Indianapolis International Airport

Noise Exposure Map Update

Final

December 2013

INDIANAPOLIS INTERNATIONAL AIRPORT

NOISE EXPOSURE MAP UPDATE

FINAL

December 2013

Prepared for:

Indianapolis Airport Authority
7800 Col. H. Weir Cook Memorial Drive
Indianapolis, IN 46241

Prepared by:

Landrum & Brown, Incorporated
11279 Cornell Park Drive
Cincinnati, Ohio 45242

Indianapolis Airport Authority

7800 Col. H. Weir Cook Memorial Dr.
Indianapolis, Indiana 46241
office 317.487.5042
fax 317.487.5034

December 20, 2013

Mr. Jim Keefer
District Office Manager
FAA, Chicago Airports District Office
2300 East Devon Avenue
Des Plaines, Illinois 60018

Subject: Submission of Noise Exposure Maps for Indianapolis International Airport

Dear Mr. Keefer:

Enclosed please find five (5) copies of the above referenced document submitted under 14 CFR Part 150 for appropriate Federal Aviation Administration (FAA) determination. The Indianapolis Airport Authority (IAA) requests FAA acceptance of the updated Noise Exposure Maps (NEMs) for existing conditions (2013 NEM) and future conditions (2018 NEM) at the Indianapolis International Airport.

The future NEM is based upon reasonable forecasts and planning assumptions developed for the airport. We herein verify that the documentation is representative of existing and future forecast conditions as of the date of submission. These NEMs are an update to the NEMs that were previously determined by the FAA to be in compliance with 14 CFR Part 150.

On behalf of the IAA, I would like to express appreciation for the FAA for its support in conducting the Noise Exposure Map Update. We look forward to an expeditious Federal review of the NEMs.

Sincerely,

Michael W. Wells
President
Indianapolis Airport Authority

STATEMENT OF CERTIFICATION AND PUBLIC NOTIFICATION

These maps, the Existing (2013) and Future (2018) Noise Exposure Maps, and accompanying documentation for the Indianapolis International Airport, are submitted in accordance with 14 CFR Part 150. To the best of my knowledge and belief, the Existing (2013) and Future (2018) Noise Exposure Maps were prepared with the best available information and on the basis of reasonable assumptions and are hereby certified as true, complete, and representative of existing and future aircraft noise levels.

I also hereby certify that interested persons have been afforded adequate opportunity to submit their views, data, and comments concerning the correctness and adequacy of the draft Noise Exposure Maps and descriptions of forecast aircraft operations. A copy of all written comments received during development of the Noise Exposure Maps and the responses thereto are included in this document.

Michael W. Wells

Date 12/20/13

Michael W. Wells
President
Indianapolis Airport Authority

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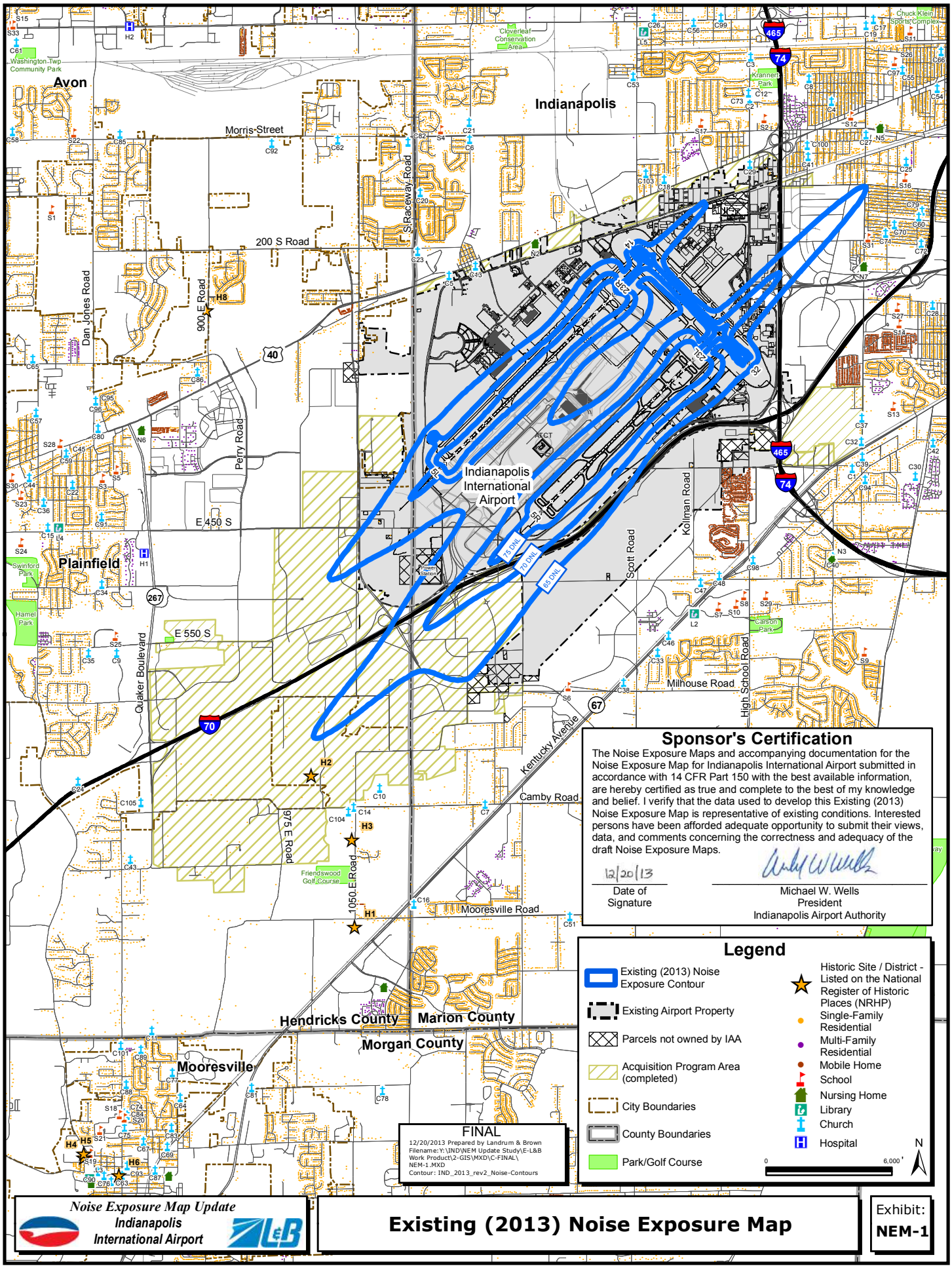
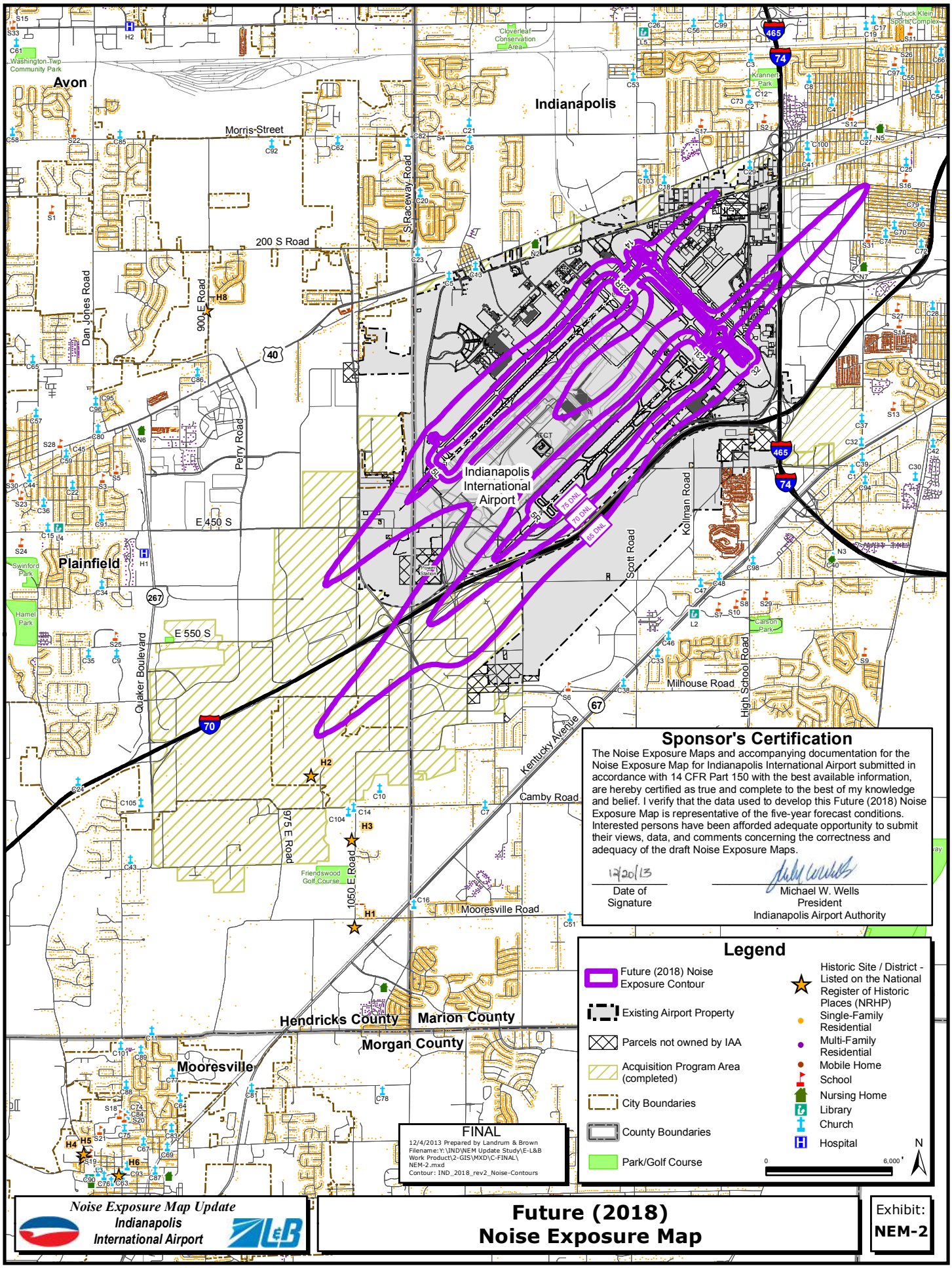

Avon
Indianapolis
Plainfield
Mooresville
Morris Street
200 S Road
E 450 S
E 550 S
Dan Jones Road
900 E Road
Perry Road
Raceway Road
Scott Road
Kollman Road
Quaker Boulevard
975 E Road
1050 E Road
Kentucky Avenue
Camby Road
Milhouse Road
Mooresville Road
High School Road
Indianapolis International Airport
ATCT
75 DNL
70 DNL
65 DNL
Hendricks County
Marion County
Morgan County
Washington Twp Community Park
Cloverleaf Conservation Area
Chuck Klein Sports Complex
Krannert Park
Swinford Park
Hamel Park
Friendswood Golf Course
Carson Park
H1
H2
H3
H4
H5
H6
H8
Sponsor's Certification
The Noise Exposure Maps and accompanying documentation for the Noise Exposure Map for Indianapolis International Airport submitted in accordance with 14 CFR Part 150 with the best available information, are hereby certified as true and complete to the best of my knowledge and belief. I verify that the data used to develop this Existing (2013) Noise Exposure Map is representative of existing conditions. Interested persons have been afforded adequate opportunity to submit their views, data, and comments concerning the correctness and adequacy of the draft Noise Exposure Maps.
12/20/13
Date of Signature
Michael W. Wells
President
Indianapolis Airport Authority
Legend
Existing (2013) Noise Exposure Contour
Existing Airport Property
Parcels not owned by IAA
Acquisition Program Area (completed)
City Boundaries
County Boundaries
Park/Golf Course
Historic Site / District - Listed on the National Register of Historic Places (NRHP)
Single-Family Residential
Multi-Family Residential
Mobile Home
School
Nursing Home
Library
Church
Hospital
0
6,000'
N
FINAL
12/20/2013 Prepared by Landrum & Brown
Filename: Y:\IND\NEM Update Study\E-L&B Work Product\2-GIS\MXD\C-FINAL\ NEM-1.MXD
Contour: IND_2013_rev2_Noise-Contours
Noise Exposure Map Update
Indianapolis
International Airport
Existing (2013) Noise Exposure Map
Exhibit:
NEM-1

BACK OF EXHIBIT



Sponsor's Certification

The Noise Exposure Maps and accompanying documentation for the Noise Exposure Map for Indianapolis International Airport submitted in accordance with 14 CFR Part 150 with the best available information, are hereby certified as true and complete to the best of my knowledge and belief. I verify that the data used to develop this Future (2018) Noise Exposure Map is representative of the five-year forecast conditions. Interested persons have been afforded adequate opportunity to submit their views, data, and comments concerning the correctness and adequacy of the draft Noise Exposure Maps.

12/20/13
Date of Signature

Michael W. Wells
President
Indianapolis Airport Authority

Legend

- Future (2018) Noise Exposure Contour
- Existing Airport Property
- Parcels not owned by IAA
- Acquisition Program Area (completed)
- City Boundaries
- County Boundaries
- Park/Golf Course
- Historic Site / District - Listed on the National Register of Historic Places (NRHP)
- Single-Family Residential
- Multi-Family Residential
- Mobile Home
- School
- Nursing Home
- Library
- Church
- Hospital

0 6,000

FINAL

12/4/2013 Prepared by Landrum & Brown
Filename: Y:\IND\NEM Update Study\E-L&B Work Product\2-GIS\MXD\C-FINAL\NEM-2.mxd
Contour: IND_2018_rev2_Noise-Contours

Noise Exposure Map Update
Indianapolis International Airport

Future (2018) Noise Exposure Map

Exhibit: **NEM-2**

BACK OF EXHIBIT

AIRPORT NAME: Indianapolis International Airport REVIEWER: _____

PROGRAM REQUIREMENT	YES/NO/NA	SUPPORTING PAGES
I. Submitting And Identifying The NEM:		
A. Submission is properly identified:		
1. 14 C.F.R. Part 150 NEM?	Yes	Letter of Transmittal; Pages 1 through 3
2. NEM and NCP together?	n/a	n/a
3. Revision to NEMs FAA previously determined to be in compliance with Part 150?	Yes	Letter of Transmittal; Page 1
B. Airport and Airport Operator's name are identified?	Yes	Letter of Transmittal; Page 1
C. NCP is transmitted by airport operator's dated cover letter, describing it as a Part 150 submittal and requesting appropriate FAA determination?	n/a	n/a
II. Consultation: [150.21(b), A150.105(a)]		
A. Is there a narrative description of the consultation accomplished, including opportunities for public review and comment during map development?	Yes	Section 1.3 and Appendix A
B. Identification of consulted parties:		
1. Are the consulted parties identified?	Yes	Appendix A
2. Do they include all those required by 150.21(b) and A150.105(a)?	Yes	Appendix A
3. Agencies in 2., above, correspond to those indicated on the NEM?	Yes	Appendix A and NEM-1 & NEM-2 (see full-size NEMs included in the pocket in the back cover)
C. Does the documentation include the airport operator's certification, and evidence to support it, that interested persons have been afforded adequate opportunity to submit their views, data, and comments during map development and in accordance with 150.21(b)?	Yes	Sponsor's Certification, NEM-1 and NEM-2
D. Does the document indicate whether written comments were received during consultation and, if there were comments, that they are on file with the FAA regional airports division manager?	Yes	Appendix A

AIRPORT NAME: Indianapolis International Airport REVIEWER: _____

PROGRAM REQUIREMENT	YES/NO/NA	SUPPORTING PAGES
III. General Requirements: [150.21]		
A. Are there two maps, each clearly labeled on the face with year (existing condition year and one that is at least 5 years into the future)?	Yes	Exhibits NEM-1 & NEM-2 (located in the back pocket of Volume I)
B. Map currency:		
1. Does the year on the face of the existing condition map graphic match the year on the airport operator's NEM submittal letter?	Yes	Letter of Transmittal; Exhibit NEM-1;
2. Is the forecast year map based on reasonable forecasts and other planning assumptions and is it for at least the fifth calendar year after the year of submission?	Yes	Letter of Transmittal; Section 5, Page 51; Future (2018) NEM/NCP Noise Exposure Map (located in the back pocket); Appendix G
3. If the answer to 1 and 2 above is no, the airport operator must verify in writing that data in the documentation are representative of existing condition and at least 5 years' forecast conditions as of the date of submission?	n/a	n/a
C. If the NEM and NCP are submitted together:		
1. Has the airport operator indicated whether the forecast year map is based on either forecast conditions without the program or forecast conditions if the program is implemented?	n/a	n/a
2. If the forecast year map is based on program implementation:		
a. Are the specific program measures that are reflected on the map identified?	n/a	n/a
b. Does the documentation specifically describe how these measures affect land use compatibilities depicted on the map?	n/a	n/a
3. If the forecast year NEM does not model program implementation, the airport operator must either submit a revised forecast NEM showing program implementation conditions [B150.3(b), 150.35(f)] or the sponsor must demonstrate the adopted forecast year NEM with approved NCP measures would not change by plus/minus 1.5 DNL? (150.21(d))	n/a	n/a

AIRPORT NAME: Indianapolis International Airport REVIEWER: _____

PROGRAM REQUIREMENT	YES/NO/NA	SUPPORTING PAGES
IV. Map Scale, Graphics, And Data Requirements: [A150.101, A150.103, A150.105, 150.21(a)]		
A. Are the maps of sufficient scale to be clear and readable (they must not be less than 1" to 2,000'), and is the scale indicated on the maps?	Yes	Large-Scale NEM exhibits located in the back pocket of this report
B. Is the quality of the graphics such that required information is clear and readable?	Yes	Large-Scale NEM exhibits located in the back pocket of this report
C. Depiction of the airport and its environs:		
1. Is the following graphically depicted to scale on both the existing condition and forecast year maps?		
a. Airport boundaries	Yes	Large-Scale NEM exhibits located in the back pocket of this report
b. Runway configurations with runway end numbers	Yes	Large-Scale NEM exhibits located in the back pocket of this report
2. Does the depiction of the off-airport data include?		
a. A land use base map depicting streets and other identifiable geographic features	Yes	Large-Scale NEM exhibits located in the back pocket of this report
b. The area within the DNL 65 dB (or beyond, at local discretion)	Yes	Large-Scale NEM exhibits located in the back pocket of this report
c. Clear delineation of geographic boundaries and the names of all jurisdictions with planning and land use control authority within the DNL 65 dB (or beyond, at local discretion)	Yes	Large-Scale NEM exhibits located in the back pocket of this report
D. 1.Continuous contours for at least the DNL 65, 70, and 75 dB?	Yes	Large-Scale NEM exhibits located in the back pocket of this report
2. Has the local land use jurisdiction(s) adopted a lower local standard and if so, has the sponsor depicted this on the NEMs?	No	n/a
3. Based on current airport and operational data for the existing condition year NEM, and forecast data representative of the selected year for the forecast NEM?	Yes	Letter of Transmittal; Section 4, Pages 4-41; and Section 5, Pages 51-66

AIRPORT NAME: Indianapolis International Airport REVIEWER: _____

PROGRAM REQUIREMENT	YES/NO/NA	SUPPORTING PAGES
IV. Map Scale, Graphics, And Data Requirements: [A150.101, A150.103, A150.105, 150.21(a)] **continued**		
E. Flight tracks for the existing condition and forecast year timeframes, which are numbered to correspond to narrative	Yes	Sections 4.5 and 5.5 Exhibits 4, 5, 6, 7, 8, 9, 10 and 11; and Supplemental exhibits at 1" = 2,000' scale
F. Locations of any noise monitoring sites	Yes	Appendix E and Large-Scale NEM exhibits (located in the back pocket)
G. Noncompatible land use identification:		
1. Are noncompatible land uses within at least the DNL 65 dB noise contour depicted on the map graphics?	Yes	Large-Scale NEM exhibits (located in the back pocket)
2. Are noise sensitive public buildings and historic properties identified?	Yes	Large-Scale NEM exhibits (located in the back pocket) and Appendix F
3. Are the noncompatible uses and noise sensitive public buildings readily identifiable and explained on the map legend?	Yes	Large-Scale NEM exhibits (located in the back pocket of Volume I) and Appendix F
4. Are compatible land uses, which would normally be considered noncompatible, explained in the accompanying narrative?	Yes	Section 4.8, Pages 41-42 and Section 5.8, Pages 65-66
V. Narrative Support Of Map Data: [150.21(a), A150.1, A150.101, A150.103]		
A. 1. Are the technical data and data sources on which the NEMs are based adequately described in the narrative?	Yes	Section 4, Pages 4-41; and Section 5, Pages 5-66; and Appendix G
2. Are the underlying technical data and planning assumptions reasonable?	Yes	Sponsor's Certification; Section 4, Pages 4-41; and Section 5, Pages 51 66
B. Calculation of Noise Contours:		
1. Is the methodology indicated?	Yes	Section 3, Page 3
a. Is it FAA approved?	Yes	Section 3, Page 3
b. Was the same model used for both maps	Yes	Section 3, Page 3
c. Has AEE approval been obtained for use of a model other than those that have previous blanket FAA approval?	n/a	n/a

AIRPORT NAME: Indianapolis International Airport REVIEWER: _____

PROGRAM REQUIREMENT	YES/NO/NA	SUPPORTING PAGES
V. Narrative Support Of Map Data: [150.21(a), A150.1, A150.101, A150.103], **continued**		
2. Correct use of noise models:		
a. Does the documentation indicate, or is there evidence, the airport operator (or its consultant) has adjusted or calibrated FAA-approved noise models or substituted one aircraft type for another that was not included on the FAA's pre-approved list of aircraft substitutions?	Yes	Section 4.6, Pages 39-40; and Appendix E, Section E.3.3
b. If so, does this have written approval from AEE, and is that written approval included in the submitted document?	n/a	n/a
3. If noise monitoring was used, does the narrative indicate that Part 150 guidelines were followed?	Yes	Appendix E, Section E.3
4. For noise contours below DNL 65 dB, does the supporting documentation include an explanation of local reasons?	n/a	n/a
C. Noncompatible Land Use Information:		
1. Does the narrative (or map graphics) give estimates of the number of people residing in each of the contours (DNL 65, 70 and 75, at a minimum) for both the existing condition and forecast year maps?	Yes	Section 4.8, Table 9; and Section 5.8, Table 19
2. Does the documentation indicate whether the airport operator used Table 1 of Part 150?	Yes	Section 3, Page 3
a. If a local variation to table 1 was used:		
(1) Does the narrative clearly indicate which adjustments were made and the local reasons for doing so?	n/a	n/a
(2) Does the narrative include the airport operator's complete substitution for table 1?	n/a	n/a
3. Does the narrative include information on self- generated or ambient noise where compatible or noncompatible land use identifications consider non-airport and non-aircraft noise sources?	n/a	n/a

AIRPORT NAME: Indianapolis International Airport REVIEWER: _____

PROGRAM REQUIREMENT	YES/NO/NA	SUPPORTING PAGES
V. Narrative Support Of Map Data: [150.21(a), A150.1, A150.101, A150.103], **continued**		
4. Where normally noncompatible land uses are not depicted as such on the NEMs, does the narrative satisfactorily explain why, with reference to the specific geographic areas?	Yes	Section 4.8, Pages 41-42; and Section 5.8, Pages 65-66
5. Does the narrative describe how forecast aircraft operations, forecast airport layout changes, and forecast land use changes will affect land use compatibility in the future?	Yes	Section 5 and Appendix G
VI. Map Certifications: [150.21(b), 150.21(e)]		
A. Has the operator certified in writing that interested persons have been afforded adequate opportunity to submit views, data, and comments concerning the correctness and adequacy of the draft maps and forecasts?	Yes	Sponsor's Certificatation
B. Has the operator certified in writing that each map and description of consultation and opportunity for public comment are true and complete under penalty of 18 U.S.C. § 1001?	Yes	Sponsor's Certificatation

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TABLE OF CONTENTS

APPENDICES

EXHIBITS

EXHIBITS, *Continued*

TABLES

PAGE

TABLES, *Continued*

Sections 1-6

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1. INTRODUCTION

1.1 14 CFR PART 150

There are two components to 14 Code of Federal Regulations (CFR) Part 150: Noise Exposure Maps (NEMs) and a Noise Compatibility Program (NCP). The NEMs provide information on the existing and five-year future expected boundaries of significant levels of annual average noise exposure surrounding the Airport to all interested parties. The NCP sets forth measures intended to mitigate the impacts of significant noise exposure on residential areas and other noise-sensitive facilities near the Airport and to restrict the introduction of new incompatible uses into locations exposed to significant noise levels. This document updates the NEMs for Existing (2013) and Future (2018) conditions at the Indianapolis International Airport (IND or Airport).

1.2 BACKGROUND

The Indianapolis Airport Authority (IAA) has undertaken a long history of noise compatibility planning at IND. This document reflects the sixth iteration in noise compatibility planning for IND. The first five iterations are listed below:

- IND Part 150 NCP, 1987
- IND Part 150 NCP Study Update, 1992
- IND Part 150 NCP Study Update, 1997
- IND NEM Study Update, 2003
- IND NEM Study Update, 2008

One of the recommendations of the previously approved NCP is the periodic update of the NEMs and NCP to stay current with local conditions. In August 2009, the NEMs for the Existing (2008) and Future (2013) conditions at IND were determined to be in compliance by the Federal Aviation Administration (FAA) as part of the 2008 NEM Update. Five years have passed since the NEMs were last updated; therefore, IAA has undertaken this update of the official NEMs for IND. The following sections of this document will discuss this process to update the NEMs and provide the resulting noise exposure patterns.

1.3 PUBLIC INVOLVEMENT

The NEM Update process began in September 2012 through a data collection phase. In October 2013, a series of informal Community Leader Focus Group Meetings were held with local officials and stakeholders to solicit their input on the process (see Section 1.3.1 for a description of the meetings). Two back-to-back Public Open Houses/Public Hearings were held on **November 18, 2013** (5:00 pm to 7:00 pm at Plainfield High School, 1 Red Pride Drive, Plainfield, Indiana 46168) and **November 19, 2013** (5 pm to 7 pm at Lynhurst 7th and 8th Grade Center, 2805 South Lynhurst Drive, Indianapolis, Indiana 46241) to present the findings and

accept public comments on the Draft NEM Update document. Appendix A, *Public Coordination*, includes meeting materials from the Focus Group and Public Open Houses/Public Hearings, as well as other coordination materials.

1.3.1 COMMUNITY LEADER FOCUS GROUP MEETINGS

A series of meetings were held in October 2013 to inform local officials of the process to update the NEMs. At these meetings, information was presented describing the NEM update process including previous noise compatibility planning efforts undertaken by the IAA, current data collection, and the methodology and draft results of the noise modeling for the updating the NEMs. The Community Leader Focus Group Meetings also informed local officials of the timeline of the project and afforded them the opportunity to provide their input during the study. Invitation letters, sign-in sheets, presentation materials, comments received, and meeting summaries from the Community Leader Focus Group Meetings are included in Appendix A, *Public Coordination*.

1.3.2 DRAFT NEM UPDATE DOCUMENT AND PUBLIC HEARING

This Draft NEM Update document was made available to the public on November 4, 2013 at local libraries, the Airport, and online. Appendix B, *Document Locations*, provides a list of the locations for public viewing of the Draft NEM Update document. Public Open Houses/Public Hearings were held on:

November 18, 2013
Plainfield High School
1 Red Pride Drive
Plainfield, IN 46168
5:00 pm to 7:00 pm

November 19, 2013
Lynhurst 7th and 8th Grade Center
2805 South Lynhurst Drive
Indianapolis, IN 46241
5:00 pm to 7:00 pm

Written comments on the Draft NEM Update document were accepted between November 18, 2013 and December 5, 2013. An electronic copy of the document is available at http://www.indianapolisairport.com, under the Sound and Noise Management section of the Airport website.

2. NOISE EXPOSURE MAPS (NEMs)

The NEMs in this document are the official noise contours for IND and have been prepared for Existing (2013) conditions and for Future (2018) conditions. The NEMs were prepared according to the 14 CFR Part 150 guidelines in regards to methodology, noise metrics, identification of incompatible land uses, and public outreach. Among other requirements, 14 CFR Part 150 states that the Integrated Noise Model (INM) be utilized to prepare the NEMs. The data from noise measurement programs, like the one conducted for this study, can be used to assist in the development of input data and verification of the output of the INM; however, it cannot be the sole source of noise data used for the preparation of the NEMs. See Appendix E, *Noise Complaints and Noise Measurement Program*, for a complete discussion of the noise measurement program.

3. METHODOLOGY

The noise exposure patterns at IND are presented in terms of the average annual Day-Night Sound Level (DNL) for Existing (2013) and Future (2018) conditions. The annual DNL metric is the annual average of the total noise energy that occurs at a location. With DNL, nighttime (10:00 p.m. to 6:59 a.m.) noise events are weighted (or penalized) by 10 decibels (dB) to reflect the greater perceived impact of noise at night. The DNL is used in Part 150 Studies and in other noise study related documents to demonstrate compliance with the National Environmental Policy Act (NEPA). The NEMs display contour lines that connect points of equal DNL exposure at 65, 70, and 75 dB.

The noise levels computed during this study used the latest version of the INM at the time the study was initiated (version 7.0d). The INM was developed under the auspices of the FAA for use in Part 150 and other environmental studies. The distribution of the noise pattern calculated by the INM is a function of the number of aircraft operations during the evaluation period, the types of aircraft flown, the time of day when they are flown, the way they are flown, how frequently each runway is used for landing and takeoff, and the routes of flight to and from the runways. Substantial variations in any one of these factors may, when extended over a long period of time, may cause marked changes to the annual noise pattern. Detailed information on each of these elements is presented in Section 4, *Existing (2013) Conditions*, and Appendix D, *Noise Modeling Methodology*.

The distribution and number of housing units, persons, and noise-sensitive public uses located within each significant contour range (65-70 DNL, 70-75 DNL, 75+ DNL) was determined through application of Geographic Information System (GIS) technology, coupled with field validation surveys. Appendix F, *Land Use Assessment Methodology*, includes a detailed description of the mapping used in this report. The identification of noise-sensitive land uses is based upon Table 1, Part 150 Land Use Compatibility Guidelines. This table is located in Appendix C, *FAA Policies, Guidance, and Regulations*. The underlying base map on which each noise exposure pattern is displayed was current as of August 2013. All noise impacts associated with Existing (2013) and Future (2018) noise conditions were automatically calculated by overlaying the noise exposure contours with the GIS base map.

4. EXISTING (2013) CONDITIONS

The noise contours depicted on the Existing (2013) NEM represent the noise pattern as it exists in 2013. The Existing (2013) Noise Exposure Contour is based on actual operating data at IND for the period from September 1, 2011 through August 31, 2012. The following sections describe the input data that was used to model the Existing (2013) NEM.

4.1 RUNWAY LAYOUT

IND currently has three runways: two parallel runways (5L/23R and 5R/23L) that are spaced 4,850 feet apart and oriented in a northeast-southwest direction, and a crosswind runway (14/32) that is oriented northwest-southeast. The existing airport layout is shown on **Exhibit 1**. The current runways and lengths at IND are listed below:

Runway	Length (feet)
05L/23R	11,200
05R/23L	10,000
14/32	7,280

4.2 OPERATING LEVELS

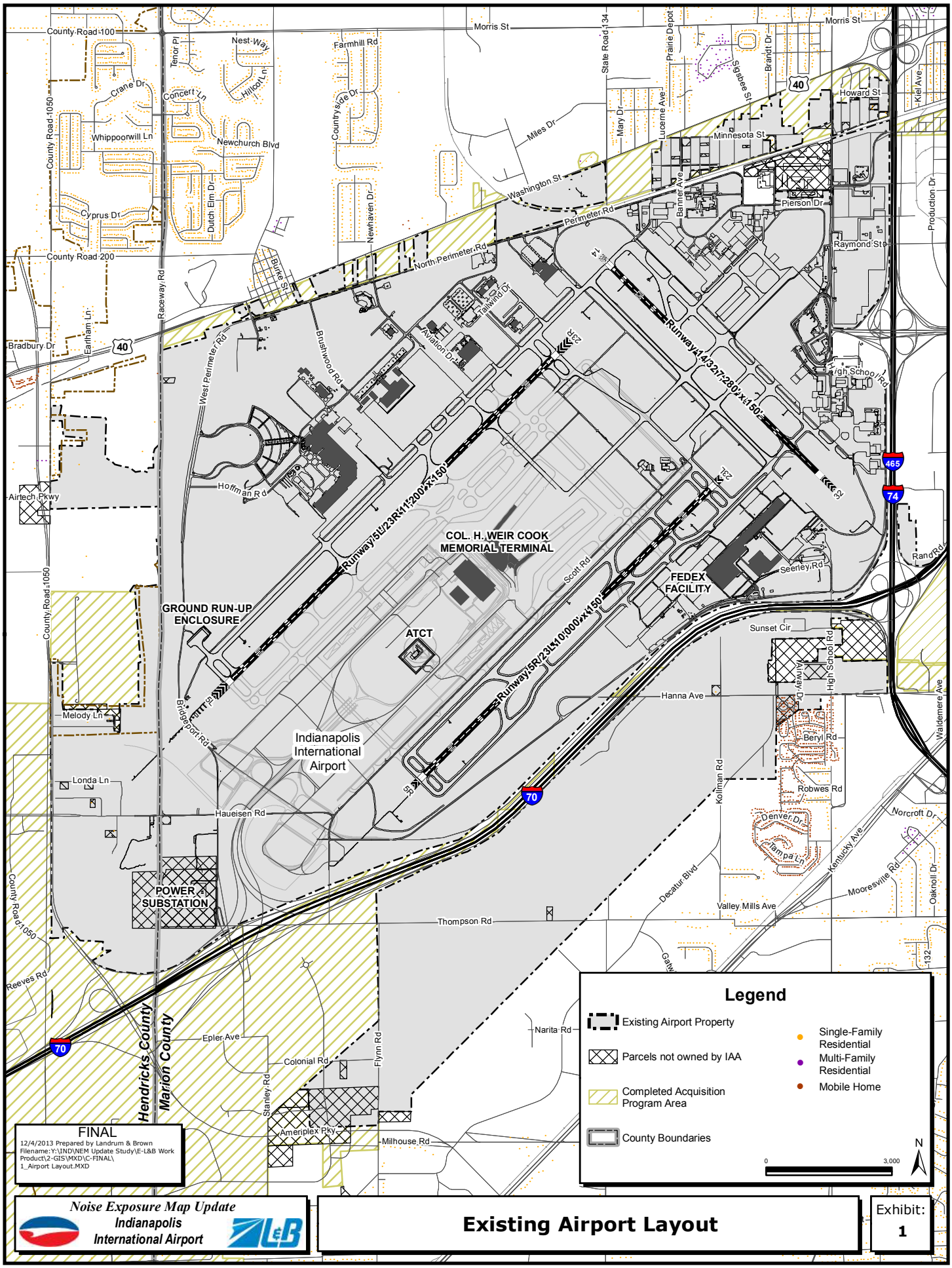
The INM uses average-annual operating data, grouped by time of day, to calculate DNL contours. The number of annual operations at IND was based on Air Traffic Control Tower (ATCT) counts for the period from September 1, 2011 through August 31, 2012. During that period, 159,757 annual operations occurred at IND, which rounds to 438 average-annual day operations. **Table 1** provides a summary of the average daily operations and fleet mix at IND, organized by aircraft category, operation type, and time of day.

The INM applies a 10 dB penalty to all nighttime (10:00 p.m. to 6:59 a.m.) operations. For Existing (2013) conditions, 119 of the total average-annual day operations (approximately 27 percent) occurred during nighttime hours.

Table 1
DISTRIBUTION OF AVERAGE DAILY OPERATIONS BY AIRCRAFT CATEGORY
EXISTING (2013) CONDITIONS
Indianapolis International Airport

Aircraft Category	Arrivals		Departures		Total
	Day	Night	Day	Night	
Air Carrier	93	47	86	54	280
Cargo Jets	10	33	10	33	86
Large Passenger Jets	83	14	76	21	194
Air Taxi	46	7	46	7	106
Regional Jets	42	5	42	5	94
Commuter / Cargo Props	4	2	4	2	12
General Aviation / Military	24	2	24	2	52
General Aviation Jets	11	1	12	0	24
General Aviation Propeller Aircraft	12	1	11	2	26
Military Aircraft	1	0	1	0	2
Total	**163**	**56**	**156**	**63**	**438**

Note: Day = 7:00 a.m. to 9:59 p.m., Night = 10:00 p.m. to 6:59 a.m.
Source: OAG, ATCT records, Landing Fee Reports, AOMS data, Landrum & Brown, 2013.


Runway 14/32 7,230' x 150'
Runway 5L/23R 11,200' x 150'
Runway 5R/23L 10,000' x 150'
COL. H. WEIR COOK MEMORIAL TERMINAL
FEDEX FACILITY
GROUND RUN-UP ENCLOSURE
ATCT
POWER SUBSTATION
Indianapolis International Airport
Hendricks County
Marion County
Morris St
County Road 100
County Road 1050
County Road 200
Raceway Rd
Tenor Pl
Nest Way
Farmhill Rd
Crane Dr
Concert Ln
Hillcot Ln
Whippoorwill Ln
Newchurch Blvd
Countryside Dr
Dutch Elm Dr
Cyprus Dr
Newhaven Dr
Burke St
State Road 134
Prairie Depot
Sylabee St
Brandt Dr
Howard St
Kiel Ave
Miles Dr
Mary Dr
Lucerne Ave
Minnesota St
Washington St
Banner Ave
Pierson Dr
Perimeter Rd
North Perimeter Rd
Production Dr
Raymond St
Tailwind Dr
Aviation Dr
Brushwood Rd
West Perimeter Rd
Bradbury Dr
Eartham Ln
Airtech Pkwy
Hoffman Rd
Scott Rd
Seerley Rd
Rand Rd
Sunset Cir
High School Rd
Hanna Ave
Melody Ln
Bridgeport Rd
Londa Ln
Haueisen Rd
Beryl Rd
Robwes Rd
Denver Dr
Tampa Ln
Kollman Rd
Kentucky Ave
Norcroft Dr
Mooresville Rd
Oaknoll Dr
Waldemere Ave
Decatur Blvd
Valley Mills Ave
Thompson Rd
Reeves Rd
Epler Ave
Colonial Rd
Stanley Rd
Flynn Rd
Narita Rd
Ameriplex Pkwy
Milhouse Rd
40
70
74
465
Legend
Existing Airport Property
Parcels not owned by IAA
Completed Acquisition Program Area
County Boundaries
Single-Family Residential
Multi-Family Residential
Mobile Home
0
3,000
N
FINAL
12/4/2013 Prepared by Landrum & Brown
Filename:Y:\IND\NEM Update Study\E-L&B Work Product\2-GIS\MXD\C-FINAL\1_Airport Layout.MXD
Noise Exposure Map Update
Indianapolis International Airport
Existing Airport Layout
Exhibit: 1

BACK OF EXHIBIT

4.3 FLEET MIX

Fleet mix refers to the specific types of aircraft that operate at the Airport. Because the INM uses an average-annual day to calculate DNL noise levels, the number of average-annual day operations are allocated to specific aircraft types in accordance with their annual distributions found in the data sources reviewed. Specific aircraft types and times of operation were developed from Official Airline Guide (OAG) data, landing fee reports, and the Airport's Operations Management System (AOMS) data for the period from September 2011 through August 2012.

Large passenger jet operations accounted for 44 percent of the total operations and included Boeing 737-300/500/700/800s, Boeing 757-200s, Airbus 319/320s, McDonnell-Douglas DC9-30/50s, MD-82/88/90, Bombardier CRJ-700/900s and Embraer 170/175 types. Cargo jet aircraft accounted for 20 percent of the total operations and included Boeing 727-200s and 777 Freighters, Airbus 300/310s, DC10-10/30s, and MD-11s. Regional jets (jets with less than 70 seats), such as the Bombardier CRJ-200 and Embraer 140/145, accounted for 21 percent of total operations. The remainder of operations included cargo/commuter prop aircraft and general aviation aircraft. **Table 2** shows the average-annual day fleet mix and operational levels, by aircraft type for the Existing (2013) condition.

