2014/2016 forecasts of aircraft operations under Alternative 1, status quo conditions. The airports that are forecast to receive operations diverted from VNY as a result of the project include Bob Hope Airport, Camarillo, Chino, LAX, and Fox Field. These forecasts and the forecasts of diverted operations, described in Section 7, provide the basis for the analysis of the environmental impacts of the proposed project and the two alternatives on the diversion airports.

8.1 Forecast Methodology

A detailed approach was used to forecast business jets operations, including fleet mix and time of day profiles, for each of the diversion airports. Forecasts of other segments of activity, such as commercial airline operations or non-jet general aviation, at all diversion airports except LAX were based on growth projections from the FAA's Terminal Area Forecasts (December 2006). Baseline and forecast operations for LAX were based on existing forecasts prepared for LAWA for the Los Angeles International Airport Senior and Subordinate Revenue Bonds Series 2008 - Final Official Statement. Derivative forecasts for operations by aircraft type and by time of day were derived from several available data sources, such as the U.S. Department of Transportation (USDOT) T100 database, FAA ATADS, FAA ETMSC, ASDI, the Official Airline Guide, 2006 INM modeling inputs for LAX, and individual airport master plans obtained for Chino, Camarillo, and Fox Field.

Business Jet Forecast Assumptions

The level of business jet operations at the diversion airports was determined from the FAA's ETMSC database, which also provided information on aircraft type. Actual business jet operations were reviewed from 2000, the earliest year available in ETMSC, to 2006 to assess historic growth trends at the diversion airports. Table 39 presents the ETMSC business jet operations from 2000 to 2006 for each of the diversion airports and VNY.

Of the five diversion airports, LAX and Bob Hope Airport accommodated the most business jet activity in 2006, with approximately 20,000 operations each. However, VNY accommodated more than 40,000 business jets operations, more than twice as many as Bob Hope Airport and LAX. The other diversion airports handled significantly fewer business jet operations. In 2006, there were 4,600 business jets operations at Camarillo, 1,500 at Chino, and only 500 at Fox Field. VNY accommodated more than twice as many business jet operations as Bob Hope Airport and LAX.

Business jet operations at the diversion airports grew at various rates, from 2.6% per year at Fox Field to 10.2% per year at Camarillo. While Bob Hope Airport and LAX accommodated similar levels of business jet operations, activity at Bob Hope Airport has been growing faster, at 8.1% per year, compared to 5.5% at LAX. The ETMSC data indicate that business jet activity at VNY grew at an average rate of 8.1% per year from 2000 to 2006, the same rate as business jet operations at Bob Hope Airport.

Table 39. Historic Business Jet Operations at Diversion Airports and VNY, 2000 to 2006

Year	BUR	CMA	CNO	LAX	WJF	VNY
2000	12,466	2,592	1,048	14,664	428	27,106
2001	13,719	2,729	713	14,292	341	29,188
2002	15,175	3,612	1,176	15,019	387	35,631
2003	15,792	4,213	1,122	15,825	473	38,025
2004	17,980	4,630	1,194	18,323	547	41,919
2005	19,659	5,000	1,238	19,987	561	43,112
2006	19,857	4,650	1,480	20,250	500	43,349
Average Annual Growth						
2000–2006	8.1%	10.2%	5.9%	5.5%	2.6%	8.1%
Note: VNY operations are from ETMSC and differ slightly from ARTS data for VNY and the estimated base-year (2004) level of VNY jet operations. Source: FAA, ETMSC, 2000–2006.						

Table 40 summarizes forecast growth assumptions for business jet operations at each of the diversion airports. Forecast growth rates are based on historical growth trends and projected growth for the business jet industry. At Bob Hope Airport, long-term forecast growth in business jet operations is similar to the forecast rate for VNY. Business jet operations are forecast to grow the fastest Camarillo and the slowest at Fox Field, consistent with historic growth trends.

Table 40. Actual and Forecast Average Annual Growth in Business Jet Operations at Diversion Airports

Year	BUR	CMA	CNO	LAX	WJF
Actual 2000–2006	8.1%	10.2%	5.9%	5.5%	2.6%
Forecast					
2006–2014	6.5%	8.2%	4.7%	4.3%	1.9%
2014–2016	6.9%	8.9%	5.0%	4.6%	1.9%
Source: SH&E.					

Forecast Assumptions for Other Aviation Activity

Other types of aviation activity at the diversion airports include civil general aviation operations in non-jet aircraft, civilian training operations (GA non-jet local), and operations performed by the military. In addition, Bob Hope Airport and LAX have a substantial number of commercial airline operations, including activity by passenger and all-cargo carriers and regional/commuter airlines. For all diversion airports except LAX, forecast growth rates for all non-business jet activity at the diversion airports were based on the FAA Terminal Area Forecasts. For LAX, forecasts of all non-business jet activity were based on existing forecasts prepared for LAWA for the Los Angeles International Airport Senior and Subordinate Revenue Bonds Series 2008 - Final Official Statement. Table 41 summarizes the forecast growth assumptions for each type of activity for each of the diversion airports.

Table 41. Forecast Average Annual Growth Rates for Non-Business Jet Operations at Diversion Airports, 2006–2014 and 2014–2016

Period	Activity Type	BUR	CMA	CNO	LAX	WJF
2006–2014	Air Carrier	1.5%	na	na	1.0%	na
	Commuter	2.5%	na	na	1.5%	na
	Itinerant GA Non-Jet	2.3%	1.6%	1.7%	1.4%	0.5%
	Local GA Non-Jet	0.8%	0.0%	0.0%	Na	0.5%
	Military (Itinerant + Local)	0.0%	0.0%	0.0%	1.0%	0.0%
2014–2016	Air Carrier	1.5%	na	na	1.5%	na
	Commuter	2.5%	na	na	0.9%	na
	Itinerant GA Non-Jet	1.3%	1.0%	1.1%	1.2%	0.4%
	Local GA Non-Jet	0.8%	0.0%	0.0%	na	0.5%
	Military (Itinerant + Local)	0.0%	0.0%	0.0%	0.0%	0.0%

Source: FAA Terminal Area Forecasts, December 2006 (BUR, CMA, CNO and WJF)

LAWA, Los Angeles International Airport Senior and Subordinate Revenue Bonds Series 2008 - Final Official Statement (LAX)

Estimation of 2007 Baseline Aircraft Operations

Actual changes in aircraft operations as reported in the FAA ATADS and FAA ETMSC databases were reviewed and used to estimate activity levels for the 2007 baseline for all diversion airports except LAX. Growth rate assumptions were developed and applied to calendar year (CY) 2006 activity to estimate the 2007 baseline activity at each of the diversion airports. The 2007 baseline activity levels for LAX were based on actual data reported by LAWA in the Los Angeles International Airport Senior and Subordinate Revenue Bonds Series 2008 - Final Official Statement. Table 42 presents the growth rate assumptions used to estimate 2007 baseline operations by type for the diversion airports other than LAX and summarizes actual 2006-2007 growth rates for LAX.

Table 42. Forecast Growth Rate Assumptions for Aircraft Operations at Diversion Airports, 2006–2007

Activity Type	BUR*	CMA	CNO	LAX **	WJF
Business Jet	-5.0%	5.0%	37.6%	3.8%	1.5%
Air Carrier	5.7%	na	na	0.0%	na
Commuter	-4.4%	na	na	7.1%	na
Itinerant GA Non-Jet	-10.5%	-6.4%	3.4%	2.9%	-5.3%
Local GA Non-Jet	-35.2%	-1.5%	-4.7%	na	3.9%
Military (Itinerant + Local)	-4.8%	125.2%	51.1%	0.0%	-0.1%

Note: Actual growth for year to date (YTD) September 2006–2007 based on FAA ATADS and ETMSC, except where noted.

* Actual growth for YTD September 2006–2007 for business jets based on FAA, ETMSC; actual YTD November 2006–2007 growth rates for major air carriers and commuter airlines based on USDOT T-100 database; actual CY 2006–2007 growth for non-jet GA and military based on FAA ATADS.

** LAWA, Los Angeles International Airport Senior and Subordinate Revenue Bonds Series 2008 - Final Official Statement (LAX)

Estimated 2007 baseline operations for the diversion airports are summarized in Table 43. The level of aircraft activity at the diversion airports ranges from 66,000 annual operations at Fox Field to 664,000 at LAX. Only Bob Hope Airport and LAX have operations by scheduled commercial airlines (major air carriers and commuter airlines). The majority of the activity at the other airports consists of itinerant and local non-jet aircraft operations. Section 8.2 provides a more detailed description of baseline operations for each diversion airport.

Table 43. Estimated 2007 Baseline Operations at Diversion Airports by Type of Activity

Activity Type	BUR	CMA	CNO	LAX	WJF
Business Jet	18,863	4,883	2,037	21,013	508
Air Carrier	58,629	na	na	454,946	na
Commuter	11,819	na	na	173,081	na
Itinerant GA Non-Jet	26,174	74,601	67,590	11,981	31,738
Local GA Non-Jet	5,060	63,860	96,376	—	32,291
Military(Itinerant + Local)	265	1,740	594	2,488	1,513
Total	**120,810**	**145,083**	**166,596**	**663,509**	**66,049**

8.2 Baseline (2007) Activity at Diversion Airports

This section describes the 2007 baseline level of aircraft activity at each of the diversion airports.

Bob Hope Airport

As shown in Table 44, there were an estimated 121,000 operations, excluding overflights, at Bob Hope Airport in the 2007 baseline. Major air carriers and commuter airlines accounted for 58% of total airport operations. GA non-jet itinerant operations, which include air taxis and the cargo operations of Ameriflight, represented 22% of total activity. Business jets were responsible for 16% of total operations in the base year. Because of the high level of regularly scheduled commercial airline services at Bob Hope Airport, local operations, including training activity, is minimal.

Table 44.2007 Baseline Operations at Bob Hope Airport by Type of Activity

Activity Type	Annual	Average Daily	Percent of Total
Air Carrier/Commuter	70,448	193.0	58%
Business Jet	18,863	51.7	16%
GA Non-Jet Itinerant	26,174	71.7	22%
GA Non-Jet Local	5,060	13.9	4%
Military (Itinerant + Local)	265	0.7	0%
Total	**120,810**	**331.0**	**100%**

Table 45 presents estimated baseline operations for Bob Hope Airport by type and by time of day. Approximately 75% of total aircraft operations were performed during the day. The evening period accounted for 16% of operations, and nearly 9% of activity occurred during the night. The GA non-jet category had the highest percentage of activity during the night period, at 27.2%. This category includes the Ameriflight cargo operations, which contribute to the high nighttime share for this category of activity. Almost 12% of business jet operations occurred during the night but only 2.1% of commercial airline activity. The limited amount of commercial airline activity at night illustrates the effect of the current voluntary nighttime curfew for air carriers at Bob Hope Airport.

Table 45. 2007 Baseline Operations at Bob Hope Airport by Type of Activity and Time of Day

Activity Type	Operations by Time of Day				Percent of Total 24 Hours		
	Day	Evening	Night	Total	Day	Evening	Night
Air Carrier/Commuter	54,226	14,754	1,468	70,448	77.0%	20.9%	2.1%
Business Jet	14,721	1,948	2,194	18,863	78.0%	10.3%	11.6%
GA Non-Jet Itinerant	16,207	2,852	7,115	26,174	61.9%	10.9%	27.2%
GA Non-Jet Local	4,742	318	—	5,060	93.7%	6.3%	0.0%
Military (Itinerant + Local)	253	12	—	265	95.3%	4.7%	0.0%
Total	**90,149**	**19,884**	**10,777**	**120,810**	**74.6%**	**16.5%**	**8.9%**

As shown in Table 46, departing flights accounted for 52.2% of daytime operations at Bob Hope Airport. Evening operations were heavily weighted toward arrivals, which accounted of 63.8% of evening activity. Departures represented nearly 57% of nighttime operations. While scheduled airlines drive the mix of arriving and departing flights during the day and evening periods, GA non-jet itinerant flights drive the mix of activity during the night period. GA non-jet itinerant operations, which include Ameriflight cargo operations, accounted for 66% of total nighttime operations; 57.8% of these were departures.

Table 46. 2007 Baseline Operations at Bob Hope Airport by Type of Activity, Time of Day, and Direction

Activity Type	Day		Evening		Night	
	Arrivals	Departures	Arrivals	Departures	Arrivals	Departures
Air Carrier/Commuter	46.9%	53.1%	63.8%	36.2%	26.4%	73.6%
Business Jet	47.3%	52.7%	62.2%	37.8%	57.5%	42.5%
GA Non-Jet Itinerant	50.5%	49.5%	66.5%	33.5%	42.2%	57.8%
GA Non-Jet Local	50.0%	50.0%	50.0%	50.0%	—	—
Military (Itinerant + Local)	47.6%	52.4%	100.0%	0.0%	—	—
Total	**47.8%**	**52.2%**	**63.8%**	**36.2%**	**43.1%**	**56.9%**

The 2007 baseline fleet mix for Bob Hope Airport is summarized by INM type in Table 47. The top five types accounted for nearly 53% of total aircraft operations. Narrowbody commercial aircraft, such as Boeing 737s, represented by INM types 737300 and 737700, were among the most prevalent types in the Bob Hope Airport fleet mix and together accounted for 36% of Bob Hope Airport's total aircraft operations. The CL601 INM type represents regional jets operated by scheduled airlines and accounted for 6.1% of total aircraft operations. The DHC6 type, which represents GA non-jet operations and some military operations, accounted for 5.7% of aircraft activity. The GV INM type, which represents business jet activity and some scheduled airline regional jet operations, was the fifth most prevalent type in the Bob Hope Airport fleet mix, with a 4.9% share of baseline activity.

Table 47. 2007 Baseline Operations at Bob Hope Airport by INM Aircraft Type

INM Type	Annual Operations	Percent of Total
737300	21,915	18.1%
737700	21,592	17.9%
CL601	7,418	6.1%
DHC6	6,861	5.7%
GV	5,907	4.9%
LEAR35	4,806	4.0%
GASEPV	4,703	3.9%
MD81	4,694	3.9%
A320-211	3,928	3.3%
BEC58P	3,635	3.0%
CNA441	3,615	3.0%
CNA172	3,330	2.8%
MU3001	3,329	2.8%
SD330	3,092	2.6%
GASEPF	2,786	2.3%
CNA206	2,451	2.0%
GIV	2,202	1.8%
737500	2,019	1.7%
IA1125	1,813	1.5%
A319-131	1,585	1.3%
CL600	1,470	1.2%
CNA750	1,237	1.0%
A310-304	1,109	0.9%
737800	895	0.7%
CNA500	885	0.7%
1900D	832	0.7%
FAL900	422	0.3%
GIIB	411	0.3%
A300-622R	395	0.3%
FAL50	300	0.2%

INM Type	Annual Operations	Percent of Total
737400	237	0.2%
GII	215	0.2%
CIT3	167	0.1%
757PW	134	0.1%
757RR	133	0.1%
PA28	105	0.1%
LEAR25	92	0.1%
FAL20	52	0.0%
PA30	16	0.0%
C130	11	0.0%
F16A	5	0.0%
F-18	4	0.0%
CNA55B	3	0.0%
Total	**120,810**	**100.0%**

As shown in Table 48, there were 757 operations in Stage 2 business jet aircraft (excluding military operations) at Bob Hope Airport in 2007. Stage 2 types in the Bob Hope Airport fleet are represented by the following INM types: GIIB (411 operations), GII (212 operations), LEAR25 (81 operations), and FAL20 (52 operations). Stage 3 aircraft types accounted for 96% of Bob Hope Airport's total business jet operations in the baseline case.

Table 48. 2007 Baseline Business Jet Operations at Bob Hope Airport by Noise Stage

Noise Stage	Annual Operations	Percent of Total
Stage 2	757	4.0%
Stage 3	18,106	96.0%
Total	**18,863**	**100.0%**

Camarillo Airport

In 2007, there were 145,000 aircraft operations at Camarillo Airport. As shown in Table 49, GA non-jet aircraft accounted for 95% of total airport operations. More than 40% of the airport's operations are local operations, which include pilot training activity, such as touch-and-go operations; flights that remain within the local traffic pattern; and flights between the airport and a practice area within a 20-mile radius of the tower. Business jet aircraft accounted for less than 5,000 annual operations, or 3% of total activity.

Table 49. 2007 Baseline Operations at Camarillo Airport by Type of Activity

Activity Type	Annual	Average Daily	Percent of Total
Air Carrier/Commuter	0	—	0.0%
Business Jet	4,883	13.4	3.4%
GA Non-Jet Itinerant	74,601	204.4	51.4%
GA Non-Jet Local	63,860	175.0	44.0%
Military (Itinerant + Local)	1,740	4.8	1.2%
Total	**145,083**	**397.5**	**100.0%**

Table 50 summarizes 2007 aircraft activity at Camarillo by type and by time of day. Nearly 92% of aircraft operations at Camarillo occurred during the daytime. The high percentage of daytime activity reflects the high percentage of non-jet itinerant and training operations that occur predominantly during daytime hours. Approximately 6% of aircraft operations occurred during evening hours, and only 2% operated during the night. The time-of-day pattern for business jets differs from the time-of-day pattern for non-jet aircraft, with a higher percentage of activity occurring during the evening and night periods. In 2007, 8% of business jet operations were in the evening, and 7% were at night.

Table 50.2007 Baseline Operations at Camarillo Airport by Type of Activity and Time of Day

	Operations by Time of Day				Percent of Total 24 Hours		
Activity Type	**Day**	**Evening**	**Night**	**Total**	**Day**	**Evening**	**Night**
Air Carrier/Commuter	—	—	—	—	—	—	—
Business Jet	4,134	408	341	4,883	84.7%	8.4%	7.0%
GA Non-Jet Itinerant	68,297	4,399	1,904	74,601	91.6%	5.9%	2.6%
GA Non-Jet Local	58,909	3,752	1,198	63,860	92.2%	5.9%	1.9%
Military (Itinerant + Local)	1,593	103	44	1,740	91.6%	5.9%	2.6%
Total	**132,933**	**8,663**	**3,487**	**145,083**	**91.6%**	**6.0%**	**2.4%**

As shown in Table 51, daytime operations were evenly balanced between arrivals and departures. The evening period was not balanced, with departures accounting for 53% of evening operations. During the night period there was a higher percentage of arrivals than departures, 52% and 48%, respectively. Business jet activity at Camarillo had a different time-of-day pattern than the overall airport average. For business jets, departures represented more than half of daytime activity, while arrivals were the most frequent type of business jet operation during the evening and night periods.

Table 51. 2007 Baseline Operations at Camarillo Airport by Type of Activity, Time of Day, and Direction

Activity Type	Day		Evening		Night	
	Arrivals	**Departures**	**Arrivals**	**Departures**	**Arrivals**	**Departures**
Air Carrier/Commuter	—	—	—	—	—	—
Business Jet	46.9%	53.1%	65.2%	34.8%	69.3%	30.7%
GA Non-Jet Itinerant	50.5%	49.5%	41.9%	58.1%	49.6%	50.4%
GA Non-Jet Local	50.0%	50.0%	50.0%	50.0%	—	—
Military (Itinerant + Local)	50.5%	49.5%	41.9%	58.1%	—	—
Total	**50.2%**	**49.8%**	**46.5%**	**53.5%**	**51.6%**	**48.4%**

Table 52 summarizes the 2007 baseline aircraft fleet for Camarillo Airport by aircraft INM type. The generic types for single-engine variable-pitch (GASEPV) and single-engine fixed-pitch (GASEPF) aircraft account for nearly three-quarters of the aircraft types operating at Camarillo. Other prevalent types in the Camarillo fleet include twin-engine pistons, represented by the BEC58P INM type; other single-engine pistons, represented by CNA172; and light turboprops, represented by CNA411. Together, these five INM types account for 93% of the aircraft in the Camarillo fleet.

Table 52. 2007 Baseline Operations at Camarillo Airport by INM Aircraft Type

INM Type	Annual Operations	Percent of Total
GASEPV	57,833	39.9%
GASEPF	46,279	31.9%
BEC58P	16,567	11.4%
CNA172	9,033	6.2%
CNA441	5,512	3.8%
DHC6	2,094	1.4%
CNA206	1,707	1.2%
MU3001	1,075	0.7%
LEAR35	934	0.6%
CL600	582	0.4%
CNA500	582	0.4%
DC3	514	0.4%
GV	449	0.3%

INM Type	Annual Operations	Percent of Total
SD330	399	0.3%
GIV	331	0.2%
CNA750	252	0.2%
IA1125	186	0.1%
GIIB	132	0.1%
DC6	128	0.1%
FAL50	109	0.1%
FAL900	74	0.1%
CNA55B	69	0.0%
CIT3	49	0.0%
C130	46	0.0%
LEAR25	46	0.0%
PA28	42	0.0%
LEAR25	35	0.0%
GII	19	0.0%
FAL20	3	0.0%
SABR80	2	0.0%
Total	145,083	100.0%

Table 53 shows the business jet fleet mix at Camarillo by noise classification stage. In 2007, approximately 4% of Camarillo's business jet operations were performed by Stage 2 jets.

Table 53. 2007 Baseline Business Jet Operations at Camarillo Airport by Noise Stage

Noise Stage	Annual Operations	Percent of Total
Stage 2	191	3.9%
Stage 3	4,691	96.1%
Total	**4,883**	**100.0%**

Chino Airport

Chino Airport accommodated 167,000 aircraft operations in 2007. As shown in Table 54, civilian GA non-jet aircraft accounted for 99% of operations at Chino. More than half of airport operations were local operations, including pilot training and touch-and-go maneuvers.

Table 54. 2007 Baseline Operations at Chino Airport by Type of Activity

Activity Type	**Annual**	**Average Daily**	**Percent of Total**
Air Carrier/Commuter	—	—	0%
Business Jet	2,037	5.6	1%
GA Non-Jet Itinerant	67,590	185.2	41%
GA Non-Jet Local	96,376	264.0	58%
Military (Itinerant + Local)	594	1.6	0%
Total	**166,596**	**456.4**	**100%**

Table 55 presents Chino Airport operations by type and by time of day. Because of the high proportion of activity by non-jet aircraft, particularly local operations, more than 90% of total aircraft operations at Chino occurred during the daytime. Six percent of operations occurred during the evening, and 1% occurred during the night. A much higher percentage of jet aircraft operations occurred during the evening and night periods. Of the 2,000 annual jet operations, 11% operated during the evening, and approximately 12% operated during the night.

Table 55. 2007 Baseline Operations at Chino Airport by Type of Activity and Time of Day

	Operations by Time of Day				**Percent of Total 24 Hours**		
Activity Type	**Day**	**Evening**	**Night**	**Total**	**Day**	**Evening**	**Night**
Air Carrier/Commuter	—	—	—	—	—	—	—
Business Jet	1,570	231	236	2,037	77.1%	11.4%	11.6%
GA Non-Jet Itinerant	61,677	4,210	1,703	67,590	91.3%	6.2%	2.5%
GA Non-Jet Local	89,938	6,438	—	96,376	93.3%	6.7%	0.0%
Military (Itinerant + Local)	542	37	15	594	91.3%	6.2%	2.5%
Total	**153,726**	**10,916**	**1,954**	**166,596**	**92.3%**	**6.6%**	**1.2%**

As shown in Table 56 daytime and nighttime activity is almost evenly balanced between arrivals and departures. However, during the evening period, 42% of total airport operations are arrivals, and 58% are departures. Business jets have a different pattern of operation than the airport average, which is heavily influenced by non-jet aircraft. Of the business jet activity, 53% of daytime operations were departures, 32% of evening operations were departures, and 49% of night operations were departures.

Table 57. 2007 Baseline Operations at Chino Airport by Type of Activity, Time of Day and Direction

Activity Type	Day		Evening		Night	
	Arrivals	**Departures**	**Arrivals**	**Departures**	**Arrivals**	**Departures**
Air Carrier/Commuter	—	—	—	—	—	—
Business Jet	47.2%	52.8%	68.3%	31.7%	50.7%	49.3%
GA Non-Jet Itinerant	51.5%	48.5%	28.3%	71.7%	50.5%	49.5%
GA Non-Jet Local	50.0%	50.0%	50.0%	50.0%	—	—
Military (Itinerant + Local)	51.5%	48.5%	28.3%	71.7%	50.5%	49.5%
Total	**50.6%**	**49.4%**	**42.0%**	**58.0%**	**50.5%**	**49.5%**

Aircraft operations at Chino are summarized by INM aircraft type in Table 58. Five INM types, representing light general aviation aircraft, accounted for 95% of the 2007 baseline operations at Chino. Four of the top INM types are single-engine piston types (GASEPV, CNA172, CNA206, and GASEPF) and the BEC58P represents a twin-engine piston type.

Table 58. 2007 Baseline Operations at Chino Airport by INM Aircraft Type

INM Type	Annual Operations	Percent of Total
GASEPV	48,562	29.1%
CNA172	39,051	23.4%
CNA206	26,833	16.1%
BEC58P	26,447	15.9%
GASEPF	17,528	10.5%
CNA441	3,022	1.8%
PA28	1,555	0.9%
DHC6	934	0.6%
LEAR35	613	0.4%
SD330	563	0.3%
MU3001	353	0.2%
CNA500	315	0.2%
CL600	252	0.2%
GII	198	0.1%
GIIB	84	0.1%
IA1125	84	0.1%
FAL20	63	0.0%

INM Type	Annual Operations	Percent of Total
C130	36	0.0%
LEAR25	31	0.0%
F-18	29	0.0%
CNA750	13	0.0%
FAL50	7	0.0%
CNA55B	7	0.0%
GIV	6	0.0%
FAL900	4	0.0%
CIT3	3	0.0%
GV	3	0.0%
Total	**166,596**	**100.0%**

While there were only 2,000 operations in business jet aircraft at Chino during the base year (approximately), 18% were performed by Stage 2 jets, as shown in Table 59.

Table 59. 2007 Baseline Business Jet Operations at Chino Airport by Noise Stage

Noise Stage	Annual Operations	Percent of Total
Stage 2	376	18.5%
Stage 3	1,661	81.5%
Total	**2,037**	**100.0%**

LAX

Baseline operations at LAX are summarized by type of activity in Table 60. There were approximately 664,000 aircraft operations at LAX in 2007. Nearly 95% were performed by commercial passenger or cargo airlines. Business jets accounted for 3% of total aircraft operations, and civilian GA non-jets performed less than 2% of operations.

Table 60. 2007 Baseline Operations at Los Angeles International Airport by Type of Activity

Activity Type	Annual	Average Daily	Percent of Total
Air Carrier/Commuter	628,027	1,720.6	94.7%
Business Jet	21,013	57.6	3.2%
GA Non-Jet Itinerant	11,981	32.8	1.8%
GA Non-Jet Local	—	—	0.0%
Military (Itinerant + Local)	2,488	6.8	0.4%
Total	**663,509**	**1,817.8**	**100.0%**

Table 61 presents 2007 operations at LAX by type and by time of day. Slightly more than two-thirds of all aircraft operations occurred during the daytime. Compared to the other diversion airports, LAX had the highest percentage of operations occurring during the evening and nighttime. In 2007, approximately 16% of operations were performed during the evening, and 16% occurred at night. The high percentage of evening and night operations reflects the airport's role as a large-hub commercial service airport and international gateway, with many Asian and eastbound domestic flights departing during the evening and nighttime hours. Of the business jets that operated at LAX in 2007, 76% operated during the daytime, and 24% operated during the evening and nighttime hours.

Table 61. 2007 Baseline Operations at Los Angeles International Airport by Type of Activity and Time of Day

	Operations by Time of Day				Percent of Total 24 Hours		
Activity Type	**Day**	**Evening**	**Night**	**Total**	**Day**	**Evening**	**Night**
Air Carrier/Commuter	427,554	98,361	102,112	628,027	68.1%	15.7%	16.3%
Business Jet	15,994	2,388	2,631	21,013	76.1%	11.4%	12.5%
GA Non-Jet Itinerant	7,662	3,109	1,210	11,981	64.0%	25.9%	10.1%
GA Non-Jet Local	—	—	—	—	0.0%	0.0%	0.0%
Military (Itinerant + Local)	104	124	2,260	2,488	4.2%	5.0%	90.8%
Total	451,314	103,982	108,213	663,509	68.0%	**15.7%**	16.3%

Table 62 summarizes baseline operations at LAX by type, time of day, and direction. Total daytime activity was evenly balanced between arrivals and departures. Arrivals made up 60% of evening activity, and departures accounted for almost 59% of nighttime operations. While departures accounted for the majority of night activity by air carriers, 53% of nighttime business jet operations were arrivals.

Table 62 2007 Baseline Operations at Los Angeles International Airport by Type of Activity, Time of Day, and Direction

	Day		Evening		Night	
Activity Type	**Arrivals**	**Departures**	**Arrivals**	**Departures**	**Arrivals**	**Departures**
Air Carrier/Commuter	49.7%	50.3%	60.6%	39.5%	41.1%	58.9%
Business Jet	47.6%	52.4%	62.9%	37.1%	52.9%	47.1%
GA Non-Jet Itinerant	51.4%	48.6%	51.0%	49.0%	38.3%	61.7%
GA Non-Jet Local	—	—	—	—	—	—
Military (Itinerant + Local)	0.0%	100.0%	100.0%	0.0%	49.6%	50.4%
Total	**49.7%**	**50.3%**	**60.3%**	**39.7%**	**41.5%**	**58.5%**

Table 63 summarizes 2007 baseline operations at LAX by INM type. The aircraft fleet operating at LAX primarily consists of a diverse mix of large and small commercial transport aircraft. The commercial airline fleet at LAX includes narrowbody jets, such as the Boeing 737-300 (737300) and the Airbus A320 (A32023); widebody jets, such as the Boeing 747-400 (747400) and Boeing 767-300 (767300); and small turboprop aircraft, such as the Embraer Brasilia (EMB120) and Saab 340 (SF340). The business jet fleet at LAX is also diverse and includes long-range widebody corporate jets, such as the Canadair Challenger 601 (CL600) and Gulfstream IV (GIV); medium-size corporate jets, such as the Falcon 20 (FAL20); and light corporate jets, such as the LEAR35 and Cessna Citation 500 (CNA500).

Table 63. 2007 Baseline Operations at Los Angeles International Airport by INM Aircraft Type

INM Type	**Annual Operations**	**Percent of Total**
737300	78,903	12.0%
EMB120	78,334	11.5%
757PW	48,221	7.3%
CL601	44,116	6.5%
A32023	41,230	6.3%
A319	35,958	5.5%
SF340	34,939	5.1%
747400	31,822	4.8%
737400	26,259	4.0%
757RR	23,277	3.5%
737800	21,882	3.3%
767300	20,431	3.1%

INM Type	Annual Operations	Percent of Total
CL600	17,047	2.5%
MD83	15,951	2.4%
MD82	14,922	2.3%
737700	14,811	2.3%
767CF6	10,436	1.6%
DHC8	9,122	1.3%
777200	8,436	1.3%
757300	6,914	1.1%
737500	6,897	1.1%
A32123	5,811	0.9%
767400	5,112	0.8%
A340	4,874	0.7%
DC1010	4,665	0.7%
LEAR35	4,188	0.6%
MU3001	4,077	0.6%
74720B	3,227	0.5%
MD11GE	2,675	0.4%
A7D	2,488	0.4%
GIV	2,456	0.4%
7373B2	2,205	0.3%
737N9	2,112	0.3%
A30062	2,078	0.3%
MD9028	2,003	0.3%
727EM2	1,855	0.3%
CNA750	1,834	0.3%
A300	1,617	0.2%
MD11PW	1,438	0.2%
DC870	1,339	0.2%
GV	1,306	0.2%
DC1030	1,248	0.2%
IA1125	1,224	0.2%
EMB14L	1,163	0.2%
747200	1,075	0.2%
MD81	1,061	0.2%
777300	1,022	0.2%

INM Type	Annual Operations	Percent of Total
CNA441	977	0.1%
A310	814	0.1%
FAL900	765	0.1%
737N17	695	0.1%
GIIB	694	0.1%
GASEPV	640	0.1%
74710Q	616	0.1%
A330	559	0.1%
CNA500	557	0.1%
FAL50	504	0.1%
DHC6	455	0.1%
GII	372	0.1%
CIT3	368	0.1%
BEC58P	293	0.0%
DC8QN	232	0.0%
CNA206	185	0.0%
SD330	129	0.0%
CNA172	123	0.0%
LEAR25	95	0.0%
707QN	71	0.0%
GASEPF	54	0.0%
FAL20	49	0.0%
74720A	38	0.0%
767JT9	36	0.0%
DC1040	34	0.0%
727EM1	28	0.0%
L1011	28	0.0%
DC93LW	13	0.0%
747SP	11	0.0%
DC95HW	10	0.0%
CNA55B	4	0.0%
DC3	2	0.0%
CNA20T	1	0.0%
SABR80	1	0.0%
Total	663,509	**100.0%**

As shown in Table 64, 94% of the business jets that operated at LAX in 2007 were Stage 3 aircraft. Only 1,200 of the business jet operations were by Stage 2 aircraft.

Table 64. 2007 Baseline Business Jet Operations at Los Angeles International Airport by Noise Stage

Noise Stage	Annual Operations	Percent of Total
Stage 2	1,211	5.8%
Stage 3	19,802	94.2%
Total	**21,013**	**100.0%**

William J. Fox Field

William J. Fox Field handled 66,000 aircraft operations in the 2007. Civilian GA non-jet aircraft accounted for almost all of the activity (see Table 65). Local operations, including training maneuvers, represented almost half of all aircraft operations. Business jets accounted for only 508 annual operations, or slightly less than 1% of total activity.

Table 65.2007 Baseline Operations at Fox Field by Type of Activity

Activity Type	Annual	Average Daily	Percent of Total
Air Carrier/Commuter	—	—	0%
Business Jet	508	1.4	1%
GA Non-Jet Itinerant	31,738	87.0	48%
GA Non-Jet Local	32,291	88.5	49%
Military (Itinerant + Local)	1,513	4.1	2%
Total	**66,049**	**181.0**	**100%**

Table 66 summarizes baseline operations by type and time of day. Because activity is dominated by GA non-jet aircraft with a high percentage of local operations, 85% of aircraft operations occurred during the daytime. An estimated 14% of total operations occurred during the evening hours, and only 1% occurred during the more noise-sensitive night period.

Table 66. 2007 Baseline Operations at Fox Field by Type of Activity and Time of Day

Activity Type	Operations by Time of Day				Percent of Total 24 Hours		
	Day	Evening	Night	Total	Day	Evening	Night
Air Carrier/Commuter	—	—	—	—	—	—	—
Business Jet	470	18	19	508	92.6%	3.6%	3.8%
GA Non-Jet Itinerant	26,984	4,449	304	31,738	85.0%	14.0%	1.0%
GA Non-Jet Local	27,454	4,515	322	32,291	85.0%	14.0%	1.0%
Military (Itinerant + Local)	1,286	212	15	1,513	85.0%	14.0%	1.0%
Total	**56,195**	**9,195**	**660**	**66,049**	**85.1%**	**13.9%**	**1.0%**

Total activity across all three time periods is well balanced, with a 50/50 mix of arrivals and departures (see Table 67). However, arrivals accounted for 60% of nighttime business jet operations.

Table 67. 2007 Baseline Operations at Fox Field by Type of Activity, Time of Day, and Direction

Activity Type	Day		Evening		Night	
	Arrivals	Departures	Arrivals	Departures	Arrivals	Departures
Air Carrier/Commuter	—	—	—	—	—	—
Business Jet	49.6%	50.4%	48.9%	51.1%	60.3%	39.7%
GA Non-Jet Itinerant	50.0%	50.0%	50.1%	49.9%	49.8%	50.2%
GA Non-Jet Local	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%
Military (Itinerant + Local)	50.0%	50.0%	50.1%	49.9%	49.8%	50.2%
Total	**50.0%**	**50.0%**	**50.0%**	**50.0%**	**50.2%**	**49.8%**

The aircraft fleet at Fox Field, summarized by INM type in Table 68, is dominated by light, single-engine piston aircraft. The generic types for GASEPF and GASEPV accounted for more than 70% of aircraft operations at Fox Field in the 2007 baseline fleet.

Table 68. 2007 Baseline Operations at Fox Field by INM Aircraft Type

INM Type	Annual Operations	Percent of Total
GASEPF	33,066	50.1%
GASEPV	13,694	20.7%
BEC58P	7,192	10.9%
CNA441	4,652	7.0%
DC3	2,280	3.5%
BO105	2,117	3.2%
DC6	1,528	2.3%
C130	1,012	1.5%
LEAR35	156	0.2%
CNA500	93	0.1%
MU3001	70	0.1%
IA1125	51	0.1%
GIV	33	0.0%
GV	31	0.0%
CL600	24	0.0%
CIT3	15	0.0%
LEAR25	10	0.0%
CNA750	8	0.0%
GIIB	8	0.0%
GII	5	0.0%
FAL50	4	0.0%
CNA55B	1	0.0%
Total	**66,049**	**100.0%**

As shown in Table 69, only 4% of business jet operations were performed by Stage 2 aircraft.

Table 69. 2007 Baseline Business Jet Operations at Fox Field by Noise Stage

Noise Stage	Annual Operations	Percent of Total
Stage 2	22	4.4%
Stage 3	485	95.6%
Total	**508**	**100.0%**

8.3 Forecast (2014/2016) Activity

This section describes forecast aircraft operations for each of the diversion airports under Alternative 1 but excludes any diverted operations that may result from implementation of the project. Forecast operations are presented for 2014 and 2016, and in some cases forecast activity is compared to the 2007 baseline activity.

Bob Hope Airport

Table 70 summarizes baseline and forecast aircraft operations at Bob Hope Airport by type of activity. In 2014, aircraft operations at Bob Hope Airport are forecast at 148,000, a 23% increase over the 2007 baseline level of activity. Business jets are forecast to be the fastest growing segment of activity and will account for 33,000 operations, or 22% of total operations, in 2014 compared to 16% in 2007. Aircraft operations are forecast to reach 156,000 in 2016, with the business jet operations growing to 37,000, or 24% of the total.

Table 70. Baseline and Forecast Operations at Bob Hope Airport by Type of Activity

Activity Type	2007 Baseline	Percent of Total	2014 Forecast	Percent of Total	2016 Forecast	Percent of Total
Air Carrier/Commuter	70,448	58.3%	79,086	53.4%	81,741	52.3%
Business Jet	18,863	15.6%	32,744	22.1%	37,439	24.0%
GA Non-Jet Itinerant	26,174	21.7%	30,626	20.7%	31,446	20.1%
GA Non-Jet Local	5,060	4.2%	5,332	3.6%	5,413	3.5%
Military (Itinerant + Local)	265	0.2%	265	0.2%	265	0.2%
Total	**120,810**	**100.0%**	**148,053**	**100.0%**	**156,303**	**100.0%**

The number of operations occurring during the noise-sensitive evening and night hours is forecast to increase from approximately 31,000 in 2007 to 37, 000 in 2014 and 39,000 in 2016. As shown in Table 71, the percentage of total operations occurring during the night period increases over the forecast period from 8.9% to

9.3% because of growth in business jet operations and their increased share of total forecast activity.

Table 71. Baseline and Forecast Operations at Bob Hope Airport by Time of Day

	Operations by Time of Day				Percent of Total 24 Hours		
Year	**Day**	**Evening**	**Night**	**Total**	**Day**	**Evening**	**Night**
2007 Baseline	90,149	19,884	10,777	120,810	74.6%	16.5%	8.9%
2014 Forecast	110,742	23,530	13,781	148,053	74.8%	15.9%	9.3%
2016 Forecast	117,070	24,634	14,600	156,303	74.9%	15.8%	9.3%

Table 72 summarizes forecast aircraft operations at Bob Hope Airport by INM aircraft type.

Table 72. Forecast Operations at Bob Hope Airport by INM Aircraft Type

INM Type	2014 Operations	Percent of Total	2016 Operations	Percent of Total
737300	24,312	16.4%	25,039	16.0%
737700	23,953	16.2%	24,669	15.8%
LEAR35	8,922	6.0%	10,317	6.6%
CL601	8,814	6.0%	9,260	5.9%
DHC6	8,026	5.4%	8,241	5.3%
GV	7,475	5.0%	7,933	5.1%
MU3001	6,111	4.1%	7,044	4.5%
GASEPV	5,382	3.6%	5,513	3.5%
MD81	5,208	3.5%	5,363	3.4%
A320-211	4,358	2.9%	4,488	2.9%
CNA441	4,230	2.9%	4,343	2.8%
IA1125	3,449	2.3%	4,015	2.6%
BEC58P	3,942	2.7%	4,014	2.6%
CNA172	3,895	2.6%	3,999	2.6%
SD330	3,617	2.4%	3,714	2.4%
GIV	3,290	2.2%	3,575	2.3%
GASEPF	3,083	2.1%	3,146	2.0%
CNA206	2,860	1.9%	2,936	1.9%
CNA750	2,352	1.6%	2,739	1.8%
CL600	2,426	1.6%	2,718	1.7%

INM Type	2014 Operations	Percent of Total	2016 Operations	Percent of Total
737500	2,240	1.5%	2,307	1.5%
CNA500	1,607	1.1%	1,846	1.2%
A319-131	1,758	1.2%	1,811	1.2%
A310-304	1,230	0.8%	1,267	0.8%
737800	992	0.7%	1,022	0.7%
1900D	973	0.7%	999	0.6%
CNA55B	486	0.3%	742	0.5%
FAL900	631	0.4%	686	0.4%
FAL50	571	0.4%	664	0.4%
A300-622R	438	0.3%	452	0.3%
CIT3	317	0.2%	369	0.2%
737400	263	0.2%	270	0.2%
GIIB	262	0.2%	234	0.1%
757PW	148	0.1%	153	0.1%
757RR	147	0.1%	151	0.1%
PA28	122	0.1%	126	0.1%
GII	64	0.0%	48	0.0%
FAL20	24	0.0%	20	0.0%
LEAR25	35	0.0%	30	0.0%
PA30	18	0.0%	19	0.0%
C130	11	0.0%	11	0.0%
F16A	5	0.0%	5	0.0%
F-18	4	0.0%	4	0.0%
Total	**148,053**	**100.0%**	**156,303**	**100.0%**

Business jet operations in Stage 2 aircraft are projected to decline by more than 50% over the forecast period as older aircraft are retired. Between the 2007 baseline and 2016, business jet operations in Stage 3 aircraft are expected to more than double, from 18,000 to 37,000. By 2016, Stage 2 business jets are projected to account for less than 1% of total business jet operations at Bob Hope Airport (see Table 73).

Table 73. Baseline and Forecast Business Jet Operations at Bob Hope Airport by Noise Stage

Noise Stage	2007 Baseline	Percent of Total	2014 Operations	Percent of Total	2016 Operations	Percent of Total
Stage 2	757	4.0%	371	1.1%	318	0.8%
Stage 3	18,106	96.0%	32,373	98.9%	37,121	99.2%
Total	**18,863**	**100.0%**	**32,744**	**100.0%**	**37,439**	**100.0%**

Camarillo Airport

Baseline and forecast aircraft operations at Camarillo Airport are summarized by type of activity in Table 74. Total aircraft operations are projected to increase by 17%, from 145,000 in 2007 to 169,000 in 2016. Business jet operations are forecast to be the fastest growing, more than doubling over the forecast period. However, non-jet general aviation will continue to be the dominant type of activity at Camarillo, accounting for 93% of 2016 operations.

Table 74. Baseline and Forecast Operations at Camarillo Airport by Type of Activity

Activity Type	2007 Baseline	Percent of Total	2014 Forecast	Percent of Total	2016 Forecast	Percent of Total
Air Carrier/Commuter	—	0.0%	—	0.0%	—	0.0%
Business Jet	4,883	3.4%	8,764	5.3%	10,395	6.1%
GA Non-Jet Itinerant	74,601	51.4%	90,386	54.6%	92,157	54.5%
GA Non-Jet Local	63,860	44.0%	64,781	39.1%	64,781	38.3%
Military (Itinerant + Local)	1,740	1.2%	1,740	1.1%	1,740	1.0%
Total	**145,083**	**100.0%**	**165,671**	**100.0%**	**169,073**	**100.0%**

Because business jet operations are forecast to account for only 6.1% of activity by 2016, the time-of-day profile for the airport changes very little over the forecast period. As shown in Table 75, 8% to 9% of Camarillo operations are forecast to occur during the evening and night periods, compared to 8.4% in the 2007 baseline.

Table 75. Baseline and Forecast Operations at Camarillo Airport by Time of Day

	Operations by Time of Day				Percent of Total 24 Hours		
Year	**Day**	**Evening**	**Night**	**Total**	**Day**	**Evening**	**Night**
2007 Baseline	132,933	8,663	3,487	145,083	91.6%	6.0%	2.4%
2014 Forecast	151,499	9,983	4,189	165,671	91.4%	6.0%	2.5%
2016 Forecast	154,488	10,230	4,355	169,073	91.4%	6.1%	2.6%

Forecast Camarillo operations by INM aircraft type are presented in Table 76.

Table 76. Forecast Operations at Camarillo Airport by INM Aircraft Type

INM Type	2014 Operations	Percent of Total	2016 Operations	Percent of Total
GASEPV	63,937	38.6%	64,572	38.2%
GASEPF	51,499	31.1%	52,047	30.8%
BEC58P	19,304	11.7%	19,607	11.6%
CNA172	9,624	5.8%	9,679	5.7%
CNA441	6,669	4.0%	6,799	4.0%
DHC6	2,483	1.5%	2,527	1.5%
CNA206	1,986	1.2%	2,017	1.2%
LEAR35	1,727	1.0%	2,032	1.2%
MU3001	1,626	1.0%	1,818	1.1%
CL600	1,299	0.8%	1,608	1.0%
GV	1,050	0.6%	1,316	0.8%
GIV	774	0.5%	970	0.6%
CNA500	707	0.4%	735	0.4%
DC3	623	0.4%	635	0.4%
CNA750	498	0.3%	594	0.4%
SD330	483	0.3%	493	0.3%
IA1125	368	0.2%	439	0.3%
FAL50	214	0.1%	256	0.2%
FAL900	174	0.1%	218	0.1%
DC6	155	0.1%	158	0.1%
CNA55B	130	0.1%	206	0.1%
CIT3	97	0.1%	115	0.1%

INM Type	2014 Operations	Percent of Total	2016 Operations	Percent of Total
GIIB	81	0.0%	72	0.0%
PA28	51	0.0%	52	0.0%
C130	46	0.0%	46	0.0%
LEAR25	46	0.0%	46	0.0%
LEAR25	11	0.0%	8	0.0%
GII	6	0.0%	4	0.0%
FAL20	2	0.0%	2	0.0%
SABR80	2	0.0%	2	0.0%
Total	**165,671**		**169,073**	**100.0%**

Table 77 summarizes baseline and forecast business jet activity at Camarillo by noise stage classification. As older Stage 2 business jets, such as the LEAR25 and Gulfstream II, are retired, the number of Stage 2 business jet operations at Camarillo is expected to decline over the forecast period. However, Stage 3 business jet operations are forecast to increase, from approximately 4,700 in 2007 to 10,300 in 2016. As a result, Stage 3 aircraft will account for 99% of total business jet operations at Camarillo in 2016, compared to 96% in the baseline year.

Table 77. Baseline and Forecast Business Jet Operations at Camarillo Airport by Noise Stage

Noise Stage	2007 Baseline	Percent of Total	2014 Operations	Percent of Total	2016 Operations	Percent of Total
Stage 2	191	3.9%	102	1.2%	88	0.8%
Stage 3	4,691	96.1%	8,662	98.8%	10,307	99.2%
Total	**4,883**	**100.0%**	**8,764**	**100.0%**	**10,395**	**100.0%**

Chino Airport

As shown in Table 78, total aircraft operations at Chino Airport are forecast to increase by 8.4%, from 167,000 in 2007 to 181,000 in 2016. Business jets are forecast to grow at a faster rate, increasing by 15%, but still remain a small portion of total airport activity.

Table 78. Baseline and Forecast Operations at Chino Airport by Type of Activity

Activity Type	2007 Baseline	Percent of Total	2014 Forecast	Percent of Total	2016 Forecast	Percent of Total
Air Carrier/Commuter	—	0.0%	—	0.0%	—	0.0%
Business Jet	2,037	1.2%	2,132	1.2%	2,349	1.3%
GA Non-Jet Itinerant	67,590	40.6%	74,983	41.9%	76,567	42.4%
GA Non-Jet Local	96,376	57.8%	101,121	56.5%	101,121	56.0%
Military (Itinerant + Local)	594	0.4%	594	0.3%	594	0.3%
Total	**166,596**	**100.0%**	**178,830**	**100.0%**	**180,631**	**100.0%**

The time-of-day operating profile for Chino Airport remains constant over the forecast period, with approximately 8% of aircraft operations occurring during the evening and night periods (see Table 79).

Table 79. Baseline and Forecast Operations at Chino Airport by Time of Day

	Operations by Time of Day				Percent of Total 24 Hours		
Year	**Day**	**Evening**	**Night**	**Total**	**Day**	**Evening**	**Night**
2007 Baseline	153,726	10,916	1,954	166,596	92.3%	6.6%	1.2%
2014 Forecast	164,992	11,694	2,144	178,830	92.3%	6.5%	1.2%
2016 Forecast	166,610	11,814	2,206	180,631	92.2%	6.5%	1.2%

Table 80 presents forecast operations at Chino by INM aircraft type.

Table 80. Forecast Operations at Chino Airport by INM Aircraft Type

INM Type	2014 Operations	Percent of Total	2016 Operations	Percent of Total
GASEPV	51,661	28.9%	52,056	28.8%
CNA172	42,073	23.5%	42,451	23.5%
CNA206	28,905	16.2%	29,164	16.1%
BEC58P	27,429	15.3%	27,700	15.3%
GASEPF	18,953	10.6%	19,125	10.6%
CNA441	3,717	2.1%	3,771	2.1%
PA28	1,675	0.9%	1,691	0.9%
DHC6	1,377	0.8%	1,402	0.8%
SD330	842	0.5%	858	0.5%

INM Type	2014 Operations	Percent of Total	2016 Operations	Percent of Total
LEAR35	755	0.4%	853	0.5%
MU3001	419	0.2%	468	0.3%
CNA500	371	0.2%	414	0.2%
CL600	257	0.1%	276	0.2%
IA1125	109	0.1%	125	0.1%
GIIB	53	0.0%	47	0.0%
CNA55B	30	0.0%	45	0.0%
GII	57	0.0%	42	0.0%
C130	36	0.0%	36	0.0%
F-18	29	0.0%	29	0.0%
FAL20	29	0.0%	24	0.0%
CNA750	17	0.0%	20	0.0%
FAL50	10	0.0%	11	0.0%
LEAR25	9	0.0%	7	0.0%
GIV	6	0.0%	6	0.0%
FAL900	4	0.0%	5	0.0%
CIT3	4	0.0%	4	0.0%
GV	3	0.0%	3	0.0%
Total	**178,830**	**100.0%**	**180,631**	**100.0%**

Stage 2 business jet operations at Chino are forecast to decline over the forecast period, from approximately one per day in 2007 to one every third day by 2016, as shown in Table 81. Stage 3 jets are forecast to account for all the growth in business jet operations at Chino. As a result, the Stage 2 share of business jet operations will decline, from 18.5% in 2007 to 5.1% in 2016.

Table 81. Baseline and Forecast Business Jet Operations at Chino Airport by Noise Stage

Noise Stage	2007 Baseline	Percent of Total	2014 Operations	Percent of Total	2016 Operations	Percent of Total
Stage 2	376	18.5%	148	6.9%	120	5.1%
Stage 3	1,661	81.5%	1,984	93.1%	2,229	94.9%
Total	**2,037**	**100.0%**	**2,132**	**100.0%**	**2,349**	**100.0%**

LAX

Table 82 summarizes baseline and forecast aircraft operations at LAX by activity type. Total aircraft operations are forecast to grow from 664,000 in 2007 to 739,379 in 2016. Business jets operations are forecast to reach 31,000 by 2016 and account for 4.2% of total airport activity.

Table 82. Baseline and Forecast Operations at Los Angeles International Airport by Type of Activity

Activity Type	2007 Baseline	Percent of Total	2014 Forecast	Percent of Total	2016 Forecast	Percent of Total
Air Carrier/Commuter	628,027	94.7%	674,332	93.9%	692,196	93.6%
Business Jet	21,013	3.2%	28,454	4.0%	31,131	4.2%
GA Non-Jet Itinerant	11,981	1.8%	13,035	1.8%	13,352	1.8%
GA Non-Jet Local	—	0.0%	—	0.0%	—	0.0%
Military (Itinerant + Local)	2,488	0.4%	2,700	0.4%	2,700	0.4%
Total	**663,509**	**100.0%**	718,520	**100.0%**	739,379	**100.0%**

Because commercial airline services are forecast to continue to be the dominant type of activity at LAX, the time-of-day profile for airport operations is unchanged over the forecast period. Approximately 32% of LAX aircraft operations occur during the evening and night periods in the baseline and forecast years, as summarized in Table 83.

Table 83. Baseline and Forecast Operations at Los Angeles International Airport by Time of Day

	Operations by Time of Day				Percent of Total 24 Hours		
Year	**Day**	**Evening**	**Night**	**Total**	**Day**	**Evening**	**Night**
2007 Baseline	451,314	103,982	108,213	663,509	68.0%	15.7%	16.3%
2014 Forecast	488,948	112,307	117,265	718,520	68.0%	15.6%	16.3%
2016 Forecast	503,245	115,474	120,660	739,379	68.1%	15.6%	16.3%

Forecast aircraft operations at LAX are summarized by INM aircraft type in Table 84.

Table 84. Forecast Operations at Los Angeles International Airport by INM Aircraft Type

INM Type	2014 Operations	Percent of Total	2016 Operations	Percent of Total
737300	85,454	11.9%	87,974	11.9%

INM Type	2014 Operations	Percent of Total	2016 Operations	Percent of Total
EMB120	82,195	11.4%	83,706	11.3%
757PW	52,225	7.3%	53,765	7.3%
CL601	46,291	6.4%	47,142	6.4%
A32023	44,653	6.2%	45,969	6.2%
A319	38,943	5.4%	40,091	5.4%
SF340	36,661	5.1%	37,335	5.0%
747400	34,464	4.8%	35,480	4.8%
737400	28,439	4.0%	29,277	4.0%
757RR	25,210	3.5%	25,953	3.5%
737800	23,699	3.3%	24,398	3.3%
767300	22,127	3.1%	22,779	3.1%
CL600	18,891	2.6%	19,563	2.6%
MD83	17,275	2.4%	17,785	2.4%
MD82	16,161	2.2%	16,637	2.3%
737700	16,041	2.2%	16,513	2.2%
767CF6	11,302	1.6%	11,636	1.6%
777200	9,924	1.4%	10,165	1.4%
DHC8	9,137	1.3%	9,406	1.3%
757300	7,488	1.0%	7,709	1.0%
737500	7,469	1.0%	7,690	1.0%
A32123	5,953	0.8%	6,564	0.9%
767400	6,294	0.9%	6,479	0.9%
A340	5,396	0.8%	5,832	0.8%
LEAR35	5,536	0.8%	5,700	0.8%
DC1010	5,278	0.7%	5,434	0.7%
MU3001	5,052	0.7%	5,201	0.7%
74720B	3,451	0.5%	3,788	0.5%
GIV	3,495	0.5%	3,598	0.5%
MD11GE	2,711	0.4%	3,020	0.4%
7373B2	2,897	0.4%	2,983	0.4%
CNA750	2,700	0.4%	2,700	0.4%
737N9	2,388	0.3%	2,459	0.3%
A30062	2,287	0.3%	2,355	0.3%

INM Type	2014 Operations	Percent of Total	2016 Operations	Percent of Total
MD9028	2,251	0.3%	2,317	0.3%
727EM2	2,169	0.3%	2,233	0.3%
A7D	2,009	0.3%	2,068	0.3%
A300	1,809	0.3%	2,015	0.3%
IA1125	1,835	0.3%	2,014	0.3%
GV	1,751	0.2%	1,803	0.2%
MD11PW	1,557	0.2%	1,603	0.2%
DC870	1,450	0.2%	1,493	0.2%
DC1030	1,352	0.2%	1,391	0.2%
EMB14L	1,220	0.2%	1,243	0.2%
747200	1,165	0.2%	1,199	0.2%
MD81	1,149	0.2%	1,182	0.2%
777300	1,076	0.1%	1,181	0.2%
FAL900	1,107	0.2%	1,140	0.2%
A310	1,063	0.1%	1,089	0.1%
CNA441	881	0.1%	907	0.1%
737N17	745	0.1%	830	0.1%
74710Q	751	0.1%	773	0.1%
FAL50	691	0.1%	732	0.1%
A330	696	0.1%	713	0.1%
CNA500	667	0.1%	686	0.1%
GASEPV	605	0.1%	623	0.1%
CIT3	544	0.1%	607	0.1%
DHC6	495	0.1%	507	0.1%
GIIB	441	0.1%	394	0.1%
BEC58P	319	0.0%	327	0.0%
DC8QN	251	0.0%	259	0.0%
CNA206	202	0.0%	207	0.0%
SD330	140	0.0%	143	0.0%
CNA172	134	0.0%	137	0.0%
707QN	77	0.0%	79	0.0%
GII	107	0.0%	78	0.0%
GASEPF	59	0.0%	60	0.0%

INM Type	2014 Operations	Percent of Total	2016 Operations	Percent of Total
74720A	41	0.0%	42	0.0%
767JT9	39	0.0%	40	0.0%
DC1040	37	0.0%	38	0.0%
727EM1	30	0.0%	31	0.0%
L1011	30	0.0%	31	0.0%
FAL20	23	0.0%	19	0.0%
DC93LW	24	0.0%	17	0.0%
LEAR25	14	0.0%	14	0.0%
747SP	11	0.0%	12	0.0%
DC95HW	11	0.0%	12	0.0%
DC3	3	0.0%	3	0.0%
CNA20T	1	0.0%	1	0.0%
SABR80	1	0.0%	1	0.0%
CNA55B	-	0.0%	-	0.0%
Total	**718,520**	**100.0%**	**739,379**	**100.0%**
Note: This table has been revised to reflect revised forecast numbers, but the changes are too numerous to show in strikeout. These changes do not affect the impact conclusions.				

As the fleet of Stage 2 business jets shrinks over the forecast period, the number of Stage 2 business jet operations at LAX is also expected to decline. By 2016, approximately 500 annual operations in Stage 2 business jets are expected at LAX compared to 1,200 in 2007. As a result, the Stage 2 aircraft share of business jet activity at LAX will fall from 5.8% in 2007 to less than 2% in 2016 (see Table 85).

Table 85. Baseline and Forecast Business Jet Operations at Los Angeles International Airport by Noise Stage

Noise Stage	2007 Baseline	Percent of Total	2014 Operations	Percent of Total	2016 Operations	Percent of Total
Stage 2	1,211	5.8%	596	2.1%	509	1.6%
Stage 3	19,802	94.2%	27,858	97.9%	30,622	98.4%
Total	**21,013**	**100.0%**	**28,454**	**100.0%**	**31,131**	**100.0%**

William J. Fox Field

Aircraft activity at Fox Field is forecast to increase by 6% over the forecast period, reaching 70,000 annual operations in 2016 (see Table 86). Business jet operations are forecast to increase at a faster rate but remain less than 1% of total activity in the outer forecast year.

Table 86. Baseline and Forecast Operations at Fox Field by Type of Activity

Activity Type	2007 Baseline	Percent of Total	2014 Forecast	Percent of Total	2016 Forecast	Percent of Total
Air Carrier/Commuter	—	0.0%	—	0.0%	—	0.0%
Business Jet	508	0.8%	583	0.8%	606	0.9%
GA Non-Jet Itinerant	31,738	48.1%	35,048	50.4%	35,304	50.3%
GA Non-Jet Local	32,291	48.9%	32,394	46.6%	32,716	46.6%
Military (Itinerant + Local)	1,513	2.3%	1,513	2.2%	1,513	2.2%
Total	**66,049**	**100.0%**	**69,537**	**100.0%**	**70,139**	**100.0%**

The percentage of Fox Field operations occurring during the evening and night hours remains unchanged over the forecast period, as shown in Table 87.

Table 87. Baseline and Forecast Operations at Fox Field by Time of Day

	Operations by Time of Day				Percent of Total 24 Hours		
Year	**Day**	**Evening**	**Night**	**Total**	**Day**	**Evening**	**Night**
2007 Baseline	56,195	9,195	660	66,049	85.1%	13.9%	1.0%
2014 Forecast	59,154	9,677	706	69,537	85.1%	13.9%	1.0%
2016 Forecast	59,668	9,759	712	70,139	85.1%	13.9%	1.0%

Table 88 presents forecast aircraft operations at Fox Field by INM aircraft type.

Table 88. Forecast Operations at Fox Field by INM Aircraft Type

INM Type	2014 Operations	Percent of Total	2016 Operations	Percent of Total
GASEPF	33,461	48.1%	33,783	48.2%
GASEPV	13,131	18.9%	13,232	18.9%
BEC58P	9,962	14.3%	10,032	14.3%
CNA441	5,751	8.3%	5,791	8.3%

BO105	2,105	3.0%	2,120	3.0%
C130	2,019	2.9%	2,033	2.9%
DC3	1,512	2.2%	1,522	2.2%
DC6	1,013	1.5%	1,020	1.5%
LEAR35	181	0.3%	187	0.3%
CNA500	102	0.1%	104	0.1%
MU3001	78	0.1%	80	0.1%
IA1125	61	0.1%	64	0.1%
GIV	42	0.1%	45	0.1%
GV	39	0.1%	42	0.1%
CL600	30	0.0%	32	0.0%
CIT3	18	0.0%	18	0.0%
CNA55B	9	0.0%	12	0.0%
CNA750	10	0.0%	10	0.0%
FAL50	5	0.0%	5	0.0%
GIIB	5	0.0%	4	0.0%
LEAR25	2	0.0%	2	0.0%
GII	1	0.0%	1	0.0%
Total	**69,537**	**100.0%**	**70,139**	**100.0%**

The retirement of older Stage 2 business jets is projected to result in fewer Stage 2 jet operations at Fox Field. By 2016, Stage 2 aircraft will account for only 1% of total business jet operations, compared to 4% in the 2007 base year (see Table 89).

Table 89. Baseline and Forecast Business Jet Operations at Fox Field by Noise Stage

Noise Stage	2007 Baseline	Percent of Total	2014 Operations	Percent of Total	2016 Operations	Percent of Total
Stage 2	22	4.4%	8	1.4%	7	1.2%
Stage 3	485	95.6%	575	98.6%	599	98.8%
Total	**508**	**100.0%**	**583**	**100.0%**	**606**	**100.0%**

9.0 Project Analysis of CNEL Exposure at VNY

The VNY noise analysis includes the following elements:

- Section 9.1: AEM-based estimates of percentage change in area within 65 dB CNEL[17] and decibel change in CNEL;[18]
- Section 9.2: Preparation of full CNEL contours using the INM;
- Section 9.3: Estimates of residential population, dwelling units, and sensitive receptors within 65 dB CNEL;
- Section 9.4: Supplemental grid point threshold-of-significance analysis; and
- Section 9.5: Discussion of exemptions for historic aircraft and maintenance activity.

As discussed in Section 4, CEQA guidelines permit the use of the AEM as a screening tool to determine if a project will result in a 1.5 dB increase in CNEL, which would trigger the more detailed INM-based analyses involved in the second through fourth steps listed above. As discussed in Section 9.1, AEM analyses found that the proposed project and Alternative 2 (Exempted Stage 3 and 4 Aircraft) would reduce exposure compared to the No-Project (Alternative 1) conditions. For CEQA purposes, the noise analysis could have been considered complete with these AEM results. However, the additional contour, population, and supplemental grid-point analyses were undertaken to illustrate the benefits of the proposed project.

The Section 9.5 discussion addresses the effect of two elements of the proposed project (i.e., the exemption of (1) historic aircraft and (2) maintenance-related operations). Section 10 presents noise analyses for the diversion airports.

9.1 AEM Calculations

The VNY operations summarized in Section 5 for the 2007 and 2014 scenarios under consideration were entered into the AEM to compare the 2014 proposed project and both alternatives to the 2007 baseline, as required by CEQA. In addition, the 2014 proposed project and 2014 Exempted Stage 3 and 4 Aircraft Alternative (Alternative 2) were compared to the 2014 No-Project Alternative (Alternative 1) to illustrate the estimated benefit of these two actions.

2014 Project and Alternatives Compared to 2007 Baseline

Table 90 presents the AEM analysis results for the 2014 proposed project and alternatives compared to the 2007 baseline. As the table shows, the proposed project

[17] The AEM spreadsheet is designed to calculate the percent change in the area within the 65 dB Day-Night Average Sound Level (DNL) contour. As discussed in Appendix B.1.8, DNL applies a 10-fold weighting "penalty" to night (10 p.m.–7 a.m.) operations. As discussed in Appendix B.1.9, CNEL adds a three-fold weighting penalty to evening (7 p.m.–10 p.m.) operations. Evening operations were adjusted by this factor to reflect this penalty and to properly calculate CNEL rather than simply using DNL as a surrogate for CNEL.

[18] The calculated change in area was translated into a decibel change using the AEM assumption that a 17% change in area is equivalent to a 1-decibel change in noise exposure.

and Alternative 2, Exempted Stage 3 and 4 Aircraft, would both reduce the area within the 65 dB CNEL compared to the No-Project Alternative (Alternative 1). In all cases, the changes are well below the 1.5 dB threshold of significance.

Table 90. AEM Analyses: 2014 Project and Alternatives vs. 2007 Baseline

Scenario	AEM-Estimated Changes Compared to 2007 Baseline	
	Area within 65 dB CNEL	**Change in CNEL**
2014 Proposed Project	6.6%	0.4 dB
2014 Alternative 1, No Project	13.3%	0.8 dB
2014 Alternative 2, Exempted Stage 3 and 4 Aircraft	6.8%	0.4 dB
Source: HMMH 2008		

2014 Project and Alternative 2 (the Exempted Stage 3 and 4 Aircraft Alternative) Compared to Alternative 1 (the No-Project Alternative)

To further illustrate the benefits of the phaseout variations, Table 91 presents the AEM analysis results for the 2014 proposed project and the Exempted Stage 3 and 4 Aircraft Alternative (Alternative 2) compared to the 2014 No-Project Alternative (Alternative 1). As the table shows, the two phaseout variations would reduce the area within the 65 dB CNEL by approximately 6 percent and slightly reduce CNEL.

Table 91. AEM Analyses: 2014 Project and Alternative 2, Exempted Stage 3 and 4 Aircraft, vs. 2014 Alternative 1, No Project

Scenario	AEM-Estimated Changes Compared to 2014 Alternative 1, No Project	
	Area within 65 dB CNEL	**Change in CNEL**
2014 Proposed Project	-6.0%	-0.4 dB
2014 Alternative 2, Exempted Stage 3 and 4 Aircraft	-5.8%	-0.4 dB
Source: HMMH 2008.		

9.2 CNEL Contour Analyses

While the preceding AEM screening does not trigger a requirement for more detailed analysis, CNEL contours were prepared to further demonstrate the benefit of the phaseout variations under consideration.[19] Figures 3 through 6 present the following CNEL comparisons:

- Figure 3: 2014 Project Compared to 2007 Baseline;
- Figure 4: 2014 Project Compared to Alternative 1, No-Project Alternative;
- Figure 5: 2014 Alternative 1, No-Project Alternative, Compared to 2007 Baseline; and
- Figure 6: 2014 Project Compared to Alternative 2, Exempted Stage 3 and 4 Aircraft.

These figures show graphically the following results, consistent with the AEM analysis:

- While the proposed project noise exposure in 2014 is greater than the 2007 baseline noise exposure (Figure 3), the increase is the result of projected growth in airport activity that would occur *independent of the project*, since the 2014 proposed project CNEL contours are smaller than the 2014 No-Project contours (Figure 4);
- The growth in noise exposure from 2007 to 2014 without the project (Figure 5) is noticeably greater than the growth from 2007 to 2014 with the proposed project (Figure 3) (i.e., *the proposed project mitigates the projected growth in exposure);* and
- The proposed project noise exposure is essentially identical to Alternative 2, Exempted Stage 3 and 4 Aircraft (Figure 5); the exemption permits such a small number of aircraft to continue operating that the benefit of the restriction is not noticeably affected.

The population impact analysis (following the figures) quantifies these comparisons.

9.3 Population, Dwelling Unit, and Sensitive-Receptor Impact Analyses

To further quantify the benefits of the proposed project, land use analyses were undertaken to estimate the residential dwelling units, residential population, and other potentially sensitive land uses within the contours presented in the preceding figures.

The land use data within the base maps used in the contour figures were updated through field surveys on a parcel-by-parcel basis within an area that completely encompassed the outermost contours. Dwelling unit and population counts were developed from 2000 census block-level data and applied to the field-verified land uses.

[19] In addition, the INM incorporates extensive refinements undertaken to model significant noise abatement departure procedures flown at VNY, for which FAA approved "user-defined profile" adjustments to the INM based on extensive engineering analysis summarized in Appendix B.4, Section B.4.8.2.

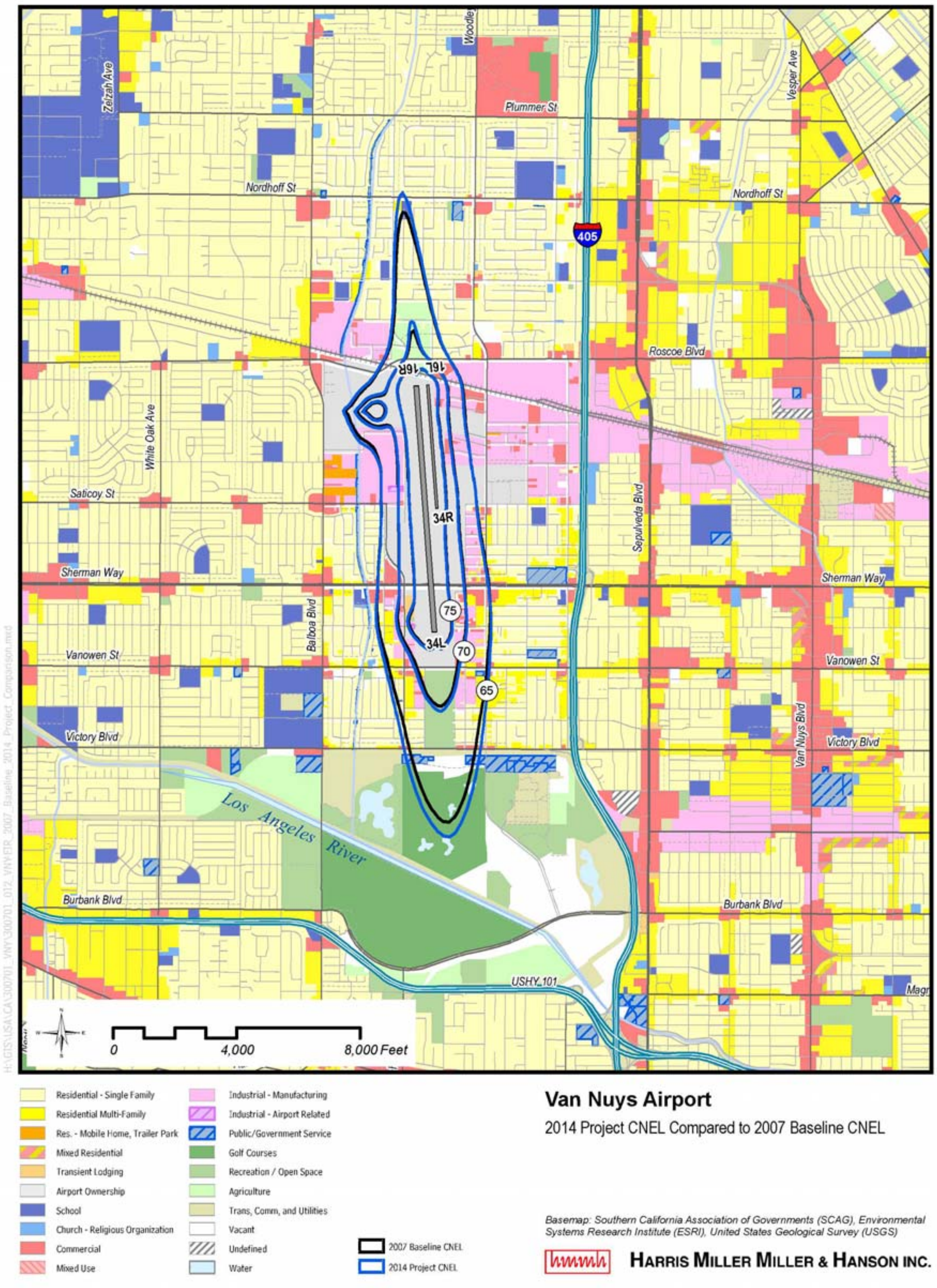


Figure 3

2014 Proposed Project CNEL

Compared to 2007 Baseline CNEL

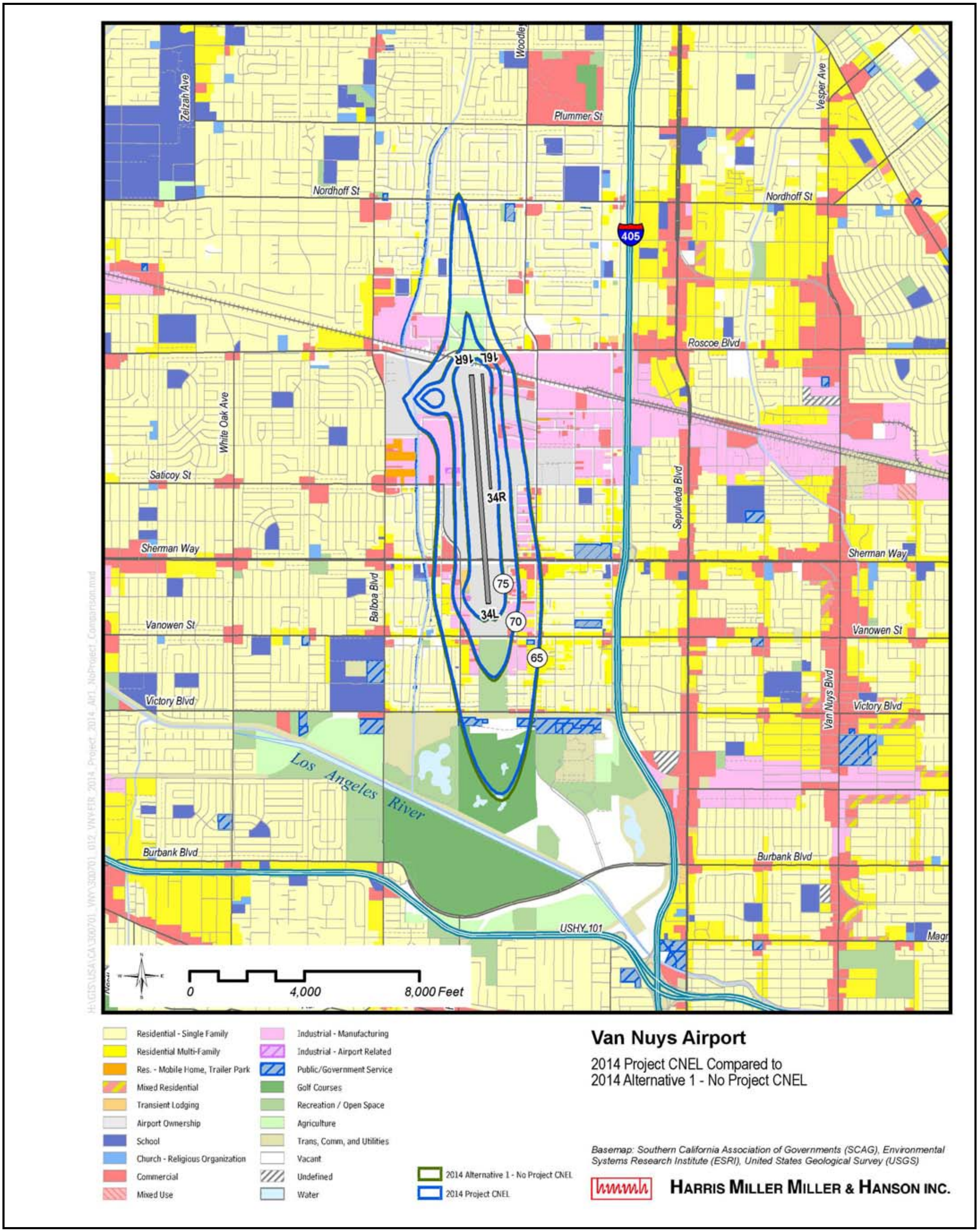


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Figure 4

2014 Proposed Project CNEL

Compared to 2014 No-Project (Alt. 1)

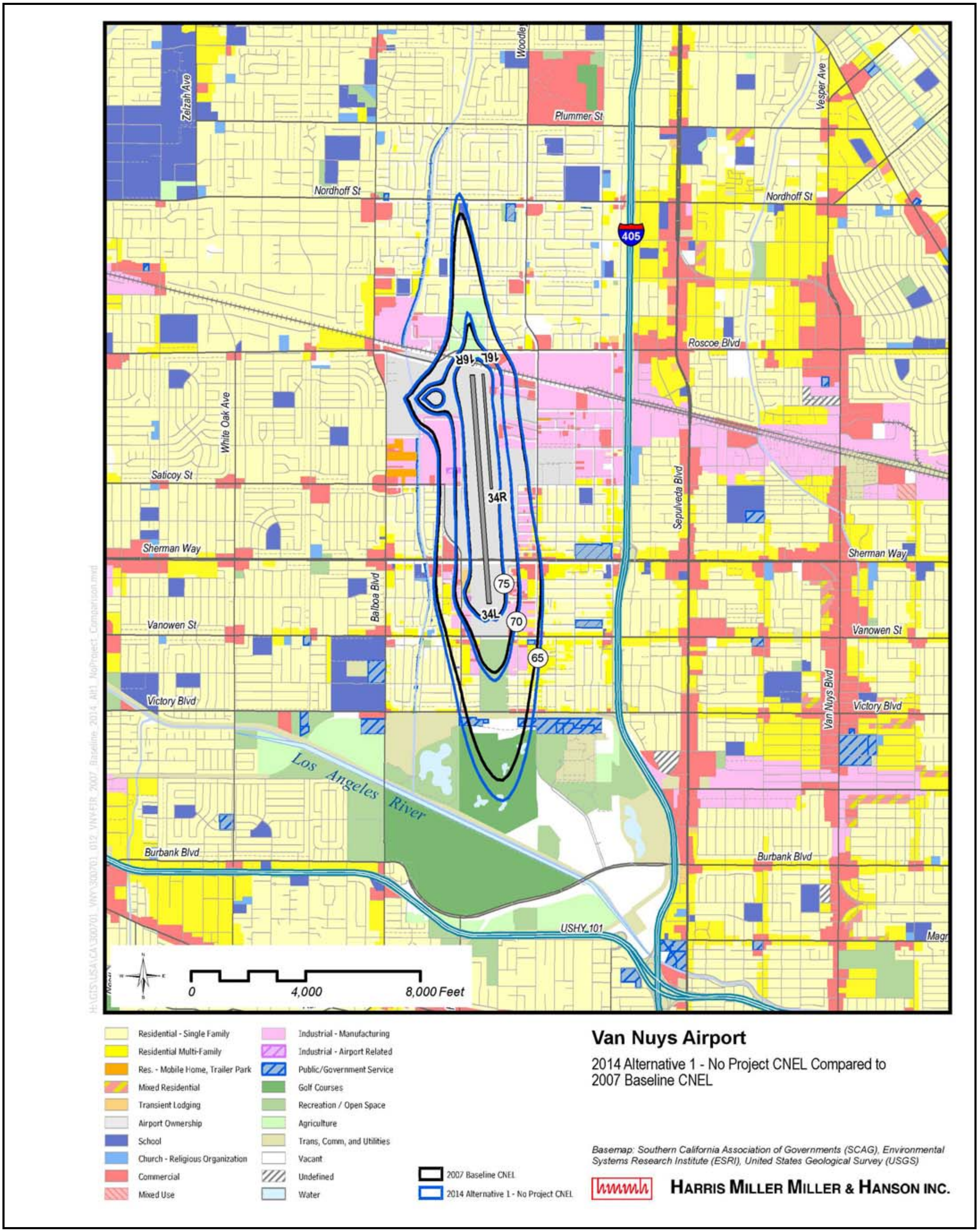

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Figure 5

2014 No-Project (Alt. 1) CNEL

Compared to 2007 Baseline CNEL

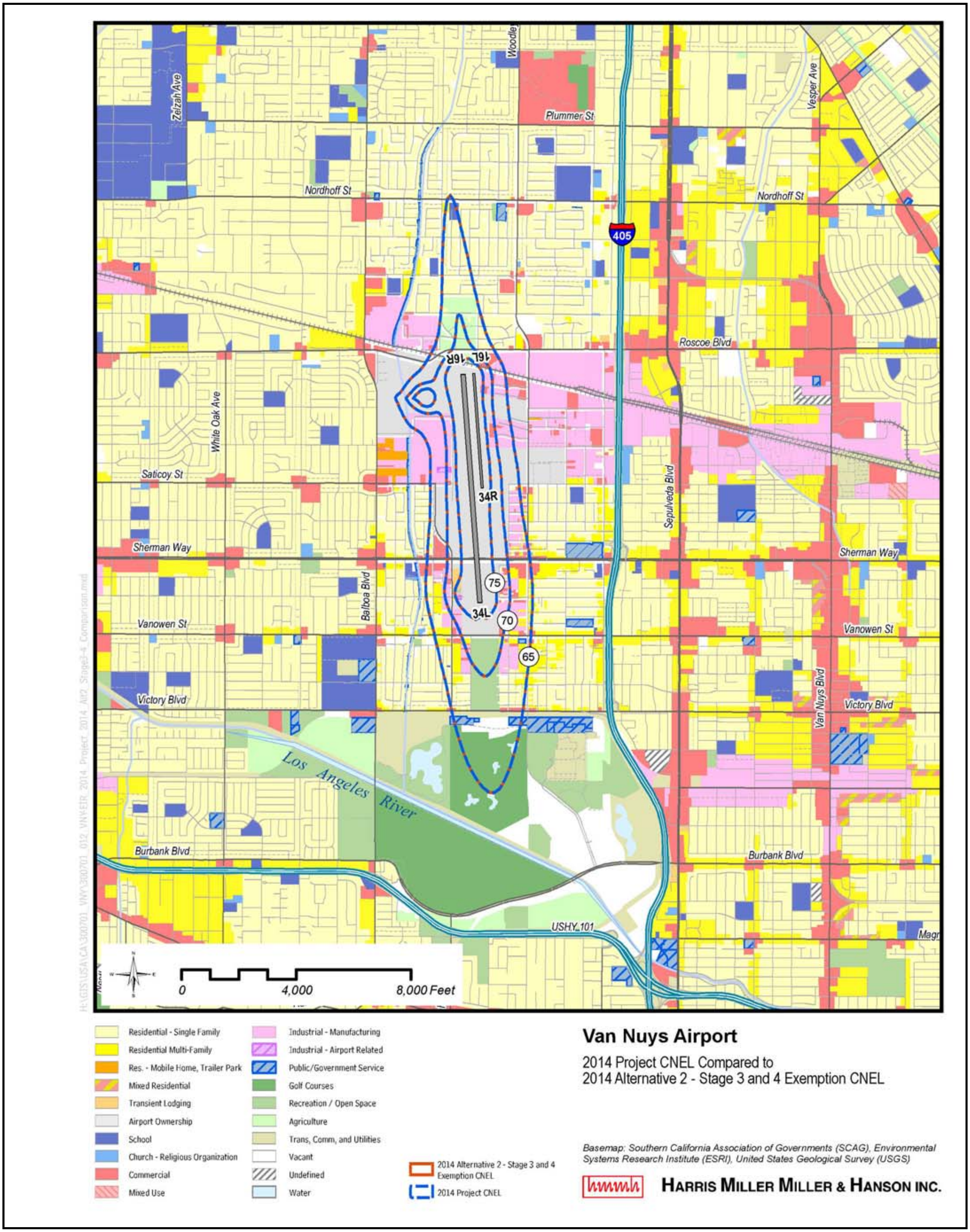

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Figure 6

2014 Project CNEL Compared to Alt. 2, Exempted Stage 3 and 4 Aircraft CNEL

The top half of Table 92 presents the total estimated residential dwelling units and population within the 65–70 and 70–75 dB CNEL contour bands (the only two bands encompassing any residential use).