Stage 2 aircraft that were retrofitted with hushkits to meet the current Stage 3 aircraft noise standards[1] continued to decline at IND and now make up approximately two percent of total operations at the Airport. This is an important factor in calculating the overall noise levels, because while these aircraft meet the Stage 3 noise standards, they remain the loudest aircraft in the fleet. These hushkitted aircraft include the Boeing 727-200 and DC9-50s. Data from the 2008 NEM update shows approximately nine percent of operations in 2008 were operated by hushkitted aircraft.

[1] See Appendix D for additional information on Stage 2 and Stage 3 noise certifications.

Table 2
DISTRIBUTION OF AVERAGE DAILY OPERATIONS BY AIRCRAFT TYPE
EXISTING (2013) BASELINE
Indianapolis International Airport

Aircraft Type	INM ID	Arrivals		Departures		Total
		Day	Night	Day	Night	
Cargo Jets						
Airbus A300 Freighter	A300-622R	3	8	3	8	**22**
Airbus A310 Freighter	A310-304	0	5	0	5	**10**
Boeing 727-200 (hushkitted)	727EM2	0	2	0	2	**4**
Boeing 757-200	757PW	0	2	1	1	**4**
Boeing 757-200	757RR	0	3	1	2	**6**
Boeing 747-400	747400	1	0	0	1	**2**
Boeing 777 Freighter	7773ER	0	1	0	1	**2**
McDonnell-Douglas MD10	DC1010	4	6	2	8	**20**
McDonnell-Douglas MD10	DC1030	1	2	2	1	**6**
McDonnell-Douglas MD11	MD11GE	0	4	1	3	**8**
McDonnell-Douglas MD11	MD11PW	1	0	0	1	**2**
Subtotal		*10*	*33*	*10*	*33*	***86***
Large Passenger Jets						
Boeing 717-200	717200	6	3	8	1	**18**
Boeing 737-300	737300	7	1	8	0	**16**
Boeing 737-500	737500	1	0	1	0	**2**
Boeing 737-700	737700	12	1	11	2	**26**
Boeing 737-800	737800	1	0	1	0	**2**
Boeing 757-300	757300	1	0	1	0	**2**
Airbus A319	A319-131	5	1	5	1	**12**
Airbus A320	A320-211	3	1	3	1	**8**
Airbus A320	A320-232	2	0	1	1	**4**
McDonnell-Douglas MD80 Series	MD82	4	0	4	0	**8**
McDonnell-Douglas MD80 Series	MD83	5	2	6	1	**14**
McDonnell-Douglas MD90	MD9025	1	0	0	1	**2**
Douglas DC9-5 (hushkitted)	DC95HW	1	0	0	1	**2**
Bombardier CRJ-700	CRJ9-ER	8	3	8	3	**22**
Bombardier CRJ-900	CRJ9-ER	3	1	3	1	**8**
Embraer 170	EMB170	16	1	12	5	**34**
Embraer 175	EMB175	7	0	4	3	**14**
Subtotal		*83*	*14*	*76*	*21*	***194***

Table 2 *(continued)*
DISTRIBUTION OF AVERAGE DAILY OPERATIONS BY AIRCRAFT TYPE
EXISTING (2013) BASELINE
Indianapolis International Airport

Aircraft Type	INM ID	Arrivals		Departures		Grand Total
		Day	Night	Day	Night	
Regional Jets						
Bombardier CRJ-200	CL601	14	2	14	2	**32**
Embraer 140	EMB140	3	2	3	2	**10**
Embraer 145	EMB145	10	1	10	1	**22**
Embraer 145	EMB14L	15	0	15	0	**30**
Subtotal		*42*	*5*	*42*	*5*	***94***
Commuter / Cargo Props						
Avions de Transport Regional ATR-42	ATR42	0	1	0	1	**2**
Avions de Transport Regional ATR-72	ATR72	1	0	1	0	**2**
Cessna 208 Grand Caravan	CNA208	1	1	1	1	**4**
Bombardier Dash 8-100	DHC8	1	0	1	0	**2**
Bombardier Dash 8-300	DHC830	1	0	1	0	**2**
Subtotal		*4*	*2*	*4*	*2*	***12***
General Aviation Jets						
General Aviation Twin Engine Jet	CIT3	1	0	1	0	**2**
General Aviation Twin Engine Jet	CL600	1	0	1	0	**2**
General Aviation Twin Engine Jet	CNA525C	1	0	1	0	**2**
General Aviation Twin Engine Jet	CNA55B	1	0	1	0	**2**
General Aviation Twin Engine Jet	CNA560XL	1	0	1	0	**2**
General Aviation Twin Engine Jet	GIV	1	0	1	0	**2**
General Aviation Twin Engine Jet	LEAR35	4	0	4	0	**8**
General Aviation Twin Engine Jet	MU3001	1	1	2	0	**4**
Subtotal		*11*	*1*	*12*	*0*	***24***
General Aviation Props						
General Aviation Twin Piston	BEC58P	2	0	2	0	**4**
General Aviation Single Piston	CNA172	0	1	0	1	**2**
General Aviation Single Piston	CNA182	1	0	1	0	**2**
General Aviation Single Piston	CNA206	1	0	1	0	**2**
General Aviation Turboprop	CNA441	4	0	3	1	**8**
General Aviation Single Piston	GASEPV	3	0	3	0	**6**
General Aviation Single Piston	PA28	1	0	1	0	**2**
Subtotal		*12*	*1*	*11*	*2*	***26***
Military Aircraft						
Northrup Talon T-38A	T-38A	1	0	1	0	**2**
Subtotal		*1*	*0*	*1*	*0*	***2***
Total		**163**	**56**	**156**	**63**	**438**

Note: Day = 7:00 a.m. to 9:59 p.m., Night = 10:00 p.m. to 6:59 a.m.

Source: OAG, ATCT records, Landing Fee Reports, AOMS data, FAA ETMSC, Landrum & Brown, 2013.

4.4 RUNWAY END UTILIZATION

Average-annual day runway end utilization was derived primarily from analysis of the AOMS data for the period from September 2011 through August 2012. **Table 3** summarizes the percentage of use by each aircraft category on each of the runways at IND during the daytime (7:00 a.m. – 9:59 p.m.) and nighttime (10:00 p.m. – 6:59 a.m.).

During the daytime (7:00 a.m. to 9:59 p.m.), the Airport primarily operated in southwest flow due to the prevailing southwest winds. When the Airport operated in this configuration, aircraft arrived from the northeast and departed to the southwest on Runways 23L and 23R. Approximately 64 percent of the operations occurred in southwest flow (36% on Runway 23L and 28% on Runway 23R). Approximately 31 percent of operations occurred in northeast flow, in which aircraft arrive from the southwest and depart to the northeast on Runways 05L (13%) and 05R (18%). The remaining 6 percent of the operations occurred on the crosswind runway (2% on Runway 14 and 4% on Runway 32).

During the nighttime (10:00 p.m. to 6:59 a.m.) the Airport operates in a preferential reverse flow configuration when weather and operating conditions permit. Under this operating configuration aircraft arrive from the southwest to Runways 05L and 05R and depart to the southwest on Runways 23L and 23R. The use of preferential reverse flow was implemented to reduce nighttime overflights of the more densely populated areas to the northeast of IND. Approximately 52 percent of nighttime arrivals occurred in northeast flow from September 2011 through August 2012 (38% on Runway 05R and 14% on Runway 05L). In comparison, approximately 25 percent of daytime arrivals occur in northeast flow (13% on Runway 5R and 12% on Runway 5L). Aircraft depart to the southwest approximately 75 percent of the time at night (50% from Runway 23L and 25% from Runway 23R) compared to 60 percent of daytime departures that occur in southwest flow (30% on Runway 23L and 30% on Runway 23R). The measures included in the 1997 Part 150 Study Update regarding runway end utilization are summarized below:

- **NA-1:** Continue preferential use of Runways 23R/L for departures during 24 hours per day and for arrivals between 6 a.m. and 10 p.m.
- **NA-2:** Continue preferential use of Runways 5R/L for arrivals between 10 p.m. and 6 a.m.

Table 3
RUNWAY END UTILIZATION
EXISTING (2013) BASELINE
Indianapolis International Airport

Daytime Arrivals						
Aircraft Category	**05R**	**23L**	**05L**	**23R**	**14**	**32**
Cargo Jets	27%	57%	6%	9%	0%	1%
Large Passenger Jets	12%	35%	15%	36%	0%	2%
Regional Jets	14%	40%	12%	30%	1%	3%
Propeller Aircraft	9%	36%	6%	26%	16%	7%
Military Aircraft	13%	40%	12%	30%	1%	4%
Total	13%	38%	12%	31%	2%	3%
Nighttime Arrivals						
Aircraft Category	**05R**	**23L**	**05L**	**23R**	**14**	**32**
Cargo Jets	55%	38%	4%	3%	0%	0%
Large Passenger Jets	18%	21%	30%	31%	0%	1%
Regional Jets	14%	19%	33%	31%	1%	2%
Propeller Aircraft	3%	14%	5%	28%	42%	9%
Military Aircraft	0%	0%	0%	0%	0%	0%
Total	38%	30%	14%	15%	2%	1%
Daytime Departures						
Aircraft Category	**05R**	**23L**	**05L**	**23R**	**14**	**32**
Cargo Jets	28%	64%	2%	6%	0%	1%
Large Passenger Jets	17%	28%	18%	35%	0%	1%
Regional Jets	17%	30%	14%	29%	4%	5%
Propeller Aircraft	14%	15%	8%	18%	21%	23%
Military Aircraft	17%	31%	14%	29%	5%	5%
Total	17%	30%	15%	30%	4%	5%
Nighttime Departures						
Aircraft Category	**05R**	**23L**	**05L**	**23R**	**14**	**32**
Cargo Jets	10%	65%	3%	22%	0%	0%
Large Passenger Jets	16%	38%	13%	32%	0%	0%
Regional Jets	18%	31%	17%	33%	1%	1%
Propeller Aircraft	3%	6%	5%	4%	10%	73%
Military Aircraft	0%	0%	0%	0%	0%	0%
Total	12%	50%	8%	25%	1%	5%
Total Operations						
	05R	**23L**	**05L**	**23R**	**14**	**32**
Arrivals	20%	36%	13%	27%	2%	3%
Departures	16%	36%	13%	28%	3%	5%
Total	18%	36%	13%	28%	2%	4%

Daytime = 7:00 a.m. – 9:59 p.m.
Nighttime = 10:00 p.m. – 6:59 a.m.

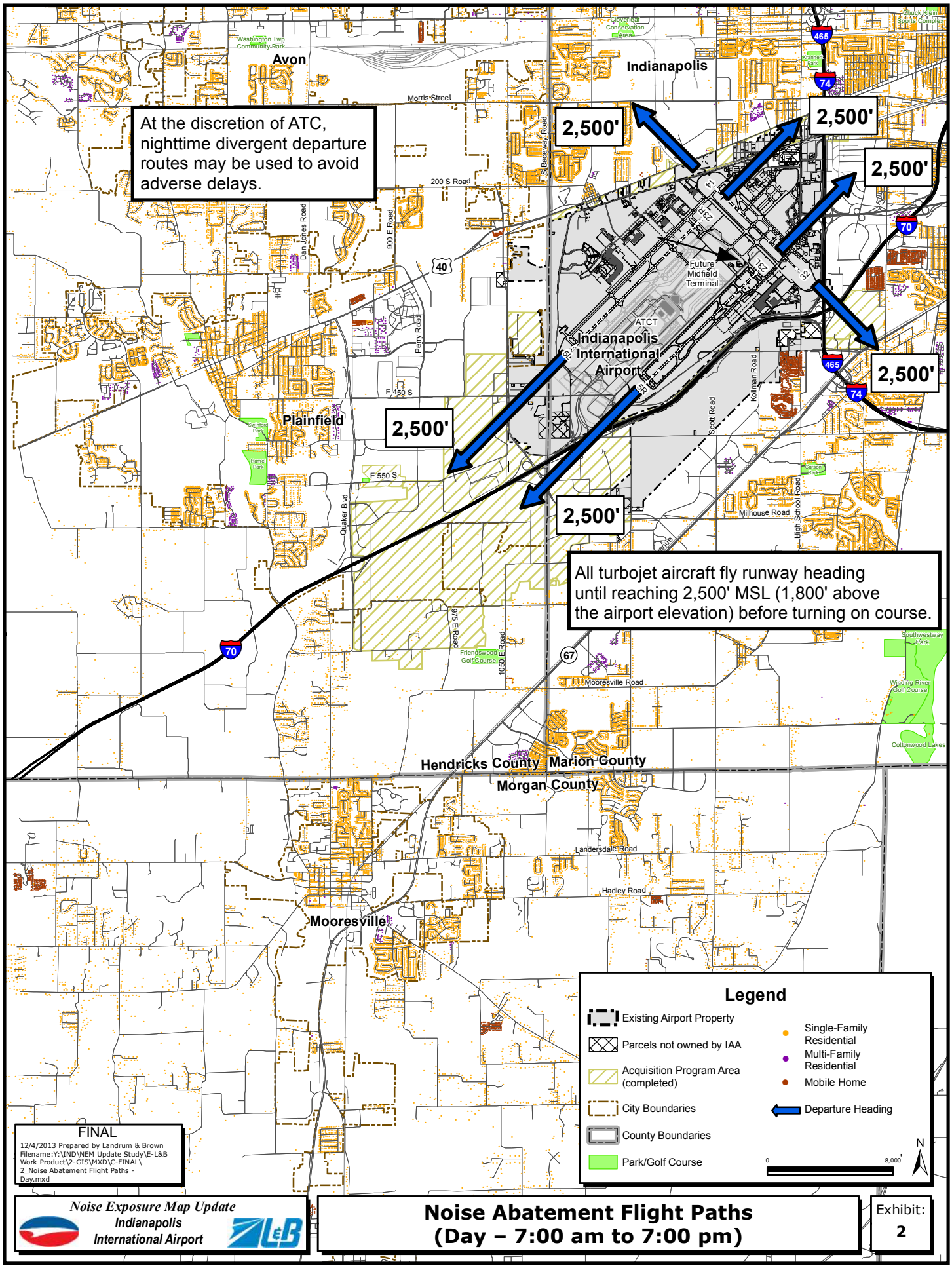
Source: AOMS data, September 2011 through August 2012; Landrum & Brown analysis, 2013.

4.5 FLIGHT TRACKS

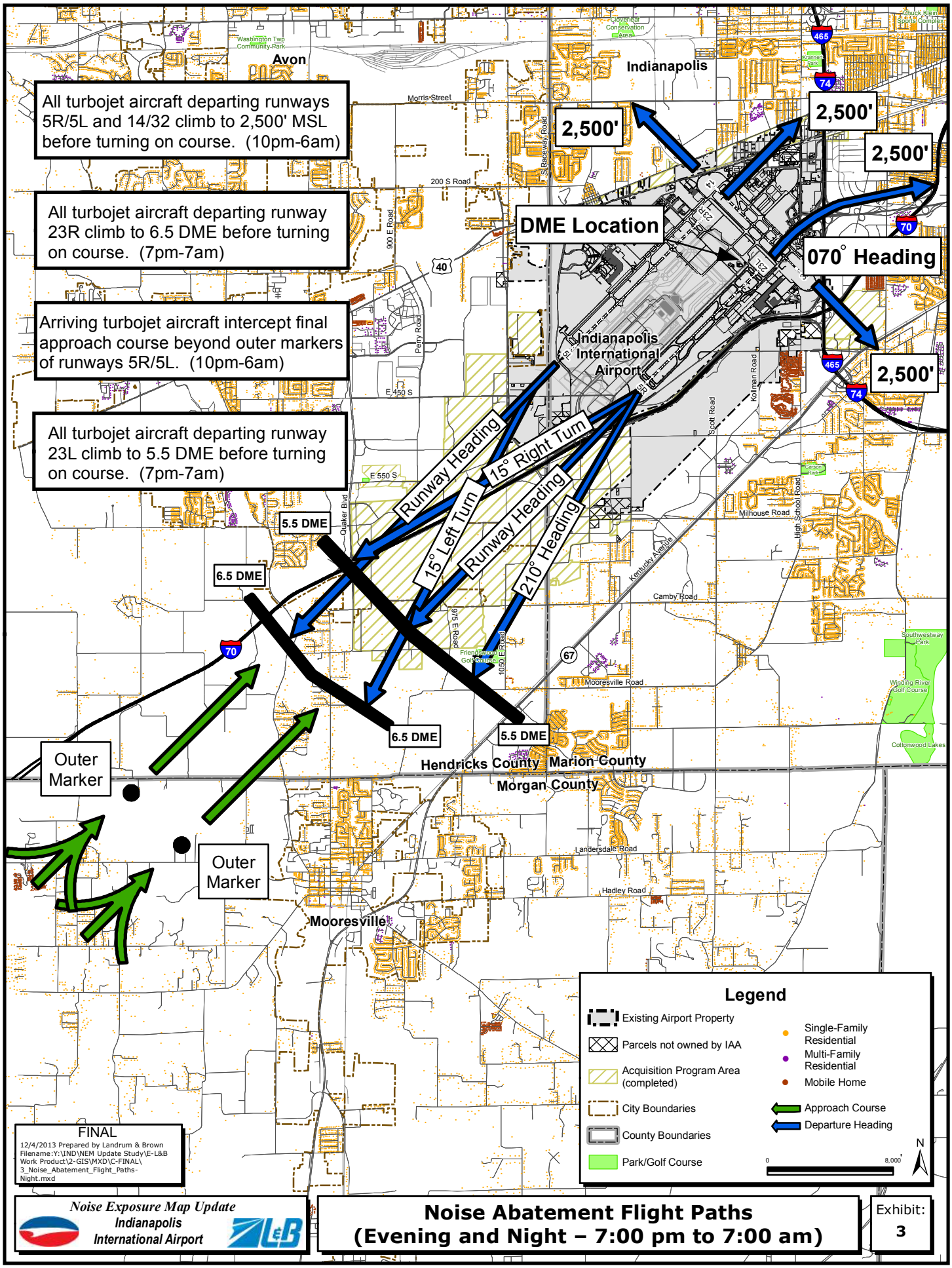
Through the 1997 Part 150 Study Update and subsequent 1999 Supplemental Environmental Impact Statement (SEIS), noise abatement flight tracks were defined at IND. **Exhibit 2** and **Exhibit 3** show the location of consolidated noise abatement flight tracks. A review of operational conditions found that these tracks remain representative of existing conditions. These recommendations from the 1997 Part 150 Study Update concerning the air traffic procedures are presented below:

- **NA-10:** Continue use of 070-degree heading for departures from Runway 5R during the period between 10:00 p.m. and 6:00 a.m. Maintain heading until reaching 2,500 MSL.
- **NA-17:** Endorse internal control procedures by ATCT which result in jet aircraft departing Runway 23L between 7:00 p.m. and 7:00 a.m. flying either runway heading or a 15-degree right divergent turn or left divergent turn to a 210 degree heading, initiated at the middle marker of the ILS approach to Runway 5R, and maintenance of such divergent or runway headings until reaching a distance of 5.5 DME prior to turns to en-route courses.
- **NA-18:** Endorse internal control procedures by ATCT which result in jet aircraft departing Runway 23R between 7:00 p.m. and 7:00 a.m. flying either runway heading or a left divergent turn of 15 degrees, initiated at the middle marker of the ILS approach to Runway 5L, and maintenance of such divergent or runway heading until reaching a distance of 6.5 DME prior to turns to en-route courses.

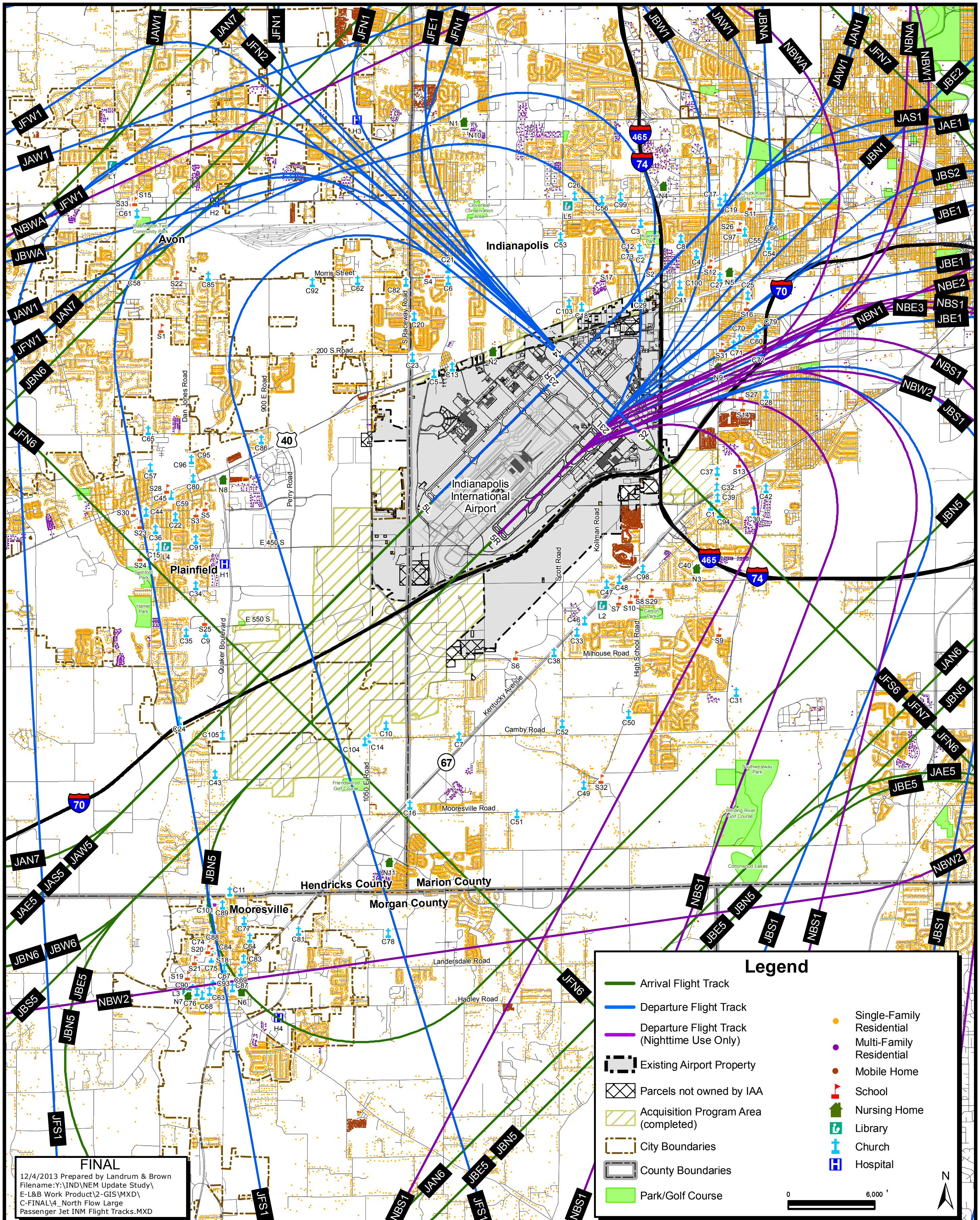
There are two components to modeling flight tracks in the INM, flight track location and percent utilization. AOMS radar data was gathered for selected periods from September 2011 through August 2012 and analyzed to verify the location and percent utilization of flight corridors at IND. Consolidated flight track locations and percent utilization were developed based on this radar data. These flight tracks were used in the INM to model the flight corridors present around the Airport. The INM flight tracks modeled for the 2013 NEM are shown on **Exhibit 4 through Exhibit 11**. **Table 4** shows arrival flight track utilization percentages and **Table 5** shows departure flight track utilization percentages for the Existing (2013) Noise Exposure Contour.


At the discretion of ATC, nighttime divergent departure routes may be used to avoid adverse delays.
2,500'
2,500'
2,500'
2,500'
2,500'
2,500'
All turbojet aircraft fly runway heading until reaching 2,500' MSL (1,800' above the airport elevation) before turning on course.
Avon
Indianapolis
Plainfield
Mooresville
Hendricks County
Marion County
Morgan County
Indianapolis International Airport
ATCT
Future Midfield Terminal
Morris Street
200 S Road
E 450 S
E 550 S
Mooresville Road
Landersdale Road
Hadley Road
Milhouse Road
Scott Road
Kollman Road
High School Road
Dan Jones Road
900 E Road
Perry Road
Quaker Blvd
975 E Road
1050 E Road
S Raceway Road
Friendswood Golf Course
Winding River Golf Course
Cottonwood Lakes
Southwestway Park
Cloverleaf Conservation Area
Washington Twp Community Park
Chuck Klein Sports Complex
Hamel Park
Swinford Park
Carson Park
Legend
Existing Airport Property
Parcels not owned by IAA
Acquisition Program Area (completed)
City Boundaries
County Boundaries
Park/Golf Course
Single-Family Residential
Multi-Family Residential
Mobile Home
Departure Heading
0
8,000'
N
FINAL
12/4/2013 Prepared by Landrum & Brown
Filename:Y:\IND\NEM Update Study\E-L&B Work Product\2-GIS\MXD\C-FINAL\2_Noise Abatement Flight Paths - Day.mxd
Noise Exposure Map Update
Indianapolis International Airport
Noise Abatement Flight Paths
(Day – 7:00 am to 7:00 pm)
Exhibit:
2

BACK OF EXHIBIT


All turbojet aircraft departing runways 5R/5L and 14/32 climb to 2,500' MSL before turning on course. (10pm-6am)
All turbojet aircraft departing runway 23R climb to 6.5 DME before turning on course. (7pm-7am)
Arriving turbojet aircraft intercept final approach course beyond outer markers of runways 5R/5L. (10pm-6am)
All turbojet aircraft departing runway 23L climb to 5.5 DME before turning on course. (7pm-7am)
2,500'
2,500'
2,500'
2,500'
DME Location
070° Heading
Runway Heading
15° Right Turn
15° Left Turn
Runway Heading
210° Heading
5.5 DME
6.5 DME
6.5 DME
5.5 DME
Outer Marker
Outer Marker
Indianapolis International Airport
Avon
Indianapolis
Mooresville
Hendricks County
Marion County
Morgan County
Morris Street
200 S Road
900 E Road
Perry Road
E 450 S
E 550 S
Quaker Blvd
S Raceway Road
Scott Road
Kollman Road
Milhouse Road
High School Road
Kentucky Avenue
Camby Road
975 E Road
1050 E Road
Mooresville Road
Landersdale Road
Hadley Road
Legend
Existing Airport Property
Parcels not owned by IAA
Acquisition Program Area (completed)
City Boundaries
County Boundaries
Park/Golf Course
Single-Family Residential
Multi-Family Residential
Mobile Home
Approach Course
Departure Heading
FINAL
12/4/2013 Prepared by Landrum & Brown
Filename:Y:\IND\NEM Update Study\E-L&B Work Product\2-GIS\MXD\C-FINAL\3_Noise_Abatement_Flight_Paths-Night.mxd
Noise Exposure Map Update
Indianapolis International Airport
Noise Abatement Flight Paths
(Evening and Night – 7:00 pm to 7:00 am)
Exhibit: 3

BACK OF EXHIBIT



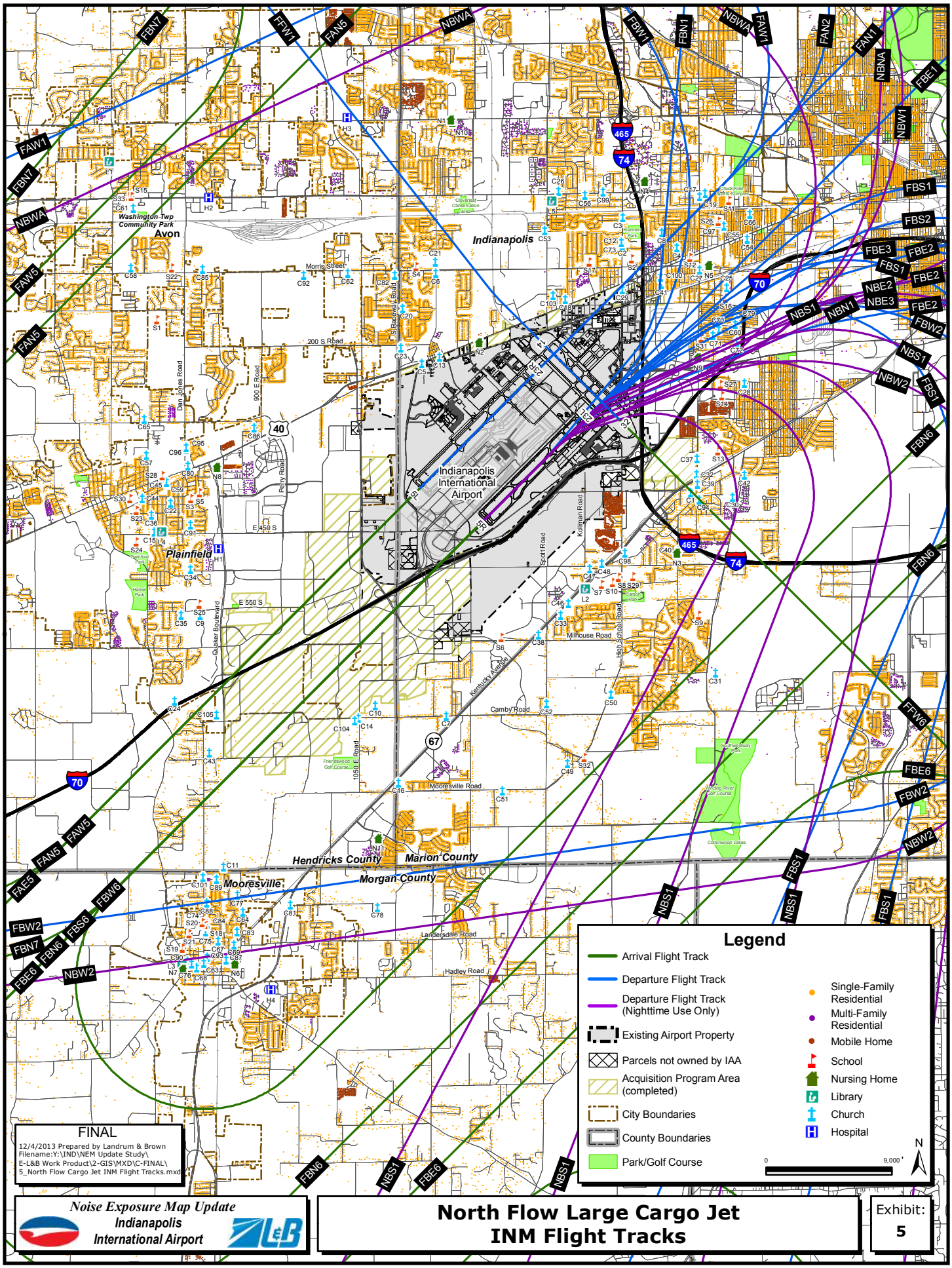
Noise Exposure Map Update

Indianapolis International Airport

North Flow Large Passenger Jet INM Flight Tracks

Exhibit: 4

BACK OF EXHIBIT


Legend
Arrival Flight Track
Departure Flight Track
Departure Flight Track (Nighttime Use Only)
Existing Airport Property
Parcels not owned by IAA
Acquisition Program Area (completed)
City Boundaries
County Boundaries
Park/Golf Course
Single-Family Residential
Multi-Family Residential
Mobile Home
School
Nursing Home
Library
Church
Hospital
Indianapolis
Indianapolis International Airport
Avon
Plainfield
Mooresville
Hendricks County
Marion County
Morgan County
Washington Twp Community Park
Morris Street
200 S Road
E 450 S
E 550 S
Kentucky Avenue
Camby Road
Mooresville Road
Landersdale Road
Hadley Road
Milhouse Road
Scott Road
Kolman Road
High School Road
Perry Road
Quaker Boulevard
900 E Road
1050 E Road
FINAL
12/4/2013 Prepared by Landrum & Brown
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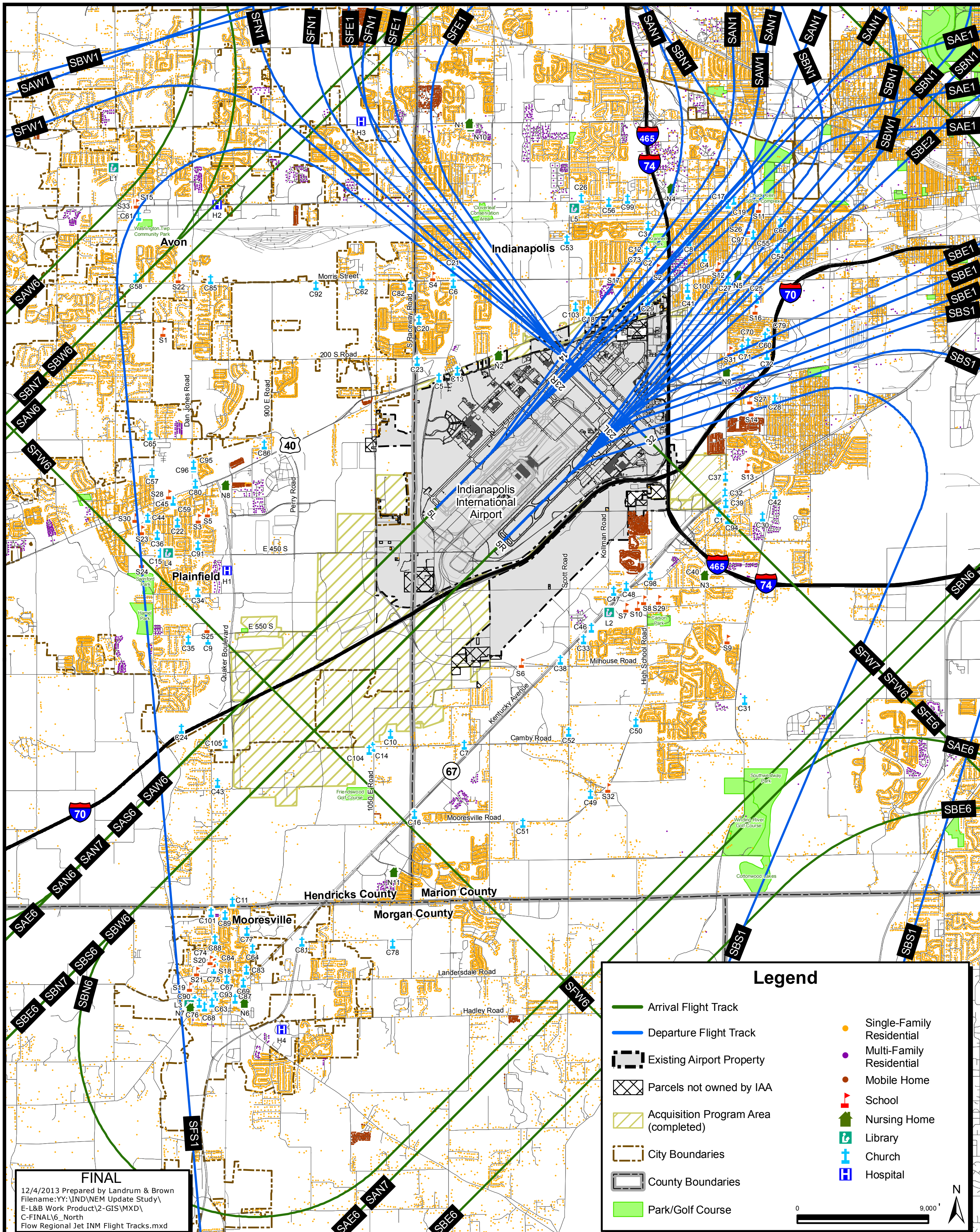
Noise Exposure Map Update
Indianapolis International Airport
North Flow Large Cargo Jet INM Flight Tracks
Exhibit: 5

BACK OF EXHIBIT



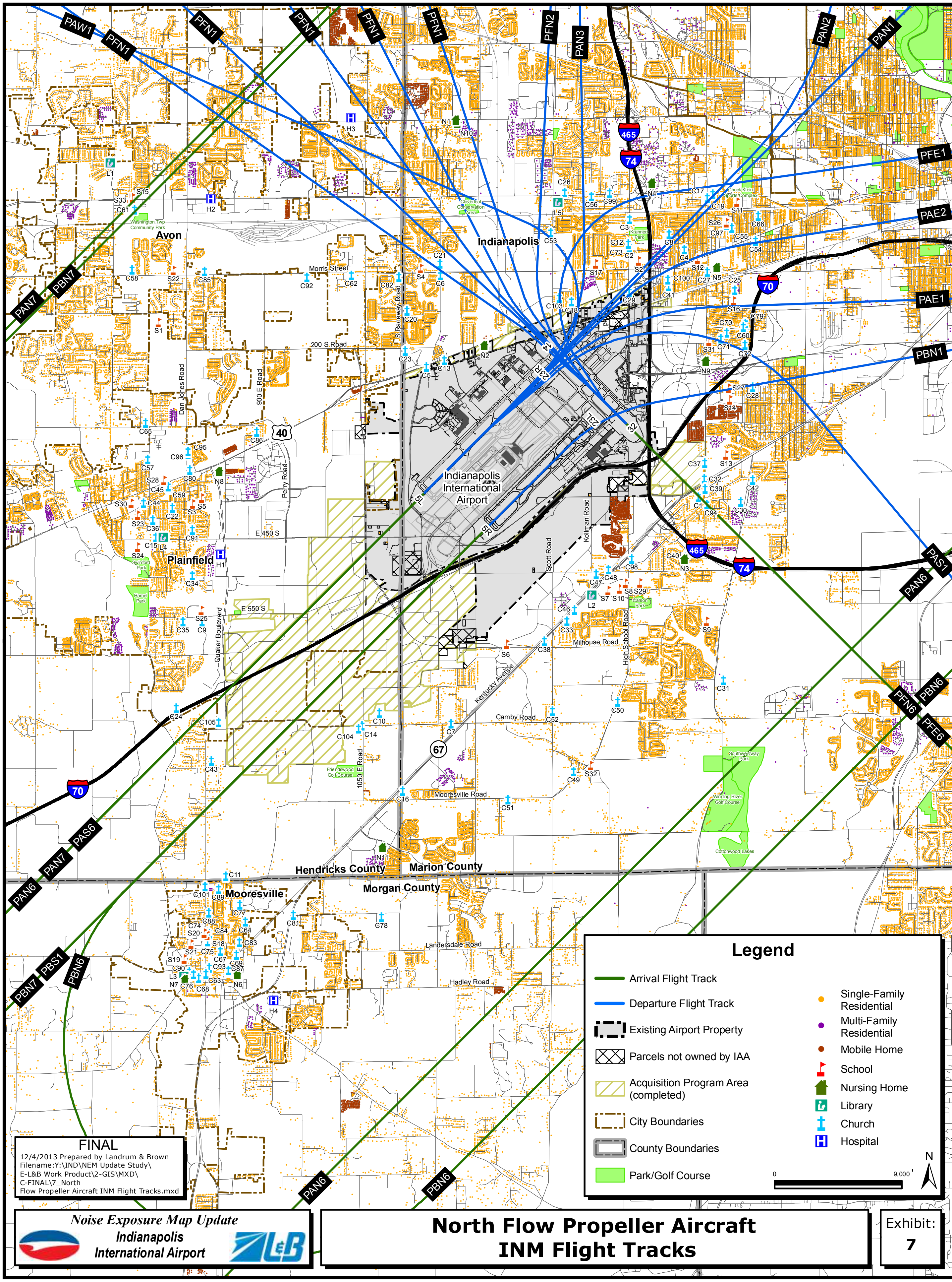
Noise Exposure Map Update

Indianapolis International Airport

North Flow Regional/Air Taxi Jet INM Flight Tracks

Exhibit: 6

BACK OF EXHIBIT



FINAL
12/4/2013 Prepared by Landrum & Brown
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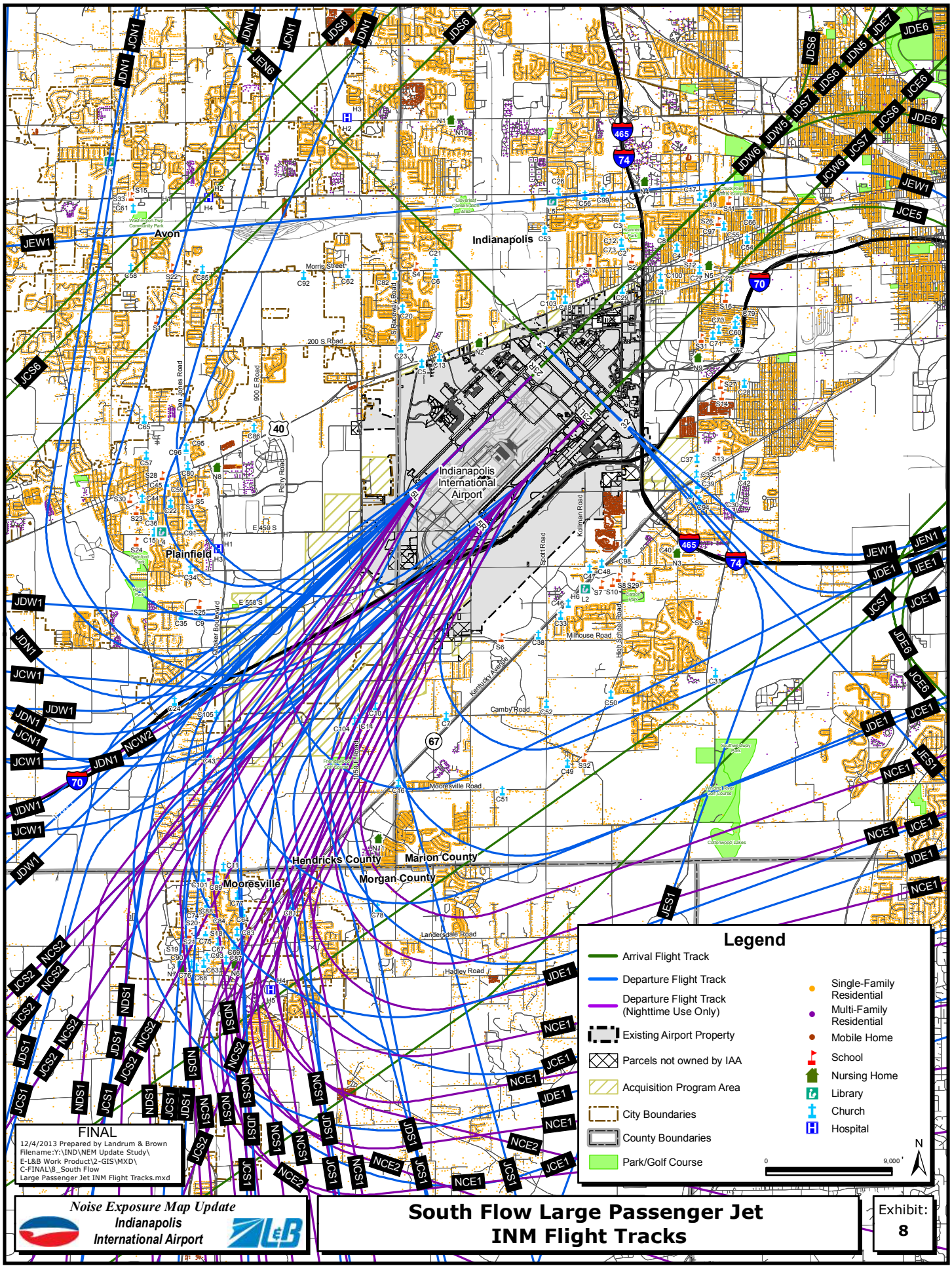
Noise Exposure Map Update
Indianapolis International Airport

North Flow Propeller Aircraft INM Flight Tracks

Exhibit: 7

BACK OF EXHIBIT


Avon
Indianapolis
Indianapolis International Airport
Plainfield
Mooresville
Hendricks County
Marion County
Morgan County
Morris Street
200 S Road
E 450 S
E 550 S
Perry Road
Girls School Road
900 E Road
S Raceway Road
Kolman Road
Scott Road
High School Road
Milhouse Road
Kentucky Avenue
Camby Road
Mooresville Road
Landersdale Road
Hadley Road
Legend
Arrival Flight Track
Departure Flight Track
Departure Flight Track (Nighttime Use Only)
Existing Airport Property
Parcels not owned by IAA
Acquisition Program Area
City Boundaries
County Boundaries
Park/Golf Course
Single-Family Residential
Multi-Family Residential
Mobile Home
School
Nursing Home
Library
Church
Hospital
0
9,000
N
FINAL
12/4/2013 Prepared by Landrum & Brown
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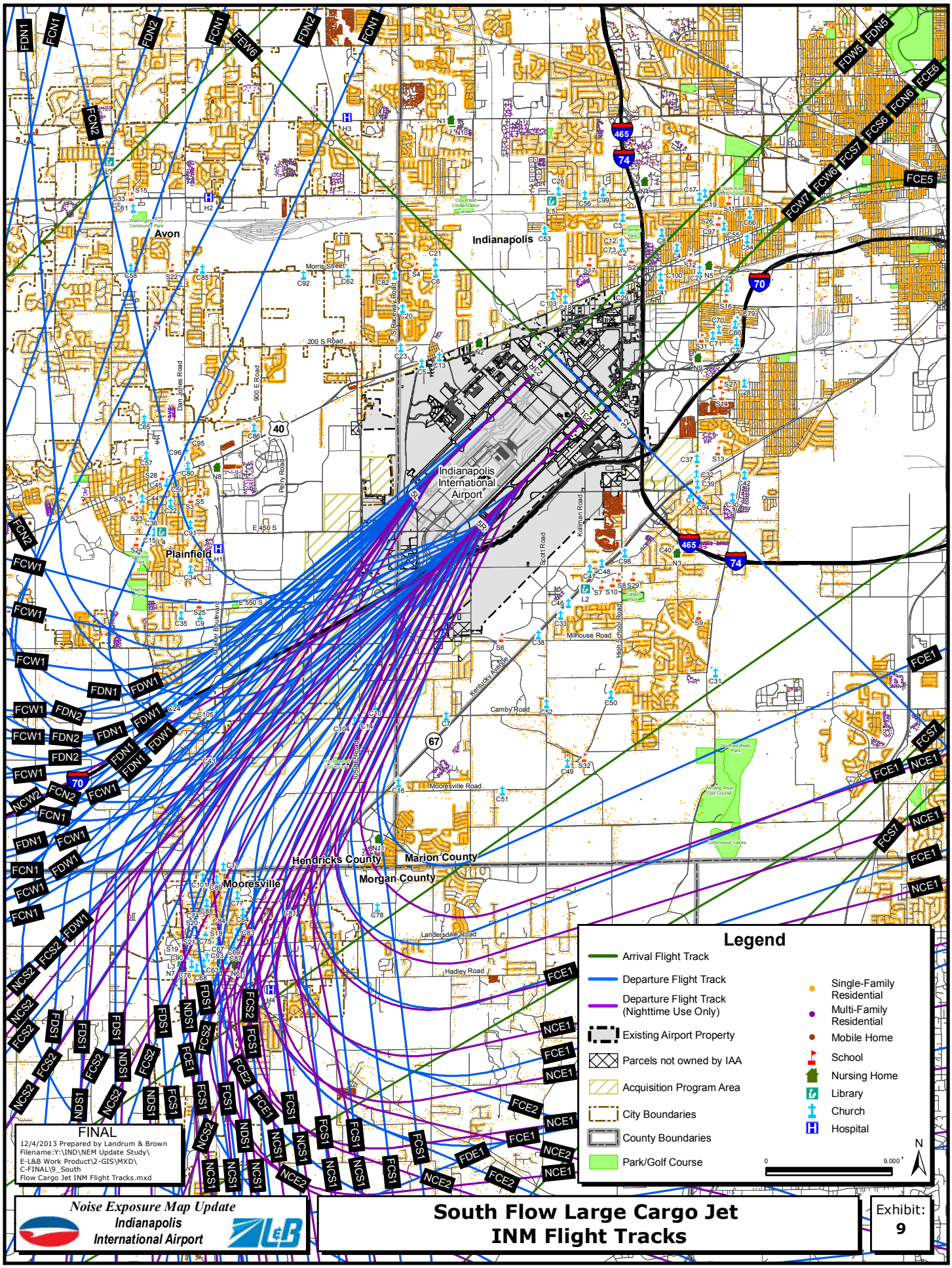
Noise Exposure Map Update
Indianapolis International Airport
South Flow Large Passenger Jet INM Flight Tracks
Exhibit: 8

BACK OF EXHIBIT


Avon
Indianapolis
Indianapolis International Airport
Plainfield
Mooresville
Hendricks County
Marion County
Morgan County
Legend
Arrival Flight Track
Departure Flight Track
Departure Flight Track (Nighttime Use Only)
Existing Airport Property
Parcels not owned by IAA
Acquisition Program Area
City Boundaries
County Boundaries
Park/Golf Course
Single-Family Residential
Multi-Family Residential
Mobile Home
School
Nursing Home
Library
Church
Hospital
FINAL
12/4/2013 Prepared by Landrum & Brown
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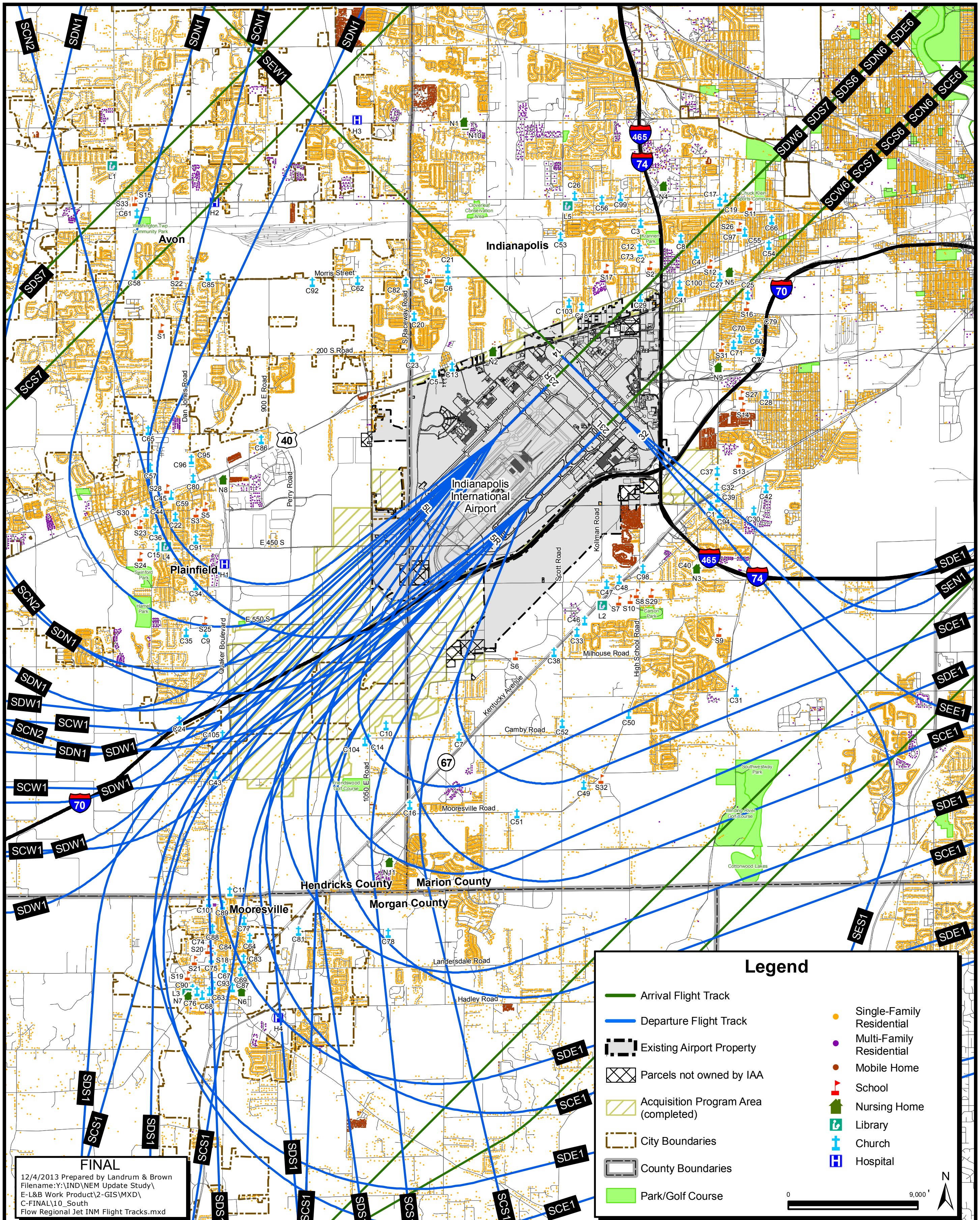
Noise Exposure Map Update
Indianapolis International Airport
South Flow Large Cargo Jet INM Flight Tracks
Exhibit: 9

BACK OF EXHIBIT

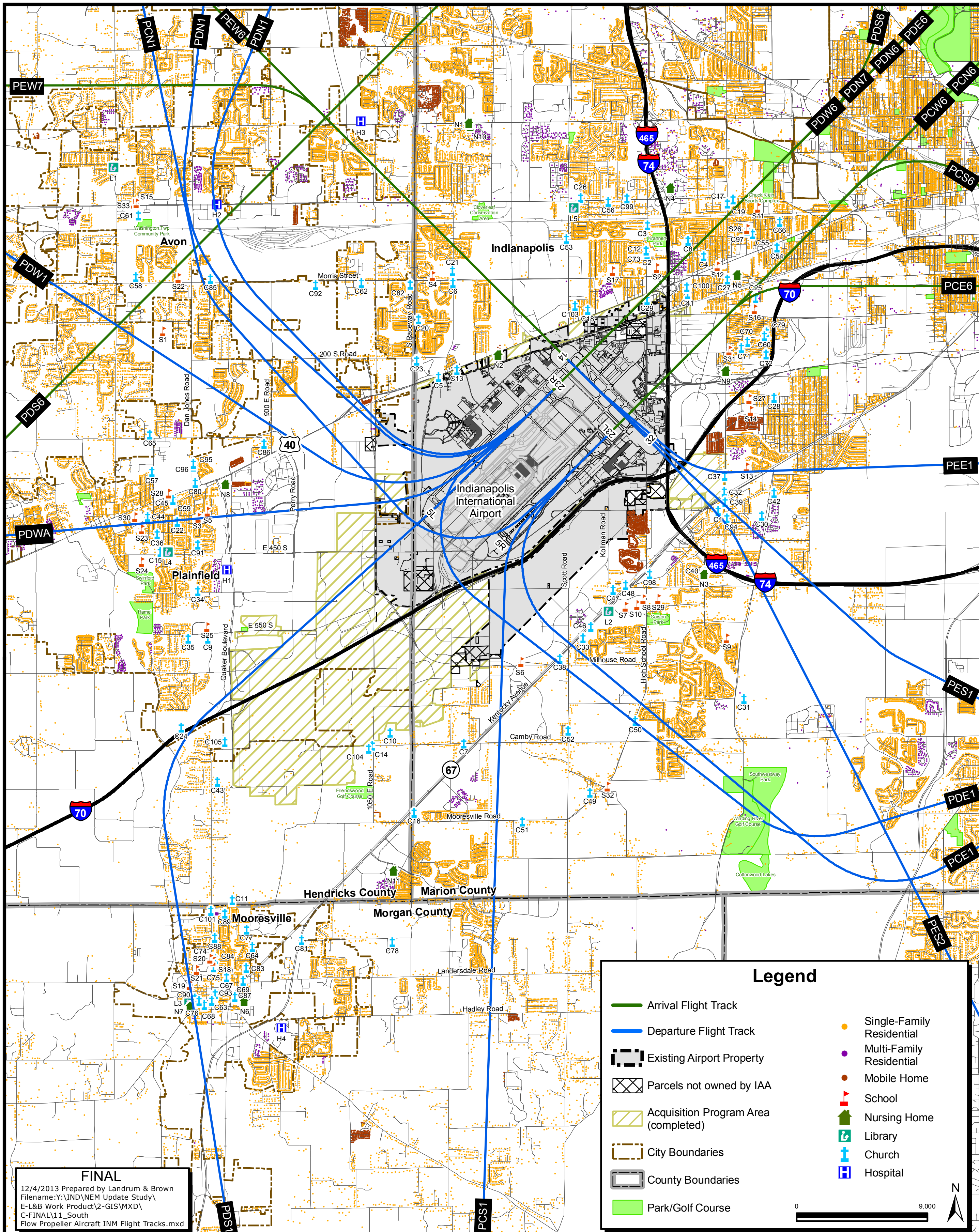


Noise Exposure Map Update
Indianapolis International Airport

South Flow Regional/Air Taxi Jet INM Flight Tracks

Exhibit:
10

BACK OF EXHIBIT



Noise Exposure Map Update

Indianapolis International Airport

South Flow Propeller Aircraft INM Flight Tracks

Exhibit: 11

BACK OF EXHIBIT

Table 4
ARRIVAL FLIGHT TRACK UTILIZATION PERCENTAGES
EXISTING (2013) CONDITIONS
Indianapolis International Airport

Runway	Flight Track ID	Cargo Jets	Large Passenger Jets	Regional Jets	Propeller Aircraft	Military Aircraft
23L	FCE5	1.0%	0.0%	0.0%	0.0%	0.0%
	FCE6	9.0%	0.0%	0.0%	0.0%	0.0%
	FCN6	16.1%	0.0%	0.0%	0.0%	0.0%
	FCS6	2.6%	0.0%	0.0%	0.0%	0.0%
	FCS7	4.2%	0.0%	0.0%	0.0%	0.0%
	FCW6	5.0%	0.0%	0.0%	0.0%	0.0%
	FCW7	4.1%	0.0%	0.0%	0.0%	0.0%
	JCE5	0.0%	4.9%	0.0%	0.0%	0.0%
	JCE6	0.0%	4.9%	0.0%	0.0%	0.0%
	JCN5	0.0%	9.3%	0.0%	0.0%	0.0%
	JCS6	0.0%	0.7%	0.0%	0.0%	0.0%
	JCS7	0.0%	1.5%	0.0%	0.0%	0.0%
	JCW6	0.0%	11.6%	0.0%	0.0%	0.0%
	PCE6	0.0%	0.0%	0.0%	4.2%	0.0%
	PCN6	0.0%	0.0%	0.0%	19.2%	0.0%
	PCS6	0.0%	0.0%	0.0%	6.0%	0.0%
	PCW6	0.0%	0.0%	0.0%	3.1%	0.0%
	SCE6	0.0%	0.0%	5.9%	0.0%	0.0%
	SCN6	0.0%	0.0%	15.0%	0.0%	40.4%
	SCS6	0.0%	0.0%	5.6%	0.0%	0.0%
	SCS7	0.0%	0.0%	0.7%	0.0%	0.0%
	SCW6	0.0%	0.0%	10.4%	0.0%	0.0%
05R	FBE6	14.0%	0.0%	0.0%	0.0%	0.0%
	FBN6	17.3%	0.0%	0.0%	0.0%	0.0%
	FBN7	1.5%	0.0%	0.0%	0.0%	0.0%
	FBS6	7.7%	0.0%	0.0%	0.0%	0.0%
	FBW6	7.9%	0.0%	0.0%	0.0%	0.0%
	JBE5	0.0%	3.8%	0.0%	0.0%	0.0%
	JBN5	0.0%	2.8%	0.0%	0.0%	0.0%
	JBN6	0.0%	0.7%	0.0%	0.0%	0.0%
	JBS5	0.0%	3.3%	0.0%	0.0%	0.0%
	JBW6	0.0%	2.2%	0.0%	0.0%	0.0%
	PBN6	0.0%	0.0%	0.0%	2.8%	0.0%
	PBN7	0.0%	0.0%	0.0%	2.8%	0.0%
	PBS1	0.0%	0.0%	0.0%	2.1%	0.0%
	SBE6	0.0%	0.0%	2.5%	0.0%	0.0%
	SBN6	0.0%	0.0%	4.0%	0.0%	6.7%
	SBN7	0.0%	0.0%	1.3%	0.0%	6.7%
	SBS6	0.0%	0.0%	2.2%	0.0%	0.0%
	SBW6	0.0%	0.0%	3.6%	0.0%	0.0%

Table 4, *Continued*
ARRIVAL FLIGHT TRACK UTILIZATION PERCENTAGES
EXISTING (2013) CONDITIONS
Indianapolis International Airport

Runway	Flight Track	Cargo Jets	Large Passenger Jets	Regional Jets	Propeller Aircraft	Military Aircraft
23R	FDN5	3.4%	0.0%	0.0%	0.0%	0.0%
	FDW5	1.3%	0.0%	0.0%	0.0%	0.0%
	JDE6	0.0%	5.3%	0.0%	0.0%	0.0%
	JDE7	0.0%	5.3%	0.0%	0.0%	0.0%
	JDN5	0.0%	9.9%	0.0%	0.0%	0.0%
	JDS6	0.0%	1.7%	0.0%	0.0%	0.0%
	JDS7	0.0%	0.8%	0.0%	0.0%	0.0%
	JDW5	0.0%	5.4%	0.0%	0.0%	0.0%
	JDW6	0.0%	6.9%	0.0%	0.0%	0.0%
	PDE6	0.0%	0.0%	0.0%	4.3%	0.0%
	PDN6	0.0%	0.0%	0.0%	12.5%	0.0%
	PDN7	0.0%	0.0%	0.0%	4.1%	0.0%
	PDS6	0.0%	0.0%	0.0%	2.7%	0.0%
	PDW6	0.0%	0.0%	0.0%	2.8%	0.0%
	SDE6	0.0%	0.0%	9.4%	0.0%	29.8%
	SDN6	0.0%	0.0%	8.9%	0.0%	0.0%
	SDS6	0.0%	0.0%	2.7%	0.0%	0.0%
	SDS7	0.0%	0.0%	0.8%	0.0%	0.0%
	SDW6	0.0%	0.0%	8.5%	0.0%	0.0%
05L	FAE5	3.6%	0.0%	0.0%	0.0%	0.0%
	FAN5	0.0%	0.0%	0.0%	0.0%	0.0%
	FAW5	1.1%	0.0%	0.0%	0.0%	0.0%
	JAE5	0.0%	5.0%	0.0%	0.0%	0.0%
	JAN6	0.0%	1.5%	0.0%	0.0%	0.0%
	JAN7	0.0%	3.0%	0.0%	0.0%	0.0%
	JAS5	0.0%	4.0%	0.0%	0.0%	0.0%
	JAW5	0.0%	3.2%	0.0%	0.0%	0.0%
	PAN6	0.0%	0.0%	0.0%	2.0%	0.0%
	PAN7	0.0%	0.0%	0.0%	2.0%	0.0%
	PAS6	0.0%	0.0%	0.0%	1.5%	0.0%
	SAE6	0.0%	0.0%	2.8%	0.0%	11.5%
	SAN6	0.0%	0.0%	3.6%	0.0%	0.0%
	SAN7	0.0%	0.0%	1.7%	0.0%	0.0%
	SAS6	0.0%	0.0%	2.3%	0.0%	0.0%
	SAW6	0.0%	0.0%	3.5%	0.0%	0.0%

Table 4, *Continued*
ARRIVAL FLIGHT TRACK UTILIZATION PERCENTAGES
EXISTING (2013) CONDITIONS
Indianapolis International Airport

Runway	Flight Track	Cargo Jets	Large Passenger Jets	Regional Jets	Propeller Aircraft	Military Aircraft
14	FEW6	0.0%	0.0%	0.0%	0.0%	0.0%
	JEN6	0.0%	0.2%	0.0%	0.0%	0.0%
	PEW6	0.0%	0.0%	0.0%	18.9%	0.0%
	PEW7	0.0%	0.0%	0.0%	1.5%	0.0%
	SEW1	0.0%	0.0%	1.2%	0.0%	1.3%
32	FFW6	0.3%	0.0%	0.0%	0.0%	0.0%
	JFN6	0.0%	0.6%	0.0%	0.0%	0.0%
	JFN7	0.0%	0.2%	0.0%	0.0%	0.0%
	JFS6	0.0%	1.1%	0.0%	0.0%	0.0%
	PFE6	0.0%	0.0%	0.0%	6.5%	0.0%
	PFN6	0.0%	0.0%	0.0%	1.1%	0.0%
	SFE6	0.0%	0.0%	1.9%	0.0%	3.6%
	SFW6	0.0%	0.0%	0.8%	0.0%	0.0%
	SFW7	0.0%	0.0%	0.8%	0.0%	0.0%
Total		100.0%	100.0%	100.0%	100.0%	100.0%

Source: AOMS data 2011-2012, Landrum & Brown analysis, 2013.

Table 5
DEPARTURE FLIGHT TRACK UTILIZATION PERCENTAGES
EXISTING (2013) CONDITIONS
Indianapolis International Airport

Runway	Flight Track	Cargo Jets	Large Passenger Jets	Regional Jets	Propeller Aircraft	Military Aircraft
23L	FCE1	2.2%	0.0%	0.0%	0.0%	0.0%
	FCE2	3.7%	0.0%	0.0%	0.0%	0.0%
	FCN1	5.0%	0.0%	0.0%	0.0%	0.0%
	FCN2	2.7%	0.0%	0.0%	0.0%	0.0%
	FCS1	3.0%	0.0%	0.0%	0.0%	0.0%
	FCS2	0.7%	0.0%	0.0%	0.0%	0.0%
	FCW1	7.6%	0.0%	0.0%	0.0%	0.0%
	JCE1	0.0%	10.9%	0.0%	0.0%	0.0%
	JCN1	0.0%	4.2%	0.0%	0.0%	0.0%
	JCS1	0.0%	6.9%	0.0%	0.0%	0.0%
	JCS2	0.0%	1.6%	0.0%	0.0%	0.0%
	JCW1	0.0%	6.9%	0.0%	0.0%	0.0%
	NCE1	20.3%	0.0%	0.0%	0.0%	0.0%
	NCE2	7.4%	0.0%	0.0%	0.0%	0.0%
	NCS1	3.5%	0.0%	0.0%	0.0%	0.0%
	NCS2	6.9%	0.0%	0.0%	0.0%	0.0%
	NCW2	1.7%	0.0%	0.0%	0.0%	0.0%
	PCE1	0.0%	0.0%	0.0%	4.9%	0.0%
	PCN1	0.0%	0.0%	0.0%	1.4%	0.0%
	PCS1	0.0%	0.0%	0.0%	6.8%	0.0%
	SCE1	0.0%	0.0%	12.2%	0.0%	0.0%
	SCN1	0.0%	0.0%	2.8%	0.0%	31.4%
	SCN2	0.0%	0.0%	6.1%	0.0%	0.0%
	SCS1	0.0%	0.0%	7.3%	0.0%	0.0%
	SCW1	0.0%	0.0%	2.0%	0.0%	0.0%
05R	FBE1	0.6%	0.0%	0.0%	0.0%	0.0%
	FBE2	0.6%	0.0%	0.0%	0.0%	0.0%
	FBE3	0.6%	0.0%	0.0%	0.0%	0.0%
	FBN1	0.6%	0.0%	0.0%	0.0%	0.0%
	FBS1	1.7%	0.0%	0.0%	0.0%	0.0%
	FBS2	1.0%	0.0%	0.0%	0.0%	0.0%
	FBW1	1.7%	0.0%	0.0%	0.0%	0.0%
	JBE1	0.0%	2.9%	0.0%	0.0%	0.0%
	JBE2	0.0%	2.9%	0.0%	0.0%	0.0%
	JBN1	0.0%	1.1%	0.0%	0.0%	0.0%
	JBNA	0.0%	1.3%	0.0%	0.0%	0.0%
	JBS1	0.0%	2.3%	0.0%	0.0%	0.0%
	JBS2	0.0%	2.3%	0.0%	0.0%	0.0%
	JBW1	0.0%	1.9%	0.0%	0.0%	0.0%
	JBWA	0.0%	1.8%	0.0%	0.0%	0.0%

Table 5, *Continued*
DEPARTURE FLIGHT TRACK UTILIZATION PERCENTAGES – EXISTING (2013) CONDITIONS
Indianapolis International Airport

Runway	Flight Track	Cargo Jets	Large Passenger Jets	Regional Jets	Propeller Aircraft	Military Aircraft
05R	NBE2	2.3%	0.0%	0.0%	0.0%	0.0%
	NBE3	1.0%	0.0%	0.0%	0.0%	0.0%
	NBN1	0.9%	0.0%	0.0%	0.0%	0.0%
	NBNA	0.6%	0.0%	0.0%	0.0%	0.0%
	NBS1	0.8%	0.0%	0.0%	0.0%	0.0%
	NBW1	0.4%	0.0%	0.0%	0.0%	0.0%
	NBWA	0.5%	0.0%	0.0%	0.0%	0.0%
	PBN1	0.0%	0.0%	0.0%	11.4%	0.0%
	SBE1	0.0%	0.0%	6.3%	0.0%	0.0%
	SBE2	0.0%	0.0%	2.1%	0.0%	0.0%
	SBN1	0.0%	0.0%	6.4%	0.0%	17.2%
	SBS1	0.0%	0.0%	2.0%	0.0%	0.0%
	SBW1	0.0%	0.0%	0.3%	0.0%	0.0%
	NBW2	0.1%	0.0%	0.0%	0.0%	0.0%
	FBW2	0.2%	0.0%	0.0%	0.0%	0.0%
23R	FDE1	0.5%	0.0%	0.0%	0.0%	0.0%
	FDN1	1.0%	0.0%	0.0%	0.0%	0.0%
	FDN2	7.6%	0.0%	0.0%	0.0%	0.0%
	FDS1	0.7%	0.0%	0.0%	0.0%	0.0%
	FDW1	4.7%	0.0%	0.0%	0.0%	0.0%
	JDE1	0.0%	8.2%	0.0%	0.0%	0.0%
	JDN1	0.0%	5.3%	0.0%	0.0%	0.0%
	JDS1	0.0%	12.9%	0.0%	0.0%	0.0%
	JDW1	0.0%	8.4%	0.0%	0.0%	0.0%
	NDS1	3.8%	0.0%	0.0%	0.0%	0.0%
	PDE1	0.0%	0.0%	0.0%	2.2%	0.0%
	PDN1	0.0%	0.0%	0.0%	4.2%	0.0%
	PDS1	0.0%	0.0%	0.0%	6.0%	0.0%
	PDW1	0.0%	0.0%	0.0%	1.5%	0.0%
	PDWA	0.0%	0.0%	0.0%	1.5%	0.0%
	SDE1	0.0%	0.0%	12.6%	0.0%	0.0%
	SDN1	0.0%	0.0%	9.3%	0.0%	28.6%
	SDS1	0.0%	0.0%	5.5%	0.0%	0.0%
	SDW1	0.0%	0.0%	2.0%	0.0%	0.0%
05L	FAN1	1.0%	0.0%	0.0%	0.0%	0.0%
	FAN2	0.2%	0.0%	0.0%	0.0%	0.0%
	FAW1	1.6%	0.0%	0.0%	0.0%	0.0%
	JAE1	0.0%	4.2%	0.0%	0.0%	0.0%
	JAN1	0.0%	2.6%	0.0%	0.0%	0.0%
	JAS1	0.0%	6.2%	0.0%	0.0%	0.0%
	JAW1	0.0%	3.9%	0.0%	0.0%	0.0%
	PAE1	0.0%	0.0%	0.0%	0.6%	0.0%

Table 5, *Continued*
DEPARTURE FLIGHT TRACK UTILIZATION PERCENTAGES – EXISTING (2013) CONDITIONS
Indianapolis International Airport

Runway	Flight Track	Cargo Jets	Large Passenger Jets	Regional Jets	Propeller Aircraft	Military Aircraft
05L	PAE2	0.0%	0.0%	0.0%	0.6%	0.0%
	PAN1	0.0%	0.0%	0.0%	1.6%	0.0%
	PAN2	0.0%	0.0%	0.0%	0.6%	0.0%
	PAN3	0.0%	0.0%	0.0%	0.6%	0.0%
	PAS1	0.0%	0.0%	0.0%	2.8%	0.0%
	PAW1	0.0%	0.0%	0.0%	0.9%	0.0%
	SAE1	0.0%	0.0%	6.9%	0.0%	13.5%
	SAN1	0.0%	0.0%	5.7%	0.0%	0.0%
	SAW1	0.0%	0.0%	2.0%	0.0%	0.0%
14	JEE1	0.0%	0.0%	0.0%	0.0%	0.0%
	JEN1	0.0%	0.0%	0.0%	0.0%	0.0%
	JES1	0.0%	0.0%	0.0%	0.0%	0.0%
	JEW1	0.0%	0.0%	0.0%	0.0%	0.0%
	PEE1	0.0%	0.0%	0.0%	7.6%	0.0%
	PES1	0.0%	0.0%	0.0%	1.4%	0.0%
	PES2	0.0%	0.0%	0.0%	9.6%	0.0%
	SEE1	0.0%	0.0%	1.7%	0.0%	0.0%
	SEN1	0.0%	0.0%	1.3%	0.0%	4.5%
	SES1	0.0%	0.0%	1.1%	0.0%	0.0%
	FEW1	0.0%	0.0%	0.0%	0.0%	0.0%
32	FFW1	0.2%	0.0%	0.0%	0.0%	0.0%
	JFE1	0.0%	0.4%	0.0%	0.0%	0.0%
	JFN1	0.0%	0.0%	0.0%	0.0%	0.0%
	JFN2	0.0%	0.1%	0.0%	0.0%	0.0%
	JFS1	0.0%	0.3%	0.0%	0.0%	0.0%
	JFW1	0.0%	0.4%	0.0%	0.0%	0.0%
	PFE1	0.0%	0.0%	0.0%	17.6%	0.0%
	PFN1	0.0%	0.0%	0.0%	5.5%	0.0%
	PFN2	0.0%	0.0%	0.0%	10.8%	0.0%
	SFE1	0.0%	0.0%	1.8%	0.0%	0.0%
	SFN1	0.0%	0.0%	1.5%	0.0%	4.8%
	SFS1	0.0%	0.0%	0.7%	0.0%	0.0%
	SFW1	0.0%	0.0%	0.4%	0.0%	0.0%
Total		100.0%	100.0%	100.0%	100.0%	100.0%

Source: AOMS data 2011-2012, Landrum & Brown analysis, 2013.

4.6 FLIGHT PROFILES

Aircraft weight upon departure is a factor in the dispersion of noise because it impacts the rate at which an aircraft is able to climb. Generally, heavier aircraft have a slower rate of climb and a wider dispersion of noise along their flight routes. Where specific aircraft weights are unknown, the INM uses the distance flown to the first stop as a surrogate for the weight, by assuming that the weight has a direct relationship with the fuel load necessary to reach the first destination. The INM groups trip lengths into seven stage categories and assigns standard aircraft weights to each stage category. These categories are:

Stage Category	Stage Length
1	0-500 nautical miles
2	500-1000 nautical miles
3	1000-1500 nautical miles
4	1500-2500 nautical miles
5	2500-3500 nautical miles
6	3500-4500 nautical miles
7	4500+ nautical miles

The trip lengths flown from IND are based upon scheduled operations for the baseline period. **Table 6** indicates the proportion of the operations that fell within each of the seven trip length categories for the 2013 NEM operating levels. For the 2013 NEM conditions, 51 percent of all cargo jet departures, 61 percent of all large passenger jet departures, 78 percent of all regional jet departures, and 100 percent of all propeller and military aircraft departures operated to destinations with a stage length of one (0 to 500 nautical miles).

Departure flight profiles at IND are also subject to the voluntary measure included of the 1997 NCP listed below:

- **NA-11:** Continue preference for Close-in Noise Abatement Departure Procedures from Runways 5R/L, 32, and 14 at night. Above 3,000 AGL (3,700´ MSL), initiate best rate of climb to assigned enroute altitude.
- **NA-15:** Revoke preference for standard departure procedures from Runways 23R/L and replace with preference for Close-in Noise Abatement Departure Procedures as currently practiced by nighttime cargo carriers. Above 3,000´ AGL (3,700´ MSL), initiate best rate of climb to assigned enroute altitude.

FedEx implements the Close-In Noise Abatement Departure Procedure as recommended by the NCP measures, in which flaps and thrust settings upon departure are adjusted to reduce noise over areas close to the Airport, generally within one to three miles from the start of takeoff. As such the INM profiles for FedEx aircraft were modified from the standard profiles to the ICAO A profiles, if available, which are included in the INM to model these Close-In Noise Abatement Departure Procedures.

Table 6
DEPARTURE TRIP LENGTH DISTRIBUTION
EXISTING (2013) CONDITIONS
Indianapolis International Airport

Stage Length	Cargo Jets	Large Passenger Jets	Regional Jets	Propeller Aircraft	Military Aircraft	Total
1	51%	61%	78%	100%	100%	67%
2	28%	29%	22%	0%	0%	24%
3	5%	8%	0%	0%	0%	5%
4	9%	2%	0%	0%	0%	3%
5	5%	0%	0%	0%	0%	1%
6	2%	0%	0%	0%	0%	0%
7	0%	0%	0%	0%	0%	0%

Source: Landrum & Brown, 2013.

Results from the correlation of noise levels and altitudes observed during the noise measurement program, completed in August 2013, found that in most cases the standard approach to assigning aircraft weights adequately represented the activity at IND; however, when correlating the data from the aircraft noise measurement sessions to actual radar data from the AOMS system, it was noted that the noise levels generated by certain aircraft were consistently greater than their distance-based stage length would define them to be. Where the modeled and measured noise levels of particular aircraft types varied by a certain degree above tolerable levels, additional analysis of the departures at IND was conducted. For this analysis, average aircraft weights and measured noise levels were compared with aircraft weights and predicted noise levels generated by the INM. The results of the analysis indicated that average calculated aircraft departure weights for several aircraft were higher than what was predicted by the INM for those particular aircraft using the distance-based method. Additional information on this analysis is included in Appendix E, Section E.3.3.

4.7 ENGINE RUN-UPS

Engine run-up locations and times were based on a review of previous run-up data from the 2008 NEM Update at IND and discussions with IND staff. Engine run-ups are primarily performed on cargo jet, air carrier jet and general aviation jet aircraft. These run-ups occur at the Ground Run-up Enclosure (GRE) located on the southwest side of the airfield (see Exhibit 1). For modeling the Existing (2013) Baseline condition, it was assumed that approximately 2.7 run-ups occur per week at IND. It was assumed that all run-ups are conducted at low/idle power (30% thrust setting) for up to 30 minutes. In addition, it was assumed that a percentage of these run-ups would also be conducted at high (70% thrust) and maximum power (100% thrust) for an additional period of time. It is assumed that approximately 80 percent of all run-ups occur during the daytime (7:00 a.m. to 9:59 p.m.) **Table 7** shows the number, types, durations and times of day of engine run-ups that were modeled for the Existing (2013) Noise Exposure Contour.

Table 7
GROUND RUN-UP OPERATIONS
EXISTING (2013) CONDITIONS
Indianapolis International Airport

Thrust Setting	Average Duration	Aircraft Type	Number of Run-ups
Max	10 minutes	737300, 737700, 727EM2, 757RR, A319-131, CL600, CNA441, DHC830, EMB170, GIV, LEAR35, MD11GE	1.3 per week
High - 70%	20 minutes	737300, 737700, 727EM2, 757RR, A319-131, CL600, CNA441, DHC830, EMB170, GIV, LEAR35, MD11GE	2.0 per week
Low Idle - 30%	30 minutes	737300, 737700, 727EM2, 757RR, A319-131, CL600, CNA441, DHC830, EMB170, GIV, LEAR35, MD11GE	2.7 per week

Source: Indianapolis International Airport Final Noise Exposure Map Update, 2008; Landrum & Brown, 2013.

4.8 EXISTING (2013) NOISE EXPOSURE CONTOUR

The Existing (2013) Noise Exposure Contour, showing contours of 65, 70, and 75 DNL levels, is presented on **Exhibit 12**. The area within each five-decibel noise exposure contour is shown in **Table 8.** The 65+ DNL of the Existing (2013) Noise Exposure Contour encompasses approximately 6.55 square miles of land area. The majority of this area is either over airport property or within the noise land acquisition area.