As discussed in Appendix B.5, Section B.5.3.1, LAWA is committed to sound insulating all residential dwelling units within the 65 dB CNEL contour (where the owner accepts the offer of treatment). The bottom half of the table presents the estimated dwelling units and population that are outside the area within which LAWA expects to have completed sound insulation treatment by the end of 2009.

Table 92. Estimated Dwelling Units and Residents within 2007 and 2014 CNEL Contours (with and without sound insulation)

		Analysis Year, Case, and CNEL Contour Interval											
		2007			**2014**								
		Baseline			**Project**			**Alt. 1, No Project**			**Alt. 2, St. 3/4 Ex.**		
Basis for Counts	**Type of Count***	**65–70 CNEL**	**70–75 CNEL**	**Total**	**65–70 CNEL**	**70–75 CNEL**	**Total**	**65–70 CNEL**	**70–75 CNEL**	**Total**	**65–70 CNEL**	**70–75 CNEL**	**Total**
All dwelling units, regardless of sound insulation	S.F. D.U.	411	8	419	626	9	635	688	9	697	627	9	636
	S.F. Pop.	1,320	39	1,359	1,957	42	1,999	2,138	42	2,180	1,960	42	2,002
	M.F. D.U.	1,600	27	1,627	1,922	110	2,032	1,958	170	2,128	1,922	110	2,032
	M.F. Pop.	5,451	104	5,555	6,421	438	6,859	6,496	663	7,159	6,421	438	6,859
	Total D.U.	~~2,100~~ 2,011	35	~~2,135~~ 2,046	2,548	119	2,667	2,646	179	2,825	2,549	119	2,668
	Total Pop.	6,771	143	6,914	8,378	480	8,858	8,634	705	9,339	8,381	480	8,861
Dwellings anticipated to require sound insulation**	S.F. D.U.	400	0	400	615	1	616	677	1	678	616	1	617
	S.F. Pop.	1,286	0	1,286	1,927	4	1,931	2,104	4	2,108	1,926	4	1,930
	M.F. D.U.	1,379	0	1,379	1,784	0	1,784	1,820	60	1,880	1,784	0	1,784
	M.F. Pop.	4,659	0	4,659	5,963	0	5,963	6,038	225	6,263	5,963	0	5,963
	Total D.U.	1,779	0	1,779	2,399	1	2,400	2,497	61	2,558	2,400	1	2,401
	Total Pop.	5,945	0	5,945	7,890	4	7,894	8,142	229	8,371	7,889	4	7,893

*S.F. = single family, M.F. = multifamily, D.U. = dwelling units. ** Includes those units lacking insulation under 2007 conditions or anticipated to lack insulation under forecast 2014 conditions, respectively. See full discussion and figure in Appendix B.5.3.1.

Source: HMMH 2008.

As the table shows, the proposed project reduces the number of dwelling units that would require sound insulation in 2014, from 2,558 (Alternative 1, No Project) to 2,400. Alternative 2, Exempted Stage 3 and 4 Aircraft, adds one dwelling unit requiring sound insulation compared to the proposed project.

As discussed in Section 2, CEQA analyses must consider all potentially sensitive land uses within 65 dB CNEL. Section 2.1 discusses the land use compatibility criteria that apply to LAWA airports and that are consistent with City of Los Angeles, state, and federal guidelines and all applicable CEQA requirements. Following those criteria, there is only one parcel containing potentially noise-sensitive nonresidential land uses within any of the noise contours presented in the preceding figures. That parcel is occupied by the Los Angeles Baptist City Mission, at 16514 Nordhoff Street (North Hills). The property includes a house of worship and school. It is identified in Figure 7 and discussed further in the following section.

9.4 Supplemental Threshold of Significance Analysis

To further illustrate the AEM-based conclusion that the proposed project does not result in a significant increase in exposure, a “supplemental” noise analysis was undertaken that involved calculating CNEL values for the baseline conditions, project, and alternatives at 1,255 specific locations in the vicinity of the airport. These locations are depicted in Figure 7. One of the locations is the Los Angeles Baptist City Mission, at 16514 Nordhoff Street. The CNEL calculation for the mission was prepared for the center of the shaded parcel. The remaining 1,254 locations are on the rectangular grid centered on VNY. The CNEL grid calculations were prepared for points centered in each labeled square. The points are spaced 500 feet apart on both north-south and east-west axes.

Table 93 presents the detailed supplemental noise analysis results for the mission. As the table shows, CNEL in 2014 with the proposed project would be only 1.1 dB above the 2007 baseline and would be 0.1 dB less than in 2014 No-Project conditions (i.e., the proposed project would reduce noise exposure in 2014).

Table 93. Supplemental Noise Analysis Results for the Los Angeles Baptist City Mission, at 16514 Nordhoff Street

				CNEL Difference 2014 Project CNEL Minus:		
2007 Baseline CNEL	**2014 Project CNEL**	**2014 Alt. 1, No-Project CNEL**	**2014 Alt. 2, Exempted Stage 3 and 4 Aircraft CNEL**	**2007 Baseline CNEL**	**2014 Alt. 1, No-Project CNEL**	**2014 Alt. 2, Exempted Stage 3 and 4 Aircraft CNEL**
64.3 dB	65.4 dB	65.5 dB	65.4 dB	1.1 dB	-0.1 dB	0.0 dB
Source: HMMH 2008.						

Appendix B.7 presents the same supplemental noise analysis results for the 1,254 grid points shown in Figure 7. The analysis reveals that there are no grid points at which the CNEL difference between the 2014 project and the 2007 baseline reaches the 1.5 dB threshold of significance; the greatest difference is 1.3 dB. Moreover, the proposed project either would result in the same or less noise exposure in 2014 compared to No-Project conditions.

9.5 Effect of Historic Aircraft and Maintenance-Related Operations

As discussed in Chapter 2, the proposed project includes exemptions for operations of historic aircraft and for operations related to maintenance services conducted at VNY. These exemptions would permit a small number of operations by aircraft that exceed the departure noise limits; the maximum forecast of exempted operations is 362 per year, slightly less than one per day, in 2014. To illustrate the negligible effect of these additional operations, Figure 8 presents a comparison of 2014 CNEL contours for the proposed project compared to separate contours that include each of the two categories of exempted operations. As the figure indicates, the effect of the small number of exempted operations is minimal.

10.0 2014/2016 Project Analysis at Diversion Airports

As discussed in Chapter 2, it is anticipated that the proposed project would divert some operations from VNY to BUR, CMA, CNO, LAX, and WJF.

Two types of noise analysis were conducted for these "diversion" airports: (1) an AEM screening to determine if the additional operations would result in an increase in noise exposure, in terms of CNEL, that reaches the CEQA threshold of significance and (2) a so-called "Berkeley Jets" analysis to consider potential effects of changes in the numbers of additional flights—in particular, additional flights that are likely to be noticeable from a noise perspective. The Berkeley Jets analysis is commonly referred to as a type of "single event" analysis, in that it focuses on noise exposure associated with *individual* aircraft operations, in contrast to (and to augment) the CNEL-based assessment of *cumulative* exposure. Section 10.1 presents the AEM analyses. Section 10.2 presents the Berkeley Jets analyses.

10.1 Area Equivalent Method CNEL Screening Analysis

As discussed in Section 4, CEQA guidelines permit the use of the AEM as a screening tool to determine whether more sophisticated analyses are warranted. For each of the diversion airports, the VNY operations summarized in Section 5 for the 2007 and 2014 scenarios under consideration were entered into the AEM to compare the 2014 proposed project and both alternatives to the 2007 baseline, as required by CEQA. In addition, the 2014 proposed project and 2014 Exempted Stage 3 and 4

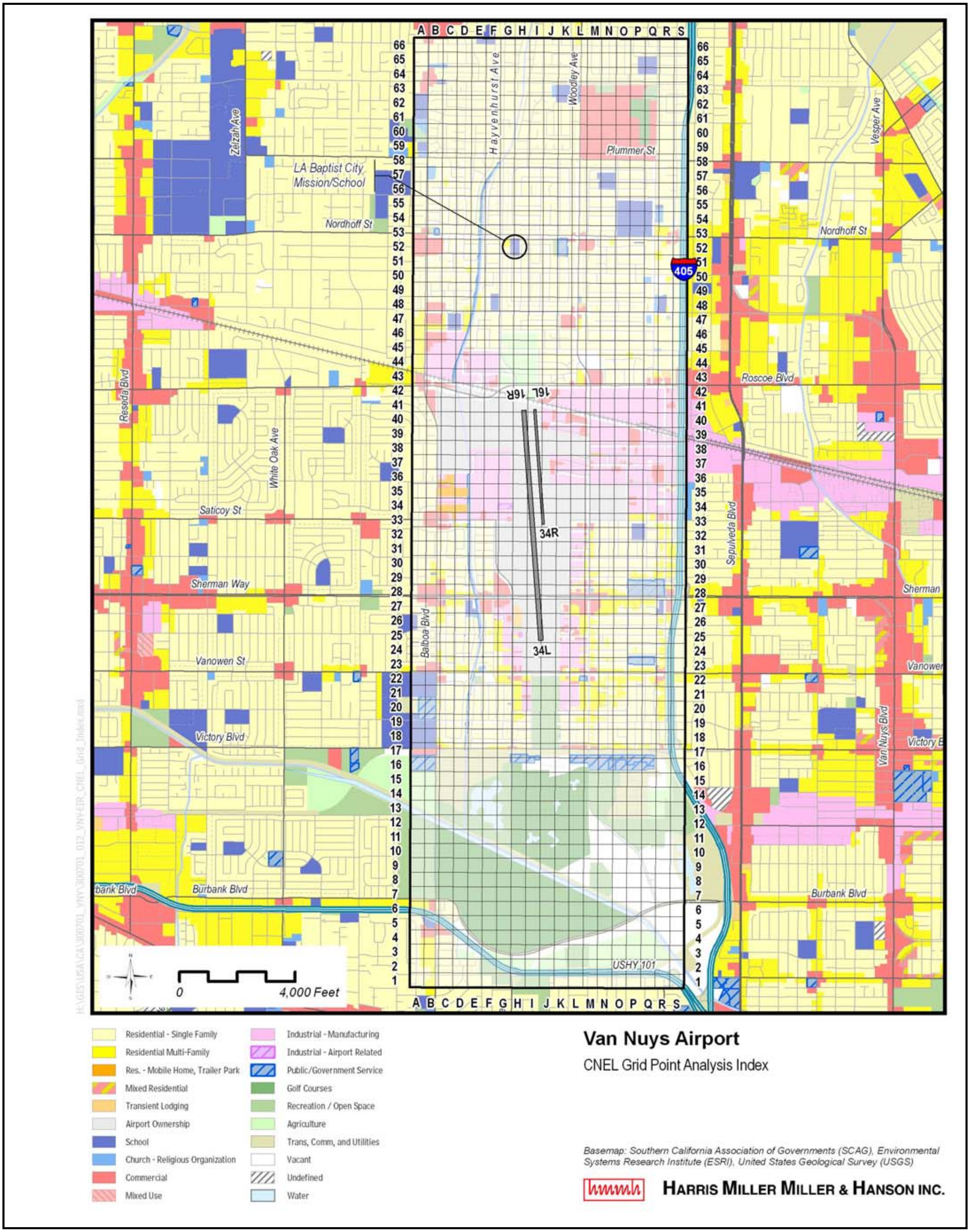

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Figure 7

Supplemental Threshold of Significance Analysis Locations

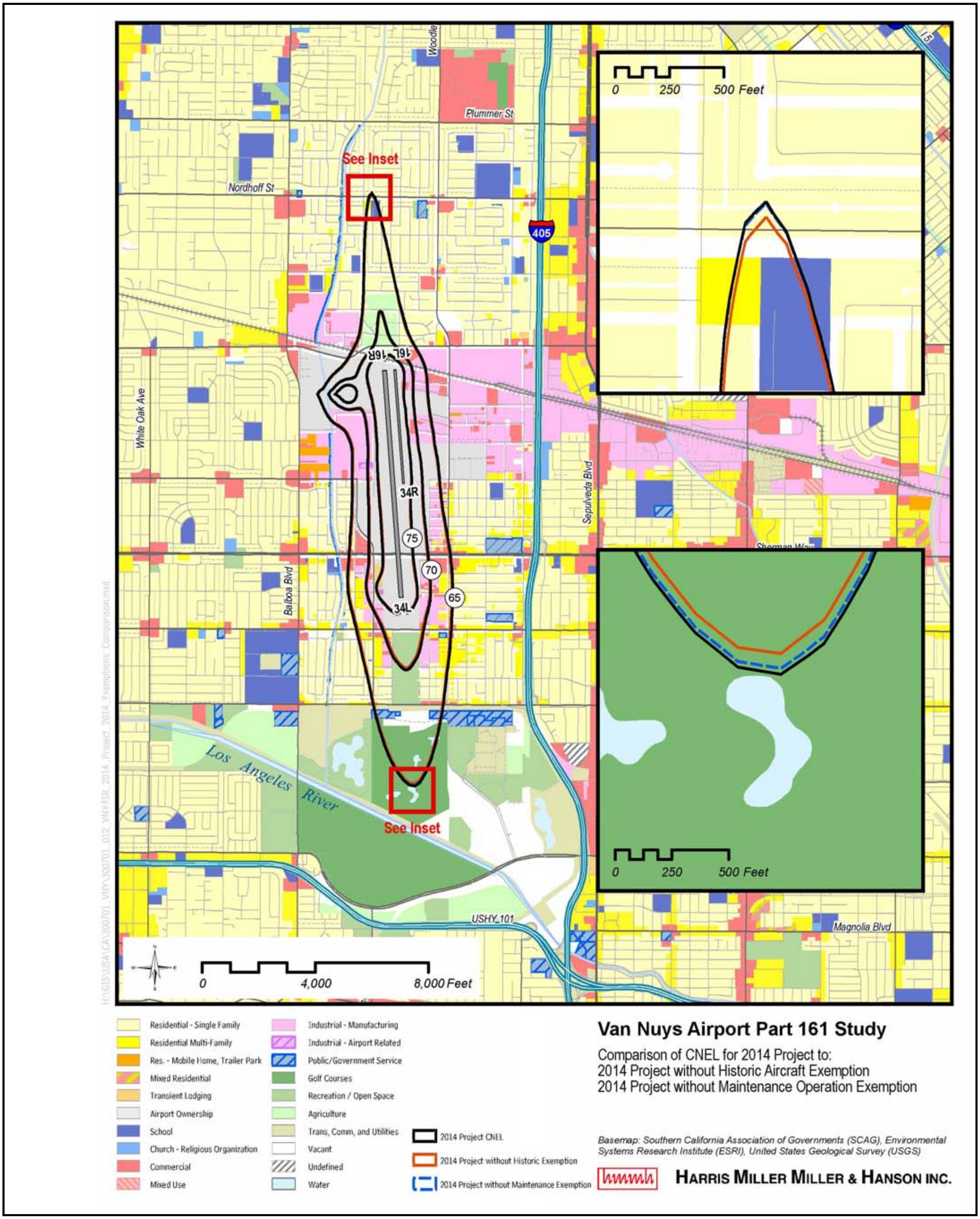

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Figure 8

Effects on 2014 Project CNEL Contours of Eliminating: (1) Historic Aircraft Exemption and (2) Maintenance Operation Exemption

Aircraft Alternative (Alternative 2) were compared to the 2014 No-Project Alternative (Alternative 1) to illustrate the estimated benefit of these two actions.

As discussed in Section 4.1, since the maximum anticipated effect on operations at BUR, CMA, and LAX would occur in 2014, it was used as the forecast year for analysis at those airports. Since there would be no effect on operations at CNO and WJF until 2016, it was used as the forecast year for analyses at those airports.

Los Angeles International Airport

Table 94 presents AEM analysis results for the 2014 proposed project and alternatives compared to the 2007 baseline and 2014 forecast conditions at LAX. As the table shows, forecast growth in activity at LAX, independent of any action at VNY, will result in approximately a 6.0% increase in the area within the 65 dB CNEL contour and approximately a 0.4 dB overall increase in CNEL compared to the 2007 baseline. However, the proposed project and alternatives under consideration at VNY have no effect on the area within the 65 dB CNEL or overall CNEL exposure in 2014. Normal forecast growth in activity at LAX overwhelms any change associated with diversions from VNY.

Neither the proposed project nor either of the alternatives under consideration at VNY would result in a change in noise exposure that meets or exceeds the 1.5 dB CEQA threshold of significance, compared to either the 2014 baseline or 2014 forecast conditions at LAX.

Table 94.LAX AEM Analyses: 2014 Project and Alternatives vs. 2007 Baseline

	2014 VNY Proposed Project		**2014 VNY Alternative 1, No-Project Alternative**		**2014 VNY Alternative 2, Exempted Stage 3 and 4 Aircraft**	
	Area	**CNEL**	**Area**	**CNEL**	**Area**	**CNEL**
2007 LAX Baseline	6.0%	0.4 dB	6.0%	0.4 dB	6.0%	0.4 dB
2014 LAX Baseline	0.0%	0.0 dB	0.0%	0.0 dB	0.0%	0.0 dB

Note: Percent change in area within 65 dB CNEL and approximate decibel change in CNEL for cases listed above compared to baseline listed on left (i.e., case listed above minus case listed on left; positive entry means case listed above is “noisier”).

Source: HMMH 2008.

Camarillo Airport

Table 95 presents AEM analysis results for the 2014 proposed project and alternatives compared to the 2007 baseline and 2014 forecast conditions at CMA. As the table shows, the 2014 Alternative 1, No-Project Alternative (i.e., normal growth in activity at CMA, independent of any action at VNY), will result in approximately a 13.8% increase in the area within the 65 dB CNEL contour and approximately a 0.8 dB overall increase in CNEL. The proposed project and Alternative 2 (Exempted Stage 3 and 4 Aircraft) would result in approximately a 19.8% increase in the area within the 65 dB CNEL contour and approximately a 1.1 dB overall increase in CNEL compared to the 2007 baseline but only a 5.3% increase in area and 0.3 dB increase in CNEL exposure in 2014.

Table 95. CMA AEM Analyses: 2014 Project and Alternatives vs. 2007 Baseline

	2014 VNY Proposed Project		**2014 VNY Alternative 1, No-Project Alternative**		**2014 VNY Alternative 2, Exempted Stage 3 and 4 Aircraft**	
	Area	**CNEL**	**Area**	**CNEL**	**Area**	**CNEL**
2007 CMA Baseline	19.8%	1.1 dB	13.8%	0.8 dB	19.8%	1.1 dB
2014 CMA Baseline	5.3%	0.3 dB	0.0%	0.0 dB	5.3%	0.3 dB

Note: Percent change in area within 65 dB CNEL and approximate decibel change in CNEL for cases listed above compared to baseline listed on left (i.e., case listed above minus case listed on left; positive entry means case listed above is "noisier").

Source: HMMH 2008.

Neither the proposed project nor either of the alternatives under consideration at VNY would result in a change in noise exposure that meets or exceeds the 1.5 dB CEQA threshold of significance compared to either the 2014 baseline or 2014 forecast conditions at CMA.

Chino Airport

Table 96 presents the AEM analysis results for the 2016 proposed project and alternatives compared to the 2007 baseline and 2016 forecast conditions at CNO. As the table shows, the 2016 Alternative 1, No-Project Alternative (i.e., normal change in activity at CNO, independent of any action at VNY), will result in approximately a 1.5% decrease in the area within the 65 dB CNEL contour and approximately a 0.1 dB overall decrease in CNEL. The proposed project and Alternative 2 (Exempted Stage 3 and 4 Aircraft) would result in approximately a 5.9% increase in the area within the 65 dB CNEL contour and approximately a 0.4 dB overall increase in CNEL compared to the 2007 baseline and a 7.5% increase in area and 0.5 dB increase in CNEL exposure in 2016.

Neither the proposed project nor either of the alternatives under consideration at VNY would result in a change in noise exposure that meets or exceeds the 1.5 dB CEQA threshold of significance compared to either the 2016 baseline or 2016 forecast conditions at CNO.

Table 96. CNO AEM Analyses: 2016 Project and Alternatives vs. 2007 Baseline

	2016 VNY Proposed Project		**2016 VNY Alternative 1, No-Project Alternative**		**2016 VNY Alternative 2, Exempted Stage 3 and 4 Aircraft**	
	Area	**CNEL**	**Area**	**CNEL**	**Area**	**CNEL**
2007 CNO Baseline	5.9%	0.4 dB	-1.5%	-0.1 dB	5.9%	0.4 dB
2016 CNO Baseline	7.5%	0.5 dB	0.0%	0.0 dB	7.5%	0.5 dB

Note: Percent change in area within 65 dB CNEL and approximate decibel change in CNEL for cases listed above compared to baseline listed on left (i.e., case listed above minus case listed on left; positive entry means case listed above is "noisier").

Source: HMMH 2008.

William J. Fox Airfield

Table 97 presents the AEM analysis results for the 2016 proposed project and alternatives compared to the 2007 baseline and 2016 forecast conditions at WJF. As the table shows, the 2016 Alternative 1, No-Project Alternative (i.e., normal growth in activity at WJF, independent of any action at VNY), will result in approximately a 8.5% decrease in the area within the 65 dB CNEL contour and approximately a 0.5 dB overall decrease in CNEL. The proposed project and Alternative 2 (Exempted Stage 3 and 4 Aircraft) would result in approximately a 4.9% decrease in the area within the 65 dB CNEL contour and approximately a 0.3 dB overall decrease in CNEL compared to the 2007 baseline and a 3.9% increase in area and 0.2 dB increase in CNEL exposure in 2016.

Neither the proposed project nor either of the alternatives under consideration at VNY would result in a change in noise exposure that meets or exceeds the 1.5 dB CEQA threshold of significance compared to either the 2016 baseline or 2016 forecast conditions at WJF.

Table 97. WJF AEM Analyses: 2016 Project and Alternatives vs. 2007 Baseline

	2016 VNY Proposed Project		**2016 VNY Alternative 1, No-Project Alternative**		**2016 VNY Alternative 2, Exempted Stage 3 and 4 Aircraft**	
	Area	**CNEL**	**Area**	**CNEL**	**Area**	**CNEL**
2007 WJF Baseline	-4.9%	-0.3 dB	-8.5%	-0.5 dB	-4.9%	-0.3 dB
2016 WJF Baseline	3.9%	0.2 dB	0.0%	0.0 dB	3.9%	0.2 dB

Note: Percent change in area within 65 dB CNEL and approximate decibel change in CNEL for cases listed above compared to baseline listed on left (i.e., case listed above minus case listed on left; positive entry means case listed above is "noisier").

Source: HMMH 2008.

Bob Hope Airport

Table 98 presents AEM analysis results for the 2014 proposed project and alternatives compared to the 2007 baseline and 2014 baseline conditions at BUR. As the table shows, the 2014 Alternative 1, No-Project Alternative (i.e., normal growth in activity at BUR, independent of any action at VNY), will result in approximately a 14.6% increase in the area within the 65 dB CNEL contour and approximately a 0.9 dB overall increase in CNEL. The proposed project and Alternative 2 (Exempted Stage 3 and 4 Aircraft) would result in approximately a 16.3% increase in the area within the 65 dB CNEL contour and approximately a 1.0 dB overall increase in CNEL compared to the 2007 baseline but only a 1.5% increase in area and 0.1 dB increase in CNEL exposure in 2014.

Neither the proposed project nor either of the alternatives under consideration at VNY would result in a change in noise exposure that meets or exceeds the 1.5 dB CEQA threshold of significance compared to either the 2014 baseline or 2014 forecast conditions at BUR.

Table 98. BUR AEM Analyses: 2014 Project and Alternatives vs. 2007 Baseline

	2014 VNY Proposed Project		2014 VNY Alternative 1, No-Project Alternative		2014 VNY Alternative 2, Exempted Stage 3 and 4 Aircraft	
	Area	**CNEL**	**Area**	**CNEL**	**Area**	**CNEL**
2007 BUR Baseline	16.3%	1.0 dB	14.6%	0.9 dB	16.3%	1.0 dB
2014 BUR Baseline	1.5%	0.1 dB	0.0%	0.0 dB	1.5%	0.1 dB

Note: Percent change in area within 65 dB CNEL and approximate decibel change in CNEL for cases listed above compared to baseline listed on left (i.e., case listed above minus case listed on left; positive entry means case listed above is "noisier").

Source: HMMH 2008.

The Burbank-Glendale-Pasadena Airport Authority has recently released an "Official Draft Part 161 Application for a Proposed Curfew at Bob Hope Airport."[20] That application uses a 2015 forecast year. Table 99 presents the results of an AEM analysis that applied the forecast 2014 VNY diversions to the BUR 2015 forecast, both with and without the BUR curfew in place. Since the noise level limit at VNY would be the same in 2015 as in 2014, and since operations in the aircraft types that would be affected by phaseout are expected to decrease slowly over time, even in the absence of the phaseout, the 2014 diversions provide a slightly conservatively high (i.e., "worst-case") assumption to assess at BUR.

[20] Jacobs Consultancy. 2008. Official Draft FAR Part 161 Application for a Proposed Curfew at Bob Hope Airport. Prepared for Burbank-Glendale-Pasadena Airport Authority, Burbank, CA. March.

Table 99. BUR AEM Analyses Utilizing BUR Forecast, with and without Proposed BUR Curfew

	Effect of VNY Proposed Project		**Effect of VNY Alternative 1, No-Project Alternative**		**Effect of VNY Alternative 2, Exempted Stage 3 and 4 Aircraft**	
	Area	**CNEL**	**Area**	**CNEL**	**Area**	**CNEL**
2015 BUR Baseline	0.9%	0.1 dB	0.0%	0.0 dB	0.9%	0.1 dB
2015 BUR Curfew	1.5%	0.1 dB	0.0%	0.0 dB	1.5%	0.1 dB
Note: Percent change in area within 65 dB CNEL and approximate decibel change in CNEL for cases listed above compared to baseline listed on left (i.e., case listed above minus case listed on left; positive entry means case listed above is "noisier"). Source: HMMH 2008.						

Table 99 reveals that neither the proposed project nor either of the alternatives under consideration at VNY would result in a significant change in noise exposure compared to 2015 forecast conditions at BUR, with or without the adoption of a curfew at that airport.

10.2 Single-Event Noise Analysis ("Berkeley Jets")

In a 2001 decision, the California Court of Appeal found that, for purposes of preparing an EIR that complies with CEQA, sole reliance on the CNEL metric is not necessarily sufficient to provide adequate information on potential noise impacts in areas outside 65 dB CNEL.[21] This decision, commonly referred to as "Berkeley Jets," addressed an increase in nighttime operations associated with a proposed airport development program at Oakland International Airport (OAK).

"The flaw in the EIR's noise analysis was its failure to provide, in addition to a community noise equivalent level, (a community noise measure) analysis, the most fundamental information about the project's noise impacts, which specifically included the number of additional nighttime flights that would occur under the project, the frequency of those flights, and their effect on sleep."

Nighttime activity was the issue of concern in the assessment of the OAK development proposal. Therefore, Berkeley Jets has most often been applied to assess nighttime noise. However, at a more fundamental level, the Berkeley Jets decision addresses the inadequacy of CNEL to fully describe potential noise impacts of individual aircraft "noise events," regardless of the time of day.

As discussed in the preceding section, it is anticipated that so few operations would be diverted from VNY that they would not cause significant CNEL increases at any of the airports anticipated to accommodate the diversions. However, consistent with the spirit of the Berkeley Jets decision, this EIR goes beyond CNEL analysis to

[21] Berkeley Keep Jets Over the Bay Committee v. Board of Port Commissioners, (2001) 91 Cal. App. 4th 1344.

provide detailed information about the frequency and single-event noise levels of the diverted operations. Moreover, this analysis goes beyond the customary application of the decision to assess the extent to which the diverted activity would increase the frequency of relatively noisy operations during the CNEL day and evening time periods (7 a.m.–7 p.m. and 7 p.m.–10 p.m., respectively) as well at night (10 p.m.–7 a.m.).

Table 100 provides a summary of relevant statistics related to the number and frequency of operations that the proposed project and Alternative 2 (Exempted Stage 3 and 4 Aircraft Alternative) would divert to other airports. Since Alternative 1 (No-Project Alternative) would not involve any new restriction at VNY, it would not divert any operations to other airports.

Table 100. Statistics Related to Frequency of Additional Operations that the Proposed Project and Alternative 2 (Exempted Stage 3 and 4 Aircraft Alternative) Would Divert to Other Airports

	Statistics Related to Diverted Operations by CNEL Time Period								
	Day (7 a.m.–7 p.m.)			**Evening (7 p.m.–10 p.m.)**			**Night (10 p.m.–7 a.m.)**		
Airport	Approx. No. of Diverted Day Ops (per day)	Approx. Percent Increase in Day Ops	Approx. Days between Diverted Ops	Approx. No. of Diverted Evening Ops (per day)	Approx. Percent Increase in Evening Ops	Approx. Days between Diverted Ops	Approx. No. of Diverted Night Ops (per day)	Approx. Percent Increase in Night Ops	Approx. Days between Diverted Ops
BUR	0.4313	0.142%	2	0.0618	0.096%	16	0.0331	0.088%	30
CMA	0.2572	0.062%	4	0.0371	0.135%	27	0.0200	0.174%	50
CNO	0.2514	0.055%	4	0.0109	0.034%	92	-.0109	0.181%	92
LAX*	0.1155	0.009%	9	0.0466	0.015%	21	0.0078	0.002%	128
WJF	0.7104	0.435%	1	0.0000	0.000%	--	0.0000	0.000%	--
* No operations would divert to LAX under Alternative 2 (Exempted Stage 3 and 4 Aircraft Alternative).									

Source: HMMH 2008.

As the preceding table shows, the absolute number of diverted operations to other airports and the relative increase in operations at those airports are extremely small; in every case, the increase is less than one-half of a percent. Moreover, the diversions would be so small in number that, for the daytime CNEL time period, they would occur no more frequently than once per day, on average. At night, the time period of particular interest in the Berkeley Jets decision, the diversions would occur at most once every 30 days.

This straightforward summary clearly demonstrates that the number and frequency of diverted operations would be so small that they would represent an increase in activity that is far less than normal day-to-day variation in activity at the airports.

One further step was undertaken to supplement this analysis to take into consideration the fact that the diverted operations would be in relatively noisy aircraft. To take this factor into account, the number and frequency of potential diversions were categorized according to their relative "noisiness" and compared to the underlying frequency of operations at the airports in the same categories. The fundamental purpose of this supplemental analysis was to determine whether the diversions would result in a dramatic shift in the overall distribution of operations by noisiness. The result of this additional analysis was consistent with the preceding AEM and overall statistical reviews (i.e., the diversions would not result in a significant change in activity at the airports). Because of the length of this supplemental review, it is presented in Appendix B.5.8.

11.0 VNY Noise Management Program

LAWA considers noise compatibility to be a high-priority, continuing process; over many decades of effort, it has established an extensive noise compatibility program at VNY. The VNY Noise Management Program (NMP)—and LAWA's continuing commitment to its implementation and improvement—is recognized for its innovation and benefits across the United States and internationally.

LAWA is proposing the phaseout of noisier aircraft at VNY to complement this existing program. The existing airport operations, noise exposure, and surrounding land use compatibility data collected and analyzed in this EIR reflect the past effects and current status of the program.

Major NMP components include:

- aircraft noise abatement measures to reduce noise exposure or shift it away from sensitive land uses ,
- remedial land use measures to address existing incompatible land uses that cannot be corrected through noise abatement, and
- preventive land use measures to deter introduction of new incompatible land uses.

The agency devotes significant staff and financial resources to program administration, publicity, implementation, monitoring, enforcement, review, and refinement. These program elements are implemented by numerous LAWA staff, including staff in the Noise Management Division (NMD), based at LAWA headquarters, and in the VNY Noise Management Office (NMO), assisted by administrative, operational, public affairs, environmental, and other staff at VNY and LAWA headquarters.

The NMD and VNY NMO operate an extensive noise and operations monitoring system at VNY, LAX, and L.A./Ontario International Airport (ONT). The system supports program monitoring and enforcement, pilot training, reporting, complaint analysis, and other program implementation functions. LAWA is in the process of upgrading the system to ensure it provides state-of-the-art capabilities.

Appendix Sections B.5.2 and B.5.3 summarize the purpose, details, and implementation of major noise abatement and compatible land use elements of the NMP, including:

11.1 Major Noise Abatement Elements

Major noise abatement elements of the VNY noise management program include:

- Quiet Jet Departure Program,
- No Early Turn Program,
- Departure Techniques,
- Run-Up Restriction,
- Helicopter and Route Deviation Program,
- Partial Curfew,
- Non-Addition Rule,

11.2 Major Compatible Land Use Measures

LAWA, City of Los Angeles, and California programs and regulations include the following major compatible land use measures at VNY:

- Sound Insulation,
- Avigation and Noise Easements,
- Compatible Building Code, and
- Noise Disclosure.

12.0 Significant Unavoidable Impacts

As demonstrated by the analysis provided in this section and the appendices to this EIR, none of the alternatives under consideration at VNY would produce a significant increase in noise impacts. Therefore, the proposed project would not result in any significant impacts, and no mitigation measures are required.

B.1

NOISE TERMINOLOGY

B.1.1 Introduction

To assist reviewers in interpreting the complex noise metrics used in evaluating airport noise, we present below an introduction to relevant fundamentals of acoustics and noise terminology.

Eight acoustical descriptors of noise are introduced here, roughly in increasing degree of complexity:

- Decibel, dB
- A-Weighted Decibel, dBA
- Maximum A-Weighted Sound Level, Lmax
- Sound Exposure Level, SEL
- Single-Event Noise Exposure Level, SENEL
- Equivalent A-Weighted Sound Level, Leq
- Day-Night Average Sound Level, DNL
- Community Noise Equivalent Level, CNEL

These noise metrics form the basis for the majority of noise analysis conducted at airports in California and the United States as a whole.

B.1.2 Decibel, dB

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. Although the loudest sounds that we hear without pain have about one million times more energy than the quietest sounds we hear, 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 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 a reference pressure (the quietest sound we can hear).

The logarithmic conversion of sound pressure to sound pressure level (SPL) means that the quietest sound that we can hear (the reference pressure) has a sound pressure level of about 0 dB, while the loudest sounds that 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, combining decibels is unlike common arithmetic. For example, if two sound sources each produce 100 dB operating individually, then operated together, they produce 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. 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.

If one noise source is much louder than another, the two sources operating together will produce virtually the same sound pressure level (and sound to our ears) that the louder source would produce alone. For example, a 100 dB source plus an 80 dB source produce approximately 100 dB of noise when operating together (actually, 100.04 dB). 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.

Conveniently, people also hear in a logarithmic fashion, which affects the manner in which they interpret, or perceive. Two useful rules of thumb to remember when comparing sound levels are as follows: (1) A 6 to 10 dB increase in the sound pressure level is sometimes described 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.

B.1.3 A-Weighted Decibel, dBA

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

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:

- Our ear is better equipped to hear mid-range and high frequencies and is less sensitive to lower frequencies. Thus, we find mid- and high-frequency noise more annoying.
- 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 of about 20 Hz to a high 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. The acoustical community has defined several "filters," which approximate this sensitivity of our ear and, thus, help us to judge the relative loudness of various sounds made up of many different frequencies.

The "A" filter (or "A weighting") does this best for most environmental noise sources. A-weighted sound levels are measured in decibels, just like unweighted. To avoid ambiguity, A-weighted sound levels should be identified as such (e.g., "an A-weighted sound level of 85 dB") or in an abbreviated form (e.g., "a sound level of 85 dBA") where the "A" indicates that the sound level has been A-weighted.

Figure B.1.1 depicts the A-weighting adjustments to sound in frequencies from approximately 20 Hz to 10,000 Hz.

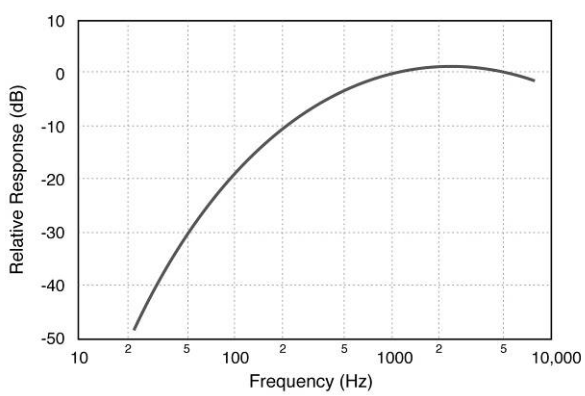


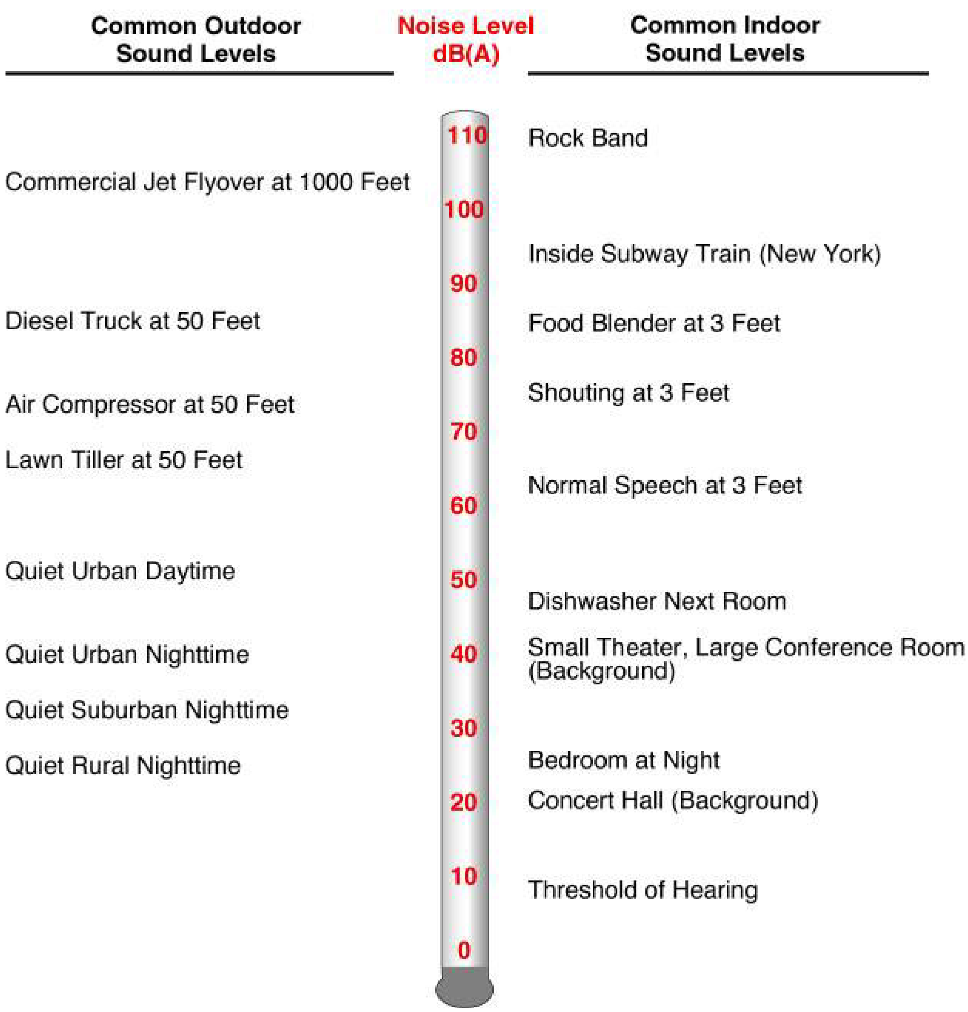
Figure B.1.1 A-Weighting Frequency Response

Source: HMMH

The A-weighted filter significantly de-emphasizes those parts of the total noise that occur at lower frequencies (those below about 500 Hz) and also at very high frequencies, above 10,000 Hz, which 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, which we hear quite easily. Because this filter generally matches our ears' sensitivity, sounds having higher A-weighted sound levels are usually judged to be louder than those with lower A-weighted sound levels, a relationship that otherwise might not be true. It is for this reason that acousticians normally use A-weighted sound levels to evaluate environmental noise sources.

Government agencies in the United States (and most governments worldwide)[1] recommend or require the use of A-weighted sound levels for measuring, modeling, describing, and assessing aircraft sound levels (and sound levels from most other transportation and environmental sources).

Figure B.1.2 depicts representative A-weighted sound levels for a variety of common environmental sounds.



[1] Of relevance to this project, these agencies include the California Department of Transportation, Division of Aeronautics; California Environmental Protection Agency; U.S. Environmental Protection Agency; and Federal Aviation Administration.

Figure B.1.2 Representative A-Weighted Sound Levels

Source: HMMH

B.1.4 Maximum A-Weighted Sound Level, Lmax

An additional dimension to environmental noise is that A-weighted levels vary with time. For example, the sound level 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, the wind blows, or a vehicle passes by). This is illustrated in Figure B.1.3.

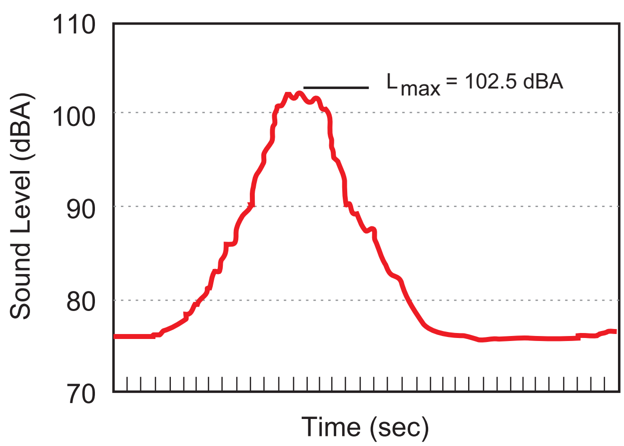


Figure **B.1.3** Variation in the A-Weighted Sound Level over Time

Source: HMMH

Because of this variation, it is often convenient to describe a particular noise "event" by its maximum sound level, abbreviated as Lmax (or $L_A$max, if the decibel abbreviation dB is used). In Figure B.1.3 the Lmax is approximately 102.5 dBA.

While the maximum level is easy to understand, it suffers from a serious drawback when used to describe the relative "noisiness" of an event such as an aircraft flyover; i.e., it describes only one dimension of the event and provides no information on the event's overall, or *cumulative*, noise exposure. In fact, two events with identical maximum levels 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 sections introduce two closely related measures that account for this concept of a noise "dose," or the *cumulative* exposure associated with an individual "noise event" such as an aircraft flyover.

B.1.5 Sound Exposure Level, SEL

The most commonly used measure of cumulative noise exposure for an individual noise event, such as an aircraft flyover, is the Sound Exposure Level, or SEL. SEL is a summation of the A-weighted sound energy over the *entire duration* of a noise event. SEL expresses the accumulated energy in terms of the 1-second-long steady-state sound level that would contain the same amount of energy as the actual time-varying level. In simple terms, SEL "compresses" the energy into a single second. Figure B.1.4 depicts this compression:

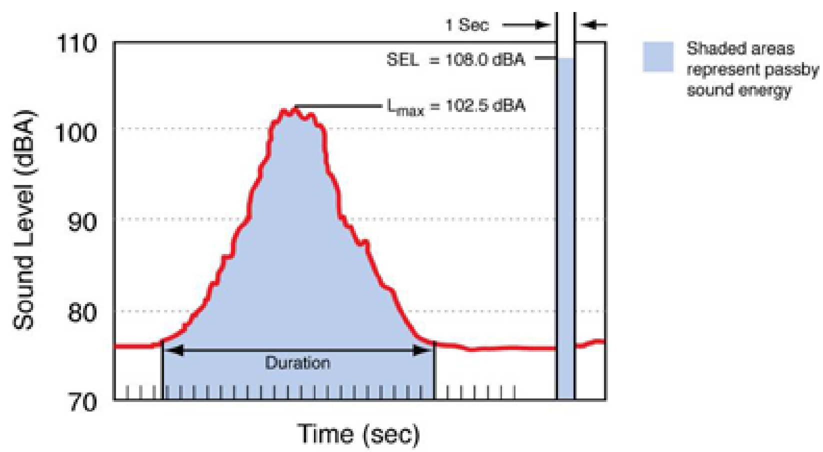


Figure B.1.4 Graphical Depiction of Sound Exposure Level

Source: HMMH

Note that because SEL is normalized to 1 second, it almost always will be a higher value than the event's Lmax. In fact, for most aircraft flyovers, SEL is on the order of 5 to 12 dB higher than Lmax.

B.1.6 Single-Event Noise Exposure Level, SENEL

California regulations require use of a measure called the Single-Event Noise Exposure Level, or SENEL, to describe the cumulative noise exposure for an individual noise event, such as an aircraft flyover.[2] SENEL is a very slight variation on SEL. Just like SEL, it is the 1-second-long steady-state level that contains the same amount of energy as the actual time-varying level. However, unlike SEL, it is calculated only over the period when the level exceeds a selected threshold.

Figure B.1.5 depicts the SENEL concept for the noise event used in the Figure B.1.4 SEL example but with an 80 dB SENEL threshold value. Note that even though the

[2] Title 21, California Code of Regulations, California Airport Noise Standards, Subchapter 6, Noise Standards, Article 1, General, Section 5001, Definitions, p. 220.

SENEL is calculated over a shorter duration, both metrics have the value of 108 dB. This situation is typical for most noise events; for all but very unusual noise events, as long as the threshold is at least 10 dB below the maximum level, the SEL and SENEL values will be within 0.1 dB.

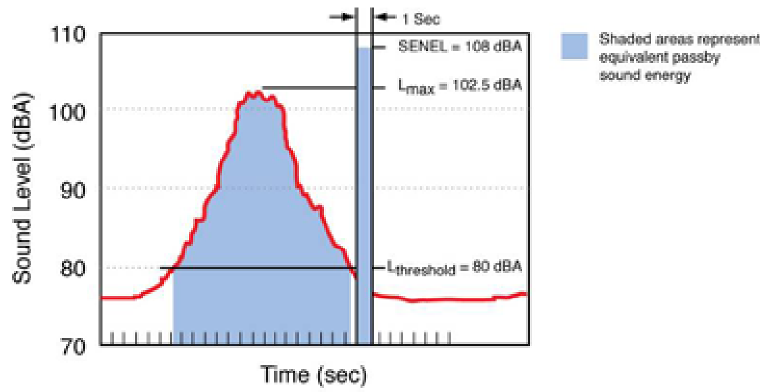


Figure B.1.5 Graphical Depiction of Single-Event Noise Exposure Level

Source: HMMH

Because SENEL is a cumulative measure, a higher SENEL can result from either a louder or longer event or some combination. Figure B.1.6 provides a representative example. The longer duration noise event on the right results in a higher SENEL than the event on the left, even though it has a lower Lmax.

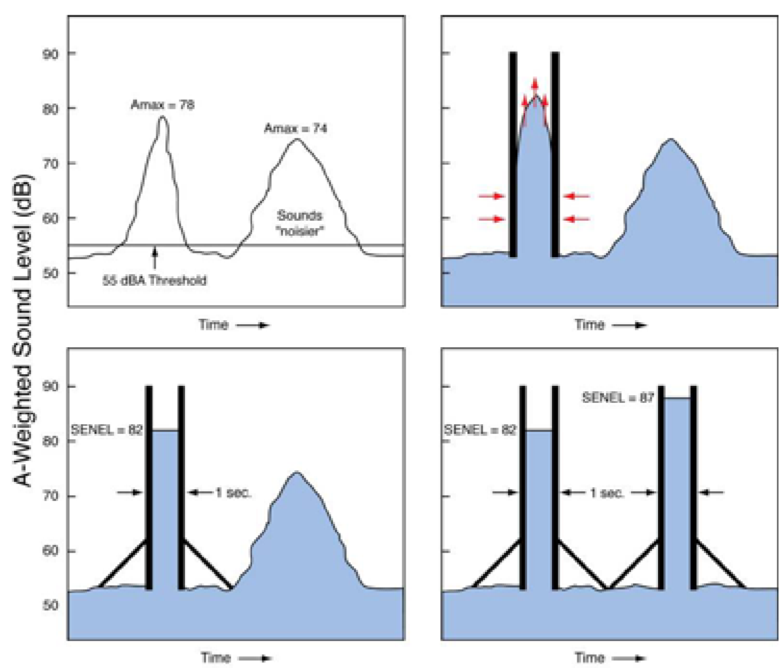


Figure B.1.6 Graphical Depiction of Single-Event Noise Exposure Level for Two Noise Events with Different Maximums and Durations

Source: HMMH

SEL and SENEL provide bases for comparing noise events that generally match our impression of their overall "noisiness," including the effects of both duration and level; the higher the SEL or SENEL, the more annoying a noise event is likely to be.

B.1.7 Equivalent A-Weighted Sound Level, Leq

The Equivalent Sound Level, abbreviated Leq, is a measure of the exposure resulting from the accumulation of sound levels over a particular period of interest (e.g., an hour, an 8-hour school day, nighttime, or a full 24-hour day). The applicable period should always be identified or clearly understood when discussing the metric.

Leq may be thought of as a constant sound level over the period of interest that contains as much sound energy as the actual varying level. It is a way of assigning a single number to a time-varying sound level. This is illustrated in Figure B.1.7.

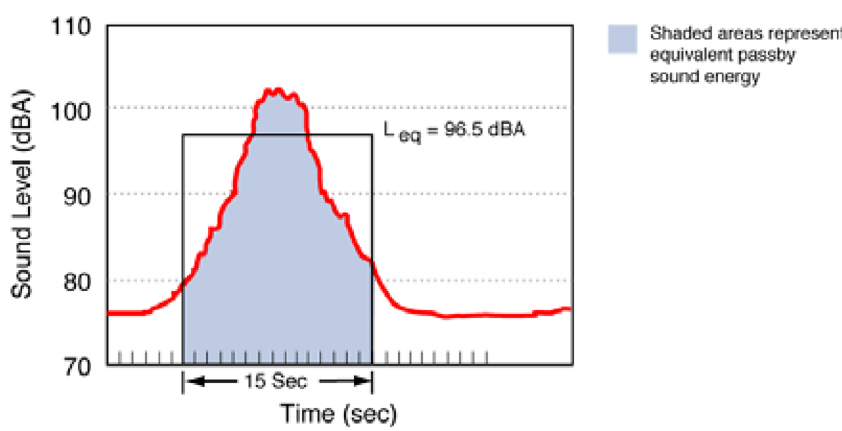


Figure B.1.7 Example of a 1-Minute Equivalent Sound Level

Source: HMMH

In airport noise applications, Leq is often presented for consecutive 1-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.

B.1.8 Day-Night Average Sound Level, DNL or Ldn

The previous sections address noise measures that account for short-term fluctuations in A-weighted levels as sound sources come and go, affecting the overall noise environment. The Day-Night Average Sound Level (DNL or Ldn) represents a 24-

hour A-weighted noise dose. DNL is essentially equal to the 24-hour A-weighted Leq, with one important adjustment: Noise occurring at night—from 10 p.m. through 7 a.m.—is "factored up." The factoring up can be made in one of two ways:

- Weighting, by counting each nighttime noise contribution 10 times; e.g., if DNL is calculated by summing the SEL of aircraft operations over a 24-hour period, each nighttime operation is represented by 10 identical daytime operations.
- Penalizing, by adding 10 dB to all nighttime noise contributions; e.g., if DNL is calculated from the SEL of aircraft operations occurring over a 24-hour period, 10 dB are added to the SEL values for nighttime operations.

The 10 dB adjustment accounts for our greater sensitivity to nighttime noise and the fact lower ambient levels at night tend to make noise events, such as aircraft flyovers, more intrusive.

Figure B.1.8 depicts this adjustment graphically.

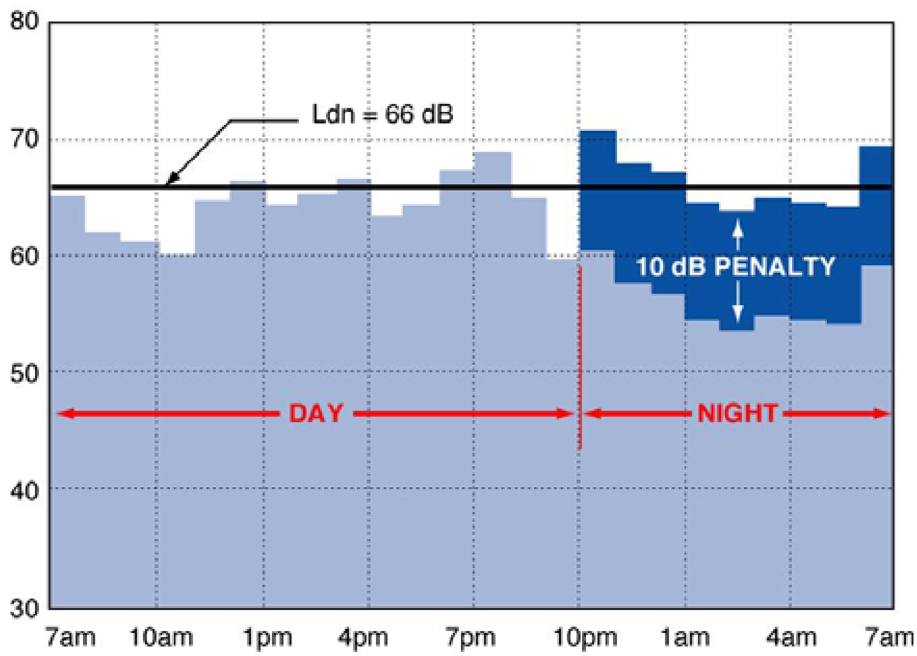


Figure B.1.8 Example of a Day-Night Average Sound Level Calculation

Source: HMMH

Most aircraft noise studies utilize computer-generated estimates of DNL, determined by adding up the energy from the SELs from each event, with the 10 dB penalty/weighting applied to night operations. Computed values of DNL 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 may also be helpful in understanding shorter term aspects of a noise environment.

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

- It is applicable to the evaluation of pervasive long-term noise in various defined areas and under various conditions over long periods of time.
- It correlates well with known effects of noise on individuals and the public.
- It is simple, practical, and accurate. In principal, it is useful for planning as well as for enforcement or monitoring purposes.
- The required measurement equipment, with standard characteristics, is commercially available.
- It is closely related to existing methods currently in use.

Representative values of DNL in our environment range from a low of 40 to 45 dB in extremely quiet, isolated locations to highs of 80 or 85 dB immediately adjacent to a busy truck route. DNL would typically be in the range of 50 to 55 dB in a quiet residential community and 60 to 65 dB in an urban residential neighborhood. Figure B.1.9 presents representative outdoor DNL values measured at various locations in the United States.

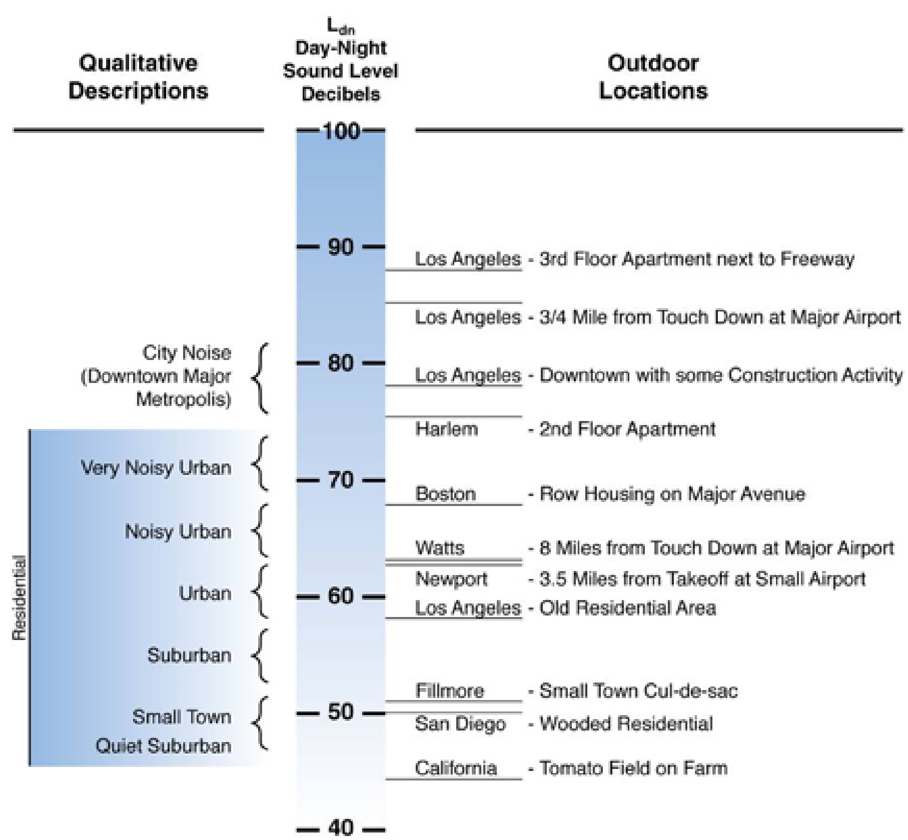


Figure B.1.9 Examples of Measured Day-Night Average Sound Levels

Source: USEPA 1974, p.14.

Most public agencies dealing with noise exposure, including the Federal Aviation Administration (FAA), Department of Defense, and Department of Housing and Urban Development (HUD), have adopted DNL in their guidelines and regulations. As noted in the following section, the state of California requires the use of a variant of DNL for use in airport noise assessments.

When preparing environmental noise analyses, the FAA considers a change of 1.5 dB within the DNL 65 dB contour to be "significant." If a change of 1.5 dB is observed, analysts should look between the 60 and 65 dB contours to see if there are areas of change of 3 dB or more; this is also considered a "significant impact."

Section B.1.2 provided rules of thumb for interpreting moment-to-moment changes in sound level. The following guidelines may be helpful in interpreting changes in cumulative exposure:

DNL Change	Community Response	Mitigation
0–2 dB	May be noticeable	Abatement may be beneficial
2–5 dB	Generally noticeable	Abatement should be beneficial
Over 5 dB	A change in community reaction is likely	Abatement definitely beneficial

B.1.9 Community Noise Equivalent Level, CNEL

The California regulations referenced in the discussion of SENEL (Section B.1.6) require use of a slight variation of DNL to express cumulative A-weighted noise exposure over any number of days—the Community Noise Equivalent Level (CNEL).[3] CNEL differs from DNL in one way: It adds an "evening" (7 p.m.–10 p.m.) period during which noise events are weighted by a factor of three, which is mathematically equivalent to adding approximately a 4.77 dB penalty. Figure B.1.10 depicts this adjustment graphically.

[3] Title 21, California Code of Regulations, California Airport Noise Standards, Subchapter 6, Noise Standards, Article 1. General, Section 5001, Definitions, p. 220.

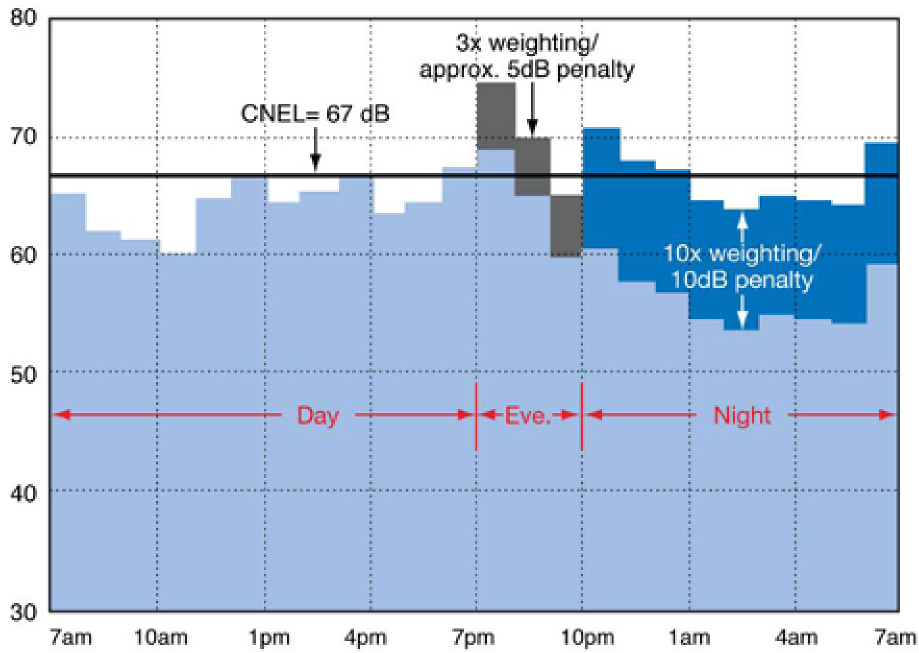


Figure B.1.10 Example of a Community Noise Equivalent Level Calculation

Source: HMMH

Unless noise exposure is calculated for an unlikely situation where there is no noise-producing activity during the evening period (an unlikely situation), CNEL will always be greater than DNL. However, from a practical standpoint this difference is rarely more than 1 decibel, as it was in hypothetical data used in Figures B.1.8 and B.1.10. For this reason, the DNL values shown in Figure B.1.9 are reasonably representative of CNEL values for the same environments, as are guidelines for interpreting changes in exposure discussed in Section B.1.8. FAA applies the same criteria for thresholds of significant change in CNEL that they have set for DNL.

B.2

AIRCRAFT NOISE EFFECTS

B.2.1 Introduction

The primary effects of noise on people are behavioral (i.e., those that produce annoyance or that are associated with activity interference, such as communication, rest or and sleep). Sections B.2.2–B.2.4 address those categories. Potential health effects fall into two areas: auditory (i.e., hearing loss) and non-auditory (e.g., cardiovascular disease and hypertension). As discussed in Sections B.2.5 and B.2.6, there is no conclusive scientific evidence that exposure to aircraft noise results in either auditory or non-auditory health effects.

B.2.2 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. 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 100% intelligibility.

Figure B.2.1 presents typical distances between talker and listener for satisfactory outdoor conversations in the presence of different steady A-weighted background noise levels for raised, normal, and relaxed vocal effort. As the background level increases, the talker must raise his/her voice or the individuals must get closer together to continue their conversation. Any combination of talker-listener distances and background noise that falls below the bottom line in the figure represents an ideal environment for outdoor speech communication and is considered necessary for acceptable indoor conversation as well.

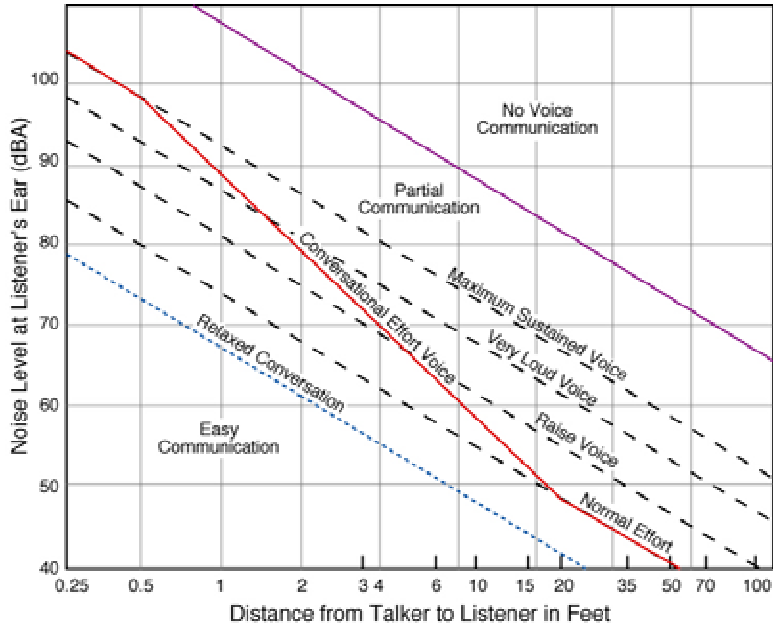


Figure B.2.1 Distances at Which Ordinary Speech Can Be Understood

Source: HMMH

One implication of the relationships in the figure is that for typical communication distances of 3 or 4 feet (1 to 1.5 meters), acceptable outdoor conversations where 95% intelligibility is acceptable can be carried on in a normal voice as long as the background noise outdoors is less than about 65 dBA. If 100% intelligibility is desired, the interior background level must be less than about 45 dBA. If the noise exceeds either of these levels, as might occur when an aircraft passes overhead, intelligibility is lost unless vocal effort is increased or communication distance decreased.

B.2.3 Sleep Interference

The effect of aviation noise on sleep is a long-recognized concern of those interested in addressing the impacts of noise on people. Sleep disturbance has been studied in laboratories and in "field" studies in which subjects were exposed to noise in their own homes using real or simulated noise.

A comparison of laboratory and field results led to the conclusion that laboratory studies result in higher awakening (Pearsons 1989). As a result, in 1997, the Federal Interagency Committee on Aircraft Noise (FICAN) recommended a new dose-response curve for predicting awakening based on the upper limit of *field* studies (FICAN 1997). The field study results are denoted by circles in Figure B.2.2. The figure also depicts a curve prepared by the Federal Interagency Committee on Noise (FICON), which preceded FICAN and represented a "best fit" to data that included both laboratory and field studies (FICON 1992); the curve is above the FICAN data, reflecting the effect of laboratory results.

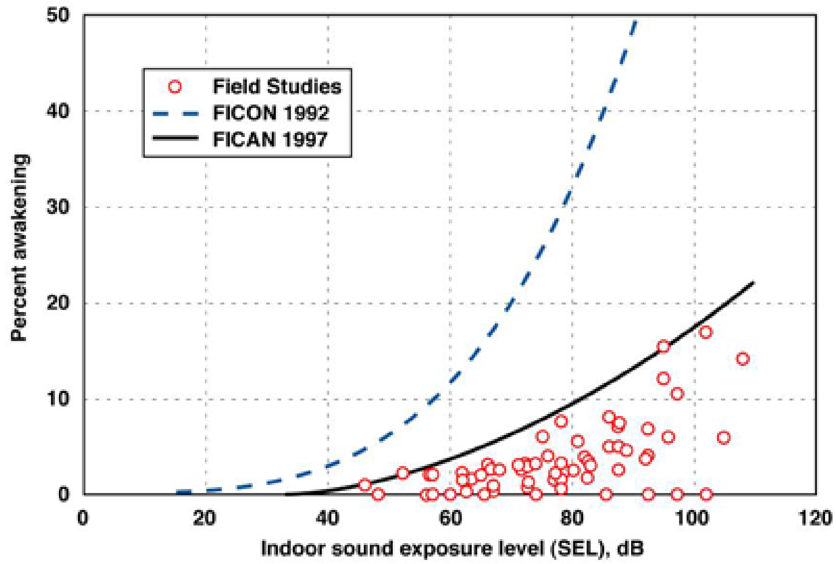


Figure B.2.2 Recommended FICAN Awakening Dose-Response Relationship

Source: HMMH

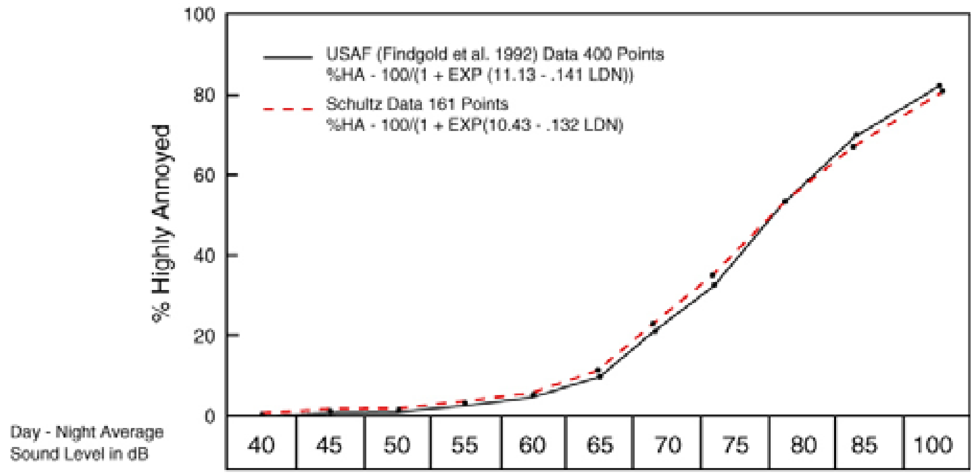
The solid line in the figure (the "FICAN curve") represents the *upper limit* of the field study data, which should be interpreted as predicting the "maximum percent of the exposed population expected to be behaviorally awakened," or the "maximum % awakened." FICAN notes that the dose-response relationship represented by the curve uses behavioral awakening as the indicator of sleep disturbance (i.e., it does not reflect changes in sleep state). FICAN cautions that the curve should be applied only to adults in long-term residential settings.

B.2.4 Community Annoyance

Social survey data have long made it clear 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 DNL. A wide variety of responses have been investigated in social survey research. The concept of "percent highly annoyed" in sample populations seems to provide the most consistent response of a community to a particular noise source.

The most widely recognized relationship between noise and the percentage of people highly annoyed by it, regardless of the noise source, was developed by Schultz in the late 1970s. Schultz based his analysis on data from 18 surveys conducted worldwide; the curve indicates that at levels as low as DNL 55, approximately 5% of the people will still be highly annoyed, with the percentage increasing more rapidly as exposure increases above DNL 65.

FICON (1992) reconfirmed Schultz' relationship, taking into account more recent survey results provided by the U.S. Air Force (USAF) Armstrong Laboratories.



Calculated % HA Points	40	45	50	55	60	65	70	75	80	85	100
USAF	0.41	0.831	1.66	3.31	6.48	12.29	22.1	36.47	53.74	70.16	82.64
SCHULTZ	0.576	1.11	2.12	4.03	7.52	13.59	23.32	37.05	53.25	68.78	81

Figure B.2.3 Comparison of Schultz Data (1978) and USAF Data (1992) on Annoyance

Source: FICON 1992, page 3-6.

B.2.5 Noise-Induced Hearing Loss

Hearing loss is measured as "threshold shift." Threshold refers to the quietest sound a person can hear. When a threshold shift occurs, the sound must be louder before it can be heard (i.e., a person's hearing is not as sensitive as it was before the threshold shift). The natural decrease of hearing sensitivity with age is called presbycusis. For hundreds of years it has been known that excessive exposure to loud noises can lead to noise-induced temporary threshold shifts, which in time can result in permanent hearing impairment, causing individuals to experience difficulty in understanding speech. For example, with a threshold shift of 25 dB, a person could correctly understand only about 90% of the sentences spoken in a conversational level at a 3-foot (1-meter) distance in a quiet room.

A temporary threshold shift (TTS) usually precedes a noise-induced permanent threshold shift (NIPTS); i.e., after exposure to high noise levels for a short time or lower noise levels for a much longer time, a person's threshold of audibility is temporarily shifted to higher levels. After continuous noise exposure on an 8-hour shift, such TTS can amount to more than 20 dB. However, as its name indicates, it is only temporary, and the ear recovers fully after several hours. If such exposures are repeated daily, or if the ear is not allowed to recover from this "auditory fatigue" over a quiet night before it is exposed to noise again, TTS can lead to a permanent threshold shift (PTS).

Research over the last 40 years on industrial and military populations gives a reasonable understanding of the development of noise-induced hearing loss, including the amount of hearing loss caused by combinations of noise level, frequency spectrum, and duration of exposure. Detailed international criteria have been developed that identify maximum noise exposures that do not produce noise-induced hearing loss in any segment of the population exposed. The U.S. Occupational Safety and Health Administration (OSHA) identifies the maximum permissible A-weighted exposure to be 90 dB Leq for 8 hours.

It is extremely unlikely that aircraft noise around airports could ever produce hearing loss. For example, it would take more than 9,000 over flights per day with an average sound exposure level of 90 dB to produce an 8-hour Leq of 85 dB on the ground. If this occurred 5 days a week for 40 years, and if people were exposed to this outdoors without any attenuation from buildings, the resultant noise exposure would start to produce a NIPTS of less than 10 dB in the most sensitive 10% of the population.

Studies in many countries have demonstrated that the possibility for permanent hearing loss in communities due to aircraft noise exposure is remote, even under the most intense commercial take-off and landing patterns. For example, an FAA-funded study compared the hearing of the population near Los Angeles International Airport with the hearing of the population in a quiet area without aircraft noise.[4] There was no significant difference between the hearing levels of the two populations and no correlation of the hearing level with the length of time people lived in the airport neighborhood. A similar, extensive, more recent study in the vicinity of London's Heathrow Airport came to the same conclusions.

B.2.6 Non-Auditory Health Effects

In spite of considerable worldwide research, there is little solid evidence supporting a claim that noise affects human physical and mental health in the workplace or in communities. Most authoritative reviews, such as the World Health Organization (WHO) Environmental Health Criteria Document on noise, agree that "research on this subject has not yielded any positive evidence, so far, that disease is caused or aggravated by noise exposure [that is] insufficient to cause hearing impairment" (WHO 1980).

For practical noise control considerations, the present status of our knowledge means that the criteria for evaluating a noise impact, with respect to its direct and indirect

[4] Parnell, Nagel, and Cohen. 1972. *Evaluation of Hearing Levels of Residents Living near a Major Airport.* FAA-RD-72-72. U.S. Department of Transportation, Federal Aviation Administration. Washington, DC.

effects on health, are the same criteria as those applied to prevent any hearing impairment. In other words, by using criteria that prevent noise-induced hearing loss, minimize speech and sleep disruption, and minimize community reactions and annoyance, any effects on health will also be prevented.

B.3

NOISE/LAND USE COMPATIBILITY

B.3.1 Introduction

Given the relationships between noise and the collective response of people to their environment, the cumulative exposure metrics DNL and CNEL have become accepted as standards for evaluating community noise exposure. In addition, they aid decision making regarding the compatibility of alternative land uses.

In their application to airport noise, in particular, DNL and CNEL projections have two principal functions:

- to provide a quantitative basis for assessing land use compatibility with aircraft noise exposure, and
- to provide a means for determining the significance of changes in noise exposure that might result from changes in airport layout, operations, or activity levels.

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.

While the federal government, through the FAA, has preempted control of aircraft noise at the source (i.e., certification of aircraft for operation in the United States), the federal government defers to local land use jurisdictions for determination of the level of noise exposure that is acceptable for given land uses. Despite that deference, most local land use control jurisdictions and airport proprietors, including California, Los Angeles, and LAWA, base aircraft noise/land use compatibility decisions on federal guidelines set forth in Federal Aviation Regulation (FAR) Part 150.[5]

[5] 14 C.F.R. Part 150, Airport Noise Compatibility Planning.

The following sections summarize the federal, state, city, and LAWA guidelines and regulations, in order.

B.3.2 FAA Guidelines

Part 150 defines a two-step process for airport proprietors to follow in first identifying land uses that are incompatible with aircraft noise and then addressing through noise reduction ("abatement") or noise mitigation. While the program is voluntary, there is a significant incentive for airport proprietors to participate, since federal funding is available to assist proprietors in implementing FAA-approved abatement or mitigation measures. In addition, the FAA is more likely to assist with implementation of airport operational noise abatement measures that involve FAA air traffic control actions if they are an FAA-approved element of a Part 150 "noise compatibility program."

Part 150 sets forth FAA-recommended guidelines for noise/land use compatibility, based on DNL. The guidelines are designed to protect public health and welfare but also take into account the feasibility of controlling noise. For purposes of application of Part 150 and other federal environmental studies conducted in California, the FAA considers CNEL to be the functional equivalent of DNL and applies the Part 150 guidelines without adjustment.

The guidelines represent a compilation of extensive scientific research into noise-related activity interference and attitudinal response. However, the guidelines should be applied with a recognition of the subjective nature of response to noise and the special circumstances that can increase or decrease 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 aircraft noise annoying at relatively low levels.

The table on the following page reproduces the FAA's noise/land use compatibility guidelines from Part 150.

Table B.3.1 FAA Noise/Land Use Compatibility Guidelines

Source: 14 C.F.R. Part 150, Airport Noise Compatibility Planning, Appendix A, Table 1.

Land Use	Yearly Day-Night Average Sound Level, Ldn, in Decibels (key and notes on following page)					
	< 65	65–70	70–75	75–80	80–85	> 85
Residential Use						
Residential other than mobile homes and transient lodgings	Y	N(1)	N(1)	N	N	N
Mobile home park	Y	N	N	N	N	N
Transient lodgings	Y	N(1)	N(1)	N(1)	N	N
Public Use						
Schools	Y	N(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, bldg. mtls., hardware, and farm equip.	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	Y	Y	Y
Golf courses, riding stables, water recreation	Y	Y	25	30	N	N

Key to Table B.3.1

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 use and related structures generally compatible; measures to achieve NLR of 25, 30, or 35 dB must be incorporated into design and construction of structure.

Notes for Table B.3.1

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.

(1) Where the community determines that residential or school uses must be allowed, measures to achieve outdoor-to-indoor Noise Level Reduction (NLR) of at least 25 dB and 30 dB should be incorporated into building codes and be considered in individual approvals. Normal residential construction can be expected to provide a NLR of 20 dB; thus, the reduction requirements are often stated as 5, 10, or 15 dB over standard construction and normally assume mechanical ventilation and closed windows year-round. However, the use of NLR criteria will not eliminate outdoor noise problems.

(2) Measures to achieve NLR of 25 dB must be incorporated into the design and construction of portions of these buildings where the public is received, in office areas, noise sensitive areas, or where the normal noise level is low.

(3) Measures to achieve NLR of 30 dB must be incorporated into the design and construction of portions of these buildings where the public is received, in office areas, noise sensitive areas, or where the normal noise level is low.

(4) Measures to achieve NLR of 35 dB must be incorporated into the design and construction of portions of these buildings where the public is received, in office areas, noise sensitive areas, or where the normal noise level is low.

(5) Land use is compatible provided special sound reinforcement systems are installed.

(6) Residential buildings require an NLR of 25.

(7) Residential buildings require an NLR of 30.

(8) Residential buildings not permitted.

B.3.3 California Division of Aeronautics Standards

For noise assessment, CEQA requires the determination of exposure of persons to noise levels in excess of standards established in the local general plan or noise ordinance or applicable standards of other agencies. For airport noise studies, the California Division of Aeronautics has adopted noise standards that state, in part:

The following rules and regulations are promulgated in accordance with Article 3, Chapter 4, Part 1, Division 9, Public Utilities Code (Regulation of Airports) to provide noise standards governing the operation of aircraft and aircraft engines for all airports operating under a valid permit issued by the Department of Transportation. These standards are based upon two separate legal grounds: (1) the power of airport proprietors to impose noise ceilings and other limitations on the use of the airport, and (2) the power of the state to act to an extent not prohibited by federal law. The regulations are designed to cause the airport proprietor, aircraft operator, local governments, pilots, and the department to work cooperatively to diminish noise problems. The regulations accomplish these ends by controlling and reducing the noise impact area in communities in the vicinity of airports.[6]

The level of noise acceptable to a reasonable person residing in the vicinity of an airport is established as a CNEL value of 65 dB for purposes of these regulations. This criterion level has been chosen for reasonable persons residing in urban residential areas where houses are of typical California construction and may have windows partially open. It has been selected with reference to speech, sleep, and community reaction.[7]

The Division of Aeronautics noise standards further define land uses that are incompatible with aircraft noise as follows:[8]

- *Residences, including but not limited to, detached single-family dwellings, multi-family dwellings, high-rise apartments, condominiums and mobile homes, unless:*
  - *An avigation easement for aircraft noise, has been acquired by the airport proprietor;*
  - *A dwelling unit which was in existence at the same location prior to January 1, 1989, and has adequate acoustic insulation to ensure an interior CNEL of 45 dB or less due to aircraft noise in all habitable rooms;*
  - *A residence is a high rise apartment or condominium having an interior CNEL of 45 dB or less in all habitable rooms due to aircraft noise, and an air circulation or air conditioning system, as appropriate;*
  - *A residence exposed to an exterior CNEL less than 80 dB (75 dB if the residence has an exterior normally occupiable private habitable area) where the airport proprietor has made a genuine effort to acoustically treat the residence or acquire avigation easements*

[6] California Code of Regulations (CCR). 1990. Title 21, Subchapter 6, Noise Standards. Register 90. No. 10, 3/10/90. California Division of Aeronautics, Department of Transportation. Sacramento, CA. Article 1, General, Section 5001, p. 219.

[7] Ibid., Article 1, General, Section 5006, p. 224.

[8] Ibid., Article 1, General, Section 5014, pp. 225–226.

for the residence involved, or both, but the property owner has refused to take part in the program; or

- *A residence which is owned by the airport proprietor;*

- *Public and private schools of standard construction for which an avigation easement for noise has not been acquired by the airport proprietor, or that do not have adequate acoustic performance to ensure an interior CNEL of 45 dB or less in all classrooms due to aircraft noise;*
- *Hospitals and convalescent homes for which an avigation easement for noise has not been acquired by the airport proprietor, or that do not have adequate acoustic performance to provide an interior CNEL of 45 dB or less due to aircraft noise in all rooms used for patient care; and*
- *Churches and other places of worship for which an avigation easement for noise has not been acquired by the airport proprietor or that do not have adequate acoustic performance to ensure an interior CNEL of 45 dB or less due to aircraft noise.*

These standards are consistent with the Part 150 guidelines set forth in Section B.3.2.

B.3.4 Los Angeles CEQA Standards

The City of Los Angeles has adopted guidelines for preparing CEQA analyses. The guidelines define standards for land uses that are incompatible with aircraft noise based directly on the Division of Aeronautics noise standards presented in Section B.3.3.[9] As noted previously, these standards are consistent with the FAA's Part 150 guidelines set forth in B.3.2.

B.3.5 LAWA Thresholds

On behalf of the City of Los Angeles, LAWA has prepared and made a Part 150 submission for VNY to the FAA.[10] In that submission, LAWA and the City of Los Angeles officially adopted the FAA guidelines from Part 150 as the basis for determining the compatibility of surrounding land uses with noise exposure associated with operations at the airport.

[9] City of Los Angeles. 2006. *L.A. CEQA Thresholds Guide*. Environmental Affairs Department. Los Angeles, CA, p. I.4-3–I.4-4.

[10] City of Los Angeles, Los Angeles World Airports. 2003. *Van Nuys Airport Part 150 Study*. Los Angeles, CA. Prepared by Environmental Management Division.

B.4

DEVELOPMENT OF VNY NOISE CONTOURS

B.4.1 Introduction

The L.A. CEQA Thresholds Guide (City of Los Angeles, 2006, p. I.4-5) requires the use of the FAA's Integrated Noise Model (INM) to prepare CNEL contours for civilian airports. Appendix A of FAR Part 150 provides standards to be followed in applying the INM. Those standards were followed in preparing contours for this EIR, using the most recent release of the INM available at the time (i.e., version 7.0).

The following sections will describe the required inputs to the INM, except for details on the aircraft fleet mix and operations, which are described in Chapter ~~4 of this report~~5 of the Noise Technical Report (Appendix B).

B.4.2 INM Input Requirements

The INM contains the necessary algorithms to compute the necessary aircraft flight profiles and noise metrics; however, there are various airport-specific details that must be determined to make the model results specific to the desired airport. Therefore, various INM input parameters were researched, collected, and derived through close communications with the FAA and airport staffs. The following INM input requirements are discussed in greater detail in the sections noted:

- VNY Physical Parameters (B.4.3)
- VNY Runway Utilization (B.4.4)
- VNY Flight Track Geometry and Utilization (B.4.5)
- VNY Overflight Flight Track Geometry and Utilization (B.4.6)
- VNY Meteorological Data (B.4.7)
- Aircraft Noise and Performance Characteristics (B.4.8)

B.4.3 VNY Physical Parameters

VNY is located in the San Fernando Valley of Los Angeles, California. The airport is surrounded by various communities, including Van Nuys, Sherman Oaks, North Hills, Reseda, Encino, and Lake Balboa. Figure B.4.1 presents the VNY airport layout.

VNY has two parallel operational runways: Runway 16R/34L and Runway 16L/34R. The primary runway, Runway 16R/34L, is 8,001 feet long and 150 feet wide. Runway 16L/34R is 4,011 feet long and 75 feet wide. Both runways have a negative gradient of 0.7% from north to south. The published airport elevation is 799 feet above mean sea level.

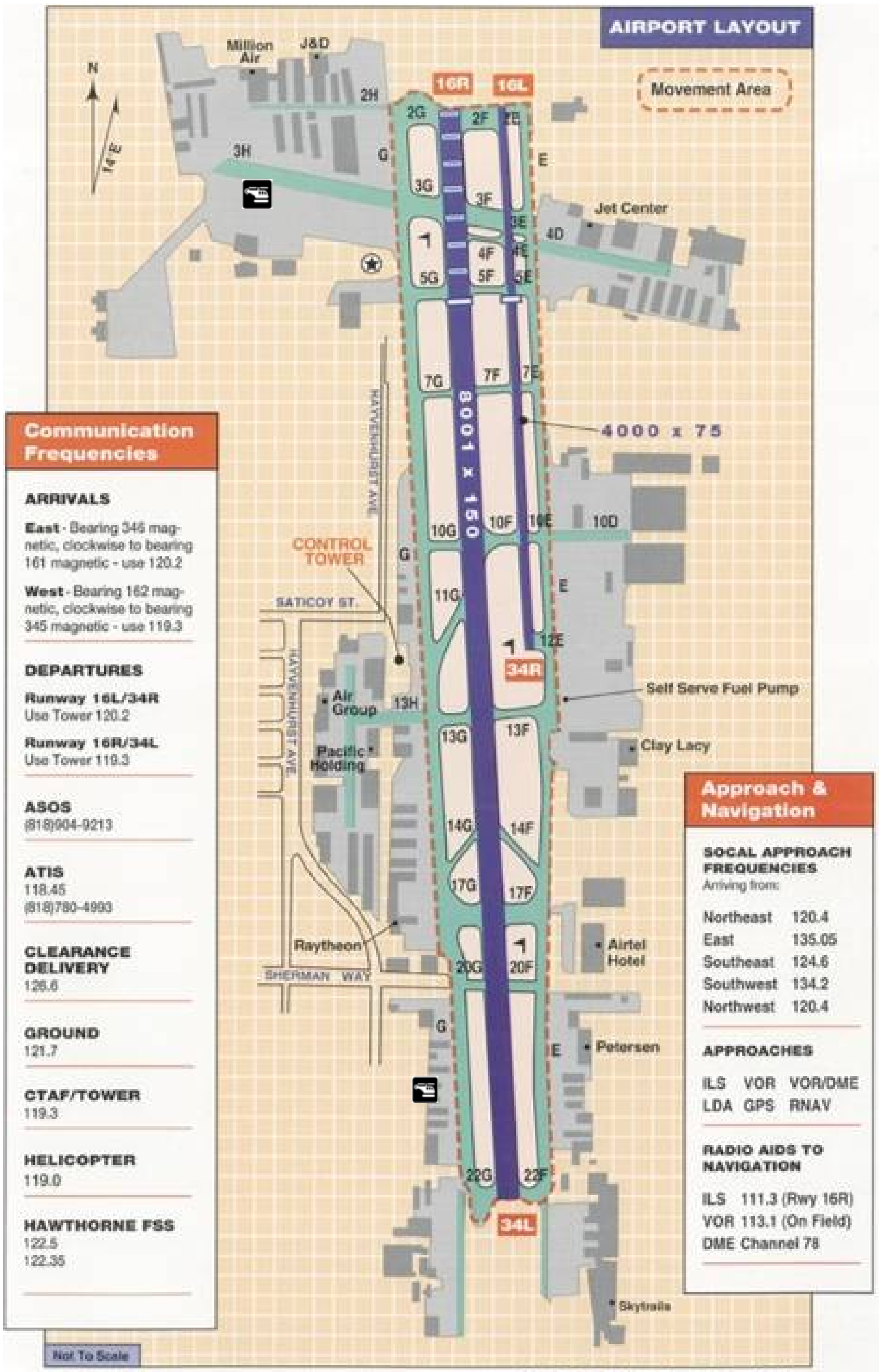
The INM includes an internal database on the airport layout, including runway locations, orientation, start of takeoff roll points, runway end elevations, landing thresholds, approach angles, etc. These data were verified with VNY sources and cross checked with the recent Part 150 submittal and quarterly LAWA noise contour INM studies.

Both Runways 16R and 16L have displaced arrival thresholds of 1,431 feet. Runway 16R has an approach angle of 3.9 degrees, while the other runways have standard approach angles of 3 degrees.

VNY helicopter operations operate primarily from the old National Guard ramp on the northwest portion of the airport and from Fixed Base Operators (FBOs) located on the southwestern portion of the airport between taxiways 20G and 22G. Modeling helipads were created in these two locations: HNW in the northwest and HSW in the southwest. These helipads are denoted with a small helicopter icon.

Figure B.4.1 VNY Airport Layout

Source: LAWA



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B.4.4 VNY Runway Utilization

B.4.4.1 Fixed-Wing Aircraft

The FAA Automated Radar Terminal System (ARTS) data for January 2004–June 2005 was used in conjunction with the Part 150 study, LAWA quarterly contour models, the LAWA Van Nuys Data System (VNDS), and LAWA annual runway utilization reports for 2004 and 2005 to determine representative runway utilizations for the fixed-wing aircraft. In addition, discussions with the FAA Air Traffic Control Tower (ATCT) manager provided information on local patterns and runway intersection departure use rates by propeller and turboprop aircraft.

After reviewing all the available information, the derived runway use was based primarily on the LAWA annual runway utilization statistics for years 2004 and 2005 and the VNDS listing of jet operations. The LAWA statistics listed average annual hourly use rates, which were then converted to average annual daily rates. The VNDS listing was used to determine the jet utilization rates for each runway end. After determining the jet usage, which was confined to Runway 16R/34L, HMMH made an assumption that 9% of the total operations were helicopter related and then determined the utilization rates for the propeller aircraft. Table B.4.1 presents the modeled runway use for arrival and departure operations for all modeled cases for the fixed-wing aircraft split into day (7:00 a.m.–7:00 p.m.), evening (7:00 p.m.–10:00 p.m.), and night (10:00 p.m.–7:00 a.m.).

Table B.4.1 Runway Utilization for Fixed-Wing Aircraft Arrivals and Departures

Source: 2004–2005 ARTS Data, LAWA VNDS, LAWA Runway Statistics, HMMH

Aircraft Group	Runway	Departures			Arrivals		
		Day	**Evening**	**Night**	**Day**	**Evening**	**Night**
Jets	16L	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	16R	0.8384	0.8180	0.7887	0.8306	0.8049	0.8580
	34L	0.1616	0.1820	0.2113	0.1394	0.1951	0.1420
	34R	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Props	16L	0.2293	0.3100	0.2338	0.3729	0.2495	0.3116
	16R	0.5900	0.5280	0.5687	0.4401	0.5508	0.4851
	34L	0.1190	0.1328	0.1975	0.1038	0.1383	0.2033
	34R	0.0617	0.0292	0.0000	0.0832	0.0614	0.0000

Local pattern operations are limited to propeller aircraft. Approximately 90% of local patterns are flown on the shorter runway, 16L/34R, with a pattern altitude of 1,000 feet above field elevation (AFE), with a left pattern for 16L and a right pattern for 34R. Local patterns flown on 16R/34L have a pattern altitude of 1,200 feet AFE, with a right pattern for Runway 16R and a left pattern for 34L. Repetitive operations are not permitted during nighttime hours. Using an approximate 80/20 spilt for south and north operations, respectively, HMMH developed the runway utilization rates for local patterns, which are summarized in Table B.4.2.

Table B.4.2 Runway Utilization Rates for Local Pattern Operations

Source: LAWA Part 150, LAWA Runway Statistics, FAA ATCT, HMMH

	Time of Day		
Runway	**Day**	**Evening**	**Night**
16L	0.7200	0.7200	0.0000
16R	0.0800	0.0800	0.0000
34L	0.0200	0.0200	0.0000
34R	0.1800	0.1800	0.0000

These runway utilization rates were then applied to the fixed-wing flight operations detailed in Section 4.2.5 and assumed to apply to all case years.

B.4.4.2 Helicopters

Helicopter radar data showed operations to and from VNY centered primarily around two areas: the aircraft ramp area to the northwest in the vicinity of taxiway 3H and the aircraft ramp area southwest of the runways between taxiways 20G and 22 G. HMMH developed helipads at these locations (HNW and HSW), with accompanying helicopter flight tracks derived from the available radar data. These tracks closely follow the six established helicopter routes: Stagg, Flood Basin, Bull Creek, Saticoy, Tracks West, and Balboa. The general helicopter radar flight tracks were used to develop the individual helipad use, which is summarized in Table B.4.3.

Table B.4.3 Helipad Utilization Rates for Helicopter Arrivals and Departures

Source: 2004–2005 ARTS Data, HMMH

	Departures			**Arrivals**		
Helipad	**Day**	**Evening**	**Night**	**Day**	**Evening**	**Night**
HNW	0.5278	0.7769	0.5603	0.3595	0.3710	0.2828
HSW	0.4722	0.2231	0.4397	0.6405	0.6290	0.7172

These helipad utilization rates were then applied to the helicopter flight operations detailed in Section 5 and assumed to apply to all case years.

The FAA, working in cooperation with LAWA and operators, has established six helicopter ingress and egress routes at VNY and associated altitude minimums. These routes and altitudes are designed to maximize the safety and efficiency of traffic control and mitigate the noise impact on the adjacent communities. The VNY ATCT and individual operators enter into formal "letters of agreement" (LOAs) to implement this program. The following two pages present a sample copy of an LOA. The helicopter modeling flight tracks discussed and depicted in the next section are based on actual radar observations of helicopter operations that reflect a strong central tendency along these preferred routes.

Sample Helicopter Letter of Agreement (page 1 of 2)

Source: VNT ATCT

LETTER OF AGREEMENT

EFFECTIVE: November 15, 2001

SUBJECT: Helicopter Operations and SVFR Separation Minima

1. PURPOSE. To establish procedures for the operation and control of helicopters. The goal is to ensure safe and efficient aircraft operations while minimizing noise impact on the surrounding community.

2. SCOPE. These procedures apply to VFR and SVFR operations in the Van Nuys Class Delta airspace. Use of these procedures are limited to signatories of this agreement.

3. RESPONSIBILITIES.

a. All signatories to this agreement shall ensure that their pilots are familiar with and adhere to the provisions herein.

b. Nothing in this letter shall be construed as approval or permission to violate any Federal Aviation Regulations (FAR) or other regulation. Each pilot shall be responsible for advising ATC if a deviation from any part of this agreement is necessary to comply with any regulation.

5. PROCEDURES.

a. General.

(1) VFR and SVFR operations shall be conducted using routes and altitudes specified in Attachment 1 of this Letter of Agreement unless otherwise authorized by ATC.

(2) Pilots shall climb to or descend from the specified altitude within the boundary of Van Nuys Airport unless otherwise authorized by ATC.

(3) Pilots shall contact Van Nuys Helicopter Control prior to entering the Van Nuys Class Delta airspace.

(4) Runway crossings shall be accomplished at midfield unless otherwise instructed by ATC.

(5) All arrivals to and departures from areas not visible from the tower will be at pilot's own risk.

(6) Unless otherwise directed by ATC, helicopters shall squawk 1204 prior to entering and while operating in Van Nuys Class Delta Airspace.

b. Special VFR. SVFR helicopters shall maintain visual reference to the surface and shall be provided the following aircraft separation minima:

(1) 1 mile between SVFR helicopters. This separation may be reduced to 200 feet if both helicopters are departing simultaneously on courses that diverge by at least 30 degrees and;

(a) The tower can determine this separation by reference to surface markings, or;

(b) One of the departing helicopters is instructed to remain at least 200 feet from the other.

(2) Between a SVFR helicopter and an arriving or departing IFR aircraft:

(a) 1/2 mile if the IFR aircraft is less than 1 mile from the landing airport.

(b) 1 mile if the IFR aircraft is 1 mile or more from the landing airport.

Sample Helicopter Letter of Agreement (page 2 of 2)

Source: VNT ATCT

VAN NUYS TOWER AND
Letter of Agreement
Subject: Helicopter Operations and SVFR Separation Minima
Effective: November 15, 2001

Attachment
Page 1

VFR AND SVFR HELICOPTER ROUTES

STAGG (INDUSTRIAL) DEPARTURE - Proceed east via Stagg Street to the San Diego Freeway thence northbound or southbound via the freeway or eastbound over the industrial area. Altitude: 1300 feet MSL. (See Note 1)

STAGG (INDUSTRIAL) ARRIVAL - Proceed inbound via the San Diego Freeway or the industrial area east of the freeway to Stagg Street thence via Stagg Street to the airport. Altitude: 1300 feet MSL. (See Note 1)

FLOOD BASIN DEPARTURE (BASIN SOUTH) (RUNWAY 16 IN USE) - Proceed straight out via Runway 16R, continue over the golf course to the flood basin thence on course. Altitude: 1300 feet MSL. (See Note 2)

SATICOY DEPARTURE - Proceed westbound via Saticoy Street. Altitude: 1300 feet MSL. (Pilots may request higher altitude after passing Balboa Blvd.)

SATICOY ARRIVAL - Proceed eastbound via Saticoy Street. Altitude: 1300 feet MSL.

BALBOA DEPARTURE - Proceed westbound via Saticoy Street thence northbound via Balboa Blvd. Altitude: 1300 feet MSL. (Pilots may request higher altitude after passing Nordhoff Street.)

BALBOA ARRIVAL - Proceed southbound via Balboa Blvd. thence via Saticoy Street. Altitude: 1300 feet MSL.

TRACKS ARRIVAL/DEPARTURE - Proceed to and from Van Nuys Airport via the Southern Pacific Railroad tracks west of the airport. Altitude: 1300 feet MSL.

BULL CREEK ARRIVAL/DEPARTURE - Proceed to and from Van Nuys Airport via the Bull Creek. Altitude: 1300 feet MSL. (Least preferred - See Note 2)

NOTE 1 - THE STAGG ARRIVAL/DEPARTURE ROUTE FOLLOWS THE INDUSTRIAL AREA LOCATED BETWEEN THE TWO LARGE WORLD WAR II ERA HANGERS AND THE RAILROAD TRACKS. THE AIRPORT ROTATING BEACON ALIGNS IN AN EAST/WEST DIRECTION WITH THE STAGG (INDUSTRIAL) ROUTE.

NOTE 2 - FOR NOISE ABATEMENT, THE FLOOD BASIN DEPARTURE SHOULD BE REQUESTED TO THE EXTENT POSSIBLE.

GENERAL NOTE - ALTITUDES ABOVE 1300 FEET MSL FOR NOISE ABATEMENT MUST BE REQUESTED BY THE PILOT. TOWER WILL TRY TO APPROVE YOUR REQUEST. THE AIRPORT MANAGER ENCOURAGES HIGHER ALTITUDES WHEN TRAFFIC AND WEATHER PERMITS, ESPECIALLY AT NIGHT AND DURING EARLY MORNING HOURS.

B.4.5 VNY Flight Track Geometry and Use

ARTS data from July 1, 2004, through June 30, 2005, were used to sample more than 166,000 tracks for use in developing INM model flight tracks. In addition, during the VNY noise measurement program, observations recorded various flight tracks flown for arriving and departing aircraft as well as the local patterns and incorporated this information into the modeling process. Flight tracks for local pattern activity were based solely on observations.

Displaying the radar tracks in the INM enabled the development of the central track or "backbone" track and the addition of "sub-tracks" on either side of the backbone to better represent the dispersal of actual tracks. Most modeled flight tracks consisted of the backbone track with four sub-tracks on either side. The overall width of the sub-track distribution was defined based on the area spanned by the actual radar tracks being modeled. The flight operations modeled on each central track group were allocated across a total of nine tracks using the INM standard distribution.

Aircraft were grouped into three major subgroups: jets, propeller aircraft, and helicopters. Each subgroup was treated independently and evaluated for the three time-of-day periods: day, evening, night. Figures B.4.2 through B.4.17 present the resulting modeled flight tracks for each of the aircraft groups for arrivals and departures and for touch-and-go pattern operations.

Based on information from the ATCT, it was assumed that propeller aircraft conducted takeoffs that started at the taxiway intersections listed below (i.e., rather than using the full runway length) 15% of the time. The intersections are labeled in Figure B.4.1 as follows:

- Intersection 5E/5F for Runway 16L,
- Intersection 10G/10L for Runway 16R,
- Intersection 13G/13F for Runway 34L, and
- Intersection 10E/10F for Runway 34.

The intersection takeoffs were modeled on the same flight tracks depicted in Figures B.4.10 through B.4.13; the initial straight segments of each of these tracks were shortened to account for the start of takeoff roll displacement.

Tables following the figures define flight track utilization rates.

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Figure B.4.2 Modeled Flight Tracks for Runway 16R Jet Arrivals

Source: HMMH

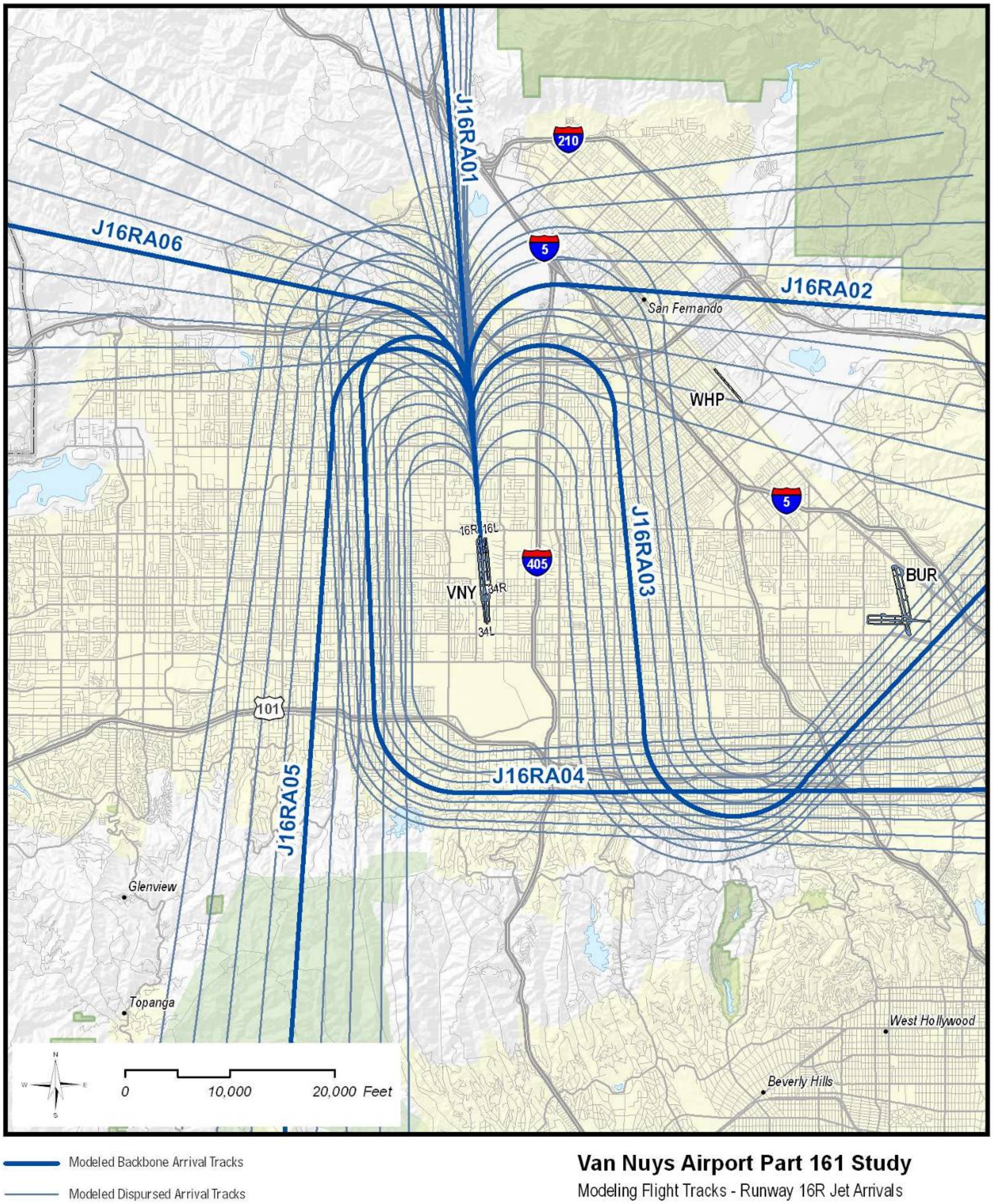

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Figure B.4.3 Modeled Flight Tracks for Runway 34L Jet Arrivals

Source: HMMH

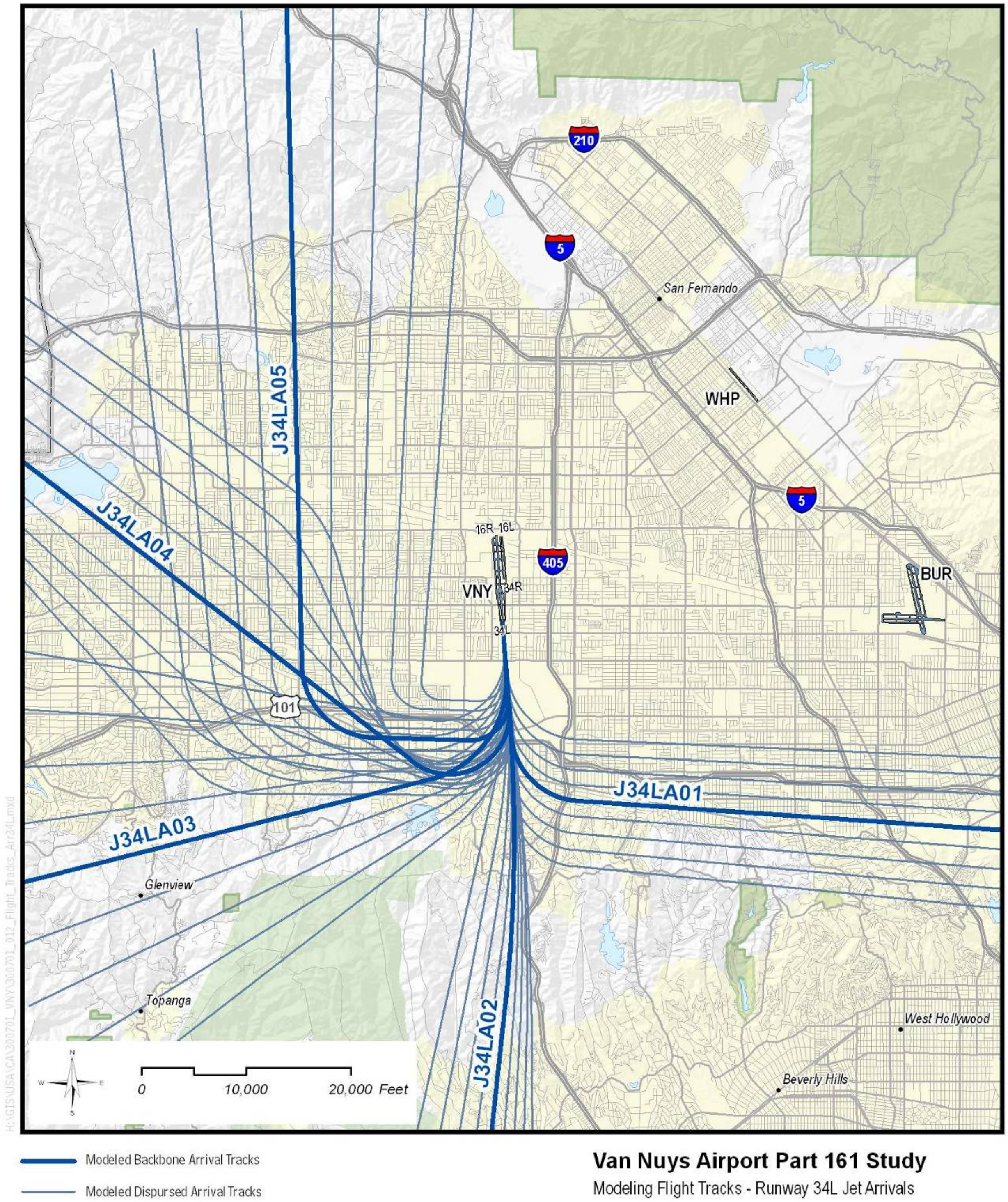

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Figure B.4.4 Modeled Flight Tracks for Runway 16R Jet Departures

Source: HMMH

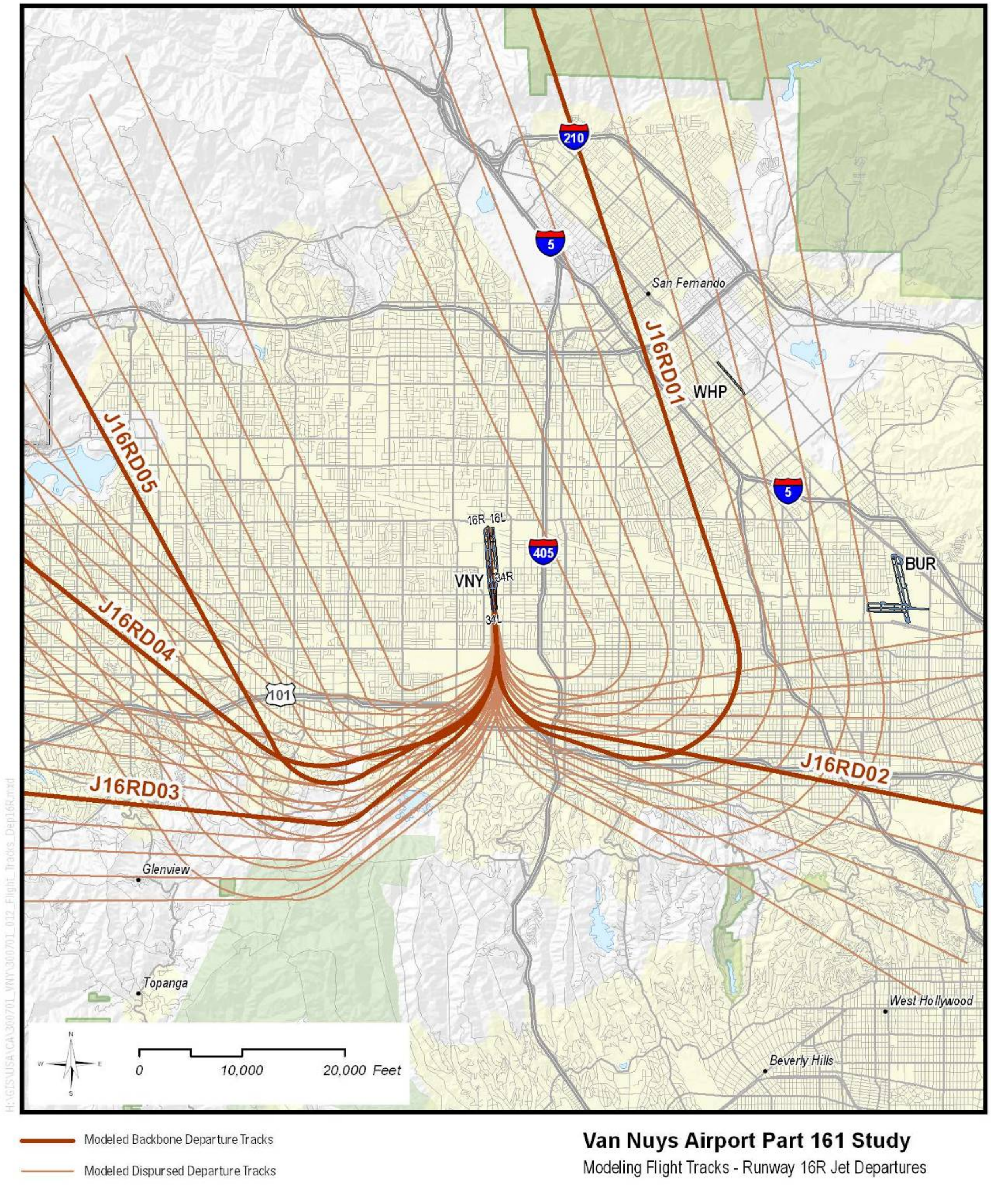

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Figure B.4.5 Modeled Flight Tracks for Runway 34L Jet Departures

Source: HMMH

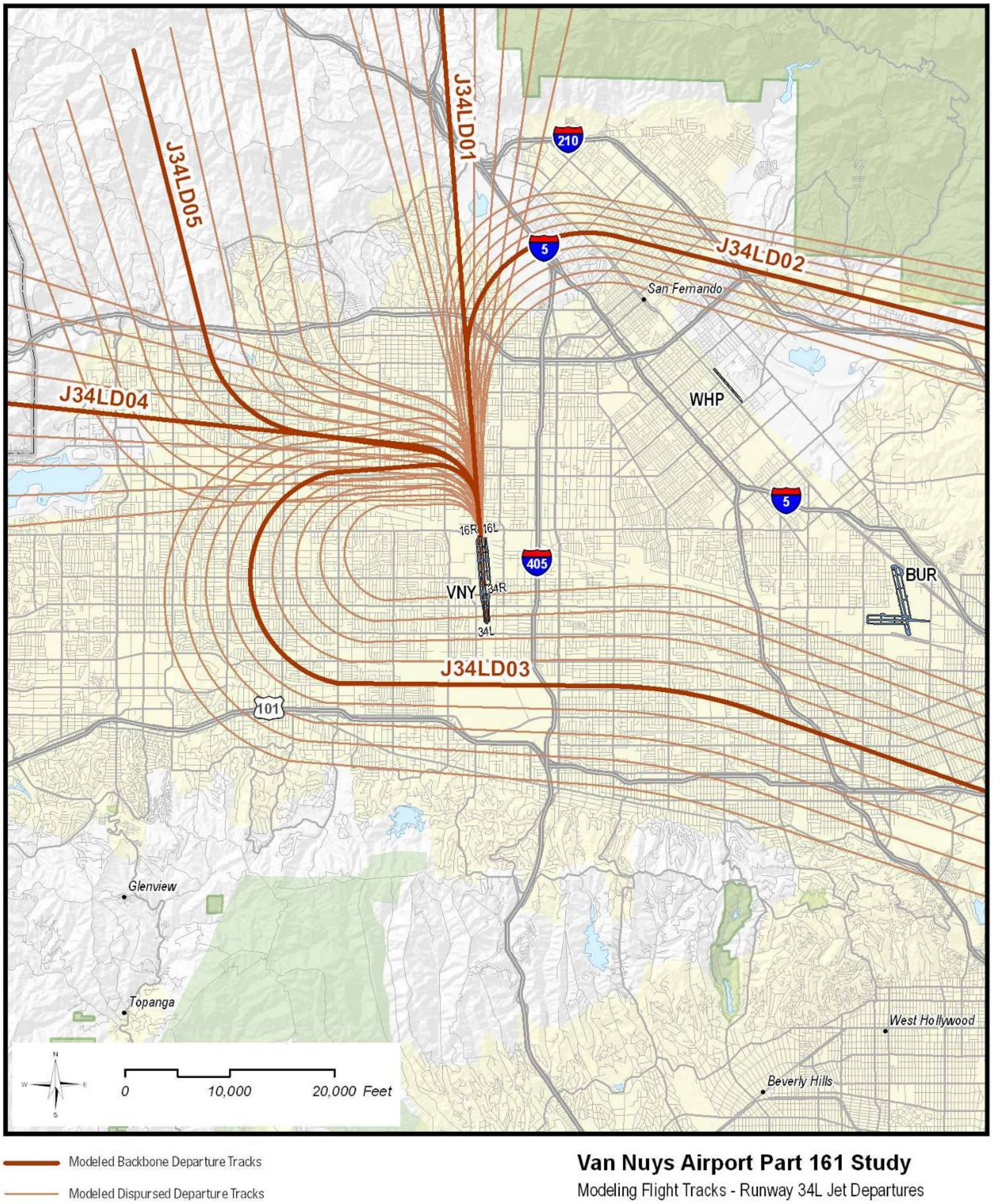

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Figure B.4.6 Modeled Flight Tracks for Runway 16L Propeller Arrivals

Source: HMMH

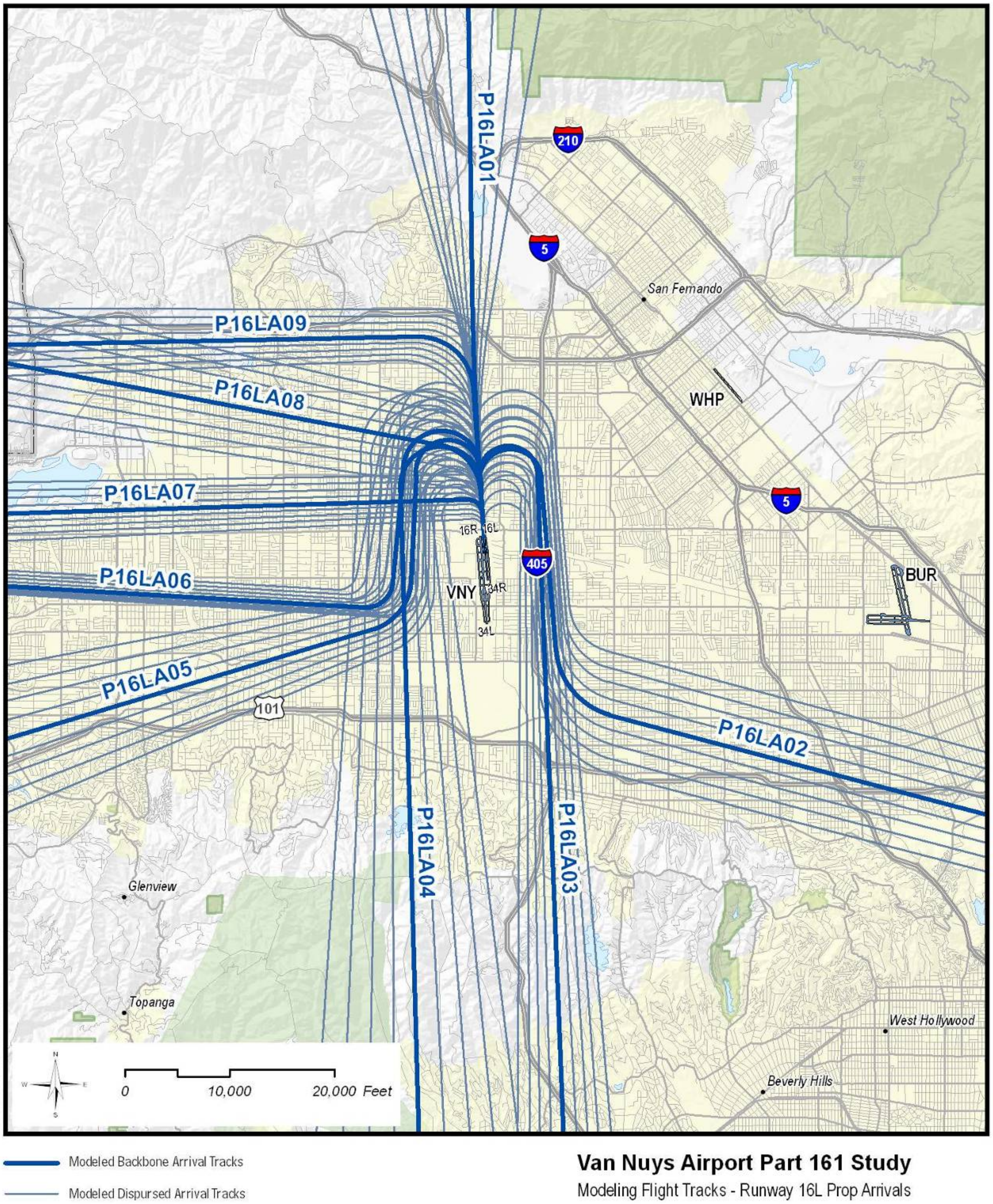

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Figure B.4.7 Modeled Flight Tracks for Runway 16R Propeller Arrivals

Source: HMMH

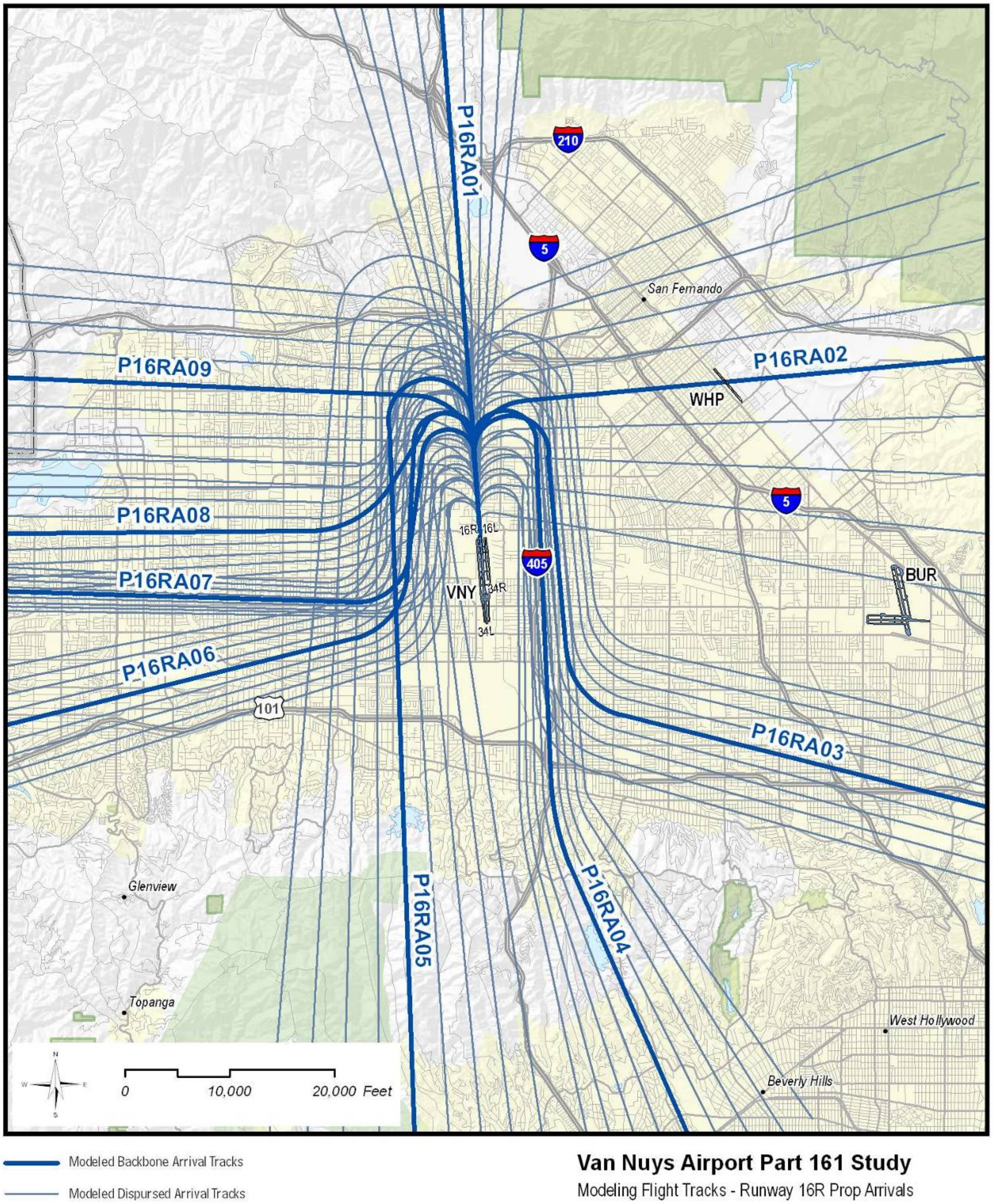

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Figure B.4.8 Modeled Flight Tracks for Runway 34L Propeller Arrivals

Source: HMMH

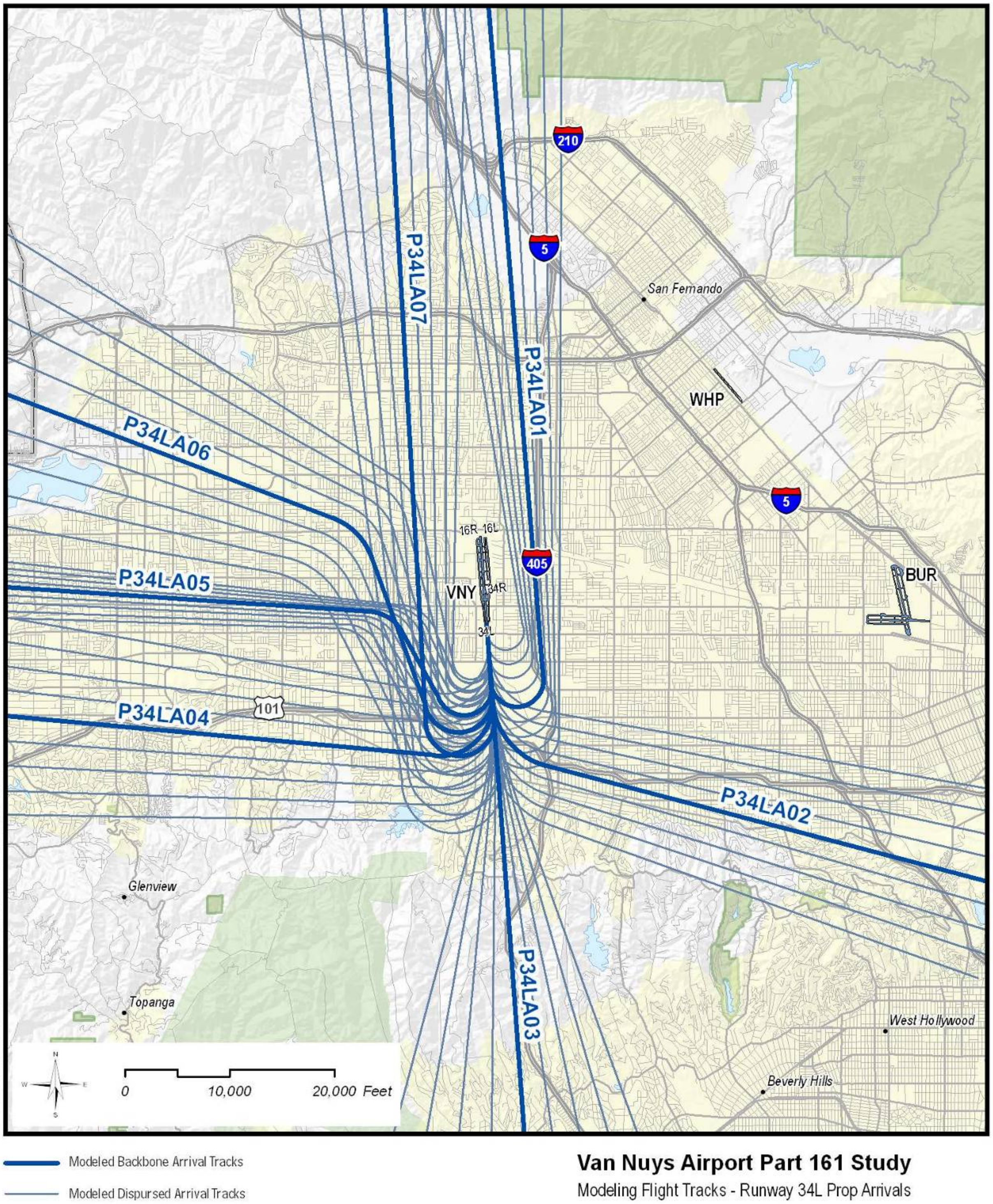

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Figure B.4.9 Modeled Flight Tracks for Runway 34R Propeller Arrivals

Source: HMMH

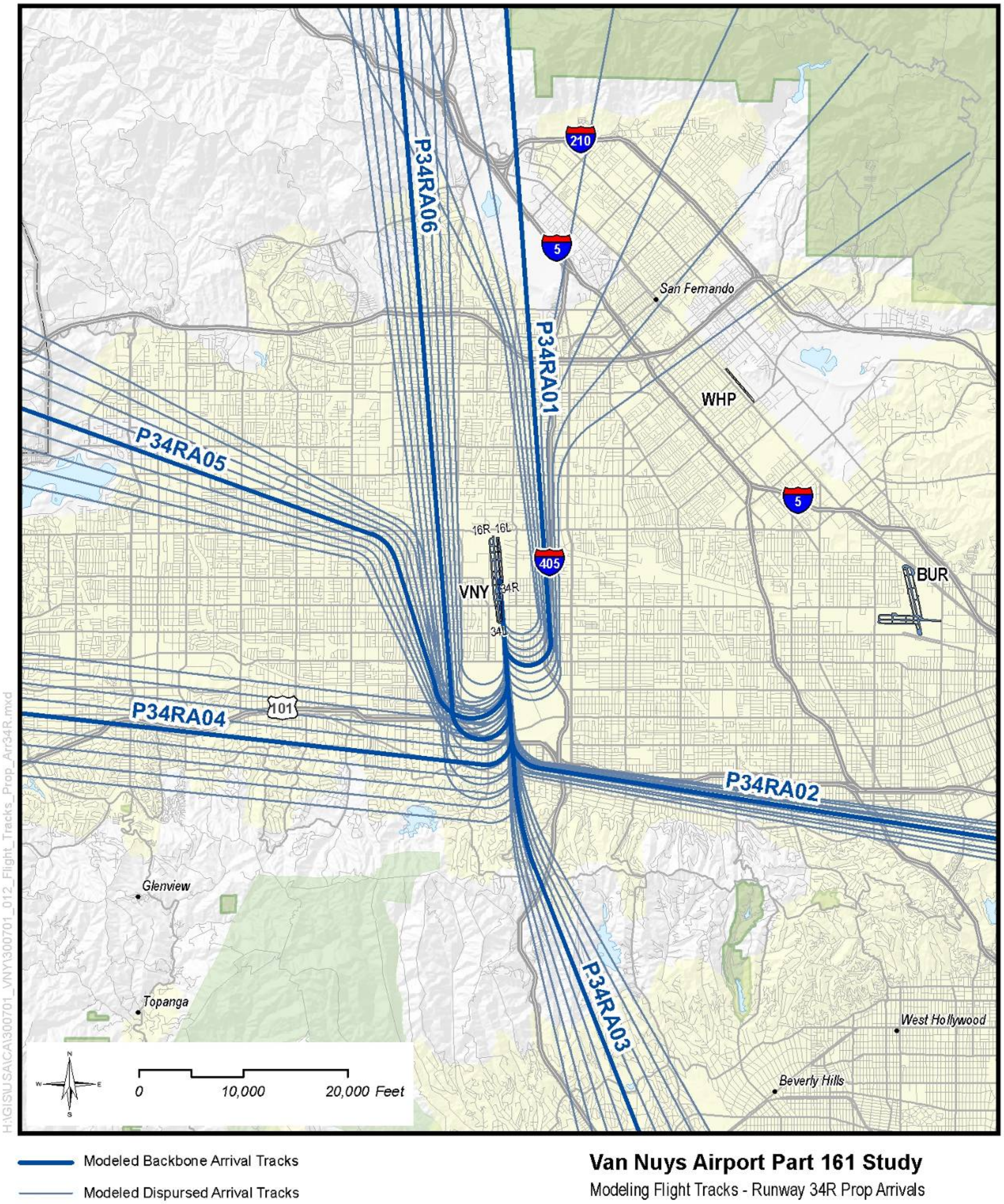

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Figure B.4.10 Modeled Flight Tracks for Runway 16L Propeller Departures

Source: HMMH

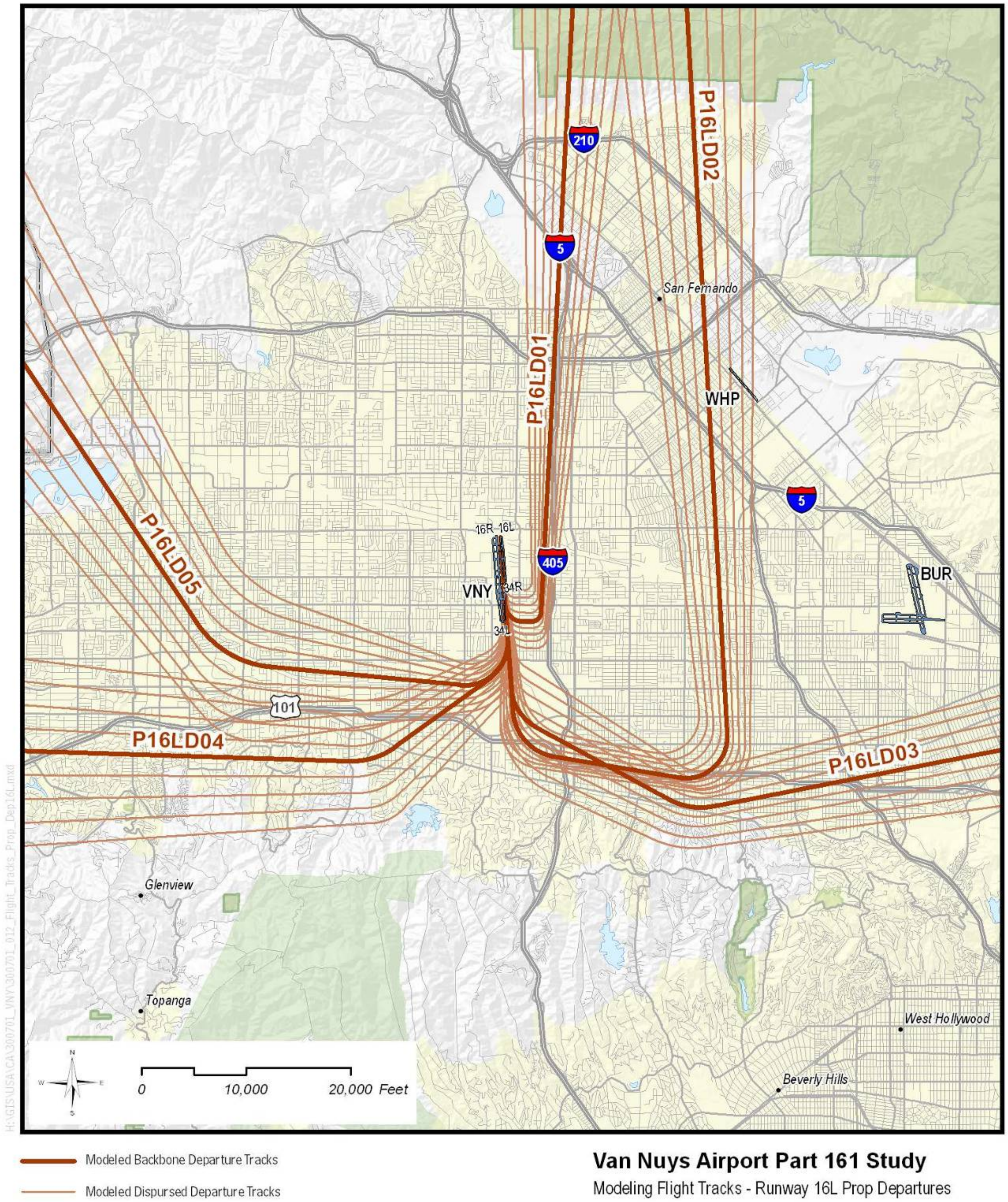

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Figure B.4.11 Modeled Flight Tracks for Runway 16R Propeller Departures

Source: HMMH

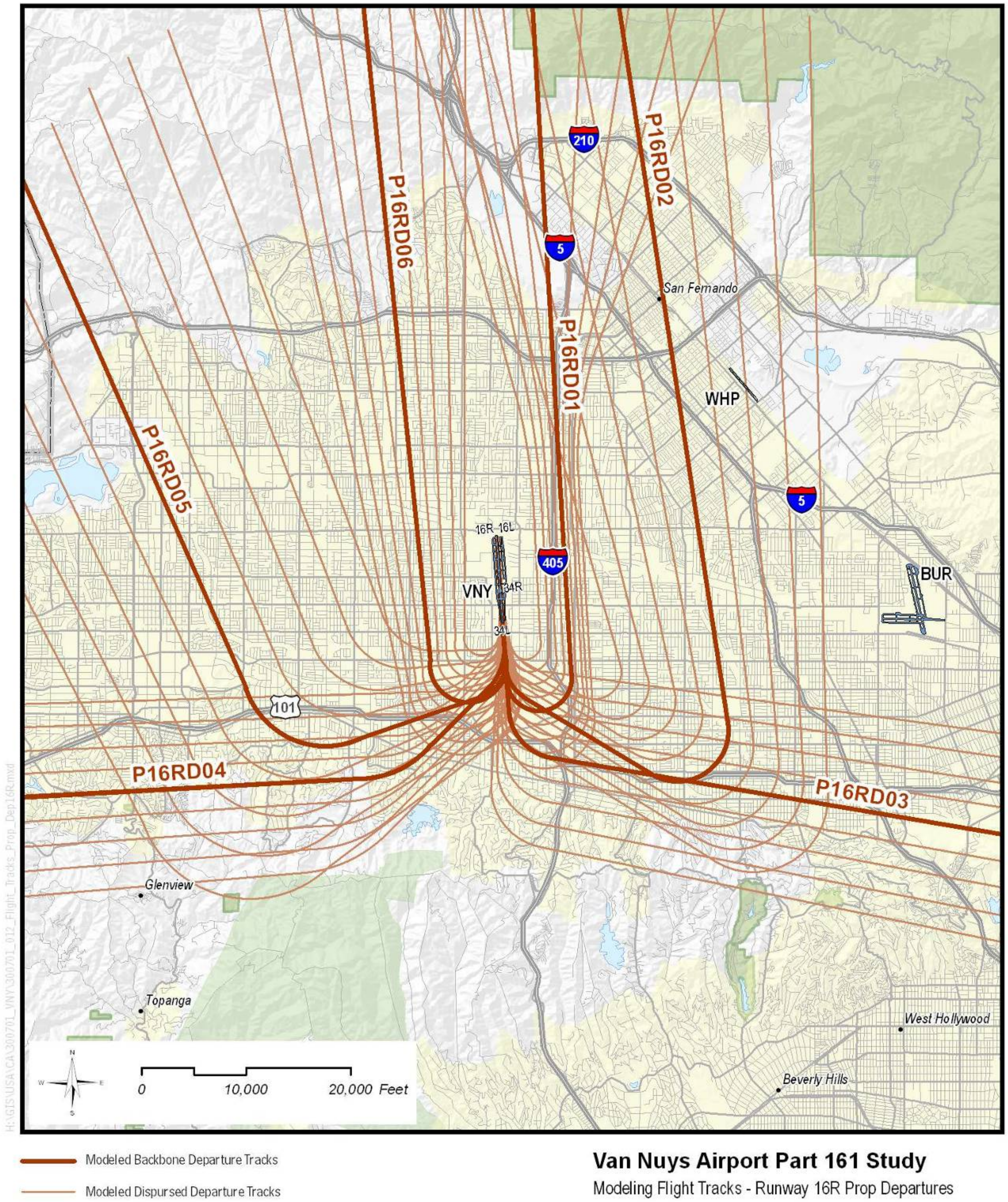

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Figure B.4.12 Modeled Flight Tracks for Runway 34L Propeller Departures

Source: HMMH

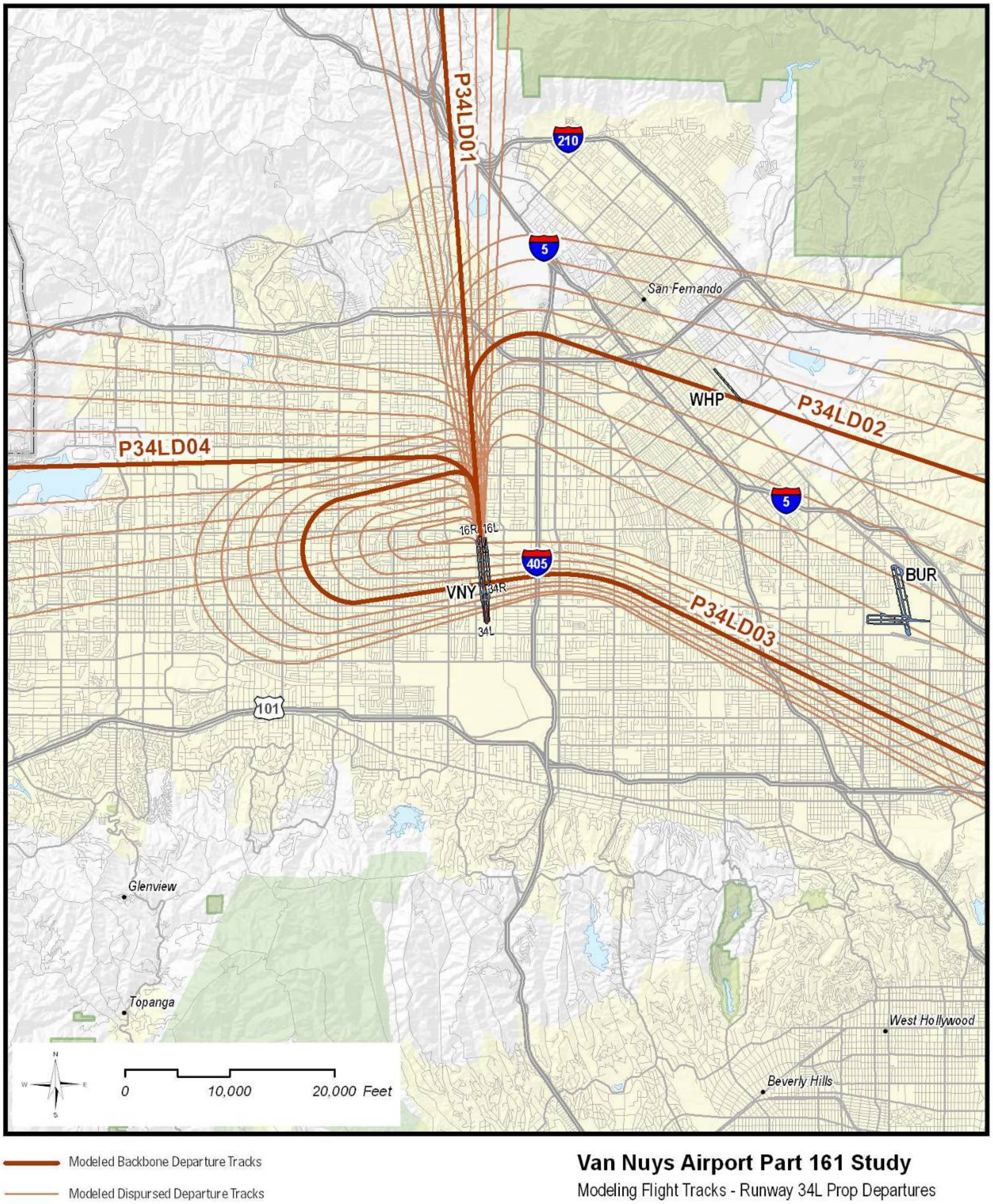

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Figure B.4.13 Modeled Flight Tracks for Runway 34R Propeller Departures

Source: HMMH

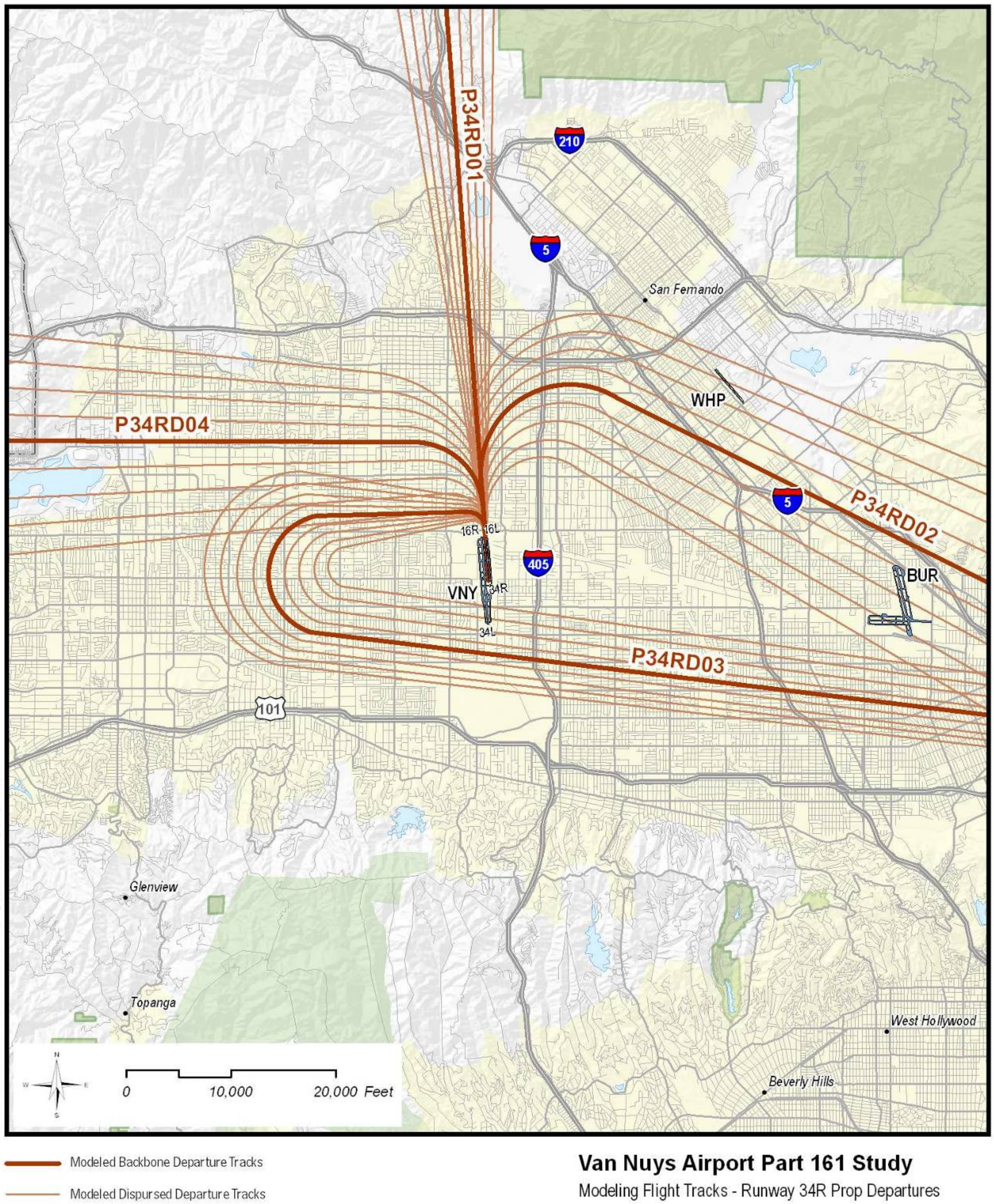

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Figure B.4.14 Modeled Flight Tracks for Helicopter Arrivals

Source: HMMH

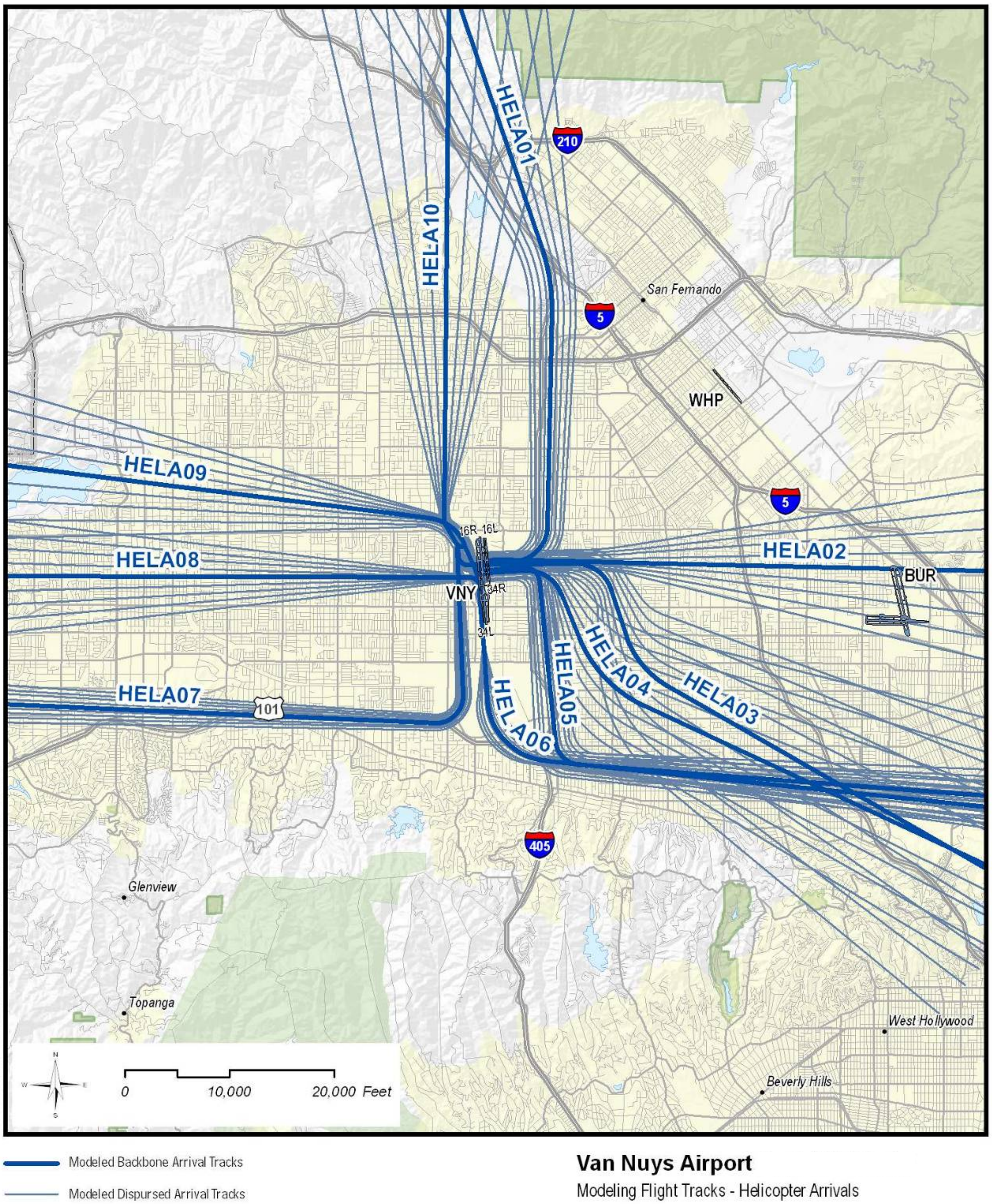

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Figure B.4.15 Modeled Flight Tracks for Helicopter Departures

Source: HMMH

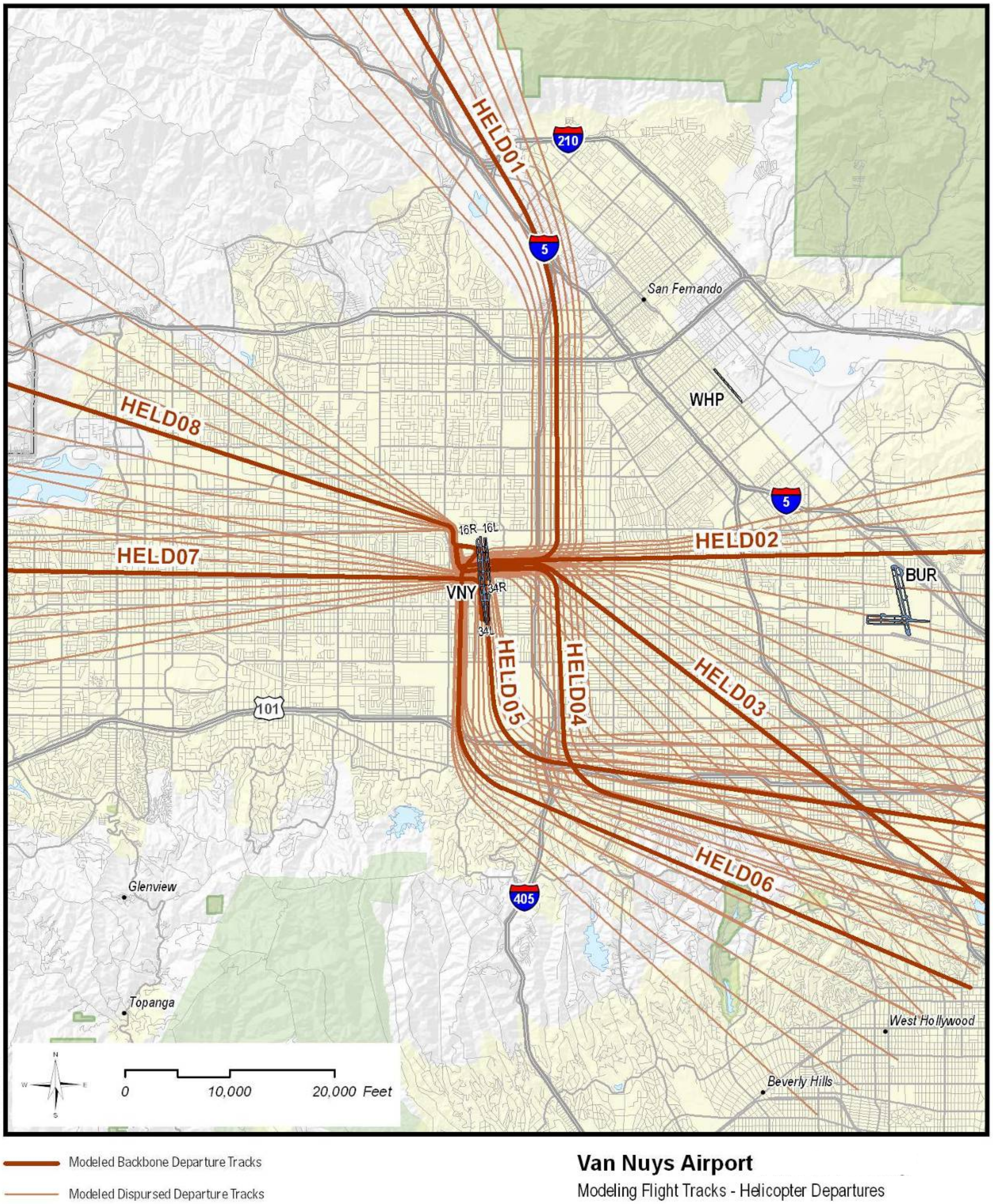

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Figure B.4.16 Modeled Flight Tracks for Runways 16L/16R, Local Pattern

Source: HMMH

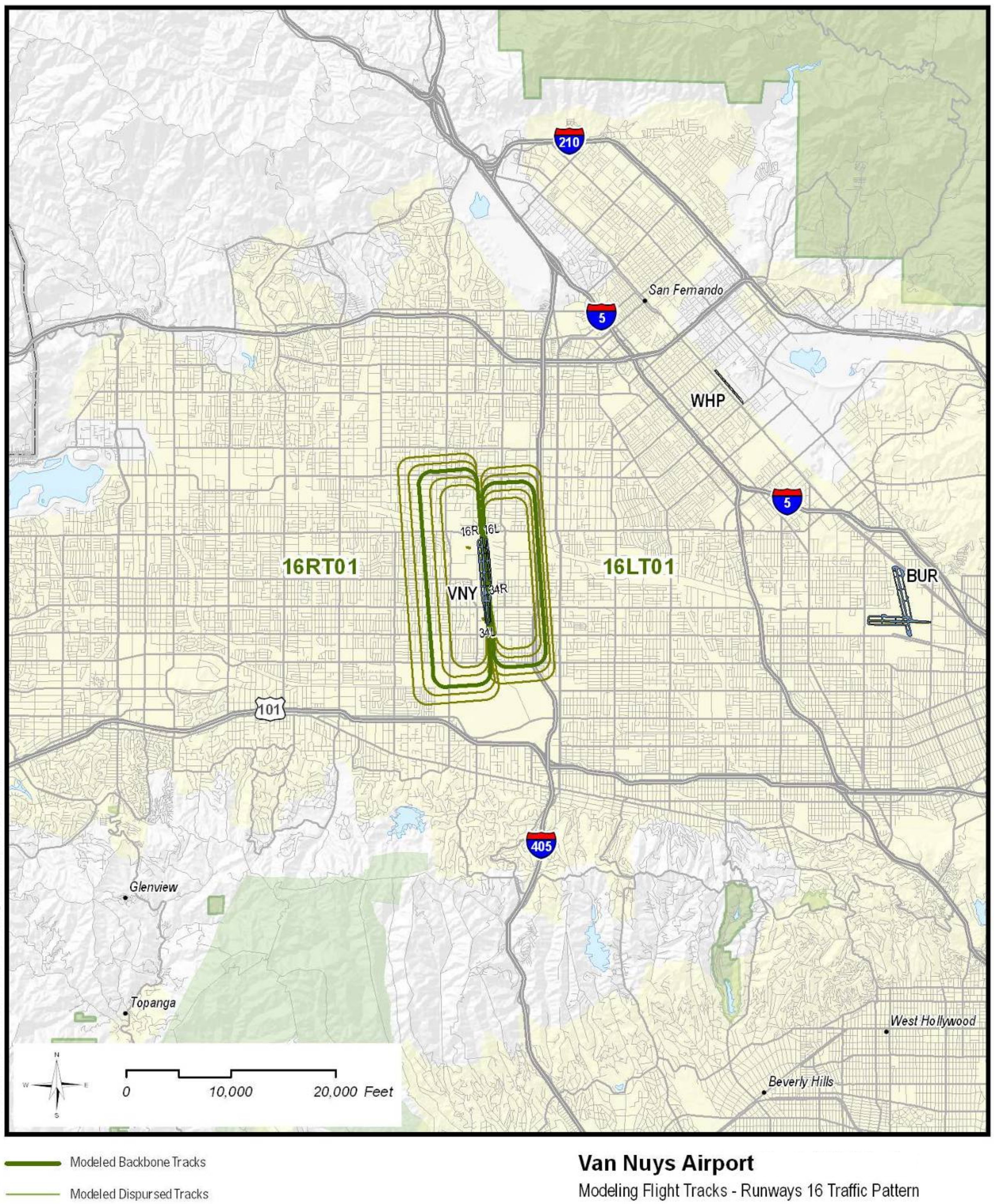

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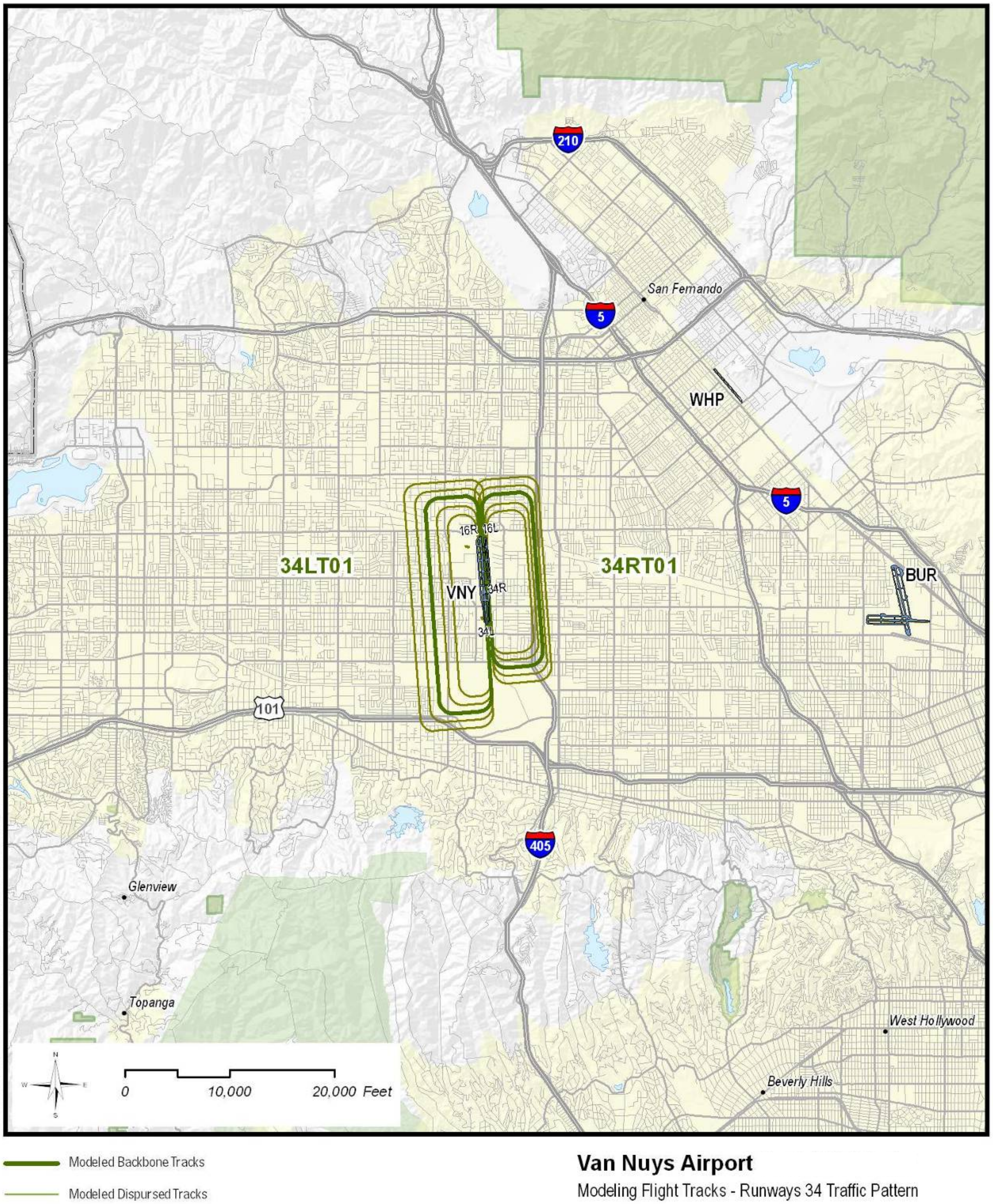
Figure B.4.17 Modeled Flight Tracks for Runways 34L/34R, Local Pattern

Source: HMMH



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Tables B.4.4 and B.4.5 list the flight track utilization rates for departures and arrivals. The flight track nomenclature for fixed-wing aircraft consists of seven or eight characters: first digit = aircraft group (J or P); second through fourth digits = runway (16L, 16R, 34L, 34R); fifth digit = operation (Arrival or Departure); sixth and seventh digits = track number (01, 02, etc.); and eighth digit = intersection departure (I), if appropriate. For example, track P16LD01I is an intersection departure for a propeller aircraft on runway 16L flying track 01. Helicopter track nomenclature consists of three digits (HEL), one digit = operation (Arrival or Departure), and two digits = track number (01, 02, etc.). Local pattern flight tracks were modeled using one track for each runway.