To the north of the Airport the noise contours are shorter and thinner, which reflects heavier usage by aircraft arriving to Runways 23L and 23R, while the contour is longer and wider to the south due to the greater percentage of departures from Runways 23L and 23R.

Table 8
AREA EXPOSED TO VARIOUS NOISE LEVELS (IN SQUARE MILES)
EXISTING (2013) NOISE EXPOSURE CONTOUR
Indianapolis International Airport

CONTOUR RANGE	2013 BASELINE (SQUARE MILES)
65-70 DNL	4.03
70-75 DNL	1.45
75 + DNL	1.06
65 + DNL	6.55

Note: Total of 65+ DNL may not equal sum of individual contour bands due to rounding.
Contour: IND_2013rev1_Noise-Contours
Source: Landrum & Brown, 2013.

Table 9 shows the total number of households and noise-sensitive facilities within the Existing (2013) Noise Exposure Contour at levels of 65, 70, and 75 DNL. There are four total housing units and an estimated 11 residents located within the 65-70 DNL of the Existing (2013) Noise Exposure Contour. Two of these housing

units are located south of IND on South Stanley Road. The other two housing units are located near the intersection of East County Road 450 South and Ramona Drive. The areas where these four housing units are located were offered acquisition as part of the 1997 Part 150 Update and subsequent Record of Decision (ROD). The owners chose not to participate in the acquisition program. There are no housing units located within the 70+ DNL of the Existing (2013) Noise Exposure Contour. There are no noise-sensitive facilities (defined as schools, churches, libraries, hospitals, and nursing homes) located within the 65+ DNL of the Existing (2013) Noise Exposure Contour.

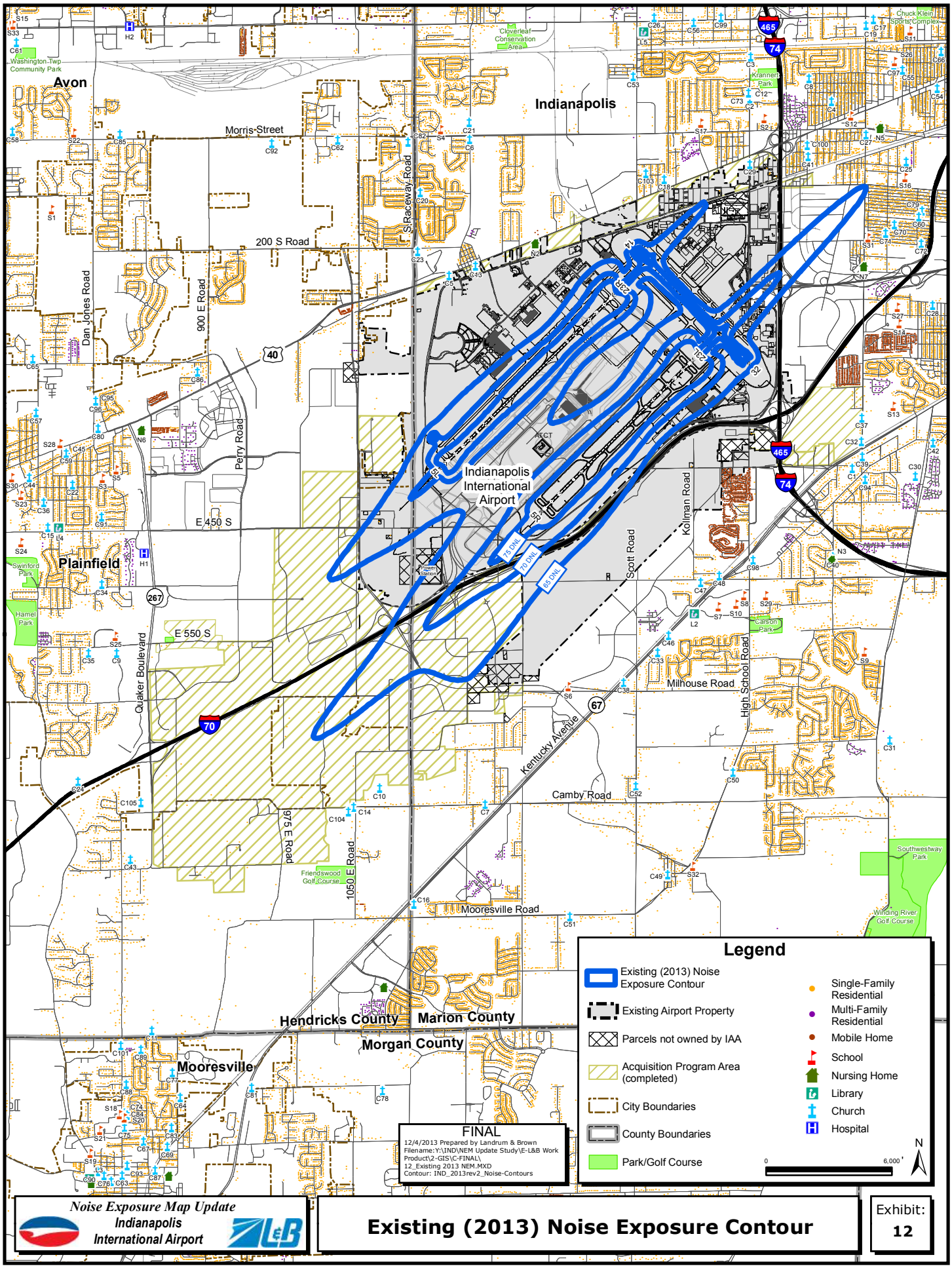
Table 9
POPULATION, HOUSING, AND NOISE-SENSITIVE FACILITIES EXPOSED TO VARIOUS NOISE LEVELS
EXISTING (2013) NOISE EXPOSURE CONTOUR
Indianapolis International Airport

Jurisdiction / Mitigation Area	65-70 DNL	70-75 DNL	75+ DNL	65+ DNL
Housing Units				
Guilford Township	**0**	**0**	**0**	**0**
Unmitigated	0	0	0	0
Airport Acquisition	0	0	0	0
Environmental	0	0	0	0
Sales Assistance	0	0	0	0
Sound Insulation & Purchase Assurance	0	0	0	0
Indianapolis / Marion County	**2**	**0**	**0**	**2**
Unmitigated	0	0	0	0
Airport Acquisition	2	0	0	2
Environmental	0	0	0	0
Sales Assistance	0	0	0	0
Sound Insulation & Purchase Assurance	0	0	0	0
Plainfield	**2**	**0**	**0**	**2**
Unmitigated	0	0	0	0
Airport Acquisition	2	0	0	2
Environmental	0	0	0	0
Sales Assistance	0	0	0	0
Sound Insulation & Purchase Assurance	0	0	0	0
Total Housing Units	**4**	**0**	**0**	**4**
Population				
Total Population	**11**	**0**	**0**	**11**
Noise-Sensitive Facilities				
Schools	0	0	0	0
Churches	0	0	0	0
Libraries	0	0	0	0
Hospitals	0	0	0	0
Nursing Homes	0	0	0	0
Total Noise-Sensitive Facilities	**0**	**0**	**0**	**0**

* Total population estimated based upon the housing counts multiplied by the average household size for each Census Track

Contour: IND_2013Noise-Contours

Source: Landrum & Brown, 2013.


Avon
Indianapolis
Plainfield
Mooresville
Morris Street
200 S Road
E 450 S
E 550 S
Dan Jones Road
900 E Road
Perry Road
Raceway Road
Scott Road
Kollman Road
Milhouse Road
High School Road
Kentucky Avenue
Camby Road
Mooresville Road
975 E Road
1050 E Road
Quaker Boulevard
Indianapolis International Airport
ATCT
75 DNL
70 DNL
65 DNL
Hendricks County
Marion County
Morgan County
Washington Twp Community Park
Cloverleaf Conservation Area
Chuck Klein Sports Complex
Krannert Park
Swinford Park
Hamel Park
Carson Park
Friendswood Golf Course
Southwestway Park
Wilding River Golf Course
Power Station
Legend
Existing (2013) Noise Exposure Contour
Existing Airport Property
Parcels not owned by IAA
Acquisition Program Area (completed)
City Boundaries
County Boundaries
Park/Golf Course
Single-Family Residential
Multi-Family Residential
Mobile Home
School
Nursing Home
Library
Church
Hospital
0
6,000
N
FINAL
12/4/2013 Prepared by Landrum & Brown
Filename:Y:\IND\NEM Update Study\E-L&B Work Product\2-GIS\C-FINAL\
12_Existing 2013 NEM.MXD
Contour: IND_2013rev2_Noise-Contours
Noise Exposure Map Update
Indianapolis
International Airport
Existing (2013) Noise Exposure Contour
Exhibit:
12

BACK OF EXHIBIT

4.9 COMPARISON TO PREVIOUS NEM

The currently approved NEMs, from the 2003 NEM Update, depict the noise exposure for two conditions (2008 and 2013). **Exhibit 13** shows the Existing (2013) Noise Exposure Contour compared to the Future (2013) Noise Exposure Contour that was prepared for the 2008 NEM Update. The Existing (2013) Noise Exposure Contour retains a similar shape as the Future (2013) NEM noise exposure contour that was previously prepared for the 2008 NEM. However, the Existing (2013) Baseline is smaller in size due to the lower number of aircraft operations than were previously forecast at IND, as well as the continued phase-out of older, louder aircraft from commercial fleets operating at IND.

4.10 SUPPLEMENTAL NOISE ANALYSIS

In addition to the noise exposure contours, supplemental noise analysis was conducted to provide a greater understanding of noise conditions at specific locations, including areas outside of the 65 DNL noise contour. This analysis included a review of historic noise complaint data, a noise measurement program, and an INM grid point analysis. Additional information about the noise complaint history and the noise measurement program is included in Appendix C, *Noise Measurements and Complaints*. **Table 10** summarizes the INM grid point analysis, providing the INM predicted DNL, equivalent sound level (Leq), maximum noise level (Lmax), time above 65 dB (TA65), shown in minutes and seconds, and the number of events above 65 dB (NA65) for each grid point shown in **Exhibit 14**. See **Appendix D, *Noise Methodology***, for a description of the supplemental noise metrics used for this analysis.

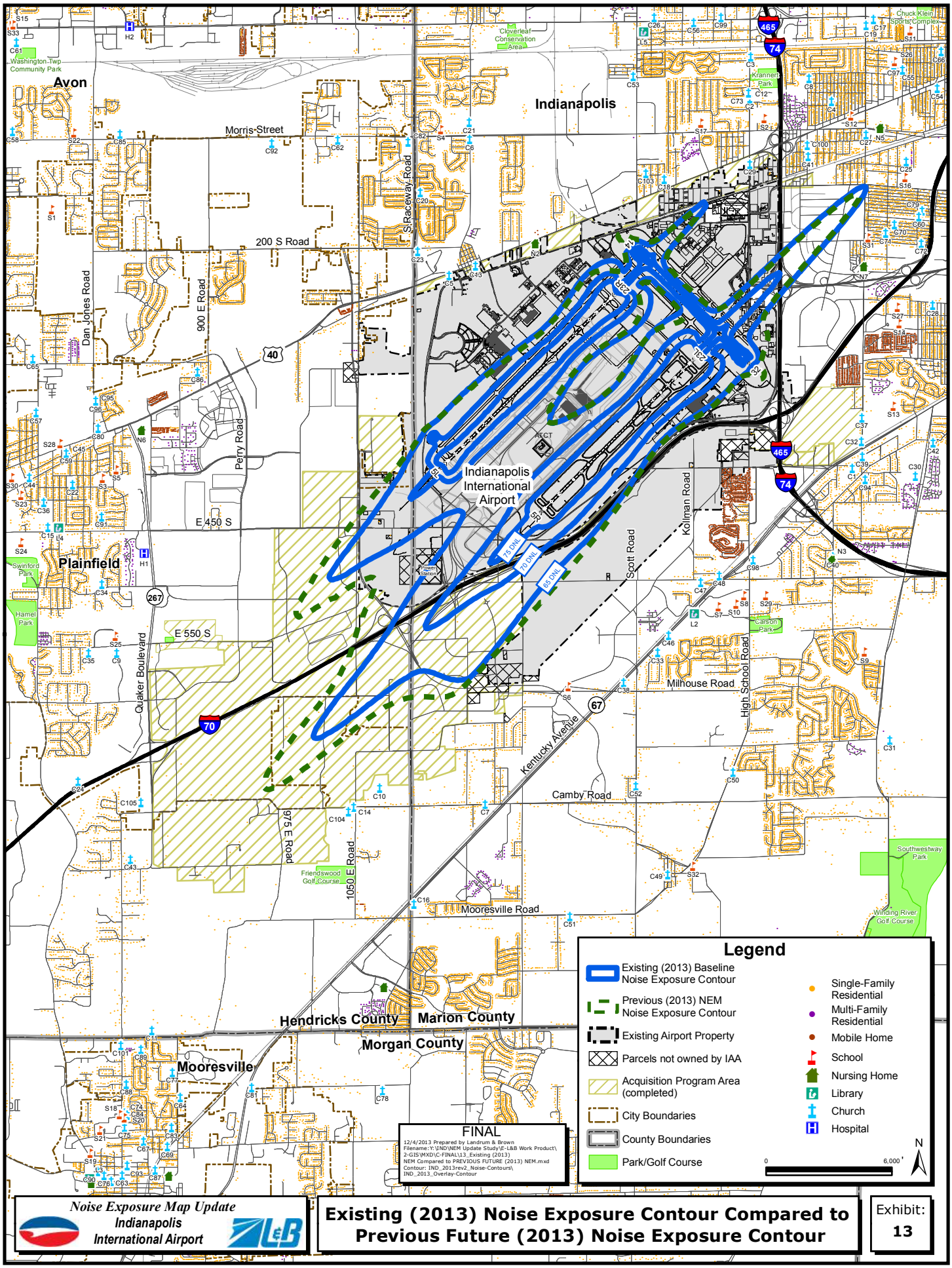
Table 10
GRID ANALYSIS REPORT
EXISTING (2013) NOISE EXPOSURE CONTOUR
Indianapolis International Airport

Grid ID	DNL	Leq	Lmax	TA65	NA65
L1	56.1	51.7	88.5	10:12	54
L2	64.6	58.3	87.7	28:00	106
L3	57.8	51.3	90.3	9:06	40
L4	51.9	45.7	92.9	2:06	9
L5	53.6	45.6	77.4	2:24	14
L6	59.8	52.2	83.5	12:12	51
L7	53.1	46.3	77.0	3:12	15
L8	57.7	51.0	80.8	11:18	55
L9	52.5	46.2	81.6	3:06	18
L10	49.1	41.6	72.6	0:12	2
S1	46.6	41.4	81.3	0:36	3
S2	50.0	44.5	82.6	1:06	5
S3	57.6	51.2	85.8	10:42	48
S4	51.8	46.0	82.9	2:12	12
S5	55.4	48.5	81.1	6:24	32
S6	47.6	40.3	70.1	0:06	1
S7	54.2	47.2	79.8	4:24	24

Table 10, *Continued*
GRID ANALYSIS REPORT
EXISTING (2013) NOISE EXPOSURE CONTOUR
Indianapolis International Airport

Grid ID	DNL	Leq	Lmax	TA65	NA65
S8	44.5	37.5	71.1	0:06	1
S9	57.8	51.3	81.3	13:06	62
S10	57.0	50.3	79.8	10:18	53
S11	57.1	49.9	80.0	8:36	49
S12	57.4	51.5	85.5	12:54	53
S13	59.1	51.1	80.9	12:06	51
S14	56.9	49.0	79.1	7:54	40
S15	55.9	47.9	77.9	6:42	34
S16	53.2	46.5	78.4	3:06	16
S17	55.3	50.7	84.6	8:12	47
S18	59.1	51.6	80.7	14:36	66
S19	56.4	49.2	79.7	6:24	31
S20	42.9	36.6	70.6	0:00	0
S21	53.5	45.5	77.1	2:30	14
S22	47.3	40.1	75.9	0:12	2
S23	46.1	39.2	70.5	0:06	1
S24	57.7	49.3	81.6	6:18	26
S25	58.7	50.3	82.9	7:18	28
S26	59.5	51.1	84.7	8:18	32
S27	61.9	55.6	84.6	24:54	97
S28	55.0	50.9	83.8	12:18	60
S29	56.7	48.5	85.0	5:42	23
S30	43.2	36.4	73.7	0:00	0
S31	51.8	47.5	82.3	4:18	20
S32	56.6	48.4	81.0	5:00	23
S33	49.5	43.0	79.9	0:24	3
S34	50.9	43.7	75.7	0:12	3
S35	43.6	37.6	71.2	0:00	1
S36	52.8	48.2	85.9	5:18	25
S37	50.9	46.4	80.5	3:30	15
S38	57.8	53.5	89.5	18:54	88
S39	60.5	54.6	88.1	24:24	105
S40	57.5	52.0	86.8	14:54	70
S41	57.7	53.6	86.3	20:30	86
S42	61.0	54.8	85.6	24:24	99
S43	57.6	53.5	86.0	19:54	86

Source: Landrum & Brown, 2013.

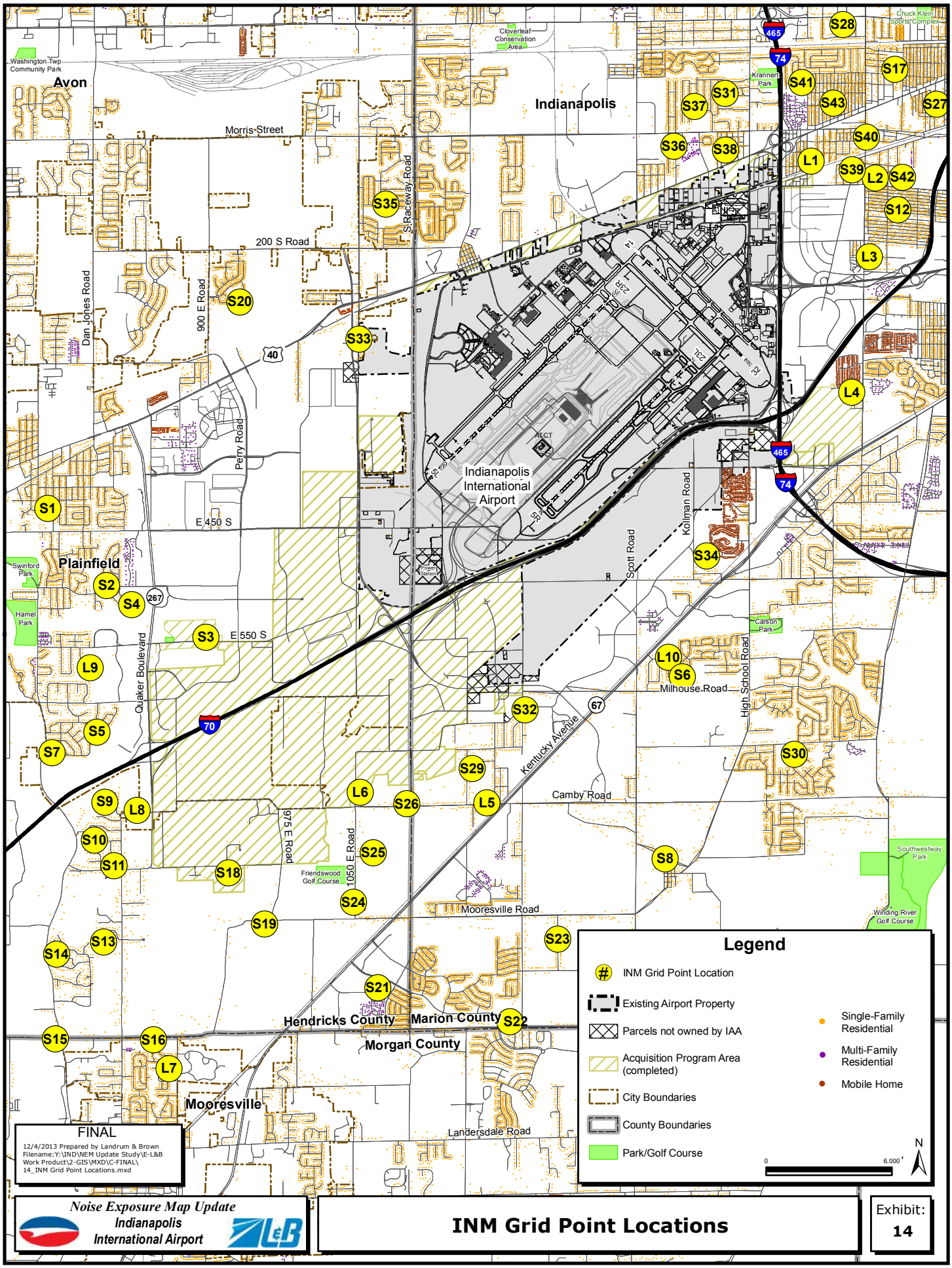


Noise Exposure Map Update
Indianapolis International Airport

Existing (2013) Noise Exposure Contour Compared to Previous Future (2013) Noise Exposure Contour

Exhibit: **13**

BACK OF EXHIBIT


Avon
Indianapolis
Plainfield
Indianapolis International Airport
Hendricks County
Marion County
Morgan County
Mooresville
Morris Street
200 S Road
E 450 S
E 550 S
Mooresville Road
Camby Road
Milhouse Road
Landersdale Road
Dan Jones Road
900 E Road
975 E Road
1050 E Road
Perry Road
Quaker Boulevard
S Raceway Road
Scott Road
Kollman Road
Kentucky Avenue
High School Road
Washington Twp Community Park
Cloverleaf Conservation Area
Chuck Klein Sports Complex
Krannert Park
Swinford Park
Hamel Park
Carson Park
Friendswood Golf Course
Southwestway Park
Winding River Golf Course
S1 S2 S3 S4 S5 S6 S7 S8 S9 S10 S11 S12 S13 S14 S15 S16 S17 S18 S19 S20 S21 S22 S23 S24 S25 S26 S27 S28 S29 S30 S31 S32 S33 S34 S35 S36 S37 S38 S39 S40 S41 S42 S43
L1 L2 L3 L4 L5 L6 L7 L8 L9 L10
Legend
INM Grid Point Location
Existing Airport Property
Parcels not owned by IAA
Acquisition Program Area (completed)
City Boundaries
County Boundaries
Park/Golf Course
Single-Family Residential
Multi-Family Residential
Mobile Home
N
0
6,000
FINAL
12/4/2013 Prepared by Landrum & Brown
Filename:Y:\IND\NEM Update Study\E-L&B Work Product\2-GIS\MXD\C-FINAL\14_INM Grid Point Locations.mxd
Noise Exposure Map Update
Indianapolis International Airport
INM Grid Point Locations
Exhibit: 14

BACK OF EXHIBIT

5. FUTURE (2018) CONDITIONS

The noise exposure contours depicted on the Future (2018) NEM represent the noise patterns projected for Future (2018) conditions. The Future (2018) Noise Exposure Contour is based on a forecast of operations prepared for the ongoing Master Plan at IND. The forecast is included as Appendix G, *Forecast*, in this document.

5.1 RUNWAY LAYOUT

No changes to runway configuration are expected to occur at IND by 2018; therefore, the same runway configuration was modeled for both the 2013 and 2018 baseline conditions.

5.2 OPERATING LEVELS

The number of aircraft operations modeled for the Future (2018) Baseline scenario at IND was based on the Aviation Demand Forecast[2] being prepared for the Airport Master Plan, which is consistent with the FAA's Terminal Area Forecast (TAF). Additional information regarding aircraft fleet projections was based on data provided by FedEx, as well as trends in aircraft retirement/replacement.

The distribution of aircraft operating during nighttime hours (10:00 p.m. to 6:59 a.m.) is 27 percent of the total operations, approximately the same as under Existing (2013) Conditions. **Table 11** summarizes the Future (2018) operations organized by aircraft category, operation type, and time of day (day of night).

5.3 FLEET MIX

For the Future (2018) conditions, large air carrier jet aircraft are projected to fly 52 percent of the total operations and will primarily be composed of Boeing 737-300/500/700/800s, Boeing 757-200s, Airbus 319/320s, McDonnell Douglas MD-82/88/90s, Bombardier CRJ700/900s, and Embraer 170/175 aircraft. Cargo jet aircraft are forecast to fly 19 percent of the total operations and will include Boeing 757-200, Boeing 777-200, Airbus 300/310, DC10-10, and MD11 aircraft.

The number of hushkitted aircraft at IND will continue to be reduced as airlines phase out and replace these aircraft. It is projected that huskitted aircraft, primarily Boeing 727-200s and Douglas DC9-5 aircraft, will comprise less than one percent of total operations at IND by 2018. **Table 12** provides detailed information showing average daily operations and fleet mix at IND. **Table 13** provides a side-by-side comparison of the operations and fleet mix modeled for the Existing (2013) and Future (2018) conditions.

[2] Indianapolis Airport Authority, Draft Working Paper No. 4, Aviation Demand Forecasts, Prepared by RS&H, August 7, 2012.

Table 11
DISTRIBUTION OF AVERAGE DAILY OPERATIONS BY AIRCRAFT CATEGORY
FUTURE (2018) BASELINE CONDITIONS
Indianapolis International Airport

Aircraft Category	Arrivals		Departures		Total
	Day	Night	Day	Night	
Air Carrier	114	52	108	58	332
Cargo Jets	11	34	11	34	90
Large Passenger Jets	103	18	97	24	242
Air Taxi	37	7	37	7	88
Regional Jets	33	5	33	5	76
Commuter / Cargo Props	4	2	4	2	12
General Aviation / Military	22	2	22	2	48
General Aviation Jets	11	1	12	0	24
General Aviation Props	10	1	9	2	22
Military Aircraft	1	0	1	0	2
Total	**173**	**61**	**167**	**67**	**468**

Note: Day = 7:00 a.m. to 9:59 p.m., Night = 10:00 p.m. to 6:59 a.m.

Source: OAG, ATCT records, Landing Fee Reports, AOMS data, Landrum & Brown, 2013.

Table 12
DISTRIBUTION OF AVERAGE DAILY OPERATIONS BY AIRCRAFT TYPE
FUTURE (2018) CONDITIONS
Indianapolis International Airport

Aircraft Type	INM ID	Arrivals		Departures		Total
		Day	Night	Day	Night	
Heavy Cargo Jets						
Airbus A300 Freighter	A300-622R	3	8	3	8	**22**
Airbus A310 Freighter	A310-304	0	5	0	5	**10**
Boeing 727-200 (hushkitted)	727EM2	0	1	0	1	**2**
Boeing 757-200	757PW	0	3	1	2	**6**
Boeing 757-200	757RR	0	4	1	3	**8**
Boeing 747-400	747400	1	0	0	1	**2**
Boeing 767-300	767CF6	0	3	2	1	**6**
Boeing 777-200	7773ER	1	1	1	1	**4**
McDonnell-Douglas MD10	DC1010	4	4	1	7	**16**
McDonnell-Douglas MD10	DC1030	1	1	1	1	**4**
McDonnell-Douglas MD11	MD11GE	0	4	1	3	**8**
McDonnell-Douglas MD11	MD11PW	1	0	0	1	**2**
Subtotal		*11*	*34*	*11*	*34*	***90***
Large Passenger Jets						
Boeing 717-200	717200	8	3	10	1	**22**
Boeing 737-300	737300	7	1	8	0	**16**
Boeing 737-500	737500	0	0	0	0	**0**
Boeing 737-700	737700	14	2	13	3	**32**
Boeing 737-800	737800	3	1	4	0	**8**
Boeing 757-300	757300	1	0	1	0	**2**
Airbus A319	A319-131	4	2	5	1	**12**
Airbus A320	A320-211	3	3	4	2	**12**
Airbus A320	A320-232	4	0	3	1	**8**
McDonnell-Douglas MD80 Series	MD82	4	0	4	0	**8**
McDonnell-Douglas MD80 Series	MD83	5	2	6	1	**14**
McDonnell-Douglas MD90	MD9025	2	0	1	1	**4**
Douglas DC9-5 (hushkitted)	DC95HW	1	0	0	1	**2**
Bombardier CRJ-700	CRJ9-ER	12	2	11	3	**28**
Bombardier CRJ-900	CRJ9-ER	5	1	5	1	**12**
Embraer 170	EMB170	19	1	14	6	**40**
Embraer 175	EMB175	9	0	7	2	**18**
Embraer 190	EMB190	2	0	1	1	**4**
Subtotal		*103*	*18*	*97*	*24*	***242***
Regional Jets						
Bombardier CRJ-200	CL601	11	2	11	2	**26**
Embraer 140	EMB140	2	2	2	2	**8**
Embraer 145	EMB145	8	1	8	1	**18**
Embraer 145	EMB14L	12	0	12	0	**24**
Subtotal		*33*	*5*	*33*	*5*	***76***

Table 12, *Continued*
DISTRIBUTION OF AVERAGE DAILY OPERATIONS BY AIRCRAFT TYPE
FUTURE (2018) CONDITIONS
Indianapolis International Airport

Aircraft Type	INM ID	Arrivals		Departures		Grand Total
		Day	Night	Day	Night	
Commuter / Cargo Props						
Avions de Transport Regional ATR-42	ATR42	0	1	0	1	**2**
Avions de Transport Regional ATR-72	ATR72	1	0	1	0	**2**
Cessna 208 Grand Caravan	CNA208	1	1	1	1	**4**
Bombardier Dash 8-100	DHC8	1	0	1	0	**2**
Bombardier Dash 8-300	DHC830	1	0	1	0	**2**
Subtotal		*4*	*2*	*4*	*2*	***12***
General Aviation Jets						
General Aviation Twin Engine Jet	CIT3	1	0	1	0	**2**
General Aviation Twin Engine Jet	CL600	1	0	1	0	**2**
General Aviation Twin Engine Jet	CNA525C	1	0	1	0	**2**
General Aviation Twin Engine Jet	CNA55B	1	0	1	0	**2**
General Aviation Twin Engine Jet	CNA560XL	1	0	1	0	**2**
General Aviation Twin Engine Jet	GIV	1	0	1	0	**2**
General Aviation Twin Engine Jet	LEAR35	4	0	4	0	**8**
General Aviation Twin Engine Jet	MU3001	1	1	2	0	**4**
Subtotal		*11*	*1*	*12*	*0*	***24***
General Aviation Props						
General Aviation Twin Piston	BEC58P	2	0	2	0	**4**
General Aviation Single Piston	CNA172	0	1	0	1	**2**
General Aviation Single Piston	CNA182	1	0	1	0	**2**
General Aviation Single Piston	CNA206	1	0	1	0	**2**
General Aviation Turboprop	CNA441	3	0	2	1	**6**
General Aviation Single Piston	GASEPV	2	0	2	0	**4**
General Aviation Single Piston	PA28	1	0	1	0	**2**
Subtotal		*10*	*1*	*9*	*2*	***22***
Military Aircraft						
Northrup Talon T-38A	T-38A	1	0	1	0	**2**
Subtotal		*1*	*0*	*1*	*0*	***2***
Total		**173**	**61**	**167**	**67**	**468**

Note: Day = 7:00 a.m. to 9:59 p.m., Night = 10:00 p.m. to 6:59 a.m.
Source: OAG, ATCT records, Landing Fee Reports, AOMS data, FAA ETMSC, Landrum & Brown, 2013.

Table 13
COMPARISON OF AVERAGE DAILY OPERATIONS BY AIRCRAFT TYPE
EXISTING (2013) AND FUTURE (2018) BASELINE
Indianapolis International Airport

Aircraft Type	INM ID	Average Annual Day Operations		Total Change
		2013	2018	
Cargo Jets				
Airbus A300 Freighter	A300-622R	22	22	0
Airbus A310 Freighter	A310-304	10	10	0
Boeing 727-200 (hushkitted)	727EM2	4	2	-2
Boeing 757-200	757PW	4	6	2
Boeing 757-200	757RR	6	8	2
Boeing 747-400	747400	2	2	0
Boeing 767-300	767CF6	0	6	6
Boeing 777 Freighter	7773ER	2	4	2
McDonnell-Douglas MD10	DC1010	20	16	-4
McDonnell-Douglas MD10	DC1030	6	4	-2
McDonnell-Douglas MD11	MD11GE	8	8	0
McDonnell-Douglas MD11	MD11PW	2	2	0
Subtotal		86	90	4
Large Passenger Jets				
Boeing 717-200	717200	18	22	4
Boeing 737-300	737300	16	16	0
Boeing 737-500	737500	2	0	-2
Boeing 737-700	737700	26	32	6
Boeing 737-800	737800	2	8	6
Boeing 757-300	757300	2	2	0
Airbus A319	A319-131	12	12	0
Airbus A320	A320-211	8	12	4
Airbus A320	A320-232	4	8	4
McDonnell-Douglas MD80 Series	MD82	8	8	0
McDonnell-Douglas MD80 Series	MD83	14	14	0
McDonnell-Douglas MD90	MD9025	2	4	2
Douglas DC9-5 (hushkitted)	DC95HW	2	2	0
Bombardier CRJ-700	CRJ9-ER	22	28	6
Bombardier CRJ-900	CRJ9-ER	8	12	4
Embraer 170	EMB170	34	40	6
Embraer 175	EMB175	14	18	4
Embraer 190	EMB190	0	4	4
Subtotal		194	242	48
Regional Jets				
Bombardier CRJ-200	CL601	32	26	-6
Embraer 140	EMB140	10	8	-2
Embraer 145	EMB145	22	18	-4
Embraer 145	EMB14L	30	24	-6
Subtotal		94	76	-18

Table 13 *(continued)*
COMPARISON OF AVERAGE DAILY OPERATIONS BY AIRCRAFT TYPE
EXISTING (2013) AND FUTURE (2018) BASELINE
Indianapolis International Airport

Aircraft Type	INM ID	Average Annual Day Operations		Total Change
		2013	2018	
Commuter / Cargo Props				
Avions de Transport Regional ATR-42	ATR42	2	2	0
Avions de Transport Regional ATR-72	ATR72	2	2	0
Cessna 208 Grand Caravan	CNA208	4	4	0
Bombardier Dash 8-100	DHC8	2	2	0
Bombardier Dash 8-300	DHC830	2	2	0
Subtotal		*12*	*12*	*0*
General Aviation Jets				
General Aviation Twin Engine Jet	CIT3	2	2	0
General Aviation Twin Engine Jet	CL600	2	2	0
General Aviation Twin Engine Jet	CNA525C	2	2	0
General Aviation Twin Engine Jet	CNA55B	2	2	0
General Aviation Twin Engine Jet	CNA560XL	2	2	0
General Aviation Twin Engine Jet	GIV	2	2	0
General Aviation Twin Engine Jet	LEAR35	8	8	0
General Aviation Twin Engine Jet	MU3001	4	4	0
Subtotal		*24*	*24*	*0*
General Aviation Props				
General Aviation Twin Piston	BEC58P	4	4	0
General Aviation Single Piston	CNA172	2	2	0
General Aviation Single Piston	CNA182	2	2	0
General Aviation Single Piston	CNA206	2	2	0
General Aviation Turboprop	CNA441	8	6	-2
General Aviation Single Piston	GASEPV	6	4	-2
General Aviation Single Piston	PA28	2	2	0
Subtotal		*26*	*22*	*-4*
Military Aircraft				
Northrup Talon T-38A	T-38A	2	2	0
Subtotal		*2*	*2*	*0*
Total		*438*	*468*	*30*

Source: OAG, ATCT records, Landing Fee Reports, AOMS data, FAA ETMSC, FAA TAF, IAA Aviation Demand Forecast, Landrum & Brown, 2013.

5.4 RUNWAY END UTILIZATION

Average-annual day runway end utilization, in terms of the percent of time each runway end is used by the various aircraft categories (cargo jets, large passenger jets, regional jets, propeller aircraft, and military aircraft), is not expected to change in 2018;[3] therefore, the same runway use input data was used to model the Existing (2013) and the Future (2018) Noise Exposure Contours as shown in Table 3.

5.5 FLIGHT TRACKS

Discussions with representatives from FedEx and the IND ATCT were held regarding potential implementation of Standard Instrument Departure Procedures (SIDS) using Area Navigation (RNAV) technology at IND. Between 2012 and 2013, several SIDS had been developed for potential implementation for nighttime departures at IND to improve aircraft route efficiency and simplify ATCT controller instructions to pilots. These procedures were designed and have been refined to be consistent with the nighttime noise abatement measures described in Section 4.5 of this document.

RNAV procedures would not be flown from the runway end to the first waypoint due to the inability to predict the point at which the aircraft would turn, as this would force ATCT to increase separation between leading and trailing departures on the same runway under current FAA guidelines. Therefore, ATCT controllers would not modify the initial instructions to pilots upon departure, rather aircraft would fly the procedure as a SID to an RNAV and be vectored from the initial heading into the RNAV portion of the route at a distance expected to be approximately 5-6 nautical miles from the distance measuring equipment (DME) at IND. At some point in the future, FAA may grant a waiver allowing simultaneous departures on the parallel runways under total RNAV control; however, at this point a waiver has not been issued. Even if a waiver were granted, the proposed SIDS procedures were designed to overlay the existing approved noise abatement departure corridors and would not be expected to cause significant changes to flight tracks. Therefore, flight track locations were not modified from those modeled for the Existing (2013) NEM.

Flight track utilization percentages modeled in the INM change slightly due to changes in operating levels and fleet mix between the Existing (2013) and Future (2018) conditions. **Table 14** shows arrival flight track utilization percentages and **Table 15** shows departure flight track utilization percentages for the Future (2018) Noise Exposure Contour.

[3] Runway use, in particular the distribution of overnight cargo operations between the two parallel runways (Runway 05R/23L and Runway 05L/23R, is partially a function of runway capacity. It is assumed that operating levels will not reach levels that would exceed the current runway capacity on the parallel runways by 2018. Therefore, no change to runway use percentages is anticipated.

Table 14
ARRIVAL FLIGHT TRACK UTILIZATION PERCENTAGES
FUTURE (2018) BASELINE
Indianapolis International Airport

Runway	Flight Track ID	Cargo Jets	Large Passenger Jets	Regional Jets	Propeller Aircraft	Military Aircraft
23L	FCE5	1.1%	0.0%	0.0%	0.0%	0.0%
	FCE6	9.3%	0.0%	0.0%	0.0%	0.0%
	FCN6	16.7%	0.0%	0.0%	0.0%	0.0%
	FCS6	2.5%	0.0%	0.0%	0.0%	0.0%
	FCS7	4.0%	0.0%	0.0%	0.0%	0.0%
	FCW6	4.7%	0.0%	0.0%	0.0%	0.0%
	FCW7	3.9%	0.0%	0.0%	0.0%	0.0%
	JCE5	0.0%	4.8%	0.0%	0.0%	0.0%
	JCE6	0.0%	4.8%	0.0%	0.0%	0.0%
	JCN5	0.0%	9.4%	0.0%	0.0%	0.0%
	JCS6	0.0%	0.8%	0.0%	0.0%	0.0%
	JCS7	0.0%	1.7%	0.0%	0.0%	0.0%
	JCW6	0.0%	11.4%	0.0%	0.0%	0.0%
	PCE6	0.0%	0.0%	0.0%	2.2%	0.0%
	PCN6	0.0%	0.0%	0.0%	20.4%	0.0%
	PCS6	0.0%	0.0%	0.0%	6.7%	0.0%
	PCW6	0.0%	0.0%	0.0%	3.5%	0.0%
	SCE6	0.0%	0.0%	6.1%	0.0%	0.0%
	SCN6	0.0%	0.0%	14.5%	0.0%	40.4%
	SCS6	0.0%	0.0%	5.2%	0.0%	0.0%
	SCS7	0.0%	0.0%	0.7%	0.0%	0.0%
	SCW6	0.0%	0.0%	10.7%	0.0%	0.0%
05R	FBE6	14.6%	0.0%	0.0%	0.0%	0.0%
	FBN6	17.1%	0.0%	0.0%	0.0%	0.0%
	FBN7	1.4%	0.0%	0.0%	0.0%	0.0%
	FBS6	7.4%	0.0%	0.0%	0.0%	0.0%
	FBW6	7.5%	0.0%	0.0%	0.0%	0.0%
	JBE5	0.0%	3.7%	0.0%	0.0%	0.0%
	JBN5	0.0%	2.8%	0.0%	0.0%	0.0%
	JBN6	0.0%	0.7%	0.0%	0.0%	0.0%
	JBS5	0.0%	3.2%	0.0%	0.0%	0.0%
	JBW6	0.0%	2.4%	0.0%	0.0%	0.0%
	PBN6	0.0%	0.0%	0.0%	2.7%	0.0%
	PBN7	0.0%	0.0%	0.0%	2.7%	0.0%
	PBS1	0.0%	0.0%	0.0%	2.4%	0.0%
	SBE6	0.0%	0.0%	2.6%	0.0%	0.0%
	SBN6	0.0%	0.0%	3.9%	0.0%	6.7%
	SBN7	0.0%	0.0%	1.3%	0.0%	6.7%
	SBS6	0.0%	0.0%	2.1%	0.0%	0.0%
	SBW6	0.0%	0.0%	3.8%	0.0%	0.0%

Table 14 *(continued)*
ARRIVAL FLIGHT TRACK UTILIZATION PERCENTAGES
FUTURE (2018) BASELINE
Indianapolis International Airport

Runway	Flight Track	Cargo Jets	Large Passenger Jets	Regional Jets	Propeller Aircraft	Military Aircraft
23R	FDN5	3.4%	0.0%	0.0%	0.0%	0.0%
	FDW5	1.3%	0.0%	0.0%	0.0%	0.0%
	JDE6	0.0%	5.1%	0.0%	0.0%	0.0%
	JDE7	0.0%	5.1%	0.0%	0.0%	0.0%
	JDN5	0.0%	9.9%	0.0%	0.0%	0.0%
	JDS6	0.0%	1.8%	0.0%	0.0%	0.0%
	JDS7	0.0%	0.9%	0.0%	0.0%	0.0%
	JDW5	0.0%	6.1%	0.0%	0.0%	0.0%
	JDW6	0.0%	6.3%	0.0%	0.0%	0.0%
	PDE6	0.0%	0.0%	0.0%	3.0%	0.0%
	PDN6	0.0%	0.0%	0.0%	12.5%	0.0%
	PDN7	0.0%	0.0%	0.0%	4.6%	0.0%
	PDS6	0.0%	0.0%	0.0%	3.0%	0.0%
	PDW6	0.0%	0.0%	0.0%	3.1%	0.0%
	SDE6	0.0%	0.0%	9.6%	0.0%	29.8%
	SDN6	0.0%	0.0%	9.0%	0.0%	0.0%
	SDS6	0.0%	0.0%	2.3%	0.0%	0.0%
	SDS7	0.0%	0.0%	0.5%	0.0%	0.0%
	SDW6	0.0%	0.0%	8.8%	0.0%	0.0%
05L	FAE5	3.6%	0.0%	0.0%	0.0%	0.0%
	FAN5	0.0%	0.0%	0.0%	0.0%	0.0%
	FAW5	1.0%	0.0%	0.0%	0.0%	0.0%
	JAE5	0.0%	4.8%	0.0%	0.0%	0.0%
	JAN6	0.0%	1.5%	0.0%	0.0%	0.0%
	JAN7	0.0%	3.1%	0.0%	0.0%	0.0%
	JAS5	0.0%	4.1%	0.0%	0.0%	0.0%
	JAW5	0.0%	3.4%	0.0%	0.0%	0.0%
	PAN6	0.0%	0.0%	0.0%	1.9%	0.0%
	PAN7	0.0%	0.0%	0.0%	1.9%	0.0%
	PAS6	0.0%	0.0%	0.0%	1.7%	0.0%
	SAE6	0.0%	0.0%	3.0%	0.0%	11.5%
	SAN6	0.0%	0.0%	3.6%	0.0%	0.0%
	SAN7	0.0%	0.0%	1.7%	0.0%	0.0%
	SAS6	0.0%	0.0%	2.2%	0.0%	0.0%
	SAW6	0.0%	0.0%	3.7%	0.0%	0.0%

Table 14 *(continued)*
ARRIVAL FLIGHT TRACK UTILIZATION PERCENTAGES
FUTURE (2018) BASELINE
Indianapolis International Airport

Runway	Flight Track	Cargo Jets	Large Passenger Jets	Regional Jets	Propeller Aircraft	Military Aircraft
14	FEW6	0.0%	0.0%	0.0%	0.0%	0.0%
	JEN6	0.0%	0.2%	0.0%	0.0%	0.0%
	PEW6	0.0%	0.0%	0.0%	18.8%	0.0%
	PEW7	0.0%	0.0%	0.0%	1.7%	0.0%
	SEW1	0.0%	0.0%	1.2%	0.0%	1.3%
32	FFW6	0.3%	0.0%	0.0%	0.0%	0.0%
	JFN6	0.0%	0.6%	0.0%	0.0%	0.0%
	JFN7	0.0%	0.2%	0.0%	0.0%	0.0%
	JFS6	0.0%	1.1%	0.0%	0.0%	0.0%
	PFE6	0.0%	0.0%	0.0%	5.9%	0.0%
	PFN6	0.0%	0.0%	0.0%	1.2%	0.0%
	SFE6	0.0%	0.0%	1.8%	0.0%	3.6%
	SFW6	0.0%	0.0%	0.8%	0.0%	0.0%
	SFW7	0.0%	0.0%	0.8%	0.0%	0.0%
Total		100.0%	100.0%	100.0%	100.0%	100.0%

Note: Total percent for each aircraft type may not equal 100% due to rounding.
Source: AOMS data, September 2011 through August 2012; Landrum & Brown analysis, 2013.

Table 15
DEPARTURE FLIGHT TRACK UTILIZATION PERCENTAGES
FUTURE (2018) BASELINE
Indianapolis International Airport

Runway	Flight Track	Cargo Jets	Large Passenger Jets	Regional Jets	Propeller Aircraft	Military Aircraft
23L	FCE1	3.6%	0.0%	0.0%	0.0%	0.0%
	FCE2	3.6%	0.0%	0.0%	0.0%	0.0%
	FCN1	4.8%	0.0%	0.0%	0.0%	0.0%
	FCN2	2.6%	0.0%	0.0%	0.0%	0.0%
	FCS1	2.9%	0.0%	0.0%	0.0%	0.0%
	FCS2	0.7%	0.0%	0.0%	0.0%	0.0%
	FCW1	7.3%	0.0%	0.0%	0.0%	0.0%
	JCE1	0.0%	10.4%	0.0%	0.0%	0.0%
	JCN1	0.0%	3.6%	0.0%	0.0%	0.0%
	JCS1	0.0%	6.6%	0.0%	0.0%	0.0%
	JCS2	0.0%	1.7%	0.0%	0.0%	0.0%
	JCW1	0.0%	8.0%	0.0%	0.0%	0.0%
	NCE1	19.4%	0.0%	0.0%	0.0%	0.0%
	NCE2	7.5%	0.0%	0.0%	0.0%	0.0%
	NCS1	4.5%	0.0%	0.0%	0.0%	0.0%
	NCS2	6.6%	0.0%	0.0%	0.0%	0.0%
	NCW2	1.6%	0.0%	0.0%	0.0%	0.0%
	PCE1	0.0%	0.0%	0.0%	5.5%	0.0%
	PCN1	0.0%	0.0%	0.0%	1.6%	0.0%
	PCS1	0.0%	0.0%	0.0%	5.9%	0.0%
	SCE1	0.0%	0.0%	11.9%	0.0%	0.0%
	SCN1	0.0%	0.0%	3.3%	0.0%	31.4%
	SCN2	0.0%	0.0%	7.2%	0.0%	0.0%
	SCS1	0.0%	0.0%	6.8%	0.0%	0.0%
	SCW1	0.0%	0.0%	1.2%	0.0%	0.0%
05R	FBE1	0.7%	0.0%	0.0%	0.0%	0.0%
	FBE2	1.2%	0.0%	0.0%	0.0%	0.0%
	FBE3	0.6%	0.0%	0.0%	0.0%	0.0%
	FBN1	0.6%	0.0%	0.0%	0.0%	0.0%
	FBS1	1.7%	0.0%	0.0%	0.0%	0.0%
	FBS2	0.9%	0.0%	0.0%	0.0%	0.0%
	FBW1	1.7%	0.0%	0.0%	0.0%	0.0%
	JBE1	0.0%	2.8%	0.0%	0.0%	0.0%
	JBE2	0.0%	2.8%	0.0%	0.0%	0.0%
	JBN1	0.0%	1.0%	0.0%	0.0%	0.0%
	JBNA	0.0%	1.3%	0.0%	0.0%	0.0%
	JBS1	0.0%	2.3%	0.0%	0.0%	0.0%
	JBS2	0.0%	2.3%	0.0%	0.0%	0.0%
	JBW1	0.0%	2.3%	0.0%	0.0%	0.0%
	JBWA	0.0%	1.9%	0.0%	0.0%	0.0%

Table 15 *(continued)*
DEPARTURE FLIGHT TRACK UTILIZATION PERCENTAGES
FUTURE (2018) BASELINE
Indianapolis International Airport

Runway	Flight Track	Cargo Jets	Large Passenger Jets	Regional Jets	Propeller Aircraft	Military Aircraft
05R	NBE2	2.2%	0.0%	0.0%	0.0%	0.0%
	NBE3	1.0%	0.0%	0.0%	0.0%	0.0%
	NBN1	0.9%	0.0%	0.0%	0.0%	0.0%
	NBNA	0.5%	0.0%	0.0%	0.0%	0.0%
	NBS1	0.8%	0.0%	0.0%	0.0%	0.0%
	NBW1	0.4%	0.0%	0.0%	0.0%	0.0%
	NBWA	0.5%	0.0%	0.0%	0.0%	0.0%
	PBN1	0.0%	0.0%	0.0%	11.1%	0.0%
	SBE1	0.0%	0.0%	6.4%	0.0%	0.0%
	SBE2	0.0%	0.0%	2.1%	0.0%	0.0%
	SBN1	0.0%	0.0%	6.9%	0.0%	17.2%
	SBS1	0.0%	0.0%	1.4%	0.0%	0.0%
	SBW1	0.0%	0.0%	0.4%	0.0%	0.0%
	NBW2	0.1%	0.0%	0.0%	0.0%	0.0%
	FBW2	0.2%	0.0%	0.0%	0.0%	0.0%
23R	FDE1	0.5%	0.0%	0.0%	0.0%	0.0%
	FDN1	1.0%	0.0%	0.0%	0.0%	0.0%
	FDN2	7.4%	0.0%	0.0%	0.0%	0.0%
	FDS1	0.6%	0.0%	0.0%	0.0%	0.0%
	FDW1	4.5%	0.0%	0.0%	0.0%	0.0%
	JDE1	0.0%	8.0%	0.0%	0.0%	0.0%
	JDN1	0.0%	4.5%	0.0%	0.0%	0.0%
	JDS1	0.0%	12.6%	0.0%	0.0%	0.0%
	JDW1	0.0%	9.6%	0.0%	0.0%	0.0%
	NDS1	4.1%	0.0%	0.0%	0.0%	0.0%
	PDE1	0.0%	0.0%	0.0%	1.3%	0.0%
	PDN1	0.0%	0.0%	0.0%	4.6%	0.0%
	PDS1	0.0%	0.0%	0.0%	5.6%	0.0%
	PDW1	0.0%	0.0%	0.0%	1.7%	0.0%
	PDWA	0.0%	0.0%	0.0%	1.7%	0.0%
	SDE1	0.0%	0.0%	12.5%	0.0%	0.0%
	SDN1	0.0%	0.0%	11.0%	0.0%	28.6%
	SDS1	0.0%	0.0%	4.8%	0.0%	0.0%
	SDW1	0.0%	0.0%	1.2%	0.0%	0.0%
05L	FAN1	1.1%	0.0%	0.0%	0.0%	0.0%
	FAN2	0.2%	0.0%	0.0%	0.0%	0.0%
	FAW1	1.5%	0.0%	0.0%	0.0%	0.0%
	JAE1	0.0%	4.2%	0.0%	0.0%	0.0%
	JAN1	0.0%	2.5%	0.0%	0.0%	0.0%

Table 15 *(continued)*
DEPARTURE FLIGHT TRACK UTILIZATION PERCENTAGES
FUTURE (2018) BASELINE
Indianapolis International Airport

Runway	Flight Track	Cargo Jets	Large Passenger Jets	Regional Jets	Propeller Aircraft	Military Aircraft
05L	JAS1	0.0%	6.1%	0.0%	0.0%	0.0%
	JAW1	0.0%	4.2%	0.0%	0.0%	0.0%
	PAE1	0.0%	0.0%	0.0%	0.4%	0.0%
	PAE2	0.0%	0.0%	0.0%	0.4%	0.0%
	PAN1	0.0%	0.0%	0.0%	1.8%	0.0%
	PAN2	0.0%	0.0%	0.0%	0.7%	0.0%
	PAN3	0.0%	0.0%	0.0%	0.7%	0.0%
	PAS1	0.0%	0.0%	0.0%	2.6%	0.0%
	PAW1	0.0%	0.0%	0.0%	1.0%	0.0%
	SAE1	0.0%	0.0%	7.6%	0.0%	13.5%
	SAN1	0.0%	0.0%	5.6%	0.0%	0.0%
	SAW1	0.0%	0.0%	1.5%	0.0%	0.0%
14	JEE1	0.0%	0.0%	0.0%	0.0%	0.0%
	JEN1	0.0%	0.0%	0.0%	0.0%	0.0%
	JES1	0.0%	0.0%	0.0%	0.0%	0.0%
	JEW1	0.0%	0.0%	0.0%	0.0%	0.0%
	PEE1	0.0%	0.0%	0.0%	8.5%	0.0%
	PES1	0.0%	0.0%	0.0%	0.9%	0.0%
	PES2	0.0%	0.0%	0.0%	8.9%	0.0%
	SEE1	0.0%	0.0%	1.6%	0.0%	0.0%
	SEN1	0.0%	0.0%	1.6%	0.0%	4.5%
	SES1	0.0%	0.0%	0.8%	0.0%	0.0%
	FEW1	0.0%	0.0%	0.0%	0.0%	0.0%
32	FFW1	0.2%	0.0%	0.0%	0.0%	0.0%
	JFE1	0.0%	0.4%	0.0%	0.0%	0.0%
	JFN1	0.0%	0.0%	0.0%	0.0%	0.0%
	JFN2	0.0%	0.1%	0.0%	0.0%	0.0%
	JFS1	0.0%	0.3%	0.0%	0.0%	0.0%
	JFW1	0.0%	0.4%	0.0%	0.0%	0.0%
	PFE1	0.0%	0.0%	0.0%	17.0%	0.0%
	PFN1	0.0%	0.0%	0.0%	6.1%	0.0%
	PFN2	0.0%	0.0%	0.0%	12.1%	0.0%
	SFE1	0.0%	0.0%	1.7%	0.0%	0.0%
	SFN1	0.0%	0.0%	1.7%	0.0%	4.8%
	SFS1	0.0%	0.0%	0.6%	0.0%	0.0%
	SFW1	0.0%	0.0%	0.1%	0.0%	0.0%
Total		100.0%	100.0%	100.0%	100.0%	100.0%

Note: Total percent for each aircraft type may not equal 100% due to rounding.
Source: AOMS data, September 2011 through August 2012; Landrum & Brown analysis, 2013.

5.6 FLIGHT PROFILES

The trip lengths flown from IND are based upon projected operations for the future conditions. There are expected to be no major changes in the destinations served by airlines from IND. However, changes in the number of operations and fleet mix results in small variations in the departure trip length distributions compared to the 2013 conditions as shown in **Table 16**. For the Future (2018) conditions, 51 percent of all cargo jet departures, 59 percent of all large passenger jet departures, 82 percent of all regional jet departures, and 100 percent of all propeller and military aircraft departures operate to destinations with a stage length of one (0 to 500 nautical miles).

As with the Existing (2013) NEM, departure profiles for FedEx aircraft were modeled using the ICAO A profile, if available, rather than the standard INM profile, to represent the Close-In Noise Abatement Departure Profiles implemented by FedEx per the recommended measures in the 1997 NCP. As with the Existing (2013) NEM, stage lengths were modified for certain aircraft modeled in the Future (2018) NEM to more accurately reflect their average weight as discussed in Appendix E, Section E.3.3.

Table 16
DEPARTURE TRIP LENGTH DISTRIBUTION
FUTURE (2018) CONDITIONS
Indianapolis International Airport

Stage Length	Cargo Jets	Large Passenger Jets	Regional Jets	Propeller Aircraft	Military Aircraft	Total
1	51%	59%	82%	100%	100%	65%
2	29%	31%	18%	0%	0%	25%
3	4%	9%	0%	0%	0%	6%
4	9%	2%	0%	0%	0%	3%
5	4%	0%	0%	0%	0%	1%
6	2%	0%	0%	0%	0%	0%
7	0%	0%	0%	0%	0%	0%

Source: Landrum & Brown, 2013.

5.7 ENGINE RUN-UPS

Engine run-up locations are not expected to change from the Existing (2013) condition. The total number of run-ups in 2018 is expected to increase in proportion to the forecasted increase in total operations at IND. The number of run-ups modeled for the Future (2018) Baseline scenario is shown in **Table 17**.

Table 17
GROUND RUN-UP OPERATIONS
FUTURE (2018) BASELINE
Indianapolis International Airport

Thrust Setting	Average Duration	Aircraft Type	Number of Run-ups
Max	10 minutes	737300, 737700, 757PW, 757RR, A319-131, CL600, CNA441, DHC830, EMB170, GIV, LEAR35, MD11GE	1.3 per week
High - 70%	20 minutes	737300, 737700, 757PW, 757RR, A319-131, CL600, CNA441, DHC830, EMB170, GIV, LEAR35, MD11GE	2.1 per week
Low Idle - 30%	30 minutes	737300, 737700, 757PW, 757RR, A319-131, CL600, CNA441, DHC830, EMB170, GIV, LEAR35, MD11GE	2.8 per week

Source: Indianapolis International Airport Final Noise Exposure Map Update, 2008; Landrum & Brown, 2013.

5.8 FUTURE (2018) NOISE EXPOSURE CONTOUR

The Future (2018) Noise Exposure Contour, showing contours of 65, 70, and 75 DNL levels, is presented on **Exhibit 15**. The area within each five-decibel noise exposure contour is shown in **Table 18,** *Area Exposed to Various Noise Levels.* The 65+ DNL of the Future (2018) Noise Exposure Contour encompasses approximately 6.40 square miles of land area. The majority of this area is either over airport property or within the noise land acquisition area. The 65+ DNL of the Future (2018) Noise Exposure Contour is smaller than the 65+ DNL of the Existing (2013) Noise Exposure Contour due to the continued phase-out of older, louder aircraft that is forecast at IND.

Exhibit 16 shows the Future (2018) Noise Exposure Contour compared to the Existing (2013) Noise Exposure Contour. The Future (2018) Noise Exposure Contour retains a similar shape as the Existing (2013) Noise Exposure Contour; however, some differences occur due to the forecasted increase in aircraft operations and change in fleet mix as a result of the anticipated phase-out of older aircraft from commercial fleets. This phase-out primarily reduces noise from aircraft on departure. Therefore, the 65+ DNL of the Future (2018) Noise Exposure Contour is smaller to the southwest of Runways 05R/23L and 05L/23R because the majority of aircraft depart to the southwest and the reduction in noise from this phase-out is greater than the increase in noise due to the forecasted increase in overall operations at IND. However, the 65+ DNL of the Future (2018) Noise Exposure Contour is larger than the 65+ DNL of the Existing (2013) Noise Exposure

Contour to the northeast of IND because the majority of aircraft arrive from the northeast and the phase-out of older aircraft has less of an effect on reducing arrival noise. Since the majority of aircraft arrive from the northeast, the contour is larger in this area due to the forecasted increase in aircraft operations in 2018.

Table 18
AREA EXPOSED TO VARIOUS NOISE LEVELS (IN SQUARE MILES)
FUTURE (2018) COMPARED TO EXISTING (2013) NOISE EXPOSURE CONTOURS
Indianapolis International Airport

CONTOUR RANGE	2013 BASELINE (SQUARE MILES)	2018 BASELINE (SQUARE MILES)	DIFFERENCE
65-70 DNL	4.03	3.94	-0.09
70-75 DNL	1.45	1.42	-0.04
75 + DNL	1.06	1.04	-0.02
65 + DNL	6.55	6.40	-0.15

Note: Total of 65+ DNL may not equal sum of individual contour bands due to rounding.
Contour: IND_2013rev1_Noise-Contours, IND_2018Noise-Contours.
Source: Landrum & Brown, 2013.

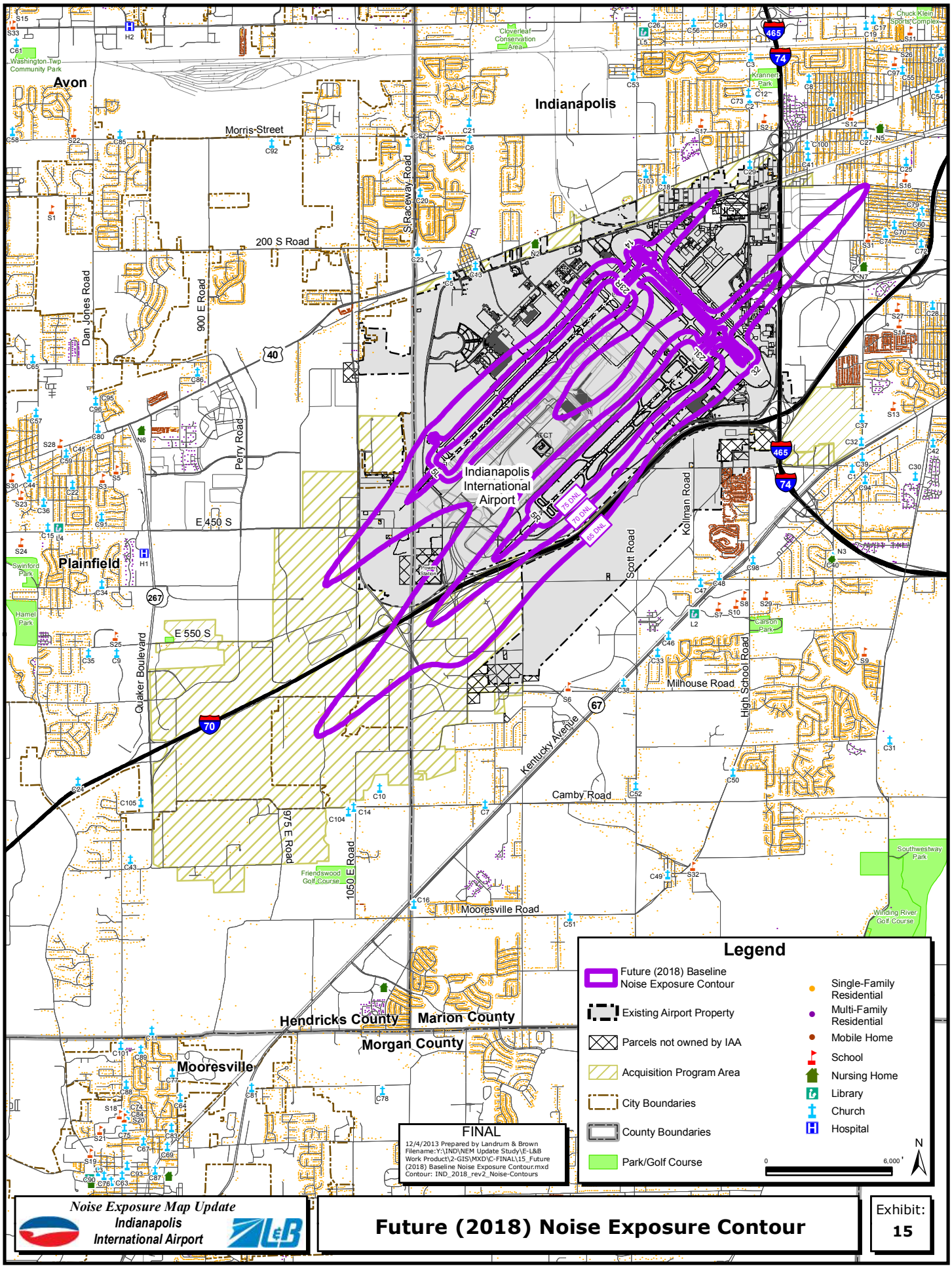
Table 19 shows the total number of households and noise-sensitive facilities within the Future (2018) Noise Exposure Contour at levels of 65, 70, and 75 DNL. There are 6 total housing units and an estimated 16 residents located within the 65-70 DNL of the Future (2018) Noise Exposure Contour. Four of these housing units are also within the Existing (2013) Noise Exposure Contour and are located in an area that was offered acquisition as part of the 1997 Part 150 Update and subsequent ROD. The owners chose not to participate in the acquisition program.

There are two housing units within the 65+ DNL of the Future (2018) Noise Exposure Contour that were not inside the 65+ DNL of the Existing (2013) Noise Exposure Contour. These housing units are located to the northeast of Runway 05R/23L in an area that was not included in any previous noise mitigation program.

There are no housing units located within the 70+ DNL of the Future (2018) Noise Exposure Contour. There are no noise-sensitive facilities (defined as schools, churches, libraries, hospitals, and nursing homes) located within the 65+ DNL of the Future (2018) Noise Exposure Contour.

5.9 SUPPLEMENTAL NOISE ANALYSIS

Table 20, provides a comparison of the DNL, Leq, Lmax, TA65, and NA65 metrics for the INM grid points depicted on Exhibit 14 between the Existing (2013) and Future (2018) Noise Exposure Contour. At most grid point locations the noise levels and number of events and time above 65 dB increases from 2013 to 2018 due to the forecast increase in aircraft operations. However, at a few locations, primarily those located along the typical departure corridors, noise levels decrease due to the projected phase-out of older, louder aircraft and the reduction in departure noise that is associated with this phase-out.

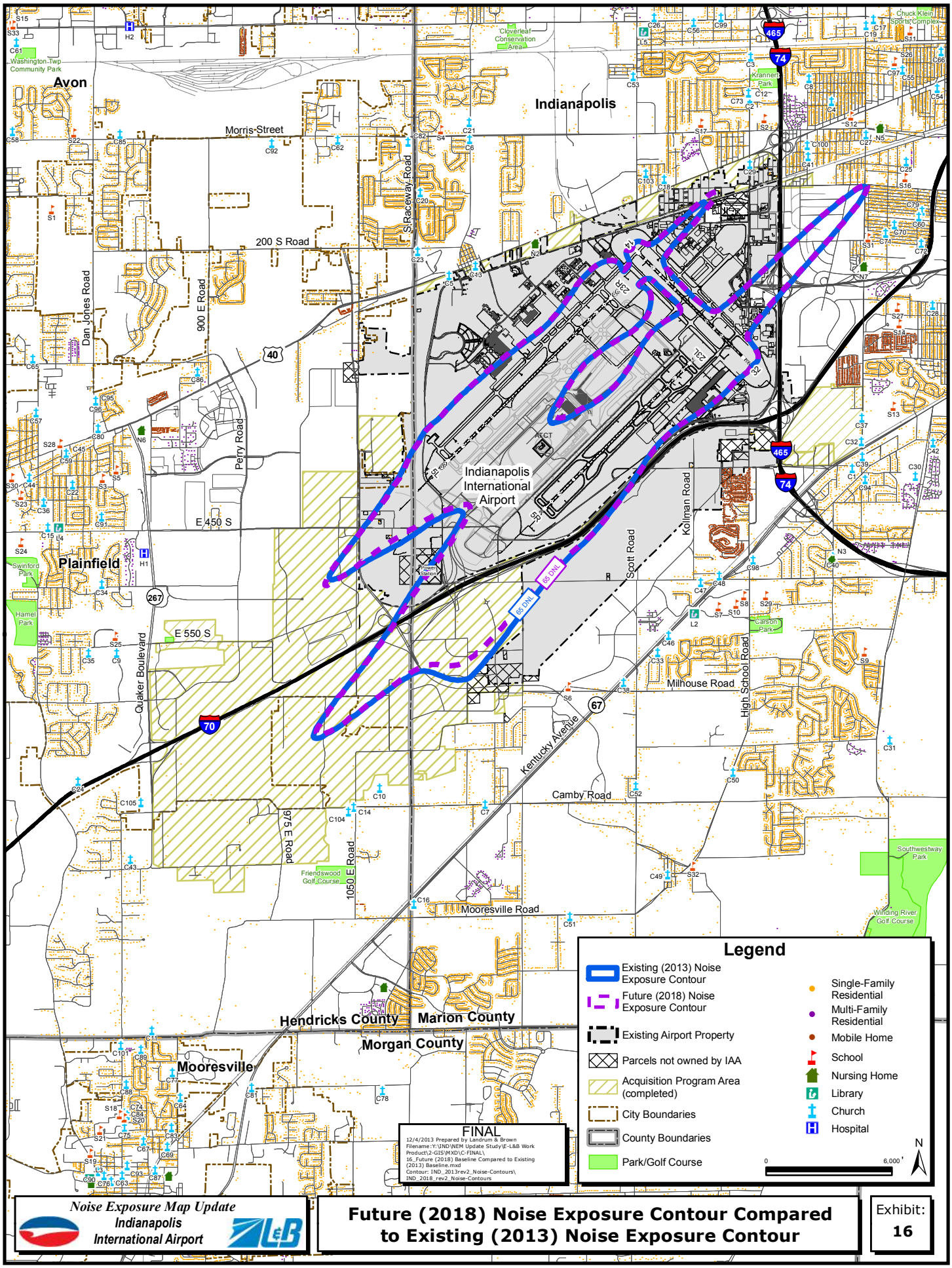


Noise Exposure Map Update
Indianapolis International Airport

Future (2018) Noise Exposure Contour

Exhibit: 15

BACK OF EXHIBIT



Noise Exposure Map Update
Indianapolis International Airport

Future (2018) Noise Exposure Contour Compared to Existing (2013) Noise Exposure Contour

Exhibit: **16**

BACK OF EXHIBIT

Table 19
POPULATION, HOUSING, AND NOISE-SENSITIVE FACILITIES EXPOSED TO VARIOUS NOISE LEVELS
FUTURE (2018) NOISE EXPOSURE CONTOUR
Indianapolis International Airport

Jurisdiction / Mitigation Area	65-70 DNL	70-75 DNL	75+ DNL	65+ DNL
Housing Units				
Guilford Township	**0**	**0**	**0**	**0**
Unmitigated	0	0	0	0
Airport Acquisition	0	0	0	0
Environmental	0	0	0	0
Sales Assistance	0	0	0	0
Sound Insulation & Purchase Assurance	0	0	0	0
Indianapolis / Marion County	**4**	**0**	**0**	**4**
Unmitigated	2	0	0	2
Airport Acquisition	2	0	0	2
Environmental	0	0	0	0
Sales Assistance	0	0	0	0
Sound Insulation & Purchase Assurance	0	0	0	0
Plainfield	**2**	**0**	**0**	**2**
Unmitigated	0	0	0	0
Airport Acquisition	2	0	0	2
Environmental	0	0	0	0
Sales Assistance	0	0	0	0
Sound Insulation & Purchase Assurance	0	0	0	0
Total Housing Units	**6**	**0**	**0**	**6**
Population				
Total Population	**16**	**0**	**0**	**16**
Noise-Sensitive Facilities				
Schools	0	0	0	0
Churches	0	0	0	0
Libraries	0	0	0	0
Hospitals	0	0	0	0
Nursing Homes	0	0	0	0
Total Noise-Sensitive Facilities	**0**	**0**	**0**	**0**

* Total population estimated based upon the housing counts multiplied by the average household size for each Census Track

Contour: IND_2018Noise-Contours

Source: Landrum & Brown, 2013.

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Table 20
GRID ANALYSIS REPORT
EXISTING (2013) NOISE EXPOSURE CONTOUR COMPARED TO FUTURE (2018) NOISE EXPOSURE CONTOUR
Indianapolis International Airport

Grid ID	DNL			Leq			Lmax			TA65			NA65		
	2013	2018	Change	2013	2018	Change	2013	2018	Change	2013	2018	Change	2013	2018	Change
L1	56.1	56.5	0.4	51.7	52.1	0.4	88.5	88.5	0.0	10:12	11:42	1:30	54.4	62	8
L2	64.6	64.7	0.1	58.3	58.6	0.3	87.7	87.7	0.0	28:00	30:24	2:24	105.8	114	8
L3	57.8	57.5	-0.3	51.3	51.2	-0.1	90.3	90.3	0.0	9:06	9:42	0:36	40.0	43	3
L4	51.9	51.8	-0.1	45.7	45.9	0.2	92.9	92.9	0.0	2:06	2:06	0:00	8.9	10	1
L5	53.6	53.4	-0.2	45.6	45.7	0.1	77.4	77.4	0.0	2:24	2:12	-0:12	14.3	14	0
L6	59.8	59.4	-0.4	52.2	51.9	-0.3	83.5	82.8	-0.7	12:12	12:36	0:24	51.3	56	5
L7	53.1	52.8	-0.3	46.3	46.1	-0.2	77.0	77.0	0.0	3:12	2:48	-0:24	14.9	14	-1
L8	57.7	57.9	0.2	51.0	51.3	0.3	80.8	80.8	0.0	11:18	12:42	1:24	54.9	65	10
L9	52.5	52.8	0.3	46.2	46.5	0.3	81.6	81.6	0.0	3:06	3:18	0:12	17.8	20	2
L10	49.1	49.0	-0.1	41.6	41.9	0.3	72.6	72.6	0.0	0:12	0:12	0:00	2.1	2	0
S1	46.6	46.7	0.1	41.4	41.6	0.2	81.3	81.3	0.0	0:36	0:36	0:00	2.6	3	0
S2	50.0	50.2	0.2	44.5	44.8	0.3	82.6	82.6	0.0	1:06	1:06	0:00	5.5	6	0
S3	57.6	57.8	0.2	51.2	51.5	0.3	85.8	85.8	0.0	10:42	11:48	1:06	47.9	55	7
S4	51.8	52.0	0.2	46.0	46.4	0.4	82.9	82.9	0.0	2:12	2:24	0:12	12.2	14	1
S5	55.4	55.6	0.2	48.5	48.9	0.4	81.1	81.1	0.0	6:24	6:48	0:24	32.0	36	4
S6	47.6	47.5	-0.1	40.3	40.5	0.2	70.1	70.1	0.0	0:06	0:06	0:00	1.0	1	0
S7	54.2	54.4	0.2	47.2	47.5	0.3	79.8	79.8	0.0	4:24	4:42	0:18	23.9	27	3
S8	44.5	44.6	0.1	37.5	37.9	0.4	71.1	71.1	0.0	0:06	0:06	0:00	1.2	1	0
S9	57.8	58.2	0.4	51.3	51.7	0.4	81.3	81.3	0.0	13:06	14:30	1:24	61.8	108	46
S10	57.0	57.3	0.3	50.3	50.7	0.4	79.8	79.8	0.0	10:18	11:36	1:18	52.9	61	8
S11	57.1	57.2	0.1	49.9	50.1	0.2	80.0	80.0	0.0	8:36	8:48	0:12	49.0	53	4
S12	57.4	57.4	0.0	51.5	51.6	0.1	85.5	85.0	-0.5	12:54	14:12	1:18	53.3	60	6
S13	59.1	59.2	0.1	51.1	51.3	0.2	80.9	80.9	0.0	12:06	12:48	0:42	50.8	54	4

Table 20, *Continued*
GRID ANALYSIS REPORT
EXISTING (2013) NOISE EXPOSURE CONTOUR COMPARED TO FUTURE (2018) NOISE EXPOSURE CONTOUR
Indianapolis International Airport

Grid ID	DNL			Leq			Lmax			TA65			NA65		
	2013	2018	Change	2013	2018	Change	2013	2018	Change	2013	2018	Change	2013	2018	Change
S14	56.9	57.0	0.1	49.0	49.2	0.2	79.1	79.1	0.0	7:54	8:12	0:18	39.5	42	2
S15	55.9	56.0	0.1	47.9	48.1	0.2	77.9	77.9	0.0	6:42	6:54	0:12	34.0	35	1
S16	53.2	53.0	-0.2	46.5	46.5	0.0	78.4	78.4	0.0	3:06	2:48	-0:18	15.9	15	-1
S17	55.3	55.7	0.4	50.7	51.1	0.4	84.6	84.6	0.0	8:12	9:30	1:18	46.7	54	7
S18	59.1	59.1	0.0	51.6	51.8	0.2	80.7	80.7	0.0	14:36	15:12	0:36	65.7	73	7
S19	56.4	56.0	-0.4	49.2	49.0	-0.2	79.7	78.5	-1.2	6:24	6:00	-0:24	30.5	32	1
S20	42.9	43.0	0.1	36.6	37.0	0.4	70.6	70.6	0.0	0:00	0:00	0:00	0.3	0	0
S21	53.5	53.1	-0.4	45.5	45.3	-0.2	77.1	77.1	0.0	2:30	2:18	-0:12	14.1	14	0
S22	47.3	47.3	0.0	40.1	40.4	0.3	75.9	75.9	0.0	0:12	0:12	0:00	1.6	2	0
S23	46.1	46.1	0.0	39.2	39.5	0.3	70.5	70.5	0.0	0:06	0:06	0:00	1.0	1	0
S24	57.7	57.0	-0.7	49.3	48.9	-0.4	81.6	81.6	0.0	6:18	6:12	-0:06	25.8	28	2
S25	58.7	58.0	-0.7	50.3	49.9	-0.4	82.9	82.9	0.0	7:18	7:18	0:00	28.4	30	2
S26	59.5	58.9	-0.6	51.1	50.6	-0.5	84.7	84.7	0.0	8:18	8:18	0:00	31.9	34	2
S27	61.9	62.1	0.2	55.6	56.0	0.4	84.6	84.6	0.0	24:54	27:12	2:18	97.3	105	8
S28	55.0	55.6	0.6	50.9	51.4	0.5	83.8	83.8	0.0	12:18	14:42	2:24	59.7	72	12
S29	56.7	56.4	-0.3	48.5	48.4	-0.1	85.0	85.0	0.0	5:42	5:36	-0:06	23.3	25	1
S30	43.2	43.2	0.0	36.4	36.7	0.3	73.7	68.9	-4.8	0:00	0:00	0:00	0.3	0	0
S31	51.8	52.3	0.5	47.5	48.0	0.5	82.3	82.3	0.0	4:18	5:00	0:42	20.4	23	3
S32	56.6	56.1	-0.5	48.4	48.2	-0.2	81.0	81.0	0.0	5:00	4:54	-0:06	22.7	24	1
S33	49.5	49.7	0.2	43.0	43.4	0.4	79.9	79.9	0.0	0:24	0:18	-0:06	2.9	3	0
S34	50.9	51.0	0.1	43.7	44.1	0.4	75.7	75.7	0.0	0:12	0:12	0:00	2.6	3	0
S35	43.6	43.8	0.2	37.6	38.0	0.4	71.2	71.2	0.0	0:00	0:00	0:00	0.6	1	0
S36	52.8	53.1	0.3	48.2	48.6	0.4	85.9	85.9	0.0	5:18	6:00	0:42	24.6	28	4

Table 20, *Continued*
GRID ANALYSIS REPORT –
EXISTING (2013) NOISE EXPOSURE CONTOUR COMPARED TO FUTURE (2018) NOISE EXPOSURE CONTOUR
Indianapolis International Airport

Grid ID	DNL			Leq			Lmax			TA65			NA65		
	2013	2018	Change	2013	2018	Change	2013	2018	Change	2013	2018	Change	2013	2018	Change
S37	50.9	51.3	0.4	46.4	46.9	0.5	80.5	80.5	0.0	3:30	3:54	0:24	14.5	16	2
S38	57.8	58.3	0.5	53.5	54.0	0.5	89.5	89.5	0.0	18:54	21:54	3:00	88.0	98	10
S39	60.5	60.7	0.2	54.6	54.9	0.3	88.1	88.1	0.0	24:24	27:00	2:36	104.8	113	8
S40	57.5	57.8	0.3	52.0	52.4	0.4	86.8	86.8	0.0	14:54	16:42	1:48	69.8	82	12
S41	57.7	58.3	0.6	53.6	54.1	0.5	86.3	86.3	0.0	20:30	23:36	3:06	86.5	96	9
S42	61.0	61.2	0.2	54.8	55.1	0.3	85.6	85.6	0.0	24:24	26:48	2:24	99.4	106	7
S43	57.6	58.2	0.6	53.5	53.9	0.4	86.0	86.0	0.0	19:54	23:00	3:06	86.1	97	10

Source: Landrum & Brown, 2013.