As noted for the runway use, the flight track utilization rates are assumed to apply to the 2007 and future cases.

Table B.4.4 Departure Flight Track Utilization Rates

Source: ARTS 2004–2005 data, FAA ATCT, HMMH

Aircraft Group	Runway/ Helipad	Track Name	Day	Evening	Night
Jet	16R	J16RD01	0.5469	0.5043	0.5673
		J16RD02	0.1331	0.2155	0.1714
		J16RD03	0.0939	0.0560	0.0082
		J16RD04	0.0185	0.0216	0.0327
		J16RD05	0.2076	0.2026	0.2204
	34L	J34LD01	0.1053	0.1154	0.3334
		J34LD02	0.0351	0.0000	0.0000
		J34LD03	0.0947	0.0769	0.0588
		J34LD04	0.2912	0.3846	0.2745
		J34LD05	0.4737	0.4231	0.3333
Propeller	16L	P16LD01	0.1545	0.0000	0.0000
		P16LD01I	0.0273	0.0000	0.0000
		P16LD02	0.0773	0.0000	0.0000
		P16LD02I	0.0136	0.0000	0.0000
		P16LD03	0.2575	0.8500	0.8500
		P16LD03I	0.0455	0.1500	0.1500
		P16LD04	0.2318	0.0000	0.0000
		P16LD04I	0.0409	0.0000	0.0000
		P16LD05	0.1288	0.0000	0.0000
		P16LD05I	0.0228	0.0000	0.0000

Table B.4.4 (cont'd.) Departure Flight Track Utilization Rates

Source: ARTS 2004–/2005 data, FAA ATCT, HMMH

Aircraft Group	Runway/ Helipad	Track Name	Day	Evening	Night
Propeller	16R	P16RD01	0.0139	0.0065	0.0177
		P16RD01I	0.0025	0.0011	0.0031
		P16RD02	0.0887	0.0392	0.1240
		P16RD02I	0.0157	0.0069	0.0219
		P16RD03	0.2996	0.3794	0.3010
		P16RD03I	0.0529	0.0670	0.0531
		P16RD04	0.2494	0.1373	0.0531
		P16RD04I	0.0440	0.0242	0.0094
		P16RD05	0.1300	0.2354	0.3365
		P16RD05I	0.0229	0.0415	0.0594
		P16RD06	0.0683	0.0523	0.0177
		P16RD06I	0.0121	0.0092	0.0031
	34L	P34LD01	0.1337	0.1417	0.1889
		P34LD01I	0.0236	0.0250	0.0333
		P34LD02	0.2340	0.2361	0.0000
		P34LD02I	0.0413	0.0417	0.0000
		P34LD03	0.1003	0.1889	0.0000
		P34LD03I	0.0177	0.0333	0.0000
		P34LD04	0.3820	0.2833	0.6611
		P34LD04I	0.0674	0.0500	0.1167
	34R	P34RD01	0.0507	0.0000	0.0000
		P34RD01I	0.0089	0.0000	0.0000
		P34RD02	0.1142	0.2125	0.0000
		P34RD02I	0.0202	0.0375	0.0000
		P34RD03	0.1015	0.1063	0.1308
		P34RD03I	0.0179	0.0188	0.0231
		P34RD04	0.5836	0.5312	0.7192
		P34RD04I	0.1030	0.0937	0.1269
Helicopter	HNW	HELD01	0.1272	0.2673	0.1231
		HELD03	0.3991	0.4850	0.5076
		HELD05	0.3158	0.1090	0.1077
		HELD06	0.0702	0.0793	0.0308
		HELD08	0.0877	0.0594	0.2308
	HSW	HELD02	0.1176	0.2760	0.2941
		HELD04	0.5197	0.3102	0.2549
		HELD07	0.3627	0.4138	0.4510

Table B.4.5 Arrival Flight Track Utilization Rates

Source: ARTS 2004–2005 data, FAA ATCT, HMMH

Aircraft Group	Runway/ Helipad	Track Name	Day	Evening	Night
Jet	16R	J16RA01	0.6910	0.6643	0.6854
		J16RA02	0.0592	0.0474	0.0955
		J16RA03	0.0219	0.0146	0.0169
		J16RA04	0.0116	0.0000	0.0112
		J16RA05	0.1622	0.1898	0.1180
		J16RA06	0.0541	0.0839	0.0730
	34L	J34LA01	0.1039	0.1096	0.2791
		J34LA02	0.0794	0.1781	0.1628
		J34LA03	0.2627	0.2192	0.1395
		J34LA04	0.1222	0.1918	0.0698
		J34LA05	0.4318	0.3013	0.3488
Propeller	16L	P16LA01	0.3124	0.2000	0.2500
		P16LA02	0.0707	0.0800	0.0000
		P16LA03	0.0629	0.2800	0.0000
		P16LA04	0.1257	0.1600	0.2500
		P16LA05	0.0864	0.0667	0.0000
		P16LA06	0.0334	0.0000	0.0000
		P16LA07	0.0609	0.0267	0.5000
		P16LA08	0.2181	0.1333	0.0000
		P16LA09	0.0295	0.0533	0.0000
	16R	P16RA01	0.3949	0.2536	0.4685
		P16RA02	0.0303	0.0700	0.0759
		P16RA03	0.0618	0.0773	0.0506
		P16RA04	0.0194	0.2464	0.0633
		P16RA05	0.0947	0.0894	0.1139
		P16RA06	0.0750	0.0556	0.0253
		P16RA07	0.0336	0.0290	0.0000
		P16RA08	0.0472	0.0169	0.0759
		P16RA09	0.2431	0.1618	0.1266
	34L	P34LA01	0.0851	0.0556	0.0217
		P34LA02	0.1234	0.2083	0.6957
		P34LA03	0.1929	0.4028	0.1304
		P34LA04	0.2199	0.1250	0.1087
		P34LA05	0.0227	0.0278	0.0000
		P34LA06	0.1560	0.0694	0.0000
		P34LA07	0.2000	0.1111	0.0435
	34R	P34RA01	0.3748	0.0000	0.0000
		P34RA02	0.0313	0.2000	0.2000
		P34RA03	0.2188	0.6000	0.6000
		P34RA04	0.2188	0.0000	0.0000
		P34RA05	0.0625	0.2000	0.2000
		P34RA06	0.0938	0.0000	0.0000

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Table B.4.5 (cont'd.) Arrival Flight Track Utilization Rates

Source: ARTS 2004–2005 data, FAA ATCT, HMMH

Aircraft Group	Runway/ Helipad	Track Name	Day	Evening	Night
Helicopter	HNW	HELA01	0.3179	0.4494	0.3171
		HELA03	0.4271	0.3188	0.4146
		HELA07	0.1722	0.1159	0.1463
		HELA10	0.0828	0.1159	0.1220
	HSW	HELA02	0.1190	0.2137	0.2115
		HELA04	0.2881	0.1966	0.2982
		HELA05	0.1840	0.2649	0.1346
		HELA06	0.1710	0.1880	0.2597
		HELA08	0.1022	0.0769	0.0384
		HELA09	0.1357	0.0599	0.0576

B.4.6 Overflight Track Geometry and Utilization

The operations and fleet mixes used for the aircraft overflights of VNY are detailed in Section 6. These include arrivals to Runway 8 at BUR and other overflights of VNY by aircraft and helicopters. The procedure that was used for VNY arrivals and departures was incorporated here to develop typical overflight routes and utilization. The flight track for all modeled arriving flights at BUR consisted of a straight track corresponding to the ILS and normal VFR arrival to Runway 8. This flight track crosses VNY in the vicinity of Sherman Way. Most modeled flight tracks consisted of the backbone track with two sub-tracks on either side. The overall width of the sub-track distribution was defined based on the area spanned by the actual radar tracks being modeled. The flight operations modeled on each central track group were allocated across a total of five tracks using the INM standard distribution. Figure B.4.18 presents the overflight radar tracks and resulting modeled flight tracks for the aircraft overflights.

To determine the flight track utilization rates of the non-BUR overflight tracks, the radar flight track density was used for each track. The resulting rate was used for all times of day for each identified aircraft. Table B.4.6 lists the overflight flight tracks and their utilization.

Table B.4.6 Overflight Flight Track Utilization Rates

Source: ARTS 2004–2005 data, HMMH

Track Name	Utilization Rate All Times of Day
OVFT01	0.2530
OVFT02	0.2530
OVFT03	0.1807
OVFT04	0.1807
OVFT05	0.1326

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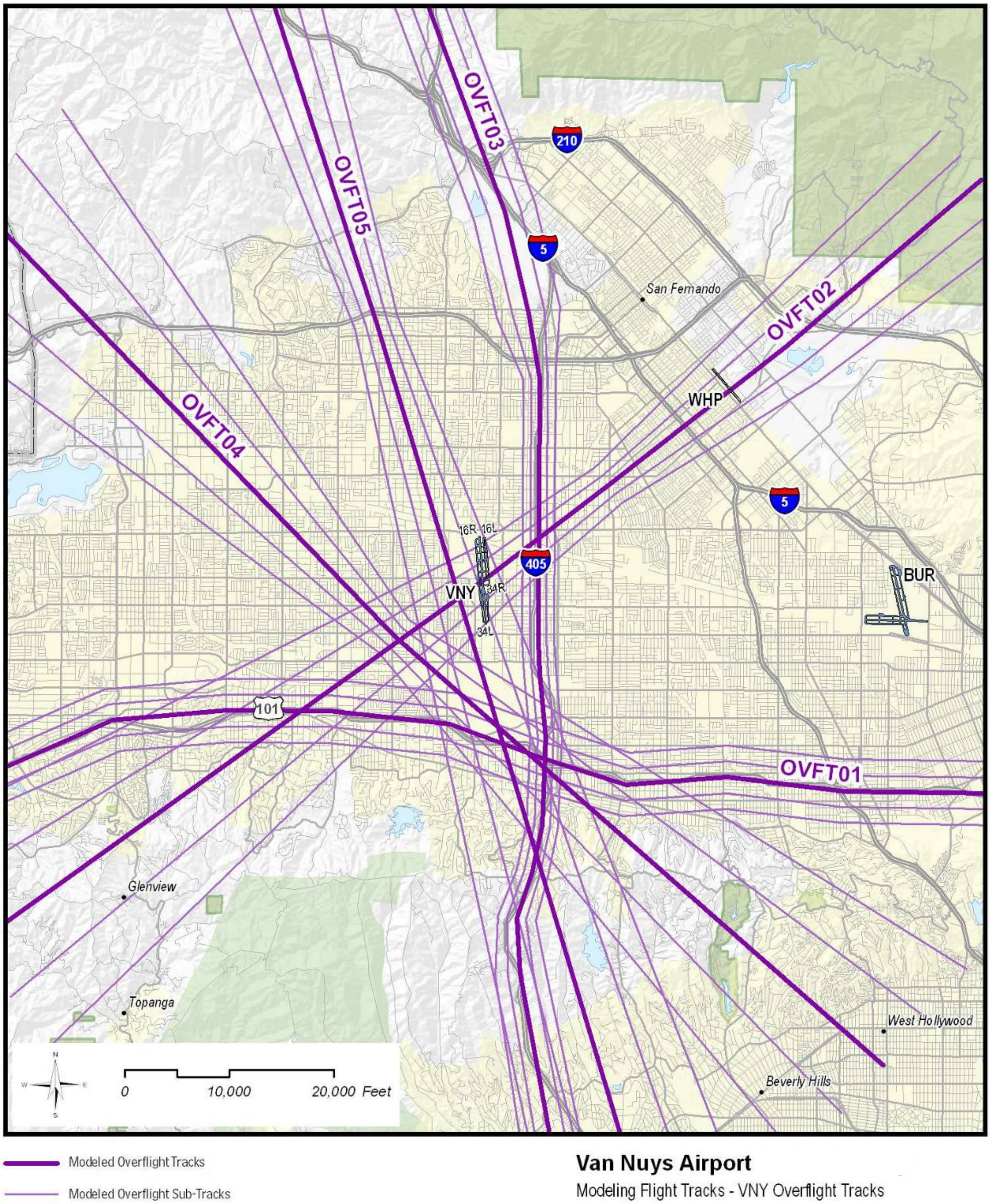
Figure B.4.18 Modeled Flight Tracks for Helicopter and Fixed-Wing Aircraft Overflights



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B.4.7 Meteorological Data

The INM requires average values of temperature in degrees Fahrenheit, sea level pressure in inches of mercury (Hg), relative humidity in percent, and headwind in knots (kts). Average daily values of temperature, wet bulb temperature, and sea level barometric pressure for VNY were acquired from the National Climatic Data Center for 2004. HMMH then developed annual average values for temperature (66.1°F), relative humidity (54.2%), and sea level barometric pressure (29.96 in. Hg) and used the default value, 8 kts, for the prevailing headwind. These values were then input into the INM as the meteorological annual averages.

B.4.8 Aircraft Noise and Performance

Specific noise and performance data must be entered for each aircraft type operating at the airport. Noise data are included in the form of sound exposure level (SEL) at a range of distances (from 200 feet to 25,000 feet) from a particular aircraft with engines at a specific thrust level. Performance data include thrust, speed, and altitude profiles for takeoff and landing operations. The INM database contains standard noise and performance data for more than 100 types of fixed-wing aircraft and helicopters. The program automatically accesses the applicable noise and performance data for departure and arrival operations by those aircraft.

To model operations at VNY as accurately as feasible, it was necessary to obtain FAA approval for two refinements to the INM database:

- Use of "substitute" aircraft types for aircraft not included in the INM database, and
- Use of "user-defined" modeling inputs reflecting the benefits of the most commonly used "noise abatement departure profile" (NADP) procedures that differ from the standard INM departure profiles.

The following subsections summarize these revisions.

B.4.8.1 Substitute Aircraft

Some aircraft types included in the operations modeled at VNY are not included in the INM's standard database. For these aircraft types, recommendations for INM substitute aircraft were forwarded to the FAA for approval or identification of an alternate approved substitution. These aircraft types and their FAA-approved INM substitutions follow.

Table B.4.7 FAA Approved and Recommended INM Aircraft Substitutions

Source: FAA/AEE, HMMH

Aircraft Type	FAA Approved Aircraft Substitution
Very Light Jets (VLJ)	CNA55B or CNA500
L-39 ~~Albatross~~Albatros	T-38A
Bombardier CRJ-700	GV
Raytheon Beechcraft Premier 1	CNA 500
Bombardier Global Express	GV
Twin Piston Radial Engines (B-25, B-26)	DC3
C10T	CNA210
P46T, PC12	SD330
TBM7	GASEPF

A copy of related FAA correspondence is presented on the following page.

U.S. Department
of Transportation
**Federal Aviation
Administration**

Office of Environment and Energy

800 Independence Ave., S.W.
Washington, D.C. 20591

November 21, 2006

Mr. Robert D Behr Jr.
Harris Miller Miller & Hanson Inc.
945 University Avenue, Suite 201
Sacramento, CA 95825

Dear Mr. Behr:

The Office of Environment and Energy has reviewed the proposed substitutions submitted for aircraft modeling for Van Nuys Airport (VNY) in support of the Los Angeles World Airports (LAWA) FAA Part 161 Study.

Our office approves the following use of the INM standard types, and concurs with your proposals:

1. Use INM substitution aircraft CNA55B or CNA500 for modeling VLJ.
2. Use INM standard aircraft GV for modeling Bombardier CRJ-700 (CRJ7).
3. Use INM substitution aircraft CNA500B for modeling Raytheon/Beechcraft 390 Premier I (PRM1).
4. Use INM standard aircraft GV for modeling Bombardier BD-700 Global Express (GLEX).
5. Use INM standard aircraft DC3 for modeling Twin Piston Radial Engine Aircraft (B-25, B-26).

Our office recommends the following use of INM types for the noise modeling, which differ from your proposals

1. Use INM standard aircraft T-38A for modeling L-39 Albatross
2. Use INM standard aircraft CNA210 for modeling Single-Engine Turboprop C10T.
3. Use INM substitution aircraft SD330 for modeling Single-Engine Turboprop P46T.
4. Use INM substitution aircraft SD330 for modeling Single-Engine Turboprop PC12.
5. Use INM standard aircraft GASEPF for modeling Single-Engine Turboprop TBM7.

Please understand that approvals listed above are limited to this particular Part 161 Study. Any additional projects or non-standard INM input will require separate approval.

Sincerely,

M. Marsan

Dr. Mehmet Marsan
Acting Manager
AEE/Noise Division

B.4.8.2 User-Defined Profiles

The 2003 Part 150 study for VNY included FAA-approved user-defined departure profiles flown for the Lear 25, Gulfstream II, Gulfstream IIB, and Gulfstream III aircraft operating at VNY.

Appendix B in the INM User's Guide provides the FAA guidance and checklist for processing user changes to INM standard profiles to expedite the approval process. Users must provide:

- Background of project,
- Statement of benefit,
- Analysis demonstrating benefit,
- Concurrence on aircraft performance,
- Certification of new parameters, and
- Graphical and tabular comparison.

An effort was undertaken to expand the previous effort to more of the corporate jets flying in and out of VNY by gathering more data from the FBO data were received from two operators, and face-to-face meetings were conducted with two more. The data gathered from the operators were used to build user-defined profiles in INM input format. In contrast to the Part 150 study, the more recent INM had incorporated the departure profiles flown by the Gulfstream II and III aircraft; therefore, no adjustments were needed or sought for these aircraft. The aircraft for which new information on departure profiles were sought included the Lear 25, Gulfstream IV, Boeing 727, and Douglas A-3. After developing the INM profiles based on operator input and obtaining the concurrence of the operators, new profile packages for these aircraft types were submitted, as outlined above, to the FAA for approval.

These profiles and accompanying concurrence packages follow, in order, for the following aircraft:

- Gulfstream IV~~,~~
- Douglas A-3~~,~~
- Boeing 727~~,~~
- Lear 25/25
- ~~, and~~
- Gulfstream III with hushkit for recertification to Part 36 Stage 3~~.~~

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June 9, 2006

Mr. Sandy Liu
Federal Aviation Administration
Office of Environment and Energy
800 Independence Ave., SW
Washington, DC 20591

Subject: Request for Approval of User Changes to the Integrated Noise Model, GIV

Reference: HMMH Project Number 300701

Dear Mr. Liu:

This letter is a request for approval of user changes to the Integrated Noise Model (INM) version 6.2 for use at Van Nuys (VNY) airport. These changes involve augmenting the standard departure profiles in the INM with actual procedures as flown by pilots operating at VNY.

Section 1 – Background

We are submitting this request for written approval for changes to the Integrated Noise Model standard profiles in support of a Van Nuys Airport FAR Part 161 study. Los Angeles World Airports (LAWA), the proprietor of VNY, is the sponsor of the study.

This letter contains data on the Gulfstream GIV operating procedures as provided by The Air Group. We will send similar letters containing data for other aircraft operating at VNY which also are flown differently than modeled in the INM. In support of the Part 161 process, we held a meeting on January 25, 2006 with personnel from The Air Group, a Fixed Base Operator (FBO) at VNY, to determine how they operate their GIV aircraft. The Air Group's approval of our modeling of this procedure is documented in Appendix A. We refer to this procedure as the Air Group procedure in this document.

Section 2 – Statement of Benefit

The Air Group procedure provides a benefit (maximum of -0.2 dBA, SEL) from 0.5 to 10 nautical miles (nm) from the brake release point.

Section 3 – Analysis Demonstrating Benefit

The differences between the standard INM departure and the Air Group procedure are primarily due to the different flaps schedule used in the Air Group procedure. The Air Group procedure reduces from 20 degrees of flaps at takeoff to 0 degrees of flaps at 400 feet Above Field Elevation (AFE). The standard INM GIV departure uses 20 degrees of flaps from takeoff up to 1,850 feet AFE. The intention of the Air Group procedure is to climb out from VNY at the maximum rate possible; the primary reason for this procedure is to quickly gain altitude to avoid conflicts with arrival traffic at neighboring Burbank airport.

The analysis shows the Air Group procedure provides noise benefits from 0.5 to 10 nautical miles from the brake release point. The benefit is a maximum (-1.7 dB, SEL, relative to the INM standard procedure) at 0.5 nm from the departure end, with the benefit decreasing as the aircraft continues down the flight track.

HARRIS MILLER MILLER & HANSON INC.

AG - GIV Request for Approval of User Changes to INM
June 9, 2006
Page 2

Table 1 shows the SEL results under the flight path from the Air Group procedure; the standard INM departure profile is presented for comparison.

Section 4 – Concurrence on Aircraft Performance

A letter from Air Group stating agreement with these procedures is found in Appendix A.

Section 5 – Certification of New Parameters

The aircraft performance characteristics provided by the Air Group have been translated into INM procedure steps using standard engineering practice. We developed no new aircraft performance coefficients for this study. The procedure steps data in this study conform to the rules given in the INM User's Guide and SAE-1845. We used net corrected thrust in units of pounds for all thrust settings.

Section 6 – Graphical and Tabular Comparison

Tables 2-5 and Figures 1-3 present the results of the modeling analysis by showing the altitude, airspeed, and net corrected thrust per engine of the modeled procedures as a function of distance from the brake release point.

If you have any questions or comments regarding the content of this letter, you can reach me via telephone at 916.568.1116 or via e-mail at rbehr@hmmh.com. Thank you for your consideration. I look forward to hearing back from you at your earliest convenience.

Sincerely yours,

HARRIS MILLER MILLER & HANSON INC.

Robert D. Behr
Senior Consultant

enclosures:

HARRIS MILLER MILLER & HANSON INC.

AG - GIV Request for Approval of User Changes to INM
June 9, 2006
Page 3

Table 1. Comparison of Noise Impacts from Brake Release for INM Standard and Air Group Departure Procedures
INM Aircraft Model: GIV Profile Weight: 63,410 lb

Distance from Brake Release (nm)	INM Standard, SEL (dBA)	Air Group, SEL (dBA)	Difference SEL (dBA)
0.00	134.2	134.2	0.0
0.50	107.8	106.1	-1.7
1.00	91.6	90.7	-0.9
1.50	86.6	86.2	-0.4
2.00	83.4	83.1	-0.3
2.50	81.0	80.6	-0.4
3.00	79.7	79.5	-0.2
3.50	77.7	77.4	-0.3
4.00	76.4	76.2	-0.2
4.50	75.3	75.0	-0.3
5.00	74.1	73.4	-0.7
5.50	73.0	72.9	-0.1
6.00	71.7	71.9	0.2
6.50	71.0	71.0	0.0
7.00	70.2	70.1	-0.1
7.50	69.5	69.4	-0.1
8.00	68.8	68.7	-0.1
8.50	68.1	68.1	0.0
9.00	67.6	67.5	-0.1
9.50	67.0	66.9	-0.1
10.0	66.5	66.4	-0.1

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AG - GIV Request for Approval of User Changes to INM
June 9, 2006
Page 4

Table 2. INM Standard GIV Departure Procedures
Profile Weight: 63,410 lb

Step Number	Altitude Above Field Elevation (AFE), feet	Calibrated Airspeed, knots	Flaps	Thrust Setting
1	0.0	-	20	Max takeoff
2	35.0	-	20	Max takeoff
3	-	159.2	20	Max takeoff
4	400	-	20	Max takeoff
5	600	-	20	Max Climb
6	750	-	20	Max Climb
7	1850	-	10	Max Climb
8	3000	-	10	Max Climb
9	-	250	zero	Max Climb
10	5000	-	zero	Max Climb
11	6000	-	zero	Max Climb
12	7000	-	zero	Max Climb
13	8000	-	zero	Max Climb
14	9000	-	zero	Max Climb
15	10000	-	zero	Max Climb

Table 3. Air Group GIV Departure Procedures
Profile Weight: 63,410 lb

Step Number	Altitude Above Field Elevation (AFE), feet	Calibrated Airspeed, knots	Flaps	Thrust Setting
1	0	-	20	Max takeoff
2	35	-	20	Max takeoff
3	400	-	20	Max takeoff
4	-	160	zero	Max takeoff
5	2000	-	zero	Max Climb
6	3000	-	zero	Max Climb
7	-	250	zero	Max Climb
8	5000	-	zero	Max Climb
9	6000	-	zero	Max Climb
10	7000	-	zero	Max Climb
11	8000	-	zero	Max Climb
12	9000	-	zero	Max Climb
13	10000	-	zero	Max Climb

HARRIS MILLER MILLER & HANSON INC.

AG - GIV Request for Approval of User Changes to INM
June 9, 2006
Page 5

Table 4. INM Standard GIV Departure Parameters
Profile Weight: 63,410 lb

Distance from Brake Release, nm	Altitude Above Field Elevation (AFE), feet	True Airspeed, knots	Net Corrected Thrust per Engine, lb
0.00	0.0	35.0	13181.0
0.45	0.0	147.0	11009.1
0.47	35.0	147.1	11011.1
0.70	209.3	160.8	10824.9
0.82	400.0	161.3	10835.9
0.90	500.0	161.5	8667.5
0.99	600.0	161.7	8690.3
1.12	750.0	162.1	8707.3
2.01	1850.0	164.8	8832.7
2.97	3000.0	167.6	8963.7
6.09	4573.4	269.5	8289.4
6.54	5000.0	271.3	8338.0
7.63	6000.0	275.4	8451.9
8.75	7000.0	279.7	8565.8
9.92	8000.0	284.1	8679.7
11.12	9000.0	288.5	8784.3
12.39	10000.0	293.1	8835.2

Table 5. Air Group GIV Departure Parameters
Profile Weight: 63,410 lb

Distance from Brake Release, nm	Altitude Above Field Elevation (AFE), feet	True Airspeed, knots	Net Corrected Thrust per Engine, lb
0.00	0.0	35.0	13181.0
0.45	0.0	147.0	11009.1
0.47	35.0	147.1	11011.1
0.68	400.0	147.9	11032.2
0.85	566.8	151.9	8791.5
1.34	1062.8	163.7	8735.4
2.07	2000.0	166.0	8842.2
2.88	3000.0	168.4	8956.1
5.04	3628.7	265.7	8181.7
6.47	5000.0	271.3	8338.0
7.56	6000.0	275.4	8451.9
8.69	7000.0	279.7	8565.8
9.85	8000.0	284.1	8679.7
11.06	9000.0	288.5	8784.3
12.32	10000.0	293.1	8835.2

HARRIS MILLER MILLER & HANSON INC.

AG - GIV Request for Approval of User Changes to INM
June 9, 2006
Page 6

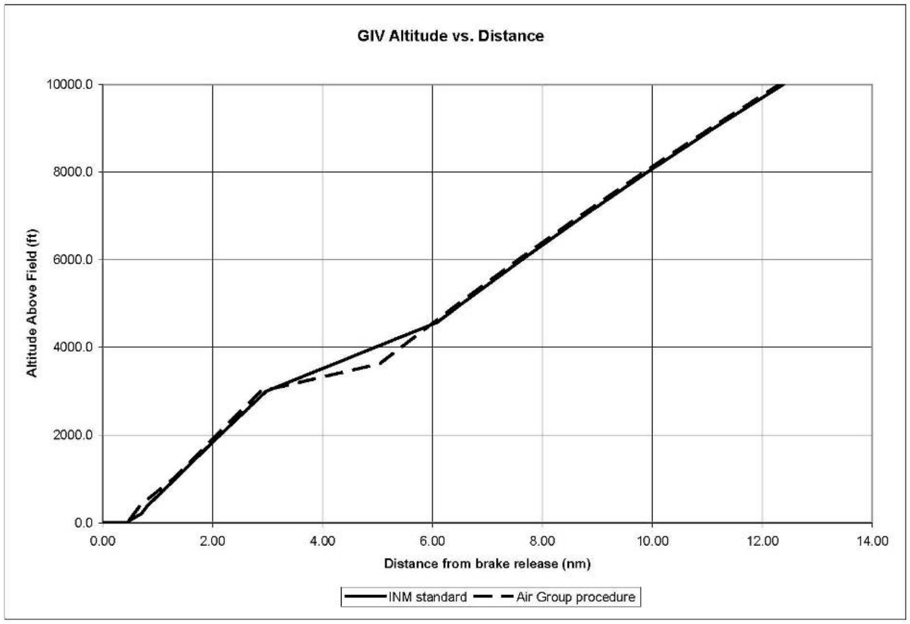

Figure 1. Altitude Profiles for Standard and Air Group Procedures

HARRIS MILLER MILLER & HANSON INC.

AG - GIV Request for Approval of User Changes to INM
June 9, 2006
Page 7

Figure 2. Airspeed Profiles for Standard and Air Group Procedures

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AG - GIV Request for Approval of User Changes to INM
June 9, 2006
Page 8

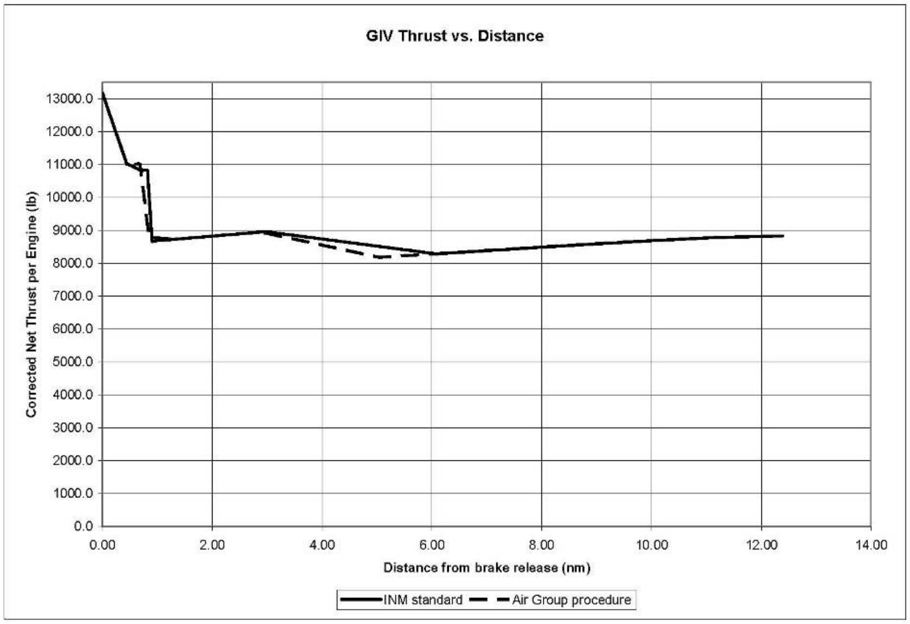

Figure 3. Thrust Profiles for Standard and Air Group Procedures

HARRIS MILLER MILLER & HANSON INC.

AG - GIV Request for Approval of User Changes to INM
June 9, 2006
Page 9

APPENDIX A

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HARRIS MILLER MILLER & HANSON INC.

Review and Concurrence of VNY Aircraft Performance Data – Air Group
March 29, 2006
Page 4

The Air Group concurrence with modeled procedures:

The Air Group certifies that the proposed profile for Gulfstream IV aircraft departing from Van Nuys Airport falls within reasonable bounds of the aircraft's performance.

DAVID BAKER
Name

CHIEF PILOT
Position/ Title

U.S. Department
of Transportation
Federal Aviation Administration

Office of Environment and Energy

800 Independence Ave., S.W.
Washington, D.C. 20591

JUN 21 2006

Mr. Bob Behr
Harris Miller Miller & Hanson Inc.
945 University Ave., Suite 201
Sacramento, CA 95825

Dear Sirs:

The Office of Environment and Energy has reviewed the data submitted for the user defined departure profile data for the GIV and approves its use in the Van Nuys Airport FAR Part 161 study.

Please understand that this approval for use of the profile is limited to this particular Van Nuys Airport FAR Part 161 study. Any additional projects or non-standard INM input for VNY will require separate approval as will use of this profile for another site.

Sincerely,

Sandy R. Liu

Sandy Liu
AEE/Noise Division

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June 20, 2006

Sandy Liu
Federal Aviation Administration
Office of Environment and Energy
800 Independence Ave., SW
Washington, DC 20591

Subject: Request for Approval of User Changes to the Integrated Noise Model, A-3
Reference: HMMH Project Number 300701

Dear Mr. Liu:

This letter is a request for approval of user changes to the Integrated Noise Model (INM) version 6.2 for use at Van Nuys Airport (VNY). These changes involve augmenting the standard departure profiles in the INM with actual procedures as flown by pilots operating at VNY.

Section 1 – Background

We are submitting this request for written approval for changes to the Integrated Noise Model standard profiles in support of a Van Nuys Airport FAR Part 161 study. Los Angeles World Airports (LAWA), the proprietor of VNY, is the sponsor of the study.

This letter contains data on the Douglas A-3 (INM type A3) operating procedures as provided by Raytheon Flight Test Operations (Raytheon). We will send similar letters containing data for other aircraft operating at VNY which also are flown differently than modeled in the INM. In support of the Part 161 process, we received information from January-June 2006 from personnel at Raytheon, a Fixed Base Operator (FBO) at VNY, stating how they operate their A-3 aircraft. Raytheon's approval of our modeling of this procedure is documented in Appendix A. We refer to this procedure as the Raytheon procedure in this document.

Section 2 – Statement of Benefit

The Raytheon procedure provides a benefit (maximum of -6.4 dBA, SEL) from 0.0 to 1.5 nautical miles (nm) from the brake release point.

Section 3 – Analysis Demonstrating Benefit

The differences between the standard INM departure and the Raytheon procedure are primarily due to slightly different initial power settings during the takeoff roll and significant differences during the climb-out phase. The Raytheon procedure begins with a thrust setting of 96% RPM. Upon reaching 400 feet Above Field Elevation (AFE), the power is decreased to a power setting of 93%; this power setting is retained up to 10000 feet AFE. The standard INM A-3 departure uses 97% RPM during the ground roll, with an increase to 98% at rotation and up to 400 feet AFE. At 400 feet, the power is decreased to 93%.

The analysis shows the Raytheon procedure provides noise benefits from 0.0 to 1.5 nautical miles from the brake release point. After about 1.5 nm from brake release, the INM standard aircraft begins a power reduction to 93%, resulting in less noise under the flight path (maximum of 2.9 dBA, SEL, at 2.0 nm from brake release) than the Raytheon procedure due to the higher climb gradient and faster airspeeds of the standard procedure. Raytheon's chief test pilot has stated that the high speed (250

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knots at 700 feet AGL) and small climb gradient (5000 feet in 33 nm) of the INM standard procedure is impossible to accept in the high volume air traffic environment around VNY.

Table 1 shows the SEL results under the flight path from the Raytheon procedure; the standard INM departure profile is presented for comparison.

Section 4 – Concurrence on Aircraft Performance

A letter from Raytheon stating agreement with these procedures is found in Appendix A.

Section 5 – Certification of New Parameters

The aircraft performance characteristics provided by Raytheon have been translated into INM procedure steps using standard engineering practice. We developed no new aircraft performance coefficients for this study. The procedure steps data in this study conform to the rules given in the INM User's Guide and SAE-1845. We used % RPM for all thrust settings.

Section 6 – Graphical and Tabular Comparison

Tables 2-3 and Figures 1-3 present the results of the modeling analysis by showing the altitude, airspeed, and engine % RPM of the modeled procedures as a function of distance from the brake release point.

If you have any questions or comments regarding the content of this letter, you can reach me via telephone at 916.568.1116 or via e-mail at rbehr@hmmh.com. Thank you for your consideration. I look forward to hearing back from you at your earliest convenience.

Sincerely yours,

HARRIS MILLER MILLER & HANSON INC.

Robert D. Behr
Senior Consultant

enclosures:

HARRIS MILLER MILLER & HANSON INC.

A-3 Request for Approval of User Changes to INM
June 20, 2006
Page 3

Table 1. Comparison of Noise Impacts from Brake Release for INM Standard and Raytheon A-3 Departure Procedures

INM Aircraft Model: A3 Profile Weight: Standard 68,000 lb; Raytheon 69,400 lb

Distance from Brake Release (nm)	INM Standard, SEL (dBA)	Raytheon, SEL (dBA)	Difference SEL (dBA)
0.00	154.6	152.8	-1.8
0.50	134.1	130.6	-3.5
1.00	128.3	125.9	-2.4
1.50	123.6	122.3	-1.3
2.00	109.4	112.3	2.9
2.50	106.7	109.4	2.7
3.00	104.8	107.2	2.4
3.50	103.4	105.4	2.0
4.00	102.3	103.8	1.5
4.50	101.3	102.5	1.2
5.00	100.0	101.1	1.1
5.50	98.6	99.9	1.3
6.00	97.5	98.8	1.3
6.50	97.0	97.8	0.8
7.00	96.8	97.0	0.2
7.50	96.7	96.2	-0.5
8.00	96.5	95.5	-1.0
8.50	96.4	94.8	-1.6
9.00	96.3	94.0	-2.3
9.50	96.2	93.3	-2.9
10.0	96.1	92.6	-3.5

HARRIS MILLER MILLER & HANSON INC.

A-3 Request for Approval of User Changes to INM
June 20, 2006
Page 4

Table 2. INM Standard A-3 Departure Procedures
Profile Weight: 68,000 lb

Distance from Brake Release (nm)	Altitude Above Field Elevation (AFE), feet	True Airspeed, knots	Power Parameter % RPM
0.00	0.0	35.0	97.0
0.20	0.0	105.0	98.0
1.48	400.0	190.0	98.0
1.81	700.0	250.0	93.0
3.13	1400.0	250.0	93.0
4.77	2100.0	250.0	93.0
6.09	3000.0	250.0	93.0
32.92	5000.0	250.0	93.0

Table 3. Raytheon A-3 Departure Procedures
Profile Weight: 69,400 lb

Distance from Brake Release (nm)	Altitude Above Field Elevation (AFE), feet	True Airspeed, knots	Power Parameter % RPM
0.00	0.0	35.0	96.0
0.20	0.0	133.6	96.0
1.64	400.0	157.7	96.0
1.70	420.0	157.8	93.0
2.00	700.0	158.4	93.0
4.91	3000.0	190.4	93.0
19.11	10000.0	235.7	93.0

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A-3 Request for Approval of User Changes to INM
June 20, 2006
Page 5

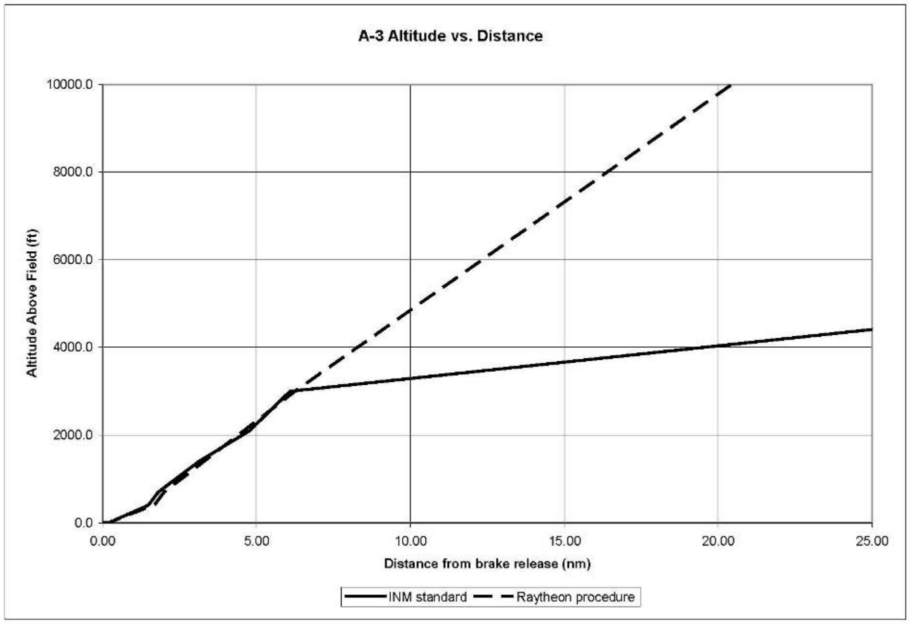

Figure 1. Altitude Profiles for Standard and Raytheon Procedures

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A-3 Request for Approval of User Changes to INM
June 20, 2006
Page 6

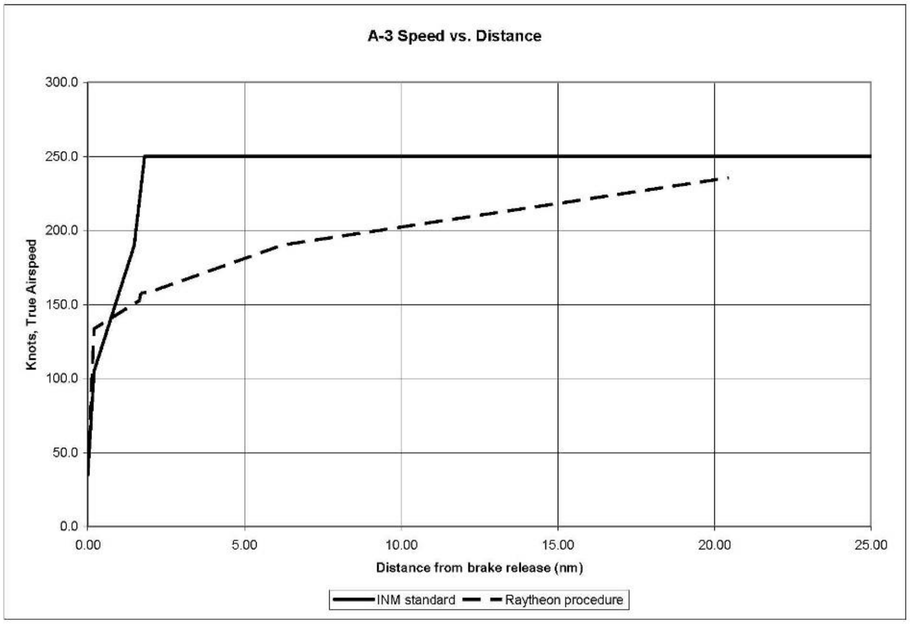

Figure 2. Airspeed Profiles for Standard and Raytheon Procedures

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A-3 Request for Approval of User Changes to INM
June 20, 2006
Page 7

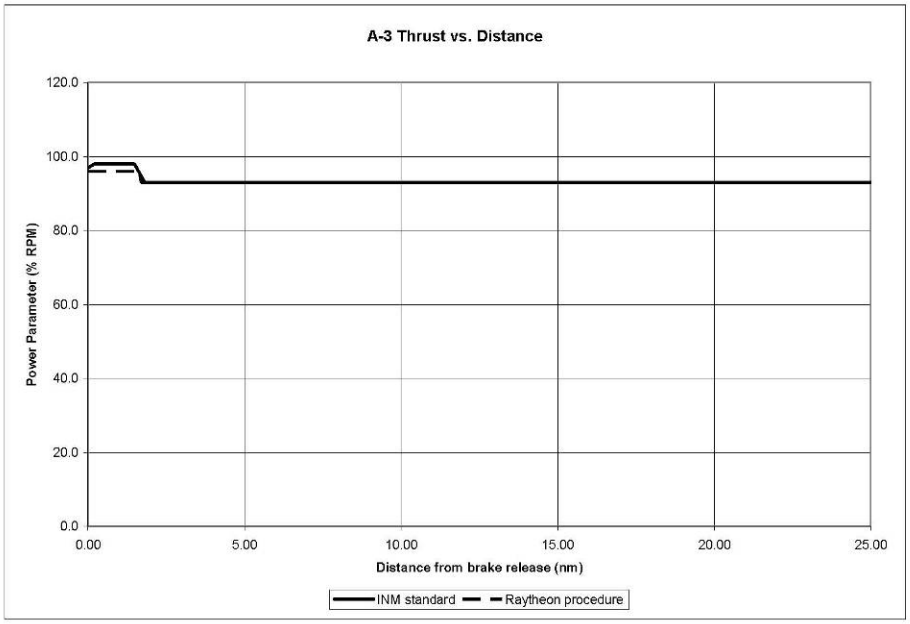

Figure 3. Thrust Profiles for Standard and Raytheon Procedures

HARRIS MILLER MILLER & HANSON INC.

A-3 Request for Approval of User Changes to INM
June 20, 2006
Page 8

APPENDIX A

Review and Concurrence of VNY Aircraft Performance Data - Raytheon
June 7, 2006
Page 4

Raytheon Flight Test Operations concurrence with modeled procedures:

Raytheon Flight Test Operations certifies that the proposed profile for A-3 aircraft departing from Van Nuys Airport falls within reasonable bounds of the aircraft's performance.

Name

[redacted] Chief Test Pilot
Position/Title

JUN-19-2006 15:24 FROM:TO 8183754587 TO:916 568 1201 P.4/7

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March 13, 2007

Dr. "Bill" Hua He
Federal Aviation Administration
Office of Environment and Energy
800 Independence Ave., SW
Washington, DC 20591

Subject: Supplemental Information for A-3 Non-Standard Departure Profiles at Van Nuys Airport

Reference: HMMH Project Number 300701

Dear Dr. He:

This letter is in response to questions raised regarding our request (previously submitted in June 2006) to use actual operator profiles for the A-3 aircraft when modeling in the Integrated Noise Model (INM) at Van Nuys Airport (VNY). The INM modeling is in support of the VNY FAR Part 161 study. Los Angeles World Airports (LAWA), the proprietor of VNY, is the sponsor of the study.

Section 1 – Background

In recent communications from the FAA, questions were raised concerning how certain values were calculated using standard engineering procedures. This document and attachments attempt to describe in detail the methodology employed using information from the INM Version 6.0 User's Guide and Technical Manual and SAE-AIR-1845 equations.

In support of the Part 161 process, we received flight profile information from January-June 2006 from personnel at Raytheon, a Fixed Base Operator (FBO) at VNY, stating how they operate their A-3 aircraft. We worked directly with the Raytheon Chief Pilot to gather and record data during actual A-3 departure flights from VNY. The data were then converted into the required format for the Integrated Noise Model.

As stated in our original letter of request, the differences between the standard INM departure and the Raytheon procedure are primarily due to slightly different initial power settings during the takeoff roll and significant differences during the climb-out phase. The Raytheon procedure begins with a thrust setting of 96% RPM. Upon reaching 400 feet Above Field Elevation (AFE), the power is decreased to a power setting of 93%; this power setting is retained up to 10000 feet AFE. The standard INM A-3 departure uses 97% RPM during the ground roll, with an increase to 98% at rotation and up to 400 feet AFE. At 400 feet, the power is decreased to 93%.

Raytheon's chief test pilot has stated that the high speed (250 knots at 700 feet AFE and small climb gradient (5000 feet in 33 nm) of the INM standard procedure is impossible to accept in the high volume air traffic environment around VNY.

Section 2 – Derivation of New Parameters

Data provided by Raytheon included the aircraft power setting, altitude, rate of climb, and calibrated/indicated airspeed at various points in the profile. These aircraft performance characteristics were then translated into INM procedure steps using standard engineering practice which is detailed below and in the attached spreadsheet. The procedure steps data conform to the

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Supplemental Data for A-3 Request for Approval of User Changes to INM
March 13, 2007
Page 2

rules given in the INM User's Guide / Technical Manual and SAE-AIR-1845. We used % RPM for all thrust settings. We developed no new aircraft performance coefficients for this study.

The attached spreadsheet details the calculations of true airspeed from calibrated airspeed using INM Version 6.0 Technical Manual equations in Section 2.3.3 and SAE-AIR-1845 equation A5,

$v_T = v\ \sigma^{-1/2}$

where
v_T is true airspeed in knots
v is calibrated airspeed in knots
σ is air density ratio at aircraft altitude

In addition, the attached spreadsheet shows the calculation of the distance traveled for each segment based on time and true airspeed (except for the provided Raytheon data at the 2 nm point) and then incorporated into the INM profile points file detailed in the table below.

Raytheon A-3 Departure Procedures
Profile Weight: 69,400 lb

Distance from Brake Release (nm)	Altitude Above Field Elevation (AFE), feet	True Airspeed, knots	Power Parameter % RPM
0.00	0.0	35.0	96.0
0.20	0.0	133.6	96.0
1.64	400.0	157.7	96.0
1.70	420.0	157.8	93.0
2.00	700.0	158.4	93.0
5.34	3000.0	190.4	93.0
17.77	10000.0	235.7	93.0

Section 3 –Comparison with Measured Data

As previously stated, specific cockpit procedure data were collected on several A-3 flights by Raytheon pilots. The chief pilot was well aware that the cockpit procedure variations would be compared for overall effects on noise monitor measurements. Noise monitor readings at permanent noise monitorV-7, located approximately two nautical miles from brake release for Runway 16R departures and near runway centerline, were gathered for the A-3 departures and compared to the INM results at the same point. The range of measured SEL values for the A-3 departures was 110.3 – 114.3 dBA. The modeled SEL for the Raytheon procedure was 112.2 dBA, nearly the center of the measured range of values. The modeled SEL for the A-3 Standard or Noisemap profile at V-7 was 109.4 dBA.

Section 4 –Other Observations

We noted that the INM standard points profile for the A-3 uses a constant "True Airspeed" of 250 knots from 700 feet through 5,000 feet AFE which is probably inconsistent with normal cockpit procedures to fly calibrated/indicated airspeed.

If you have any questions or comments regarding the content of this letter, you can reach me via telephone at 916.568.1116 or via e-mail at rbehr@hmmh.com. I hope this clarifies questions you had

HARRIS MILLER MILLER & HANSON INC.

Supplemental Data for A-3 Request for Approval of User Changes to INM
March 13, 2007
Page 3

on our previous request. Thank you for your consideration. I look forward to hearing back from you at your earliest convenience.

Sincerely yours,

HARRIS MILLER MILLER & HANSON INC.

Robert D. Behr

Robert D. Behr
Senior Consultant

Attachment: A3 Data Sheet

A-3 Data Sheet
Computation of data for profile points INM input

	A-3		ISA Day	
Ground roll	1200 Nmap		Altitude, ROC, Power, KIAS from Raytheon	
			INM 6.0 Technical Manual	2.3.3
First Seg			theta delta sigma	
altitude	400		0.991757 0.957421 0.965379	
Distance	10000	1.645788		
KIAS	155			
KTAS	157.7548			
Power	96			

kts2fps	1.6878
T	56.15077
P	29.92
E	799
R	459.67
L	0.003566
EXP	5.256562
gamma	1.4
gas_consta	1716.2
nm2ft	6076.116

Second Seg			theta delta sigma
altitude	420		0.991619 0.956724 0.96481
ROC	1000		
ROC (ft/s)	16.66667		
KIAS	155		
KTAS	157.8014		
True (ft/s)	266.3372		
climb (rad)	0.062618		
Distance	10318.98	1.698285	SAE-AIR-1845 Equation A9
Power	93		
Third Seg			theta delta sigma
altitude	700		0.989694 0.947001 0.956862
ROC	1000		
ROC (ft/s)	16.66667		
time (sec)	16.8		
KIAS	155		
KTAS	158.4554		
True (ft/s)	267.441		
accel	0.065701		
Distance	12152.23	2	Based on Raytheon flight data (700 feet at 2 miles)
Power	93		
Fourth Seg			theta delta sigma
altitude	3000		0.973881 0.870122 0.893458
ROC	2000		
ROC (ft/s)	33.33333		
time (sec)	69		
KIAS	180		
KTAS	190.43		
True (ft/s)	321.4078		
accel	0.782127		
Distance	32467.51	5.343465	Equation based on velocity and acceleration equations.
Power	93		
Fifth Seg			theta delta sigma
altitude	10000		0.925754 0.666625 0.720089
ROC	2000		
ROC (ft/s)	33.33333		
time (sec)	210		
KIAS	200		
KTAS	235.6877		
True (ft/s)	397.7937		
accel	0.363743		
Distance	107983.7	17.77183	
Power	93		

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July 7, 2006

Mr. Sandy Liu
Federal Aviation Administration
Office of Environment and Energy
800 Independence Ave., SW
Washington, DC 20591

Subject: Request for Approval of User Changes to the Integrated Noise Model, 727
Reference: HMMH Project Number 300701

Dear Mr. Liu:

This letter is a request for approval of user changes to the Integrated Noise Model (INM) version 6.2 for use at Van Nuys (VNY) airport. These changes involve augmenting the standard departure profiles in the INM with actual procedures as flown by pilots operating at VNY.

Section 1 – Background

We are submitting this request for written approval for changes to the Integrated Noise Model standard profiles in support of a Van Nuys Airport FAR Part 161 study. Los Angeles World Airports (LAWA), the proprietor of VNY, is the sponsor of the study.

This letter contains data on the Boeing 727 operating procedures. The data are based on using the Stage 3 certificated 727EM2 (stage length 1; 156,000 lb) as the base aircraft. We will send similar letters containing data for other aircraft operating at VNY which also are flown differently than modeled in the INM. In support of the Part 161 process, we held a meeting on January 24, 2006 with personnel from Clay Lacy Aviation, a Fixed Base Operator (FBO) at VNY, to determine how they operate their Boeing 727 aircraft. Clay Lacy Aviation's approval of our modeling of this procedure is documented in appendix YY. We refer to this procedure as the Clay Lacy procedure in this document.

Section 2 – Statement of Benefit

The differences between the standard INM departure and the Clay Lacy procedure are primarily due to the lower thrust levels used in the Clay Lacy procedure from 500 to 3,000 feet Above Field Elevation (AFE). The standard INM procedure uses Maximum Takeoff power up until 200 knots are reached during departure; the takeoff flaps are set to 5 degrees and retracted during the acceleration portion of the departure. The Clay Lacy procedure uses Maximum Takeoff power up to 400 feet AFE, and then reduces to an Engine Pressure Ratio (EPR) of 1.8. This EPR setting is held to 3,000 AFE when the power is increased to Maximum Climb, which corresponds with the standard INM procedure. The Clay Lacy procedure also uses 15 degrees of flaps (due to the relatively short runway at VNY), which are maintained until 3,000 feet AFE is reached.

The lower thrust settings of the Clay Lacy procedure provide a noise benefit for the area within about three nautical miles (nm) from the brake release point. Beyond this distance, the Clay Lacy procedures is slightly louder than the INM standard due to the lower climb gradient, and hence lower altitude, until climb thrust is applied.

HARRIS MILLER MILLER & HANSON INC.

B727 Request for Approval of User Changes to INM
July 7, 2006
Page 2

Section 3 – Analysis Demonstrating Benefit

The analysis shows the Clay Lacy procedure provides noise benefits from one to three nautical miles from the break release point. The benefit is highest (4.4 dB, SEL) at 1.5 nm from the brake release point. Beyond 3.5 nm, the Clay Lacy procedure gives a slight noise increase, with a maximum penalty of about 2.5 dB (SEL) at 6 nm from the brake release point.

Table 1 shows the SEL results under the flight path from the Clay Lacy procedure; the standard INM departure profile is presented for comparison.

Section 4 – Concurrence on Aircraft Performance

A letter from Clay Lacy Aviation stating agreement with these procedures is found in Appendix A.

Section 5 – Certification of New Parameters

The aircraft performance characteristics provided by Clay Lacy Aviation have been translated into INM procedure steps using standard engineering practice. We developed no new aircraft performance coefficients for this study. The procedure steps data in this study conform to the rules given in the INM User's Guide and SAE-1845. We used net corrected thrust in units of pounds for all thrust settings.

Section 6 – Graphical and Tabular Comparison

Tables 2-5 and Figures 1-3 present the results of the modeling analysis by showing the altitude, airspeed, and net corrected thrust per engine of the modeled procedures as a function of distance from the brake release point.

If you have any questions or comments regarding the content of this letter, you can reach me via telephone at 916.568.1116 or via e-mail at rbehr@hmmh.com. Thank you for your consideration. I look forward to hearing back from you at your earliest convenience.

Sincerely yours,

HARRIS MILLER MILLER & HANSON INC.

Robert D. Behr
Senior Consultant

enclosures:

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B727 Request for Approval of User Changes to INM
July 7, 2006
Page 3

Table 1. Comparison of Noise Impacts from Brake Release for INM Standard and Clay Lacy Departure Procedures
INM Aircraft Model: 727EM2 Profile Weight: 156,000 lb

Distance from Brake Release (nm)	INM Standard, SEL (dBA)	Clay Lacy, SEL (dBA)	Difference SEL (dBA)
0.00	145.1	145.1	0.0
0.50	142.3	142.1	-0.2
1.00	120.8	120.0	-0.8
1.50	109.5	105.1	-4.4
2.00	105.5	101.7	-3.8
2.50	103.3	99.3	-4.0
3.00	101.2	97.4	-3.8
3.50	95.0	95.8	0.8
4.00	93.4	94.4	1.0
4.50	92.0	93.1	1.1
5.00	90.9	92.0	1.1
5.50	90.0	91.2	1.2
6.00	89.1	91.6	2.5
6.50	88.4	90.7	2.3
7.00	87.4	89.8	2.4
7.50	86.9	88.9	2.0
8.00	86.2	88.1	1.9
8.50	85.5	87.5	2.0
9.00	84.8	86.9	2.1
9.50	84.3	86.0	1.7
10.0	83.7	85.5	1.8

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B727 Request for Approval of User Changes to INM
July 7, 2006
Page 4

Table 2. INM Standard B727 Departure Procedures
Profile Weight: 156,000 lb

Step Number	Altitude Above Field Elevation (AFE), feet	Calibrated Airspeed, knots	Flaps	Thrust Setting
1	0.0	-	5	Max takeoff
2	1000	-	5	Max takeoff
3	-	170	5	Max takeoff
4	-	200	2	Max takeoff
5	-	210	zero	Max Climb
6	3000		zero	Max Climb
7	-	250	zero	Max Climb
8	5500	-	zero	Max Climb
9	7500	-	zero	Max Climb
10	10000	-	zero	Max Climb

Table 3. Clay Lacy B727 Departure Procedures
Profile Weight: 156,000 lb

Step Number	Altitude Above Field Elevation (AFE), feet	Calibrated Airspeed, knots	Flaps	Thrust Setting
1	0.0	-	15	Max takeoff
2	-	160	15	Max takeoff
3	400	-	15	Max takeoff
4	500	-	15	1.8 EPR
5	3000	-	15	1.8 EPR
6	-	210	zero	Max Climb
7		250	zero	Max Climb
8	5500	-	zero	Max Climb
9	7500	-	zero	Max Climb
10	10000	-	zero	Max Climb

HARRIS MILLER MILLER & HANSON INC.

B727 Request for Approval of User Changes to INM
July 7, 2006
Page 5

Table 4. INM Standard B727 Departure Parameters
Profile Weight: 156,000 lb

Distance from Brake Release, nm	Altitude Above Field Elevation (AFE), feet	True Airspeed, knots	Net Corrected Thrust per Engine, lb
0.00	0.0	35.0	14658.3
0.93	0.0	162.7	13453.4
1.87	1000.0	165.1	13816.3
2.11	1119.9	174.0	13781.5
3.00	1523.6	206.0	13595.4
3.16	1572.8	210.9	10682.0
3.36	1630.3	216.6	10618.2
5.16	3000.0	221.1	10838.5
6.95	3463.0	265.0	10588.8
9.97	5500.0	273.3	10916.7
13.16	7500.0	281.9	11238.5
17.50	10000.0	293.1	11640.7

Table 5. Clay Lacy B727 Departure Parameters
Profile Weight: 156,000 lb

Distance from Brake Release, nm	Altitude Above Field Elevation (AFE), feet	True Airspeed, knots	Net Corrected Thrust per Engine, lb
0.00	0.0	35.0	14658.3
0.83	0.0	154.3	13515.2
0.97	56.8	161.3	13485.5
1.30	400.0	162.1	13610.1
1.45	500.0	162.3	10330.0
5.63	3000.0	168.4	10360.0
5.80	3053.1	173.3	11243.7
7.51	3604.0	223.1	10935.6
9.37	4084.1	267.5	10688.8
11.50	5500.0	273.3	10916.7
14.68	7500.0	281.9	11238.5
19.03	10000.0	293.1	11640.7

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B727 Request for Approval of User Changes to INM
July 7, 2006
Page 6

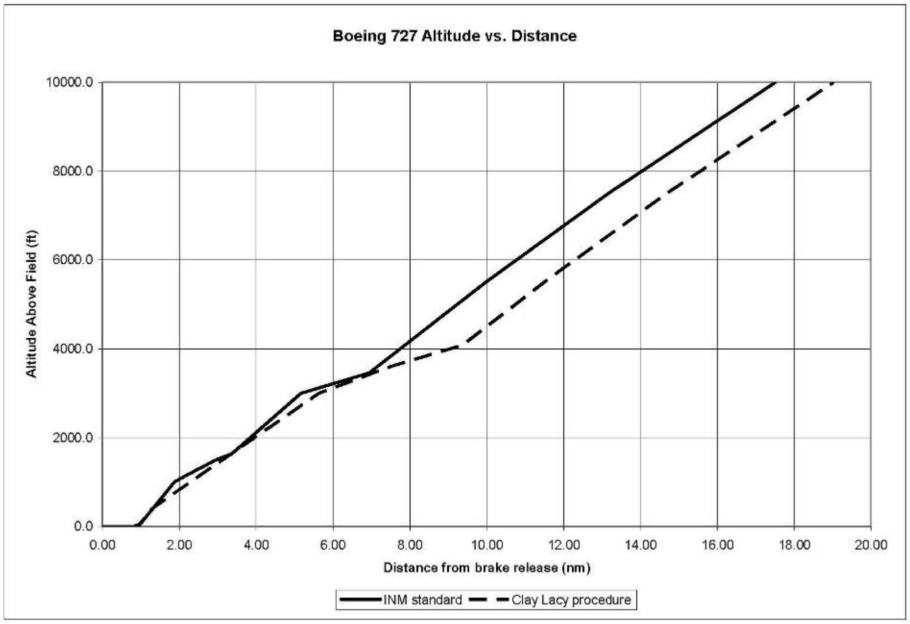

Figure 1. Altitude Profiles for Standard and Clay Lacy Procedures

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B727 Request for Approval of User Changes to INM
July 7, 2006
Page 7

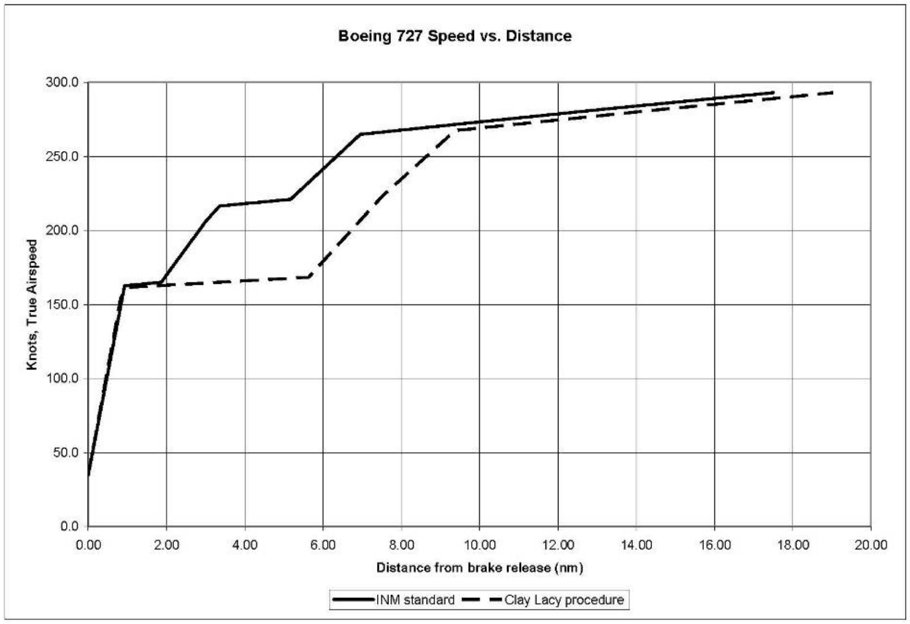

Figure 2. Airspeed Profiles for Standard and Clay Lacy Procedures

HARRIS MILLER MILLER & HANSON INC.

B727 Request for Approval of User Changes to INM
July 7, 2006
Page 8

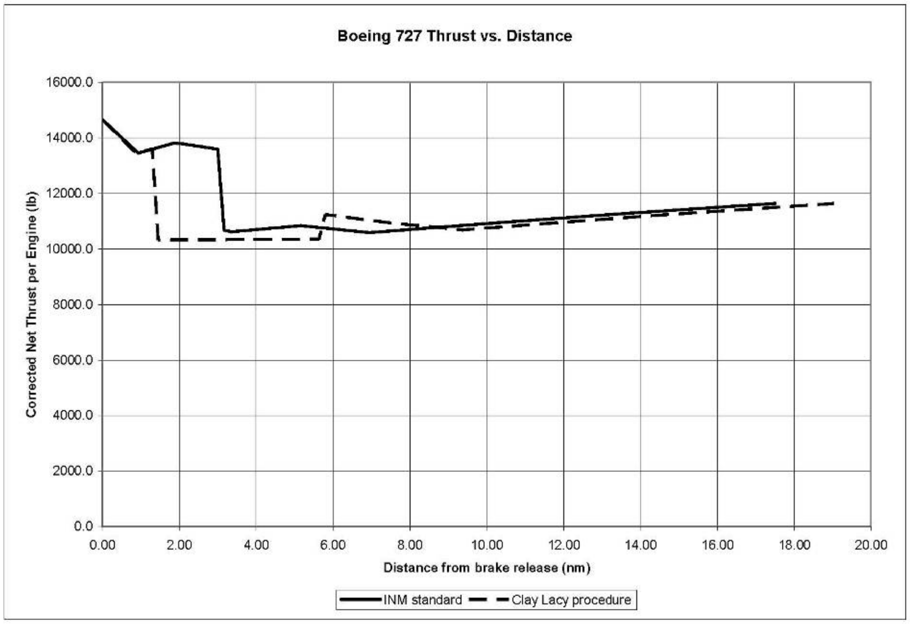

Figure 3. Thrust Profiles for Standard and Clay Lacy Procedures

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B727 Request for Approval of User Changes to INM
July 7, 2006
Page 9

Appendix A

07/06/2006 21:30 FAX 004

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Review and Concurrence of VNY Aircraft Performance Data – Clay Lacy
March 29, 2006
Page 25

Clay Lacy Aviation concurrence with modeled procedures:

Clay Lacy Aviation certifies that the proposed *profile for Boeing 727 aircraft departing* from Van Nuys Airport falls within reasonable bounds of the aircraft's performance.

Name

PRESIDENT/CLAY LACY AVIATION
Position/ Title

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March 13, 2007

Dr. "Bill" Hua He
Federal Aviation Administration
Office of Environment and Energy
800 Independence Ave., SW
Washington, DC 20591

Subject: Supplemental Information for Boeing 727 Non-Standard Departure Profiles at Van Nuys Airport

Reference: HMMH Project Number 300701

Dear Dr. He:

This letter is in response to questions raised regarding our request (previously submitted in June 2006) to use actual operator profiles for the Boeing 727 aircraft when modeling in the Integrated Noise Model (INM) at Van Nuys Airport (VNY). The INM modeling is in support of the VNY FAR Part 161 study. Los Angeles World Airports (LAWA), the proprietor of VNY, is the sponsor of the study.

Section 1 – Background

In recent communications from the FAA, questions were raised concerning how certain values were calculated using standard engineering procedures. This document and attachments attempt to describe in detail the methodology employed using information from the INM Version 6.0 User's Guide and Technical Manual and SAE-AIR-1845 equations.

In support of the Part 161 process, we held a meeting on January 24, 2006 with personnel from Clay Lacy Aviation, a Fixed Base Operator (FBO) at VNY, to determine how they operate their Boeing 727 aircraft. We received data directly from Clay Lacy which were then converted into the required format for the Integrated Noise Model.

As stated in our original letter of request, the differences between the standard INM departure for the 727EM2 Standard (Stage Length 1) and the Clay Lacy procedure are primarily due to the lower thrust levels used in the Clay Lacy procedure from 500 to 3,000 feet Above Field Elevation (AFE). The standard INM procedure uses Maximum Takeoff power up until 200 knots are reached during departure; the takeoff flaps are set to 5 degrees and retracted during the acceleration portion of the departure. The Clay Lacy procedure uses Maximum Takeoff power up to 400 feet AFE, and then reduces to an Engine Pressure Ratio (EPR) of 1.8. This EPR setting is held to 3,000 AFE when the power is increased to Maximum Climb, which corresponds with the standard INM procedure. The Clay Lacy procedure also uses 15 degrees of flaps (due to the relatively short runway at VNY), which are maintained until 3,000 feet AFE is reached.

Section 2 – Derivation of New Parameters

Data provided by Clay Lacy included the aircraft power setting, altitude, and calibrated/indicated airspeed at various points in the profile. These aircraft performance characteristics were then translated into INM procedure steps using standard engineering practice which is detailed below and in the attached spreadsheet. The procedure steps data conform to the rules given in the INM User's

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Supplemental Data for Boeing 727 Request for Approval of User Changes to INM
March 13, 2007
Page 2

Guide / Technical Manual and SAE-AIR-1845. We developed no new aircraft performance coefficients for this study.

To develop the "cut-back" thrust levels in corrected net thrust per engine (pounds), we determined the true airspeeds at the corresponding altitudes. Based on a standard day and standard lapse rate, we used the INM thrust calculator to convert the 1.8 EPR to pounds thrust per engine.

The attached spreadsheet details the calculations of true airspeed from calibrated airspeed using INM Version 6.0 Technical Manual equations in Section 2.3.3 and SAE-AIR-1845 equation A5,

$$v_T = v\,\sigma^{-1/2}$$

where

v_T is true airspeed in knots
v is calibrated airspeed in knots
σ is air density ratio at aircraft altitude

Clay Lacy B727 Departure Procedures
Profile Weight: 156,000 lb

Step Number	Altitude Above Field Elevation (AFE), feet	Calibrated Airspeed, knots	Flaps	Thrust Setting
1	0.0	-	15	Max takeoff
2	-	160	15	Max takeoff
3	400	-	15	Max takeoff
4	500	-	15	1.8 EPR
5	3000	-	15	1.8 EPR
6	-	210	zero	Max Climb
7		250	zero	Max Climb
8	5500	-	zero	Max Climb
9	7500	-	zero	Max Climb
10	10000	-	zero	Max Climb

Translated into INM Procedure

ACFT_ID	OP	PROF_ ID1	PROF_ ID2	STEP #	STEP_ TYPE	FLAP	THR	PRM1	PRM2	PRM3
727LAC	D	LACY	1	1	T	15	T	0.0	0.0	0.0
727LAC	D	LACY	1	2	A	U-15	T	1000.0	160.0	0.0
727LAC	D	LACY	1	3	C	U-15	T	400.0	0.0	0.0
727LAC	D	LACY	1	4	C	U-15	U	500.0	0.0	10330.0
727LAC	D	LACY	1	5	C	U-15	U	3000.0	0.0	10330.0
727LAC	D	LACY	1	6	A	ZERO	C	1000.0	210.0	0.0
727LAC	D	LACY	1	7	A	ZERO	C	1000.0	250.0	0.0
727LAC	D	LACY	1	8	C	ZERO	C	5500.0	0.0	0.0
727LAC	D	LACY	1	9	C	ZERO	C	7500.0	0.0	0.0
727LAC	D	LACY	1	10	C	ZERO	C	10000.0	0.0	0.0

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Supplemental Data for Boeing 727 Request for Approval of User Changes to INM
March 13, 2007
Page 3

Clay Lacy B727 Profile Points
Profile Weight: 156,000 lb

Distance from Brake Release, nm	Altitude Above Field Elevation (AFE), feet	True Airspeed, knots	Net Corrected Thrust per Engine, lb
0.00	0.0	35.0	14979.4
0.77	0.0	155.5	13836.3
0.92	57.7	162.5	13807.0
1.25	400.0	163.3	13931.2
1.41	500.0	163.6	10330.0
5.86	3000.0	169.8	10330.0
6.03	3052.7	174.5	11559.5
7.76	3607.8	224.9	11252.0
9.65	4090.8	269.7	11005.7
11.77	5500.0	275.5	11232.5
14.97	7500.0	284.1	11554.3
19.33	10000.0	295.5	11956.5

Section 3 –Comparison with Measured Data

The number of Boeing 727 operations in a year was very small limiting the number of noise monitor measurements available for comparison. Fifteen noise monitor readings at permanent noise monitorV-7, located approximately two nautical miles from brake release for Runway 16R departures and near runway centerline, were gathered for the Boeing 727 departures and compared to the INM results at the same point. The range of measured SEL values for the Boeing 727 departures was 101 – 112 dBA. The modeled SEL for the Clay Lacy procedure was 102 dBA. The modeled SEL for the 727EM2 Standard (Stage Length 1) profile at V-7 was 105 dBA.

If you have any questions or comments regarding the content of this letter, you can reach me via telephone at 916.568.1116 or via e-mail at rbehr@hmmh.com. I hope this clarifies questions you had on our previous request. Thank you for your consideration. I look forward to hearing back from you at your earliest convenience.

Sincerely yours,

HARRIS MILLER MILLER & HANSON INC.

Robert D. Behr

Robert D. Behr
Senior Consultant

Attachment: Boeing 727 Data Sheet

Boeing 727 Data Sheet
Computation of True Airspeeds at 160 knots indicated airspeed and two altitudes

Clay Lacy 727 ISA Day
Built on 727EM2 Profile with cutbacks at 400 feet AFE to 500 feet AFE and 500 feet AFE to 3,000 feet AFE

Use following to compute True Airspeed INM 6.0 Technical Manual 2.3.3

		theta	delta	sigma
altitude	500	0.991069	0.953937	0.962534
KIAS	160			
KTAS	163.0842			
Power	1.8 EPR			

		theta	delta	sigma
altitude	3000	0.973881	0.870122	0.893458
KIAS	160			
KTAS	169.2711			
Power	1.8 EPR			

kts2fps	1.6878
T	56.15077
P	29.92
E	799
R	459.67
L	0.003566
EXP	5.256562
nm2ft	6076.116

Use INM Thrust Calculator to derive Corrected Net Thrust per Engine

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July 7, 2006

Mr. Sandy Liu
Federal Aviation Administration
Office of Environment and Energy
800 Independence Ave., SW
Washington, DC 20591

Subject: Request for Approval of User Changes to the Integrated Noise Model, Lear 24/25

Reference: HMMH Project Number 300701

Dear Mr. Liu:

This letter is a request for approval of user changes to the Integrated Noise Model (INM) version 6.2 for use at Van Nuys (VNY) airport. These changes involve augmenting the standard departure profiles in the INM with actual procedures as flown by pilots operating at VNY.

Section 1 – Background

We are submitting this request for written approval for changes to the Integrated Noise Model standard profiles in support of a Van Nuys Airport FAR Part 161 study. Los Angeles World Airports (LAWA), the proprietor of VNY, is the sponsor of the study.

This letter contains data on the Lear 24/25 operating procedures as provided by Clay Lacy Aviation. We will send similar letters containing data for other aircraft operating at VNY which also are flown differently than modeled in the INM. In support of the Part 161 process, we held a meeting on January 24, 2006 with personnel from Clay Lacy Aviation, a Fixed Base Operator (FBO) at VNY, to determine how they operate their Lear 2X series aircraft. Clay Lacy Aviation's approval of our modeling of this procedure is documented in Appendix A. We refer to this procedure as the Clay Lacy procedure in this document.