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6. REVIEW OF CURRENT NOISE COMPATIBILITY PROGRAM MEASURES

The previous sections provided the methodology and input data that was used in the preparation of the official NEMs. This section reviews the currently approved noise abatement and land use management measures from the 1997 Part 150 Study Update to determine if any of the measures should be removed or modified, or if new measures are warranted.

6.1 CURRENT NOISE ABATEMENT MEASURES

The IND NCP includes the following 19 approved Noise Abatement Measures.[1]

- **NA-1:** Continue preferential use of Runways 23R/L for departures during 24 hours per day and for arrivals between 6 a.m. and 10 p.m. *Implemented.*
- **NA-2:** Continue preferential use of Runways 5R/L for arrivals between 10 p.m. and 6 a.m. *Implemented.*
- **NA-3:** Continue preferential use of Runway 32 for departures between 6 a.m. and 10 p.m., when Runways 23R/L cannot be used because of wind, weather, or closure. *Implemented.*
- **NA-4:** Continue turbojet departures along runway heading from Runways 5L, 32, and 14 until reaching 2,500´ MSL (1,800´ above the ground) 24 hours per day. Continue turbojet departures from Runway 5R along runway heading until reaching 2,500 MSL during the period between 6 a.m. and 10 p.m. *Implemented.*
- **NA-5:** Continue turbojet departures along runway heading from Runways 23R/L until reaching 2,500´ MSL (1,800´ above the ground) between 7 a.m. and 7 p.m. *Implemented.*
- **NA-6:** Continue policy calling for maintenance runups by Stage 2 aircraft to be conducted at the approach end of Runway 5R or at the southwest end of the H Taxiway, facing northeast along the taxiway alignment. *Implemented.*
- **NA-7:** Continue prohibition of intersection departures from Runway 32 by turbojet and turboprop aircraft weighing in excess of 12,500 pounds. *Implemented.*
- **NA-8:** Continue use of designated helicopter routings for overflight of compatible uses. *Implemented.*
- **NA-9:** Continue policy requiring that all routine maintenance runup activity between 10 p.m. and 7 a.m. be conducted in a hush house or using noise suppressers. Construct a runup noise enclosure at an appropriate location on the airfield. *Implemented.*
- **NA-10:** Continue use of 070 degree heading for departures from Runway 5R during the period between 10 p.m. and 6 a.m. Maintain heading until reaching 2,500 MSL. *Implemented.*

[1] FAA Record of Approval issued October 1998.

- **NA-11:** Continue preference for Close-in Noise Abatement Departure Procedures from Runways 5R/L, 32, and 14 at night. Above 3,000 AGL (3,700´ MSL), initiate best rate of climb to assigned enroute altitude. *Implemented.*
- **NA-12:** Continue policy calling for maintenance runups by Stage 3 aircraft to be conducted at the approach end of Runway 5R or at the southwest end of the H Taxiway, facing into the wind when wind velocities exceed 15 knots. *Implemented.*
- **NA-13:** Revoke endorsement of internal control procedures by ATCT which result in late-night aircraft departing Runways 23R/L flying either runway heading or an inward divergent turn of 15 degrees, initiated at the middle markers of approaches to Runways 5R/L, and maintenance of such divergent or runway headings until passing above an altitude of 3,000´ MSL before turns to enroute courses. *Implemented.*
- **NA-14:** Continue ATCT directives to vector late-night visual approaches to intercept the final approach course to Runways 5R/L at or beyond the locations of the outer markers. *Implemented.*
- **NA-15:** Revoke preference for standard departure procedures from Runways 23R/L and replace with preference for Close-in Noise Abatement Departure Procedures as currently practiced by nighttime cargo carriers. Above 3,000´ AGL (3,700´ MSL), initiate best rate of climb to assigned enroute altitude. *Implemented.*
- **NA-16:** Request the ATCT, in association with the evening and late-night jet operators, to develop internal control procedures which provide on-the-ground separation of aircraft by destination when Runways 23R/L are in use by typically assigning north/west bound jet aircraft to Runway 23R and east/south bound jet aircraft to Runway 23L. This measure is expedited by construction of Taxiway N. *Implemented.*
- **NA-17:** Endorse internal control procedures by ATCT which result in jet aircraft departing Runway 23L between 7:00 p.m. and 7:00 a.m. flying either run-way heading or a 15 degree right divergent turn or left divergent turn to a 210 degree heading, initiated at the middle markers of ILS approach to Run-way 5R, and maintenance of such divergent or runway headings until reaching a distance of 5.5 DME from the DME navigational aid (to be installed on the ILS localizer approach to Runway 5R) prior to turns to enroute courses; outward divergent turn to be used during peak operating periods when inward divergence or runway heading would increase delays. *Implemented.*
- **NA-18:** Endorse internal control procedures by ATCT which result in jet aircraft departing Runway 23R between 7:00 p.m. and 7:00 a.m. flying either runway heading or a left divergent turn of 15 degrees, initiated at the middle marker of the ILS approach to Runway 5L, and maintenance of such divergent or runway headings until reaching a distance of 6.5 DME from the DME navigational aid (to be installed on the ILS localizer approach to Runway 5L) prior to turns to enroute courses. *Implemented.*

- **NA-19:** Apply the provisions of NA-10, NA-17, and NA-18 between the hours of 7:00 p.m. and 7:00 a.m., and as necessary, at the discretion of FAA Air Traffic Control, during peak daytime departure periods between 7:00 a.m. and 7:00 p.m. to assure adequate and efficient separation of traffic. It is not intended that the divergence provided by this measure should become the standard operating practice but rather that the divergent routes be used only during periods when parallel departure courses would adversely impact on aircraft delays during daytime operating peaks. *Implemented.*

The current Noise Abatement Measures define flight corridors for arriving and departing aircraft at IND. Based on field observations and flight track analysis of radar data, the goals of the measures are being accomplished. The changes in operating levels and fleet mix do not have a negative impact on the effectiveness of the noise abatement measures. Therefore, it is not recommended to modify, remove, or supplement the existing, currently approved Noise Abatement Measures.

6.2 CURRENT LAND USE MITIGATION MEASURES

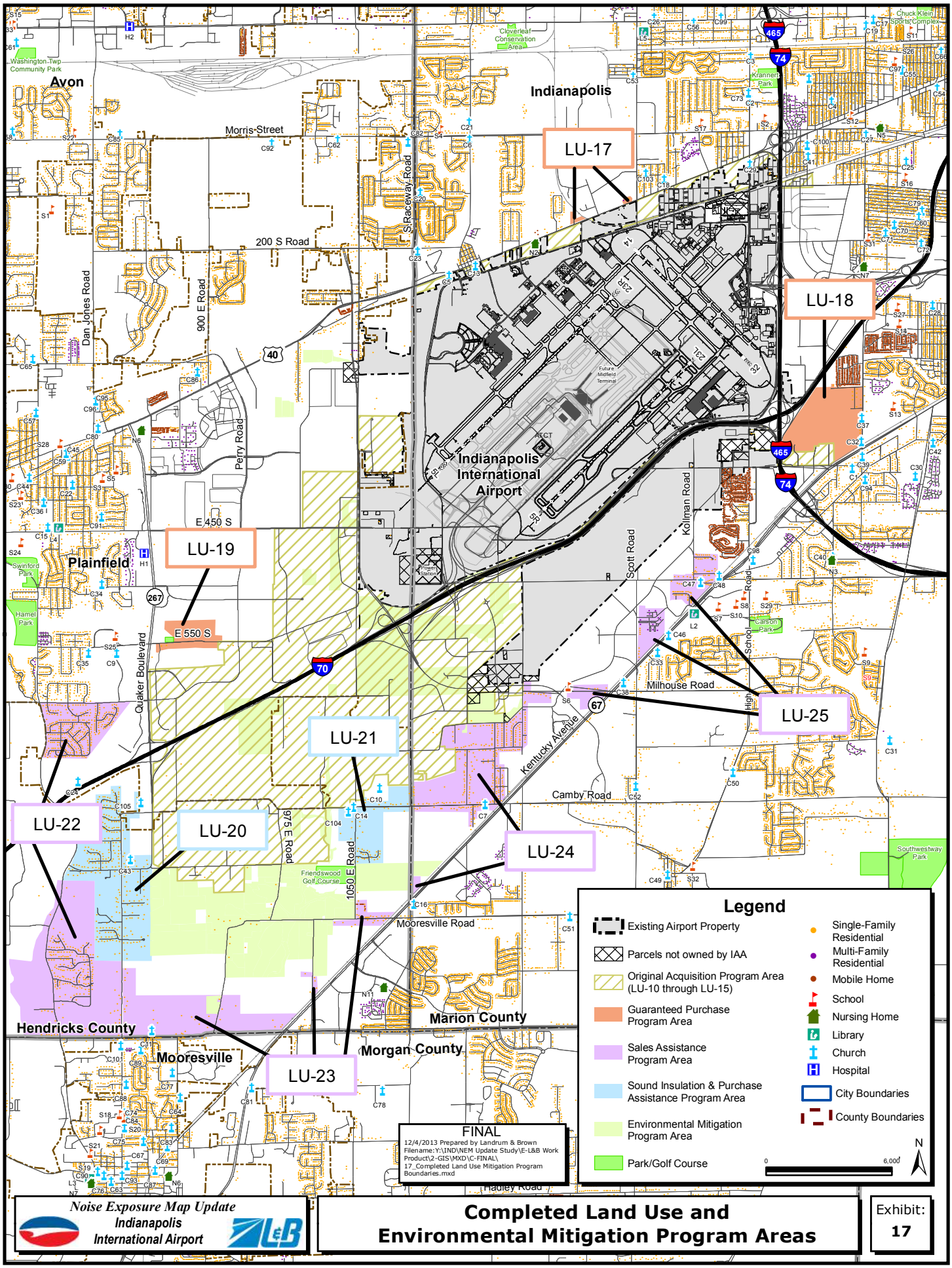
The IND NCP includes the following 25 approved Land Use Mitigation Measures. **Exhibit 17** depicts the current land use mitigation program boundaries within the airport environs.

- **LU-1:** Request Marion County to rezone land in the Minnesota Street acquisition area to commercial and industrial uses after acquisition is complete. *Continuation of unimplemented Measure LU-1 of approved 1992 NCP*.[2]
- **LU-2:** Request Marion County to rezone acquired property between County Line and Stanley Road, just south of Epler Road, to compatible uses. *Measure LU-2 of approved 1992 NCP completed. No further action required.*
- **LU-3:** Request Marion County to rezone properties within the Airport Industrial Development Plan to classifications indicated by that Plan. *Measure LU-3 of approved 1992 NCP completed. No further action required.*
- **LU-4:** Request Hendricks County to rezone property in the vicinity of the I-70 and SR 267 intersection to commercial classification. *Measure LU-4 of approved 1992 NCP completed. No further action required.*
- **LU-5:** Request Hendricks County to adopt a noise overlay zone using the 1997 and 2002 NCP contours to enhance land use compatibility within the airport environs. Request Plainfield to update their current noise overlay zone using the 1997 and 2002 NCP contours. *Continuation of partially implemented Measure LU-5 of the approved 1992 NCP.*
- **LU-6:** Continue to implement an informal fair disclosure policy whereby Airport staff disseminates information on aircraft noise levels within the community and among the public, developers, real estate agencies, and

[2] This measure is partially implemented.

lenders. *Continuation of implemented Measure LU-6 of the approved 1992 NCP.*

- **LU-7:** Continue to request that Hendricks County and Plainfield amend their Comprehensive Land Use Plans to reflect the recommendations in the Part 150 Study Update. Request Marion County to update their current Comprehensive Plan using the 1997 and 2002 NCP recommendations. *Continuation of Measure LU-7 of the approved 1992 NCP.*
- **LU-8:** Continue to request that Plainfield adopt policies discouraging the extension of sanitary sewers to serve residential development into areas by aircraft noise. *Continuation of Measure LU-8 of the approved 1992 NCP.*
- **LU-9:** Request the adoption of guidelines by planning commissions, boards of zoning appeals, and planning departments in Plainfield and Hendricks and Marion Counties to consider the impact of aircraft noise on community development proposals and requests for variances and special uses. *Continuation of Measure LU-9 of the approved 1992 NCP*
- **LU-10:** Continue to provide for the guaranteed purchase, on a voluntary basis, of homes remaining within the 1987 acquisition program established by the original Part 150 Noise Compatibility Program. *Continuation of Measure LU-10 of the approved 1992 NCP.*
- **LU-11:** Continue to provide for the guaranteed purchase, on a voluntary basis, of homes located south of Hanna Avenue, north of SR 67, and east of I-465. *Measure LU-11 of the approved 1992 NCP was withdrawn by the Sponsor prior to 1992 NCP approval. No further action required.*
- **LU-12:** Continue to provide for the guaranteed purchase, on a voluntary basis, of homes located southwest of the Airport in an area extending from Six Points Road and adjacent areas north of I-70 and extending southwesterly to SR 267. *Continuation of Measure LU-12 of the approved 1992 NCP.*
- **LU-13:** Continue to provide for the guaranteed purchase, on a voluntary basis, of homes located between Minnesota Street and US 40, north of the United Airlines Maintenance facility and west to the Marion-Hendricks County line. *Measure LU-13 of the approved 1992 NCP was withdrawn by the Sponsor prior to 1992 NCP approval. No further action required.*
- **LU-14:** Continue to provide for the guaranteed purchase, on a voluntary basis, of homes located within the Minnesota Street Area, north of the Airport. *Continuation of Measure LU-14 of the approved 1992 NCP.*
- **LU-15:** Continue to provide for the guaranteed purchase, on a voluntary basis, of homes located in the Colonial Road area, west of Camby and south of I-70. *Continuation of Measure LU-15 of the approved 1992 NCP.*
- **LU-16:** Continue to foster redevelopment of all areas acquired under LU-11 through LU-15, as well as new areas recommended under measures LU-17 through LU-19, into compatible tax and employment generating land uses. *Continuation and modification of Measure LU-16 of the approved 1992 NCP.*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Mooresville Road
Hadley Road
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Scott Road
Kollman Road
Perry Road
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Dan Jones Road
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1050 E Road
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LU-17
LU-18
LU-19
LU-20
LU-21
LU-22
LU-23
LU-24
LU-25
Legend
Existing Airport Property
Parcels not owned by IAA
Original Acquisition Program Area (LU-10 through LU-15)
Guaranteed Purchase Program Area
Sales Assistance Program Area
Sound Insulation & Purchase Assistance Program Area
Environmental Mitigation Program Area
Park/Golf Course
Single-Family Residential
Multi-Family Residential
Mobile Home
School
Nursing Home
Library
Church
Hospital
City Boundaries
County Boundaries
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FINAL
12/4/2013 Prepared by Landrum & Brown
Filename:Y:\IND\NEM Update Study\E-L&B Work Product\2-GIS\MXD\C-FINAL\17_Completed Land Use Mitigation Program Boundaries.mxd
Noise Exposure Map Update
Indianapolis International Airport
Completed Land Use and Environmental Mitigation Program Areas
Exhibit: 17

BACK OF EXHIBIT

- **LU-17:** Provide for the guaranteed purchase of eight single-family homes and six two-family units (20 total dwellings), on a voluntary basis, within or immediately adjacent to the 65 DNL contour of the 2002 NCP. The area is immediately northwest of Runway 14/32 along the north side of Washington Street west of Girls School Road and along Brewer Road. *Approved as part of the 1997 NCP.*
- **LU-18:** Provide for the guaranteed purchase of 40 single-family homes, on a voluntary basis, within or immediately adjacent to the 65 DNL contour of the 2002 NCP. The area is generally bounded as follows: north of Hanna Avenue, west of Lynhurst Drive, and southeast of Interstate 70. *Approved as part of the 1997 NCP.*
- **LU-19:** Provide for the guaranteed purchase of 72 single-family homes, on a voluntary basis, within or immediately adjacent to the 65 DNL contour of the 2002 NCP. The area includes single-family homes within the Brunswick Park subdivision and all homes immediately adjacent to the subdivision east of SR 267. *Approved as part of the 1997 NCP.*
- **LU-20:** Provide sound insulation or purchase assurance for 314 single-family homes, on a voluntary basis, within or immediately adjacent to the 65 DNL contour of the 2002 NCP. The area includes single-family homes in an area generally bounded as follows: west of new SR 267, south of Interstate 70, and east of Old SR 267. At the option of the homeowner, the Airport shall provide sound insulation (when applicable) or offer the option of purchase assurance with the intent that the Airport would, where appropriate, sound insulate the homes purchased and then provide them at fair market value to subsequent owners. Churches and vacant lots within these areas are eligible for the purchase assurance element under this measure. *Approved as part of the 1997 NCP.*
- **LU-21:** Provide sound insulation or purchase assurance for 45 single-family homes, on a voluntary basis, within or immediately adjacent to the 65 DNL contour of the 2002 NCP. The area includes single-family homes in an area generally bounded as follows: south and east of the current guaranteed purchase eligibility area, west of the Marion/Hendricks county line, and north of the Airport's current environmental mitigation area. At the option of the homeowner, the Airport shall provide sound insulation (when applicable) or offer the option of purchase assurance with the intent that the Airport would, where appropriate, sound insulate the homes purchased and then provide them at fair market value to subsequent owners. Churches and vacant lots within these areas are eligible for the purchase assurance element under this measure. *Approved as part of the 1997 NCP.*
- **LU-22:** Provide sales assistance for 308 single-family homes, on a voluntary basis, within the Hawthorne Ridge and Hunters Ridge subdivisions. Requires a disclosure agreement. Disclosure agreement will not require non-suit covenant. *Approved as part of the 1997 NCP.*
- **LU-23:** Provide sales assistance for 234 single-family homes, on a voluntary basis, southwest of the Airport in an area generally bounded as follows: north of the Hendricks/Morgan county line, west of the Marion/Hendricks

county line, and east of the West Fork of the White Lick Creek. Requires a disclosure agreement. Disclosure agreement will not require non-suit covenant. *Approved as part of the 1997 NCP.*

- **LU-24:** Provide sales assistance for 296 single-family homes, on a voluntary basis, southwest of the Airport in an area generally bounded as follows: north of Kentucky Avenue, east of the Marion/Hendricks county line, and south of Flynn Road. Requires a disclosure agreement. Disclosure agreement will not require non-suit covenant. *Approved as part of the 1997 NCP.*
- **LU-25:** Provide sales assistance for 125 single-family homes, on a voluntary basis, south of the Airport in the Milhouse and Mendenhall Road areas and in the Valley Mills subdivision. Requires a disclosure agreement. Disclosure agreement will not require non-suit covenant. *Approved as part of the 1997 NCP.*

The current Land Use Mitigation Measures were based on the 2002 NEM/NCP from the 1997 Part 150 Study Update, which included the implementation of the Noise Abatement Measures listed above. The Noise Abatement Measures created new flight corridors that provided the ATCT much needed capacity during the nighttime hours. The location of the flight corridors and the turn points were defined in order to minimize additional or new noise impacts. However, not all noise impacts resulting from the new flight corridors could be avoided. As a result, the Land Use Mitigation Measures were developed to prevent the introduction of non-compatible land uses and to provide mitigation for existing non-compatible land uses that were located within and adjacent to the new flight corridors. The commitment to this land use mitigation program was further bolstered by its inclusion as remedial mitigation in the 1999 SEIS and subsequent Record of Decision (ROD) for the implementation of the air traffic measures.

There were approximately 1,450 housing units eligible for land use mitigation developed in the 1987 Part 150 Study and subsequent Part 150 Study Updates. Some of the housing units represent multiple parcels. Depending upon their location, these housing units were offered inclusion in either the Guaranteed Purchase Program; the Sound Insulation/Purchase Assurance Program; or the Sales Assistance Program. The following has been accomplished: Guaranteed Purchase Program: of the 1,149 eligible parcels 1,104 have been acquired with acquisition continuing in 2013 upon Owner's request; Sound Insulation/Purchase Assurance Program: of the 365 parcels 317 have been completed and the program is now closed; and Sales Assistance Program: of the 482 eligible owners 377 noise disclosures/releases have been accomplished. Exhibit 17 shows the program boundaries for the land use mitigation programs.

Based on the analysis prepared for this NEM update, a majority of the housing units that were previously eligible for the Land Use Mitigation Program fall outside of the 65+ DNL noise contour of the Existing (2013) and Future (2018) Noise Exposure Contours, but remain under the approved nighttime flight corridors. Therefore, no modifications to the land use measures are recommended.

Appendix A

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APPENDIX A
PUBLIC COORDINATION

This appendix includes copies of coordination letters sent to local jurisdictions and newspaper articles regarding the Noise Exposure Map Update project. In addition, copies of Public Hearing advertisements, sign-in sheets, handouts, comment forms, and transcripts are also included in this appendix. Comments were accepted at the Public Hearings and in writing through December 5, 2013. Oral comments were transcribed at the Public Hearings. Names and addresses have been redacted from the transcripts included in this appendix. No written comments were received during this time period. Responses to public comments are included in Appendix H of this document.

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Local Jurisdiction Coordination

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Indianapolis Airport Authority

7800 Col. H. Weir Cook Memorial Dr.
Indianapolis, Indiana 46241
office 317.487.5042
fax 317.487.5034

October 3, 2013

Joe James
Director, Planning and Zoning
Town of Plainfield
206 W. Main St
Plainfield, IN 46168

RE: Meeting to Discuss Exposure Map Update for the Indianapolis International Airport

Dear Mr. James:

The Indianapolis Airport Authority (IAA) is in the process of updating the Noise Exposure Maps (NEMs) for the Indianapolis International Airport (IND). The Federal Aviation Administration (FAA) recommends that an airport update its NEMs every five years to disclose information related to current and future aircraft noise levels.

Since the last NEMs for IND were prepared in 2008, the IAA is conducting a study to update the NEMs and determine if any modifications to the Airport Noise Compatibility Program (NCP) are warranted.

At this point in the project, we believe it is important to inform local officials and community leaders about the study results to date and the process that will occur over the next few months prior to submitting the NEMs to the FAA for official determination.

We hope you will join us for a meeting with airport officials and members of the consultant team that is preparing the study on **October 24, 2013** at 7:30 a.m. at the Plainfield Recreation Center, Room 139B, 651 Vestal Road, Plainfield, Indiana. Breakfast will be served at the meeting. Please confirm your attendance with Sharol Weddle at sweddle@ind.com.

We look forward to seeing you at the meeting.

Sincerely,

Robert A. Duncan, A.A.E.
Airport Director

Indianapolis Airport Authority

7800 Col. H. Weir Cook Memorial Dr.
Indianapolis, Indiana 46241
office 317.487.5042
fax 317.487.5034

October 3, 2013

Mark Harris
Trustee
Brown Township
471 Old State Road 67 North
Mooresville, IN 46158

RE: Meeting to Discuss Exposure Map Update for the Indianapolis International Airport

Dear Mr. Harris:

The Indianapolis Airport Authority (IAA) is in the process of updating the Noise Exposure Maps (NEMs) for the Indianapolis International Airport (IND). The Federal Aviation Administration (FAA) recommends that an airport update its NEMs every five years to disclose information related to current and future aircraft noise levels.

Since the last NEMs for IND were prepared in 2008, the IAA is conducting a study to update the NEMs and determine if any modifications to the Airport Noise Compatibility Program (NCP) are warranted.

At this point in the project, we believe it is important to inform local officials and community leaders about the study results to date and the process that will occur over the next few months prior to submitting the NEMs to the FAA for official determination.

We hope you will join us for a meeting with airport officials and members of the consultant team that is preparing the study on **October 24, 2013** at 12:00 p.m. at the Mooresville Public Library, 220 W Harrison St., Mooresville, Indiana. Lunch will be served at the meeting. Please confirm your attendance with Sharol Weddle at sweddle@ind.com.

We look forward to seeing you at the meeting.

Sincerely,

Robert A. Duncan, A.A.E.
Airport Director

Indianapolis Airport Authority

7800 Col. H. Weir Cook Memorial Dr.
Indianapolis, Indiana 46241
office 317.487.5042
fax 317.487.5034

October 3, 2013

Karlee Macer
Representative
House of Representatives, District 92
Indiana House of Representatives, 200 W. Washington St.
Indianapolis, IN 46204

RE: Meeting to Discuss Exposure Map Update for the Indianapolis International Airport

Dear Ms. Macer:

The Indianapolis Airport Authority (IAA) is in the process of updating the Noise Exposure Maps (NEMs) for the Indianapolis International Airport (IND). The Federal Aviation Administration (FAA) recommends that an airport update its NEMs every five years to disclose information related to current and future aircraft noise levels.

Since the last NEMs for IND were prepared in 2008, the IAA is conducting a study to update the NEMs and determine if any modifications to the Airport Noise Compatibility Program (NCP) are warranted.

At this point in the project, we believe it is important to inform local officials and community leaders about the study results to date and the process that will occur over the next few months prior to submitting the NEMs to the FAA for official determination.

We hope you will join us for a meeting with airport officials and members of the consultant team that is preparing the study on **October 24, 2013** at 3:00 p.m. at the Indianapolis International Airport, Col. H. Weir Cook Terminal Board Room. Please use the parking garage. Parking validation passes will be provided at the meeting. Refreshments will be served at the meeting. Please confirm your attendance with Sharol Weddle at sweddle@ind.com.

We look forward to seeing you at the meeting.

Sincerely,

Robert A. Duncan, A.A.E.
Airport Director

COMMUNITY LEADER FOCUS GROUP MEETINGS
OCTOBER 24, 2013 – INVITATION LIST

Ms. Beverley Austin
Town Council
Town of Avon

Mr. Wesley Bennett
Clerk/Treasurer
Town of Plainfield

Mr. Robin Brandgard
President of Council
Town of Plainfield

Mr. Rich Carlucci
Town Manager
Town of Plainfield

Mr. Chuck Ellis
Trustee
Guilford Township

Mr. Ed Gaddie
Councilor
Town of Plainfield

Mr. Bob Gentry
Commissioner
Hendricks County

Mr. Michael E. Graham
County Administrator
Hendricks County

Mr. Joe James
Director, Planning and Zoning
Town of Plainfield

Ms. Cinda Kelley
Executive Director
Hendricks County Economic
Development Partnership

Mr. Daniel Kinnamon
Township Board Member
Guilford Township

Mr. Bill Kirchoff
Councilor
Town of Plainfield

Mr. Tom Klein
Town Manager
Town of Avon

Mr. Kent McPhail
Councilor
Town of Plainfield

Mr. Charlie Morris
Township Board Member
Guilford Township

Mr. Scott Olinger
Superintendent
Plainfield Community School Corporation

Ms. Phyllis Palmer
Commissioner
Hendricks County

Mr. Tony Perona
Township Board Member
Guilford Township

Mr. Don Reitz
Director, Planning/Building
Hendricks County

Mr. Greg Steuerwald
Representative
House of Representatives, District 40

COMMUNITY LEADER FOCUS GROUP MEETINGS
OCTOBER 24, 2013 – INVITATION LIST

Mr. Mike Rogers
President, Town Council
Town of Avon

Mr. Peter Miller
Senator
State Senate, District 24

Ms. Lesa Ternet
Planning/Building Planner
Hendricks County

Mr. Matthew Whetstone
Commissioner
Hendricks County

Ms. Renea Whicker
Councilor
Town of Plainfield

Ms. Merri Anderson
Greater Garden City Civic Association

Ms. Anna Tyszkiewicz
Executive Director
Indianapolis Metropolitan Planning Organization

Mr. Robert Lutz
Councilor - District 13
City of Indianapolis

Ms. Marilyn Pfisterer
Councilor - District 14
City of Indianapolis

Dr. Jeff Butts
Superintendent
Metropolitan School District of Wayne Township

Mr. Dave Cox
Town Council
Town of Avon

Dr. Matthew J. Prusiecki
Superintendent
Decatur Township School District

Mr. Brian Gildea
Vice President & Executive Director
Develop Indy

Mr. Andy Harris
Trustee
Wayne Township

Mr. Jeff Miller
Councilor - District 19
City of Indianapolis

Mr. Jason Holliday
Councilor - District 22
City of Indianapolis

Mr. Michael Huber
President and CEO
Greater Indianapolis Chamber of Commerce

Mr. Dave Jackson
Town Council
Town of Avon

Mr. Deron Kintner
Executive Director, Deputy Mayor
City of Indianapolis - Local Public Improvement Bond Bank

Mr. Robert Behning
Representative
House of Representatives, District 91

COMMUNITY LEADER FOCUS GROUP MEETINGS
OCTOBER 24, 2013 – INVITATION LIST

Ms. Karlee Macer
Representative
House of Representatives,
District 92

Mr. Justin Moed
Representative
House of Representatives,
District 97

Mr. Steve Rink
Trustee
Decatur Township Trustee

Mr. Robert Sawyer
Air Traffic Manager
FAA, Indianapolis ATCT

Mr. Terry Sylvester
President
Decatur Township Civic Council

Mr. Adam Thies
Director
Indianapolis Department of Metropolitan Development

Mr. Marcus Turner
Councilor
Town of Avon

Ms. Maggie Lewis
City Council President
City of Indianapolis

Mr. R. Michael Young
Senator
State Senate, District 35

Mr. Don Adams
Commissioner
Morgan County

Mr. James Bolin
Trustee
Madison Township

Mr. Brent Callahan
Superintendent
Mooresville Parks & Recreation

Mr. Jeffrey Cook
Councilor
Town of Mooresville

Mr. Ryan Goodwin
County Council
Morgan County

Mr. Brian Goss
Commissioner
Morgan County

Mr. Kenny Hale
County Council
Morgan County

Mr. Mark Harris
Trustee
Brown Township

Ms. Angie Kath
President
Mooresville Chamber of Commerce

Ms. Vickie Kivett
County Council
Morgan County

Ms. Anthony Langley
Councilor
Town of Mooresville

COMMUNITY LEADER FOCUS GROUP MEETINGS
OCTOBER 24, 2013 – INVITATION LIST

Ms. Joy McCarthy Sessing
Executive Director
Morgan County Economic
Development Corporation

Mr. Mark Mathis
Councilor
Town of Mooresville

Dr. Larry Moore
Superintendent
Mooresville Consolidated School
Corporation

Mr. John Price
Representative
House of Representatives, District 47

Mr. Jeff Quyle
County Council
Morgan County

Mr. Rodric Bray
Senator
State Senate District 37

Mr. Norman Voyles
Commissioner
Morgan County

Mr. George Watkins
President of Council
Town of Mooresville

Mr. Robert O'Neal
County Council
Morgan County

Ms. Peggy Mayfield
Representative
House of Representatives, District 60

Ms. Virginia Perry
Councilor
Town of Mooresville

Ms. Erin Pipkin
AeroVision Committee

Ms. Kris Butler
Director, Indianapolis Bond Bank
City of Indianapolis

Mr. Kurt Fullbeck
Project Manager
City of Indianapolis

Mr. Bart York
Executive Vice President
Skillman Corporation

Mr. Tim Currens
Attorney
Law Office of Harris and Currens

Ms. Signe Nicholson
AeroVision Committee

Ms. Melanie DePoy
Development Director
Jackson Center

Mr. Alfred Bennett
Secretary
Indianapolis Airport Authority

Mr. Lynn Gordon
Member
Indianapolis Airport Authority

COMMUNITY LEADER FOCUS GROUP MEETINGS
OCTOBER 24, 2013 – INVITATION LIST

Mr. Philip Borst
Member
Indianapolis Airport Authority

Ms. Karen Caswelch
Member
Indianapolis Airport Authority

Mr. Steven Dillinger
Member
Indianapolis Airport Authority

Mr. Kelly Flynn
Vice President
Indianapolis Airport Authority

Mr. David Lewis
Member
Indianapolis Airport Authority

Mr. Jack Morton
Member
Indianapolis Airport Authority

Mr. Mike Wells
President
Indianapolis Airport Authority

Ms. Jean Wojtowicz
Member
Indianapolis Airport Authority

Indianapolis International Airport
Noise Exposure Map Update - Focus Group Meeting
October 24, 2013 @ 7:30 a.m. Plainfield Recreation Center

SIGN-IN SHEET - PLEASE PRINT

	Name	Organization	Address	Phone Number	E-Mail Address
1	Susan Zellers	IAA	1910 S. Girls School Rd, Indpls	[redacted]	szellers@ind.com
2	Linda Kelley	HCEDP	5250 E US 36 Avon		lkelley@hcedp.org
3	Shannelle Griffin	IAA	1910 S. Girls School Rd.		sgriffin@ind.com
4	Chuck Ellis	Guilford Twp	1500 S. Center		ellischucker@aol.com
5	Mike Graham	Hendricks Co	355 S. Wash. St. Danville		mgraham@co.hendricks.in.us
6	Joe James	Plainfield	206 W Main, Plainfield		jjames@town.plainfield.in.us
7	Alexa Murgal	ISRG - L&B			
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Indianapolis International Airport
Noise Exposure Map Update - Focus Group Meeting
October 24, 2013 @ 7:30 a.m. Plainfield Recreation Center

SIGN-IN SHEET - PLEASE PRINT

	Name	Organization	Address	Phone Number	E-Mail Address
1	DON REITZ	HC PLANNING	355 S WASHINGTON ST	[redacted]	DREITZ@CO.HENDRICKS.IN.US
2	ALEX GOETCHEUS	HENDRICKS COUNTY PLANNING	355 S WASHINGTON ST		agoetcheus@co.hendricks.in.us
3	Mike Medvescek	IAA	6824 Royal Ln.		
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Indianapolis International Airport
Noise Exposure Map Update - Focus Group Meeting
October 24, 2013 @ 12:00 p.m. Mooresville Public Library

SIGN-IN SHEET - PLEASE PRINT

	Name	Organization	Address	Phone Number	E-Mail Address
1	Vicki Harris	Brown Twp. Trustees office	471 Samuel Moore Pkwy Mooresville	[redacted]	vharris@btfd.com
2	Susan Zellers	IAA	1910 S. Girls School Rd Indpls		SZellers@indy.com
3	Larry Moore	Mooresville Schools	11 W. Carlisle St		larry.moore@mooresville schools.org
4	Rex Cook	"	"		
5	Mindy Taylor	Mooresville Chamber	4 E Harrison St		mindy@mooresville chamber.com
6	Brent Callahan	Mooresville Park Dist	1101 N. Indianapolis Rd		BCallahan@POSwireless.com
7	Melanie DePoy	Morgan Cty. Plan Comm.			
8	ALETA MUNGER	ISRG - L&B			
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Indianapolis International Airport
Noise Exposure Map Update - Focus Group Meeting
October 24, 2013 @ 12:00 p.m. Mooresville Public Library

SIGN-IN SHEET - PLEASE PRINT

	Name	Organization	Address	Phone Number	E-Mail Address
1	Erin Pipkin	Barnhoff	47 S. Penn Indpls 46204	[redacted]	erin pipkin@barnhoff.biz
2	Angela Kath	Chamber of Commerce	4 E. Harrison Mooresville	[redacted]	akath@firstmerchants.com
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Indianapolis International Airport
Noise Exposure Map Update - Focus Group Meeting
October 24, 2013 @ 3:00 p.m. Col. H. Weir Cook Terminal Board Room

SIGN-IN SHEET - PLEASE PRINT

	Name	Organization	Address	Phone Number	E-Mail Address
1	Susan Zellers	IAA	1910 S. Girls School Rd, Indpls	[redacted]	szellers@ind.com
2	ALETA MONGAL	ISEG - L&B			
3	John Neal	DMD - Planning	200 E Washington St Ste 1851		john.neal@indy.gov
4	Karen Caswelch	IAAB			Kcaswelch@akoyainc.com
5	SHANNETTA GRIFFITH				
6	Pam Bird	IND ATCT	8100 Col H Weir Cook MEM		pamela.s.bird@faa.gov
7	Karlee Macer		8832 Mario Creek Dr		
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Indianapolis International Airport
Noise Exposure Map Update - Focus Group Meeting
October 24, 2013 @ 3:00 p.m. Col. H. Weir Cook Terminal Board Room

SIGN-IN SHEET - PLEASE PRINT

	Name	Organization	Address	Phone Number	E-Mail Address
1	Kurt Fullbeck	City of Indianapolis	200 E Washington St	[redacted]	Kurt.Fullbeck@indy.gov
2	Melanie Barnes	Shrewsberry	7321 Shadeland Sta.		mbarnes@shrewsusa.com
3	David Lewis	IAA Board	240 N. Meridian		DL132r@att.com
4	BART YORK	SKILLMAN	3834 SOUTH EMERSON		byork@skillman.com
5	Robert Sawyer	FAA Tower			robert.j.sawyer@faa.gov
6	Tim Method	IAA	1910 S Girls School		tmethod@ind.com
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NOISE EXPOSURE MAP UPDATE

Indianapolis International Airport
Focus Group Meeting – October 24, 2013

AGENDA

IND NOISE EXPOSURE MAP UPDATE

2

Welcome and Introductions

Indianapolis Airport Authority

- Owns and operates the airport
- Sponsor of the Noise Exposure Map (NEM) Update

Consultant Team

- Landrum & Brown is the lead consultant for the NEM Update
  - *60 years of aviation planning*
  - *Experts in aircraft noise and land use planning*
- Shrewsberry and Associates
  - *Noise Measurement Program*
- Indiana Strategic Resources Group
  - *Public Outreach*

IND Noise Exposure Map Update

3

History of Noise Compatibility Planning at IND

- 1987 - Part 150 Noise Compatibility Study
- 1992 - Part 150 Update
- 1997 - Part 150 Update
- 2003 - Noise Exposure Map (NEM) Update
- 2008 - Noise Exposure Map (NEM) Update
- **2013 - Noise Exposure Map (NEM) Update**

IND Noise Exposure Map Update

4

What is a Noise Exposure Map (NEM)?

Noise contours that identify aircraft noise levels around an airport

Official noise maps for the airport

FAA recommends updating NEMs every five years

- Existing conditions (2013)
- Future conditions (2018)

Provides a count of homes and other noise-sensitive uses within a noise contour

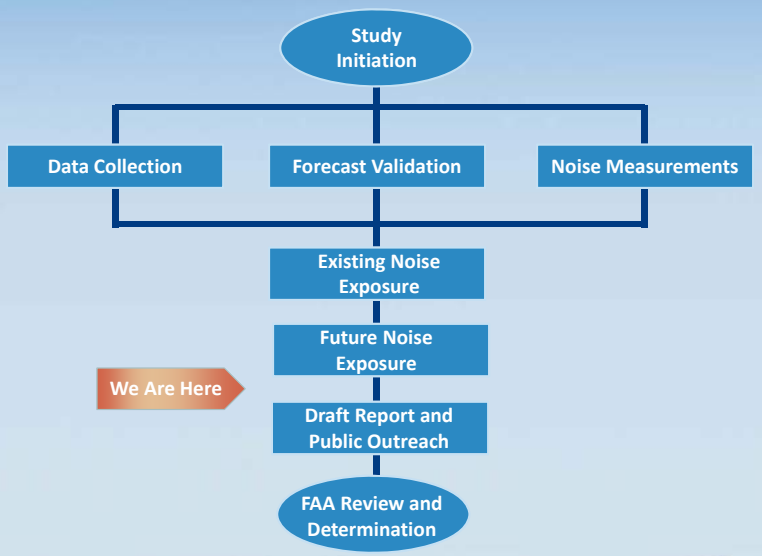
Study process allows public review of NEMs

FAA has specific guidelines for preparing NEMs

IND Noise Exposure Map Update

5

NEM Update Process



IND Noise Exposure Map Update

6

NEM Methodology

Prepared using the FAA's Integrated Noise Model (INM) Version 7.0d.
Represents an annual-average day (annual aircraft operations/365 days).
Must use specific noise metric - Day-Night Average Sound Level (DNL).