Section 2 – Statement of Benefit

The differences between the standard INM departure and the Clay Lacy procedure are primarily due to the lower thrust levels used in the Clay Lacy procedure. The standard INM procedure uses 100% power up to 1,500 feet Above Field Elevation (AFE) during departure; the Clay Lacy procedure uses 100% power up to 400 feet AFE, then reduces to 94%, with a reduction to 91% at 1,000 feet AFE. This power setting is held to 3,000 feet AFE when the power is increased to 97%, which corresponds with the maximum climb power of the standard INM procedure. The Lear 24/25 has enough excess power to maintain the required climb gradient in the event of an engine failure at any point in the Clay Lacy procedure.

The lower thrust setting of the Clay Lacy procedure provides a noise benefit for the area within about 3.5 nautical miles (nm) from the brake release point. Beyond this distance, the Clay Lacy procedure is slightly louder than the INM standard due to the lower climb gradient, and hence lower altitude, until climb thrust is applied.

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In addition to the procedure described above, Clay Lacy Aviation also indicated that they use a departure weight between 12,000 and 13,000 pounds (lbs), rather than the INM standard weight of 15,000 lbs. We modeled both the standard INM procedure and the Clay Lacy procedure using an aircraft weight of 12,500 lbs to determine the impact of the lower weights on noise at the ground. The Clay Lacy procedure provides a similar benefit compared to the INM standard procedure when the lighter weight is used.

Section 3 – Analysis Demonstrating Benefit

The analysis shows the Clay Lacy procedure provides noise benefits from 1 to 3 nautical miles from the brake release point. The benefit is highest (5.3 dB, SEL) at 1 nm from the brake release point, with the benefit decreasing as the aircraft continues down the flight track. At 3.5 nm, the procedure provides little benefit, and beyond that point, the Clay Lacy procedure gives a slight noise increase, with a consistent maximum penalty of about 1.0 dB (SEL) between 4 and 8 nm from brake release.

Table 1 shows the SEL results under the flight path from the Clay Lacy procedure; the standard INM departure profile is presented for comparison.

Error! Reference source not found. shows the SEL results under the flight path for the Clay Lacy procedure for the lower weight of 12,500 lbs; the standard INM procedure, which was also run with this lighter weight, is given for comparison. At the lower weight, the benefit of the Clay Lacy procedure drops from a maximum of 5.3 dB, SEL to 4.0 dB, SEL. The distance from brake release to where the procedure changes from a benefit to an increase in impact is also smaller, but we believe the benefits of the Clay Lacy procedure near the airport are still significant and that the procedure should be used.

Section 4 – Concurrence on Aircraft Performance

A letter from Clay Lacy Aviation stating agreement with these procedures is found in Appendix A.

Section 5 – Certification of New Parameters

The aircraft performance characteristics provided by Clay Lacy Aviation have been translated into INM procedure steps using standard engineering practice. We developed no new aircraft performance coefficients for this study. The procedure steps data in this study conform to the rules given in the INM User's Guide and SAE-1845. We used net corrected thrust in units of pounds for all thrust settings.

Section 6 – Graphical and Tabular Comparison

Tables 3-8 and Figures 1-6 present the results of the modeling analysis by showing the altitude, airspeed, and net corrected thrust per engine of the modeled procedures as a function of distance from the brake release point.

If you have any questions or comments regarding the content of this letter, you can reach me via telephone at 916.568.1116 or via e-mail at rbehr@hmmh.com. Thank you for your consideration. I look forward to hearing back from you at your earliest convenience.

HARRIS MILLER MILLER & HANSON INC.

Lear 25 Request for Approval of User Changes to INM
July 7, 2006
Page 3

Sincerely yours,

HARRIS MILLER MILLER & HANSON INC.

Robert D. Behr
Senior Consultant

enclosures:

HARRIS MILLER MILLER & HANSON INC.

Lear 25 Request for Approval of User Changes to INM
July 7, 2006
Page 4

Table 1. Comparison of Noise Impacts from Brake Release for INM Standard and Clay Lacy Departure Procedures
INM Aircraft Model: LEAR25 Profile Weight: 15,000 lb

Distance from Brake Release (nm)	INM Standard, SEL (dBA)	Clay Lacy, SEL (dBA)	Difference SEL (dBA)
0.00	153.1	153.1	0.0
0.50	148.5	148.5	0.0
1.00	121.4	116.1	-5.3
1.50	112.4	109.4	-3.0
2.00	107.8	105.0	-2.8
2.50	104.8	102.5	-2.3
3.00	101.2	100.1	-1.1
3.50	99.0	98.9	-0.1
4.00	97.2	98.1	0.9
4.50	96.0	96.9	0.9
5.00	94.8	95.8	1.0
5.50	93.7	94.6	0.9
6.00	92.4	93.3	0.9
6.50	91.2	92.2	1.0
7.00	90.1	91.0	0.9
7.50	89.0	89.9	0.9
8.00	88.0	88.9	0.9
8.50	87.1	87.9	0.8
9.00	86.1	86.9	0.8
9.50	85.3	86.0	0.7
10.00	84.5	85.1	0.6

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Lear 25 Request for Approval of User Changes to INM
July 7, 2006
Page 5

Table 2. Comparison of Noise Impacts from Brake Release for INM Standard and Clay Lacy Departure Procedures at Lower Weight
INM Aircraft Model: LEAR25 Profile Weight: 12,500 lb

Distance from Brake Release (nm)	INM Standard, SEL (dBA)	Clay Lacy, SEL (dBA)	Difference SEL (dBA)
0.00	153.1	153.1	0.0
0.50	130.6	130.4	-0.2
1.00	115.9	111.9	-4.0
1.50	108.5	105.6	-2.9
2.00	104.3	102.3	-2.0
2.50	100.2	99.6	-0.6
3.00	98.0	98.6	0.6
3.50	96.2	97.1	0.9
4.00	94.7	95.7	1.0
4.50	93.1	94.0	0.9
5.00	91.5	92.6	1.1
5.50	90.0	91.0	1.0
6.00	88.7	89.6	0.9
6.50	87.4	88.2	0.8
7.00	86.2	87.0	0.8
7.50	85.1	85.8	0.7
8.00	84.1	84.8	0.7
8.50	83.1	83.7	0.6
9.00	82.1	82.8	0.7
9.50	80.6	81.6	1.0
10.00	77.7	79.8	2.1

HARRIS MILLER MILLER & HANSON INC.

Lear 25 Request for Approval of User Changes to INM
July 7, 2006
Page 6

Table 3. INM Standard Lear 25 Departure Procedures

Step Number	Altitude Above Field Elevation (AFE), feet	Calibrated Airspeed, knots	Flaps	Thrust Setting
1	0.0	-	20	Max Takeoff
2	-	171	20	Max Takeoff
3	1500	-	20	Max Takeoff
4	-	196	10	Max Takeoff
5	3000	-	zero	Max Climb
6	-	250	zero	Max Climb
7	5500	-	zero	Max Climb
8	7500	-	zero	Max Climb
9	10000	-	zero	Max Climb

Table 4. Clay Lacy Lear 25 Departure Procedures

Step Number	Altitude Above Field Elevation (AFE), feet	Calibrated Airspeed, knots	Flaps	Thrust Setting
1	0.0	-	10	Max Takeoff
2	-	160	10	Max Takeoff
3	400	-	10	94% RPM
4	1000	-	10	94% RPM
5	1100	-	10	90% RPM
6	3000	-	zero	90% RPM
7		250	zero	Max Climb
8	5500	-	zero	Max Climb
9	7500	-	zero	Max Climb
10	10000	-	zero	Max Climb

HARRIS MILLER MILLER & HANSON INC.

Lear 25 Request for Approval of User Changes to INM
July 7, 2006
Page 7

Table 5. INM Standard Lear 25 Departure Parameters
Profile Weight: 15,000 lb

Distance from Brake Release, nm	Altitude Above Field Elevation (AFE), feet	True Airspeed, knots	Net Corrected Thrust per Engine, lb
0.00	0.0	35.0	2845.3
0.62	0.0	157.1	2527.2
0.95	214.6	172.7	2493.1
1.98	1500.0	176.0	2476.4
2.56	1824.7	202.8	2422.3
2.72	2026.3	203.4	2180.1
3.52	3000.0	206.3	2173.5
5.73	4222.7	268.1	2073.3
7.09	5500.0	273.3	2078.4
9.39	7500.0	281.9	2099.3
12.60	10000.0	293.1	2147.3

Table 6. Clay Lacy Lear 25 Departure Parameters
Profile Weight: 15,000 lb

Distance from Brake Release, nm	Altitude Above Field Elevation (AFE), feet	True Airspeed, knots	Net Corrected Thrust per Engine, lb
0.00	0.0	35.0	2845.3
0.62	0.0	157.1	2527.2
0.70	57.7	161.3	2518.0
1.06	400.0	162.1	2092.0
1.61	1000.0	163.5	2092.0
1.74	1100.0	163.8	1898.0
3.60	3000.0	168.4	1898.0
3.76	3071.5	174.7	2239.6
6.22	4139.3	267.8	2073.2
7.66	5500.0	273.3	2078.4
9.97	7500.0	281.9	2099.3
13.17	10000.0	293.1	2147.3

HARRIS MILLER MILLER & HANSON INC.

Lear 25 Request for Approval of User Changes to INM
July 7, 2006
Page 8

Table 7. INM Standard Lear 25 Departure Parameters
Profile Weight: 12,500 lb

Distance from Brake Release, nm	Altitude Above Field Elevation (AFE), feet	True Airspeed, knots	Net Corrected Thrust per Engine, lb
0.00	0.0	35.0	2845.3
0.42	0.0	143.4	2554.9
0.80	253.5	172.8	2492.5
1.55	1500.0	176.0	2476.4
1.92	1712.4	202.4	2423.3
2.09	1972.8	203.2	2181.0
2.73	3000.0	206.3	2173.5
4.10	3757.3	266.2	2073.1
5.51	5500.0	273.3	2078.4
7.28	7500.0	281.9	2099.3
9.72	10000.0	293.1	2147.3

Table 8. Clay Lacy Lear 25 Departure Parameters
Profile Weight: 12,500 lb

Distance from Brake Release, nm	Altitude Above Field Elevation (AFE), feet	True Airspeed, knots	Net Corrected Thrust per Engine, lb
0.00	0.0	35.0	2845.3
0.42	0.0	143.4	2554.9
0.62	135.3	161.4	2516.8
0.75	400.0	162.1	2512.6
0.82	500.0	162.3	2092.0
1.17	1000.0	163.5	2092.0
1.25	1100.0	163.8	1898.0
2.68	3000.0	168.4	1898.0
2.84	3071.7	177.6	2239.6
4.44	3770.1	266.3	2073.1
5.84	5500.0	273.3	2078.4
7.61	7500.0	281.9	2099.3

HARRIS MILLER MILLER & HANSON INC.

Lear 25 Request for Approval of User Changes to INM
July 7, 2006
Page 9

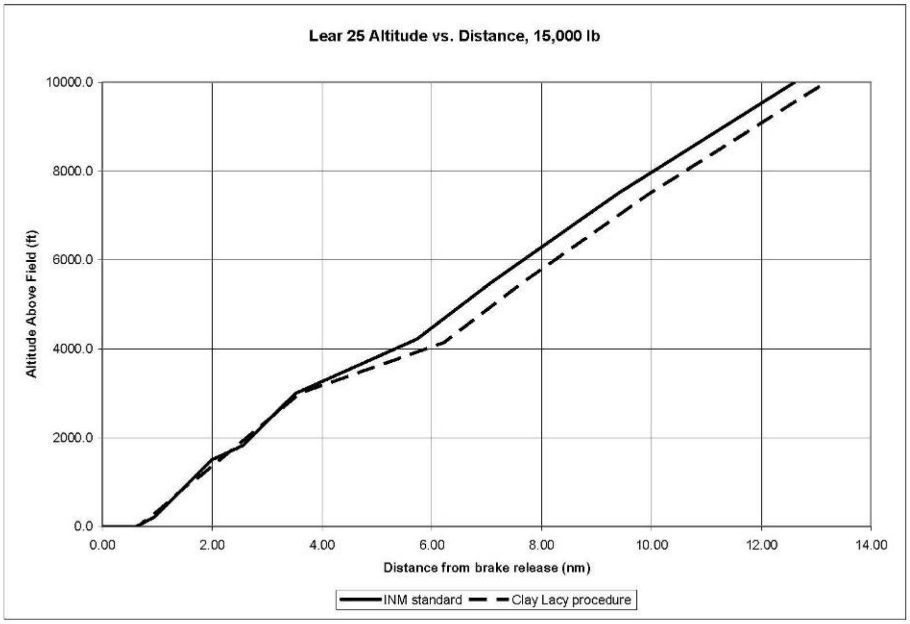

Figure 1. Altitude Profiles for Standard and Clay Lacy Procedures at Weight 15,000 Pounds

HARRIS MILLER MILLER & HANSON INC.

Lear 25 Request for Approval of User Changes to INM
July 7, 2006
Page 10

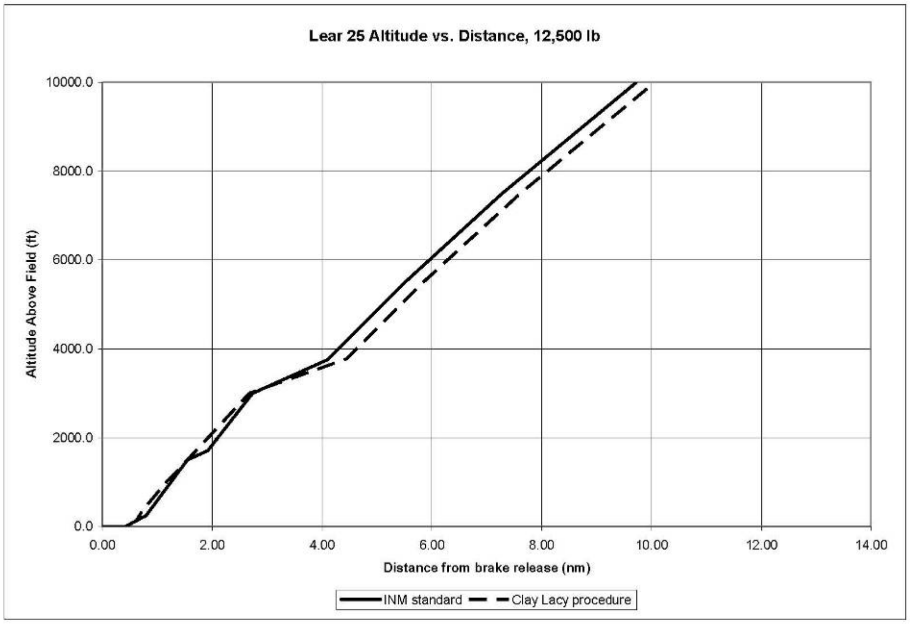

Figure 2. Altitude Profiles for Standard and Clay Lacy Procedures at Weight 12,500 Pounds

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Lear 25 Request for Approval of User Changes to INM
July 7, 2006
Page 11

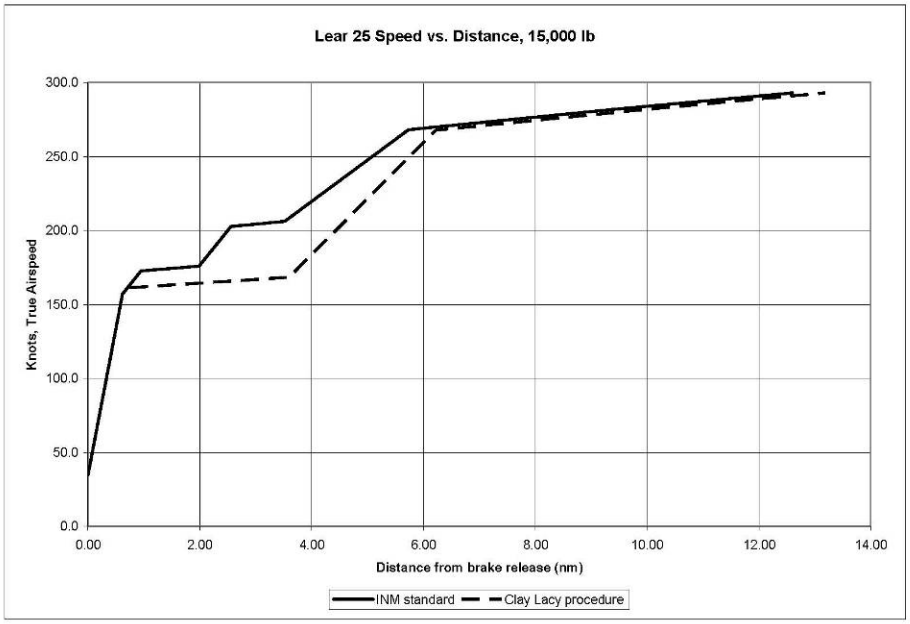

Figure 3. Airspeed Profiles for Standard and Clay Lacy Procedures at Weight 15,000 Pounds

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Lear 25 Request for Approval of User Changes to INM
July 7, 2006
Page 12

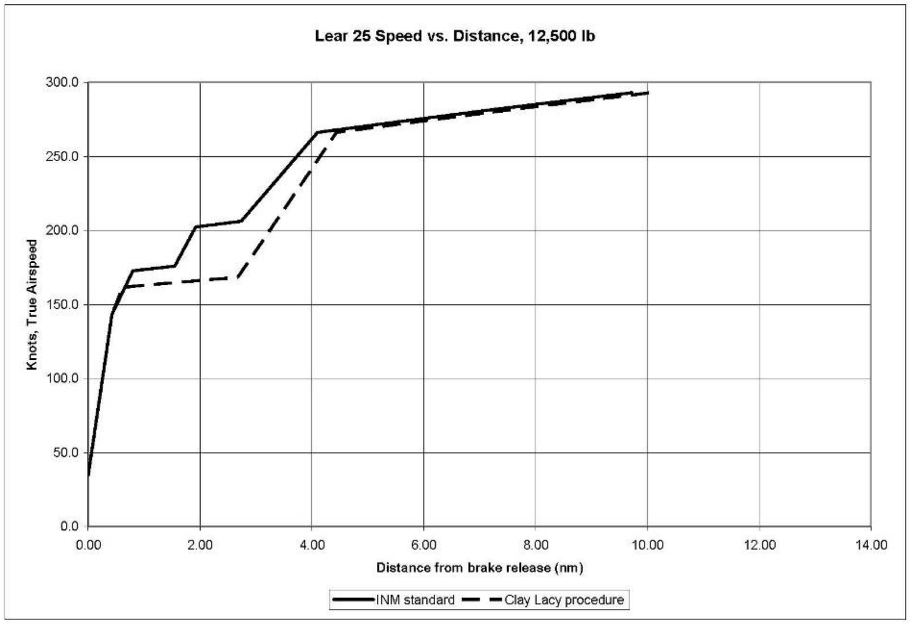

Figure 4. Airspeed Profiles for Standard and Clay Lacy Procedures at Weight 12,500 Pounds

HARRIS MILLER MILLER & HANSON INC.

Lear 25 Request for Approval of User Changes to INM
July 7, 2006
Page 13

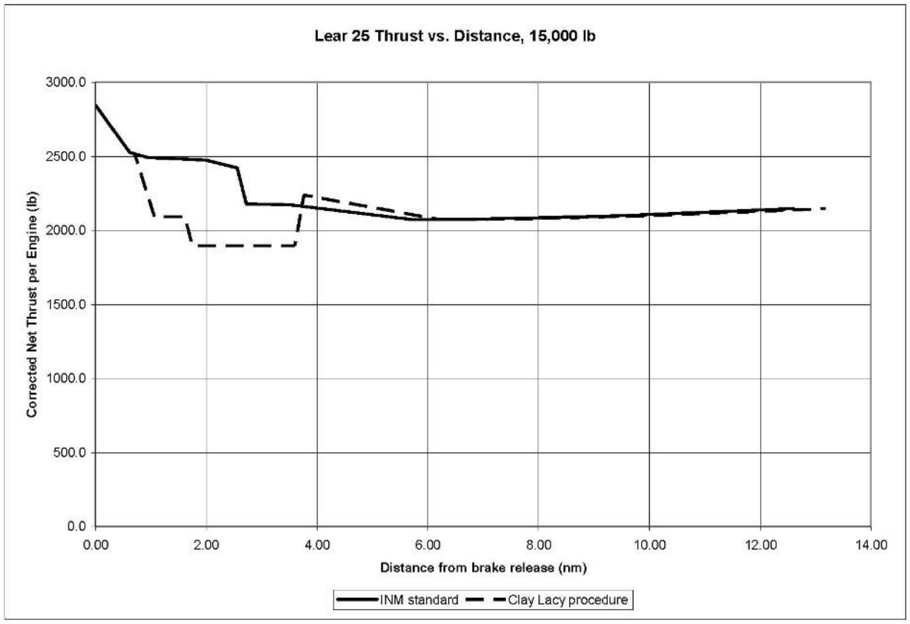

Figure 5. Thrust Profiles for Standard and Clay Lacy Procedures at Weight 15,000 Pounds

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Lear 25 Request for Approval of User Changes to INM
July 7, 2006
Page 14

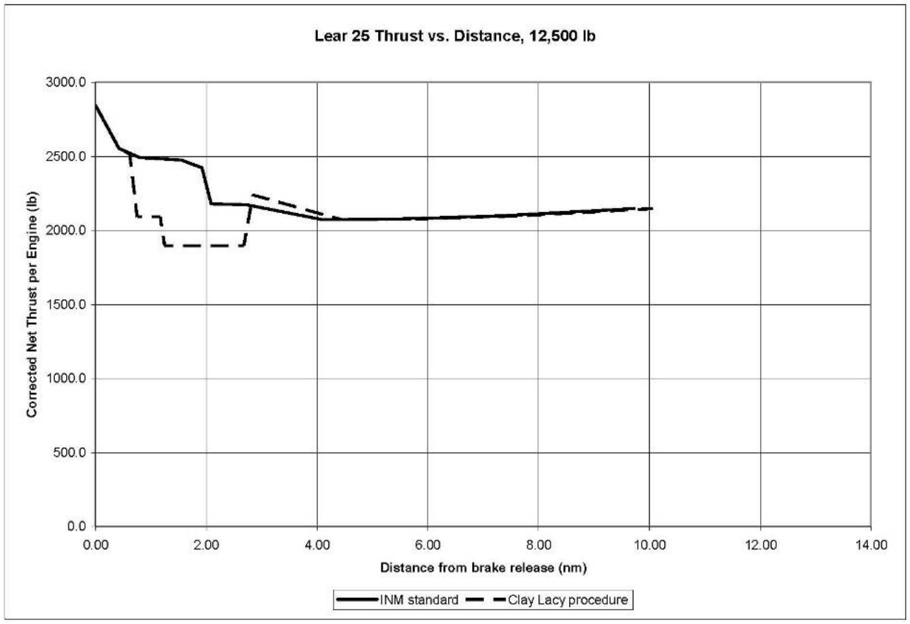

Figure 6. Thrust Profiles for Standard and Clay Lacy Procedures at Weight 12,500 Pounds

HARRIS MILLER MILLER & HANSON INC.

Lear 25 Request for Approval of User Changes to INM
July 7, 2006
Page 15

Appendix A

07/06/2006 21:29 FAX 002

Review and Concurrence of VNY Aircraft Performance Data – Clay Lacy
March 29, 2006
Page 7

Clay Lacy Aviation concurrence with modeled procedures:

Clay Lacy Aviation certifies that the proposed profile for Lear 24/25 aircraft departing from Van Nuys Airport falls within reasonable bounds of the aircraft's performance.

Name

PRESIDENT / CLAY LACY AVIATION
Position/ Title

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March 13, 2007

Dr. "Bill" Hua He
Federal Aviation Administration
Office of Environment and Energy
800 Independence Ave., SW
Washington, DC 20591

Subject: Supplemental Information for Lear 25 Non-Standard Departure Profiles at Van Nuys Airport

Reference: HMMH Project Number 300701

Dear Dr. He:

This letter is in response to questions raised regarding our request (previously submitted in July 2006) to use actual operator profiles for the Lear 25 aircraft when modeling in the Integrated Noise Model (INM) at Van Nuys Airport (VNY). The INM modeling is in support of the VNY FAR Part 161 study. Los Angeles World Airports (LAWA), the proprietor of VNY, is the sponsor of the study.

Section 1 – Background

In recent communications from the FAA, questions were raised concerning how certain values were calculated using standard engineering procedures. This document and attachments attempt to describe in detail the methodology employed using information from the INM Version 6.0 User's Guide and Technical Manual and SAE-AIR-1845 equations. We have also discussed the differences in this profile and the profile submitted under the VNY Part 150 study with LAWA representatives. They recommended/approved our submittal of this profile as it represents the current procedure flown at VNY by the major Lear 25 operator.

In support of the Part 161 process, we held a meeting on January 24, 2006 with personnel from Clay Lacy Aviation, a Fixed Base Operator (FBO) at VNY, to determine how they operate their Lear 2X series aircraft. After we gathered the data, we converted the data into the required format for the Integrated Noise Model.

As stated in our original letter of request, the differences between the standard INM departure and the proposed procedure are primarily due to the lower thrust levels used in the Clay Lacy procedure. The standard INM procedure uses maximum takeoff power up to 1,500 feet Above Field Elevation (AFE) during departure; the Clay Lacy procedure uses maximum takeoff power up to 400 feet AFE, then reduces to 94% RPM, with a reduction to 91% RPM at 1,000 feet AFE. The 91% RPM power setting is held to 3,000 feet AFE when the power is increased to 97% RPM, which corresponds with the maximum climb power of the standard INM procedure. The Lear 24/25 has enough excess power to maintain the required climb gradient in the event of an engine failure at any point in the Clay Lacy procedure.

Section 2 – Derivation of New Parameters

Data provided by Clay Lacy included the aircraft power setting, flap setting, altitude, and calibrated/indicated airspeed at various points in the profile as shown in the following table.

HARRIS MILLER MILLER & HANSON INC.

Supplemental Data for Lear 25 Request for Approval of User Changes to INM
March 13, 2007
Page 2

Clay Lacy Lear 25 Departure Procedures

Step Number	Altitude Above Field Elevation (AFE), feet	Calibrated Airspeed, knots	Flaps	Thrust Setting
1	0.0	-	10	Max Takeoff
2	-	160	10	Max Takeoff
3	400	-	10	94% RPM
4	1000	-	10	94% RPM
5	1100	-	10	91% RPM
6	3000	-	zero	91% RPM
7		250	zero	Max Climb
8	5500	-	zero	Max Climb
9	7500	-	zero	Max Climb
10	10000	-	zero	Max Climb

These aircraft performance characteristics were then translated into INM procedure steps by using standard engineering practice to determine the reduced thrust settings. The procedure steps data conform to the rules given in the INM User's Guide / Technical Manual and SAE-AIR-1845. We developed no new aircraft performance coefficients for this study. The procedure for the calculation of the thrust levels in corrected net thrust per engine in pounds follows with actual calculations in the attached spreadsheet.

The Lear aircraft do not have data coefficients in the thr_gnrl.dbf file to assist in converting N1 to pounds thrust. Data are included for three Cessna-types; therefore, it was decided to use a comparative method to determine the approximate Lear thrust levels. From the thr_gnrl.dbf file, we obtained the regression coefficients (E, F, GA, GB, H, K1, K2) for the Cessna INM types (CNA500, CNA55B, and CNA750) and used the SAE-AIR-1845 thrust equation:

$$F_n / \delta = E + F\,v + G_A\,h + G_B\,h^2 + H\,T_C + K_1\,N_1 + K_2\,N_1^2$$

where
F_n / δ corrected net thrust per engine (pounds)
v equivalent/calibrated airspeed (knots)
h pressure altitude (feet) MSL
T_C temperature (°C) at the aircraft
E, F, G_A, G_B, H, K_1, K_2 regression coefficients
N_1 power setting

From the thr_jet.dbf file we obtained the regression coefficients for the Lear aircraft as before, except for K_1 and K_2. We computed the corrected net thrust for the Cessna aircraft at a representative pressure altitude of 1,800 feet MSL and 160 knots calibrated airspeed for various N_1 levels (50 – 100). We then determined the percent of total thrust for each N_1 level and derived an average percent of total thrust for 91% and 94% N_1. These average percentages were then applied to the maximum thrust determined for the Lear aircraft through use of the equation above (without the K_1 and K_2 terms). The resulting corrected net thrust levels were then input into the INM procedure profile for the Lear aircraft (91% - 1898 pounds, 94% - 2086 pounds).

HARRIS MILLER MILLER & HANSON INC.

Supplemental Data for Lear 25 Request for Approval of User Changes to INM
March 13, 2007
Page 3

Translated into INM Procedure

ACFT_ID	OP	PROF_ ID1	PROF_ ID2	STEP #	STEP_ TYPE	FLAP	THR	PRM1	PRM2	PRM3
L25LAC	D	LACY	1	1	T	20	T	0.0	0.0	0.0
L25LAC	D	LACY	1	2	A	10	T	1698.0	160.0	0.0
L25LAC	D	LACY	1	3	C	10	T	400.0	0.0	0.0
L25LAC	D	LACY	1	4	C	10	U	500.0	0.0	2086.0
L25LAC	D	LACY	1	5	C	10	U	1000.0	0.0	2086.0
L25LAC	D	LACY	1	6	C	10	U	1100.0	0.0	1898.0
L25LAC	D	LACY	1	7	C	ZERO	U	3000.0	0.0	1898.0
L25LAC	D	LACY	1	8	A	ZERO	C	1500.0	250.0	0.0
L25LAC	D	LACY	1	9	C	ZERO	C	5500.0	0.0	0.0
L25LAC	D	LACY	1	10	C	ZERO	C	7500.0	0.0	0.0
L25LAC	D	LACY	1	11	C	ZERO	C	10000.0	0.0	0.0

Clay Lacy Lear 25 Profile Points
Profile Weight: 12,500 lb

Distance from Brake Release, nm	Altitude Above Field Elevation (AFE), feet	True Airspeed, knots	Net Corrected Thrust per Engine, lb
0.00	0.0	35.0	2833.39
0.42	0.0	144.5	2543.01
0.63	145.7	162.7	2505.24
0.77	400.0	163.3	2502.17
0.84	500.0	163.6	2086.00
1.20	1000.0	164.8	2086.00
1.29	1100.0	165.0	1898.00
2.77	3000.0	169.8	1898.00
2.94	3071.1	178.3	2238.21
4.67	3819.8	268.6	2074.19
6.08	5500.0	275.5	2084.77
7.92	7500.0	284.1	2111.79
10.44	10000.0	295.5	2167.60

Section 3 –Comparison with Measured Data

Noise monitor readings at permanent noise monitorV-7, located approximately two nautical miles from brake release for Runway 16R departures and near runway centerline, were gathered for the Lear 25 departures and compared to the INM results at the same point. The range of measured SEL values for the Lear 25 departures was 96 – 105 dBA. The modeled SEL for the Clay Lacy procedure was 102.2 dBA, near the center of the measured range of values. The modeled SEL for the Lear 25 Standard profile at V-7 was 104.2 dBA.

HARRIS MILLER MILLER & HANSON INC.

Supplemental Data for Lear 25 Request for Approval of User Changes to INM
March 13, 2007
Page 4

If you have any questions or comments regarding the content of this letter, you can reach me via telephone at 916.568.1116 or via e-mail at rbehr@hmmh.com. I hope this clarifies questions you had on our previous request. Thank you for your consideration. I look forward to hearing back from you at your earliest convenience.

Sincerely yours,

HARRIS MILLER MILLER & HANSON INC.

Robert D. Behr

Robert D. Behr
Senior Consultant

Attachment: Lear 25 Data Sheet

Lear 25/35 Data Sheet

Computation of cutback thrust levels in pounds, given N1 Levels

	E	F	G1	G2	H	K2	K3
CNA500	1743.1	-1.64678	-2.01E-03	-1.56E-07	0	-4.97E+01	5.45E-01
CNA55B	1373.8	-2.2903	-8.88E-05	3.23E-08	0	-4.49E+01	6.63E-01
CNA750	4778.6	-6.56571	6.71E-04	-4.11E-07	0	-1.47E+02	1.97E+00
LR25 (max)	2845.4	-2.03911	-1.68E-02	2.18E-06	0		
LR35 (max)	3412.2	-3.888	-4.41E-03	1.54E-06	0		

Speed	160
Alt	1800

Fn/(delta)	N1 Level	CNA500	CNA55B	CNA750			LEAR25	LEAR35
Absolute	50	354.02	422.42	1329.36				
	60	456.73	703.41	2034.52				
	70	668.43	1117.05	3134.64				
	80	989.14	1663.34	4629.72				
	90	1418.85	2342.29	6519.76				
	91	1467.81	2417.48	6730.49				
	94	1621.25	2651.02	7386.37				
	96	1728.99	2813.34	7843.37				
	100	1957.55	3153.90	8804.76			2496.0	2787.2
% of max	50	18.1%	13.4%	15.1%				
thrust	60	23.3%	22.3%	23.1%				
	70	34.1%	35.4%	35.6%	CNAX			
	80	50.5%	52.7%	52.6%	AVG	STD_DEV		
	90	72.5%	74.3%	74.0%	73.6%	1.0%	1837.027	2051.324
	91	75.0%	76.7%	76.4%	76.0%	0.9%	1897.587	2118.948
	94	82.8%	84.1%	83.9%	83.6%	0.7%	2086.384	2329.77
	96	88.3%	89.2%	89.1%	88.9%	0.5%	2218.181	2476.941
	100	100.0%	100.0%	100.0%				

U.S. Department
of Transportation
**Federal Aviation
Administration**

Office of Environment and Energy

800 Independence Ave., S.W.
Washington, D.C. 20591

April 4, 2007

Mr. Robert D Behr Jr.
Harris Miller Miller & Hanson Inc.
945 University Avenue, Suite 201
Sacreamento, CA 95825

Dear Mr. Behr:

The Office of Environment and Energy has reviewed the proposed non-standard INM departure profiles for three aircraft (Lear 25, Boeing 727 and A3) submitted for aircraft modeling for Van Nuys Airport (VNY) in support of the Los Angeles World Airports (LAWA) FAA Part 161 Study. Our office has also reviewed the supplemental steps used in deriving the non-standard profiles.

Our office approves the proposed revision of the profiles, with the understanding that

(1) The Clay Lacy Aviation has reviewed and verified that the proposed profiles for Lear25 and Boeing 727 are within the bounds of performance for the aircraft, and that the operators do in fact fly the procedure being modeled.

(1) The Raytheon Flight Test Operations has reviewed and verified that the proposed profiles for A-3 are within the bounds of performance for the aircraft, and that the operators do in fact fly the procedure being modeled.

Please understand that approvals listed above are limited to this particular Part 161 Study. Any additional projects or non-standard INM input will require separate approval.

Sincerely,

M. Marsan

Dr. Mehmet Marsan
Acting Manager
AEE/Noise Division

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April 23, 2007

Dr. "Bill" Hua He
Federal Aviation Administration
Office of Environment and Energy
800 Independence Ave., SW
Washington, DC 20591

Subject: Request for Approval of User Changes to the Integrated Noise Model, Lear35

Reference: HMMH Project Number 300701

Dear Dr. He:

This letter is a request for approval of user changes to the Integrated Noise Model (INM) version 6.2a for use at Van Nuys (VNY) airport. These changes involve augmenting the standard departure profiles in the INM with actual procedures as flown by pilots operating at VNY.

Section 1 – Background

We are submitting this request for written approval for changes to the Integrated Noise Model standard profiles in support of a Van Nuys Airport FAR Part 161 study. Los Angeles World Airports (LAWA), the proprietor of VNY, is the sponsor of the study.

This letter contains data on the Lear 35 operating procedures. In support of the Part 161 process, we held a meeting on January 24, 2006 with personnel from Clay Lacy Aviation, a Fixed Base Operator (FBO) at VNY, to determine how they operate their Lear 35 aircraft. Clay Lacy Aviation's approval of our modeling of this procedure is documented in appendix A. We refer to this procedure as the Clay Lacy procedure in this document.

Section 2 – Statement of Benefit

The differences for the Lear 35 between the standard INM departure and the Clay Lacy departure procedures are primarily due to the lower thrust levels used at the start of the Clay Lacy procedure. The standard INM procedure uses maximum takeoff power up to 1,500 feet Above Field Elevation (AFE) during departure; the Clay Lacy procedure uses maximum takeoff power up to 400 feet AFE, then reduces to 94%, with a further reduction to 91% at 1,000 feet AFE. This power setting is held to 3,000 feet AFE, where the power is increased to 97%, which corresponds with the maximum climb power of the standard INM procedure. At the same track distance, the INM standard aircraft is at a higher altitude due to the greater thrust used, and so is farther from the ground at the point where the same thrust levels are used. This greater distance from the ground for the modeled INM aircraft gives a slightly lower noise level on the ground compared to the modeled Clay Lacy aircraft.

The power settings and procedure steps used in this analysis can be seen in the attached tables. The Lear 35 has enough excess power to maintain the required climb gradient in the event of an engine failure at any point in the Clay Lacy procedure.

HARRIS MILLER MILLER & HANSON INC.

Lear 35 Request for Approval of User Changes to INM
April 23, 2007
Page 2

Section 3 – Analysis Demonstrating Benefit

The analysis shows the Clay Lacy procedure provides noise benefits from one to three and a half nautical miles from brake release. The benefit is highest (4.4 dB, SEL) at two nautical miles from brake release, with the benefit decreasing as the aircraft continues down the flight track. At four nautical miles and beyond, the Clay Lacy procedure gives a slight noise increase, with a consistent maximum penalty of about 1.4 dB (SEL) between four and six nautical miles from brake release.

Table 1 shows the SEL results under the flight path from the Clay Lacy procedure; the standard INM departure profile is presented for comparison.

Table 1 Comparison of Noise Impacts from Brake Release for INM Standard and Clay Lacy Departure Procedures

INM Aircraft Model: LEAR35 Profile Weight: 18,300 lb

Distance from Brake Release (nm)	INM Standard, SEL (dBA)	Clay Lacy, SEL (dBA)	Difference SEL (dBA)
0.00	144.6	144.6	0.0
0.50	119.3	119.3	0.0
1.00	104.6	100.7	-3.9
1.50	97.9	94.6	-3.3
2.00	94.1	89.7	-4.4
2.50	90.7	87.3	-3.4
3.00	86.6	85.2	-1.4
3.50	84.7	83.7	-1.0
4.00	83.0	84.4	1.4
4.50	81.8	83.3	1.5
5.00	80.6	82.0	1.4
5.50	79.5	80.9	1.4
6.00	78.4	79.6	1.2
6.50	77.1	78.4	1.3
7.00	76.2	77.2	1.0
7.50	75.3	76.1	0.8
8.00	74.5	75.3	0.8
8.50	73.7	74.5	0.8
9.00	73.0	73.7	0.7
9.50	72.3	73.0	0.7
10.00	71.6	72.3	0.7

Table 2 shows the INM Standard profile data and Table 3 shows the data provided by Clay Lacy including the aircraft power setting, flap setting, altitude, and calibrated/indicated airspeed at various points in the profile.

HARRIS MILLER MILLER & HANSON INC.

Lear 35 Request for Approval of User Changes to INM
April 23, 2007
Page 3

Table 2. INM Standard Lear 35 Departure Procedures
Profile Weight: 18,300 lb

Step Number	Altitude Above Field Elevation (AFE), feet	Calibrated Airspeed, knots	Flaps	Thrust Setting
1	0.0	-	20	Max Takeoff
2	-	158	20	Max Takeoff
3	1500	-	20	Max Takeoff
4	-	183	10	Max Takeoff
5	3000	-	zero	Max Climb
6	-	250	zero	Max Climb
7	5500	-	zero	Max Climb
8	7500	-	zero	Max Climb
9	10000	-	zero	Max Climb

Table 3. Clay Lacy Lear 35 Departure Procedures
Profile Weight: 18,300 lb

Step Number	Altitude Above Field Elevation (AFE), feet	Calibrated Airspeed, knots	Flaps	Thrust Setting
1	0.0	-	10	Max Takeoff
2	-	160	10	Max Takeoff
3	400	-	10	94% RPM
4	1000	-	10	94% RPM
5	1100	-	10	91% RPM
6	3000	-	zero	91% RPM
7		250	zero	Max Climb
8	5500	-	zero	Max Climb
9	7500	-	zero	Max Climb
10	10000	-	zero	Max Climb

HARRIS MILLER MILLER & HANSON INC.

Lear 35 Request for Approval of User Changes to INM
April 23, 2007
Page 4

Section 3.1 – Derivation of New Parameters

The Clay Lacy aircraft performance characteristics were then translated into INM procedure steps by using standard engineering practice to determine the reduced thrust settings. The procedure steps data conform to the rules given in the INM User's Guide / Technical Manual and SAE-AIR-1845. We developed no new aircraft performance coefficients for this study. The procedure for the calculation of the thrust levels in corrected net thrust per engine in pounds follows with actual calculations in the attached spreadsheet (Appendix B).

The Lear aircraft do not have data coefficients in the thr_gnrl.dbf file to assist in converting N1 to pounds thrust. Data are included for three Cessna-types; therefore, it was decided to use a comparative method to determine the approximate Lear thrust levels. From the thr_gnrl.dbf file, we obtained the regression coefficients (E, F, GA, GB, H, K1, K2) for the Cessna INM types (CNA500, CNA55B, and CNA750) and used the SAE-AIR-1845 thrust equation:

$$F_n / \delta = E + F\,v + G_A\,h + G_B\,h^2 + H\,T_C + K_1\,N_1 + K_2\,N_1^2$$

where
F_n / δ corrected net thrust per engine (pounds)
v equivalent/calibrated airspeed (knots)
h pressure altitude (feet) MSL
T_C temperature (°C) at the aircraft
$E, F, G_A, G_B, H, K_1, K_2$ regression coefficients
N_1 power setting

From the thr_jet.dbf file we obtained the regression coefficients for the Lear 35 aircraft as before, except for K_1 and K_2. We computed the corrected net thrust for the Cessna aircraft at a representative pressure altitude of 1,800 feet MSL and 160 knots calibrated airspeed for various N_1 levels (50 – 100). We then determined the percent of total thrust for each N_1 level and derived an average percent of total thrust for 91% and 94% N_1. These average percentages were then applied to the maximum thrust determined for the Lear aircraft through use of the equation above (without the K_1 and K_2 terms). The resulting corrected net thrust levels were then input into the INM procedure profile for the Lear aircraft (91% - 2119 pounds, 94% - 2330 pounds).

Table 4. Translated into INM Procedure

ACFT_ID	OP	PROF_ ID1	PROF_ ID2	STEP #	STEP_ TYPE	FLAP	THR	PRM1	PRM2	PRM3
L35LAC	D	LACY	1	1	T	20	T	0.0	0.0	0.0
L35LAC	D	LACY	1	2	A	10	T	1698.0	160.0	0.0
L35LAC	D	LACY	1	3	C	10	T	400.0	0.0	0.0
L35LAC	D	LACY	1	4	C	10	U	500.0	0.0	2330.0
L35LAC	D	LACY	1	5	C	10	U	1000.0	0.0	2330.0
L35LAC	D	LACY	1	6	C	10	U	1100.0	0.0	2119.0
L35LAC	D	LACY	1	7	C	ZERO	U	3000.0	0.0	2119.0
L35LAC	D	LACY	1	8	A	ZERO	C	1500.0	250.0	0.0
L35LAC	D	LACY	1	9	C	ZERO	C	5500.0	0.0	0.0
L35LAC	D	LACY	1	10	C	ZERO	C	7500.0	0.0	0.0
L35LAC	D	LACY	1	11	C	ZERO	C	10000.0	0.0	0.0

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Table 5 shows the resulting profile points for the Clay Lacy Lear 35. For comparison purposes, Table 6 shows the profile points for the Standard INM profile.

Table 5. Clay Lacy Lear 35 Departure Parameters
Profile Weight: 18,300 lb

Distance from Brake Release, nm	Altitude Above Field Elevation (AFE), feet	True Airspeed, knots	Net Corrected Thrust per Engine, lb
0.00	0.0	35.0	3412.37
0.43	0.0	144.3	2854.93
0.73	184.9	161.4	2789.50
0.89	400.0	161.9	2788.72
0.99	500.0	162.2	2330.00
1.49	1000.0	163.4	2330.00
1.61	1100.0	163.6	2119.00
3.72	3000.0	168.3	2119.00
3.89	3071.3	173.0	2511.56
7.22	4514.5	269.0	2206.27
8.51	5500.0	273.1	2215.97
11.33	7500.0	281.6	2243.94
15.28	10000.0	292.8	2294.54

Table 6. INM Standard Lear 35 Departure Parameters
Profile Weight: 18,300 lb

Distance from Brake Release, nm	Altitude Above Field Elevation (AFE), feet	True Airspeed, knots	Net Corrected Thrust per Engine, lb
0.00	0.0	35.0	3412.37
0.43	0.0	144.3	2854.93
0.74	192.5	159.4	2797.25
1.85	1500.0	162.5	2794.75
2.44	1815.7	189.1	2697.74
2.60	1993.7	189.6	2427.98
3.53	3000.0	192.5	2431.08
6.64	4452.9	268.8	2205.76
8.01	5500.0	273.1	2215.97
10.84	7500.0	281.6	2243.94
14.79	10000.0	292.8	2294.54

Section 3.2 – Comparison with Measured Data

Noise monitor readings at permanent noise monitorV-7, located approximately two nautical miles from brake release for Runway 16R departures and near runway centerline, were gathered for the Lear 35 departures and compared to the INM results at the same point. The range of measured SEL values for the Lear 35 departures was 74 – 95 dBA. The modeled SEL for the Clay Lacy procedure was 89.7 dBA,. The modeled SEL for the Lear 35 Standard profile at V-7 was 94.1 dBA.

Section 4 – Concurrence on Aircraft Performance

A letter from Clay Lacy Aviation stating agreement with these procedures is found in Appendix A.

Section 5 – Certification of New Parameters

The aircraft performance characteristics provided by Clay Lacy Aviation have been translated into INM procedure steps as shown above. We developed no new aircraft performance coefficients for this study. The procedure steps data in this study conform to the rules given in the INM User's Guide and SAE-1845. We used net corrected thrust in units of pounds for all thrust settings.

Section 6 – Graphical and Tabular Comparison

Figures 1-3 present the results of the modeling analysis by showing the altitude, airspeed, and net corrected thrust per engine of the modeled procedures as a function of distance from the brake release point. These correspond to the tabular data previously shown.

If you have any questions or comments regarding the content of this letter, you can reach me via telephone at 916.568.1116 or via e-mail at rbehr@hmmh.com. Thank you for your consideration. I look forward to hearing back from you at your earliest convenience.

Sincerely yours,

HARRIS MILLER MILLER & HANSON INC.

Robert D. Behr

Robert D. Behr
Senior Consultant

Attachment: Lear35_Data_Sheet .xls

HARRIS MILLER MILLER & HANSON INC.

Lear 35 Request for Approval of User Changes to INM
April 23, 2007
Page 7

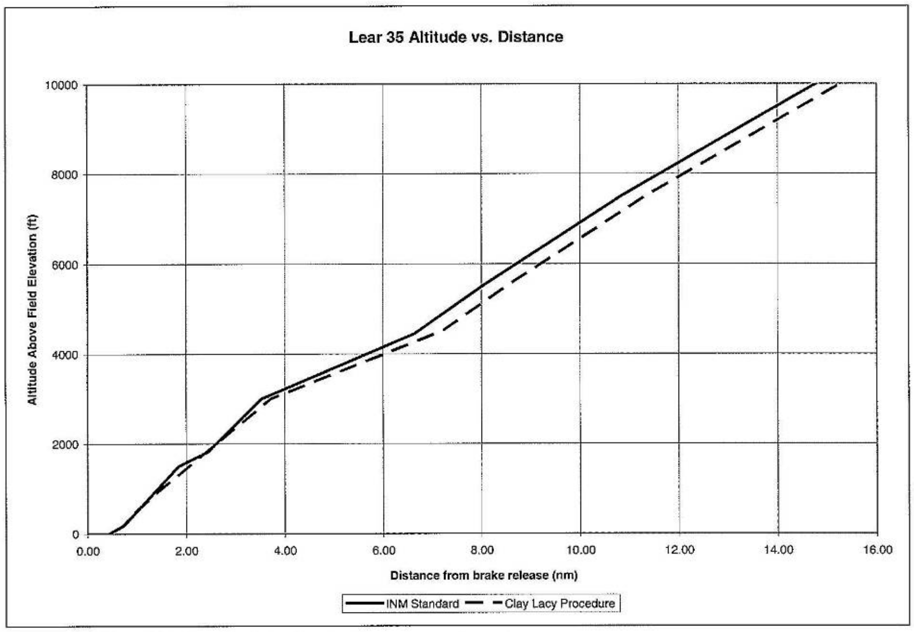

Figure 1. Altitude Profiles for Standard and Clay Lacy Procedures

HARRIS MILLER MILLER & HANSON INC.

Lear 35 Request for Approval of User Changes to INM
April 23, 2007
Page 8

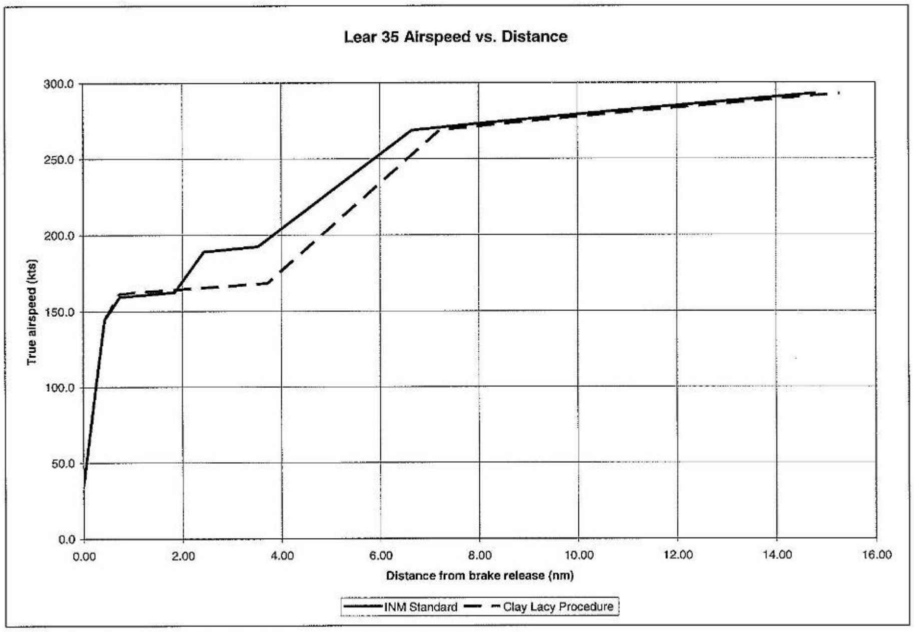

Figure 2. Airspeed Profiles for Standard and Clay Lacy Procedures

HARRIS MILLER MILLER & HANSON INC.

Lear 35 Request for Approval of User Changes to INM
April 23, 2007
Page 9

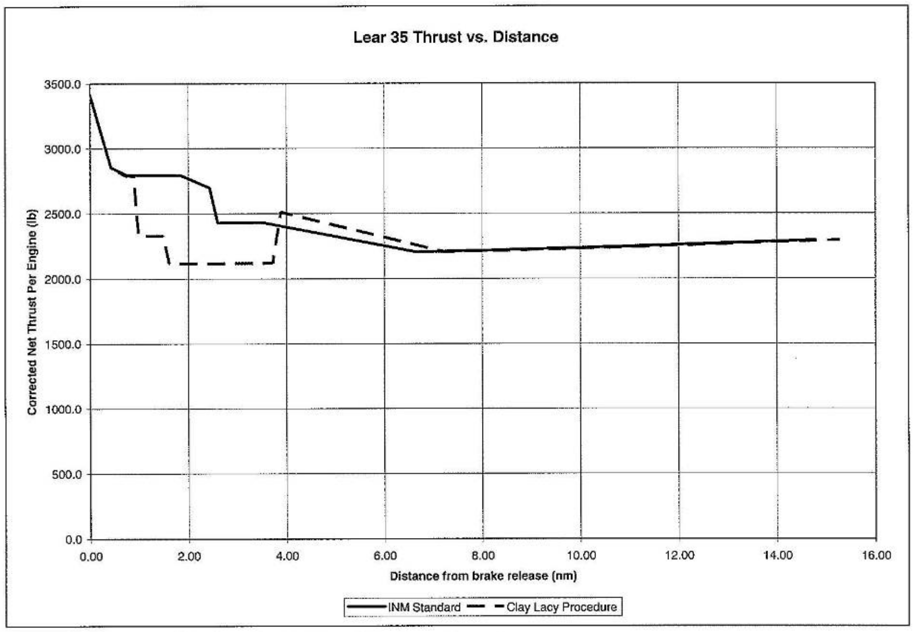

Figure 3. Thrust Profiles for Standard and Clay Lacy Procedures

HARRIS MILLER MILLER & HANSON INC.

B727 Request for Approval of User Changes to INM
April 23, 2007
Page 10

Appendix A

04/23/2007 09:34 8189099537 CLAY LACY AVIATION PAGE 02

Lear 35 Request for Approval of User Changes to INM
March 5, 2007
Page 5

Clay Lacy Aviation concurrence with modeled procedures:

Clay Lacy Aviation certifies that the proposed profile for Lear 35 aircraft departing from Van Nuys Airport provides a reasonably accurate representation of the typical departure procedure and falls within reasonable bounds of the aircraft's performance.

[signature]
Name

CEO CLAY LACY AVIATION
Position/ Title

Lear 25/35 Data Sheet
Computation of cutback thrust levels in pounds, given N1 Levels

	E	F	G1	G2	H	K2	K3		
CNA500	1743.1	-1.64678	-2.01E-03	-1.56E-07	0	-4.97E+01	5.45E-01		
CNA55B	1373.8	-2.2903	-8.88E-05	3.23E-08	0	-4.49E+01	6.63E-01		
CNA750	4778.6	-6.56571	6.71E-04	-4.11E-07	0	-1.47E+02	1.97E+00		
LR25 (max)	2845.4	-2.03911	-1.68E-02	2.18E-06	0				
LR35 (max)	3412.2	-3.888	-4.41E-03	1.54E-06	0				
Speed	160								
Alt	1800								
Fn/(delta)	N1 Level		CNA500	CNA55B	CNA750			LEAR25	LEAR35
Absolute	50		354.02	422.42	1329.36				
	60		456.73	703.41	2034.52				
	70		668.43	1117.05	3134.64				
	80		989.14	1663.34	4629.72				
	90		1418.85	2342.29	6519.76				
	91		1467.81	2417.48	6730.49				
	94		1621.25	2651.02	7386.37				
	96		1728.99	2813.34	7843.37				
	100		1957.55	3153.90	8804.76			2496.0	2787.2
% of max	50		18.1%	13.4%	15.1%				
thrust	60		23.3%	22.3%	23.1%				
	70		34.1%	35.4%	35.6%	CNAX			
	80		50.5%	52.7%	52.6%	AVG	STD_DEV		
	90		72.5%	74.3%	74.0%	73.6%	1.0%	1837.027	2051.324
	91		75.0%	76.7%	76.4%	76.0%	0.9%	1897.587	2118.948
	94		82.8%	84.1%	83.9%	83.6%	0.7%	2086.384	2329.77
	96		88.3%	89.2%	89.1%	88.9%	0.5%	2218.181	2476.941
	100		100.0%	100.0%	100.0%				

U.S. Department of Transportation
Federal Aviation Administration

Office of Environment and Energy

800 Independence Ave., S.W.
Washington, D.C. 20591

May 4, 2007

Mr. Robert D Behr Jr.
Harris Miller Miller & Hanson Inc.
945 University Avenue, Suite 201
Sacreamento, CA 95825

Dear Mr. Behr:

The Office of Environment and Energy has reviewed your proposed use of non-standard INM departure profile of Lear35 in aircraft noise modeling for Van Nuys Airport (VNY) in support of the Los Angeles World Airports (LAWA) FAA Part 161 Study. Our office has also reviewed the supplemental steps used in deriving the non-standard profiles.

Our office approves the proposed revision of the profiles, with the understanding that Clay Lacy Aviation has reviewed and verified that the proposed profile for Lear35 is within the bounds of performance for the aircraft, and that the operators do in fact fly the procedure being modeled.

Please understand that approvals listed above are limited to this particular Part 161 Study. Any additional projects or non-standard INM input will require separate approval.

Sincerely,

M. Marsan

Dr. Mehmet Marsan
Acting Manager
AEE/Noise Division

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August 13, 2007

Dr. "Bill" Hua He
Federal Aviation Administration
Office of Environment and Energy
800 Independence Ave., SW
Washington, DC 20591

Subject: Request for Approval of User-defined Aircraft – Gulfstream III Aircraft with Hushkits

Reference: HMMH Project Number 300701

Dear Dr. He:

Harris Miller Miller & Hanson Inc. (HMMH) is developing existing and forecast noise exposure contours for Van Nuys Airport (VNY) in support of the Los Angeles World Airports (LAWA) FAA Part 161 Study. We are using the Integrated Noise Model (INM) Version 7.0 for all aircraft noise modeling. This memorandum requests FAA approval of a user-defined aircraft for the Gulfstream III (GIII) recertified to 14 CFR Part Stage 3 via hushkit installations.

In previous correspondence (July 10, 2007), HMMH requested FAA guidance regarding the appropriate INM aircraft to use that would reflect the GIII operating with installed hushkits. The current INM identified aircraft substitution for the GIII is the Gulfstream IIB (INM type GIIB), which the FAA recommended as a conservative estimate for the hushkitted GIII (FAA letter dated July 17, 2007). After further review, HMMH submits this request for a user-defined aircraft that is basically the INM 7.0 standard GIIB with modified noise-power-distance (npd) curves to reflect the effects of the hushkits. There are no changes to the standard GIIB INM profiles.

Attachment 1 is a spreadsheet that summarizes data from FAA AC 36-3H which displays estimated maximum A-weighted sound levels for Gulfstream aircraft. Also included in the spreadsheet is information we received from Mr. Jim Skalecky (FAA) on the latest data he had regarding estimated maximum A-weighted sound levels from hushkitted Gulfstream aircraft. Comparing these data, the hushkitted GIII has maximum A-weighted sound levels for takeoff that are approximately 7.3 dB less than the non-hushkitted GIII while the approach levels of both aircraft are nearly the same. Using these limited data and the existing INM 7.0 data, HMMH developed revised INM Lmax and SEL npd curves as detailed below. We do not have data, nor do we have a need, to create npd curves for the other INM metrics. Therefore our proposed user-defined aircraft only has Lmax and SEL npd curves.

In INM 7.0, the GIIB uses the SPEYHK noise curves. Attachment 2 reproduces the SPEYHK noise curves (INM file npd_curve.dbf) and shows that the arrival and departure noise curves have identical values for thrust settings from 1,000 to 10,000 lbs. We assumed the aircraft was approximately 394 feet above the certification measurement position on arrival, based on the aircraft certification procedures in 14 CFR Part 36 B36.3c. In addition, we assumed that there were no changes to performance profiles between the two aircraft. Our next step was to find the thrust in the Lmax npd curves associated with 394 feet and 89.7 dBA (87.9 dBA is arrival Lmax reported in AC36-3H for the unhushkitted GIII). Table 1 shows the interpolated Lmax values for a distance of 394 feet. The

HARRIS MILLER MILLER & HANSON INC.

INM User-defined Aircraft Request – GIII with Hushkits
August 13, 2007
Page 2

interpolation indicates that the thrust level should be 3,228 lbs to produce an Lmax of 89.7 dBA at a distance of 394 feet.

Table 1 INM Thrust Estimate for 394 feet

SPEYHK INM 7.0 npd_curve.pdf			interpolated
Thrust	Lmax in dBA		
	200 ft	400 ft	394 ft
1,000	86.5	80.4	80.6
2,000	90.6	84.5	84.7
4,000	98.8	92.7	92.9
6,000	108.7	102.6	102.8
8,000	113.5	107.4	107.6
10,000	119.4	113.3	113.5

Both data sources for the take-off maximum A-weighted values (Attachment 1) indicate that there was a thrust-cutback during the take-off certification measurements. However, the thrust was not reported for either aircraft. Without further information, we therefore assumed that:

- There is a linear relationship between thrust and maximum A-weighted value benefit for the hushkit
- There is a constant 0.2 dB benefit at and below 3,228 lb of thrust (as reported in the INM npd_curve.dbf)
- The hushkit provides a linear benefit, in terms of maximum A-weighted level, as a function of thrust
- The 7.3 dB reduction maximum A-weighted sound level occurred at maximum thrust. This is a conservative assumption that would under-predict the benefits of the hushkit because the 7.3 dB was actually measured at a thrust cut back setting and hushkits are typically designed to provide maximum benefit at maximum thrust.
- Aircraft performance for both aircraft is identical
- Estimates of the hushkit's maximum A-weighted sound level benefit can also be directly applied to Sound Exposure Level npd curves.

Table 2 summarizes the two assumed data points for the two aircraft. In summary, the hushkitted GIIB has a 0.2 dB reduction at 3,228 lb of thrust and 7.3 dB reduction at 10,000 lb of thrust compared to the unhushkitted version.

HARRIS MILLER MILLER & HANSON INC.

INM User-defined Aircraft Request – GIII with Hushkits
August 13, 2007
Page 3

Table 2 Summary of Thrust versus Benefit

	Lmax (dBA) For Non-Hushkitted GIIB AC36-3H GIIB	Lmax (dBA) For Hushkitted GIII FAA provided	dB Difference	Assumed thrust (INM npd_curve.dbf)
Approach	89.7	89.5	-0.2	3,228
Departure	82.8	75.5	-7.3	10,000

Table 3 presents our proposed adjustment to the INM 7.0 npd curves as a function of thrust. We added the npd curve for 3,228 lb of thrust by interpolating between 2,000 and 4,000 lb of thrust. This allows the INM to model a constant adjustment of -0.2 dB up to 3,228 lbs of thrust. As discussed previously, we assume a linear relationship for the benefit of the hushkit between 3,228 lb and 10,000 lb of thrust.

Table 3 Lmax Adjustment as a Function of Thrust

Curves	Thrust	Interpolated dB adj	
A	1000	-0.2	from INM 7.0 npd
A	2000	-0.2	from INM 7.0 npd
A	3228	-0.2	Added to fix curve interpolation
A	4000	-1.0	from INM 7.0 npd
A	6000	-3.1	from INM 7.0 npd
A	8000	-5.2	from INM 7.0 npd
A	10000	-7.3	from INM 7.0 npd

We created the proposed SPEYHK_HKA entries for npd_curve.dbf by applying these adjustments to the INM 7.0 SPEYHK npd curves Lmax (NOISE_TYPE = M) and SEL (NOISE_TYPE = S) (presented in Attachment 2). The proposed npd_curve.dbf entries are designated SPEYHK_HKA and are presented in Attachment 3. The proposed SPEYHK_HKA noise curves do not include entries for other metrics.

Table 4 presents a grid analysis of the resulting SEL values for both the GIIB and proposed GIIB_HKA aircraft on straight out departures. The GIIB_HKA USER profile is the same as that for the GIIB STANDARD. As discussed above, the only changes are to the npd curves. The INM output SEL contours for 85 dB, 90 dB, and 95 dB are shown in Attachment 4 (GIIB_HKA in colors) for a standard day. The benefit of the proposed GIIB_HKA is only 2.4 to 2.7 dB at a range of 1.5 to 5.0 nautical miles because the GIIB STANDARD profile includes a thrust cut-back. Attachment 4 shows that the proposed aircraft has little benefit on arrival, which is expected. Attachment 4 and Table 4 show most benefit associated with the start-of-take-off roll.

HARRIS MILLER MILLER & HANSON INC.

INM User-defined Aircraft Request – GIII with Hushkits
August 13, 2007
Page 4

Table 4 Departure SEL Values for Proposed GIIB_HKA versus GIIB
Calculated with INM 7.0 using standard conditions

Grid Points (nmi) Distance from start-of-take-off-roll	GIIB (SEL, dB)	GIIB_HKA (SEL, dB)	Difference (dB)
0.5	138.9	133.6	-5.3
1.0	116.0	110.8	-5.2
1.5	102.4	99.9	-2.5
2.0	99.5	97.1	-2.4
2.5	97.2	94.8	-2.4
3.0	95.3	92.9	-2.4
3.5	93.9	91.5	-2.4
4.0	92.7	90.3	-2.4
4.5	91.7	89.2	-2.5
5.0	91.1	88.4	-2.7
5.5	94.5	89.8	-4.7
6.0	99.2	93.2	-6.0
6.5	98.0	92.1	-5.9
7.0	96.7	90.9	-5.8
7.5	95.5	89.8	-5.7
8.0	94.4	88.8	-5.6
8.5	93.3	87.8	-5.5
9.0	92.2	86.8	-5.4
9.5	91.5	86.1	-5.4
10.0	90.7	85.2	-5.5

We have included a copy of the INM 7.0 study with the standard GIIB and GIIB_HKA profiles and npd curves.

HARRIS MILLER MILLER & HANSON INC.

In the absence of additional information, we request your approval for us to use these modified npd curves to represent a GIII recertified to 14 CFR Part 36 Stage 3 via a hushkit in the INM 7.0 analysis for the Van Nuys Part 161 Study.

Thank you for your consideration of this request.

Sincerely yours,

HARRIS MILLER MILLER & HANSON INC.

Robert D. Behr
Senior Consultant

Inc: INM 7.0 Study

HARRIS MILLER MILLER & HANSON INC.

INM User-defined Aircraft Request – GIII with Hushkits
August 13, 2007
Page 6

ATTACHMENT 1
ESTIMATED MAXIMUM A-WEIGHTED SOUND LEVELS
MEASURED IN ACCORDANCE WITH PART-36 APPENDIX -C- PROCEDURES
(From AC 36-3H; April 25, 2002)

MANUFACTURER	AIRPLANE	ENGINE	TOGW 1000 LBS	MLW 1000 LBS	TO dBA	APP dBA	TO FLAPS	APP FLAPS	NOTES
GULFSTREAM	GULFSTREAM II	SPEY MK511-8	62.00	58.50	80.1	83.9	-	20*	8,15,16
GULFSTREAM	GULFSTREAM II	SPEY MK511-8	62.00	58.50	82.6	83.9	-	20*	8,15
GULFSTREAM	GULFSTREAM II	SPEY MK511-8	62.00	58.50	82.6	90.6	20	39	8,15
GULFSTREAM	GULFSTREAM II	SPEY MK511-8	65.50	58.50	84.2	90.7	10	39	8,15,16
GULFSTREAM	GULFSTREAM IIB/GIII	SPEY MK511-8	69.70	58.50	82.8	82.5	10	20*	8,15,16
GULFSTREAM	GULFSTREAM IIB/GIII	SPEY MK511-8	69.70	58.50	82.8	89.7	10	39	8,15,16
GULFSTREAM	GULFSTREAM IV	RR TAY 611-8	73.20	58.50	64.2	80.7	10	39	8,15
GULFSTREAM	GULFSTREAM IV - SP	RR TAY 611-8	74.60	66.00	64.9	81.3	20	39	8,15
GULFSTREAM	G-V	BR700-710A1-10	90.50	75.30	68.0	82.0	10	39	8,15

*****AC36-3H UPDATE INFORMATION*****
ESTIMATED MAXIMUM A-WEIGHTED SOUND LEVELS
MEASURED IN ACCORDANCE WITH PART-36 APPENDIX -C- PROCEDURES
(From James Skalecky, FAA, July 6, 2007 email to Joseph Cardello, HMMH)

MANUFACTURER	AIRPLANE	ENGINE	TOGW 1000 LBS	MLW 1000 LBS	TO dBA	APP dBA	TO FLAPS	APP FLAPS	NOTES
GULFSTREAM	GII (QTA STC ST02618AT)	SPEY MK 511-8	62	58.5	73.2	89.4		39	8, 15, 16
GULFSTREAM	GII (QTA STC ST02618AT)	SPEY MK 511-8	64.8	58.5	74.8	89.4		39	8, 15, 16
GULFSTREAM	GIIB/GIII (QTA STC ST02618AT)	SPEY MK 511-8	68.2	58.5	74.8	89.5		39	8, 15, 16
GULFSTREAM	GIIB/GIII (QTA STC ST02618AT)	SPEY MK 511-8	69.7	58.5	75.5	89.5		39	8, 15, 16

Notes: 8 Thrust cutback used.
15 Based on manufacturer's data
16 Equipped with hushkit.

HARRIS MILLER MILLER & HANSON INC.

INM User-defined Aircraft Request – GIII with Hushkits
August 13, 2007
Page 7

ATTACHMENT 2 INM 7.0 Unmodified npd Curves (npd_curve.dbf)

Lmax

NOISE_ID	NOISE_TYPE	OP_MODE	THR_SET	L_200	L_400	L_630	L_1000	L_2000	L_4000	L_6300	L_10000	L_16000	L_25000
SPEYHK	M	A	1000	86.5	80.4	76.1	71.5	64.1	56.3	50.8	45	38.9	32.8
SPEYHK	M	A	2000	90.6	84.5	80.2	75.6	68.2	60.4	54.9	49.1	43	36.9
SPEYHK	M	A	4000	98.8	92.7	88.4	83.8	76.4	68.6	63.1	57.3	51.2	45.1
SPEYHK	M	A	6000	108.7	102.6	98.3	93.7	86.3	78.5	73	67.2	61.1	55
SPEYHK	M	A	8000	113.5	107.4	103.1	98.5	91.1	83.3	77.8	72	65.9	59.8
SPEYHK	M	A	10000	119.4	113.3	109	104.4	97	89.2	83.7	77.9	71.8	65.7
SPEYHK	M	D	1000	86.5	80.4	76.1	71.5	64.1	56.3	50.8	45	38.9	32.8
SPEYHK	M	D	2000	90.6	84.5	80.2	75.6	68.2	60.4	54.9	49.1	43	36.9
SPEYHK	M	D	4000	98.8	92.7	88.4	83.8	76.4	68.6	63.1	57.3	51.2	45.1
SPEYHK	M	D	6000	108.7	102.6	98.3	93.7	86.3	78.5	73	67.2	61.1	55
SPEYHK	M	D	8000	113.5	107.4	103.1	98.5	91.1	83.3	77.8	72	65.9	59.8
SPEYHK	M	D	10000	119.4	113.3	109	104.4	97	89.2	83.7	77.9	71.8	65.7

SEL

NOISE_ID	NOISE_TYPE	OP_MODE	THR_SET	L_200	L_400	L_630	L_1000	L_2000	L_4000	L_6300	L_10000	L_16000	L_25000
SPEYHK	S	A	1000	89.4	85.5	82.5	79.1	73.3	66.8	62.1	56.9	51.3	45.6
SPEYHK	S	A	2000	93.5	89.6	86.6	83.2	77.4	70.9	66.2	61	55.4	49.7
SPEYHK	S	A	4000	101.7	97.8	94.8	91.4	85.6	79.1	74.4	69.2	63.6	57.9
SPEYHK	S	A	6000	111.8	107.9	104.9	101.5	95.7	89.2	84.5	79.3	73.7	68
SPEYHK	S	A	8000	117.3	113.4	110.4	107	101.2	94.7	90	84.8	79.2	73.5
SPEYHK	S	A	10000	123.9	120	117	113.6	107.8	101.3	96.6	91.4	85.8	80.1
SPEYHK	S	D	1000	89.4	85.5	82.5	79.1	73.3	66.8	62.1	56.9	51.3	45.6
SPEYHK	S	D	2000	93.5	89.6	86.6	83.2	77.4	70.9	66.2	61	55.4	49.7
SPEYHK	S	D	4000	101.7	97.8	94.8	91.4	85.6	79.1	74.4	69.2	63.6	57.9
SPEYHK	S	D	6000	111.8	107.9	104.9	101.5	95.7	89.2	84.5	79.3	73.7	68
SPEYHK	S	D	8000	117.3	113.4	110.4	107	101.2	94.7	90	84.8	79.2	73.5
SPEYHK	S	D	10000	123.9	120	117	113.6	107.8	101.3	96.6	91.4	85.8	80.1

HARRIS MILLER MILLER & HANSON INC.

INM User-defined Aircraft Request – GIII with Hushkits
August 13, 2007
Page 8

ATTACHMENT 3 Proposed INM 7.0 npd_curve.dbf Entries for GIII Recertified to 14 CFR Part 36 Stage 3 via a Hushkit

M = Lmax; S = SEL

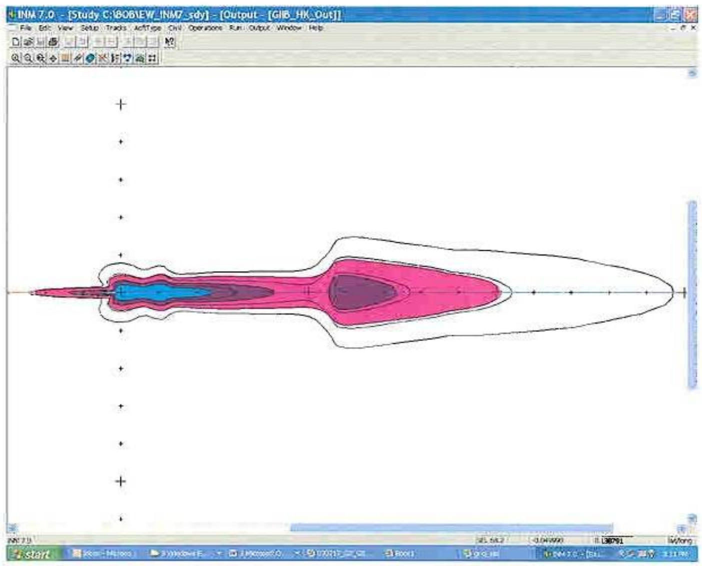
NOISE_ID	NOISE_TYPE	OP_MODE	THR_SET	L_200	L_400	L_630	L_1000	L_2000	L_4000	L_6300	L_10000	L_16000	L_25000
SPEYHK_HKA	M	A	1000	86.3	80.2	75.9	71.3	63.9	56.1	50.6	44.8	38.7	32.6
SPEYHK_HKA	M	A	2000	90.4	84.3	80	75.4	68	60.2	54.7	48.9	42.8	36.7
SPEYHK_HKA	M	A	4000	97.8	91.7	87.4	82.8	75.4	67.6	62.1	56.3	50.2	44.1
SPEYHK_HKA	M	A	6000	105.6	99.5	95.2	90.6	83.2	75.4	69.9	64.1	58	51.9
SPEYHK_HKA	M	A	8000	108.3	102.2	97.9	93.3	85.9	78.1	72.6	66.8	60.7	54.6
SPEYHK_HKA	M	A	10000	112.1	106	101.7	97.1	89.7	81.9	76.4	70.6	64.5	58.4
SPEYHK_HKA	M	D	1000	86.3	80.2	75.9	71.3	63.9	56.1	50.6	44.8	38.7	32.6
SPEYHK_HKA	M	D	2000	90.4	84.3	80	75.4	68	60.2	54.7	48.9	42.8	36.7
SPEYHK_HKA	M	D	4000	97.8	91.7	87.4	82.8	75.4	67.6	62.1	56.3	50.2	44.1
SPEYHK_HKA	M	D	6000	105.6	99.5	95.2	90.6	83.2	75.4	69.9	64.1	58	51.9
SPEYHK_HKA	M	D	8000	108.3	102.2	97.9	93.3	85.9	78.1	72.6	66.8	60.7	54.6
SPEYHK_HKA	M	D	10000	112.1	106	101.7	97.1	89.7	81.9	76.4	70.6	64.5	58.4
SPEYHK_HKA	S	A	1000	89.2	85.3	82.3	78.9	73.1	66.6	61.9	56.7	51.1	45.4
SPEYHK_HKA	S	A	2000	93.3	89.4	86.4	83	77.2	70.7	66	60.8	55.2	49.5
SPEYHK_HKA	S	A	4000	100.7	96.8	93.8	90.4	84.6	78.1	73.4	68.2	62.6	56.9
SPEYHK_HKA	S	A	6000	108.7	104.8	101.8	98.4	92.6	86.1	81.4	76.2	70.6	64.9
SPEYHK_HKA	S	A	8000	112.1	108.2	105.2	101.8	96	89.5	84.8	79.6	74	68.3
SPEYHK_HKA	S	A	10000	116.6	112.7	109.7	106.3	100.5	94	89.3	84.1	78.5	72.8
SPEYHK_HKA	S	D	1000	89.2	85.3	82.3	78.9	73.1	66.6	61.9	56.7	51.1	45.4
SPEYHK_HKA	S	D	2000	93.3	89.4	86.4	83	77.2	70.7	66	60.8	55.2	49.5
SPEYHK_HKA	S	D	4000	100.7	96.8	93.8	90.4	84.6	78.1	73.4	68.2	62.6	56.9
SPEYHK_HKA	S	D	6000	108.7	104.8	101.8	98.4	92.6	86.1	81.4	76.2	70.6	64.9
SPEYHK_HKA	S	D	8000	112.1	108.2	105.2	101.8	96	89.5	84.8	79.6	74	68.3
SPEYHK_HKA	S	D	10000	116.6	112.7	109.7	106.3	100.5	94	89.3	84.1	78.5	72.8

HARRIS MILLER MILLER & HANSON INC.

INM User-defined Aircraft Request – GIII with Hushkits
August 13, 2007
Page 9

ATTACHMENT 4

Comparison of SEL Contours (85, 90, 95) for GIIB_HKA (Color) and GIIB (Black)



U.S. Department of Transportation
Federal Aviation Administration

Office of Environment and Energy

800 Independence Ave., S.W.
Washington, D.C. 20591

August 29, 2007

Mr. Robert Behr
Harris Miller Miller and Hanson Inc.
945 University Avenue, Suite 201
Sacramento, California 95825

Dear Mr. Behr,

The Office of Environment and Energy (AEE) has received the memo dated August 13, 2007, referencing HMMH Project Number 300701 requesting approval for a user-defined aircraft type. AEE has reviewed the request for approval for INM user defined aircraft for the Gulfstream III recertified to 14 CFR Part Stage 3 via hushkit installations (GIII) for the Part 161 Study at Van Nuys Airport (VNY).

After reviewing the assumptions and methodology used to develop the GIII user-defined aircraft, the use of the GIII is accepted for the Part 161 Study at VNY.

Sincerely,

M. Marsan

Mehmet Marsan, Ph.D.
Acting Manager
AEE/Noise Division

B.5

EXISTING NOISE MANAGEMENT MEASURES

B.5.1 Introduction

LAWA considers noise compatibility to be a high-priority, continuing process; over many decades of effort, it has established an extensive noise compatibility program at VNY. The program—and LAWA's continuing commitment to its implementation and improvement—is recognized for its innovation and benefits across the United States and internationally. Major elements include:

- aircraft noise abatement measures to reduce noise exposure or shift it away from sensitive land uses,
- remedial land use measures to address existing incompatible land uses that cannot be corrected through noise abatement, and
- preventive land use measures to deter introduction of new incompatible land uses.

The agency devotes significant attention, staff, and financial resources to program administration, publicity, implementation, monitoring, enforcement, review, and refinement. Sections B.5.2 and B.5.3 summarize the elements and implementation of major noise abatement and compatible land use measures, respectively.

These program elements are implemented by numerous LAWA staff, including staff in the Noise Management Division (NMD), based at LAWA headquarters and in the VNY Noise Management Office (NMO), assisted by administrative, operational, public affairs, environmental, and other staff at VNY and LAWA headquarters.

The NMD and VNY NMO operate an extensive noise and operations monitoring system at VNY, LAX, and ONT. The system supports program monitoring and enforcement, pilot training, reporting, complaint analysis, and other program implementation functions. LAWA is in the process of upgrading the system to ensure it provides state-of-the-art capabilities.

B.5.2 Major Noise Abatement Elements

Major noise abatement elements of the VNY noise management program include:

- "Quiet Jet Departure Program,"
- "No Early Turn Program,"
- Departure Techniques,
- Run-Up Restriction,
- Helicopter and Route Deviation Program,
- Partial Curfew, and
- Non-Addition Rule.

The noise abatement handout reproduced on the following two pages summarizes several of these elements.

Other elements are implemented through City of Los Angeles ordinances, presented in Appendix B.6.

Descriptions of individual elements follow these two items.

Figure B.5-1a VNY Noise Abatement Handout (page 1 of 2) (Source: LAWA)

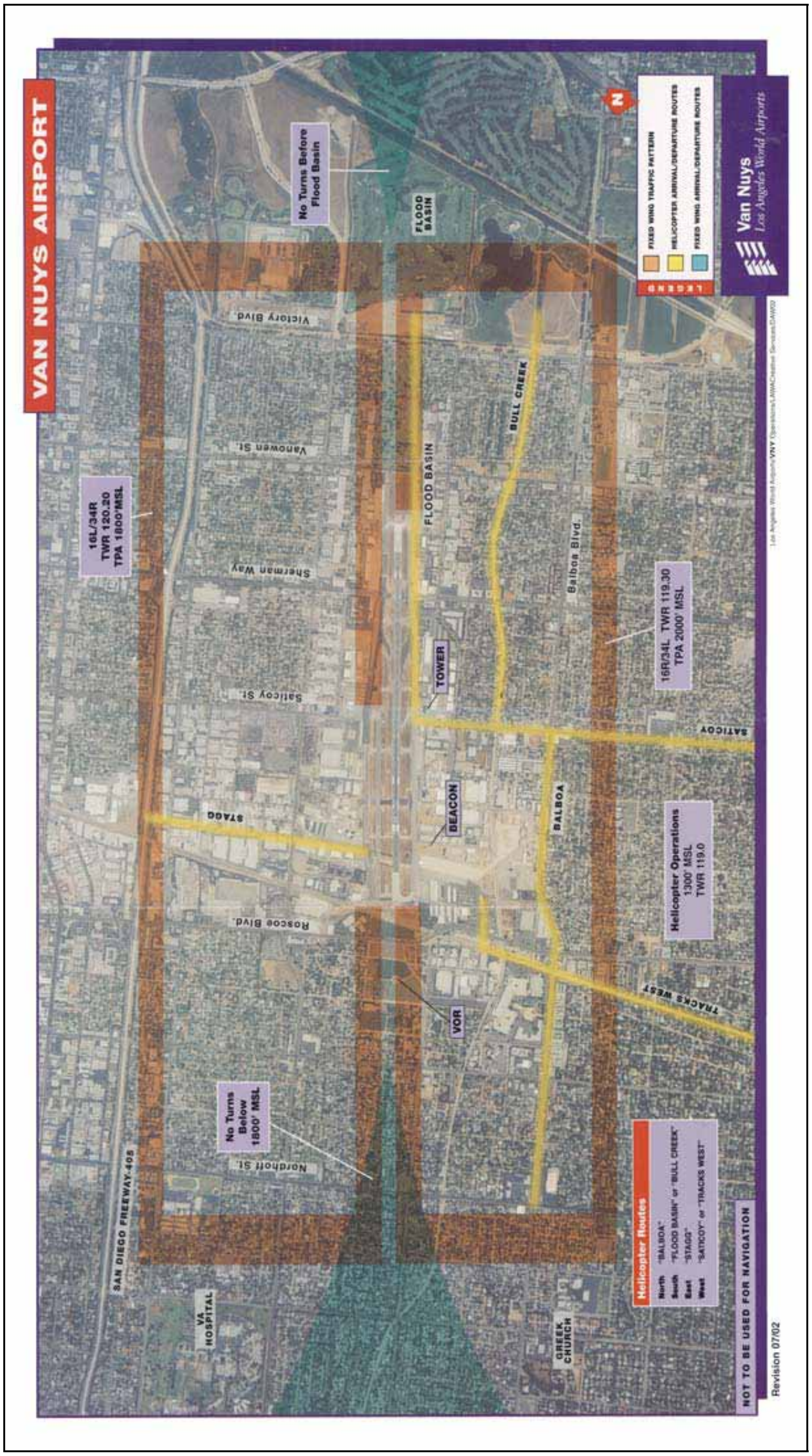


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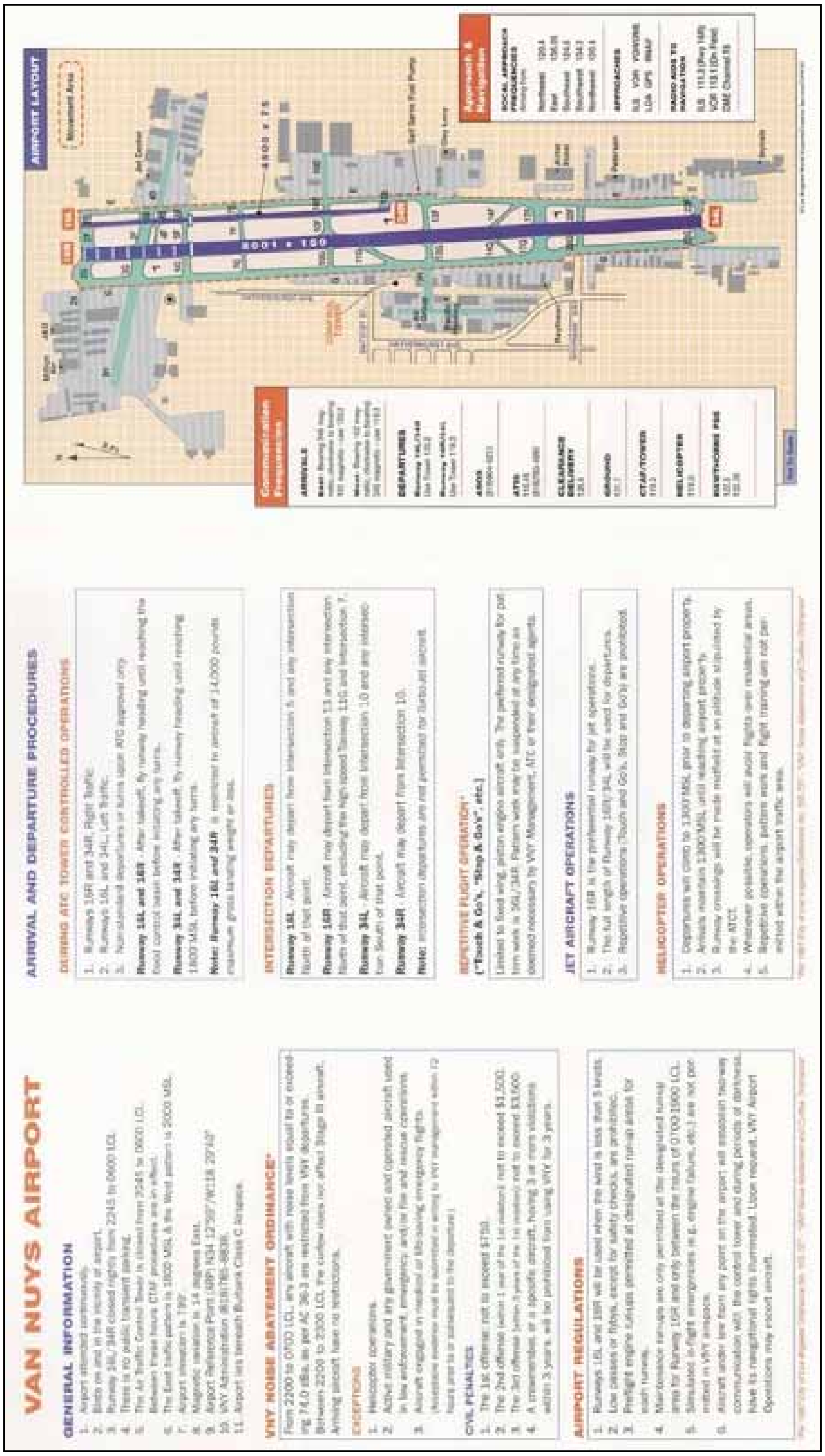
Figure B.5-1b VNY Noise Abatement Handout (page 2 of 2) (Source: LAWA)



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B.5.2.1 "Quiet Jet Departure Program"

Under the "Quiet Jet Departure Program" (also called the "Fly Friendly Program" or "Fly Neighborly Program"), jet aircraft operators are to conduct south departures so that measured noise levels are below established aircraft-type-specific targets at permanent monitoring location "V7," which is approximately 6,000 feet south of the airport (approximately 14,000 feet from brake release). The VNY NMO monitors jet departure noise levels and flight track data at V7 and contacts operators of jet aircraft that exceed the target levels set for the relevant aircraft type. This program is used to monitor and modify takeoff aircraft operations and to assist pilots in utilizing the appropriate noise mitigation takeoff procedures. LAWA formally initiated the program in February of 1994. Pilots can contact the NMO to identify departure target noise levels for a specific aircraft.

An important element of the program is a "Letter of Commitment" in which jet operators agree to use quiet departure procedures to avoid exceeding the target decibel levels on takeoff, which states:

- Pilots will fly aircraft using noise abatement techniques as outlined in manufacturers' operating manuals or National Business Aircraft Association (NBAA) Noise Abatement Program,
- Pilots will work to research complaints from local residents regarding individual flights and to encourage participation by other jet operators, and
- Voluntary compliance will help forestall more drastic measures to reduce noise.

There is no formal penalty associated with exceeding the target noise level.

B.5.2.2 "No Early Turn Program"

The "No Early Turn Program" calls for the following:

- Takeoffs on Runways 16L and 16R shall climb straight out 2.2 miles, measured from the VNY very-high-frequency omnidirectional radial (VOR) antenna, which is located off the north end of the airport) and attain a minimum altitude of 1,800 feet above mean sea level (MSL) prior to turning. Some LAWA publications describe this measure in the following visual-reference terms: "Climb straight out over flood basin before starting turn unless instructed by air traffic control."
- Takeoffs on Runways 34R/34L shall climb to an altitude of 1,800 feet MSL before starting turn unless instructed by air traffic control (ATC).

The NMO notifies any aircraft owner identified as conducting operations contrary to this program. The program uses the notification process to communicate to the operators the requirements of this program and to assist the pilots to fly the established departure route and altitude.

There is no formal penalty associated with making an early turn without ATC instruction.

B.5.2.3 Departure Techniques

In addition to procedures included in the "Quiet Jet Departure Program" and "No Early Turn Program," LAWA publications also cite the following departure techniques:

- Runway 16R is the preferred runway for all jet aircraft,[1]
- The full length of Runway 16R/34L will be used for all jet departures, and
- Jet repetitive operations and pattern flying/training are not permitted.

There are no formal penalties associated with the first two of these techniques. Section 7 of Los Angeles City Ordinance No. 155,727, the "Noise Abatement and Curfew Regulation" (reproduced in full in Section B.6), includes formal enforcement and penalty provisions[2] for violation of restrictions on repetitive operations, established by Sections 1(j) and 3(a) and (b):

> Section 1, "Definitions," item (j), defines a "repetitive operation" as "A practice operation, including, but not limited to, "touch and go" or "stop and go" operations, which utilize an airport runway to land where the aircraft touching down or landing takes off again within 5 minutes. However, this definition does not include such operations as are necessary because of safety considerations or weather phenomena."
>
> Section 3, "Repetitive Aircraft Operations," includes the following two restrictions:
>
> (a) No person shall engage in repetitive operations in any propeller-powered aircraft between the hours of 10:00 p.m. and 7:00 a.m. of the following day from June 21 through September 15 and between the hours of 9:00 p.m. and 7:00 a.m. of the following day from September 16 through June 20.
>
> (b) No person shall engage in repetitive operations in any turbo-jet or fan jet-powered aircraft at anytime at the airport.

---

[1] Section 4 of the Van Nuys Airport Noise Abatement and Curfew Regulation (Ordinance No. 155,727, presented in Section B.6, defines a nighttime preferential runway program:

> Preferential Runway. Between the hours of 11:00 p.m. and 7:00 a.m. of the following day, weather and traffic permitting, all aircraft shall depart on Runway 16R and shall arrive on Runway 34L of the airport unless instructed otherwise by the Federal Aviation Administration air traffic controller.

However, the City has published the following notice regarding this measure (also presented in Section B.6):

PUBLIC NOTICE RE: ORDINANCE 155727**

EFFECTIVE AUGUST 8, 1982, VAN NUYS AIRPORT DOES NOT HAVE AIR TRAFFIC CONTROLLERS BETWEEN THE HOURS OF 2245 AND 0600 OF THE FOLLOWING DAY, LOCAL TIME DAILY.

THE FEDERAL AVIATION ADMINISTRATION AIR TRAFFIC CONTROLLER HAS SUSPENDED THE PROVISIONS OF SECTION 4 OF THE VAN NUYS NOISE ABATEMENT AND CURFEW ORDINANCE 155727 UNTIL FURTHER NOTICE. SECTION 3, PARAGRAPH 222 AND 223 OF THE AIRMAN'S INFORMATION MANUAL APPLIES AT VAN NUYS AIRPORT BETWEEN HOURS 2245 AND 0600 OF THE FOLLOWING DAY LOCAL TIME DAILY UNTIL FURTHER NOTICE.

[2] These penalties include fines ranging from $750 to $3,500 and may include denial for permission to use the airport for up to 3 years.

B.5.2.4 Run-Up Restriction

The Noise Abatement and Curfew Regulation also includes formal enforcement and penalty provisions for violation of a run-up restriction, established by Sections 1(k) and 5:

> Section 1, "Definitions," item (j), defines a "run-up" as "The ground testing or revving of an aircraft engine not immediately connected to contemporaneous air operation.
>
> Section 5, "Run-ups," No person shall test or run-up an aircraft engine for maintenance purposes between the hours of 7:00 p.m. and 7:00 a.m. of the following day. Engine run-ups shall be done only in areas designated in writing by the general manager.

LAWA has published a letter to tenants that permits them to conduct idle power run-ups on their leasehold property under certain conditions. Attachment F presents a copy of that letter.

B.5.2.5 Helicopter and Route Deviation Program

The FAA has established six flight routes that specify ingress and egress and altitude minimums to maximize the safety and efficiency of traffic control and to mitigate the noise impact on the adjacent communities. The NMO notifies helicopter owners of operations that deviate from the established routes. The VNY Air Traffic Control Tower (ATCT) and individual operators enter into formal "letters of agreement" to implement this program. The VNY Noise Abatement Handout (presented at the beginning of Appendix Section B.5.2) depicts the routes graphically.

B.5.2.6 Partial Curfew

The Noise Abatement and Curfew Regulation establishes a partial curfew. Briefly, the regulation prohibits non-Stage 3 fixed-wing aircraft with a takeoff noise level in excess of 74 dBA, as published in the most recent version of FAA AC 36-3, from departing between 10 p.m. and 7 a.m. Stage 3 fixed-wing aircraft are exempt until 11 p.m. The rule also exempts:

- Military aircraft and any government owned or operated aircraft involved in law enforcement, emergency, fire, or rescue operations;
- Aircraft not included in AC 36-3 that have been identified by the FAA in writing as having 74.0 dBA or lower takeoff noise level or for which satisfactory evidence has been furnished to the Board of Airport Commissioners (BOAC) that the departure noise will not exceed 74.0 dBA; and
- Aircraft engaged in a bona fide medical or life-saving emergency for which acceptable evidence has been submitted in writing to the VNY general manager within 72 hours of the departure.

B.5.2.7 Non-Addition Rule

The Non-Addition Rule, an amendment to the Noise Abatement and Curfew Regulation, became effective on January 1, 2002. Briefly, the rule prohibits any additional non-Stage 3 aircraft with noise levels exceeding 77 dBA from being based at VNY or parked, tied down, or hangared at the airport for more than 30 days in any calendar year, subject to exceptions for major maintenance, repair, and refurbishment. The rule includes provisions that permitted operators to replace "exempt based non-Stage 3 aircraft" with aircraft exceeding the 77 dBA limit; the period for designating such replacements ended December 31, 2005, and the replacement aircraft can be based (i.e., parked, tied down, or hangared for more than 30 days a year) at the airport only through 2010. Penalties for violation of the rule have the same structure as the Noise Abatement and Curfew Regulation.

B.5.3 Existing VNY Compatible Land Use Measures

LAWA, City of Los Angeles, and California programs and regulations include the following major compatible land use measures at VNY:

- Sound Insulation,
- Avigation and Noise Easements,
- Compatible Building Code, and
- Noise Disclosure.

B.5.3.1 Sound Insulation

LAWA has established an Airport Noise Mitigation Program (ANMP) at VNY to sound insulate existing incompatible land uses within the 65 dB CNEL contour that LAWA prepares for VNY on a quarterly basis in accordance with the requirements of Caltrans Division of Aeronautics requirements.[3] LAWA has funded the program to date from internal revenue sources.

LAWA's Residential Sound Insulation Division implements the program. Participation in the program is voluntary. Homeowners are offered treatment in a prioritized order based on the CNEL value at the parcel for the 12 months of operations ending September 30, 1998.[4] The treatment includes modifications needed to reduce the maximum interior CNEL to 45 dB in all habitable rooms. LAWA will continue the program until all owners of eligible property have been offered treatment and the treatment is completed on dwelling units owned by those agreeing to participate.

---

[3] California Code of Regulations (CCR). 1990. Title 21. Subchapter 6. *Noise Standards*. Register 90. No. 10, 3/10/90. California Division of Aeronautics, Department of Transportation. Sacramento, CA. Article 3, Implementation by Airport Proprietors. Section 5001, Validation of the Noise Impact Boundary, p. 226.2.

[4] This static contour is used to avoid variability in the eligible area.

As a "noise problem" airport, as defined by the Caltrans Division of Aeronautics noise standards[5] summarized in Appendix B.3, Section B.3.3, LAWA must operate VNY under a variance obtained from the division. In its most recent application for a variance, LAWA depicted the remaining homes to be sound insulated within the most current CNEL contours developed under Caltrans Division of Aeronautics guidelines. That figure is reproduced on the following page.

LAWA stated in that application that it anticipated all remaining homes would be sound insulated (where the owner elected to accept the offer of sound insulation) by the end of 2009 (under the assumption that property owners offered insulation will continue to accept at the historic 80% acceptance rate—and with continuation of the current $2 million in annual funding).[6]

LAWA ~~prepared~~ prepares an annual report on the program terms and status. The most recent report[7] presents the following statistics:

- LAWA has supplied $21,746,400 in revenue-based funding for the program from its 1999/00 through 2005/06 fiscal year budgets,
- 521 residential units have been sound insulated through the end of Calendar Year 2005, and
- There are no other incompatible land uses within the ANMP eligibility contour.

B.5.3.2 Avigation and Noise Easements

Property owners must sign an "avigation and noise easement" prior to receiving a sound insulation treatment.

[5] Noise problem airports have noise-sensitive land uses within the 65 dB CNEL contour.

[6] Los Angeles World Airports. 2007. *Request for Variance to Noise Regulations for California Airports*. Prepared by: Noise Management Division. Los Angeles, CA. Submitted to: Ms. Elizabeth Eskridge, Department of Transportation, Division of Aeronautics, Sacramento, CA. Submitted by: Ms. Gina Marie Lindsey, Executive Director, Los Angles World Airports, Los Angeles, CA.

[7] Los Angeles World Airports. October 2006. *Van Nuys Airport Aircraft Noise Mitigation Program, 2005 Annual Compliance Report*. Noise Management Division. Los Angeles, CA.

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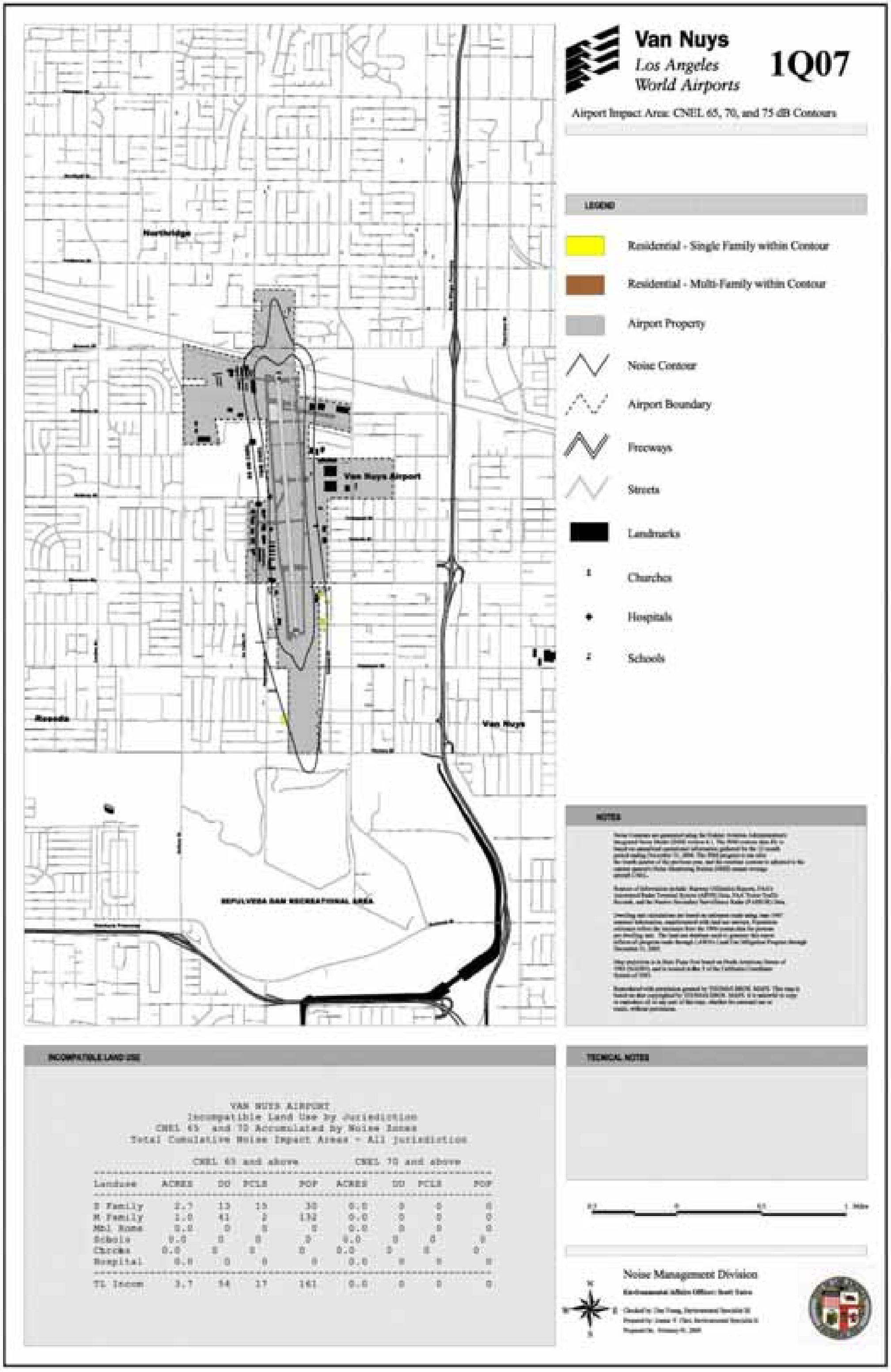
~~First Quarter 2007 VNY Noise Contours Prepared for Caltrans Division of Aeronautics~~

Figure B.5-2 First Quarter 2007 VNY Noise Contours Prepared for Caltrans Division of Aeronautics



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B.5.3.3 Compatible Building Code

The City of Los Angeles Municipal Code requires acoustical analysis for new construction and alterations and additions to existing structures:[8]

CHAPTER IX BUILDING REGULATIONS

DIVISION 12 INTERIOR ENVIRONMENT

SEC. 91.1207. SOUND TRANSMISSION.

Section 1207 of the CBC is adopted by reference, except Sections 1207.1, 1207.11.1, 1207.11.3, 1207.11.4 and 1207.12 of the CBC are not adopted and in lieu, Sections 91.1207.1, 91.1207.11.1, 91.1207.11.3, 91.1207.11.4 and 91.1207.12 are added.

91.1207.1. Purpose and Scope. The purpose of this section is to establish uniform minimum noise insulation performance standards to protect persons within new hotels, motels, dormitories, residential care facilities, apartment houses, dwellings, private schools, and places of worship from the effects of excessive noise, including but not limited to, hearing loss or impairment and interference with speech and sleep.

91.1207.11.1. Application Consistent with Local Land-Use Standards. All structures identified in Section 91.1207.1 located in noise critical areas, such as proximity to highways, county roads, city streets, railroads, rapid transit lines, airports or industrial areas shall be designed to prevent the intrusion of exterior noises beyond prescribed levels. Proper design shall include, but shall not be limited to, orientation of the structure, setbacks, shielding and sound insulation of the building itself.

91.1207.11.3. Airport Noise Sources. Residential structures and all other structures identified in Section 91.1207.1 located where the annual L_{dn} or CNEL (as defined in Title 21, Subchapter 6, California Code of Regulations) exceeds 60 db, shall require an acoustical analysis showing that the proposed design will achieve prescribed allowable interior level.

EXCEPTION: New single family detached dwellings and all non- residential noise sensitive structures located outside the noise impact boundary of 65 db CNEL are exempt from Section 91.1207.

Alterations or additions to all noise sensitive structures, within the 65db and greater CNEL shall comply with the Section 91.1207. If the addition or alteration cost exceeds 75% of the replacement cost of the existing structure, then the entire structure must comply with Section 91.1207.

For public-use airports or heliports, the L_{dn} or CNEL shall be determined from the Aircraft Noise Impact Area Map prepared by the Airport Authority. For military bases, the Ldn shall be determined from the facility Air Installation Compatible Use Zone (AICUZ) plan. For all other airports or heliports, or public-use airports or heliports for which a land-use plan has not been developed, the L_{dn} or CNEL shall be determined from the noise element of the general plan of the local jurisdiction.

[8] Available: <http://www.amlegal.com/nxt/gateway.dll?f=templates&fn=default.htm&vid=amlegal:losangeles_ca_mc>.

When aircraft noise is not the only significant source, noise levels from all sources shall be added to determine the composite site noise level.

91.1207.11.4. Other Noise Sources. All structures identified in Section 91.1207.1 located where the L_{dn} or CNEL exceeds 60db shall require an acoustical analysis showing that the proposed design will limit exterior noise to the prescribed allowable interior level. The noise element of the local general plan shall be used to the greatest extent possible to identify sites with noise levels potentially greater than 60db.

91.1207.12. Compliance. Evidence of compliance shall be submitted with the application for a building permit for all structures identified in Section 91.1207.1. Evidence of compliance shall consist of the submittal of an acoustical analysis report prepared under the supervision of a person experienced in the field of acoustical engineering or the use of prescriptive standards as determined by the Superintendent of Building for residential structures. The report shall show topographical relationships of noise sources and dwelling sites, identification of noise sources and their characteristics, predicted noise spectra and levels at the exterior of the proposed structure considering present and future land usage, the basis for the prediction (measured or obtained from published data), the noise attenuation measures to be applied, and an analysis of the noise insulation effectiveness of the proposed construction showing that the prescribed interior level requirements are met.

If interior allowable noise levels are met by requiring that windows be unopenable or closed, the design for the structure must also specify a ventilation or air-conditioning system to provide a habitable interior environment. The ventilation system must not compromise the interior room noise reduction.

B.5.3.4 Noise Disclosure

Section 11010 of the State of California Business and Professions Code[9] requires any person who intends to offer subdivided lands within California for sale or lease to file with the Department of Real Estate an application for a public report that includes, among other things, the location of all existing airports and of all proposed airports shown on the general plan of any city or county located within 2 statute miles of the subdivision. A copy of the report must be given to the prospective purchaser by the owner, subdivider, or agent prior to the execution of a binding contract or agreement for the sale or lease of any lot or parcel in a subdivision or upon request by any member of the public.

If the property to be subdivided is located within an airport influence area (e.g., within the 65 dB CNEL contour at VNY), the following statement shall be included in the notice of intention:

[9] Available: <http://www.leginfo.ca.gov/cgi-bin/displaycode?section=bpc&group=11001-12000&file=11010-11023>.

NOTICE OF AIRPORT IN VICINITY

> This property is presently located in the vicinity of an airport, within what is known as an airport influence area. For that reason, the property may be subject to some of the annoyances or inconveniences associated with proximity to airport operations (for example: noise, vibration, or odors). Individual sensitivities to those annoyances can vary from person to person. You may wish to consider what airport annoyances, if any, are associated with the property before you complete your purchase and determine whether they are acceptable to you. (B) For purposes of this section, an "airport influence area," also known as an "airport referral area," is the area in which current or future airport-related noise, overflight, safety, or airspace protection factors may significantly affect land uses or necessitate restrictions on those uses as determined by an airport land use commission.

The California Department of Transportation Legal Division interprets existing law to require sellers of residential property to provide a notice of proximity to airports to prospective buyers, as reported in the California Airport Land Use Planning Handbook[10] (January 2002):

> California state real estate law requires that sellers of real property disclose "any fact materially affecting the value and desirability of the property" (California Civil Code, Section 1102.1(a)). While this general requirement leaves to the property seller the decision as to whether airport-related information constitutes a fact warranting disclosure, other sections of state disclosure law specifically mention airports. Section 1102.17 of the Civil Code says that: "The seller of residential real property subject to this article who has actual knowledge that the property is affected by or zoned to allow industrial use described in Section 731a of the Code of Civil Procedure shall give written notice of that knowledge as soon as practicable before transfer of title."
>
> Section 731a of the Code of Civil Procedure then specifies: "Whenever any city, city and county, or county shall have established zones or districts under authority of law wherein certain manufacturing or commercial or airport uses are expressly permitted, except in an action to abate a public nuisance brought in the name of the people of the State of California, no person or persons, firm or corporation shall be enjoined or restrained by the injunctive process from reasonable and necessary operation in any such industrial or commercial zone or airport of any use expressly permitted therein, nor shall such use be deemed a nuisance without evidence of the employment of unnecessary and injurious methods of operation…."

[10] State of California Department of Transportation. 2002. *California Airport Land Use Planning Handbook*. Division of Aeronautics. Sacramento, CA. Prepared by Shutt Moen Associates, Santa Rosa, CA, pp. 3-26 – 3-27.

The interpretation of the Department of Transportation Legal Division is that these sections of the law establish a requirement for disclosure of information regarding the effects of airports on nearby property provided that the seller has "actual knowledge" of such effects. ALUCs have particular expertise in defining where airports have effects on surrounding lands. ALUCs thus can give authority to this disclosure requirement by establishing a policy indicating the geographic boundaries of the lands deemed to be affected by airport activity. In most cases, this boundary will coincide with commission's planning boundary for an airport (the airport area of influence). Furthermore, ALUCs should disseminate information regarding their disclosure policy and its significance by formally mailing copies to local real estate brokers and title companies. Having received this information, the brokers would be obligated to tell sellers that the facts should be disclosed to prospective buyers.

B.6

VNY NOISE ORDINANCES

B.6.1 Introduction

This appendix section presents the City of Los Angeles noise ordinances for VNY. The previous section discusses the roles these ordinances play in the existing VNY noise management program. Chapter 2 of the EIR discusses the manner in which the noisier aircraft phaseout regulation would be integrated into this ordinance framework. The existing ordinances include:

- City of Los Angeles Ordinance No. 155,727, "”Van Nuys Airport Noise Abatement and Curfew Regulation." This ordinance includes the partial night curfew (see Section B.5.2.6), limits on repetitive operations (B.5.2.3) and run-ups (B.5.2.4), and the suspended night preferential runway program (B.5.2.3). This ordnance also includes sections on definitions, enforcement, and penalties and other administrative provisions that also apply to other ordinances;
- City of Los Angeles Ordinance No. 171889, which extends the hours of the partial night curfew in Ordinance 155,727, as discussed in Section B.5.2.6; and
- City of Los Angeles Ordinance No. 173215 adds the "Non-Addition Rule," as discussed in Section B.5.2.7.

These ordinances are published on the City of Los Angeles website at http://cityclerk.lacity.org/ordinance/.

City of Los Angeles Ordinance No. 155,727
Van Nuys Airport Noise Abatement and Curfew Regulation

Section 1. Definitions: Except where the context otherwise requires, the following terms, when used in this regulation, shall have the following definitions:

(a) Advisory Circular 36-3A - Estimated maximum A - Weighted Sound Levels for airplanes at Part 36 Appendix "C" Locations - Takeoff - as set forth in the United States Department of Transport, Federal Aviation Administration, Advisory Circular 36-3A, dated June 11, 1980, attached as Exhibit "A" to this regulation and make part hereof as though set forth in full, and as said Advisory Circular may be amended from time to time.

(b) Aircraft - All fixed-wing aircraft driven by one or more propeller, turbojet, or turbo fan engines.

(c) Airport - Van Nuys Airport.

(d) Airport Manager - Van Nuys Airport Manager.

(e) Board - Board of Airport Commissioners of the City of Los Angeles as described in Article XXIV, Section 238, et. seq. of the Charter of the City of Los Angeles.

(f) dBA - A-weighted sound pressure level.

(g) Depart - The movement of an aircraft from the time it commences its departure until it is airborne.

(h) General Manager - General Manager of the Department of Airports, as described and defined in Article VI, Section 70 et. seq. and Article XXIV, Section 238, et. seq. of the Charter of the City of Los Angeles.

(i) Person - An individual, partnership, business, corporation, joint venture, or any entity responsible for an aircraft operation.

(j) Repetitive Operation - A practice operation, including but not limited to "touch and go" or "stop and go" operations, which utilize and Airport runway to land where the aircraft touching down or landing takes off again within five minutes. However, this definition does not include such operations as are necessary because of safety considerations or weather phenomena.

(k) Run-up - The ground testing or revving of an aircraft engine not immediately connected to contemporaneous air operation.

(l) "Stop and Go" Operation - The action by an aircraft consisting of a landing, followed by a complete stop on the runway, and then a takeoff from that point.

(m) "Touch and Go" Operation - The action taken by an aircraft consisting of a landing and departure on a runway without stopping or exiting the runway.

(n) For the purposes of this regulation, all times are local Pacific Standard Time, unless Daylight Savings Time is in force and, in such event, it shall be used.

Section 2. Curfew. No aircraft may depart from Van Nuys Airport between the hours of 11:00 pm and 7:00 am of the following day, except those aircraft listed below:

(a) Military aircraft and any government owned or operated aircraft involved in law enforcement, emergency, fire or rescue operations.

(b) Aircraft whose estimated takeoff noise levels, as set forth in Federal Aviation Administration Advisory Circular AC36-3H (or in any revision, supplement, or replacement thereof listing the noise levels) are equal to or less than 74 dBA.

(c) Aircraft of a type not included in Advisory Circular 36-3H, for which evidence has been furnished to the Board that the departure noise of said aircraft will not exceed 74.0 dBA set forth in Advisory Circular 36-3A. When furnishing evidence that an aircraft has the ability to depart and not exceed the dBA level of 74.0, the person producing such evidence shall be required to provide appropriate information to validate conclusions and ability to comply with this regulation. The Board reserves the right to validate the aircraft's compliance ability through utilization of actual flight noise measurements.

(d) Aircraft which have been identified by the Federal Aviation Administration in writing as having 74.0 dBA or lower takeoff noise level although such figure is not published in Advisory Circular AC36-3H.

(e) Aircraft engaged in a bona fide medical or life-saving emergency for which acceptable evidence has been submitted in writing to the General Manager within seventy-two (72) hours prior to or subsequent to said departure.

Section 3. Repetitive Aircraft Operations.

(a) No person shall engage in repetitive operations in any propeller powered aircraft between the hours of 10:00 pm and 7:00 am of the following day from June 21 through September 15, and between the hours of 9:00 pm and 7:00 am of the following day, from September 16 through June 20.

(b) No person shall engage in repetitive operations in any turbo-jet or fan jet powered aircraft, at anytime, at the Airport.

Section 4. Preferential Runway. Between the hours of 11:00 pm and 7:00 am of the following day, weather and traffic permitting, all aircraft shall depart on Runway 16R and shall arrive on Runway 34L of the Airport unless instructed otherwise by the Federal Aviation Administration Air Traffic Controller. **(See Public Notice [following this ordinance]).

Section 5. Run-ups. No person shall test or run-up an aircraft engine for maintenance purposes between the hours of 7:00 pm and 7:00 am of the following day. Engine run-ups shall be done only in areas designated in writing by the General Manager.

Section 6. Presumption. For the purpose of this regulation, the beneficial owner of an aircraft shall be rebuttably presumed to be the pilot of the aircraft with authority to control the aircraft's operations, except that where the aircraft is leased, the lessee shall be presumed to be the pilot.

In the case of any pilot training operation in which both an instructor and student pilot are in the aircraft operated in violation of any provision of this regulation, the instructor shall be rebuttably presumed to have caused such violation.

Section 7. Enforcement and Penalties.

(a) Civil Penalties. In addition to any other remedy provided for by this regulation or elsewhere, any person who violates any provision of this regulation shall be liable for a civil penalty not to exceed seven hundred and fifty ($750) dollars. Any person who violates any provision of this regulation for a second time within one year of a prior violation shall be liable for a civil penalty not to exceed one thousand five hundred ($1500) dollars upon such second violation.

Any person who violates any provision of this regulation for a third or any subsequent time within a three (3) year period shall be liable for a civil penalty not to exceed three thousand five hundred ($3500) dollars.

Civil penalties shall be assessed and recovered in a civil action brought in the name of the City of Los Angeles by the City Attorney of Los Angeles in any court of competent jurisdiction in Los Angeles County. Funds recovered thereby shall be placed in the Airport Revenue Fund.

(b) Denial of Use of Airport. In the event any person has violated any provision of this regulation three (3) or more times within a three year period of the first violation, then for a period of three years thereafter, such person shall be deemed a persistent violator and be denied permission to depart from Airport in an aircraft owned, borrowed, rented or leased by such person and denied the right to lease, rent or use space for any aircraft (including tie-down) at Airport.

(c) Exclusion of Aircraft for Violations. In the event an aircraft has been operated in violation of any provision of this regulation on three or more occasions within a three-year period of the first violation, whether piloted by the same or different individuals, then it shall be presumed that future operations of said aircraft will result in continued violations. The Airport Manger shall thereafter deny said aircraft permission for a period of three years to tie-down, be based at, or takeoff from Airport provided, however, that a new owner, who has not operated the aircraft or caused it to be operated in violation of this regulation, shall be entitled to appeal such decision to the Airport Manager upon furnishing satisfactory evidence of a change in both the operating personnel and ownership of such aircraft. Upon receiving such evidence, the Airport Manager shall restore all rights to said aircraft.

(d) Other Enforcement. The provisions of the regulation may be judicially enforced by injunction or other relief deemed appropriate by any court of competent jurisdiction.

Any person, except employees of the Federal Aviation Administration acting in the course and scope of their employment, who counsels, aids, assists, or abets any other person in the operation of any aircraft in violation of this regulation is subject to the same penalty provisions as are specified in this section.

The remedies described herein shall be deemed to be cumulative, and, the election to seek any remedy shall not be deemed to be a waiver of other remedies nor a bar to seek more than one remedy for the same violation of this regulation.

Section 8. Savings Clause. If any section, subsection, sentence, clause or phrase of this regulation is for any reason held to be invalid or unconstitutional by the decision of any court of competent jurisdiction, such decision shall not affect the validity of the remaining portions of this regulation. The City Council hereby declares that it would have passed this regulation and each section, subsection, sentence, clause and phrase thereof, irrespective of the fact that any one or more sections, subsections, sentences, clauses, or phrases be declared invalid or unconstitutional.

Section 9. Designated Officers and Employees. The General Manager, and such other City employees as are designated by the General Manager, shall have the duty and authority to enforce the provisions of this regulation.

I hereby certify that the foregoing ordinance was introduced at the meeting of the Council of the City of Los Angeles of July 29, 1981 and was passed at its meeting of August 5, 1981.
REX E. LAYTON, City Clerk

By Chauncy B. Pruner, Deputy. Approved August 10, 1981.
TOM BRADLEY, Mayor.
File No. 73-2158 S1 & S2, 77-4557 (DJG9588) Aug 31

PUBLIC NOTICE RE: ORDINANCE 155727**

EFFECTIVE AUGUST 8, 1982, VAN NUYS AIRPORT DOES NOT HAVE AIR TRAFFIC CONTROLLERS BETWEEN THE HOURS OF 2245 AND 0600 OF THE FOLLOWING DAY, LOCAL TIME DAILY.

THE FEDERAL AVIATION ADMINISTRATION AIR TRAFFIC CONTROLLER HAS SUSPENDED THE PROVISIONS OF SECTION 4 OF THE VAN NUYS NOISE ABATEMENT AND CURFEW ORDINANCE NO. 155727 UNTIL FURTHER NOTICE. SECTION 3, PARAGRAPH 222 AND 223 OF THE AIRMAN'S INFORMATION MANUAL APPLIES AT VAN NUYS AIRPORT BETWEEN HOURS 2245 AND 0600 OF THE FOLLOWING DAY. LOCAL TIME DAILY UNTIL FURTHER NOTICE.

ORDINANCE No. 171889

An Ordinance approving a Regulation adopted by Resolution 20030 of the Board of Airport Commissioners of the City of Los Angeles amending Ordinance 155,727 of the City of Los Angeles, known as the Van Nuys Noise Abatement and Curfew Regulation, to add section 2.1 extending the curfew hours at Van Nuys Airport.

The People of the City of Los Angeles Do Ordain as Follows:

Section 1. The Regulation, adopted by Resolution No. 20030 of the Board of Airport Commissioners December 4, 1997, is hereby approved. Said Regulation contained in said Resolution provides an additional curfew hour for aircraft at Van Nuys Airport.

Section 2. Ordinance 155,727 of the City of Los Angeles is hereby amended by adding one new section to read as follows:

Section 2.1 Curfew. Except for aircraft exempted by subdivisions (a) through (e) of Section 2, no aircraft may depart from Van Nuys Airport between the hours of 10:00 pm and 11:00 pm. The provisions of this section shall not be applicable to any aircraft certificated as Stage 3 pursuant to 14 Code of Federal Regulation Part 36.

Section 3. The City Clerk shall certify to the passage of this ordinance and cause the same to be published in some daily newspaper printed and published in the City of Los Angeles.
I hereby certify that the foregoing ordinance was passed by the Council of the City of Los Angeles, at its meeting

DEC 19, 1997.

ORDINANCE No. 173215

An Ordinance approving a Regulation adopted by Resolution 20736 of the Board of Airport Commissioners of the City of Los Angeles amending Ordinance 155,727 of the City of Los Angeles, known as the Van Nuys Noise Abatement and Curfew Regulation, to add Section 5.1 and subsection (gg) to Section 1, thereby adding a Non-Addition Rule.

The People of the City of Los Angeles Do Ordain as Follows:

Section 1. The Regulation, adopted by Resolution No. 207736 of the Board of Airport Commissioners on July 28, 1999, is hereby approved. Said Regulation contained in said Resolution provides an additional noise abatement regulation for aircraft at Van Nuys Airport.

Section 2. Ordinance 155,727 of the City of Los Angeles is hereby amended by adding one new section and one subsection to read as follows:

Section 5.1 Non-addition.

No person or tenant may tie down, part or hangar any aircraft at Van Nuys Airport, whose Advisory Circular 36-3G takeoff noise level equals or exceeds 77 dBA, for more than thirty (30) days in any calendar year, unless said aircraft is an exempt based aircraft.

EXEMPTION A - STAGE 3: The provisions of this section shall not be applicable to any aircraft certificated as Stage 3 pursuant to 14 Code of Federal Regulations Part 36.

EXEMPTION B - REPAIR AND MAINTENANCE: Notwithstanding the restrictions of Section 5.1, a Stage 2 aircraft with a takeoff noise level in excess of 77 dBA may be parked, tied down or hangared at the Airport in excess of the 30 day limit (and such additional time as is necessary) to perform major repairs or refurbishment, required maintenance inspections or systems installations and warranty work (hereinafter "work") provided all of the following conditions are fully satisfied:

(a) Prior to the day of arrival of the aircraft the Airport Manager receives a written "work notice" containing the anticipated date of arrival, the name of the aircraft owner and operator, the aircraft type and registration "N" number, the name of the company or entity contracted to perform the work, a description of the work to be preformed, and an estimate of the duration of the stay; and

(b) The aircraft is not being charged a tie-down fee or other use fee by an Airport tenant; and

(c) The aircraft owner or operator obtains a written permit from the Airport Manager authorizing an exemption under this subsection prior to or within 24 hours of arrival of the aircraft at the Airport; and

(d) The aircraft owner or operator complies with all conditions and terms stated in the written permit granted by the Airport Manager, including but not limited to mandatory daytime hours for flight arrival and departures; and

(e) The aircraft owner or operator provides written notice of departure to the Airport Manager within 24 hours of departure from the Airport.

EXEMPTION C - REPLACEMENT: Until December 31, 2005, notwithstanding the provisions of Section 5.1, an exempt based Stage 2 aircraft, as defined in Section 1, subsection (gg), may be replaced with another Stage 2 aircraft exceeding 77 dBA ("replacement Stage 2 aircraft"), provided all of the following apply:

(a) The Stage 2 aircraft being replaced will no longer be based at the Airport; and

(b) Calculated on the date of replacement, the replacement Stage 2 aircraft has an Advisory Circular 36-3G takeoff noise level not exceeding 85 dBA; and

(c) The replacement Stage 2 aircraft, after January 1, 2011, shall not be tied down, parked or hangared at Van Nuys Airport for more than thirty (30) days in any calendar year. A replacement Stage 2 aircraft exceeding 77 dBA shall not be considered an "exempt based aircraft", nor shall it continued presence at Van Nuys Airport under Exemption C ever entitle it to "exempt based aircraft" status.

Section 1, Subsection (gg) Exempt Based Aircraft - All aircraft which were parked, tied down or hangared at Airport for ninety (90) days or more during the twelve (12) months immediately preceding December 31, 1999.

Said ordinance was presented to the Mayor on April 24, 2000; the Mayor returned said ordinance to the City Clerk on May 5, 2000 without his approval or his objections in writing, being more than ten days after the same was presented to the Mayor. Said ordinance shall become effective and be as valid as if the Mayor had approved and signed it. (Section 30, City Charter)

B.7

SUPPLEMENTAL NOISE ANALYSIS RESULTS

B.7.1 Introduction

This appendix presents the supplemental threshold of significance noise analysis results for the 1,254 grid locations discussed in Section 9.4.

Grid Point	2007 Baseline CNEL	2014 Project CNEL	2014 Alt. 1 No-Project CNEL	2014 Alt. 2 Exempt Stage 3 and 4 Aircraft CNEL	2014 Project CNEL Minus: 2007 Baseline CNEL	2014 Project CNEL Minus: 2014 Alt. 1 No-Project CNEL	2014 Project CNEL Minus: 2014 Alt. 2 Exempt Stage 3 and 4 Aircraft CNEL
A01	54.7	55.3	55.6	55.3	0.6	-0.3	0.0
A02	55.1	55.8	56.1	55.8	0.7	-0.3	0.0
A03	55.4	56.1	56.4	56.1	0.7	-0.3	0.0
A04	55.7	56.4	56.7	56.4	0.7	-0.3	0.0
A05	55.8	56.6	56.8	56.6	0.8	-0.2	0.0
A06	55.5	56.3	56.6	56.3	0.8	-0.3	0.0
A07	55.3	56.1	56.4	56.1	0.8	-0.3	0.0
A08	55.2	56.1	56.3	56.1	0.9	-0.2	0.0
A09	55.1	55.9	56.1	55.9	0.8	-0.2	0.0
A10	54.9	55.8	56.0	55.8	0.9	-0.2	0.0
A11	54.8	55.7	55.9	55.7	0.9	-0.2	0.0
A12	54.8	55.7	55.9	55.7	0.9	-0.2	0.0
A13	54.8	55.7	55.9	55.7	0.9	-0.2	0.0
A14	54.8	55.8	55.9	55.8	1.0	-0.1	0.0
A15	54.9	55.9	56.0	55.9	1.0	-0.1	0.0
A16	54.9	55.9	56.0	55.9	1.0	-0.1	0.0
A17	55.0	55.9	56.1	55.9	0.9	-0.2	0.0
A18	55.1	56.0	56.2	56.0	0.9	-0.2	0.0
A19	55.2	56.1	56.3	56.1	0.9	-0.2	0.0
A20	55.4	56.3	56.4	56.3	0.9	-0.1	0.0
A21	55.7	56.5	56.6	56.5	0.8	-0.1	0.0
A22	55.9	56.7	56.8	56.7	0.8	-0.1	0.0
A23	56.1	56.8	57.0	56.8	0.7	-0.2	0.0
A24	56.3	57.0	57.1	57.0	0.7	-0.1	0.0
A25	56.5	57.1	57.3	57.1	0.6	-0.2	0.0
A26	56.7	57.3	57.4	57.3	0.6	-0.1	0.0
A27	56.7	57.3	57.5	57.3	0.6	-0.2	0.0

Grid Point	2007 Baseline CNEL	2014 Project CNEL	2014 Alt. 1 No-Project CNEL	2014 Alt. 2 Exempt Stage 3 and 4 Aircraft CNEL	2014 Project CNEL Minus: 2007 Baseline CNEL	2014 Alt. 1 No-Project CNEL	2014 Alt. 2 Exempt Stage 3 and 4 Aircraft CNEL
A28	56.5	57.1	57.2	57.1	0.6	-0.1	0.0
A29	56.2	56.8	56.9	56.8	0.6	-0.1	0.0
A30	56.0	56.6	56.7	56.6	0.6	-0.1	0.0
A31	55.9	56.5	56.6	56.5	0.6	-0.1	0.0
A32	55.9	56.6	56.7	56.6	0.7	-0.1	0.0
A33	56.1	56.8	56.9	56.8	0.7	-0.1	0.0
A34	56.2	56.9	57.0	56.9	0.7	-0.1	0.0
A35	55.9	56.6	56.7	56.6	0.7	-0.1	0.0
A36	55.6	56.2	56.4	56.2	0.6	-0.2	0.0
A37	55.4	56.0	56.2	56.0	0.6	-0.2	0.0
A38	55.4	55.9	56.1	55.9	0.5	-0.2	0.0
A39	55.4	56.0	56.2	56.0	0.6	-0.2	0.0
A40	55.4	56.0	56.2	56.0	0.6	-0.2	0.0
A41	55.3	56.0	56.2	56.0	0.7	-0.2	0.0
A42	55.3	56.1	56.2	56.1	0.8	-0.1	0.0
A43	55.1	55.9	56.1	55.9	0.8	-0.2	0.0
A44	54.8	55.7	55.8	55.7	0.9	-0.1	0.0
A45	54.5	55.5	55.6	55.5	1.0	-0.1	0.0
A46	54.2	55.2	55.3	55.2	1.0	-0.1	0.0
A47	54.1	55.0	55.2	55.0	0.9	-0.2	0.0
A48	54.1	55.1	55.2	55.1	1.0	-0.1	0.0
A49	54.3	55.3	55.4	55.3	1.0	-0.1	0.0
A50	54.6	55.5	55.7	55.5	0.9	-0.2	0.0
A51	54.9	55.9	56.1	55.9	1.0	-0.2	0.0
A52	55.2	56.2	56.4	56.2	1.0	-0.2	0.0
A53	55.5	56.4	56.6	56.4	0.9	-0.2	0.0
A54	55.6	56.5	56.7	56.5	0.9	-0.2	0.0
A55	55.6	56.4	56.7	56.4	0.8	-0.3	0.0
A56	55.4	56.2	56.4	56.2	0.8	-0.2	0.0
A57	55.1	55.9	56.2	55.9	0.8	-0.3	0.0
A58	54.8	55.6	55.8	55.6	0.8	-0.2	0.0
A59	54.3	55.2	55.4	55.2	0.9	-0.2	0.0
A60	53.8	54.7	54.9	54.7	0.9	-0.2	0.0
A61	53.3	54.2	54.4	54.2	0.9	-0.2	0.0
A62	52.9	53.9	54.0	53.9	1.0	-0.1	0.0
A63	52.5	53.6	53.7	53.6	1.1	-0.1	0.0
A64	52.1	53.1	53.3	53.1	1.0	-0.2	0.0
A65	51.7	52.7	52.8	52.7	1.0	-0.1	0.0
A66	51.4	52.5	52.6	52.5	1.1	-0.1	0.0
B01	54.9	55.5	55.8	55.5	0.6	-0.3	0.0
B02	55.3	56.0	56.3	56.0	0.7	-0.3	0.0
B03	55.6	56.3	56.6	56.3	0.7	-0.3	0.0
B04	56.0	56.7	57.0	56.7	0.7	-0.3	0.0
B05	56.1	56.8	57.1	56.9	0.7	-0.3	-0.1
B06	56.0	56.7	57.0	56.7	0.7	-0.3	0.0
B07	55.8	56.7	56.9	56.7	0.9	-0.2	0.0
B08	55.8	56.6	56.9	56.6	0.8	-0.3	0.0
B09	55.7	56.5	56.8	56.6	0.8	-0.3	-0.1
B10	55.6	56.5	56.7	56.5	0.9	-0.2	0.0
B11	55.5	56.4	56.6	56.4	0.9	-0.2	0.0
B12	55.5	56.5	56.7	56.5	1.0	-0.2	0.0
B13	55.5	56.5	56.7	56.5	1.0	-0.2	0.0

Grid Point	2007 Baseline CNEL	2014 Project CNEL	2014 Alt. 1 No-Project CNEL	2014 Alt. 2 Exempt Stage 3 and 4 Aircraft CNEL	2014 Project CNEL Minus: 2007 Baseline CNEL	2014 Project CNEL Minus: 2014 Alt. 1 No-Project CNEL	2014 Project CNEL Minus: 2014 Alt. 2 Exempt Stage 3 and 4 Aircraft CNEL
B14	55.6	56.6	56.8	56.6	1.0	-0.2	0.0
B15	55.6	56.6	56.8	56.6	1.0	-0.2	0.0
B16	55.7	56.7	56.9	56.7	1.0	-0.2	0.0
B17	55.9	56.8	57.0	56.8	0.9	-0.2	0.0
B18	56.0	57.0	57.1	57.0	1.0	-0.1	0.0
B19	56.1	57.1	57.2	57.1	1.0	-0.1	0.0
B20	56.3	57.2	57.4	57.2	0.9	-0.2	0.0
B21	56.6	57.4	57.6	57.4	0.8	-0.2	0.0
B22	56.8	57.6	57.8	57.6	0.8	-0.2	0.0
B23	57.1	57.8	58.0	57.8	0.7	-0.2	0.0
B24	57.3	58.0	58.1	58.0	0.7	-0.1	0.0
B25	57.5	58.1	58.2	58.1	0.6	-0.1	0.0
B26	57.6	58.2	58.3	58.2	0.6	-0.1	0.0
B27	57.6	58.2	58.3	58.2	0.6	-0.1	0.0
B28	57.5	58.0	58.2	58.0	0.5	-0.2	0.0
B29	57.2	57.7	57.9	57.7	0.5	-0.2	0.0
B30	56.9	57.4	57.6	57.4	0.5	-0.2	0.0
B31	56.8	57.3	57.5	57.3	0.5	-0.2	0.0
B32	56.8	57.5	57.6	57.5	0.7	-0.1	0.0
B33	57.0	57.7	57.9	57.7	0.7	-0.2	0.0
B34	57.1	57.8	57.9	57.8	0.7	-0.1	0.0
B35	57.0	57.7	57.8	57.7	0.7	-0.1	0.0
B36	57.0	57.6	57.8	57.6	0.6	-0.2	0.0
B37	57.1	57.7	57.9	57.7	0.6	-0.2	0.0
B38	57.3	57.9	58.1	57.9	0.6	-0.2	0.0
B39	57.5	58.1	58.3	58.1	0.6	-0.2	0.0
B40	57.3	58.0	58.1	58.0	0.7	-0.1	0.0
B41	57.0	57.7	57.8	57.7	0.7	-0.1	0.0
B42	56.6	57.4	57.6	57.4	0.8	-0.2	0.0
B43	55.9	56.8	56.9	56.8	0.9	-0.1	0.0
B44	55.4	56.3	56.5	56.3	0.9	-0.2	0.0
B45	55.1	56.0	56.1	56.0	0.9	-0.1	0.0
B46	54.8	55.8	55.9	55.8	1.0	-0.1	0.0
B47	54.8	55.8	55.9	55.8	1.0	-0.1	0.0
B48	54.9	55.9	56.0	55.9	1.0	-0.1	0.0
B49	55.1	56.1	56.3	56.1	1.0	-0.2	0.0
B50	55.4	56.4	56.6	56.4	1.0	-0.2	0.0
B51	55.7	56.7	56.9	56.7	1.0	-0.2	0.0
B52	56.0	56.9	57.1	56.9	0.9	-0.2	0.0
B53	56.1	57.0	57.3	57.0	0.9	-0.3	0.0
B54	56.2	57.1	57.3	57.1	0.9	-0.2	0.0
B55	56.1	57.0	57.2	57.0	0.9	-0.2	0.0
B56	55.9	56.7	56.9	56.7	0.8	-0.2	0.0
B57	55.5	56.4	56.6	56.4	0.9	-0.2	0.0
B58	55.2	56.0	56.2	56.0	0.8	-0.2	0.0
B59	54.7	55.6	55.8	55.6	0.9	-0.2	0.0
B60	54.2	55.1	55.3	55.1	0.9	-0.2	0.0
B61	53.7	54.7	54.8	54.7	1.0	-0.1	0.0
B62	53.4	54.4	54.5	54.4	1.0	-0.1	0.0
B63	53.0	54.1	54.2	54.1	1.1	-0.1	0.0
B64	52.7	53.7	53.9	53.7	1.0	-0.2	0.0
B65	52.4	53.5	53.6	53.5	1.1	-0.1	0.0

Grid Point	2007 Baseline CNEL	2014 Project CNEL	2014 Alt. 1 No-Project CNEL	2014 Alt. 2 Exempt Stage 3 and 4 Aircraft CNEL	2014 Project CNEL Minus:		
					2007 Baseline CNEL	2014 Alt. 1 No-Project CNEL	2014 Alt. 2 Exempt Stage 3 and 4 Aircraft CNEL
B66	52.3	53.3	53.4	53.3	1.0	-0.1	0.0
C01	55.1	55.7	56.0	55.7	0.6	-0.3	0.0
C02	55.5	56.2	56.5	56.2	0.7	-0.3	0.0
C03	55.9	56.6	56.9	56.6	0.7	-0.3	0.0
C04	56.3	57.0	57.3	57.0	0.7	-0.3	0.0
C05	56.5	57.2	57.5	57.2	0.7	-0.3	0.0
C06	56.5	57.2	57.5	57.2	0.7	-0.3	0.0
C07	56.4	57.2	57.5	57.2	0.8	-0.3	0.0
C08	56.4	57.3	57.5	57.3	0.9	-0.2	0.0
C09	56.3	57.2	57.5	57.2	0.9	-0.3	0.0
C10	56.3	57.2	57.4	57.2	0.9	-0.2	0.0
C11	56.3	57.3	57.5	57.3	1.0	-0.2	0.0
C12	56.4	57.4	57.6	57.4	1.0	-0.2	0.0
C13	56.5	57.5	57.6	57.5	1.0	-0.1	0.0
C14	56.5	57.5	57.7	57.5	1.0	-0.2	0.0
C15	56.6	57.6	57.8	57.6	1.0	-0.2	0.0
C16	56.7	57.7	57.9	57.7	1.0	-0.2	0.0
C17	56.9	57.9	58.1	57.9	1.0	-0.2	0.0
C18	57.0	58.0	58.2	58.0	1.0	-0.2	0.0
C19	57.2	58.1	58.3	58.1	0.9	-0.2	0.0
C20	57.4	58.3	58.5	58.3	0.9	-0.2	0.0
C21	57.7	58.5	58.7	58.5	0.8	-0.2	0.0
C22	57.9	58.7	58.9	58.7	0.8	-0.2	0.0
C23	58.2	58.9	59.1	58.9	0.7	-0.2	0.0
C24	58.5	59.2	59.3	59.2	0.7	-0.1	0.0
C25	58.7	59.3	59.5	59.3	0.6	-0.2	0.0
C26	58.8	59.3	59.5	59.3	0.5	-0.2	0.0
C27	58.8	59.3	59.5	59.3	0.5	-0.2	0.0
C28	58.7	59.2	59.4	59.2	0.5	-0.2	0.0
C29	58.5	59.0	59.2	59.0	0.5	-0.2	0.0
C30	58.2	58.7	58.9	58.7	0.5	-0.2	0.0
C31	58.0	58.5	58.7	58.5	0.5	-0.2	0.0
C32	58.0	58.6	58.8	58.6	0.6	-0.2	0.0
C33	58.2	58.9	59.0	58.9	0.7	-0.1	0.0
C34	58.3	59.0	59.2	59.0	0.7	-0.2	0.0
C35	58.5	59.2	59.3	59.2	0.7	-0.1	0.0
C36	58.9	59.6	59.8	59.6	0.7	-0.2	0.0
C37	59.6	60.4	60.6	60.4	0.8	-0.2	0.0
C38	60.6	61.4	61.5	61.4	0.8	-0.1	0.0
C39	61.2	62.1	62.2	62.1	0.9	-0.1	0.0
C40	59.7	60.4	60.6	60.4	0.7	-0.2	0.0
C41	58.7	59.5	59.6	59.5	0.8	-0.1	0.0
C42	57.7	58.4	58.6	58.4	0.7	-0.2	0.0
C43	56.9	57.7	57.9	57.7	0.8	-0.2	0.0
C44	56.4	57.3	57.4	57.3	0.9	-0.1	0.0
C45	56.1	57.0	57.1	57.0	0.9	-0.1	0.0
C46	55.9	56.8	57.0	56.8	0.9	-0.2	0.0
C47	55.9	56.9	57.0	56.9	1.0	-0.1	0.0
C48	56.0	57.0	57.2	57.0	1.0	-0.2	0.0
C49	56.2	57.2	57.4	57.2	1.0	-0.2	0.0
C50	56.4	57.4	57.6	57.4	1.0	-0.2	0.0
C51	56.7	57.7	57.9	57.7	1.0	-0.2	0.0

Grid Point	2007 Baseline CNEL	2014 Project CNEL	2014 Alt. 1 No-Project CNEL	2014 Alt. 2 Exempt Stage 3 and 4 Aircraft CNEL	2014 Project CNEL Minus: 2007 Baseline CNEL	2014 Project CNEL Minus: 2014 Alt. 1 No-Project CNEL	2014 Project CNEL Minus: 2014 Alt. 2 Exempt Stage 3 and 4 Aircraft CNEL
C52	56.9	57.9	58.1	57.9	1.0	-0.2	0.0
C53	57.0	57.9	58.1	57.9	0.9	-0.2	0.0
C54	57.0	57.9	58.1	57.9	0.9	-0.2	0.0
C55	56.8	57.8	58.0	57.8	1.0	-0.2	0.0
C56	56.6	57.5	57.7	57.5	0.9	-0.2	0.0
C57	56.2	57.1	57.3	57.1	0.9	-0.2	0.0
C58	55.8	56.7	56.9	56.7	0.9	-0.2	0.0
C59	55.3	56.2	56.4	56.2	0.9	-0.2	0.0
C60	54.8	55.8	56.0	55.8	1.0	-0.2	0.0
C61	54.5	55.5	55.6	55.5	1.0	-0.1	0.0
C62	54.2	55.2	55.4	55.2	1.0	-0.2	0.0
C63	53.9	55.0	55.1	55.0	1.1	-0.1	0.0
C64	53.7	54.8	54.9	54.8	1.1	-0.1	0.0
C65	53.6	54.6	54.7	54.6	1.0	-0.1	0.0
C66	53.4	54.5	54.6	54.5	1.1	-0.1	0.0
D01	55.2	55.9	56.2	55.9	0.7	-0.3	0.0
D02	55.7	56.4	56.7	56.4	0.7	-0.3	0.0
D03	56.2	56.9	57.2	56.9	0.7	-0.3	0.0
D04	56.7	57.4	57.7	57.4	0.7	-0.3	0.0
D05	56.9	57.6	57.9	57.7	0.7	-0.3	-0.1
D06	57.0	57.8	58.1	57.8	0.8	-0.3	0.0
D07	57.1	57.9	58.1	57.9	0.8	-0.2	0.0
D08	57.1	57.9	58.2	57.9	0.8	-0.3	0.0
D09	57.1	58.0	58.2	58.0	0.9	-0.2	0.0
D10	57.2	58.1	58.3	58.1	0.9	-0.2	0.0
D11	57.3	58.2	58.5	58.2	0.9	-0.3	0.0
D12	57.4	58.4	58.6	58.4	1.0	-0.2	0.0
D13	57.4	58.4	58.6	58.4	1.0	-0.2	0.0
D14	57.5	58.6	58.8	58.6	1.1	-0.2	0.0
D15	57.7	58.7	58.9	58.7	1.0	-0.2	0.0
D16	57.8	58.9	59.1	58.9	1.1	-0.2	0.0
D17	58.0	59.0	59.2	59.0	1.0	-0.2	0.0
D18	58.2	59.2	59.4	59.2	1.0	-0.2	0.0
D19	58.4	59.4	59.5	59.4	1.0	-0.1	0.0
D20	58.7	59.6	59.8	59.6	0.9	-0.2	0.0
D21	59.0	59.8	60.0	59.8	0.8	-0.2	0.0
D22	59.3	60.1	60.3	60.1	0.8	-0.2	0.0
D23	59.6	60.4	60.6	60.4	0.8	-0.2	0.0
D24	60.0	60.7	60.9	60.7	0.7	-0.2	0.0
D25	60.3	60.9	61.1	60.9	0.6	-0.2	0.0
D26	60.5	60.9	61.2	61.0	0.4	-0.3	-0.1
D27	60.5	60.9	61.1	60.9	0.4	-0.2	0.0
D28	60.4	60.8	61.0	60.8	0.4	-0.2	0.0
D29	60.2	60.6	60.8	60.6	0.4	-0.2	0.0
D30	59.9	60.4	60.6	60.4	0.5	-0.2	0.0
D31	59.7	60.2	60.4	60.2	0.5	-0.2	0.0
D32	59.6	60.2	60.4	60.2	0.6	-0.2	0.0
D33	59.7	60.3	60.5	60.3	0.6	-0.2	0.0
D34	59.9	60.6	60.8	60.6	0.7	-0.2	0.0
D35	60.3	61.0	61.2	61.0	0.7	-0.2	0.0
D36	61.1	61.9	62.0	61.9	0.8	-0.1	0.0
D37	62.5	63.4	63.5	63.4	0.9	-0.1	0.0

Grid Point	2007 Baseline CNEL	2014 Project CNEL	2014 Alt. 1 No-Project CNEL	2014 Alt. 2 Exempt Stage 3 and 4 Aircraft CNEL	2014 Project CNEL Minus:		
					2007 Baseline CNEL	2014 Alt. 1 No-Project CNEL	2014 Alt. 2 Exempt Stage 3 and 4 Aircraft CNEL
D38	64.3	65.3	65.4	65.3	1.0	-0.1	0.0
D39	67.4	68.5	68.6	68.5	1.1	-0.1	0.0
D40	62.8	63.6	63.8	63.6	0.8	-0.2	0.0
D41	60.7	61.4	61.6	61.4	0.7	-0.2	0.0
D42	59.4	60.1	60.3	60.1	0.7	-0.2	0.0
D43	58.5	59.2	59.4	59.2	0.7	-0.2	0.0
D44	57.9	58.7	58.9	58.7	0.8	-0.2	0.0
D45	57.5	58.4	58.6	58.4	0.9	-0.2	0.0
D46	57.4	58.3	58.5	58.3	0.9	-0.2	0.0
D47	57.4	58.4	58.6	58.4	1.0	-0.2	0.0
D48	57.5	58.5	58.7	58.5	1.0	-0.2	0.0
D49	57.7	58.7	58.9	58.7	1.0	-0.2	0.0
D50	57.9	58.9	59.1	58.9	1.0	-0.2	0.0
D51	58.1	59.0	59.2	59.0	0.9	-0.2	0.0
D52	58.1	59.1	59.3	59.1	1.0	-0.2	0.0
D53	58.1	59.1	59.2	59.1	1.0	-0.1	0.0
D54	58.0	58.9	59.1	58.9	0.9	-0.2	0.0
D55	57.7	58.7	58.9	58.7	1.0	-0.2	0.0
D56	57.4	58.4	58.6	58.4	1.0	-0.2	0.0
D57	57.1	58.0	58.2	58.0	0.9	-0.2	0.0
D58	56.6	57.6	57.8	57.6	1.0	-0.2	0.0
D59	56.2	57.2	57.4	57.2	1.0	-0.2	0.0
D60	55.9	56.9	57.1	57.0	1.0	-0.2	-0.1
D61	55.7	56.7	56.8	56.7	1.0	-0.1	0.0
D62	55.4	56.5	56.6	56.5	1.1	-0.1	0.0
D63	55.3	56.4	56.5	56.4	1.1	-0.1	0.0
D64	55.1	56.3	56.3	56.3	1.2	0.0	0.0
D65	55.0	56.1	56.2	56.1	1.1	-0.1	0.0
D66	54.9	56.0	56.1	56.0	1.1	-0.1	0.0
E01	55.4	56.1	56.4	56.1	0.7	-0.3	0.0
E02	55.9	56.6	56.9	56.6	0.7	-0.3	0.0
E03	56.5	57.2	57.5	57.2	0.7	-0.3	0.0
E04	57.0	57.8	58.1	57.8	0.8	-0.3	0.0
E05	57.4	58.1	58.4	58.1	0.7	-0.3	0.0
E06	57.6	58.4	58.6	58.4	0.8	-0.2	0.0
E07	57.8	58.6	58.8	58.6	0.8	-0.2	0.0
E08	57.9	58.7	59.0	58.7	0.8	-0.3	0.0
E09	58.0	58.9	59.1	58.9	0.9	-0.2	0.0
E10	58.2	59.1	59.3	59.1	0.9	-0.2	0.0
E11	58.3	59.3	59.5	59.3	1.0	-0.2	0.0
E12	58.4	59.4	59.7	59.4	1.0	-0.3	0.0
E13	58.5	59.6	59.8	59.6	1.1	-0.2	0.0
E14	58.7	59.8	60.0	59.8	1.1	-0.2	0.0
E15	58.9	60.0	60.2	60.0	1.1	-0.2	0.0
E16	59.2	60.2	60.4	60.2	1.0	-0.2	0.0
E17	59.4	60.4	60.6	60.4	1.0	-0.2	0.0
E18	59.6	60.6	60.8	60.6	1.0	-0.2	0.0
E19	59.9	60.9	61.1	60.9	1.0	-0.2	0.0
E20	60.2	61.2	61.4	61.2	1.0	-0.2	0.0
E21	60.6	61.5	61.7	61.5	0.9	-0.2	0.0
E22	61.0	61.9	62.0	61.9	0.9	-0.1	0.0
E23	61.5	62.3	62.4	62.3	0.8	-0.1	0.0

Grid Point	2007 Baseline CNEL	2014 Project CNEL	2014 Alt. 1 No-Project CNEL	2014 Alt. 2 Exempt Stage 3 and 4 Aircraft CNEL	2014 Project CNEL Minus: 2007 Baseline CNEL	2014 Project CNEL Minus: 2014 Alt. 1 No-Project CNEL	2014 Project CNEL Minus: 2014 Alt. 2 Exempt Stage 3 and 4 Aircraft CNEL
E24	61.9	62.7	62.9	62.7	0.8	-0.2	0.0
E25	62.4	63.0	63.2	63.0	0.6	-0.2	0.0
E26	62.6	63.1	63.4	63.1	0.5	-0.3	0.0
E27	62.6	63.0	63.3	63.0	0.4	-0.3	0.0
E28	62.5	62.9	63.2	62.9	0.4	-0.3	0.0
E29	62.4	62.7	63.0	62.7	0.3	-0.3	0.0
E30	62.2	62.5	62.8	62.5	0.3	-0.3	0.0
E31	61.9	62.3	62.6	62.3	0.4	-0.3	0.0
E32	61.8	62.2	62.5	62.3	0.4	-0.3	-0.1
E33	61.8	62.3	62.6	62.3	0.5	-0.3	0.0
E34	61.9	62.5	62.7	62.5	0.6	-0.2	0.0
E35	62.3	62.9	63.1	62.9	0.6	-0.2	0.0
E36	63.2	63.9	64.1	63.9	0.7	-0.2	0.0
E37	64.8	65.7	65.8	65.7	0.9	-0.1	0.0
E38	68.2	69.3	69.4	69.3	1.1	-0.1	0.0
E39	78.1	79.4	79.4	79.4	1.3	0.0	0.0
E40	67.1	68.1	68.2	68.1	1.0	-0.1	0.0
E41	63.5	64.1	64.4	64.1	0.6	-0.3	0.0
E42	61.7	62.3	62.6	62.3	0.6	-0.3	0.0
E43	60.5	61.2	61.5	61.2	0.7	-0.3	0.0
E44	59.9	60.7	60.9	60.7	0.8	-0.2	0.0
E45	59.5	60.4	60.6	60.4	0.9	-0.2	0.0
E46	59.3	60.3	60.5	60.3	1.0	-0.2	0.0
E47	59.3	60.3	60.5	60.3	1.0	-0.2	0.0
E48	59.4	60.4	60.6	60.4	1.0	-0.2	0.0
E49	59.5	60.5	60.7	60.5	1.0	-0.2	0.0
E50	59.6	60.6	60.7	60.6	1.0	-0.1	0.0
E51	59.6	60.6	60.8	60.6	1.0	-0.2	0.0
E52	59.6	60.5	60.7	60.5	0.9	-0.2	0.0
E53	59.4	60.4	60.6	60.4	1.0	-0.2	0.0
E54	59.2	60.2	60.4	60.2	1.0	-0.2	0.0
E55	59.0	60.0	60.1	60.0	1.0	-0.1	0.0
E56	58.7	59.7	59.9	59.7	1.0	-0.2	0.0
E57	58.4	59.4	59.6	59.4	1.0	-0.2	0.0
E58	58.1	59.2	59.3	59.2	1.1	-0.1	0.0
E59	57.9	58.9	59.0	58.9	1.0	-0.1	0.0
E60	57.6	58.7	58.8	58.7	1.1	-0.1	0.0
E61	57.4	58.6	58.6	58.6	1.2	0.0	0.0
E62	57.3	58.4	58.5	58.4	1.1	-0.1	0.0
E63	57.1	58.3	58.4	58.3	1.2	-0.1	0.0
E64	57.0	58.1	58.2	58.2	1.1	-0.1	-0.1
E65	56.8	58.0	58.0	58.0	1.2	0.0	0.0
E66	56.6	57.8	57.8	57.8	1.2	0.0	0.0
F01	55.5	56.2	56.5	56.2	0.7	-0.3	0.0
F02	56.2	56.9	57.2	56.9	0.7	-0.3	0.0
F03	56.8	57.6	57.9	57.6	0.8	-0.3	0.0
F04	57.4	58.1	58.4	58.1	0.7	-0.3	0.0
F05	57.8	58.6	58.9	58.6	0.8	-0.3	0.0
F06	58.2	59.0	59.2	59.0	0.8	-0.2	0.0
F07	58.5	59.3	59.6	59.3	0.8	-0.3	0.0
F08	58.7	59.6	59.9	59.6	0.9	-0.3	0.0
F09	59.0	59.9	60.1	59.9	0.9	-0.2	0.0

Grid Point	2007 Baseline CNEL	2014 Project CNEL	2014 Alt. 1 No-Project CNEL	2014 Alt. 2 Exempt Stage 3 and 4 Aircraft CNEL	2014 Project CNEL Minus: 2007 Baseline CNEL	2014 Project CNEL Minus: 2014 Alt. 1 No-Project CNEL	2014 Project CNEL Minus: 2014 Alt. 2 Exempt Stage 3 and 4 Aircraft CNEL
F10	59.2	60.2	60.4	60.2	1.0	-0.2	0.0
F11	59.4	60.4	60.7	60.4	1.0	-0.3	0.0
F12	59.6	60.6	60.9	60.6	1.0	-0.3	0.0
F13	59.9	60.9	61.1	60.9	1.0	-0.2	0.0
F14	60.1	61.2	61.4	61.2	1.1	-0.2	0.0
F15	60.4	61.5	61.7	61.5	1.1	-0.2	0.0
F16	60.7	61.8	62.0	61.8	1.1	-0.2	0.0
F17	61.0	62.1	62.3	62.1	1.1	-0.2	0.0
F18	61.3	62.4	62.6	62.4	1.1	-0.2	0.0
F19	61.7	62.7	62.9	62.7	1.0	-0.2	0.0
F20	62.1	63.1	63.3	63.1	1.0	-0.2	0.0
F21	62.6	63.6	63.7	63.6	1.0	-0.1	0.0
F22	63.1	64.0	64.2	64.0	0.9	-0.2	0.0
F23	63.7	64.5	64.8	64.6	0.8	-0.3	-0.1
F24	64.4	65.2	65.4	65.2	0.8	-0.2	0.0
F25	65.1	65.8	66.0	65.8	0.7	-0.2	0.0
F26	65.4	65.9	66.2	65.9	0.5	-0.3	0.0
F27	65.3	65.7	66.0	65.7	0.4	-0.3	0.0
F28	65.3	65.6	65.9	65.6	0.3	-0.3	0.0
F29	65.1	65.4	65.7	65.4	0.3	-0.3	0.0
F30	65.0	65.2	65.6	65.2	0.2	-0.4	0.0
F31	64.8	65.1	65.4	65.1	0.3	-0.3	0.0
F32	64.6	65.0	65.3	65.0	0.4	-0.3	0.0
F33	64.6	65.1	65.3	65.1	0.5	-0.2	0.0
F34	64.6	65.0	65.3	65.0	0.4	-0.3	0.0
F35	64.7	65.1	65.4	65.1	0.4	-0.3	0.0
F36	65.3	65.8	66.1	65.8	0.5	-0.3	0.0
F37	66.4	66.9	67.2	66.9	0.5	-0.3	0.0
F38	69.9	70.8	71.0	70.8	0.9	-0.2	0.0
F39	78.7	79.9	79.9	79.9	1.2	0.0	0.0
F40	69.7	70.5	70.7	70.5	0.8	-0.2	0.0
F41	66.9	67.4	67.7	67.4	0.5	-0.3	0.0
F42	64.7	65.2	65.5	65.2	0.5	-0.3	0.0
F43	63.2	63.8	64.1	63.8	0.6	-0.3	0.0
F44	62.5	63.2	63.4	63.2	0.7	-0.2	0.0
F45	62.1	62.9	63.1	62.9	0.8	-0.2	0.0
F46	61.9	62.8	63.0	62.8	0.9	-0.2	0.0
F47	61.8	62.8	62.9	62.8	1.0	-0.1	0.0
F48	61.8	62.7	62.9	62.7	0.9	-0.2	0.0
F49	61.8	62.7	62.9	62.7	0.9	-0.2	0.0
F50	61.7	62.7	62.8	62.7	1.0	-0.1	0.0
F51	61.7	62.6	62.7	62.6	0.9	-0.1	0.0
F52	61.5	62.5	62.6	62.5	1.0	-0.1	0.0
F53	61.3	62.3	62.5	62.3	1.0	-0.2	0.0
F54	61.1	62.2	62.3	62.2	1.1	-0.1	0.0
F55	60.9	62.0	62.1	62.0	1.1	-0.1	0.0
F56	60.7	61.8	61.9	61.8	1.1	-0.1	0.0
F57	60.5	61.6	61.7	61.6	1.1	-0.1	0.0
F58	60.2	61.4	61.5	61.4	1.2	-0.1	0.0
F59	60.0	61.2	61.3	61.2	1.2	-0.1	0.0
F60	59.7	60.9	61.0	61.0	1.2	-0.1	-0.1
F61	59.5	60.7	60.7	60.7	1.2	0.0	0.0