- 24-Hour average
- Penalty for nighttime (10:00 p.m. - 6:59 a.m.) flights (x 10)
- National standard for all Federal agencies
- 65 DNL identified as threshold for impact

Data Input Includes:

- Physical layout of runways
- Number of flight operations by Aircraft Type
- Times of day - nighttime penalty
- Runway use
- Flight paths
- Ground run-up activity
- Noise measurements

IND NOISE EXPOSURE MAP UPDATE

7

Noise Measurement Program

Conducted from August 20 through August 30, 2013

- 44 Short-Term Sites (approx. 1-2 hours at each site)
- 9 Long-Term Sites (7 days at each site)

Site Selection Criteria Included:

- Locations under or near aircraft flight paths
- Concentrations of noise complaints
- Avoidance of other noise sources
- Locations of previous noise measurements

Provided a sample of noise profile data for comparison to INM input data

- Data collection included maximum noise level, average noise level, time, and duration of each event
- Ambient (background) noise levels were recorded at each site
- Daily DNL values were calculated at the long-term sites

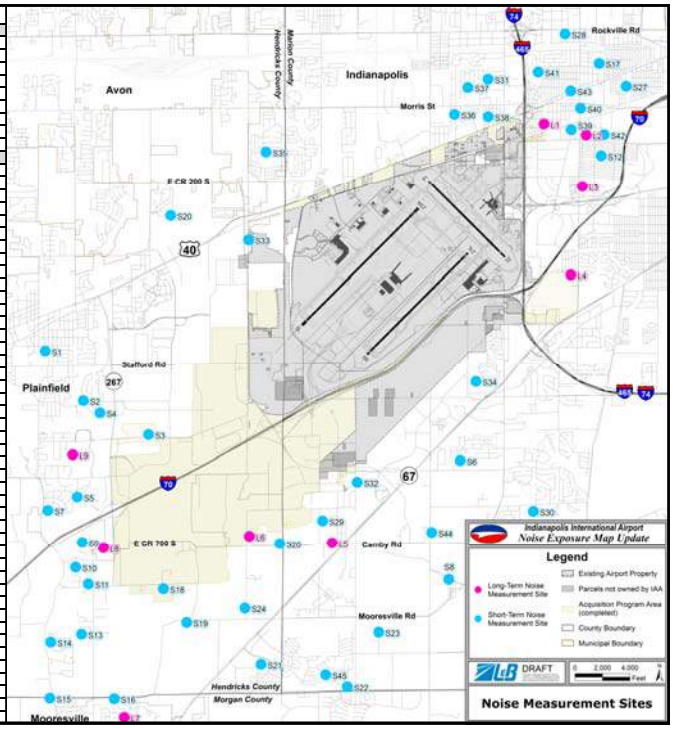
Noise event data was matched to radar data to determine type of aircraft operation that contributed to the noise level

IND NOISE EXPOSURE MAP UPDATE

8

Indianapolis International Airport
Noise Exposure Map Update

Site Number	Location
	Long-Term Sites
L1	St. Joseph Church, 1375 South Mickley Ave., Indianapolis
L2	Boys and Girls Club, 5228 West Minnesota St. Indianapolis
L3	5255 West Kelly Street, Indianapolis
L4	Corner of Seerley Road and Manhattan Avenue
L5	Camby Community Church, 8604 Camby Road
L6	6861 S. County Rd 1050 E.
L7	Mooresville United Methodist Church, 900 Indianapolis Road
L8	8364 County Road 700 S, Plainfield
L9	Plainfield Baptist Church, 1575 Reeves Road
	Short-Term Sites
S1	First Baptist Church
S2	Stanley Rd. at Classic Creek, Plainfield Apostolic Church
S3	County Road 550 & Bradley
S4	1220 American Avenue
S5	7085 Hunters Ridge
S6	Corner of Decatur Ridge Dr. and Wooden Branch Dr.
S7	7701 Andrews Pass
S8	Near Intersection of Mendenhall Rd. and Wise St.
S9	8214 Cottonwood Ct.
S10	8045 Dogwood Court
S11	8108 Timberwood
S12	Near Intersection of Beulah and Melrose
S13	8242 Filly
S14	8582 Hickory Hill Trail
S15	SR 267 and Hendricks County Line
S16	Eternal Life Church
S17	Rhoades Elementary School
S18	County Road 750 at Rost Road
S19	CR 800 South - 1/10th mile west of 975 E. Rd
S20	Amberleigh Drive
S21	Heartland Crossing - Ogden Dunes Court
S22	County Line Road and Heartland Blvd.
S23	Alan Drive and Cedar Drive
S24	County Road 1050, Close to County Road 800
S26	Intersection of Raceway Rd & Camby Rd.
S27	Intersection of Ray & Denison
S28	88 Biltmore Ave, near Intersection with Walton St.
S29	6647 Stanley Road
S30	Corner of Mills and High School Road at St. Ann's Church
S31	6501 Bower Drive - near Pergola Lane
S32	Intersection of Flynn Rd. & Trotter Rd.
S33	Ronald Reagan Parkway
S34	Intersection of Kohlman Rd. and Kohlman Ct.
S35	Corner of Laura Ln. and Zimmerman Dr.
S36	Glenhall Circle
S37	739 Arbor Woods Drive
S38	Dukane Ct. north of Morris St.
S39	Near Intersection of Martha & Norfolk St.
S40	1620 N Lynhurst Drive
S41	Cloverleaf Baptist Church - 616 S. Mickley Ave.
S42	Maplewood Elementary
S43	1022 Biltmore Ave. - near intersection of Washington St.
S44	West Newton United Methodist Church
S45	8710 Blooming Gardens Court



EXISTING (2013) NOISE EXPOSURE CONTOUR

Based on Data Collected from Sept. 1, 2011 through Aug. 31, 2012.

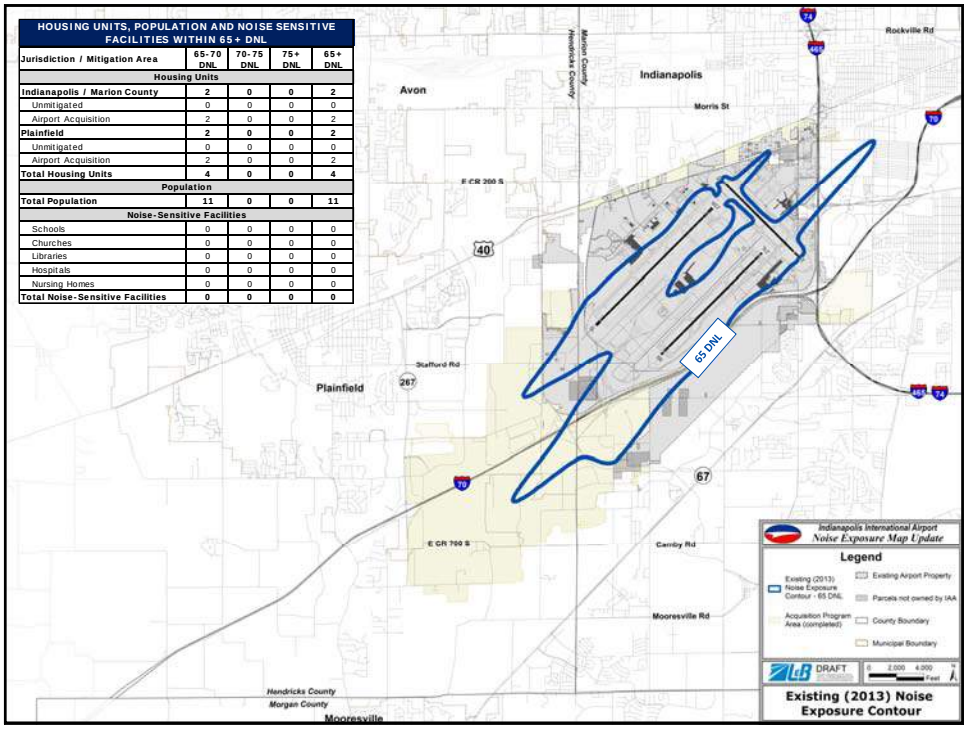
- Total Annual Operations = 159,757
- 438 Average Annual Day Operations
- 119 Average Nighttime Operations (10:00 pm to 6:59 am)

IND NOISE EXPOSURE MAP UPDATE

10

Indianapolis International Airport
Noise Exposure Map Update

HOUSING UNITS, POPULATION AND NOISE SENSITIVE FACILITIES WITHIN 65+ DNL				
Jurisdiction / Mitigation Area	65-70 DNL	70-75 DNL	75+ DNL	65+ DNL
Housing Units				
Indianapolis / Marion County	**2**	**0**	**0**	**2**
Unmitigated	0	0	0	0
Airport Acquisition	2	0	0	2
Plainfield	**2**	**0**	**0**	**2**
Unmitigated	0	0	0	0
Airport Acquisition	2	0	0	2
Total Housing Units	**4**	**0**	**0**	**4**
Population				
Total Population	**11**	**0**	**0**	**11**
Noise-Sensitive Facilities				
Schools	0	0	0	0
Churches	0	0	0	0
Libraries	0	0	0	0
Hospitals	0	0	0	0
Nursing Homes	0	0	0	0
Total Noise-Sensitive Facilities	**0**	**0**	**0**	**0**



FUTURE (2018) NOISE EXPOSURE CONTOUR

Based on Forecast Prepared for the Airport Master Plan

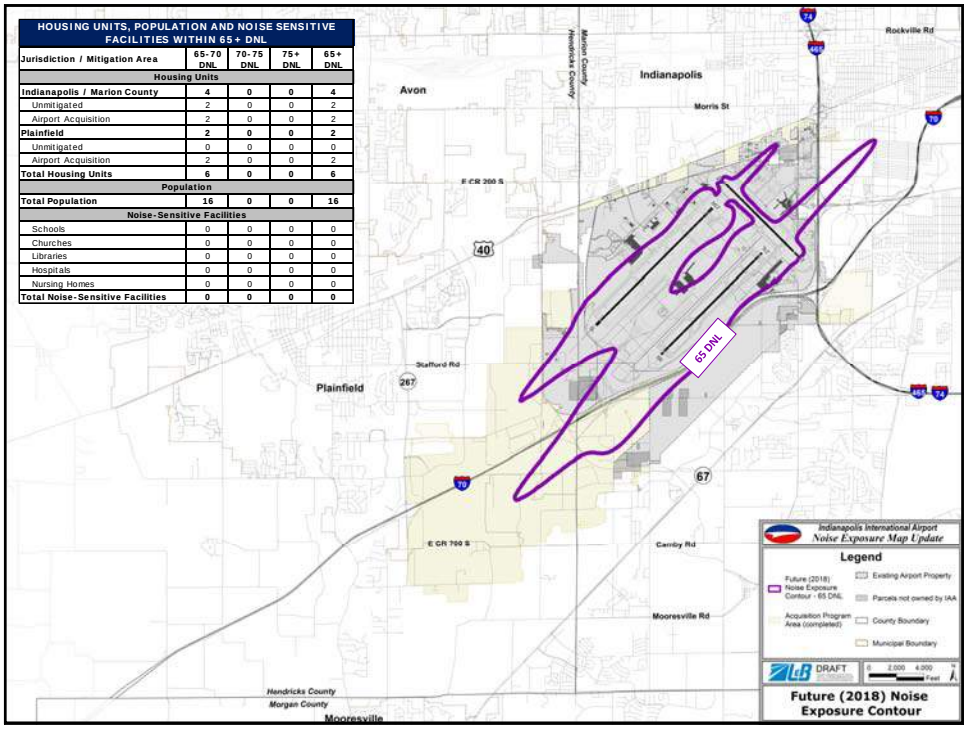
- Consistent with FAA Terminal Area Forecast
- Total Annual Operations = 169,700
- 468 Average Annual Day Operations
- 128 Average Nighttime Operations (10:00 pm to 6:59 am)

IND NOISE EXPOSURE MAP UPDATE

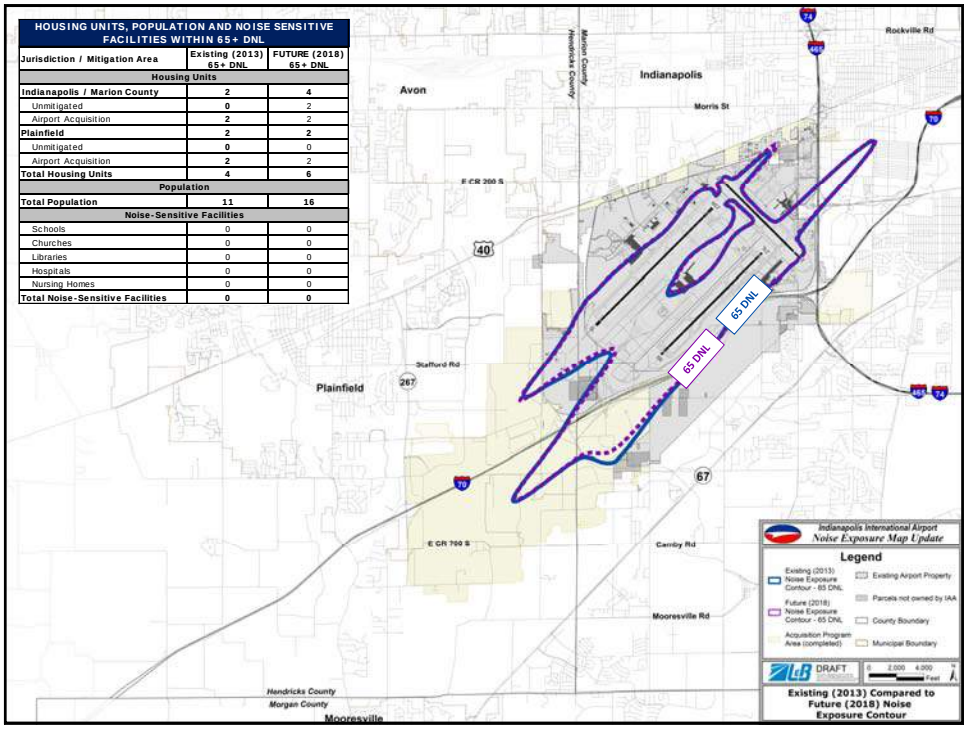
12

Indianapolis International Airport
Noise Exposure Map Update

HOUSING UNITS, POPULATION AND NOISE SENSITIVE FACILITIES WITHIN 65+ DNL				
Jurisdiction / Mitigation Area	65-70 DNL	70-75 DNL	75+ DNL	65+ DNL
Housing Units				
Indianapolis / Marion County	**4**	**0**	**0**	**4**
Unmitigated	2	0	0	2
Airport Acquisition	2	0	0	2
Plainfield	**2**	**0**	**0**	**2**
Unmitigated	0	0	0	0
Airport Acquisition	2	0	0	2
Total Housing Units	**6**	**0**	**0**	**6**
Population				
Total Population	**16**	**0**	**0**	**16**
Noise-Sensitive Facilities				
Schools	0	0	0	0
Churches	0	0	0	0
Libraries	0	0	0	0
Hospitals	0	0	0	0
Nursing Homes	0	0	0	0
Total Noise-Sensitive Facilities	**0**	**0**	**0**	**0**



HOUSING UNITS, POPULATION AND NOISE SENSITIVE FACILITIES WITHIN 65+ DNL		
Jurisdiction / Mitigation Area	Existing (2013) 65+ DNL	FUTURE (2018) 65+ DNL
Housing Units		
Indianapolis / Marion County	**2**	**4**
Unmitigated	**0**	2
Airport Acquisition	**2**	2
Plainfield	**2**	**2**
Unmitigated	**0**	0
Airport Acquisition	**2**	2
Total Housing Units	**4**	**6**
Population		
Total Population	**11**	**16**
Noise-Sensitive Facilities		
Schools	0	0
Churches	0	0
Libraries	0	0
Hospitals	0	0
Nursing Homes	0	0
Total Noise-Sensitive Facilities	**0**	**0**



NEXT STEPS

Public workshops to be held to accept comments on the Draft NEMs

- November 18th – 5pm to 7pm @ Plainfield High School
- November 19th – 5pm to 7 pm @ Lynhurst 7th & 8th Grade Center

Public Comments will be addressed in the Final Report

Final NEM Update expected to be submitted to FAA in December 2013

FAA certification of NEMs – expected 2-3 months from submission

IND NOISE EXPOSURE MAP UPDATE

15

Exposure Map (NEM) Focus Group Meetings

All three (3) meetings were held on October 24, 2013

Times and Locations of the Focus Group Meetings:

- Meeting #1: Plainfield Recreation Center, 651 Vestal Rd, Plainfield, IN – 7:30 a.m.
- Meeting #2: Mooresville Public Library, 220 W Harrison St., Mooresville, IN – 12:00 p.m.
- Meeting #3: Indianapolis International Airport, Indianapolis, IN – 3:00 p.m.

Content Presented at all Three (3) Meetings:

All three meetings covered the same general information which will be outlined in this section. Following this section are individual sections that present the questions and answers from each individual meeting. Each section will provide the names of the attendees, the questions asked, and the responses provided.

Mr. Bob Duncan, IAA Executive Director, explained to attendees the history and background of the NEM Updates. In 1987, the IAA commenced the voluntary program and received federal assistance from the Federal Aviation Administration (FAA) to conduct the studies called Part 150, since the guidance is in 14 Code of Federal Regulations (CFR) Part 150. Though voluntary, a stipulation to receiving monies from the government was requisite reporting of the findings and making public said findings.

Mr. Duncan summarized the history of noise compatibility planning at the Indianapolis International Airport (IND) which began with the first Part 150 Study that was conducted in 1987, shortly after FedEx started operations at IND. In the 1997 update, both FedEx and the United States Postal Services (USPS) had night time cargo hub operations at IND. The largest noise contours were in the 1997 update and have since become smaller.

In 2000, commercial aircraft weighing 75,000 pounds or greater with Stage 2 engines (noisier engines) were prohibited from operating in the U.S. Stage 3 engines became the industry requirement. The USPS closed their cargo aircraft hub and contracted with FedEx to deliver USPS mail through Memphis, TN. As a result of the phase-out of the Stage 2 engines and the closure of the USPS cargo hub, the noise contours have become smaller at IND.

The IAA has also implemented a noise mitigation program at IND, which includes noise abatement measures designed to direct aircraft over less populated areas to the southwest of IND when possible; and has completed a land use mitigation program that included Guaranteed Purchase (voluntary acquisition), sound insulation and sales assistance for homes impacted by noise.

Mr. Chris Sandfoss of Landrum &Brown explained the process and methodology used to conducting the Noise Exposure Map (NEM) Update. He explained FAA requirements for using the Integrated Noise Model (INM) to generate noise exposure contours, and requirements for public consultation when conducting an NEM Update.

Next, Ms. Melanie Barnes, Shrewsberry and Associates, provided an overview of the Noise Measurement Program that was conducted as part of the NEM Update at IND.

Following Ms. Barnes' discussion, Mr. Sandfoss concluded the presentation by presenting the draft noise exposure contours and current land use impacts; as well as the next steps in the NEM Update process.

Specific information and questions from the individual meetings is presented in the following pages.

Meeting # 1: Plainfield Recreation Center, 651 Vestal Rd, Plainfield, IN – 7:30 a.m.

Attendees:

- Project Team:
  - Chris Sandfoss, Landrum & Brown
  - Rob Adams, Landrum & Brown
  - Aleta Mungal, Indiana Strategic Resource Group
  - Melanie Barnes, Shrewsberry and Associates
- Susan Zeller, IAA
- Bob Duncan, IAA
- Mike Medvescek , IAA
- Shannetta Griffin, IAA
- Cinda Kelley, Hendricks County Economic Development Partnership
- Chuck Ellis, Guilford Township
- Mike Graham, Hendricks County Administrator
- Ed Gaddie, Town of Plainfield Town Council
- Joe James, Town of Plainfield Planning and Zoning
- Wes Bennett, Town of Plainfield Clerk/Treasurer
- Don Reitz, Hendricks County Department of Planning & Building
- Alex Getchell, Hendricks County Department of Planning & Building

Question and Answer Period:

- Are cargo planes obligated to travel a specific distance before throttling?
  - Mr. Sandfoss explained FedEx implements specific departure procedures designed to apply or reduce thrust in manner to reduce noise levels near the Airport.
- Could a pilot -- regardless of the type of plane s/he is flying -- be "called on" for excessive noise he/she makes?
  - Mr. Sandfoss said that implementing the procedure safely is at the discretion of the pilot, and must take into account weather and other conditions to apply or reduce thrust.
- Is there a phone number to call to complain?
  - Mr. Medvescek said yes, the IAA has a noise hotline to take calls, research the flight event in question and get back in touch with the citizen who lodged the complaint. They can track flight data, including the flight path and altitude that a particular plane was at when the noise complaint was made.
- Have complaints have gone down in the last several years?
  - Mr. Duncan indicated that they have gone down significantly, and provided the following data:
    - ✓ In 2008, there were 209 complaints
    - ✓ In 2009, there were 125 complaints
    - ✓ In 201 0, there were 103 complaints
    - ✓ In 2011, there were 95 complaints
    - ✓ In 2012 there were 23 complaints (the majority of complaints were issued by 2 people)

  - Mr. Duncan noted that part of the decrease in complaints is the result of the USPS stopping flight service and the elimination of Stage 2 engines.
- What time of day, in Plainfield, was the loudest recorded noise level from the noise measurement program?
  - Mr. Sandfoss said it was sometime between 3:30 AM and 4:30 AM.
- Were the aircraft that were complained about in the right place at the right time?
  - Mr. Duncan said that yes they were.
  - Mr. Medvescek reinforced that weather alters noise. Mr. Duncan stated that clouds act as insulators
- Do other airports have a similar noise program to that of the Indianapolis Airport Authority?
  - Mr. Duncan stated some airports have programs and some do not in that it is a voluntary program Louisville International Airport another Midwestern airport with nighttime cargo operations also have a very active program. There are some airports, such as LaGuardia (New York) with significant close in development that does not have a Part 150 program as it would be cost prohibitive, but may still take some limited mitigation steps such as sound insulating schools.
- Mr. Duncan explained that the IND program has cost $220 million to date. Both the IAA and L&B reminded the attendees this is a voluntary program, but the IAA feels it is the right thing to do and so complies with Federal guidance.
- Mr. Duncan asked if anyone in the room had heard from their constituents that airplane noise was an issue.
  - No one answered, but one person in the room said that he appreciates the IAA's efforts in addressing noise and remediating problems.
- The last comment of the morning came from a man who said that one can hear airplanes when windows are open; however, one becomes accustomed to the sound and has the ability to continue with what they were doing. Not so 10-15 years ago when the noise was so bad that you could not talk to somebody in the same room with you when the planes took off. He says the problem does not exist today.

There were no more questions or comments.

Meeting # 2: Mooresville Public Library, 220 W Harrison St., Mooresville, IN – 12:00 p.m.

Attendees:

- Project Team:
  - Chris Sandfoss, Landrum & Brown
  - Rob Adams, Landrum & Brown
  - Aleta Mungal, Indiana Strategic Resource Group
  - Melanie Barnes, Shrewsberry and Associates
- Susan Zellers, IAA
- Bob Duncan, IAA
- Vicki Harris, Brown Township
- Larry Moore, Mooresville Consolidated School Corp.
- Rex Cook, Mooresville Consolidated School Corp.
- Mindy Taylor, Mooresville Chamber
- Brent Callahan, Mooresville Parks and Recreation
- Melanie DePoy, Morgan County Planning Commission
- Erin Pipkin, AeroVision Committee
- Angela Kath, Mooresville Chamber of Commerce
- Tim Currens, AeroVision Committee

Question and Answer Period:

That was only one question from this group, and it was:

- Where are the 4-6 houses that may be affected by the new contour?
  - Mr. Sandfoss responded that four are to the south of the Airport and two are to the northeast of the Airport.

There were no more questions or comments.

Meeting # 3: Indianapolis International Airport, Indianapolis, IN – 3:00 p.m.

Attendees:

- Project Team:
  - Chris Sandfoss, Landrum & Brown
  - Aleta Mungal, Indiana Strategic Resource Group
  - Melanie Barnes, Shrewsberry and Associates
- Bob Duncan, IAA
- Susan Zellers, IAA
- Tim Method, IAA
- A.J. Babkowski, IAA
- Shannetta Griffin, IAA
- Karen Caswelch, IAA Board Member
- David Lewis, IAA Board Member
- Robert Sawyer, IND ATCT
- Pam Bird, IND ATCT
- John Neal, the City of Indianapolis, Dept. of Metropolitan Development
- Karlee Macer, Representative, Indiana General Assembly
- Kurt Fullbeck, the City of Indianapolis
- Bart York, Skillman (AeroVision Committee)

Question and Answer Period:

- Clarification was requested that approximately one-quarter of the flights are at IND are night.
  - Mr. Sandfoss said that that was correct, and that
  - IAA staff noted that approximately 100 of them are FedEx flights (50 arrivals and 50 departures).
- Are the one-quarter of nighttime flights out of IND are assessed a 10-decibel penalty?
  - Mr. Sandfoss stated that was correct.
- Will the decrease in contour in 2018 occur as a result of new, quieter aircraft?
  - Mr. Sandfoss stated that was what was being projected for 2018 conditions; although the decrease would be more noticeable for aircraft on departure compared to arrivals.
- From the old terminal to the new one, were there any changes in flight patterns?
  - ATCT representative explained that flight patterns and runway use have not changed since 1997 other than slight reductions in the use of Runway 14/32.
- How many houses are left in the noise mitigation program?
  - Mr. Duncan stated that there are a few homes that are eligible for mitigation.
- Are contours likely to change beyond 2018?
  - Mr. Duncan shared that operating levels and runway usage may change, but that the continued phase-out of older, louder aircraft will likely lessen the contour.
- Are any new housing developments expected in the contour areas?
  - No, the land is mostly farmland and those land owners are not expected to sell.
- Can a farmer sell his land to a developer and have a subdivision go in?

    - Mr. Duncan affirmed that, yes that can happen, but the IAA would likely pursue an avigation easement
- If there was to be a housing development inside the contour, could the airport be penalized?
    - Mr. Duncan said, no, since the contour maps are published, this provides constructive notice to anyone considering new noise-sensitive development. Furthermore, if development was proposed, the IAA would suggest noise attenuation be incorporated into the design to reduce interior noise levels.

There were no more questions or comments.

Public Open House/Hearing Advertisements

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LANDRUM & BROWN
Indianapolis Airport Authority

LEGAL NOTICE

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Comments on the Draft NEM Update Report may be submitted through December 5, 2013 to: Chris Sandfoss, Landrum & Brown Inc., 11279 Cornell Park Drive, Cincinnati, Ohio 45242. Comments may also be emailed to 2013NEM@ind.com or sent by fax to (513) 530-2256. hspaxlp

MOORESVILLE-TIMES
MOORESVILLE, INDIANA

PROOF OF PUBLICATION

State of Indiana

County of Morgan

The undersigned, being duly sworn on oath, says that he/she is Public Notice Clerk of Mooresville-Times a public newspaper of general circulation, printed in the town of Mooresville, in said county and state; that the notice, of which the annexed is a true copy, was published in regular edition of said paper, issued upon the following dates, to wit:

11/02/13

Joyce Thomas

Subscribed and sworn to before me
November 04, 2013

SHEILA L. CORBIN
NOTARY PUBLIC
SEAL
STATE OF INDIANA
My Comm. Expires September 04, 2016

Notary Public or Clerk

My Commission expires:

Publication Fee: $51.59

Prescribed by State Board of Accounts

80000-6111944

General Form No. 99P (Rev. 2009A)
Federal ID# 35-2061385

LEGAL AD PREPAY

MARION COUNTY, INDIANA

To: INDIANAPOLIS NEWSPAPERS
307 N PENNSYLVANIA ST - PO BOX 145
INDIANAPOLIS, IN 46206-0145

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Display Matter - (Must not exceed two actual lines, neither of which shall total more than four solid lines of the type in which the body of the advertisement is set). - number of equivalent lines _____
Head - Number of lines _____
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Total number of lines in notice _____

COMPUTATION OF CHARGES

64.0 lines 2.0 columns wide equals 128.0 equivalent lines at .487 cents per line $ 62.35
Additional charge for notices containing rule and figure work (50 per cent of above amount) .
Charges for extra proofs of publication ($1.00 for each proof in excess of two) .00
TOTAL AMOUNT OF CLAIM $ 62.35

DATA FOR COMPUTING COST

Width of single column 5.8 ems Size of type 7
Number of insertions 1.0

Pursuant to the provisions and penalties of IC 5-11-10-1, I hereby certify that the foregoing account is just and correct, that the amount claimed is legally due, after allowing all just credits, and that no part of the same has been paid.

I also certify that the printed matter attached hereto is a true copy, of the same column width and type size, which was duly published in said paper **1** times. The dates of publication being between the dates of:

11/04/2013 and **11/04/2013**

Additionally, the statement checked below is true and correct:

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___ Newspaper has a Web site, but due to a technical problem or error, public notice was posted on _____
___ Newspaper has a Web site but refuses to post the public notice.

_____

Clerk _____

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(S - 11/4/13 - 6111944)

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Tax I.C. 63-1253950
To: Hendricks Co. Flyer
8109 Kingston St. Ste 500
Avon, IN 46123

Landrum & Brown
(Governmental Unit)
Hendricks County, Indiana

PUBLISHER'S CLAIM

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COMPUTATION OF CHARGES

66 | 1 columns wide equals

66 equivalent lines at 1.4490 cents per line — $95.63

Additional charge for notices containing rule or tabular work (50 percent of above amount)

Charge for extra proofs of publication ($1.00 for each proof in excess of two)

Total Amount of Claim — $95.63

DATA FOR COMPUTING COST

Width of single column in picas 9.9 Size of type 7 point.

Number of insertions 1

Pursuant to the provisions and penalties of IC 5-11-10-1, I hereby certify that the foregoing account is just and correct, that the amount claimed is legally due, after allowing all just credits, and that no part of the same has been paid.

I also certify that the printed matter attached hereto is a true copy, of the same column width and type size, which was duly published in said paper 1 times. The dates of publication being as follows:

November 2, 2013

Additionally, the statement checked below is true and correct:

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X Newspaper has a Web site and this public notice was posted on the same day as it was published in the newspaper.

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Date: November 7, 2013

Title Legal Advertising Clerk

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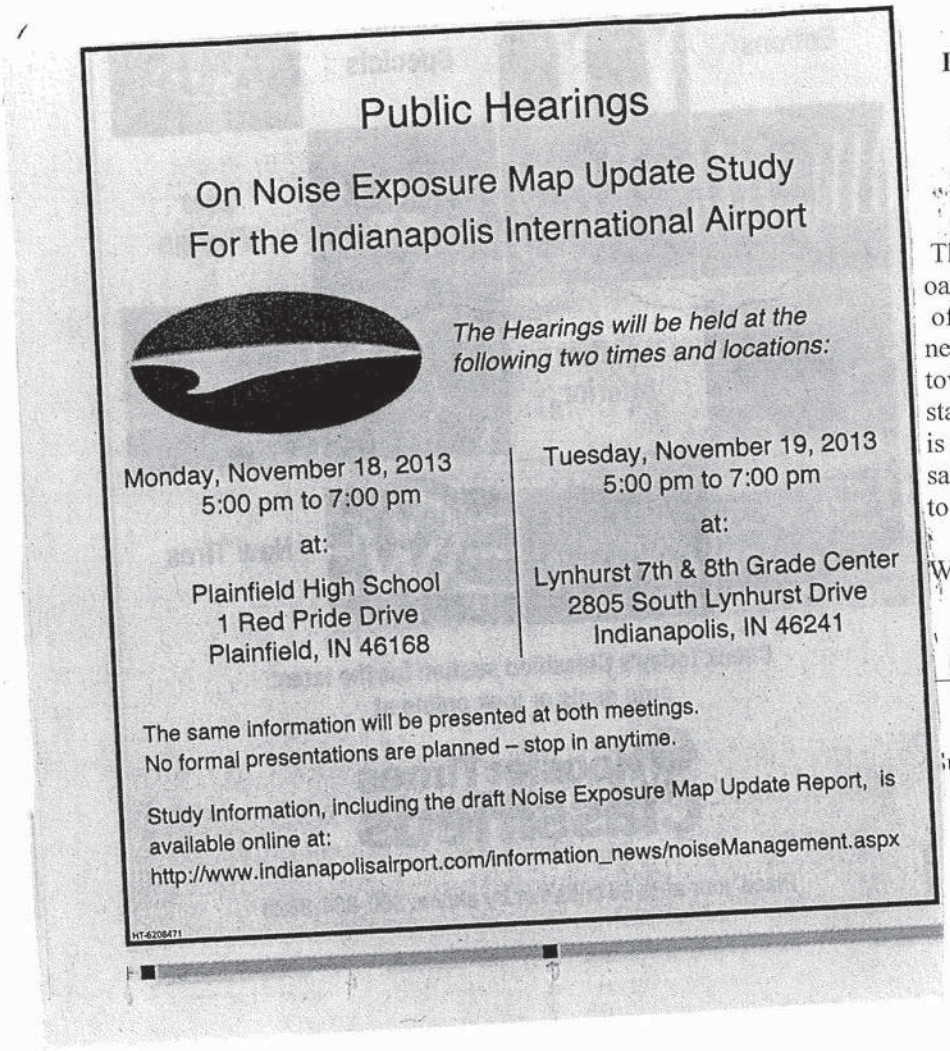
HCF-771 11/2 hspaxlp #833274

THE MOORESVILLE DECATUR TIMES
MOORESVILLE, INDIANA



Public Hearings

On Noise Exposure Map Update Study For the Indianapolis International Airport

The Hearings will be held at the following two times and locations:

Monday, November 18, 2013
5:00 pm to 7:00 pm

at:

Plainfield High School
1 Red Pride Drive
Plainfield, IN 46168

Tuesday, November 19, 2013
5:00 pm to 7:00 pm

at:

Lynhurst 7th & 8th Grade Center
2805 South Lynhurst Drive
Indianapolis, IN 46241

The same information will be presented at both meetings.
No formal presentations are planned – stop in anytime.

Study Information, including the draft Noise Exposure Map Update Report, is available online at:
http://www.indianapolisairport.com/information_news/noiseManagement.aspx

HT-6208471

PROOF OF PUBLICATION

State of Indiana

County of Morgan

The undersigned, being duly sworn on oath, says that he/she is Billing Clerk of The Mooresville Decatur Times, a public newspaper of general circulation, printed in the town of Mooresville, in said county and state; that the notice, of which the annexed is a true copy, was published in regular edition of said paper, issued upon the following dates, to wit:

Wednesday November 6th 2013

Joyce Thomas

Subscribed and sworn to before me on
Wednesday November 6th, 2013

Angela L Skaggs
Notary Public or Clerk

My Commission Expires: 04/24/2014

Publication Fee: $245.69

Angela L Skaggs
Notary Public Seal State of Indiana
Morgan County
My Commission Expires 04/24/2014

General Form No. 99P (Revised 2009A)
Tax I.C. 63-1253950
To: Hendricks County Flyer
8109 Kingston St, Ste 500
Avon, IN 46123

Landrum & Brown
(Governmental Unit)
Boone County, Indiana

PUBLISHER'S CLAIM

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3 Inches	5 columns wide equals		
equivalent lines at	cents per line		$ 390.00
Color Charges			$ 75.00
Charge for extra proofs of publication ($1.00 for each proof in excess of two)			
Total Amount of Claim			$ 465.00

DATA FOR COMPUTING COST

Width of single column in picas 9.9 Size of type 7 point.

Number of insertions 1

Pursuant to the provisions and penalties of IC 5-11-10-1, I hereby certify that the foregoing account is just and correct, that the amount claimed is legally due, after allowing all just credits, and that no part of the same has been paid.

I also certify that the printed matter attached hereto is a true copy, of the same column width and type size, which was duly published in said paper 1 times. The dates of publication being as follows:

November 6, 2013

Additionally, the statement checked below is true and correct:

_____ Newspaper does not have a Web site.
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_____ Newspaper has a Web site but refuses to post the public notice.

Lyla L Turner

Date: 11/18/2013

Title Legal Advertising Clerk

PUBLISHERS AFFIDAVIT

Hendricks

State of Indiana)
) SS:
Boone County)

Personally appeared before me, a notary public in and for said county and state, the undersigned **Cathy Wilson**
who being duly sworn, says that he/she is the legal advertising manager of
The Lebanon Reporter
a daily newspaper of general circulation printed and published
in the English language in the town of Lebanon in the state and county aforesaid,
and the printed matter attached hereto is a true copy, which was duly published
in said paper

Subscribed and sworn to before me this **18-Jan-00** day **November** of **2013**

Cathleen M Wilson
Notary Public

My commission expires:

CATHLEEN M WILSON
Notary Public, State of Indiana
Hendricks County
Commission # 625085
My Commission Expires
March 17, 2019

Public Hearings

On Noise Exposure Map Update Study For the Indianapolis International Airport

The Hearings will be held at the following two times and locations:

Monday, November 18, 2013
5:00 pm to 7:00 pm
at:
Plainfield High School
1 Red Pride Drive
Plainfield, IN 46168

Tuesday, November 19, 2013
5:00 pm to 7:00 pm
at:
Lynhurst 7th & 8th Grade Center
2805 South Lynhurst Drive
Indianapolis, IN 46241

The same information will be presented at both meetings.
No formal presentations are planned – stop in anytime.

Study Information, including the draft Noise Exposure Map Update Report, is available online at:
http://www.indianapolisairport.com/information_news/noiseManagement.aspx

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PUBLISHER'S AFFIDAVIT

STATE OF INDIANA } SS:
County of Marion, }

Personally appeared before me, a notary public in and for said county and state, the undersigned Amanda K Dolph who, being duly sworn, says that she is Legal Advertising Coordinator of the Indianapolis Star newspaper of general circulation printed and published in the English Language in the City of Indianapolis in state and county afore-said, and that the printed matter attached hereto is a true copy, which was duly published in said paper for 1 time(s), the date(s) of publication as follows: 11/6/13

00000060107 0000005018

Amanda K Dolph

Public Hearings

On Noise Exposure Map Update Study For the Indianapolis International Airport

The Hearings will be held at the following two times and locations:

Monday, November 18, 2013	Tuesday, November 19, 2013
5:00 pm to 7:00 pm	5:00 pm to 7:00 pm
at:	at:
Plainfield High School 1 Red Pride Drive Plainfield, IN 46168	Lynhurst 7th & 8th Grade Center 2805 South Lynhurst Drive Indianapolis, IN 46241

The same information will be presented at both meetings.
No formal presentations are planned – stop in anytime.

Study Information, including the draft Noise Exposure Map Update Report, is available online at:
http://www.indianapolisairport.com/information_news/noiseManagement.aspx

IS-0000005018

Subscribed and sworn to before me, this
14th day of November, 2013

Diane Yager

My commission expires: _____

DIANE S. YAGER
Notary Public, State of Indiana
Marion County
Commission # 608169
My Commission Expires
July 08, 2017

Indianapolis Airport Authority

FOR IMMEDIATE RELEASE: Nov. 4, 2013
IAA Contact: Carlo Bertolini
317.487.5025 | cbertolini@ind.com

Public meetings on airport noise to be held Nov. 18 and 19

Meetings to be held at Plainfield High School and Lynhurst 7th & 8th Grade Center

INDIANAPOLIS – The Indianapolis Airport Authority (IAA) will conduct two public meetings regarding the latest update to the Indianapolis International Airport (IND) Noise Exposure Map (NEM).

The meetings are open to all members of the public and will follow an informal, open-house approach. The first of the meetings will occur Monday, November 18, 2013 from 5 – 7 p.m. at the Plainfield High School, located at 1 Red Pride Drive, Plainfield, IN 46168. The second meeting will take place on Tuesday, November 19, 2013 from 5-7 p.m. at the Lynhurst 7th & 8th Grade Center, located at 2805 South Lynhurst Drive, Indianapolis, IN 46241.

The same information will be presented both nights. Individuals wishing to request special accommodations for attending either meeting should call 513-530-1256 by Monday, November 11, 2013. Comments received at the public hearings will become part of the final document to be submitted to the Federal Aviation Administration (FAA) for review.