Grid Point	2007 Baseline CNEL	2014 Project CNEL	2014 Alt. 1 No-Project CNEL	2014 Alt. 2 Exempt Stage 3 and 4 Aircraft CNEL	2014 Project CNEL Minus: 2007 Baseline CNEL	2014 Project CNEL Minus: 2014 Alt. 1 No-Project CNEL	2014 Project CNEL Minus: 2014 Alt. 2 Exempt Stage 3 and 4 Aircraft CNEL
F62	59.2	60.4	60.4	60.4	1.2	0.0	0.0
F63	58.9	60.1	60.1	60.1	1.2	0.0	0.0
F64	58.5	59.8	59.8	59.8	1.3	0.0	0.0
F65	58.2	59.5	59.5	59.5	1.3	0.0	0.0
F66	57.8	59.1	59.1	59.1	1.3	0.0	0.0
G01	55.7	56.5	56.8	56.5	0.8	-0.3	0.0
G02	56.4	57.2	57.5	57.2	0.8	-0.3	0.0
G03	57.1	57.9	58.2	57.9	0.8	-0.3	0.0
G04	57.7	58.5	58.8	58.5	0.8	-0.3	0.0
G05	58.3	59.1	59.3	59.1	0.8	-0.2	0.0
G06	58.8	59.6	59.8	59.6	0.8	-0.2	0.0
G07	59.2	60.0	60.3	60.1	0.8	-0.3	-0.1
G08	59.7	60.5	60.8	60.5	0.8	-0.3	0.0
G09	60.0	61.0	61.2	61.0	1.0	-0.2	0.0
G10	60.4	61.3	61.6	61.4	0.9	-0.3	-0.1
G11	60.7	61.7	61.9	61.7	1.0	-0.2	0.0
G12	61.0	62.0	62.3	62.0	1.0	-0.3	0.0
G13	61.4	62.4	62.7	62.4	1.0	-0.3	0.0
G14	61.8	62.8	63.0	62.8	1.0	-0.2	0.0
G15	62.1	63.2	63.4	63.2	1.1	-0.2	0.0
G16	62.5	63.6	63.8	63.6	1.1	-0.2	0.0
G17	62.9	64.0	64.2	64.0	1.1	-0.2	0.0
G18	63.2	64.3	64.5	64.3	1.1	-0.2	0.0
G19	63.7	64.7	64.9	64.7	1.0	-0.2	0.0
G20	64.3	65.2	65.4	65.2	0.9	-0.2	0.0
G21	64.9	65.8	66.0	65.8	0.9	-0.2	0.0
G22	65.5	66.4	66.6	66.4	0.9	-0.2	0.0
G23	66.3	67.2	67.4	67.2	0.9	-0.2	0.0
G24	67.6	68.4	68.6	68.4	0.8	-0.2	0.0
G25	68.9	69.7	69.9	69.7	0.8	-0.2	0.0
G26	69.3	69.8	70.1	69.8	0.5	-0.3	0.0
G27	68.9	69.3	69.6	69.3	0.4	-0.3	0.0
G28	68.9	69.1	69.5	69.1	0.2	-0.4	0.0
G29	68.9	69.1	69.5	69.1	0.2	-0.4	0.0
G30	68.9	69.1	69.5	69.1	0.2	-0.4	0.0
G31	69.0	69.2	69.6	69.2	0.2	-0.4	0.0
G32	69.0	69.3	69.7	69.3	0.3	-0.4	0.0
G33	69.1	69.5	69.8	69.5	0.4	-0.3	0.0
G34	69.2	69.5	69.9	69.5	0.3	-0.4	0.0
G35	69.2	69.4	69.8	69.4	0.2	-0.4	0.0
G36	69.6	69.8	70.2	69.8	0.2	-0.4	0.0
G37	70.2	70.4	70.9	70.4	0.2	-0.5	0.0
G38	71.5	71.7	72.1	71.7	0.2	-0.4	0.0
G39	73.7	74.2	74.6	74.2	0.5	-0.4	0.0
G40	74.4	74.8	75.3	74.8	0.4	-0.5	0.0
G41	73.0	73.4	73.9	73.4	0.4	-0.5	0.0
G42	68.8	69.1	69.5	69.1	0.3	-0.4	0.0
G43	66.6	67.1	67.3	67.1	0.5	-0.2	0.0
G44	65.9	66.6	66.7	66.6	0.7	-0.1	0.0
G45	65.5	66.2	66.4	66.2	0.7	-0.2	0.0
G46	65.2	66.1	66.2	66.1	0.9	-0.1	0.0
G47	65.1	66.0	66.1	66.0	0.9	-0.1	0.0

Grid Point	2007 Baseline CNEL	2014 Project CNEL	2014 Alt. 1 No-Project CNEL	2014 Alt. 2 Exempt Stage 3 and 4 Aircraft CNEL	2014 Project CNEL Minus: 2007 Baseline CNEL	2014 Project CNEL Minus: 2014 Alt. 1 No-Project CNEL	2014 Project CNEL Minus: 2014 Alt. 2 Exempt Stage 3 and 4 Aircraft CNEL
G48	65.0	65.9	66.0	65.9	0.9	-0.1	0.0
G49	64.8	65.8	65.9	65.8	1.0	-0.1	0.0
G50	64.6	65.6	65.8	65.6	1.0	-0.2	0.0
G51	64.4	65.4	65.5	65.4	1.0	-0.1	0.0
G52	64.1	65.2	65.3	65.2	1.1	-0.1	0.0
G53	63.7	64.8	64.9	64.8	1.1	-0.1	0.0
G54	63.3	64.5	64.5	64.5	1.2	0.0	0.0
G55	62.8	64.0	64.1	64.0	1.2	-0.1	0.0
G56	62.4	63.6	63.6	63.6	1.2	0.0	0.0
G57	61.9	63.1	63.2	63.1	1.2	-0.1	0.0
G58	61.4	62.6	62.7	62.6	1.2	-0.1	0.0
G59	60.9	62.2	62.2	62.2	1.3	0.0	0.0
G60	60.4	61.6	61.6	61.6	1.2	0.0	0.0
G61	59.8	61.1	61.1	61.1	1.3	0.0	0.0
G62	59.3	60.6	60.6	60.6	1.3	0.0	0.0
G63	58.8	60.0	60.1	60.0	1.2	-0.1	0.0
G64	58.3	59.5	59.6	59.5	1.2	-0.1	0.0
G65	57.8	59.0	59.1	59.0	1.2	-0.1	0.0
G66	57.3	58.5	58.5	58.5	1.2	0.0	0.0
H01	55.9	56.8	57.0	56.8	0.9	-0.2	0.0
H02	56.7	57.6	57.8	57.6	0.9	-0.2	0.0
H03	57.5	58.3	58.6	58.3	0.8	-0.3	0.0
H04	58.1	58.9	59.2	58.9	0.8	-0.3	0.0
H05	58.7	59.5	59.8	59.5	0.8	-0.3	0.0
H06	59.4	60.2	60.5	60.2	0.8	-0.3	0.0
H07	60.0	60.8	61.1	60.8	0.8	-0.3	0.0
H08	60.5	61.4	61.7	61.4	0.9	-0.3	0.0
H09	61.1	62.0	62.2	62.0	0.9	-0.2	0.0
H10	61.5	62.5	62.7	62.5	1.0	-0.2	0.0
H11	62.0	62.9	63.2	62.9	0.9	-0.3	0.0
H12	62.4	63.4	63.6	63.4	1.0	-0.2	0.0
H13	62.9	63.9	64.1	63.9	1.0	-0.2	0.0
H14	63.3	64.4	64.6	64.4	1.1	-0.2	0.0
H15	63.8	64.8	65.0	64.8	1.0	-0.2	0.0
H16	64.3	65.3	65.5	65.3	1.0	-0.2	0.0
H17	64.7	65.8	66.0	65.8	1.1	-0.2	0.0
H18	65.2	66.2	66.4	66.2	1.0	-0.2	0.0
H19	65.8	66.8	67.0	66.8	1.0	-0.2	0.0
H20	66.6	67.5	67.7	67.5	0.9	-0.2	0.0
H21	67.4	68.3	68.5	68.3	0.9	-0.2	0.0
H22	68.3	69.1	69.3	69.1	0.8	-0.2	0.0
H23	69.4	70.2	70.4	70.2	0.8	-0.2	0.0
H24	71.8	72.6	72.8	72.6	0.8	-0.2	0.0
H25	76.0	76.9	77.1	77.0	0.9	-0.2	-0.1
H26	74.9	75.6	75.8	75.6	0.7	-0.2	0.0
H27	73.7	74.0	74.3	74.0	0.3	-0.3	0.0
H28	73.9	74.0	74.4	74.0	0.1	-0.4	0.0
H29	74.2	74.3	74.7	74.3	0.1	-0.4	0.0
H30	74.6	74.7	75.2	74.7	0.1	-0.5	0.0
H31	75.2	75.3	75.8	75.3	0.1	-0.5	0.0
H32	75.8	76.0	76.6	76.0	0.2	-0.6	0.0
H33	76.4	76.8	77.3	76.8	0.4	-0.5	0.0

Grid Point	2007 Baseline CNEL	2014 Project CNEL	2014 Alt. 1 No-Project CNEL	2014 Alt. 2 Exempt Stage 3 and 4 Aircraft CNEL	2014 Project CNEL Minus: 2007 Baseline CNEL	2014 Project CNEL Minus: 2014 Alt. 1 No-Project CNEL	2014 Project CNEL Minus: 2014 Alt. 2 Exempt Stage 3 and 4 Aircraft CNEL
H34	77.0	77.4	77.9	77.4	0.4	-0.5	0.0
H35	77.6	77.6	78.2	77.6	0.0	-0.6	0.0
H36	78.4	78.6	79.1	78.6	0.2	-0.5	0.0
H37	79.6	79.9	80.4	79.9	0.3	-0.5	0.0
H38	81.7	82.1	82.7	82.2	0.4	-0.6	-0.1
H39	84.5	85.0	85.5	85.1	0.5	-0.5	-0.1
H40	88.7	89.5	89.9	89.5	0.8	-0.4	0.0
H41	83.5	84.1	84.5	84.1	0.6	-0.4	0.0
H42	71.7	72.4	72.6	72.4	0.7	-0.2	0.0
H43	70.6	71.5	71.6	71.5	0.9	-0.1	0.0
H44	69.8	70.7	70.8	70.7	0.9	-0.1	0.0
H45	68.9	69.8	69.9	69.8	0.9	-0.1	0.0
H46	67.9	68.9	69.0	68.9	1.0	-0.1	0.0
H47	67.1	68.0	68.1	68.0	0.9	-0.1	0.0
H48	66.3	67.2	67.3	67.2	0.9	-0.1	0.0
H49	65.5	66.5	66.6	66.5	1.0	-0.1	0.0
H50	64.8	65.7	65.8	65.8	0.9	-0.1	-0.1
H51	64.0	65.0	65.1	65.0	1.0	-0.1	0.0
H52	63.3	64.3	64.4	64.3	1.0	-0.1	0.0
H53	62.6	63.6	63.7	63.6	1.0	-0.1	0.0
H54	61.9	63.0	63.1	63.0	1.1	-0.1	0.0
H55	61.2	62.3	62.4	62.3	1.1	-0.1	0.0
H56	60.6	61.7	61.8	61.7	1.1	-0.1	0.0
H57	60.0	61.1	61.2	61.1	1.1	-0.1	0.0
H58	59.4	60.6	60.6	60.6	1.2	0.0	0.0
H59	58.9	60.0	60.1	60.0	1.1	-0.1	0.0
H60	58.3	59.5	59.5	59.5	1.2	0.0	0.0
H61	57.8	58.9	59.0	58.9	1.1	-0.1	0.0
H62	57.3	58.5	58.5	58.5	1.2	0.0	0.0
H63	56.8	58.0	58.0	58.0	1.2	0.0	0.0
H64	56.4	57.5	57.5	57.5	1.1	0.0	0.0
H65	55.9	57.0	57.1	57.0	1.1	-0.1	0.0
H66	55.5	56.6	56.6	56.6	1.1	0.0	0.0
I01	56.3	57.1	57.4	57.1	0.8	-0.3	0.0
I02	57.1	58.0	58.2	58.0	0.9	-0.2	0.0
I03	57.8	58.6	58.9	58.7	0.8	-0.3	-0.1
I04	58.5	59.3	59.6	59.3	0.8	-0.3	0.0
I05	59.2	60.0	60.3	60.0	0.8	-0.3	0.0
I06	59.9	60.8	61.0	60.8	0.9	-0.2	0.0
I07	60.6	61.5	61.7	61.5	0.9	-0.2	0.0
I08	61.3	62.2	62.4	62.2	0.9	-0.2	0.0
I09	61.9	62.8	63.1	62.8	0.9	-0.3	0.0
I10	62.5	63.4	63.7	63.4	0.9	-0.3	0.0
I11	63.1	64.0	64.2	64.0	0.9	-0.2	0.0
I12	63.6	64.5	64.8	64.5	0.9	-0.3	0.0
I13	64.2	65.1	65.3	65.1	0.9	-0.2	0.0
I14	64.7	65.6	65.9	65.6	0.9	-0.3	0.0
I15	65.3	66.2	66.4	66.2	0.9	-0.2	0.0
I16	65.8	66.7	66.9	66.7	0.9	-0.2	0.0
I17	66.4	67.3	67.5	67.3	0.9	-0.2	0.0
I18	67.0	67.9	68.1	67.9	0.9	-0.2	0.0
I19	67.7	68.6	68.8	68.6	0.9	-0.2	0.0

Grid Point	2007 Baseline CNEL	2014 Project CNEL	2014 Alt. 1 No-Project CNEL	2014 Alt. 2 Exempt Stage 3 and 4 Aircraft CNEL	2014 Project CNEL Minus: 2007 Baseline CNEL	2014 Project CNEL Minus: 2014 Alt. 1 No-Project CNEL	2014 Project CNEL Minus: 2014 Alt. 2 Exempt Stage 3 and 4 Aircraft CNEL
I20	68.8	69.5	69.7	69.5	0.7	-0.2	0.0
I21	70.0	70.7	70.9	70.7	0.7	-0.2	0.0
I22	71.0	71.6	71.8	71.6	0.6	-0.2	0.0
I23	72.4	73.0	73.2	73.0	0.6	-0.2	0.0
I24	76.9	77.6	77.9	77.6	0.7	-0.3	0.0
I25	83.6	84.6	84.9	84.6	1.0	-0.3	0.0
I26	82.0	82.6	83.1	82.7	0.6	-0.5	-0.1
I27	81.6	82.0	82.5	82.0	0.4	-0.5	0.0
I28	82.2	82.3	82.9	82.3	0.1	-0.6	0.0
I29	83.0	83.1	83.7	83.2	0.1	-0.6	-0.1
I30	84.2	84.4	84.9	84.4	0.2	-0.5	0.0
I31	85.8	85.9	86.4	85.9	0.1	-0.5	0.0
I32	85.9	85.8	86.4	85.9	-0.1	-0.6	-0.1
I33	85.4	85.8	86.3	85.8	0.4	-0.5	0.0
I34	84.6	85.1	85.5	85.1	0.5	-0.4	0.0
I35	83.3	83.4	83.9	83.4	0.1	-0.5	0.0
I36	82.6	82.7	83.1	82.7	0.1	-0.4	0.0
I37	81.6	81.8	82.2	81.8	0.2	-0.4	0.0
I38	81.7	81.9	82.3	82.0	0.2	-0.4	-0.1
I39	81.4	81.8	82.1	81.8	0.4	-0.3	0.0
I40	83.5	84.1	84.4	84.1	0.6	-0.3	0.0
I41	78.3	78.8	79.3	78.8	0.5	-0.5	0.0
I42	71.2	71.5	71.9	71.5	0.3	-0.4	0.0
I43	68.1	68.5	68.7	68.5	0.4	-0.2	0.0
I44	66.7	67.3	67.4	67.3	0.6	-0.1	0.0
I45	65.6	66.3	66.4	66.3	0.7	-0.1	0.0
I46	64.7	65.4	65.5	65.4	0.7	-0.1	0.0
I47	64.0	64.7	64.8	64.7	0.7	-0.1	0.0
I48	63.3	64.0	64.2	64.1	0.7	-0.2	-0.1
I49	62.6	63.4	63.5	63.4	0.8	-0.1	0.0
I50	61.9	62.7	62.8	62.7	0.8	-0.1	0.0
I51	61.1	62.0	62.2	62.0	0.9	-0.2	0.0
I52	60.4	61.4	61.5	61.4	1.0	-0.1	0.0
I53	59.7	60.7	60.8	60.7	1.0	-0.1	0.0
I54	59.1	60.1	60.2	60.1	1.0	-0.1	0.0
I55	58.4	59.5	59.6	59.5	1.1	-0.1	0.0
I56	57.9	58.9	59.0	58.9	1.0	-0.1	0.0
I57	57.3	58.4	58.5	58.4	1.1	-0.1	0.0
I58	56.8	57.9	58.0	57.9	1.1	-0.1	0.0
I59	56.3	57.4	57.5	57.4	1.1	-0.1	0.0
I60	55.9	56.9	57.0	57.0	1.0	-0.1	-0.1
I61	55.4	56.5	56.6	56.5	1.1	-0.1	0.0
I62	55.0	56.1	56.2	56.1	1.1	-0.1	0.0
I63	54.6	55.7	55.8	55.7	1.1	-0.1	0.0
I64	54.2	55.3	55.4	55.3	1.1	-0.1	0.0
I65	53.9	54.9	55.0	54.9	1.0	-0.1	0.0
I66	53.5	54.6	54.6	54.6	1.1	0.0	0.0
J01	56.7	57.6	57.9	57.6	0.9	-0.3	0.0
J02	57.5	58.4	58.7	58.4	0.9	-0.3	0.0
J03	58.2	59.1	59.4	59.1	0.9	-0.3	0.0
J04	58.9	59.8	60.1	59.8	0.9	-0.3	0.0
J05	59.7	60.5	60.8	60.5	0.8	-0.3	0.0

Grid Point	2007 Baseline CNEL	2014 Project CNEL	2014 Alt. 1 No-Project CNEL	2014 Alt. 2 Exempt Stage 3 and 4 Aircraft CNEL	2014 Project CNEL Minus:		
					2007 Baseline CNEL	2014 Alt. 1 No-Project CNEL	2014 Alt. 2 Exempt Stage 3 and 4 Aircraft CNEL
J06	60.4	61.2	61.5	61.2	0.8	-0.3	0.0
J07	61.1	62.0	62.2	62.0	0.9	-0.2	0.0
J08	61.8	62.7	63.0	62.7	0.9	-0.3	0.0
J09	62.5	63.4	63.7	63.4	0.9	-0.3	0.0
J10	63.2	64.1	64.3	64.1	0.9	-0.2	0.0
J11	63.8	64.7	64.9	64.7	0.9	-0.2	0.0
J12	64.4	65.3	65.5	65.3	0.9	-0.2	0.0
J13	65.0	65.8	66.1	65.8	0.8	-0.3	0.0
J14	65.6	66.4	66.7	66.4	0.8	-0.3	0.0
J15	66.2	67.0	67.2	67.0	0.8	-0.2	0.0
J16	66.7	67.6	67.8	67.6	0.9	-0.2	0.0
J17	67.4	68.2	68.4	68.2	0.8	-0.2	0.0
J18	68.0	68.8	69.0	68.8	0.8	-0.2	0.0
J19	68.8	69.5	69.7	69.5	0.7	-0.2	0.0
J20	69.8	70.4	70.6	70.4	0.6	-0.2	0.0
J21	71.1	71.6	71.8	71.6	0.5	-0.2	0.0
J22	71.8	72.4	72.5	72.4	0.6	-0.1	0.0
J23	72.8	73.3	73.5	73.3	0.5	-0.2	0.0
J24	76.6	77.2	77.6	77.2	0.6	-0.4	0.0
J25	81.1	82.0	82.4	82.0	0.9	-0.4	0.0
J26	78.9	79.3	79.7	79.3	0.4	-0.4	0.0
J27	77.6	77.7	78.2	77.7	0.1	-0.5	0.0
J28	77.0	77.0	77.4	77.0	0.0	-0.4	0.0
J29	76.5	76.6	77.0	76.6	0.1	-0.4	0.0
J30	76.2	76.2	76.6	76.2	0.0	-0.4	0.0
J31	75.9	76.0	76.4	76.0	0.1	-0.4	0.0
J32	75.9	76.0	76.4	76.0	0.1	-0.4	0.0
J33	76.7	76.9	77.1	76.9	0.2	-0.2	0.0
J34	76.3	76.3	76.5	76.3	0.0	-0.2	0.0
J35	75.3	75.3	75.5	75.3	0.0	-0.2	0.0
J36	74.5	74.5	74.7	74.5	0.0	-0.2	0.0
J37	73.1	73.1	73.4	73.2	0.0	-0.3	-0.1
J38	72.3	72.4	72.7	72.4	0.1	-0.3	0.0
J39	71.6	71.8	72.2	71.8	0.2	-0.4	0.0
J40	71.7	72.0	72.4	72.0	0.3	-0.4	0.0
J41	70.2	70.6	71.0	70.6	0.4	-0.4	0.0
J42	66.9	67.3	67.6	67.3	0.4	-0.3	0.0
J43	64.7	65.1	65.3	65.1	0.4	-0.2	0.0
J44	63.3	63.9	64.1	63.9	0.6	-0.2	0.0
J45	62.4	63.1	63.2	63.1	0.7	-0.1	0.0
J46	61.7	62.4	62.6	62.4	0.7	-0.2	0.0
J47	61.2	61.9	62.0	61.9	0.7	-0.1	0.0
J48	60.6	61.4	61.5	61.4	0.8	-0.1	0.0
J49	60.1	60.9	61.0	60.9	0.8	-0.1	0.0
J50	59.4	60.3	60.4	60.3	0.9	-0.1	0.0
J51	58.8	59.6	59.7	59.6	0.8	-0.1	0.0
J52	58.1	59.0	59.1	59.0	0.9	-0.1	0.0
J53	57.4	58.3	58.4	58.3	0.9	-0.1	0.0
J54	56.7	57.7	57.8	57.7	1.0	-0.1	0.0
J55	56.1	57.1	57.3	57.1	1.0	-0.2	0.0
J56	55.6	56.6	56.7	56.6	1.0	-0.1	0.0
J57	55.1	56.1	56.3	56.1	1.0	-0.2	0.0

Grid Point	2007 Baseline CNEL	2014 Project CNEL	2014 Alt. 1 No-Project CNEL	2014 Alt. 2 Exempt Stage 3 and 4 Aircraft CNEL	2014 Project CNEL Minus: 2007 Baseline CNEL	2014 Project CNEL Minus: 2014 Alt. 1 No-Project CNEL	2014 Project CNEL Minus: 2014 Alt. 2 Exempt Stage 3 and 4 Aircraft CNEL
J58	54.7	55.7	55.8	55.7	1.0	-0.1	0.0
J59	54.3	55.3	55.4	55.3	1.0	-0.1	0.0
J60	53.9	54.9	55.0	54.9	1.0	-0.1	0.0
J61	53.5	54.5	54.6	54.5	1.0	-0.1	0.0
J62	53.1	54.2	54.3	54.2	1.1	-0.1	0.0
J63	52.8	53.9	54.0	53.9	1.1	-0.1	0.0
J64	52.5	53.5	53.6	53.6	1.0	-0.1	-0.1
J65	52.2	53.2	53.3	53.2	1.0	-0.1	0.0
J66	51.9	52.9	53.0	52.9	1.0	-0.1	0.0
K01	57.2	58.1	58.4	58.1	0.9	-0.3	0.0
K02	57.9	58.8	59.1	58.8	0.9	-0.3	0.0
K03	58.6	59.5	59.7	59.5	0.9	-0.2	0.0
K04	59.3	60.1	60.4	60.1	0.8	-0.3	0.0
K05	60.0	60.8	61.1	60.8	0.8	-0.3	0.0
K06	60.6	61.4	61.7	61.4	0.8	-0.3	0.0
K07	61.3	62.1	62.4	62.1	0.8	-0.3	0.0
K08	62.0	62.8	63.1	62.8	0.8	-0.3	0.0
K09	62.6	63.5	63.8	63.5	0.9	-0.3	0.0
K10	63.2	64.1	64.3	64.1	0.9	-0.2	0.0
K11	63.7	64.6	64.9	64.6	0.9	-0.3	0.0
K12	64.2	65.1	65.3	65.1	0.9	-0.2	0.0
K13	64.7	65.6	65.8	65.6	0.9	-0.2	0.0
K14	65.2	66.0	66.3	66.0	0.8	-0.3	0.0
K15	65.6	66.5	66.7	66.5	0.9	-0.2	0.0
K16	66.1	66.9	67.2	66.9	0.8	-0.3	0.0
K17	66.5	67.4	67.6	67.4	0.9	-0.2	0.0
K18	67.0	67.8	68.0	67.8	0.8	-0.2	0.0
K19	67.5	68.3	68.5	68.3	0.8	-0.2	0.0
K20	68.1	68.9	69.1	68.9	0.8	-0.2	0.0
K21	68.9	69.6	69.8	69.6	0.7	-0.2	0.0
K22	69.4	70.1	70.3	70.1	0.7	-0.2	0.0
K23	70.0	70.6	70.8	70.6	0.6	-0.2	0.0
K24	71.1	71.8	72.0	71.8	0.7	-0.2	0.0
K25	72.2	72.8	73.1	72.8	0.6	-0.3	0.0
K26	72.1	72.5	72.8	72.5	0.4	-0.3	0.0
K27	71.7	71.9	72.3	71.9	0.2	-0.4	0.0
K28	71.4	71.5	71.9	71.5	0.1	-0.4	0.0
K29	71.0	71.1	71.5	71.1	0.1	-0.4	0.0
K30	70.6	70.6	71.0	70.7	0.0	-0.4	-0.1
K31	70.1	70.2	70.6	70.2	0.1	-0.4	0.0
K32	69.8	70.0	70.3	70.0	0.2	-0.3	0.0
K33	69.5	69.7	70.0	69.7	0.2	-0.3	0.0
K34	69.0	69.2	69.5	69.2	0.2	-0.3	0.0
K35	68.2	68.4	68.7	68.4	0.2	-0.3	0.0
K36	67.6	67.8	68.0	67.8	0.2	-0.2	0.0
K37	66.9	67.1	67.4	67.1	0.2	-0.3	0.0
K38	66.4	66.6	66.9	66.6	0.2	-0.3	0.0
K39	66.1	66.3	66.6	66.3	0.2	-0.3	0.0
K40	65.8	66.1	66.5	66.1	0.3	-0.4	0.0
K41	65.0	65.3	65.7	65.3	0.3	-0.4	0.0
K42	63.2	63.6	63.9	63.6	0.4	-0.3	0.0
K43	61.7	62.1	62.4	62.1	0.4	-0.3	0.0

Grid Point	2007 Baseline CNEL	2014 Project CNEL	2014 Alt. 1 No-Project CNEL	2014 Alt. 2 Exempt Stage 3 and 4 Aircraft CNEL	2014 Project CNEL Minus:		
					2007 Baseline CNEL	2014 Alt. 1 No-Project CNEL	2014 Alt. 2 Exempt Stage 3 and 4 Aircraft CNEL
K44	60.6	61.1	61.3	61.1	0.5	-0.2	0.0
K45	59.8	60.5	60.6	60.5	0.7	-0.1	0.0
K46	59.3	60.0	60.1	60.0	0.7	-0.1	0.0
K47	58.9	59.6	59.8	59.6	0.7	-0.2	0.0
K48	58.5	59.2	59.3	59.2	0.7	-0.1	0.0
K49	58.0	58.7	58.9	58.7	0.7	-0.2	0.0
K50	57.5	58.2	58.3	58.2	0.7	-0.1	0.0
K51	56.9	57.6	57.7	57.6	0.7	-0.1	0.0
K52	56.2	57.0	57.1	57.0	0.8	-0.1	0.0
K53	55.5	56.4	56.5	56.4	0.9	-0.1	0.0
K54	54.9	55.8	55.9	55.8	0.9	-0.1	0.0
K55	54.3	55.3	55.4	55.3	1.0	-0.1	0.0
K56	53.8	54.8	54.9	54.8	1.0	-0.1	0.0
K57	53.4	54.4	54.5	54.4	1.0	-0.1	0.0
K58	53.0	54.0	54.1	54.0	1.0	-0.1	0.0
K59	52.6	53.6	53.7	53.6	1.0	-0.1	0.0
K60	52.2	53.2	53.4	53.2	1.0	-0.2	0.0
K61	51.9	52.9	53.0	52.9	1.0	-0.1	0.0
K62	51.6	52.6	52.7	52.6	1.0	-0.1	0.0
K63	51.4	52.4	52.5	52.4	1.0	-0.1	0.0
K64	51.1	52.1	52.2	52.1	1.0	-0.1	0.0
K65	50.8	51.8	51.9	51.8	1.0	-0.1	0.0
K66	50.6	51.6	51.7	51.6	1.0	-0.1	0.0
L01	57.6	58.4	58.7	58.4	0.8	-0.3	0.0
L02	58.2	59.0	59.3	59.0	0.8	-0.3	0.0
L03	58.8	59.6	59.9	59.6	0.8	-0.3	0.0
L04	59.4	60.1	60.4	60.2	0.7	-0.3	-0.1
L05	59.9	60.7	61.0	60.7	0.8	-0.3	0.0
L06	60.5	61.2	61.5	61.2	0.7	-0.3	0.0
L07	61.0	61.8	62.1	61.8	0.8	-0.3	0.0
L08	61.5	62.4	62.6	62.4	0.9	-0.2	0.0
L09	62.1	62.9	63.2	62.9	0.8	-0.3	0.0
L10	62.5	63.4	63.6	63.4	0.9	-0.2	0.0
L11	62.8	63.8	64.0	63.8	1.0	-0.2	0.0
L12	63.2	64.1	64.4	64.1	0.9	-0.3	0.0
L13	63.5	64.5	64.7	64.5	1.0	-0.2	0.0
L14	63.9	64.8	65.1	64.8	0.9	-0.3	0.0
L15	64.2	65.2	65.4	65.2	1.0	-0.2	0.0
L16	64.6	65.5	65.8	65.5	0.9	-0.3	0.0
L17	64.9	65.9	66.1	65.9	1.0	-0.2	0.0
L18	65.2	66.1	66.4	66.1	0.9	-0.3	0.0
L19	65.5	66.4	66.6	66.4	0.9	-0.2	0.0
L20	65.9	66.8	67.0	66.8	0.9	-0.2	0.0
L21	66.4	67.2	67.4	67.2	0.8	-0.2	0.0
L22	66.7	67.5	67.7	67.5	0.8	-0.2	0.0
L23	67.0	67.7	67.9	67.7	0.7	-0.2	0.0
L24	67.4	68.1	68.3	68.1	0.7	-0.2	0.0
L25	67.8	68.4	68.6	68.4	0.6	-0.2	0.0
L26	67.9	68.3	68.6	68.3	0.4	-0.3	0.0
L27	67.7	68.0	68.3	68.0	0.3	-0.3	0.0
L28	67.5	67.6	68.0	67.6	0.1	-0.4	0.0
L29	67.1	67.2	67.5	67.2	0.1	-0.3	0.0

Grid Point	2007 Baseline CNEL	2014 Project CNEL	2014 Alt. 1 No-Project CNEL	2014 Alt. 2 Exempt Stage 3 and 4 Aircraft CNEL	2014 Project CNEL Minus: 2007 Baseline CNEL	2014 Project CNEL Minus: 2014 Alt. 1 No-Project CNEL	2014 Project CNEL Minus: 2014 Alt. 2 Exempt Stage 3 and 4 Aircraft CNEL
L30	66.6	66.7	67.0	66.7	0.1	-0.3	0.0
L31	66.1	66.2	66.5	66.2	0.1	-0.3	0.0
L32	65.6	65.9	66.1	65.9	0.3	-0.2	0.0
L33	65.2	65.5	65.7	65.5	0.3	-0.2	0.0
L34	64.8	65.2	65.4	65.2	0.4	-0.2	0.0
L35	64.3	64.7	64.9	64.7	0.4	-0.2	0.0
L36	63.9	64.3	64.5	64.3	0.4	-0.2	0.0
L37	63.5	63.9	64.1	63.9	0.4	-0.2	0.0
L38	63.0	63.3	63.6	63.3	0.3	-0.3	0.0
L39	62.6	62.8	63.2	62.8	0.2	-0.4	0.0
L40	62.2	62.5	62.8	62.5	0.3	-0.3	0.0
L41	61.6	61.9	62.2	61.9	0.3	-0.3	0.0
L42	60.4	60.8	61.1	60.8	0.4	-0.3	0.0
L43	59.3	59.8	60.0	59.8	0.5	-0.2	0.0
L44	58.4	58.9	59.1	58.9	0.5	-0.2	0.0
L45	57.8	58.4	58.6	58.4	0.6	-0.2	0.0
L46	57.4	58.0	58.2	58.0	0.6	-0.2	0.0
L47	57.1	57.7	57.8	57.7	0.6	-0.1	0.0
L48	56.7	57.3	57.5	57.3	0.6	-0.2	0.0
L49	56.3	56.9	57.0	56.9	0.6	-0.1	0.0
L50	55.8	56.5	56.6	56.5	0.7	-0.1	0.0
L51	55.3	56.0	56.1	56.0	0.7	-0.1	0.0
L52	54.7	55.4	55.6	55.4	0.7	-0.2	0.0
L53	54.1	54.9	55.0	54.9	0.8	-0.1	0.0
L54	53.4	54.3	54.4	54.3	0.9	-0.1	0.0
L55	52.9	53.8	53.9	53.8	0.9	-0.1	0.0
L56	52.4	53.4	53.5	53.4	1.0	-0.1	0.0
L57	52.0	52.9	53.1	52.9	0.9	-0.2	0.0
L58	51.6	52.6	52.7	52.6	1.0	-0.1	0.0
L59	51.3	52.2	52.4	52.3	0.9	-0.2	-0.1
L60	51.0	51.9	52.1	51.9	0.9	-0.2	0.0
L61	50.7	51.6	51.8	51.6	0.9	-0.2	0.0
L62	50.4	51.4	51.5	51.4	1.0	-0.1	0.0
L63	50.3	51.2	51.4	51.2	0.9	-0.2	0.0
L64	50.1	51.0	51.1	51.0	0.9	-0.1	0.0
L65	49.9	50.8	50.9	50.8	0.9	-0.1	0.0
L66	49.7	50.6	50.7	50.6	0.9	-0.1	0.0
M01	57.7	58.6	58.8	58.6	0.9	-0.2	0.0
M02	58.3	59.1	59.4	59.1	0.8	-0.3	0.0
M03	58.8	59.6	59.9	59.6	0.8	-0.3	0.0
M04	59.3	60.0	60.3	60.0	0.7	-0.3	0.0
M05	59.7	60.5	60.8	60.5	0.8	-0.3	0.0
M06	60.1	60.9	61.2	60.9	0.8	-0.3	0.0
M07	60.5	61.3	61.6	61.3	0.8	-0.3	0.0
M08	60.9	61.7	62.0	61.7	0.8	-0.3	0.0
M09	61.3	62.1	62.4	62.1	0.8	-0.3	0.0
M10	61.5	62.4	62.7	62.4	0.9	-0.3	0.0
M11	61.7	62.7	62.9	62.7	1.0	-0.2	0.0
M12	61.9	62.9	63.1	62.9	1.0	-0.2	0.0
M13	62.1	63.1	63.4	63.1	1.0	-0.3	0.0
M14	62.4	63.4	63.6	63.4	1.0	-0.2	0.0
M15	62.6	63.6	63.9	63.6	1.0	-0.3	0.0

Grid Point	2007 Baseline CNEL	2014 Project CNEL	2014 Alt. 1 No-Project CNEL	2014 Alt. 2 Exempt Stage 3 and 4 Aircraft CNEL	2014 Project CNEL Minus: 2007 Baseline CNEL	2014 Project CNEL Minus: 2014 Alt. 1 No-Project CNEL	2014 Project CNEL Minus: 2014 Alt. 2 Exempt Stage 3 and 4 Aircraft CNEL
M16	62.9	63.9	64.1	63.9	1.0	-0.2	0.0
M17	63.1	64.1	64.3	64.1	1.0	-0.2	0.0
M18	63.3	64.3	64.5	64.3	1.0	-0.2	0.0
M19	63.5	64.4	64.6	64.4	0.9	-0.2	0.0
M20	63.8	64.7	64.9	64.7	0.9	-0.2	0.0
M21	64.1	64.9	65.1	64.9	0.8	-0.2	0.0
M22	64.3	65.1	65.3	65.1	0.8	-0.2	0.0
M23	64.4	65.2	65.4	65.2	0.8	-0.2	0.0
M24	64.6	65.3	65.5	65.3	0.7	-0.2	0.0
M25	64.8	65.4	65.6	65.4	0.6	-0.2	0.0
M26	64.9	65.3	65.6	65.3	0.4	-0.3	0.0
M27	64.8	65.1	65.4	65.1	0.3	-0.3	0.0
M28	64.5	64.8	65.0	64.8	0.3	-0.2	0.0
M29	64.2	64.4	64.6	64.4	0.2	-0.2	0.0
M30	63.7	63.9	64.1	63.9	0.2	-0.2	0.0
M31	63.2	63.4	63.6	63.4	0.2	-0.2	0.0
M32	62.7	63.0	63.2	63.0	0.3	-0.2	0.0
M33	62.4	62.8	63.0	62.8	0.4	-0.2	0.0
M34	62.2	62.7	62.9	62.7	0.5	-0.2	0.0
M35	62.0	62.6	62.7	62.6	0.6	-0.1	0.0
M36	61.8	62.4	62.6	62.4	0.6	-0.2	0.0
M37	61.5	62.0	62.2	62.0	0.5	-0.2	0.0
M38	60.9	61.3	61.5	61.3	0.4	-0.2	0.0
M39	60.2	60.6	60.8	60.6	0.4	-0.2	0.0
M40	59.7	60.0	60.3	60.0	0.3	-0.3	0.0
M41	59.1	59.4	59.7	59.5	0.3	-0.3	-0.1
M42	58.3	58.6	58.9	58.6	0.3	-0.3	0.0
M43	57.4	57.8	58.1	57.8	0.4	-0.3	0.0
M44	56.7	57.2	57.4	57.2	0.5	-0.2	0.0
M45	56.2	56.7	56.9	56.7	0.5	-0.2	0.0
M46	55.9	56.4	56.6	56.4	0.5	-0.2	0.0
M47	55.7	56.2	56.3	56.2	0.5	-0.1	0.0
M48	55.3	55.8	56.0	55.8	0.5	-0.2	0.0
M49	55.0	55.5	55.6	55.5	0.5	-0.1	0.0
M50	54.6	55.1	55.3	55.1	0.5	-0.2	0.0
M51	54.2	54.7	54.8	54.7	0.5	-0.1	0.0
M52	53.7	54.3	54.4	54.3	0.6	-0.1	0.0
M53	53.0	53.7	53.8	53.7	0.7	-0.1	0.0
M54	52.4	53.2	53.3	53.2	0.8	-0.1	0.0
M55	51.9	52.7	52.8	52.7	0.8	-0.1	0.0
M56	51.4	52.3	52.4	52.3	0.9	-0.1	0.0
M57	51.0	51.9	52.0	51.9	0.9	-0.1	0.0
M58	50.7	51.6	51.7	51.6	0.9	-0.1	0.0
M59	50.4	51.3	51.5	51.3	0.9	-0.2	0.0
M60	50.1	51.0	51.2	51.0	0.9	-0.2	0.0
M61	49.8	50.8	50.9	50.8	1.0	-0.1	0.0
M62	49.7	50.6	50.8	50.6	0.9	-0.2	0.0
M63	49.6	50.5	50.6	50.5	0.9	-0.1	0.0
M64	49.4	50.3	50.5	50.3	0.9	-0.2	0.0
M65	49.3	50.2	50.3	50.2	0.9	-0.1	0.0
M66	49.1	50.0	50.2	50.0	0.9	-0.2	0.0
N01	57.8	58.6	58.9	58.6	0.8	-0.3	0.0

Grid Point	2007 Baseline CNEL	2014 Project CNEL	2014 Alt. 1 No-Project CNEL	2014 Alt. 2 Exempt Stage 3 and 4 Aircraft CNEL	2014 Project CNEL Minus: 2007 Baseline CNEL	2014 Project CNEL Minus: 2014 Alt. 1 No-Project CNEL	2014 Project CNEL Minus: 2014 Alt. 2 Exempt Stage 3 and 4 Aircraft CNEL
N02	58.3	59.1	59.4	59.1	0.8	-0.3	0.0
N03	58.8	59.5	59.8	59.5	0.7	-0.3	0.0
N04	59.2	59.8	60.2	59.8	0.6	-0.4	0.0
N05	59.5	60.2	60.5	60.2	0.7	-0.3	0.0
N06	59.8	60.4	60.8	60.5	0.6	-0.4	-0.1
N07	60.0	60.7	61.0	60.7	0.7	-0.3	0.0
N08	60.2	61.0	61.3	61.0	0.8	-0.3	0.0
N09	60.4	61.2	61.5	61.2	0.8	-0.3	0.0
N10	60.5	61.4	61.7	61.4	0.9	-0.3	0.0
N11	60.5	61.5	61.7	61.5	1.0	-0.2	0.0
N12	60.6	61.6	61.8	61.6	1.0	-0.2	0.0
N13	60.7	61.7	61.9	61.7	1.0	-0.2	0.0
N14	60.8	61.8	62.1	61.8	1.0	-0.3	0.0
N15	61.0	62.0	62.2	62.0	1.0	-0.2	0.0
N16	61.2	62.2	62.4	62.2	1.0	-0.2	0.0
N17	61.3	62.3	62.5	62.3	1.0	-0.2	0.0
N18	61.5	62.4	62.6	62.4	0.9	-0.2	0.0
N19	61.6	62.5	62.7	62.5	0.9	-0.2	0.0
N20	61.8	62.7	62.8	62.7	0.9	-0.1	0.0
N21	62.0	62.8	63.0	62.8	0.8	-0.2	0.0
N22	62.2	62.9	63.1	62.9	0.7	-0.2	0.0
N23	62.3	63.0	63.2	63.0	0.7	-0.2	0.0
N24	62.4	63.0	63.2	63.1	0.6	-0.2	-0.1
N25	62.5	63.1	63.3	63.1	0.6	-0.2	0.0
N26	62.5	63.0	63.2	63.0	0.5	-0.2	0.0
N27	62.4	62.8	63.0	62.8	0.4	-0.2	0.0
N28	62.2	62.5	62.7	62.5	0.3	-0.2	0.0
N29	61.8	62.1	62.3	62.1	0.3	-0.2	0.0
N30	61.4	61.6	61.8	61.6	0.2	-0.2	0.0
N31	60.9	61.2	61.4	61.2	0.3	-0.2	0.0
N32	60.6	61.0	61.2	61.0	0.4	-0.2	0.0
N33	60.5	61.0	61.2	61.0	0.5	-0.2	0.0
N34	60.5	61.2	61.3	61.2	0.7	-0.1	0.0
N35	60.5	61.2	61.4	61.2	0.7	-0.2	0.0
N36	60.5	61.3	61.4	61.3	0.8	-0.1	0.0
N37	60.3	61.0	61.1	61.0	0.7	-0.1	0.0
N38	59.6	60.2	60.4	60.2	0.6	-0.2	0.0
N39	58.8	59.3	59.4	59.3	0.5	-0.1	0.0
N40	58.1	58.5	58.7	58.5	0.4	-0.2	0.0
N41	57.5	57.9	58.1	57.9	0.4	-0.2	0.0
N42	56.8	57.1	57.3	57.1	0.3	-0.2	0.0
N43	56.1	56.5	56.7	56.5	0.4	-0.2	0.0
N44	55.6	56.0	56.2	56.0	0.4	-0.2	0.0
N45	55.1	55.6	55.7	55.6	0.5	-0.1	0.0
N46	54.8	55.3	55.4	55.3	0.5	-0.1	0.0
N47	54.6	55.0	55.1	55.0	0.4	-0.1	0.0
N48	54.3	54.8	54.9	54.8	0.5	-0.1	0.0
N49	54.0	54.5	54.6	54.5	0.5	-0.1	0.0
N50	53.8	54.2	54.3	54.2	0.4	-0.1	0.0
N51	53.4	53.9	54.0	53.9	0.5	-0.1	0.0
N52	53.0	53.5	53.6	53.5	0.5	-0.1	0.0
N53	52.4	53.0	53.1	53.0	0.6	-0.1	0.0

Grid Point	2007 Baseline CNEL	2014 Project CNEL	2014 Alt. 1 No-Project CNEL	2014 Alt. 2 Exempt Stage 3 and 4 Aircraft CNEL	2014 Project CNEL Minus: 2007 Baseline CNEL	2014 Alt. 1 No-Project CNEL	2014 Alt. 2 Exempt Stage 3 and 4 Aircraft CNEL
N54	51.8	52.4	52.5	52.4	0.6	-0.1	0.0
N55	51.2	52.0	52.1	52.0	0.8	-0.1	0.0
N56	50.8	51.7	51.8	51.7	0.9	-0.1	0.0
N57	50.4	51.3	51.4	51.3	0.9	-0.1	0.0
N58	50.1	51.0	51.1	51.0	0.9	-0.1	0.0
N59	49.9	50.8	50.9	50.8	0.9	-0.1	0.0
N60	49.6	50.6	50.7	50.6	1.0	-0.1	0.0
N61	49.5	50.4	50.5	50.4	0.9	-0.1	0.0
N62	49.4	50.3	50.4	50.3	0.9	-0.1	0.0
N63	49.3	50.2	50.4	50.2	0.9	-0.2	0.0
N64	49.2	50.1	50.2	50.1	0.9	-0.1	0.0
N65	49.2	50.0	50.2	50.1	0.8	-0.2	-0.1
N66	49.1	50.0	50.1	50.0	0.9	-0.1	0.0
O01	57.9	58.6	58.9	58.6	0.7	-0.3	0.0
O02	58.3	59.0	59.3	59.0	0.7	-0.3	0.0
O03	58.6	59.3	59.6	59.3	0.7	-0.3	0.0
O04	58.9	59.6	59.9	59.6	0.7	-0.3	0.0
O05	59.2	59.8	60.2	59.8	0.6	-0.4	0.0
O06	59.3	60.0	60.4	60.0	0.7	-0.4	0.0
O07	59.5	60.2	60.5	60.2	0.7	-0.3	0.0
O08	59.5	60.3	60.6	60.3	0.8	-0.3	0.0
O09	59.5	60.3	60.6	60.3	0.8	-0.3	0.0
O10	59.4	60.3	60.6	60.3	0.9	-0.3	0.0
O11	59.3	60.3	60.6	60.3	1.0	-0.3	0.0
O12	59.3	60.3	60.5	60.3	1.0	-0.2	0.0
O13	59.3	60.3	60.6	60.3	1.0	-0.3	0.0
O14	59.4	60.4	60.6	60.4	1.0	-0.2	0.0
O15	59.5	60.5	60.7	60.5	1.0	-0.2	0.0
O16	59.7	60.6	60.8	60.6	0.9	-0.2	0.0
O17	59.8	60.7	60.9	60.7	0.9	-0.2	0.0
O18	59.9	60.8	61.0	60.8	0.9	-0.2	0.0
O19	60.0	60.8	61.0	60.8	0.8	-0.2	0.0
O20	60.1	60.9	61.1	60.9	0.8	-0.2	0.0
O21	60.2	61.0	61.2	61.0	0.8	-0.2	0.0
O22	60.4	61.1	61.3	61.1	0.7	-0.2	0.0
O23	60.5	61.2	61.4	61.2	0.7	-0.2	0.0
O24	60.6	61.2	61.4	61.2	0.6	-0.2	0.0
O25	60.7	61.3	61.4	61.3	0.6	-0.1	0.0
O26	60.7	61.2	61.4	61.2	0.5	-0.2	0.0
O27	60.6	61.0	61.2	61.0	0.4	-0.2	0.0
O28	60.4	60.8	61.0	60.8	0.4	-0.2	0.0
O29	60.1	60.4	60.6	60.4	0.3	-0.2	0.0
O30	59.7	60.0	60.2	60.0	0.3	-0.2	0.0
O31	59.3	59.7	59.8	59.7	0.4	-0.1	0.0
O32	59.2	59.6	59.8	59.6	0.4	-0.2	0.0
O33	59.3	59.9	60.0	59.9	0.6	-0.1	0.0
O34	59.5	60.3	60.4	60.3	0.8	-0.1	0.0
O35	59.7	60.5	60.5	60.5	0.8	0.0	0.0
O36	59.7	60.6	60.6	60.6	0.9	0.0	0.0
O37	59.6	60.4	60.5	60.4	0.8	-0.1	0.0
O38	59.0	59.7	59.8	59.7	0.7	-0.1	0.0
O39	58.1	58.6	58.8	58.7	0.5	-0.2	-0.1

Grid Point	2007 Baseline CNEL	2014 Project CNEL	2014 Alt. 1 No-Project CNEL	2014 Alt. 2 Exempt Stage 3 and 4 Aircraft CNEL	2014 Project CNEL Minus: 2007 Baseline CNEL	2014 Project CNEL Minus: 2014 Alt. 1 No-Project CNEL	2014 Project CNEL Minus: 2014 Alt. 2 Exempt Stage 3 and 4 Aircraft CNEL
O40	57.2	57.7	57.9	57.7	0.5	-0.2	0.0
O41	56.6	57.1	57.2	57.1	0.5	-0.1	0.0
O42	56.0	56.4	56.6	56.4	0.4	-0.2	0.0
O43	55.4	55.8	56.0	55.8	0.4	-0.2	0.0
O44	54.9	55.3	55.5	55.3	0.4	-0.2	0.0
O45	54.6	55.0	55.1	55.0	0.4	-0.1	0.0
O46	54.3	54.7	54.8	54.7	0.4	-0.1	0.0
O47	54.0	54.4	54.5	54.4	0.4	-0.1	0.0
O48	53.8	54.2	54.3	54.2	0.4	-0.1	0.0
O49	53.6	54.0	54.1	54.0	0.4	-0.1	0.0
O50	53.4	53.8	53.9	53.8	0.4	-0.1	0.0
O51	53.1	53.5	53.6	53.5	0.4	-0.1	0.0
O52	52.6	53.1	53.2	53.1	0.5	-0.1	0.0
O53	52.1	52.6	52.7	52.6	0.5	-0.1	0.0
O54	51.5	52.1	52.2	52.1	0.6	-0.1	0.0
O55	51.0	51.8	51.9	51.8	0.8	-0.1	0.0
O56	50.6	51.4	51.5	51.4	0.8	-0.1	0.0
O57	50.3	51.1	51.3	51.1	0.8	-0.2	0.0
O58	50.1	50.9	51.0	50.9	0.8	-0.1	0.0
O59	49.9	50.8	50.9	50.8	0.9	-0.1	0.0
O60	49.7	50.6	50.7	50.6	0.9	-0.1	0.0
O61	49.6	50.5	50.6	50.5	0.9	-0.1	0.0
O62	49.6	50.6	50.7	50.6	1.0	-0.1	0.0
O63	49.6	50.5	50.6	50.5	0.9	-0.1	0.0
O64	49.6	50.5	50.6	50.5	0.9	-0.1	0.0
O65	49.6	50.5	50.6	50.5	0.9	-0.1	0.0
O66	49.6	50.5	50.6	50.5	0.9	-0.1	0.0
P01	57.9	58.6	58.9	58.6	0.7	-0.3	0.0
P02	58.2	58.9	59.2	58.9	0.7	-0.3	0.0
P03	58.5	59.1	59.5	59.2	0.6	-0.4	-0.1
P04	58.7	59.4	59.7	59.4	0.7	-0.3	0.0
P05	58.8	59.5	59.8	59.5	0.7	-0.3	0.0
P06	58.9	59.6	59.9	59.6	0.7	-0.3	0.0
P07	58.9	59.6	59.9	59.6	0.7	-0.3	0.0
P08	58.8	59.5	59.8	59.5	0.7	-0.3	0.0
P09	58.6	59.4	59.7	59.4	0.8	-0.3	0.0
P10	58.4	59.3	59.6	59.3	0.9	-0.3	0.0
P11	58.3	59.2	59.5	59.2	0.9	-0.3	0.0
P12	58.2	59.1	59.4	59.1	0.9	-0.3	0.0
P13	58.1	59.1	59.3	59.1	1.0	-0.2	0.0
P14	58.2	59.1	59.4	59.1	0.9	-0.3	0.0
P15	58.3	59.2	59.4	59.2	0.9	-0.2	0.0
P16	58.4	59.3	59.5	59.3	0.9	-0.2	0.0
P17	58.5	59.4	59.6	59.4	0.9	-0.2	0.0
P18	58.6	59.4	59.6	59.4	0.8	-0.2	0.0
P19	58.6	59.5	59.6	59.5	0.9	-0.1	0.0
P20	58.7	59.5	59.7	59.5	0.8	-0.2	0.0
P21	58.9	59.6	59.8	59.6	0.7	-0.2	0.0
P22	59.0	59.7	59.9	59.7	0.7	-0.2	0.0
P23	59.2	59.8	60.0	59.8	0.6	-0.2	0.0
P24	59.3	59.9	60.1	59.9	0.6	-0.2	0.0
P25	59.4	60.0	60.1	60.0	0.6	-0.1	0.0

Grid Point	2007 Baseline CNEL	2014 Project CNEL	2014 Alt. 1 No-Project CNEL	2014 Alt. 2 Exempt Stage 3 and 4 Aircraft CNEL	2014 Project CNEL Minus: 2007 Baseline CNEL	2014 Project CNEL Minus: 2014 Alt. 1 No-Project CNEL	2014 Project CNEL Minus: 2014 Alt. 2 Exempt Stage 3 and 4 Aircraft CNEL
P26	59.5	60.0	60.1	60.0	0.5	-0.1	0.0
P27	59.4	59.8	60.0	59.8	0.4	-0.2	0.0
P28	59.2	59.6	59.8	59.6	0.4	-0.2	0.0
P29	58.9	59.3	59.4	59.3	0.4	-0.1	0.0
P30	58.6	58.9	59.1	59.0	0.3	-0.2	-0.1
P31	58.3	58.7	58.9	58.8	0.4	-0.2	-0.1
P32	58.3	58.8	58.9	58.8	0.5	-0.1	0.0
P33	58.6	59.3	59.4	59.3	0.7	-0.1	0.0
P34	59.0	59.8	59.9	59.8	0.8	-0.1	0.0
P35	59.2	60.0	60.1	60.0	0.8	-0.1	0.0
P36	59.3	60.1	60.2	60.1	0.8	-0.1	0.0
P37	59.2	60.0	60.1	60.0	0.8	-0.1	0.0
P38	58.7	59.5	59.6	59.5	0.8	-0.1	0.0
P39	57.9	58.5	58.6	58.5	0.6	-0.1	0.0
P40	57.0	57.5	57.6	57.5	0.5	-0.1	0.0
P41	56.3	56.7	56.9	56.7	0.4	-0.2	0.0
P42	55.8	56.2	56.3	56.2	0.4	-0.1	0.0
P43	55.2	55.6	55.8	55.6	0.4	-0.2	0.0
P44	54.8	55.2	55.3	55.2	0.4	-0.1	0.0
P45	54.5	54.9	55.0	54.9	0.4	-0.1	0.0
P46	54.2	54.6	54.7	54.6	0.4	-0.1	0.0
P47	54.0	54.3	54.4	54.3	0.3	-0.1	0.0
P48	53.8	54.2	54.3	54.2	0.4	-0.1	0.0
P49	53.7	54.1	54.1	54.1	0.4	0.0	0.0
P50	53.4	53.8	53.9	53.8	0.4	-0.1	0.0
P51	53.1	53.5	53.6	53.5	0.4	-0.1	0.0
P52	52.7	53.1	53.2	53.1	0.4	-0.1	0.0
P53	52.2	52.7	52.8	52.7	0.5	-0.1	0.0
P54	51.7	52.4	52.4	52.4	0.7	0.0	0.0
P55	51.3	52.1	52.1	52.1	0.8	0.0	0.0
P56	51.0	51.8	51.9	51.8	0.8	-0.1	0.0
P57	50.7	51.6	51.7	51.6	0.9	-0.1	0.0
P58	50.6	51.5	51.6	51.5	0.9	-0.1	0.0
P59	50.5	51.4	51.5	51.4	0.9	-0.1	0.0
P60	50.4	51.4	51.4	51.4	1.0	0.0	0.0
P61	50.4	51.4	51.5	51.4	1.0	-0.1	0.0
P62	50.5	51.5	51.5	51.5	1.0	0.0	0.0
P63	50.5	51.4	51.5	51.4	0.9	-0.1	0.0
P64	50.6	51.5	51.6	51.5	0.9	-0.1	0.0
P65	50.6	51.5	51.6	51.5	0.9	-0.1	0.0
P66	50.6	51.5	51.6	51.5	0.9	-0.1	0.0
Q01	57.9	58.6	58.9	58.6	0.7	-0.3	0.0
Q02	58.1	58.8	59.1	58.8	0.7	-0.3	0.0
Q03	58.4	59.0	59.3	59.0	0.6	-0.3	0.0
Q04	58.5	59.1	59.5	59.1	0.6	-0.4	0.0
Q05	58.5	59.2	59.5	59.2	0.7	-0.3	0.0
Q06	58.5	59.2	59.5	59.2	0.7	-0.3	0.0
Q07	58.4	59.1	59.4	59.1	0.7	-0.3	0.0
Q08	58.1	58.9	59.2	58.9	0.8	-0.3	0.0
Q09	57.8	58.6	58.9	58.6	0.8	-0.3	0.0
Q10	57.5	58.4	58.7	58.4	0.9	-0.3	0.0
Q11	57.3	58.3	58.5	58.3	1.0	-0.2	0.0

Grid Point	2007 Baseline CNEL	2014 Project CNEL	2014 Alt. 1 No-Project CNEL	2014 Alt. 2 Exempt Stage 3 and 4 Aircraft CNEL	2014 Project CNEL Minus: 2007 Baseline CNEL	2014 Project CNEL Minus: 2014 Alt. 1 No-Project CNEL	2014 Project CNEL Minus: 2014 Alt. 2 Exempt Stage 3 and 4 Aircraft CNEL
Q12	57.2	58.1	58.4	58.1	0.9	-0.3	0.0
Q13	57.1	58.1	58.3	58.1	1.0	-0.2	0.0
Q14	57.2	58.1	58.3	58.1	0.9	-0.2	0.0
Q15	57.3	58.2	58.4	58.2	0.9	-0.2	0.0
Q16	57.4	58.3	58.5	58.3	0.9	-0.2	0.0
Q17	57.6	58.4	58.5	58.4	0.8	-0.1	0.0
Q18	57.7	58.5	58.6	58.5	0.8	-0.1	0.0
Q19	57.7	58.5	58.7	58.5	0.8	-0.2	0.0
Q20	57.8	58.6	58.7	58.6	0.8	-0.1	0.0
Q21	57.9	58.7	58.8	58.7	0.8	-0.1	0.0
Q22	58.1	58.8	58.9	58.8	0.7	-0.1	0.0
Q23	58.3	58.9	59.0	58.9	0.6	-0.1	0.0
Q24	58.5	59.1	59.2	59.1	0.6	-0.1	0.0
Q25	58.6	59.2	59.3	59.2	0.6	-0.1	0.0
Q26	58.7	59.2	59.3	59.2	0.5	-0.1	0.0
Q27	58.6	59.1	59.2	59.1	0.5	-0.1	0.0
Q28	58.5	58.9	59.0	58.9	0.4	-0.1	0.0
Q29	58.2	58.6	58.7	58.6	0.4	-0.1	0.0
Q30	57.9	58.4	58.5	58.4	0.5	-0.1	0.0
Q31	57.8	58.3	58.4	58.3	0.5	-0.1	0.0
Q32	57.9	58.5	58.6	58.5	0.6	-0.1	0.0
Q33	58.3	59.0	59.1	59.0	0.7	-0.1	0.0
Q34	58.8	59.6	59.6	59.6	0.8	0.0	0.0
Q35	58.9	59.8	59.8	59.8	0.9	0.0	0.0
Q36	59.0	59.9	59.9	59.9	0.9	0.0	0.0
Q37	59.0	59.8	59.9	59.8	0.8	-0.1	0.0
Q38	58.6	59.4	59.5	59.4	0.8	-0.1	0.0
Q39	57.9	58.6	58.7	58.6	0.7	-0.1	0.0
Q40	57.1	57.6	57.7	57.7	0.5	-0.1	-0.1
Q41	56.4	56.9	57.0	56.9	0.5	-0.1	0.0
Q42	55.9	56.3	56.4	56.3	0.4	-0.1	0.0
Q43	55.5	55.9	56.0	55.9	0.4	-0.1	0.0
Q44	55.1	55.5	55.6	55.5	0.4	-0.1	0.0
Q45	54.8	55.2	55.3	55.2	0.4	-0.1	0.0
Q46	54.6	55.0	55.0	55.0	0.4	0.0	0.0
Q47	54.3	54.7	54.8	54.7	0.4	-0.1	0.0
Q48	54.2	54.5	54.6	54.6	0.3	-0.1	-0.1
Q49	54.1	54.4	54.5	54.4	0.3	-0.1	0.0
Q50	53.8	54.2	54.3	54.2	0.4	-0.1	0.0
Q51	53.5	53.9	54.0	53.9	0.4	-0.1	0.0
Q52	53.1	53.7	53.7	53.7	0.6	0.0	0.0
Q53	52.7	53.3	53.4	53.3	0.6	-0.1	0.0
Q54	52.3	53.0	53.1	53.0	0.7	-0.1	0.0
Q55	52.0	52.8	52.9	52.8	0.8	-0.1	0.0
Q56	51.8	52.6	52.7	52.6	0.8	-0.1	0.0
Q57	51.6	52.5	52.6	52.5	0.9	-0.1	0.0
Q58	51.5	52.5	52.6	52.5	1.0	-0.1	0.0
Q59	51.5	52.5	52.6	52.5	1.0	-0.1	0.0
Q60	51.5	52.5	52.6	52.5	1.0	-0.1	0.0
Q61	51.6	52.6	52.7	52.6	1.0	-0.1	0.0
Q62	51.7	52.7	52.8	52.7	1.0	-0.1	0.0
Q63	51.6	52.6	52.7	52.6	1.0	-0.1	0.0

Grid Point	2007 Baseline CNEL	2014 Project CNEL	2014 Alt. 1 No-Project CNEL	2014 Alt. 2 Exempt Stage 3 and 4 Aircraft CNEL	2014 Project CNEL Minus: 2007 Baseline CNEL	2014 Project CNEL Minus: 2014 Alt. 1 No-Project CNEL	2014 Project CNEL Minus: 2014 Alt. 2 Exempt Stage 3 and 4 Aircraft CNEL
Q64	51.7	52.7	52.8	52.7	1.0	-0.1	0.0
Q65	51.7	52.7	52.7	52.7	1.0	0.0	0.0
Q66	51.7	52.7	52.7	52.7	1.0	0.0	0.0
R01	57.9	58.6	58.9	58.6	0.7	-0.3	0.0
R02	58.1	58.8	59.1	58.8	0.7	-0.3	0.0
R03	58.2	58.9	59.2	58.9	0.7	-0.3	0.0
R04	58.3	59.0	59.3	59.0	0.7	-0.3	0.0
R05	58.3	58.9	59.2	58.9	0.6	-0.3	0.0
R06	58.1	58.8	59.1	58.8	0.7	-0.3	0.0
R07	57.9	58.6	58.9	58.6	0.7	-0.3	0.0
R08	57.5	58.3	58.6	58.3	0.8	-0.3	0.0
R09	57.2	58.0	58.3	58.0	0.8	-0.3	0.0
R10	56.9	57.7	58.0	57.8	0.8	-0.3	-0.1
R11	56.6	57.5	57.8	57.6	0.9	-0.3	-0.1
R12	56.5	57.4	57.6	57.4	0.9	-0.2	0.0
R13	56.4	57.3	57.5	57.3	0.9	-0.2	0.0
R14	56.5	57.4	57.6	57.4	0.9	-0.2	0.0
R15	56.6	57.5	57.6	57.5	0.9	-0.1	0.0
R16	56.8	57.6	57.7	57.6	0.8	-0.1	0.0
R17	56.9	57.7	57.9	57.7	0.8	-0.2	0.0
R18	57.1	57.8	57.9	57.8	0.7	-0.1	0.0
R19	57.2	57.9	58.0	57.9	0.7	-0.1	0.0
R20	57.3	57.9	58.1	57.9	0.6	-0.2	0.0
R21	57.4	58.0	58.1	58.0	0.6	-0.1	0.0
R22	57.5	58.2	58.3	58.2	0.7	-0.1	0.0
R23	57.7	58.4	58.4	58.4	0.7	0.0	0.0
R24	58.0	58.6	58.7	58.6	0.6	-0.1	0.0
R25	58.2	58.7	58.8	58.7	0.5	-0.1	0.0
R26	58.2	58.8	58.9	58.8	0.6	-0.1	0.0
R27	58.2	58.7	58.8	58.7	0.5	-0.1	0.0
R28	58.1	58.6	58.7	58.6	0.5	-0.1	0.0
R29	57.9	58.3	58.4	58.3	0.4	-0.1	0.0
R30	57.6	58.1	58.2	58.1	0.5	-0.1	0.0
R31	57.6	58.1	58.2	58.1	0.5	-0.1	0.0
R32	57.8	58.4	58.5	58.4	0.6	-0.1	0.0
R33	58.2	59.0	59.0	59.0	0.8	0.0	0.0
R34	58.7	59.5	59.5	59.5	0.8	0.0	0.0
R35	58.8	59.6	59.7	59.6	0.8	-0.1	0.0
R36	58.8	59.7	59.7	59.7	0.9	0.0	0.0
R37	58.8	59.6	59.7	59.6	0.8	-0.1	0.0
R38	58.6	59.3	59.4	59.3	0.7	-0.1	0.0
R39	58.0	58.7	58.8	58.7	0.7	-0.1	0.0
R40	57.3	57.9	58.0	57.9	0.6	-0.1	0.0
R41	56.7	57.2	57.3	57.2	0.5	-0.1	0.0
R42	56.2	56.7	56.8	56.7	0.5	-0.1	0.0
R43	55.9	56.3	56.4	56.3	0.4	-0.1	0.0
R44	55.6	56.0	56.1	56.0	0.4	-0.1	0.0
R45	55.3	55.7	55.8	55.7	0.4	-0.1	0.0
R46	55.1	55.5	55.5	55.5	0.4	0.0	0.0
R47	54.8	55.2	55.3	55.2	0.4	-0.1	0.0
R48	54.6	55.1	55.1	55.1	0.5	0.0	0.0
R49	54.5	54.9	55.0	54.9	0.4	-0.1	0.0

Grid Point	2007 Baseline CNEL	2014 Project CNEL	2014 Alt. 1 No-Project CNEL	2014 Alt. 2 Exempt Stage 3 and 4 Aircraft CNEL	2014 Project CNEL Minus: 2007 Baseline CNEL	2014 Project CNEL Minus: 2014 Alt. 1 No-Project CNEL	2014 Project CNEL Minus: 2014 Alt. 2 Exempt Stage 3 and 4 Aircraft CNEL
R50	54.2	54.7	54.8	54.7	0.5	-0.1	0.0
R51	53.9	54.5	54.5	54.5	0.6	0.0	0.0
R52	53.6	54.3	54.3	54.3	0.7	0.0	0.0
R53	53.3	54.0	54.1	54.0	0.7	-0.1	0.0
R54	53.0	53.8	53.9	53.8	0.8	-0.1	0.0
R55	52.7	53.6	53.7	53.6	0.9	-0.1	0.0
R56	52.6	53.5	53.6	53.5	0.9	-0.1	0.0
R57	52.5	53.5	53.5	53.5	1.0	0.0	0.0
R58	52.5	53.5	53.5	53.5	1.0	0.0	0.0
R59	52.5	53.5	53.6	53.5	1.0	-0.1	0.0
R60	52.5	53.5	53.6	53.5	1.0	-0.1	0.0
R61	52.6	53.6	53.7	53.6	1.0	-0.1	0.0
R62	52.6	53.7	53.7	53.7	1.1	0.0	0.0
R63	52.4	53.5	53.5	53.5	1.1	0.0	0.0
R64	52.5	53.6	53.6	53.6	1.1	0.0	0.0
R65	52.4	53.4	53.5	53.4	1.0	-0.1	0.0
R66	52.3	53.3	53.4	53.3	1.0	-0.1	0.0
S01	57.9	58.6	58.9	58.6	0.7	-0.3	0.0
S02	58.1	58.8	59.0	58.8	0.7	-0.2	0.0
S03	58.2	58.8	59.1	58.8	0.6	-0.3	0.0
S04	58.1	58.8	59.1	58.8	0.7	-0.3	0.0
S05	58.0	58.7	59.0	58.7	0.7	-0.3	0.0
S06	57.8	58.5	58.8	58.5	0.7	-0.3	0.0
S07	57.5	58.2	58.5	58.2	0.7	-0.3	0.0
S08	57.1	57.9	58.2	57.9	0.8	-0.3	0.0
S09	56.8	57.6	57.9	57.6	0.8	-0.3	0.0
S10	56.4	57.3	57.6	57.3	0.9	-0.3	0.0
S11	56.2	57.1	57.3	57.1	0.9	-0.2	0.0
S12	56.0	56.9	57.1	56.9	0.9	-0.2	0.0
S13	55.9	56.9	57.0	56.9	1.0	-0.1	0.0
S14	56.0	56.9	57.1	56.9	0.9	-0.2	0.0
S15	56.2	57.0	57.2	57.0	0.8	-0.2	0.0
S16	56.4	57.2	57.3	57.2	0.8	-0.1	0.0
S17	56.6	57.3	57.4	57.3	0.7	-0.1	0.0
S18	56.7	57.4	57.5	57.4	0.7	-0.1	0.0
S19	56.8	57.5	57.6	57.5	0.7	-0.1	0.0
S20	56.9	57.6	57.7	57.6	0.7	-0.1	0.0
S21	57.1	57.7	57.8	57.7	0.6	-0.1	0.0
S22	57.3	57.9	58.0	57.9	0.6	-0.1	0.0
S23	57.5	58.1	58.2	58.1	0.6	-0.1	0.0
S24	57.8	58.4	58.5	58.4	0.6	-0.1	0.0
S25	58.0	58.6	58.7	58.6	0.6	-0.1	0.0
S26	58.1	58.7	58.8	58.7	0.6	-0.1	0.0
S27	58.1	58.7	58.7	58.7	0.6	0.0	0.0
S28	58.0	58.5	58.6	58.5	0.5	-0.1	0.0
S29	57.8	58.3	58.4	58.3	0.5	-0.1	0.0
S30	57.6	58.1	58.2	58.1	0.5	-0.1	0.0
S31	57.6	58.2	58.3	58.2	0.6	-0.1	0.0
S32	57.9	58.5	58.6	58.5	0.6	-0.1	0.0
S33	58.3	59.0	59.0	59.0	0.7	0.0	0.0
S34	58.6	59.4	59.4	59.4	0.8	0.0	0.0
S35	58.6	59.4	59.5	59.4	0.8	-0.1	0.0

Grid Point	2007 Baseline CNEL	2014 Project CNEL	2014 Alt. 1 No-Project CNEL	2014 Alt. 2 Exempt Stage 3 and 4 Aircraft CNEL	2014 Project CNEL Minus: 2007 Baseline CNEL	2014 Project CNEL Minus: 2014 Alt. 1 No-Project CNEL	2014 Project CNEL Minus: 2014 Alt. 2 Exempt Stage 3 and 4 Aircraft CNEL
S36	58.6	59.4	59.5	59.4	0.8	-0.1	0.0
S37	58.6	59.4	59.4	59.4	0.8	0.0	0.0
S38	58.4	59.2	59.2	59.2	0.8	0.0	0.0
S39	58.0	58.7	58.7	58.7	0.7	0.0	0.0
S40	57.4	58.0	58.1	58.0	0.6	-0.1	0.0
S41	56.9	57.5	57.6	57.5	0.6	-0.1	0.0
S42	56.5	57.0	57.1	57.0	0.5	-0.1	0.0
S43	56.2	56.7	56.7	56.7	0.5	0.0	0.0
S44	55.9	56.4	56.5	56.4	0.5	-0.1	0.0
S45	55.6	56.1	56.2	56.1	0.5	-0.1	0.0
S46	55.4	55.9	55.9	55.9	0.5	0.0	0.0
S47	55.2	55.7	55.7	55.7	0.5	0.0	0.0
S48	55.0	55.5	55.6	55.5	0.5	-0.1	0.0
S49	54.8	55.4	55.4	55.4	0.6	0.0	0.0
S50	54.5	55.2	55.2	55.2	0.7	0.0	0.0
S51	54.3	55.0	55.0	55.0	0.7	0.0	0.0
S52	54.0	54.8	54.8	54.8	0.8	0.0	0.0
S53	53.8	54.6	54.6	54.6	0.8	0.0	0.0
S54	53.5	54.4	54.5	54.4	0.9	-0.1	0.0
S55	53.4	54.3	54.4	54.3	0.9	-0.1	0.0
S56	53.2	54.2	54.3	54.2	1.0	-0.1	0.0
S57	53.1	54.2	54.2	54.2	1.1	0.0	0.0
S58	53.1	54.1	54.2	54.1	1.0	-0.1	0.0
S59	53.1	54.1	54.2	54.1	1.0	-0.1	0.0
S60	53.0	54.1	54.1	54.1	1.1	0.0	0.0
S61	53.0	54.0	54.1	54.0	1.0	-0.1	0.0
S62	53.1	54.2	54.2	54.2	1.1	0.0	0.0
S63	52.9	54.0	54.0	54.0	1.1	0.0	0.0
S64	52.8	53.8	53.9	53.8	1.0	-0.1	0.0
S65	52.6	53.6	53.6	53.6	1.0	0.0	0.0
S66	52.4	53.4	53.5	53.4	1.0	-0.1	0.0

B.8

SUPPLEMENTAL BERKELEY JETS ANALYSIS

B.8.1 Introduction

This appendix presents additional analysis to supplement the "Berkeley Jets" single-event noise analysis discussed in Section 10.2.

Specifically, this section presents analysis to take into consideration the fact that the operations that would be diverted to other airports from VNY under the proposed project and Alternative 2 (Exempted Stage 3 and 4 Aircraft Alternative) would be in relatively noisy aircraft. To take this factor into account, the number and frequency of potential diversions were categorized according to their relative "noisiness" and compared to the underlying frequency of operations at the airports in the same categories. The fundamental purpose of this supplemental analysis was to determine whether the diversions would result in a dramatic shift in the overall distribution of operations by noisiness. The result of this additional analysis was consistent with the preceding AEM and overall statistical reviews (i.e., the diversions would not result in a significant change in activity at the airports).

Summary of Methodology

Information on numbers of operations and associated sound levels is provided for each of the five diversion airports by time of day (day, evening, and night) for the forecast year (2014 or 2016, as discussed in Section 1.4 of the EIR) that is relevant to each airport.

Single-event noise exposure is presented in terms of the departure Sound Exposure Level (SEL). As discussed in appendix section B.5.7, SEL is the most commonly used measure of the total noise exposure associated with an individual aircraft noise event. Departure SEL values are used because they generally are louder, affect more people, and are more likely to be noticed than arrival levels; therefore, use of departure SELs presents "worst-case" information.

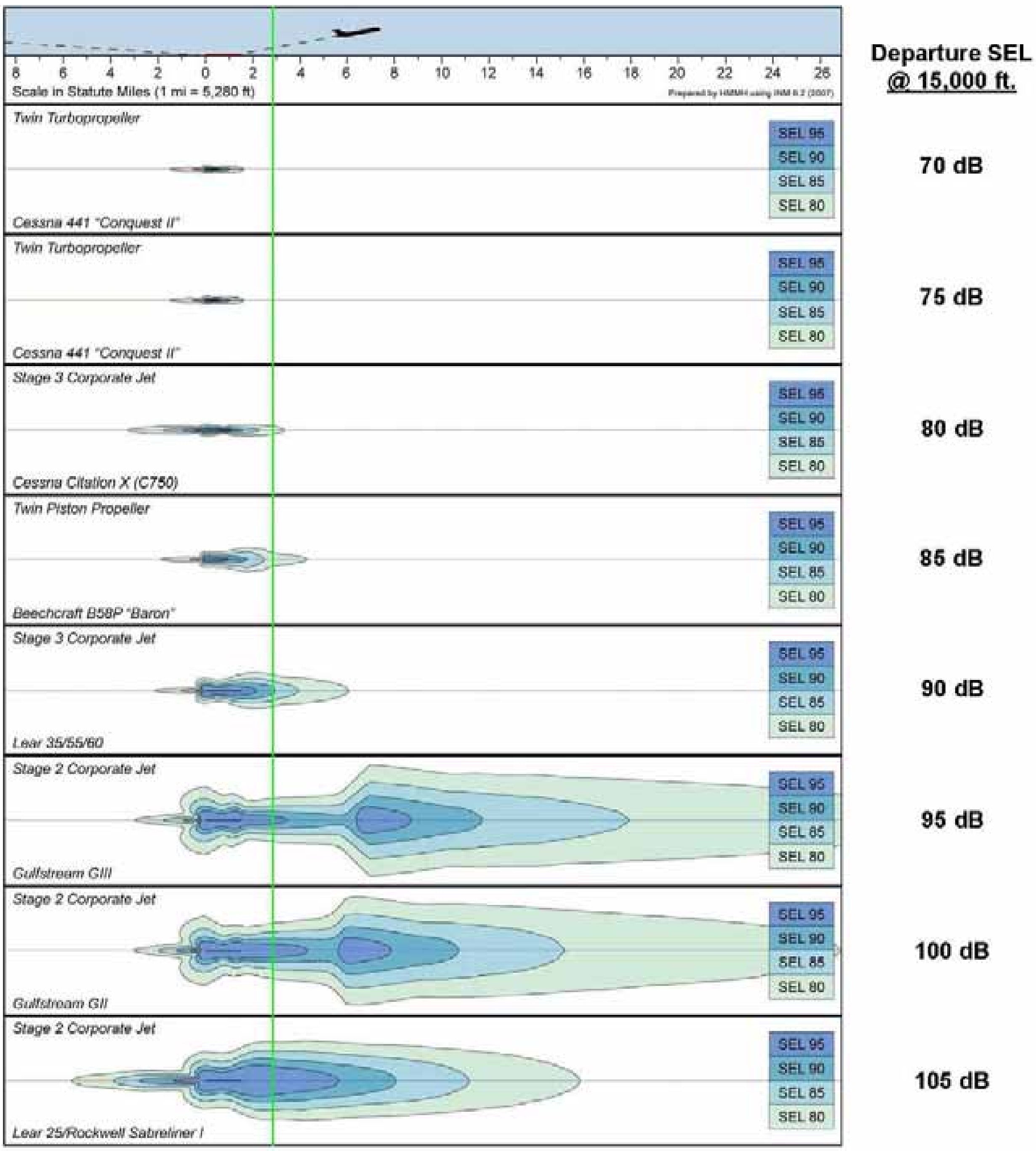
Obviously, the SEL values vary depending on location. To examine the noise levels of single events, selection of a specific location is necessary and appropriate. Hence, the SEL values are those estimated to occur 15,000 feet from the start of the takeoff roll, directly under the flight path. This location is selected to be neither very close to nor too distant from an airport.

Figure B.8.1 shows the SEL "footprint" of aircraft that produce different sound levels at 15,000 feet from start of takeoff. They are sorted by the level at this distance, and the vertical line identifies this 15,000-foot distance. (For reference, an SEL of 70 dB is about the sound level that just starts to produce some speech interference.) These plots may not be exactly the shapes of the sound levels produced by diverted aircraft, but they do show how different the areas of sound exposure can be. Note that for two of the loudest jets (Gulfstream II and Gulfstream III), the footprint shows an increase of thrust occurring at about 6 miles. This increase in thrust may not occur for all diverted jets that produce these sound levels.

In the following sections, fleet mixes and operations numbers by single-event levels are summarized for each potential diversion airport. An initial table gives the baseline and diverted fleet mixes in percentages by common aircraft category. This table shows how the diverted fleet compares with the existing fleet. It also permits some interpretation of the following charts and tables that give the distribution of SEL values for the existing and diverted fleets. Next, a figure shows the distances to 15,000 feet from start of takeoff for each runway of the subject airport.

Finally, for day, evening, and night (when there are diverted operations in each of those periods), bar charts show the distribution of SEL values for the baseline fleet (no diversions) and for both the baseline and the diversion fleet, and a table gives the numbers of operations and the percent increases for each SEL value.

Figure B.8.1 Comparison of SEL Values Produced by Aircraft Types with Noise Levels at 15,000 Feet from Start of Takeoff Roll Similar to the SEL Values of Diverted Types
Source: HMMH



Los Angeles International Airport (LAX)

Table B.8.1 provides relative fleet mixes for baseline and diverted operations for LAX. This table shows that most baseline daytime operations, before diverted aircraft use the airport, are either air carrier jets or regional jets (66% and 23%, respectively, during the day). The aircraft expected to be diverted to LAX from VNY during the day would be primarily business jets and air carrier jets.

Table B.8.1 Baseline and Diverted Fleet Mixes for LAX

Source: HMMH

	LAX Departure Operations Distribution by Aircraft Group					
	Day (7 a.m.–7 p.m.)		Evening (7 p.m.–10 p.m.)		Night (10 p.m.–7 a.m.)	
Aircraft Group	**Baseline**	**Diverted**	**Baseline**	**Diverted**	**Baseline**	**Diverted**
Business Jets	4%	77%	2%	11%	2%	100%
Regional Jets	23%	--	24%	--	11%	--
Air Carrier Jets	66%	23%	62%	89%	82%	--
Turboprop Aircraft	1%	--	3%	--	< 1%	--
Propeller Aircraft	< 1%	--	< 1%	--	< 1%	--
Military Aircraft	5%	--	8%	--	2%	--
Helicopters	< 1%	--	--	--	2%	--
Total	100%	100%	100%	100%	100%	100%

Figure B.8.2 identifies the regions that are 15,000 feet from start of takeoff roll (the departure SEL values are given in the following figures and tables).

Figure B.8.3 and Figure B.8.4 show the distributions of the SEL values for the two conditions—baseline with no diversions and baseline compared to diversions. Each bar, with its labels, shows how many departures on an average day will produce SEL values in each of the ranges shown, from 70 dB to 110 dB. Note that because diverted operations are so few compared with the baseline, Figure B.8.4 must have an expanded vertical axis to make the numbers of diverted operations visible.

While the diverted operations produce SEL values comparable to the higher baseline levels, there are relatively few diverted operations; all diverted operations are much less than one per day. Table B.8.2 is provided to help interpret such small numbers of operations. When total departures are less than one, the column "Days Between" translates the number of operations into how many days will occur between each operation at the given value of SEL. Hence, departures that produce SEL in the range of 90 dB will occur approximately every 273 days. The last column gives the percent increase in departures in each SEL range that results from the diverted operations. The following two pages provide similar information for evening and night departures.

It should be noted that this diversion analysis applies only to the proposed project, since no aircraft would be diverted to LAX under either Alternative 1 (No-Project Alternative) or Alternative 2 (Exempted Stage 3 and 4 Aircraft Alternative).

Figure B.8.2 LAX—Regions 15,000 feet from Start of Takeoff Roll
(Source: HMMH)

Figure B.8.3 LAX—Daytime Distribution of Baseline SEL Values
Source: HMMH

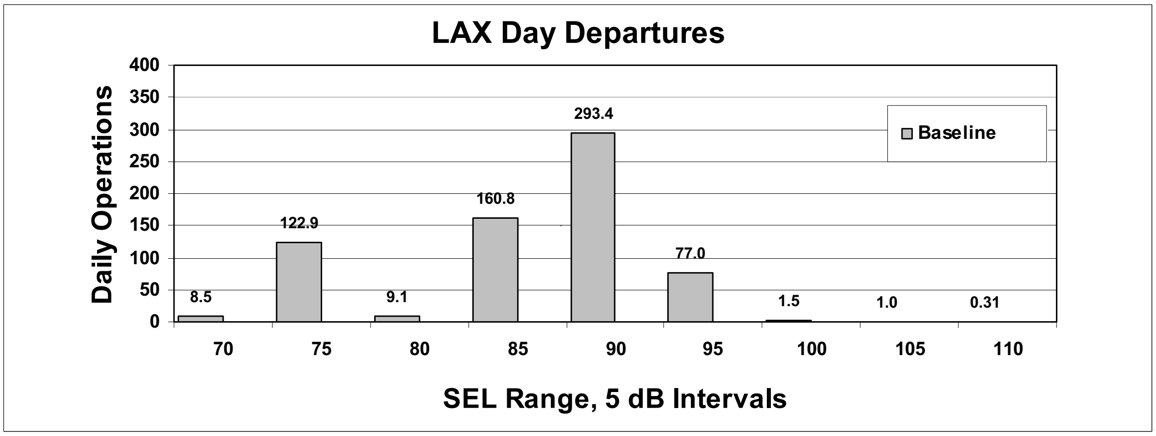


Figure B.8.4 LAX—Daytime Distributions of Baseline and Diverted SEL Values
Source: HMMH

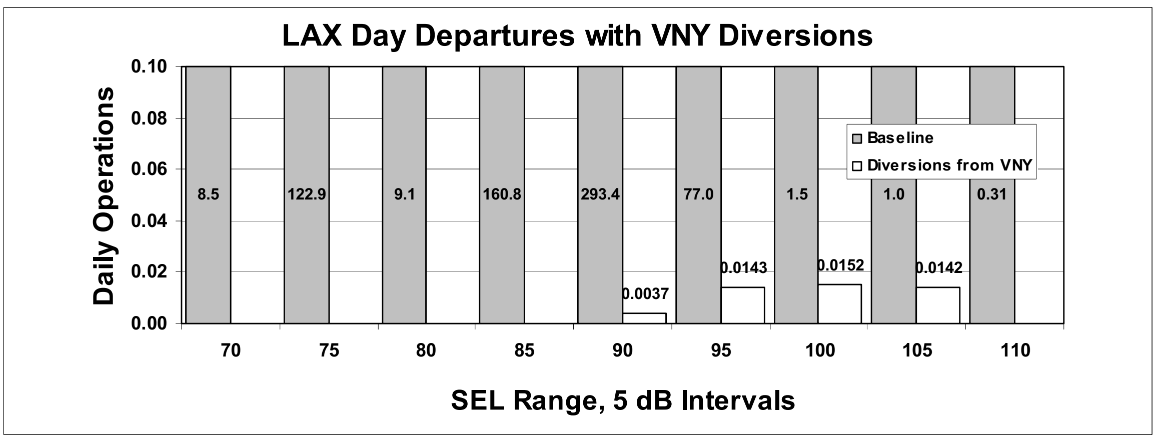


Table B.8.2 LAX—Average Day (7 a.m.–7 p.m.) Departures with and without Diverted Operations

Source: HMMH

SEL Range	LAX Average Day Departures—2014				
	Without Diversions	**Forecast Diversions**	**With Diversions**	**% Increase in Departures**	**Approx. Days between Diversions**
70	8.5	--	8.5	--	--
75	122.9	--	122.9	--	--
80	9.1	--	9.1	--	--
85	160.8	--	160.8	--	--
90	293.45	.0037	293.45	0.001%	273
95	76.98	.0143	77.00	0.02%	70
100	1.52	.0152	1.53	1.0%	66
105	1.03	.0142	1.04	1.4%	70
110	0.3	--	0.31	--	--
Total	674.558	.0475	674.61	0.01%	21

[Note: Numbers may not add due to rounding. More decimal places shown for diverted operations because of small numbers involved.]

Figure B.8.5 LAX—Evening Distribution of Baseline SEL Values

Source: HMMH

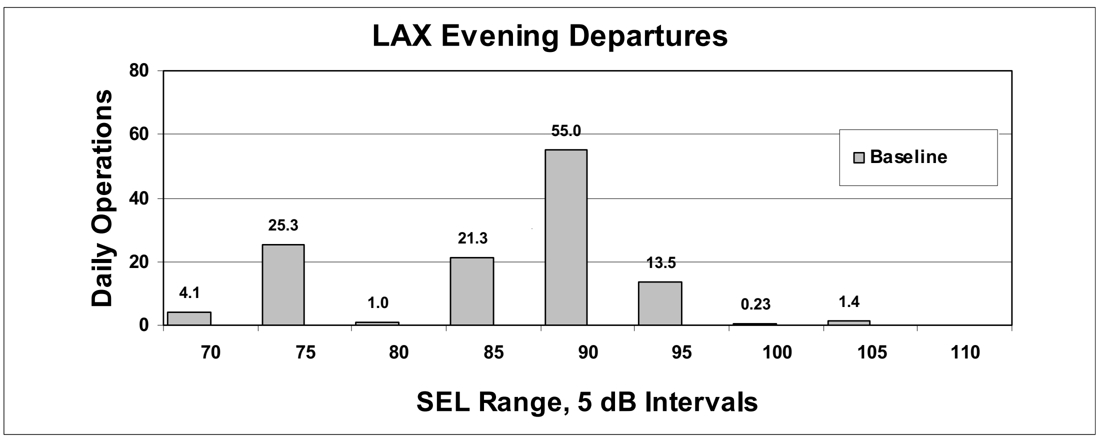


Figure B.8.6 LAX—Evening Distributions of Baseline and Diverted SEL Values
Source: HMMH

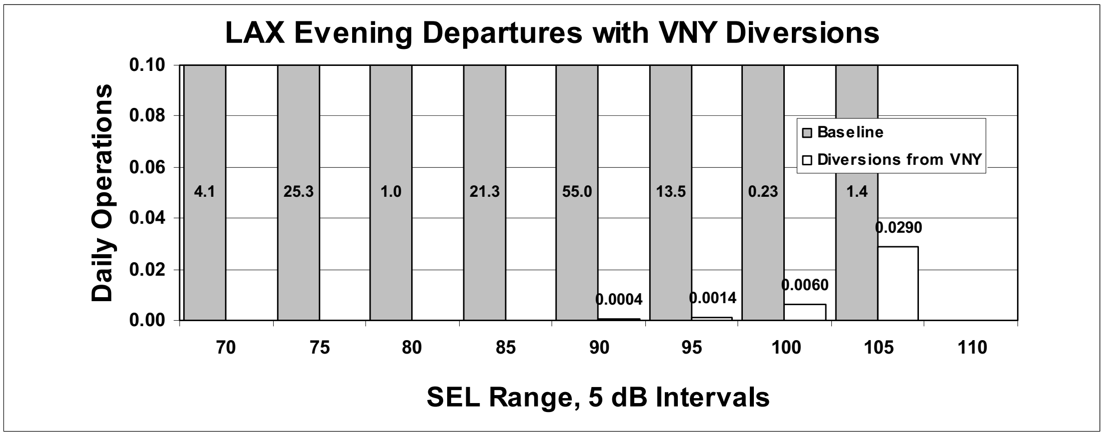


Table B.8.3 LAX—Average Evening (7 p.m.–10 p.m.) Departures with and without Diverted Operations

Source: HMMH

SEL Range	LAX Average Evening Departures—2014				
	Without Diversions	**Forecast Diversions**	**With Diversions**	**% Increase in Departures**	**Approx. Days between Diversions**
70	4.1	--	4.1	--	--
75	25.27	--	25.27	--	--
80	1.0	--	1.0	--	--
85	21.3	--	21.308	--	--
90	54.97	.0004	54.973	0.001%	2,271
95	13.54	.0014	13.543	0.010%	711
100	0.23	.0060	0.24	2.6%	168
105	1.45	.0290	1.474	2.0%	34
110	--	--	--	--	--
Total	121.88	.0368	121.92	0.03%	27

[Note: Numbers may not add due to rounding. More decimal places shown for diverted operations because of small numbers involved.]

Figure B.8.7 LAX—Nighttime Distribution of Baseline SEL Values
Source: HMMH

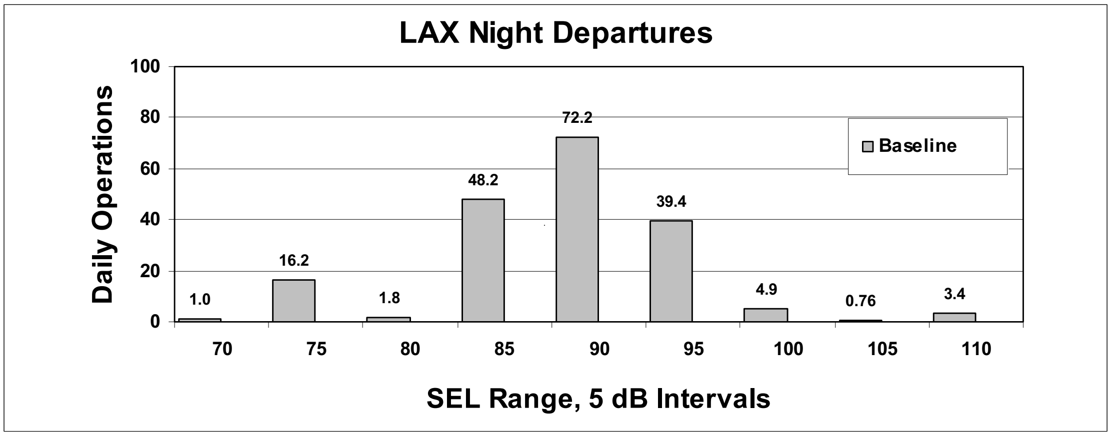


Figure B.8.8 LAX—Nighttime Distributions of Baseline and Diverted SEL Values
Source: HMMH

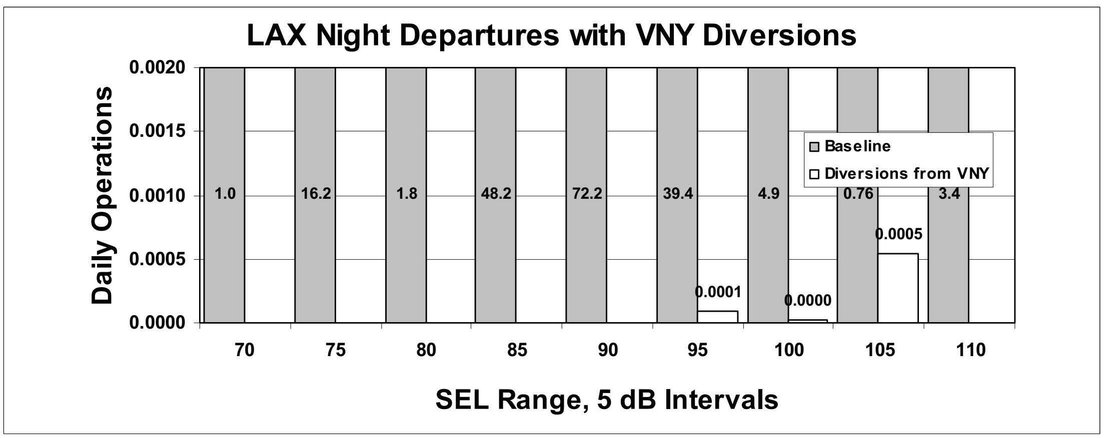


Table B.8.4 LAX—Average Night (10 p.m.–7 a.m.) Departures with and without Diverted Operations

Source: HMMH

SEL Range	LAX Average Night Departures				
	Without Diversions	**Forecast Diversions**	**With Diversions**	**% Increase in Departures**	**Approx. Days between Diversions**
70	1.0	--	1.0	--	--
75	19.2	--	19.2	--	--
80	1.8	--	1.8	--	--
85	48.17	--	48.17	--	--
90	72.21	--	72.21	--	--
95	39.407	.00009	39.4072	0.0002%	11,234
100	4.882	.00002	4.88160	0.0004%	54,512
105	0.759	.0005	0.760	0.1%	1,825
110	3.4	--	3.4	--	--
Total	187.833	.0007	187.833	0.0003%	1,526

[Note: Numbers may not add due to rounding. More decimal places shown for diverted operations because of small numbers involved.]

Bob Hope Airport (BUR)

Table B.8.5 provides relative fleet mixes for baseline and diverted operations for BUR. This table shows that most baseline daytime operations, before diverted aircraft use the airport, are either air carrier jets, business jets, or propeller aircraft (46%, 21%, and 16% during the day, respectively). The aircraft expected to be diverted to BUR from VNY during the day would be business jets.

Table B.8.5 Baseline and Diverted Fleet Mixes for BUR

Source: HMMH

	BUR Departure Operations Distribution by Aircraft Group					
	Day (7 a.m.–7 p.m.)		Evening (7 p.m.–10 p.m.)		Night (10 p.m.–7 a.m.)	
Aircraft Group	**Baseline**	**Diverted**	**Baseline**	**Diverted**	**Baseline**	**Diverted**
Business Jets	27%	100%	15%	100%	21%	100%
Regional Jets	7%	--	9%	--	7%	--
Air Carrier Jets	46%	--	62%	--	10%	--
Turboprop Aircraft	1%	--	3%	--	41%	--
Propeller Aircraft	16%	--	9%	--	20%	--
Military Type Aircraft	<1%	--	--	--	--	--
Helicopters	3%	--	2%	--	<1%	--
Total	100%	100%	100%	100%	100%	100%

Figure B.8.9 identifies the regions that are 15,000 feet from start of takeoff roll (the departure SEL values are given in the following figures and tables).

Figures B.8.10 and B.8.11 show the distributions of the SEL values for the two conditions—baseline with no diversions and baseline compared to diversions. Each bar, with its labels, shows how many departures on an average day will produce SEL values in each of the ranges shown, from 70 dB to 110 dB. Note that because diverted operations are so few compared with the baseline, Figure B.8.11 must have an expanded vertical axis to make the numbers of diverted operations visible.

While the diverted operations produce SEL values comparable to the higher baseline levels, there are relatively few diverted operations; all diverted operations are much less than one per day. Table B.8.6 is provided to help interpret such small numbers of operations. When total departures are less than one, the column "Days Between" translates the number of operations into how many days will occur between each operation at the given value of SEL. Hence, departures that produce SEL in the range of 100 dB will change from one every 5 days (5.03) to one every 3 days (3.28). The last column gives the percent increase in departures in each SEL range that results from the diverted operations. The following two pages provide similar information for evening and night departures.

It should be noted that this diversion analysis applies only to the proposed project and Alternative 2 (exempted Stage 3 and 4 Aircraft Alternative), since no aircraft would be diverted to BUR under Alternative 2 (exempted Stage 3 and 4 Aircraft Alternative). The analysis is identical for the proposed project and Alternative 2, since the same operations would be diverted in both cases.

Figure B.8.9 BUR—Regions 15,000 feet from Start of Takeoff Roll

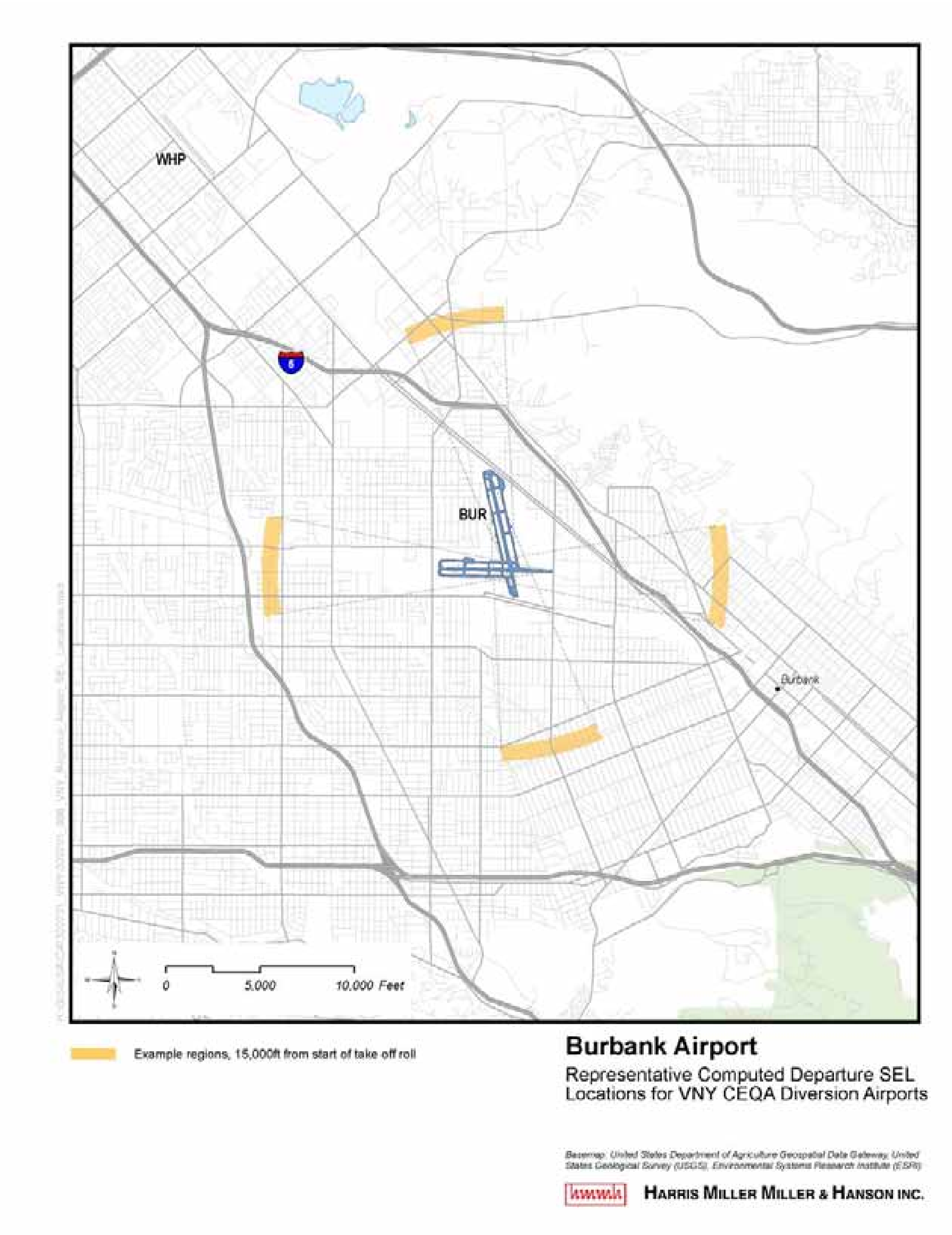


Figure B.8.10 BUR— Daytime Distribution of Baseline SEL Values
Source: HMMH

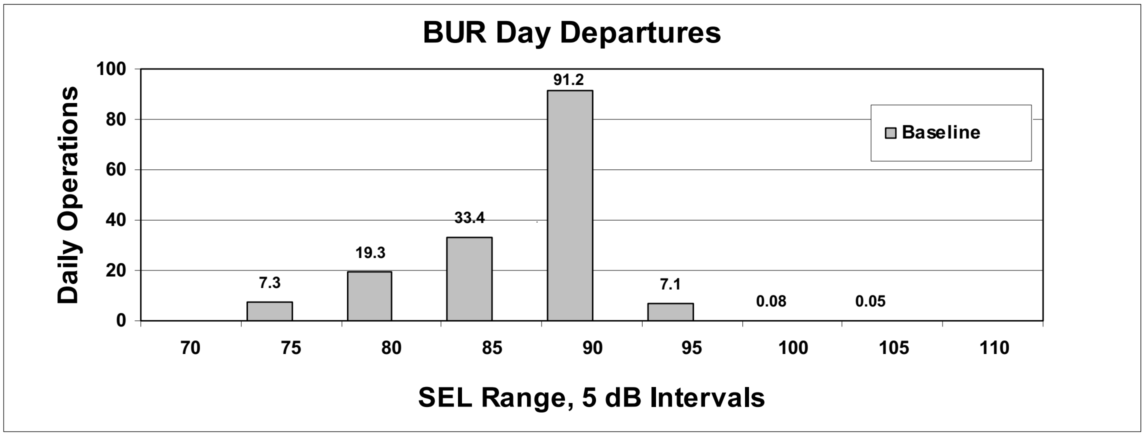


Figure B.8.11 BUR—Daytime Distributions of Baseline and Diverted SEL Values
Source: HMMH

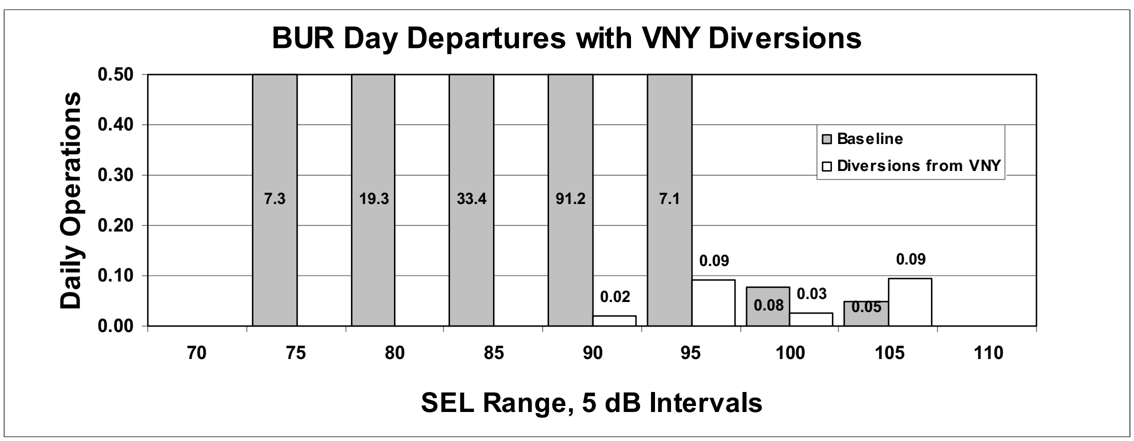


Table B.8.6 BUR—Average Daytime (7 a.m.–7 p.m.) Departures with and without Diverted Operations

Source: HMMH

SEL Range	BUR Average Daytime Departures				
	Without Diversions	**Forecast Diversions**	**With Diversions**	**% Increase in Departures**	**Approx. Days between Diversions**
70	--	--	--	--	--
75	7.3	--	7.3	--	--
80	19.3	--	19.3	--	--
85	33.4	--	33.4	--	--
90	91.18	0.02	91.20	0.02%	48
95	7.1	0.09	7.2	1.3%	11
100	0.08	0.03	0.11	34.6%	37
105	0.05	0.09	0.14	189.8%	11
110	--	--	--	--	--
Total	158.35	0.23	158.60	0.15%	4

[Note: Numbers may not add due to rounding. More decimal places shown for diverted operations because of small numbers involved.]

Figure B.8.12 BUR—Evening Distribution of Baseline SEL Values
Source: HMMH

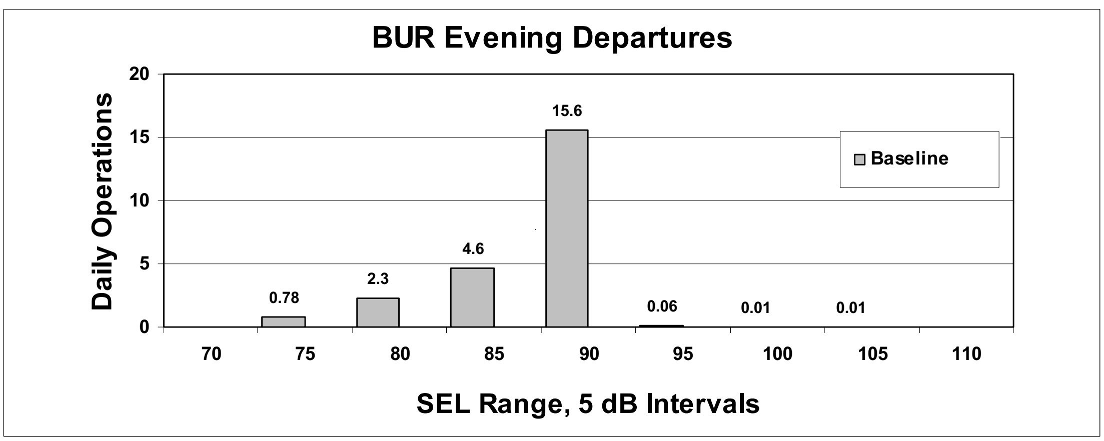


Figure B.8.13 BUR—Evening Distributions of Baseline and Diverted SEL Values
Source: HMMH

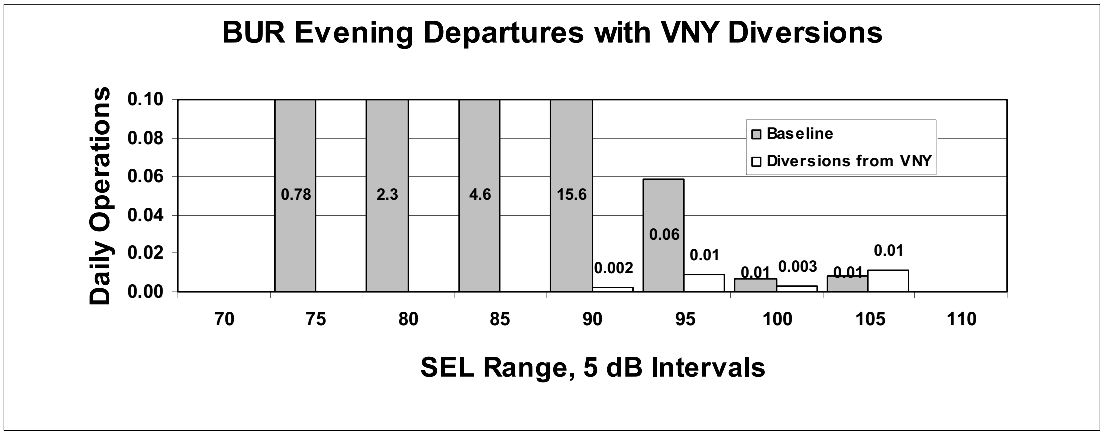


Table B.8.7 BUR—Average Evening (7 p.m.–10 p.m.) Departures with and without Diverted Operations

Source: HMMH

	BUR Average Evening Departures				
SEL Range	**Without Diversions**	**Forecast Diversions**	**With Diversions**	**% Increase in Departures**	**Approx. Days between Diversions**
70	--	--	--	--	--
75	0.78	--	0.78	--	--
80	2.3	--	2.3	--	--
85	4.6	--	4.6	--	--
90	15.59	.0024	15.60	0.02%	401
95	0.06	.0089	0.07	15.2%	112
100	0.007	.0030	0.010	43.4%	333
105	0.01	.0110	0.02	127.7%	91
110	--	--	--	--	--
Total	23.37	.025	23.40	0.11%	39

[Note: Numbers may not add due to rounding. More decimal places shown for diverted operations because of small numbers involved.]

Figure B.8.14 BUR—Nighttime Distribution of Baseline SEL Values
Source: HMMH

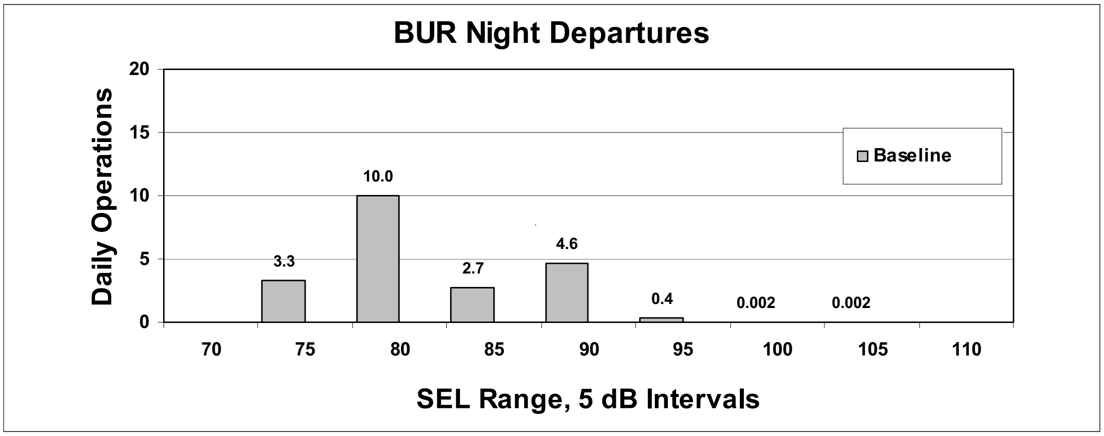


Figure B.8.15 BUR—Nighttime Distributions of Baseline and Diverted SEL Values
Source: HMMH

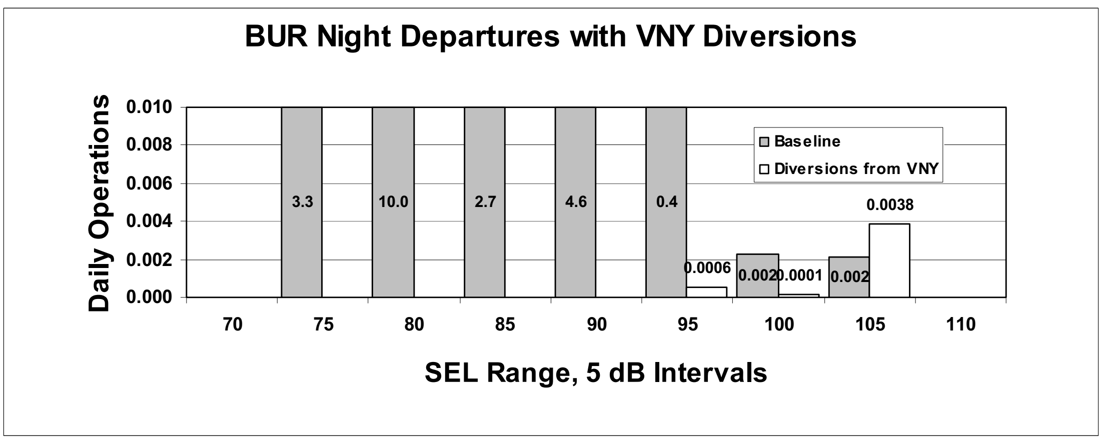


Table B.8.8 BUR—Average Night (10 p.m.–7 a.m.) Departures with and without Diverted Operations

Source: HMMH

SEL Range	BUR Average Night Departures				
	Without Diversions	**Forecast Diversions**	**With Diversions**	**% Increase in Departures**	**Approx. Days between Diversions**
70	--	--	--	--	--
75	3.3	--	3.3	--	--
80	10.0	--	10.0	--	--
85	2.72	--	2.72	--	--
90	4.63	--	4.63	--	--
95	0.374	.0006	0.375	0.2%	1,774
100	0.0023	.0001	0.0024	5.0%	8,607
105	0.002	.0038	0.006	178.7%	260
110	--	--	--	--	--
Total	21.086	.005	21.090	0.02%	221

[Note: Numbers may not add due to rounding. More decimal places shown for diverted operations because of small numbers involved.]

Camarillo Airport (CMA)

Table B.8.9 provides relative fleet mixes for baseline and diverted operations for CMA. This table shows that most baseline daytime operations, before diverted aircraft use the airport, are propeller aircraft (93% in the day). The aircraft expected to be diverted to CMA from VNY would be business jets.

Table B.8.9 Baseline and Diverted Fleet Mixes for CMA

Source: HMMH

Aircraft Group	CMA Departure Operations Distribution by Aircraft Group					
	Day (7 a.m.–7 p.m.)		Evening (7 p.m.–10 p.m.)		Night (10 p.m.–7 a.m.)	
	Baseline	**Diverted**	**Baseline**	**Diverted**	**Baseline**	**Diverted**
Business Jets	4%	100%	4%	100%	8%	100%
Regional Jets	< 1%	--	< 1%	--	2%	--
Air Carrier Jets	--	--	--	--	--	--
Turboprop Aircraft	1%	--	2%	--	2%	--
Propeller Aircraft	93%	--	93%	--	88%	--
Military Type Aircraft	< 1%	--	< 1%	--	< 1%	--
Helicopters	< 1%	--	< 1%	--	< 1%	--
Total	100%	100%	100%	100%	100%	100%

Figure B.8.16 identifies the regions that are 15,000 feet from start of takeoff roll (the departure SEL values are given in the following figures and tables).

Figures B.8.17 and B.8.18 show the distributions of the SEL values for the two conditions—baseline with no diversions and baseline compared to diversions. Each bar, with its labels, shows how many departures on an average day will produce SEL values in each of the ranges shown, from 70 dB to 110 dB. Note that because diverted operations are so few compared with the baseline, Figure B.8.18 must have an expanded vertical axis to make the numbers of diverted operations visible.

While the diverted operations produce SEL values comparable to the higher baseline levels, there are relatively few diverted operations; all diverted operations are much less than one per day. Table B.8.10 is provided to help interpret such small numbers of operations. When total departures are less than one, the column "Days Between" translates the number of operations into how many days will occur between each operation at the given value of SEL. Hence, departures that produce SEL in the range of 100 dB will change from one every 5 days (5.03) to one every 3 days (3.28). The last column gives the percent increase in departures in each SEL range that results from the diverted operations. The following two pages provide similar information for evening and night departures.

It should be noted that this diversion analysis applies only to the proposed project and Alternative 2 (Exempted Stage 3 and 4 Aircraft Alternative), since no aircraft would be diverted to CMA under Alternative 2 (Exempted Stage 3 and 4 Aircraft Alternative). The analysis is identical for the proposed project and Alternative 2, since the same operations would be diverted in both cases.

Figure B.8.16 CMA—Regions 15,000 feet from Start of Takeoff Roll
Source: HMMH

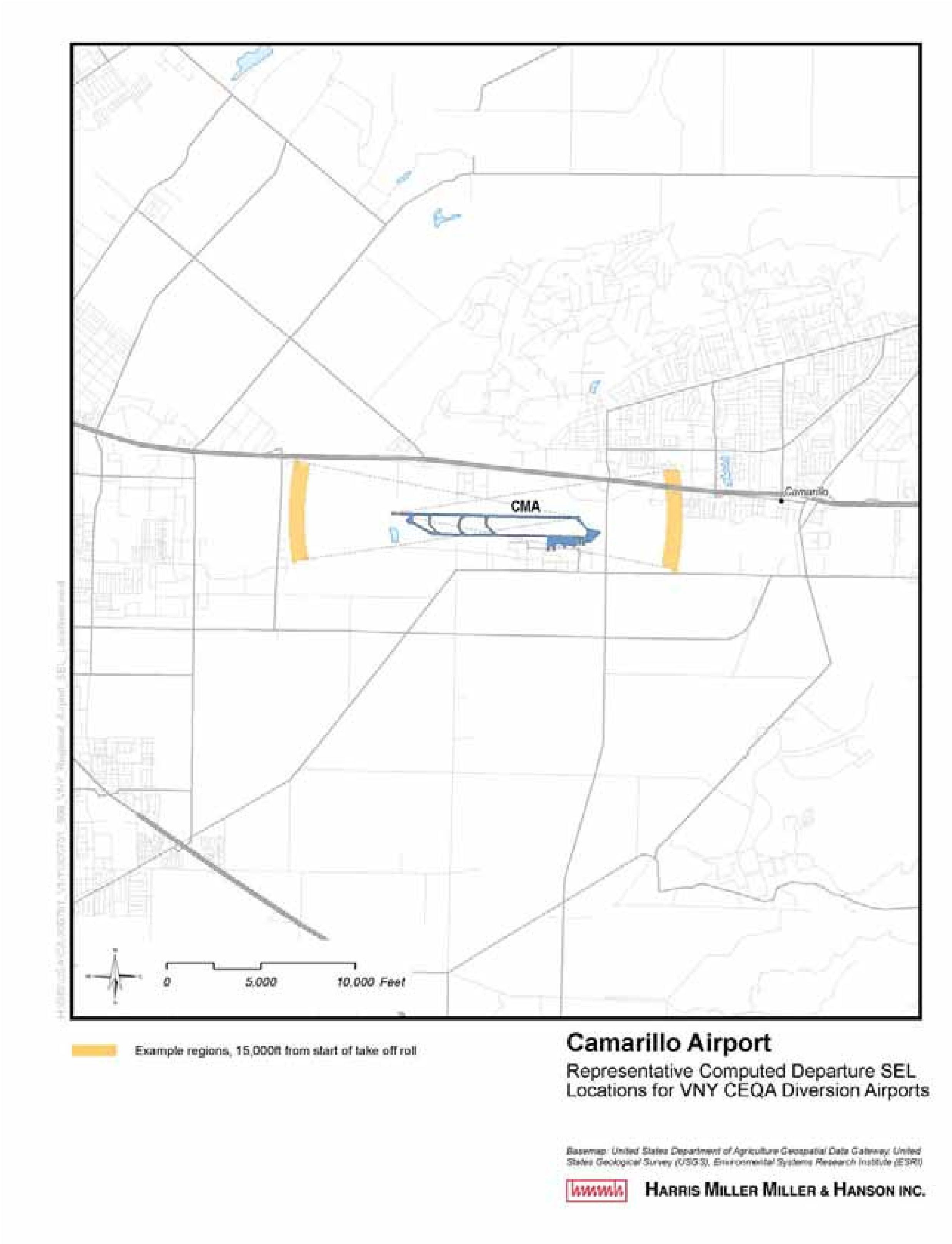


Figure B.8.17 CMA—Daytime Distribution of Baseline SEL Values
Source: HMMH

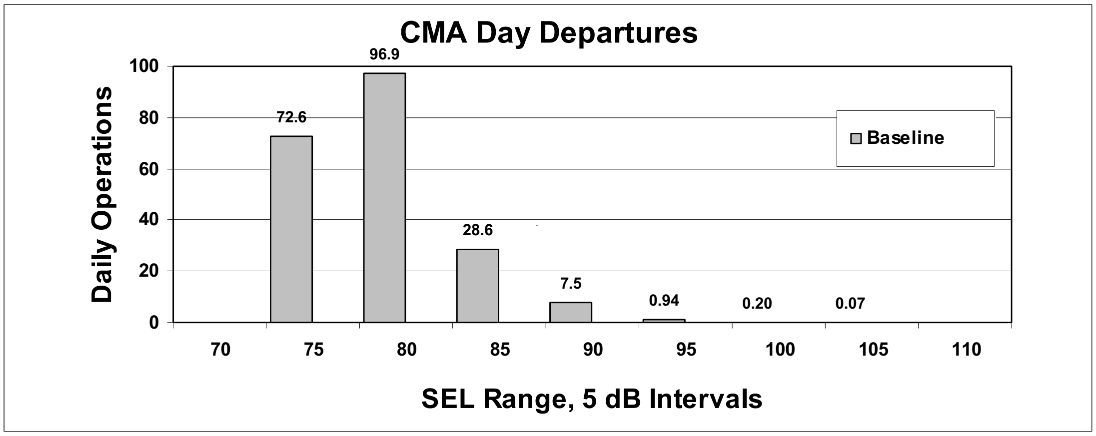


Figure B.8.18 CMA—Daytime Distributions of Baseline and Diverted SEL Values
Source: HMMH

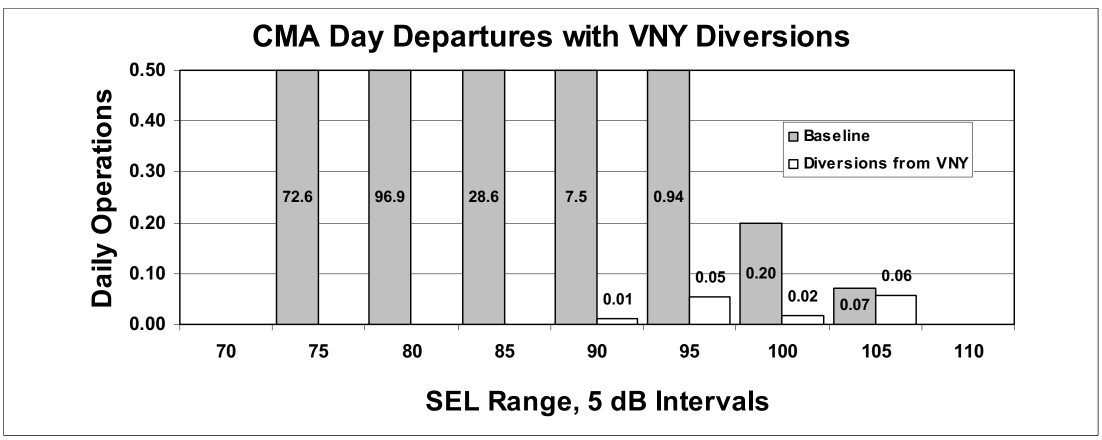


Table B.8.10 CMA—Average Day (7 a.m.–7 p.m.) Departures with and without Diverted Operations

Source: HMMH

SEL Range	CMA Average Day Departures				
	Without Diversions	**Forecast Diversions**	**With Diversions**	**% Increase in Departures**	**Approx. Days between Diversions**
70	--	--	--	--	--
75	72.6	--	72.6	--	--
80	96.9	--	96.9	--	--
85	28.6	--	28.6	--	--
90	7.5	.0122	7.6	0.16%	82
95	0.94	.0541	0.99	5.8%	18
100	0.20	.0161	0.21	8.1%	62
105	0.07	.0570	0.13	79.3%	18
110	--	--	--	--	--
Total	206.9	.1394	207.1	0.07%	7

[Note: Numbers may not add due to rounding. More decimal places shown for diverted operations because of small numbers involved.]

Figure B.8.19 CMA—Evening Distribution of Baseline SEL Values

Source: HMMH

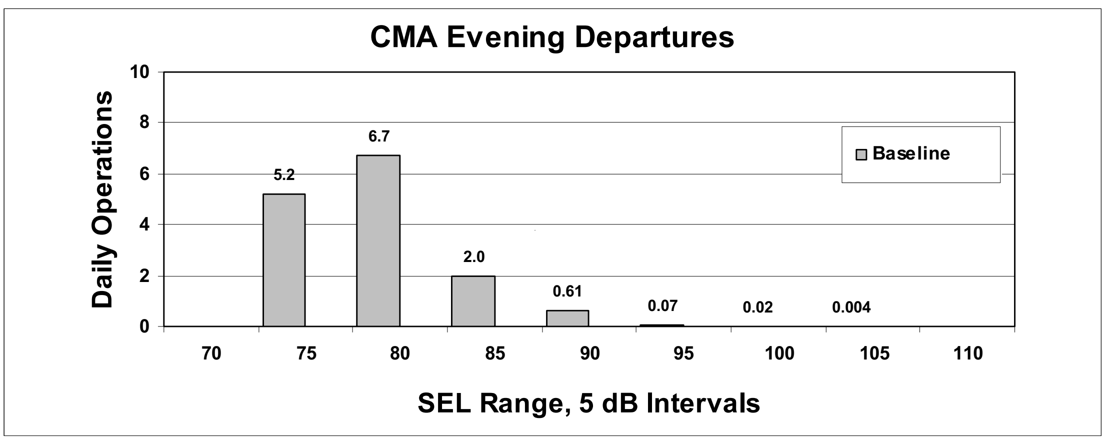


Figure B.8.20 CMA—Evening Distributions of Baseline and Diverted SEL Values
Source: HMMH

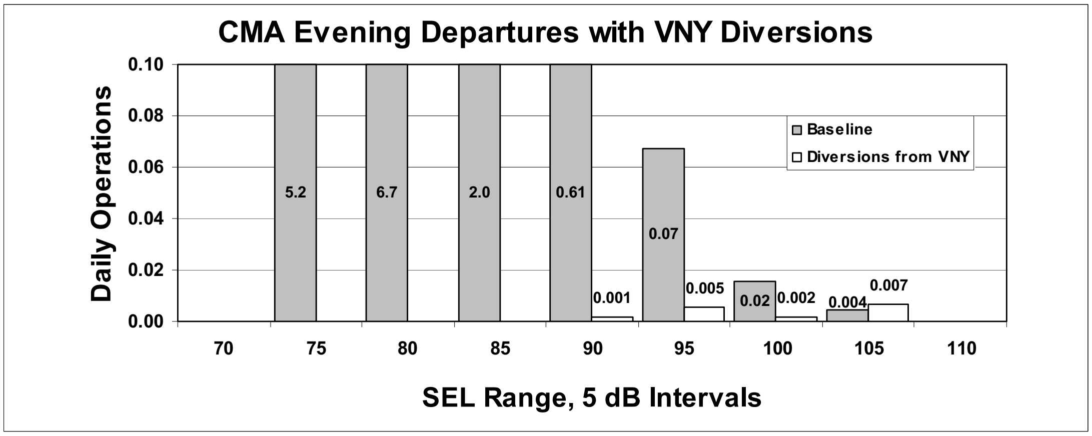


Table B.8.11 CMA—Average Evening (7 p.m.–10 p.m.) Departures with and without Diverted Operations

Source: HMMH

SEL Range	CMA Average Evening Departures				
	Without Diversions	**Forecast Diversions**	**With Diversions**	**% Increase in Departures**	**Approx. Days between Diversions**
70	--	--	--	--	--
75	5.2	--	5.2	--	--
80	6.7	--	6.7	--	--
85	2.0	--	2.0	--	--
90	0.609	.0014	0.611	0.24%	681
95	0.067	.0053	0.073	7.9%	188
100	0.016	.0018	0.017	11.4%	558
105	0.004	.0065	0.011	151.7%	153
110	--	--	--	--	--
Total	14.56	.0151	14.57	0.10%	66

[Note: Numbers may not add due to rounding. More decimal places shown for diverted operations because of small numbers involved.]

Figure B.8.21 CMA—Nighttime Distribution of Baseline SEL Values
Source: HMMH

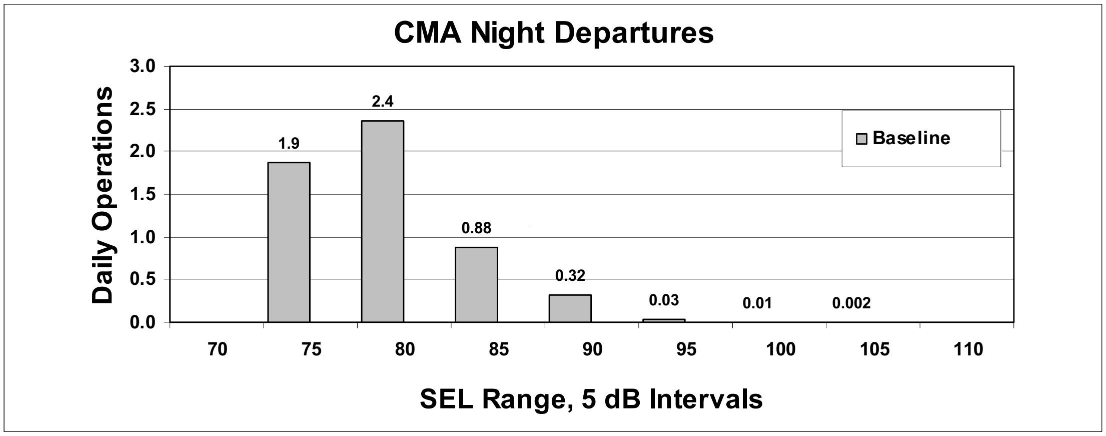


Figure B.8.22 CMA—Nighttime Distributions of Baseline and Diverted SEL Values
Source: HMMH

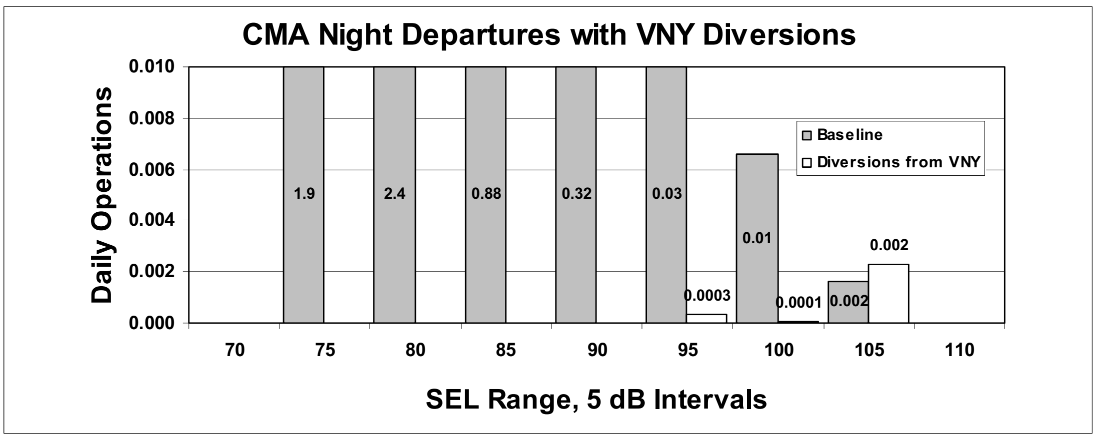


Table B.8.12 CMA—Average Night (10 p.m.–7 a.m.) Departures with and without Diverted Operations

Source: HMMH

	CMA Night Departures				
SEL Range	**Without Diversions**	**Forecast Diversions**	**With Diversions**	**% Increase in Departures**	**Approx. Days between Diversions**
70	--	--	--	--	--
75	1.9	--	1.9	--	--
80	2.4	--	2.4	--	--
85	0.88	--	0.88	--	--
90	0.32	--	0.32	--	--
95	0.0280	.0003	0.0284	1.2%	2,974
100	0.0066	.0001	0.0067	1.1%	14,430
105	0.002	.0023	0.004	140.4%	441
110	--	--	--	--	--
Total	5.462	.0027	5.465	0.05%	374

[Note: Numbers may not add due to rounding. More decimal places shown for diverted operations because of small numbers involved.]

Chino Airport (CNO)

Table B.8.13 provides relative fleet mixes for baseline and diverted operations for CNO. This table shows that most baseline daytime operations, before diverted aircraft use the airport, are propeller aircraft (98%). The aircraft expected to be diverted to CNO from VNY would be helicopters.

Table B.8.13 Baseline and Diverted Fleet Mixes for CNO

Source: HMMH

	CNO Departure Operations Distribution by Aircraft Group					
	Day (7 a.m.–7 p.m.)		Evening (7 p.m.–10 p.m.)		Night (10 p.m.–7 a.m.)	
Aircraft Group	**Baseline**	**Diverted**	**Baseline**	**Diverted**	**Baseline**	**Diverted**
Business Jets	1%	--	1%	--	9%	--
Regional Jets	< 1%	--	< 1%	--	3%	--
Air Carrier Jets	--	--	--	--	--	--
Turboprop Aircraft	< 1%	--	< 1%	--	1%	--
Propeller Aircraft	98%	--	97%	--	86%	--
Military Type Aircraft	< 1%	100%	< 1%	100%	< 1%	100%
Helicopters	< 1%	--	< 1%	--	< 1%	--
Total	100%	100%	100%	100%	100%	100%

Figure B.8.23 identifies the regions that are 15,000 feet from start of takeoff roll (the departure SEL values are given in the following figures and tables).

Figures B.8.24 and B.8.25 show the distributions of the SEL values for the two conditions—baseline with no diversions and baseline compared to diversions. Each bar, with its labels, shows how many departures on an average day will produce SEL values in each of the ranges shown, from 70 dB to 110 dB. Note that because diverted operations are so few compared with the baseline, Figure B.8.25 must have an expanded vertical axis to make the numbers of diverted operations visible.

The diverted operations produce SEL values comparable to the baseline levels, and there are relatively few diverted operations; all diverted operations are much less than one per day. Table B.8.14 is provided to help interpret such small numbers of operations. When total departures are less than one, the column "Days Between" translates the number of operations into how many days will occur between each operation at the given value of SEL. Hence, daytime departures that produce SEL in the range of 100 dB will change from one every 24 days to one every 7 days. The last column gives the percent increase in departures in each SEL range that results from the diverted operations. The following two pages provide similar information for evening and night departures.

It should be noted that this diversion analysis applies only to the proposed project and Alternative 2 (Exempted Stage 3 and 4 Aircraft Alternative), since no aircraft would be diverted to CNO under Alternative 2 (Exempted Stage 3 and 4 Aircraft Alternative). The analysis is identical for the proposed project and Alternative 2, since the same operations would be diverted in both cases.

Figure B.8.23 CNO—Regions 15,000 feet from Start of Takeoff Roll

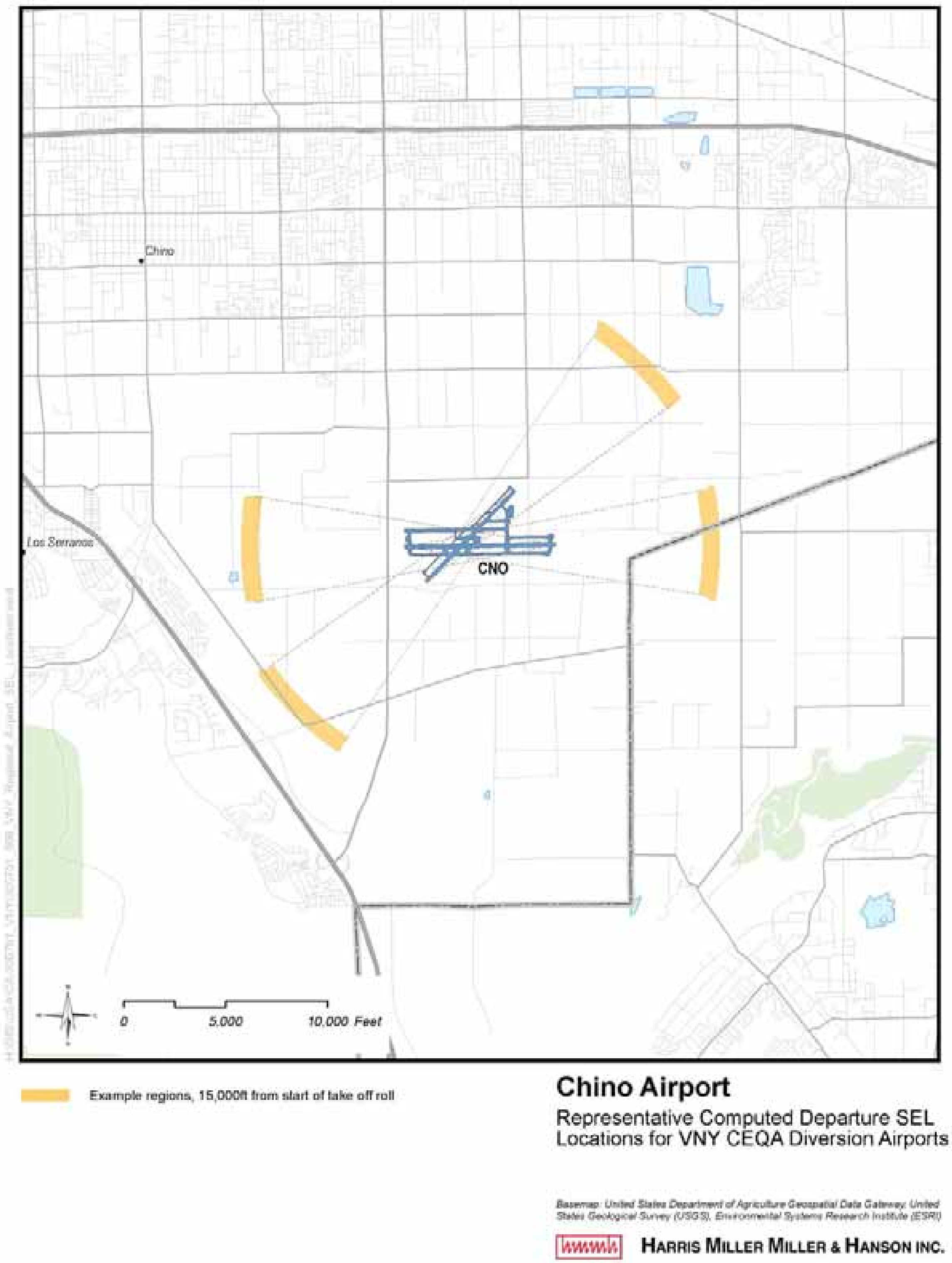


Figure B.8.24 CNO—Daytime Distribution of Baseline SEL Values
Source: HMMH

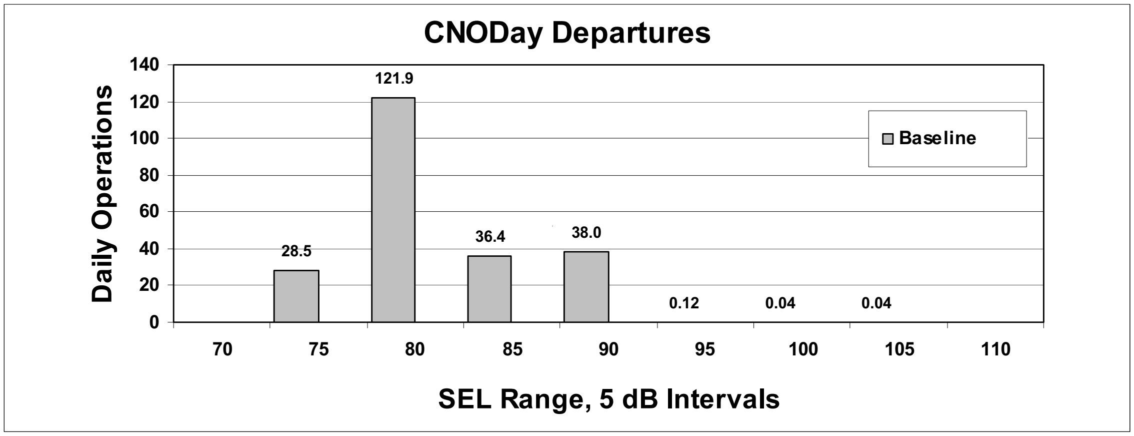


Figure B.8.25 CNO—Daytime Distributions of Baseline and Diverted SEL Values
Source: HMMH

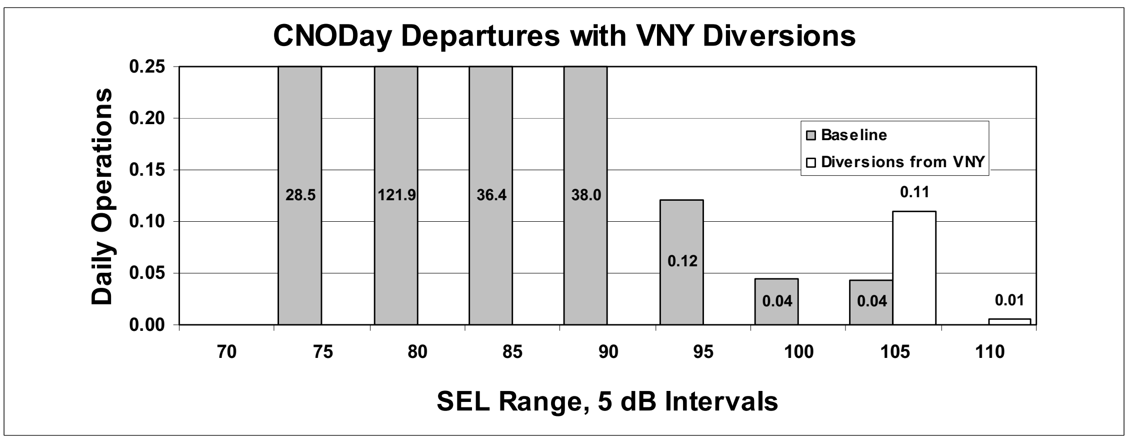


Table B.8.14 CNO—Average Day (7 a.m.–7 p.m.) Departures with and without Diverted Operations

Source: HMMH

SEL Range	CNO Average Day Departures				
	Without Diversions	Forecast Diversions	With Diversions	% Increase in Departures	Approx. Days between Diversions
70	--	--	--	--	--
75	28.5	--	28.5	--	--
80	121.9	--	121.9	--	--
85	36.4	--	36.4	--	--
90	38.0	--	38.0	--	--
95	0.12	--	0.1	--	--
100	< 0.1	--	< 0.1	--	--
105	< 0.1	.1093	0.1	257.8%	9
110	--	.0055	< 0.1	new	183
Total	224.9	.1148	225.0	0.05%	9

[Note: Numbers may not add due to rounding. More decimal places shown for diverted operations because of small numbers involved.]

Figure B.8.26 CNO—Evening Distribution of Baseline SEL Values
Source: HMMH

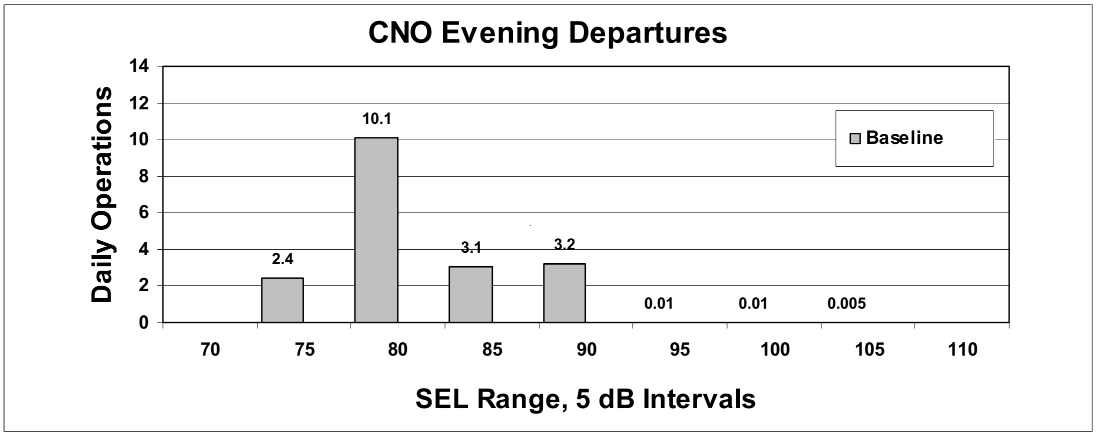


Figure B.8.27 CNO—Evening Distributions of Baseline and Diverted SEL Values
Source: HMMH

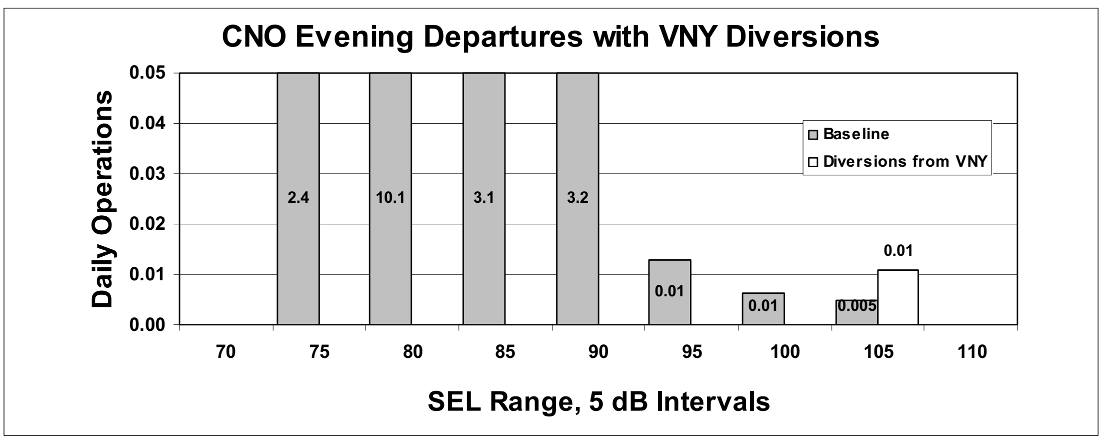


Table B.8.15 CNO—Average Evening (7 p.m.–10 p.m.) Departures with and without Diverted Operations

SEL Range	CNO Average Evening Departures				
	Without Diversions	**Forecast Diversions**	**With Diversions**	**% Increase in Departures**	**Approx. Days between Diversions**
70	--	--	--	--	--
75	2.4	--	2.4	--	--
80	10.1	--	10.1	--	--
85	3.1	--	3.1	--	--
90	3.2	--	3.2	--	--
95	< 0.1	--	< 0.1	--	--
100	< 0.1	--	< 0.1	--	--
105	< 0.1	.0109	< 0.1	224.9%	92
110	--	--	--	--	--
Total	18.9	.0109	18.9	0.06%	92

[Note: Numbers may not add due to rounding. More decimal places shown for diverted operations because of small numbers involved.]

Figure B.8.28 CNO—Nighttime Distribution of Baseline SEL Values
Source: HMMH

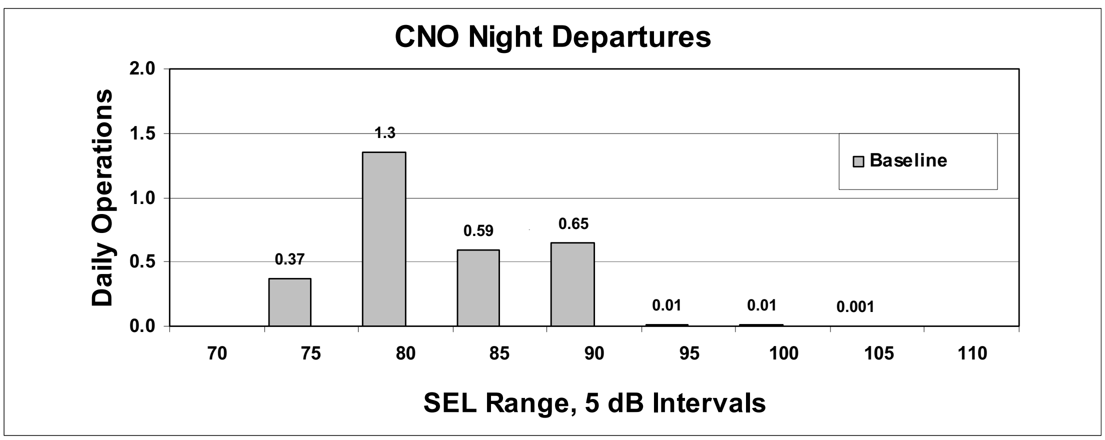


Figure B.8.29 CNO—Nighttime Distributions of Baseline and Diverted SEL Values
Source: HMMH

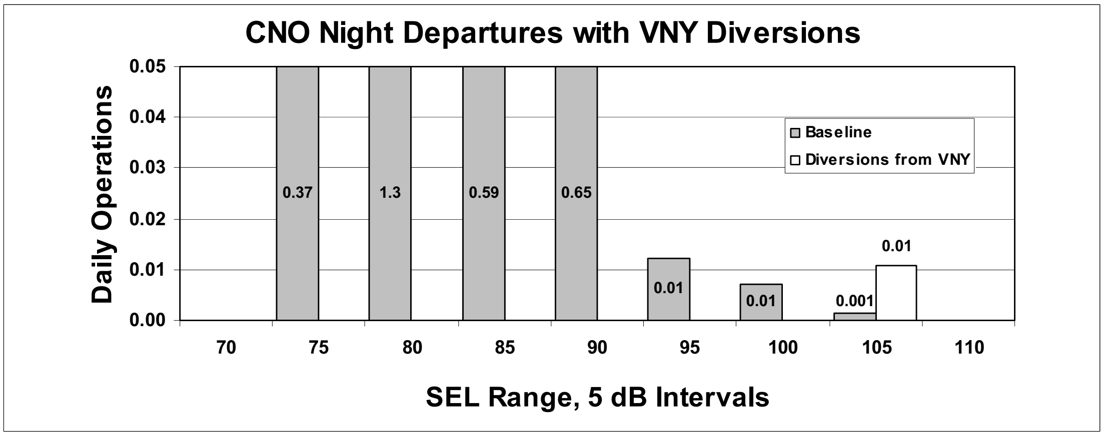


Table B.8.16 CNO—Average Night (10 p.m.–7 a.m.) Departures with and without Diverted Operations

Source: HMMH

SEL Range	CNO Average Night Departures				
	Without Diversions	Forecast Diversions	With Diversions	% Increase in Departures	Approx. Days between Diversions
70	--	--	--	--	--
75	0.4	--	0.4	--	--
80	1.3	--	1.3	--	--
85	0.6	--	0.6	--	--
90	0.6	--	0.6	--	--
95	< 0.1	--	< 0.1	--	--
100	< 0.1	--	< 0.1	--	--
105	< 0.1	.0109	< 0.1	763.7%	92
110	--	--	--	--	--
Total	3.0	.0109	3.0	0.37%	92

[Note: Numbers may not add due to rounding. More decimal places shown for diverted operations because of small numbers involved.]

William J. Fox Airfield (WJF)

Table B.8.17 provides relative fleet mixes for baseline and diverted operations for WJF. This table shows that most baseline operations, before diverted aircraft use the airport, are propeller aircraft (93% daytime). The aircraft expected to be diverted to WJF from VNY would be business jets but only in the daytime.

Table B.8.17 Baseline and Diverted Fleet Mixes for WJF

Source: HMMH

Aircraft Group	WJF Departure Operations Distribution by Aircraft Group					
	Day (7 a.m.–7 p.m.)		Evening (7 p.m.–10 p.m.)		Night (10 p.m.–7 a.m.)	
	Baseline	Diverted	Baseline	Diverted	Baseline	Diverted
Business Jets	< 1%	100%	< 1%	--	2%	--
Regional Jets	< 1%	--	< 1%	--	--	--
Air Carrier Jets	--	--	--	--	--	--
Turboprop Aircraft	--	--	--	--	--	--
Propeller Aircraft	93%	--	94%	--	92%	--
Military Type Aircraft	3%	--	3%	--	3%	--
Helicopters	3%	--	3%	--	3%	--
Total	100%	100%	100%	--	100%	--

Figure B.8.30 identifies the regions that are 15,000 feet from start of takeoff roll (the departure SEL values are given in the following figures and tables).

Figures B.8.31 and B.8.32 show the distributions of the SEL values for the two conditions—baseline with no diversions and baseline compared to diversions. Each bar, with its labels, shows how many departures on an average day will produce SEL values in each of the ranges shown, from 70 dB to 110 dB. Note that because diverted operations are so few compared with the baseline, Figure B.8.32 must have an expanded vertical axis to make the numbers of diverted operations visible.

The diverted operations produce SEL values comparable to the higher baseline levels, and there are relatively few diverted operations; all diverted operations are much less than one per day. Table B.8.18 is provided to help interpret such small numbers of operations. When total departures are less than one, the column "Days Between" translates the number of operations into how many days will occur between each operation at the given value of SEL. The last column gives the percent increase in departures in each SEL range that results from the diverted operations.

It should be noted that this diversion analysis applies only to the proposed project and Alternative 2 (Exempted Stage 3 and 4 Aircraft Alternative), since no aircraft would be diverted to WJF under Alternative 2 (Exempted Stage 3 and 4 Aircraft Alternative). The analysis is identical for the proposed project and Alternative 2, since the same operations would be diverted in both cases.

Figure B.8.30 WJF—Regions 15,000 feet from Start of Takeoff Roll

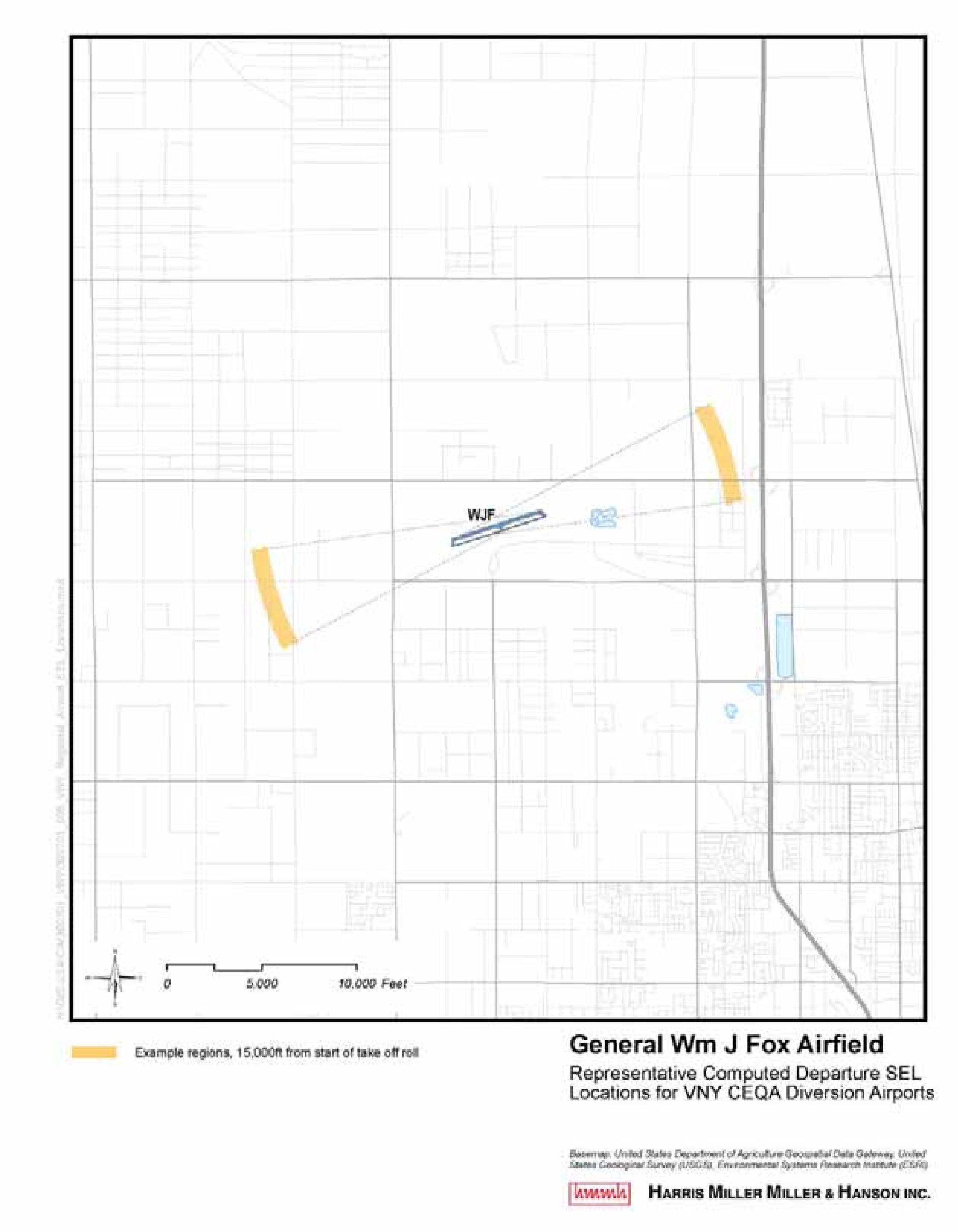


Figure B.8.31 WJF—Daytime Distributions of Baseline and Diverted SEL Values

Source: HMMH

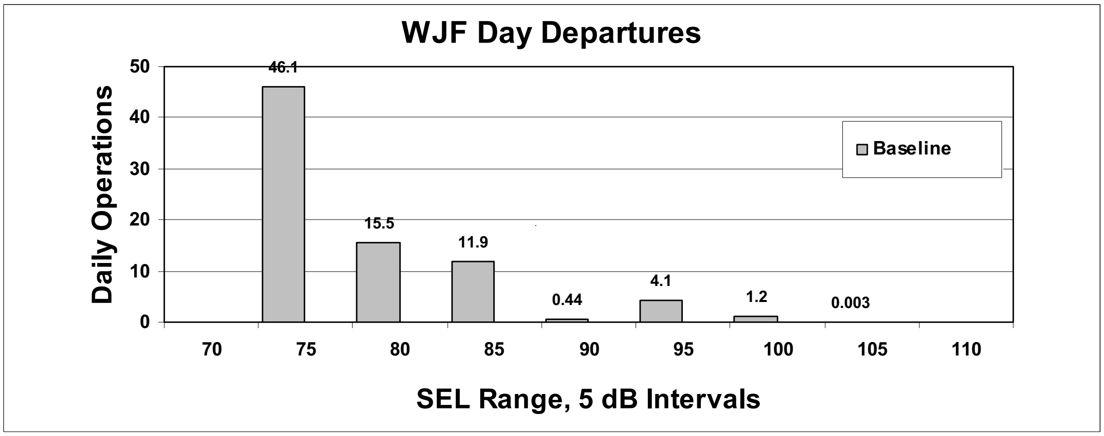


Figure B.8.32 WJF—Daytime Distributions of Baseline and Diverted SEL Values

Source: HMMH

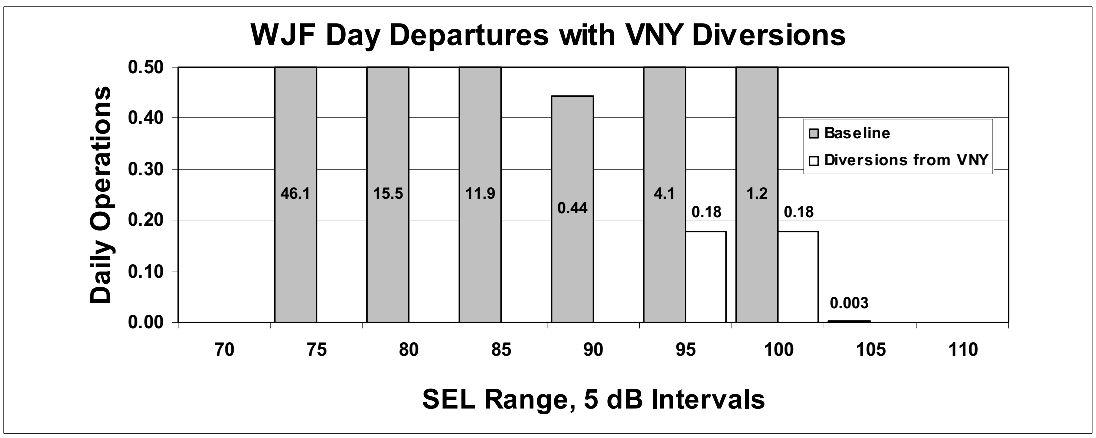


Table B.8.18 WJF—Average Day (7 a.m.–7 p.m.) Departures with and without Diverted Operations

Source: HMMH

SEL Range	WJF Average Day Departures				
	Without Diversions	**Forecast Diversions**	**With Diversions**	**% Increase in Departures**	**Approx. Days between Diversions**
70	--	--	--	--	--
75	46.1	--	46.1	--	--
80	15.5	--	15.5	--	--
85	11.9	--	11.9	--	--
90	0.4	--	0.4	--	--
95	4.1	.2	4.3	4.3%	6
100	1.2	.2	1.4	15.0%	6
105	< 0.1	--	< 0.1	--	--
110	--	--	--	--	--
Total	79.2	.4	79.6	0.45%	3

[Note: Numbers may not add due to rounding. More decimal places shown for diverted operations because of small numbers involved.]