Airport staff and noise consultants will be available at the public meetings to answer questions and provide information regarding the study, including maps and illustrations.

The IAA has published a draft NEM update report, and copies will be available for review beginning November 4, 2013 at the following locations: Marion County Public Library, 40 E. St. Clair St., Indianapolis, IN 46204; Decatur Township Branch Library, 5301 Kentucky Ave., Indianapolis, IN 46221; Mooresville Public Library, 220 W. Harrison St., Mooresville, IN 46158; Wayne Township Branch Library, 198 South Girls School Rd., Indianapolis, IN 46231; Plainfield-Guilford Township Public Library, 1120 Stafford Rd., Plainfield, IN 46168; Indianapolis International Airport, Guest Services Desk, 7800 Col. H. Weir Cook Memorial Drive, Indianapolis, IN 46241; and the IND Airport Website: http://www.indianapolisairport.com/information_news/noiseManagement.aspx

The update process ensures that modifications to flight mix, aircraft operations, and airport configuration and changes to other such factors that may affect noise levels on residential areas around the airport are accounted for. Noise monitoring results are being used to ensure accuracy in the noise modeling that has been prepared for the NEM update.

The NEM is one component of IND's overall Noise Program, under which the IAA has implemented a number of land-use and noise abatement policies to dramatic effect: as recently as 1997, the IAA received more than 1,000 noise complaints for the year. For all of 2012, only 23 such complaints were received.

Airport plans two meetings on noise exposure

The Reporter-Times | Posted: Sunday, November 10, 2013 12:59 am

INDIANAPOLIS — The Indianapolis Airport Authority will conduct public meetings on airport noise on Nov. 18 and 19.

The first meeting will be from 5 to 7 p.m. on Nov. 18 at Plainfield High School, 1 Red Pride Drive. The second meeting will be the same time on Nov. 19 at the Lynhurst 7th & 8th Grade Center, 2805 S. Lynhurst Drive in Decatur Township in Indianapolis.

Bob Duncan, executive director of the Indianapolis International Airport, said the public will be invited to read and study the latest update to the Noise Exposure Map and illustrations and make comments to airport staff and noise officials.

The same information will be presented both nights. Individuals wishing to request special accommodations for attending either meeting should call 513-530-1256 by Monday.

Duncan said comments received at the public hearings will become part of the final document to be submitted to the Federal Aviation Administration for review in December. It will take a couple of months for the review to be completed.

A draft of the NEM update report and copies of it are available for review at the Mooresville Public Library, 220 W. Harrison St. It is also available at the following locations: Decatur Township Branch Library, 5301 Kentucky Ave., Indianapolis; Plainfield-Guilford Township Public Library, 1120 Stafford Road, Plainfield; Wayne Township Branch Library, 198 S. Girls School Road, Indianapolis; Marion County Public Library at 40 E. St. Clair St., Indianapolis; and at the airport guest services desk, 7800 Col. H Weir Cook Memorial Drive, Indianapolis, or on the airport website at www.indianapolisairport.com/information_news/noiseManagement.aspx.

Duncan said noise mitigation procedures are 99.9 percent done since 1996-1997, when the airport purchased some residential property.

“We can’t go any further, so it’s safe to say that we won’t be expanding. There won’t be any new programs or new property purchases and no more sound insulations,” Duncan said this week.

He added that one of the factors that determines noise contours is the amount of time residents hear airplanes. He said the maximum amount of noise most people complain about is 17 seconds. In 1997, the IAA received more than 1,000 noise complaints for the year. For all of 2012, only 23 such complaints were received.

“But what is just noise to some people is an excruciating sound to other people. You can’t please everybody, but we try,” Duncan said. “The contours haven’t been changed since 2003.

“The NEM update process is not legally mandated to us by the FAA. We don’t have to do noise mitigation or update maps. It is a voluntary thing for the airport,” Duncan said. “We do it because the airport makes an important impact on the region. We want to please our residents, our passengers and users like FedEx.”

No changes expected

Duncan said most of the high-level noise is over airport property — not residential property. Much of the noise comes from late-night cargo flights, not passenger airplanes. Most of these arrive by 10:30 or 11 p.m. Cargo flights come in mostly from the southwest, Duncan said, to lessen the noise as 40 to 50 planes come in or go out during the night. Just one cargo flight generates the noise of 10 daytime passenger flights.

The update process accounts for modifications to flight mix, aircraft operations, airport configuration and changes to other factors that may affect noise levels on residential areas around the airport. Aircraft noise levels that the FAA determined to be incompatible with residential use when the Noise Compatibility Plan was originally implemented impacted nearly 15,000 people.

Duncan said the old airport terminal has been destroyed to ground level. He said there has been some interest in the property, but he can’t yet disclose the details.

IND’s economic impact in central Indiana is more than $4.5 billion annually, and about 10,000 people work at the airport each day. IND serves more than 7 million business and leisure travelers each year and averages 137 daily flights to 32 nonstop destinations. Home of the world’s second-largest FedEx Express operation, IND is also the nation’s eighth-largest cargo facility.

For more information, visit IND’s Facebook page at Indianapolis International Airport and Twitter page at @INDairport.

Comments on the draft NEM update report may be submitted through Dec. 5, 2013, to: Chris Sandfoss, Landrum & Brown Inc., 11279 Cornell Park Drive, Cincinnati, Ohio 45242. Comments may also be emailed to 2013NEM@ind.com or sent by fax to 513-530-2256.

Hendricks County Flyer, Avon, IN

November 12, 2013

Airport updates its noise mitigation program

Public meetings set in Plainfield and the westside

By Wade Coggeshall wade.coggeshall@flyergroup.com

Westside Flyer

The Indianapolis Airport Authority will host two public meetings regarding the latest updates to Indianapolis International Airport's Noise Exposure Map. However, not much has changed since the last update. The meetings are from 5 to 7 p.m. Nov. 18 at Plainfield High School, 1 Red Pride Drive, and from 5 to 7 p.m. Nov. 19 at the Lynhurst 7th & 8th Grade Center, 2805 S. Lynhurst Drive, Indianapolis. Both meetings are open to the public and will have an informal, open-house setting. Airport staff and noise consultants will be on hand to offer information and answer questions.

Those already familiar with the airport's NEM shouldn't expect much difference with the latest update. Robert Duncan, the IAA's executive director, said the noise exposure maps have changed ever so slightly, "Almost to the point that unless you study it for a while you can't see the differences. They're not significant at all."

The only really noticeable change is a small bump in the boundary of the southwest side of runway 23L.

"It doesn't impact any homes," Duncan said.

All the big alterations related to noise mitigation happened years ago. The airport started its noise program in 1987, which initially entailed acquiring 250 homes in the highest impacted areas. The NEM was updated in 1992 when FedEx established a hub there.

"That expanded the noise contours, which required the acquisition of about 750 homes," Duncan said. By 1996 the U.S. Postal Service, like FedEx, was running a hub with nighttime operations. That expanded the noise boundaries some five miles from the airport.
"That had us doing sound installation in the Plainfield area," Duncan said.

In 2000 the postal service contracted with FedEx to deliver mail by air. Those operations moved to the company's headquarters in Memphis.

"When we finished our study in 2002 and 2003, the noise contours shrank dramatically," Duncan said. "They've been about the same ever since."

That remains the case despite the massive growth in the warehousing and logistics industries in Plainfield.

"The thing that drives noise contours is not necessarily growth," Duncan said. "FedEx has started using larger aircraft.
They're carrying more weight with about the same number of aircraft because they've upgraded."

The company retired its fleet of 727s this summer, which were much noisier and less fuel efficient than the aircraft in use now.
"FedEx has always striven to be a good neighbor and use the quietest aircraft they can put on line as soon as they can,"
Duncan said. "They've been doing that the last several years."

Passenger aircraft is less of a concern in the airport's noise program because most of those flights are during the day. When monitoring noise, a nighttime flight (after 10 p.m.) counts as 10 daytime flights. Noise levels are measured in decibels and the averages weighted over the course of a year.

The average number of flights from IIA is actually decreasing.

"Passenger airlines are pulling back flights through mergers and reducing the amount of capacity that they operate out of the airport," Duncan said. "We've gone over the last three or four years from about 150 flights a day down to maybe 134."

According to numbers provided by the IAA, the airport's noise program has reduced complaints from more than 1,000 in 1997 to 23 last year. As well, about 15,000 residents were impacted by aircraft noise levels deemed incompatible with residential use by the Federal Aviation Administration when the noise program was implemented. The IAA estimates that number to be less than 65 now.

The airport's updated noise exposure map may be viewed online at IndianapolisAirport.com/information_news/NoiseManagement.aspx. Copies also are available at the Plainfield-Guilford Township Public Library, 1120 Stafford Road; and the Wayne Township Library, 198 S. Girls School Road.

Public Open House/Public Hearing Handout

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NOISE EXPOSURE MAP UPDATE

INDIANAPOLIS INTERNATIONAL AIRPORT

Public Open House/Public Hearing November 18 & 19, 2013

WHAT IS A NOISE EXPOSURE MAP?

The Indianapolis Airport Authority (IAA) is preparing an update to the Noise Exposure Maps (NEMs) for the Indianapolis International Airport (IND). NEMs show the official noise exposure contours for IND. The NEMs being prepared for IND reflect the Existing (2013) and five-year Future (2018) conditions. These NEMs were prepared following 14 Code of Federal Regulations (14 CFR) Part 150 guidelines with regard to methodology, noise metrics, and public consultation. 14 CFR Part 150 also requires that the Integrated Noise Model (INM) be used to prepare the noise exposure contours. This computer model computes areas of significant noise impact based on airport operational data such as runway use, flight paths, number of operations, and aircraft type. Noise measurement data was collected at various locations in the vicinity of IND to assist in the verification of input data into the INM.

WHY ARE THE NOISE EXPOSURE MAPS BEING UPDATED?

NEMs are typically updated every five years, or when operational conditions have changed significantly from the conditions under which the previous NEMs were produced. On August 13, 2009, the previous NEMs for IND were determined to be in compliance with applicable guidelines by the Federal Aviation Administration (FAA) as part of the 2008 Noise Exposure Map Update. Since five years have passed since the NEMs were last updated, the IAA has undertaken this update of the official NEMs for IND. See **Exhibit 1** of this handout for the Draft Existing (2013) and Future (2018) noise exposure contours.

WHAT IS THE PURPOSE OF TONIGHT'S PUBLIC OPEN HOUSE/PUBLIC HEARING?

The purpose of this Public Open House/Public Hearing is to provide an opportunity for you to present your comments and ask questions regarding the process, the input data, and the resulting noise exposure contours shown on the Draft NEMs. Comments are being accepted orally tonight and in writing. Oral comments may be made tonight to a transcriptionist. If you wish to leave written comments, comment forms are located in the open house area and at the registration table. You may either complete the forms this evening and leave them in the comment box, or take them with you and mail/email/fax them by ***December 5, 2013***. Information for mailing, emailing, or faxing comments is provided at the end of this newsletter and on the comment form. Comments received by this date will be

published and responded to in the Final NEM Update document that will be submitted to the FAA for review and determination. You may also view information presented on the display boards at tonight's Open House.

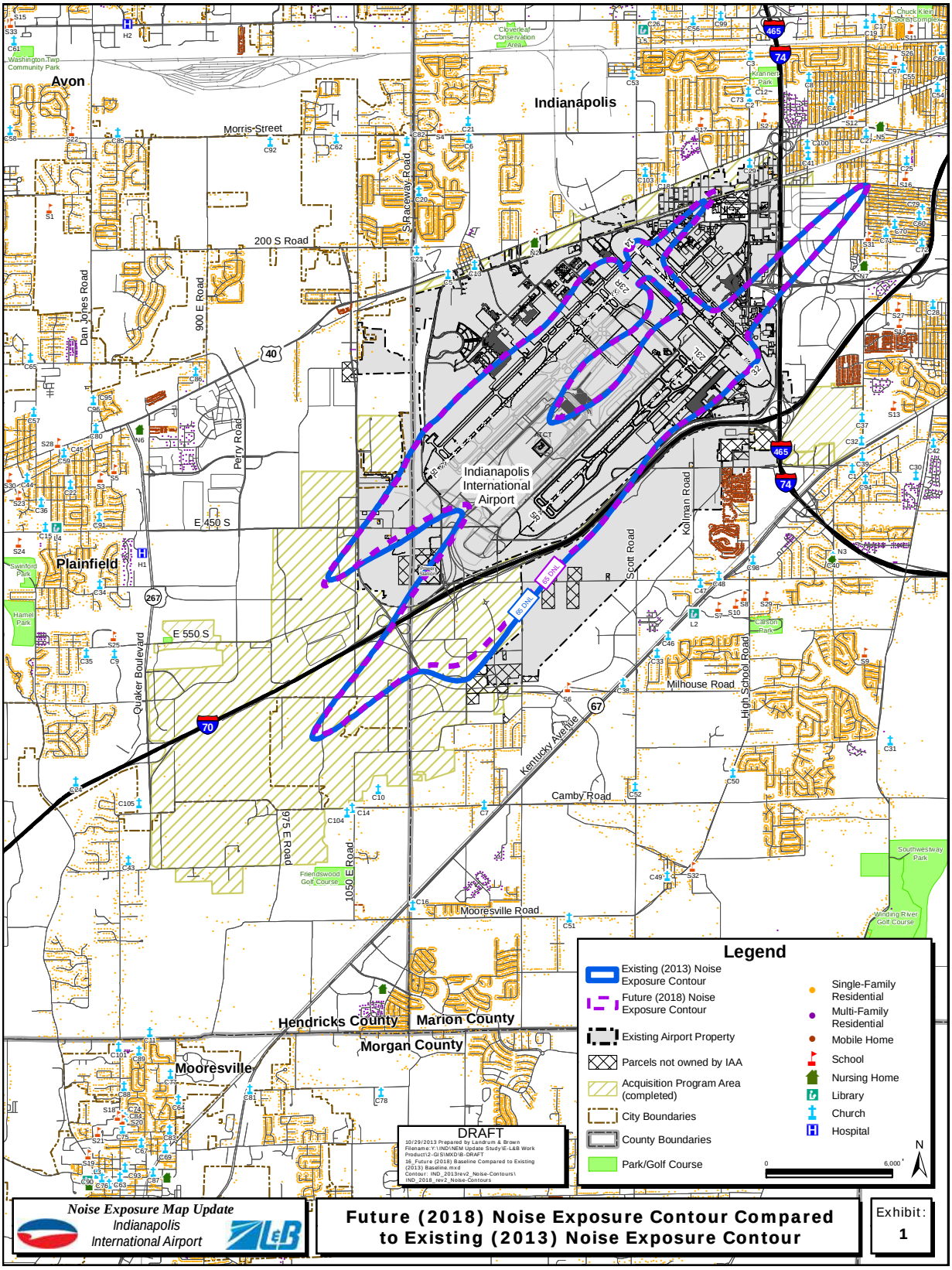
STUDY PROGRESS TO DATE

- This NEM Update Study officially started in August 2012, beginning with operational and land use data collection.
- A noise measurement program was conducted in August 2013 to assist in the development and verification of input data for the INM.
- Community focus group meetings were held in October 2013 to inform local officials of the NEM Update process.
- Noise exposure contours representing Existing (2013) and Future (2018) conditions have been prepared and overlaid onto an updated land use basemap. The noise contours show noise levels in terms of the Day-Night Average Sound Level (DNL) metric, which is required for noise studies per FAA guidelines. Noise levels of 65, 70, and 75 DNL are shown. Per Federal guidelines, 65 DNL is the level of significant impact upon noise-sensitive land uses. Noise-sensitive land uses are defined as residences, schools, libraries, churches (places of worship), hospitals, and nursing homes.
- Changes in the noise exposure contours have occurred when compared to the previous NEMs from the 2008 NEM Update. In general, the Existing (2013) noise exposure contour from this Study is smaller than the Future (2013) noise exposure contour that was developed for the 2008 NEM Update due to a lower number of aircraft operations than previously forecast for 2013. Additionally, minor changes in runway use patterns due to wind and operational conditions, and modifications to aircraft fleets, have occurred since 2008.
- The IAA has a long history of noise compatibility planning at IND, which has included a land use mitigation program that provided voluntary acquisition, sound insulation/purchase assurance, or sales assistance to owners of nearly 1,800 residential properties in the vicinity of IND.
- No changes to the noise abatement or land use mitigation programs are recommended at IND based on this NEM Update.

NOISE EXPOSURE MAP UPDATE

INDIANAPOLIS INTERNATIONAL AIRPORT

Public Open House/Public Hearing — November 18 & 19, 2013



NEXT STEPS

A Draft NEM Update Report has been prepared and is available to the public at the following locations:

Marion County Public Library
40 E. St. Clair St
Indianapolis, IN 46204
317-275-4100

Wayne Township Branch Library
198 South Girls School Road
Indianapolis, IN 46231
317-275-4530

Decatur Township Branch Library
5301 Kentucky Avenue
Indianapolis, IN 46221
317-275-4330

Plainfield-Guilford Township Public Library
1120 Stafford Road
Plainfield, IN 46168
317-839-6602

Mooresville Public Library
220 W. Harrison Street
Mooresville, IN 46158
317-831-7323

Indianapolis International Airport
Guest Services Desk
7800 Col. H. Weir Cook Memorial Drive
Indianapolis, IN 46241

Website: http://www.indianapolisairport.com/information_news/noiseManagement.aspx

- Comments can be submitted tonight at this Public Open House/Public Hearing or in writing through **December 5, 2013** to:

  Mr. Chris Sandfoss
  Landrum & Brown
  11279 Cornell Park Drive
  Cincinnati, Ohio 45242
  Fax: (513) 530-2256
  Email: 2013NEM@ind.com

- Public Comments will be addressed in the Final Report.

- The Final NEM Update Study Report is expected to be submitted to FAA in December 2013.

- FAA certification of the NEMs is expected within two to three months from the date of submission.

Public Open House/Public Hearing Sign-in Sheets

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Indianapolis International Airport
Noise Exposure Map Update - Public Open House / Public Hearing
November 18, 2013 - 5:00 p.m. to 7:00 p.m. - Plainfield High School

SIGN-IN SHEET - PLEASE PRINT

	Name	Address	Phone Number	E-Mail Address
1	Matt Lewis	[redacted]		mlewis@indi.com
2	LeRoy DIERKOS		538-3525	(H) 8398525
3	Mike & Cindy Callahan		(317) 407-1112	mg972@msn.com
4	Susan Zellers		317-487-5130	szellers@indi.com
5	Shannetta Griffin		317 487-5244	sgriffin@ind.com
6	Rodney BARTA		317 839.1900	Rodney.BARTA@Hilton.com
7	AJ Babkowski		317-487-5142	ajbabkowski@ind.com
8	Chuck Jarvis		317-856-8497	cjarvis@iupui.edu
9	Linda Cayol			
10	Bruce C. Smith		317-839-4765	bruce.c.smith@sbcglobal.net
11	Marilyn M. Templeton		317-839-3776	dstmmt@yahoo.com
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Indianapolis International Airport
Noise Exposure Map Update - Public Open House / Public Hearing
November 19, 2013 - 5:00 p.m. to 7:00 p.m. - Lynhurst 7th and 8th Grade Center

SIGN-IN SHEET - PLEASE PRINT

	Name	Address	Phone Number	E-Mail Address
1	Matt Lewis	[redacted]		mlewis@indi.com
2	Susan Zollars		317-487-5130	SZollars@indi.com
3	JEFF BRYANT		317-244-0194	
4	Billie Young		317-247 8980	
5	Shannetta Griffin		317 487-5244	Sgriffin@indi.com
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Public Comments Received

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In The Matter Of:

Noise Exposure Map Update-Indianapolis Airport

Transcript of Proceedings - Day 1
November 18, 2013

INDIANAPOLIS INTERNATIONAL AIRPORT

IN RE:)
)
NOISE EXPOSURE MAP UPDATE)

TRANSCRIPT OF PROCEEDINGS

Hearing heard on November 18, 2013, at 5:00 p.m. at Plainfield Community High School, 1 Red Pride Drive, Plainfield, Indiana, before Hearing Officer Charles E. Hostetter.

STEWART RICHARDSON & ASSOCIATES
Registered Professional Reporters
One Indiana Square
Suite 2425
Indianapolis, IN 46204
(317)237-3773

HEARING OFFICER: Good evening. My name is Charles E. Hostetter. I go by Gene. I'm the hearing officer for tonight's public hearing for the draft noise exposure map update for the Indianapolis International Airport. The Indianapolis Airport Authority is providing citizens an opportunity to comment on the draft noise exposure map update. All of the comments, along with the prepared responses, will be included in the official public record of the final noise exposure map update study document.

It is 5:00 p.m. I'm officially opening the public hearing for the draft noise exposure map update for the Indianapolis International Airport. People wishing to make comments can do so by either completing the comment form provided here tonight by making an oral statement to the transcriptionist. People that want to have their comments taken by the transcriptionist must sign in at the registration table. The order of the people that will speak will be the order in which they signed up.

Please be courteous and respect the rights of those speaking to the transcriptionist. Each speaker will be allocated up to three minutes. I

would also like to state to you that I mean no disrespect to any of you, but I will be cutting you off after your allotted time if others are waiting to speak. This is out of respect for the other people who also want to speak tonight. Speakers desiring more time may register to speak again and will be given another opportunity after all other registered speakers have had a chance to leave their comments.

If no one is requesting to speak at this time, I will recess the public hearing until the time someone wishes to speak.

(A brief recess was taken.)

HEARING OFFICER: Just state your name and tell us what you'd like to say.

MR. LeROY DIERKES: Yeah, my name is Leroy Dierkes. I live at 1184 Creekside Lane in Plainfield. In 1986, I lived approximately due west here of the high school, and I was going to build a new home. I had choices of going down to Hawthorne Ridge or Hardins Creekside Estates. At that time I went -- in 1986 I went into the bowels of the airport, and I saw the plans of the upcoming runways coming in which is now called the FedEx runway, was on the plans in 1986. I believe it

came in in '87.

So I, instead of moving -- and I could see where it would go over my house if I built down there. So I moved up to Hardins Creekside Estates. And at that time runway 23 right was not even in the plans, okay. So, therefore, I was there before the runway, okay. And I would say for the most part, there's not really been any problems as far as noise except now and then, and I'll show you on this graph here, where they cut --

HEARING OFFICER: Tell us what you're looking at right there.

MR. LeROY DIERKES: Okay. I'm looking at the flight pattern of planes that come off of runway 23 right and come off and head up toward Detroit, I'm presuming, and Chicago. And they're taking -- they're going right -- going over Ronald Reagan Parkway. I mean, not Ronald Reagan, new 267 and my house on Creekside Lane.

Several months ago, one came very close. I called Mr. Duncan. And I didn't know Mr. Duncan at the time, but that's who I ended up speaking with. And he informed me, yes, that plane was in violation. My request is that -- that they use the nighttime flight procedures during the daytime. I

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lived there, again, before the runway.

This is approximately -- if they miss my house or don't go over my house, it's approximately a mile farther out, okay. I don't think that's going to bankrupt any airline to go out the five miles and make their turn. We live there. We have kids there. We have children that are sleeping there. And, you know, we shouldn't have to -- to have this noise above us. Again, I was there before they were. You know, if I built under a runway, you know, you're going to get it. But I was there. And there were no plans for any runways out there at that time.

So anyway, that's my request, that they go out and follow the nighttime procedures, where they go out five to seven miles before they make their turn. That is my request. And not only my request but those of my neighborhood and of Providence Estates.

When Providence Estates was being planned, the developer asked me -- I asked the developer to develop it. He asked me, he says, what's the airport noise like? I says, negligible. And basically, it's negligible except when they make their turns, you know. And these are DC-10s -- no,

I'm sorry, those are MD-80s, DC-9s, that are on loud. And, you know, they're kicking it, when they're making their turn, they're on the gas and they're want withing to make that short turn up to Chicago or short turn up to Detroit.

And so anyway, I think you all are pretty good neighbors, but I'd like for them to stop this little bit right here.

HEARING OFFICER: Okay.

MR. LeROY DIERKES: That's what I'd like to see them stop. And if you can pass that information on, I know she can't visually --

HEARING OFFICER: Well, it's going to go in. All right. Thank you very much.

MR. LeROY DIERKES: I don't know if there's numbers on there or not. JCN1, JD- -- JCN1, JDN1, JCN1, whatever those means. These are the numbers. JC- -- JCN1, JDN1, JDN1. Here's one here, JDN1, JDN1. Whatever they are.

HEARING OFFICER: Okay.

MR. LeROY DIERKES: Thank you very much.

(A brief recess was taken.)

HEARING OFFICER: This is Gene Hostetter, the hearing officer, and it is now 7:00. We have nobody in line to speak, and I'm going to declare

the public session closed as of this date and time.

(The proceedings concluded at 7:00 p.m.)

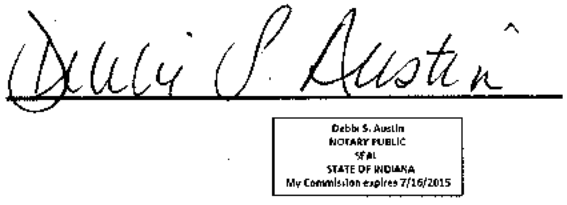
STATE OF INDIANA

COUNTY OF HENDRICKS

I, Debbi S. Austin, RMR, CRR, CSR, and a Notary Public and Stenographic Reporter within and for the County of Hendricks, State of Indiana at large, do hereby certify that on the 18th day of November, 2013, I took down in stenograph notes the foregoing proceedings;

That the transcript is a full, true and correct transcript made from my stenograph notes.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my notarial seal this 20th day of November, 2013.



My Commission Expires:
July 16, 2015

Job No. 80602

In The Matter Of:

Noise Exposure Map Update-Indianapolis Airport

Transcript of Proceedings - Day 2
November 19, 2013

INDIANAPOLIS INTERNATIONAL AIRPORT

IN RE:)
)
NOISE EXPOSURE MAP UPDATE)

TRANSCRIPT OF PROCEEDINGS

Hearing heard on November 19, 2013, at 5:00 p.m. at Lynhurst 7th and 8th Grade Center, 2805 South Lynhurst Drive, Indianapolis, Indiana, before Hearing Officer Charles E. Hostetter.

STEWART RICHARDSON & ASSOCIATES
Registered Professional Reporters
One Indiana Square
Suite 2425
Indianapolis, IN 46204
(317)237-3773

HEARING OFFICER: Good evening. My name is Charles E. Hostetter. I go by Gene. I'm the hearing officer for tonight's public hearing for the draft noise exposure map update for the Indianapolis International Airport. The Indianapolis Airport Authority is providing citizens an opportunity to comment on the draft noise exposure map update. All of the comments, along with the prepared responses, will be included in the official public record of the final noise exposure map update study document.

It is 5:00 p.m. I'm officially opening the public hearing for the draft noise exposure map update for the Indianapolis International Airport. People wishing to make comments can do so by either completing the comment form provided here tonight by making an oral statement to the transcriptionist. People that want to have their comments taken by the transcriptionist must sign in at the registration table. The order of the people that will speak will be the order in which they signed up.

Please be courteous and respect the rights of those speaking to the transcriptionist. Each speaker will be allocated up to three minutes. I

would also like to state to you that I mean no disrespect to any of you, but I will be cutting you off after your allotted time if others are waiting to speak. This is out of respect for the other people who also want to speak tonight. Speakers desiring more time may register to speak again and will be given another opportunity after all other registered speakers have had a chance to leave their comments.

If no one is requesting to speak at this time, I will recess the public hearing until the time someone wishes to speak.

(A brief recess was taken.)

HEARING OFFICER: We'll go back on the record, and if you would state your name and address and then just go ahead and make your report.

MR. [redacted]: My name is [redacted] Name and address redacted My complaint is the FedEx planes on takeoff. They can vibrate the house. I mean, it's like I was telling them, it shakes, and it's only -- usually in the mornings, from about 3 to 7. And then they've got some from midnight to 3, but the 3 to 7 is the ones we want quieted down. 9

HEARING OFFICER: Okay.

MR. [redacted]: Because it has set my alarms off on my house. It's set my truck alarm off. You know, we had to have the alarm company redo the alarm system in the house, take out the glass break sensors because it was -- they would set the glass break sensors off. We've had to pay fines for the alarms, for false alarms.

So basically that's all I've got to say for them. They need to fix something, FedEx does.

HEARING OFFICER: Thank you.

(A brief recess was taken.)

HEARING OFFICER: This is Gene Hostetter, the hearing officer, and it is now 7:00. We have nobody in line to speak, and I'm going to declare the public session closed as of this date and time.

(The proceedings concluded at 7:00 p.m.)

10

11

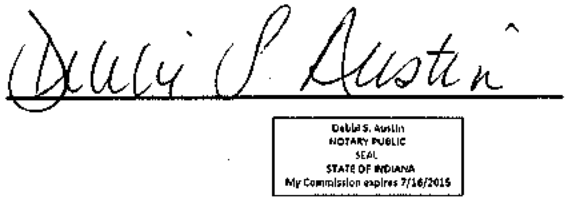
STATE OF INDIANA

COUNTY OF HENDRICKS

I, Debbi S. Austin, RMR, CRR, CSR, and a Notary Public and Stenographic Reporter within and for the County of Hendricks, State of Indiana at large, do hereby certify that on the 19th day of November, 2013, I took down in stenograph notes the foregoing proceedings;

That the transcript is a full, true and correct transcript made from my stenograph notes.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my notarial seal this 20th day of November, 2013.



My Commission Expires:
July 16, 2015

Job No. 80603

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Appendix B

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APPENDIX B
AVAILABILITY OF DOCUMENT TO PUBLIC

Copies of the Draft Noise Exposure Map Update were available to the public for review and comment at the following locations as of November 4, 2013. These locations include:

Marion County Public Library
40 E. St. Clair St
Indianapolis, IN 46204
317-275-4100

Wayne Township Branch Library
198 South Girls School Road
Indianapolis, IN 46231
317-275-4530

Decatur Township Branch Library
5301 Kentucky Avenue
Indianapolis, IN 46221
317-275-4330

Plainfield-Guilford Township Public Library
1120 Stafford Road
Plainfield, IN 46168
317-839-6602

Mooresville Public Library
220 W. Harrison Street
Mooresville, IN 46158
317-831-7323

Indianapolis International Airport
Guest Services Desk
7800 Col. H. Weir Cook Memorial Drive
Indianapolis, IN 46241

Website: http://www.indianapolisairport.com/AirportOperations/SoundandNoiseManagement/index.aspx

Oral and written comments were collected at the Public Open Houses/ Public Hearings that were held on November 18, 2013 and November 19, 2013. Comments were also accepted in writing through December 5, 2013. Copies of all comments received are included in Appendix A. Responses to comments are provided in Appendix H of this document.

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Appendix C

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APPENDIX C
FAA POLICIES, GUIDANCE, AND REGULATIONS

C.1 NOISE CONTROL POLICIES AND GUIDANCE

This section presents information regarding noise and land use criteria that may be useful in the evaluation of noise impacts. With respect to airports, the FAA has a long history of publishing noise and use assessment criteria. These laws and regulations provide the basis for local development of airport plans, analyses of airport impacts, and the enactment of Compatibility policies. Other agencies, including the USEPA and the Department of Defense, have developed noise and use criteria. A summary of some of the more pertinent regulations and guidelines is presented in the following paragraphs.

C.1.1 NOISE CONTROL ACT

Congress passed the Noise Control Act (42 U.S.C. §4901 et seq.) in 1972, which established a national policy to promote an environment for all Americans free from noise that jeopardizes their health and welfare. The act set forth the foundation for conducting research and setting guidelines to restrict noise pollution.

C.1.2 U.S. ENVIRONMENTAL PROTECTION AGENCY NOISE ASSESSMENT GUIDELINES

In response to the Noise Control Act, the USEPA published *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety.* This document identifies safe levels of environmental noise exposure without consideration for economic cost for achieving these levels. In this document, 55 dB DNL is identified as the requisite level with an adequate margin of safety for residential and recreational uses. This document does not constitute USEPA regulations or standards; rather, it is intended to "provide state and local governments as well as the Federal government and the private sector with an informational point of departure for the purpose of decision-making."

C.1.3 FEDERAL AVIATION NOISE ABATEMENT POLICY

On November 18, 1976, the U.S. Department of Transportation and FAA jointly issued the Federal Aviation Noise Abatement Policy. This policy recognized aircraft noise as a major constraint on the further development of the commercial aviation established key responsibilities for addressing aircraft noise. The policy stated that the Federal Government has the authority and responsibility to regulate noise at the source by designing and managing flight procedures to limit the impact of aircraft noise on local communities; and by providing funding to airports for noise abatement planning.

C.1.4 AVIATION SAFETY AND NOISE ABATEMENT ACT OF 1979

The Aviation Safety and Noise Abatement Act of 1979 (ASNA), which is codified as 49 U.S.C. 47501-47510, set forth the foundation for the airport noise compatibility planning program outlined in 14 Code of Federal Regulations (CFR) Part 150 (see Section C.1.6). The act established the requirements for conducting noise compatibility planning and provided assistance to and funding for which airport operators could apply to undertake such planning.

C.1.5 AIRPORT NOISE AND CAPACITY ACT OF 1990

The Airport Noise and Capacity Act (ANCA) of 1990 established two broad directives for the FAA: 1) to establish a method by which to review airport noise and access/use restrictions imposed by airport proprietors, and 2) to institute a program to phase out Stage 2 aircraft over 75,000 pounds by December 31, 1999.

C.1.6 FEDERAL REGULATIONS RELATED TO AIRPORT NOISE

The FAA has promulgated a series of regulations based on directions from Congress as provided in a series of authorizing statutes. Four separate Federal Regulations have been developed to specifically address permissible aircraft noise levels, operating procedures, and studies of aircraft noise levels. These regulations apply to activity within the U.S. Additionally, the International Civil Aviation Organization (ICAO) has developed and accepted similar regulations, which control the noise levels generated by aircraft operating in international airspace.

14 CFR Part 36

Title 14, Part 36 of the CFR sets forth noise levels that are permitted for aircraft of various weights, engine number, and date of certification. Originally released in 1974 as a result of Congress' modification of the Federal Aviation Act of 1958 through the Noise Control Act of 1972, aircraft were divided into three classes, based on the amount of noise they produced at three specific noise measurement locations during certification testing. These classes (or stages) were:

Stage 1 – the oldest and loudest aircraft, typically of the first generation of jets, designed before 1974, and having measured noise levels that exceed the standards set for the other classes of aircraft. This group included many of the first generation of jet aircraft used in passenger and cargo service, including the B-707, early B-727 and B-737 aircraft, and early DC-8s. Under 14 CFR Part 91, all such aircraft weighing more than 75,000 pounds were removed from the U.S. operating fleet by 1985, unless modified to meet Stage 2 noise standards.

Stage 2 – aircraft that were type certified before November 15, 1975 that met noise levels defined by the FAA at takeoff, sideline, and approach measurement locations. The permissible amount of noise increased with the weight of the aircraft above 75,000 pounds and the number of engines. This category included many of the second-generation jet aircraft such as the B-727, B-737-200, and DC-9 that

were extensively used in passenger and cargo service. Under 14 CFR Part 91, all such aircraft weighing more than 75,000 pounds were removed from the U.S. operating fleet by 2000, unless modified to meet Stage 3 noise standards.

Stage 3 – aircraft that meet the most stringent noise level requirements at takeoff, sideline, and approach measurement locations for their weight and engine number. This category includes the great majority of active business jet aircraft and all aircraft in passenger and cargo service that weigh more than 75,000 pounds.

The Committee on Aviation Environmental Protection, an International Civil Aviation Organization subcommittee, of which the U.S. is an active participant, has been debating the merits of adopting a more stringent standard for new aircraft type designs. In July 2005, the FAA, through notice in the *Federal Register*, adopted a Final Rule for Stage 4 Aircraft Noise Standards. No action had been taken by August 2013 to establish a phase out schedule for Stage 3 aircraft.

Stage 4 – all jet and transport-category airplanes with a maximum take-off weight of 12,500 pounds or more for which application of a new type design is submitted on or after January 1, 2006. The FAA's final Part 36 Stage 4 noise levels are a cumulative 10 EPNdB (effective perceived noise level in decibels) less than the current Stage 3 limits. They are based on the work of the International Civil Aviation Organization's committee on aviation environmental protection, in which the FAA and the International Business Aviation Council are active members.

All business jets are currently manufactured meet Stage 3 limits (by law), and nearly all would qualify to be recertified to meet Stage 4. Although the proposal doesn't contain a Stage 4 retrofit requirement and the FAA said it has no plans to impose such a requirement, one of the committee's recommendations called for a phase-out of Stage 3 airplanes with a maximum take-off weight of more than 75,000 pounds by 2020.

14 CFR Part 91

Title 14, Part 91 of the CFR as applied to noise, established schedules for phasing louder equipment out of the operating fleet of aircraft weighing more than 75,000 pounds. The schedules called for all Stage 1 aircraft over 75,000 pounds to be removed from the fleet by 1982, with the exception of two engine aircraft in small city service, which were allowed to continue in service until 1985. The schedule for the retirement of Stage 2 aircraft called for the removal of all such aircraft by the end of 1999, with interim retirement dates of 1994, 1996, and 1998 for the removal of portions of the Stage 2 fleet.

On July 2, 2013, the FAA issued a Final Rule which prohibits the operation in the contiguous United States of jet airplanes weighing 75,000 pounds or less that do not meet Stage 3 noise levels after December 31, 2015.

As of August 2013, no retirement schedules have been imposed for aircraft weighing less than 75,000 pounds nor has there been any indication of the imposition of a phase-out of Stage 3 aircraft.

14 CFR Part 150

Title 14, Part 150 of the CFR sets forth the standards under which a Part 150 Noise Compatibility Study is conducted. The background and requirements for such studies are presented in **Section One** of this document. Notably, the preparation of a Noise Compatibility Program (NCP) under 14 CFR Part 150 is a voluntary action by an airport proprietor. The process of preparing the plan is intended to open/enhance lines of communication between the airport, its neighbors, and users. It is the only mechanism to provide for the mitigation of aircraft noise impacts on noise-sensitive surrounding areas that is not directly tied to airfield development or airspace utilization conducted subject to the rules for preparation of an Environmental Impact Statement (EIS) or Environmental Assessment (EA).

Through Fiscal Year 2011, airports receiving Federal Airport Improvement Program (AIP) grant monies as a result of approved Part 150 NCPs, completed since 1982, have received grants totaling more than $5.7 billion for the implementation of Part 150 NCP recommendations. Additionally, another $3.4 billion has been committed to noise mitigation actions funded by Passenger Facility Charges (PFCs) authorized for collection for as many as 49 years into the future at different airports.[1]

The Part 150 Program allows airport operators to voluntarily submit noise exposure maps (NEMs) and NCPs to the FAA for review and approval. An NCP sets forth the measures that an airport operator "has taken" or "has proposed" for the reduction of existing incompatible land uses and the prevention of additional incompatible land uses within the area covered by NEMs.

14 CFR Part 161

Title 14, Part 161 of the CFR was published in 1991, subsequent to passage of the ANCA. That act established the requirement and schedule for the phase out of Stage 2 aircraft over 75,000 pounds. In return for that action, Congress severely restricted the ability of local communities to impose actions that would restrict the aircraft access to any airport. Different levels of requirements were established for voluntary restrictions, restrictions on Stage 2 aircraft, and restrictions on Stage 3 aircraft. These requirements are applicable to all aircraft except propeller-driven aircraft weighing less than 12,500 pounds, supersonic aircraft, and Stage 1 aircraft.

RESTRICTIVE AGREEMENTS

Subpart B of 14 CFR Part 161 sets notification requirements for the implementation of Stage 3 restrictions through agreements between airport operators and all affected airport users. (Presumably, this same procedure would be followed for implementing agreements for Stage 2 restrictions.) Before going into effect, notice of these proposed agreements must be published in local newspapers of area wide circulation, posted prominently at the airport, and sent directly to all regular airport users; the FAA; Federal, state, and local agencies with land use control authority;

[1] Federal Aviation Administration, AIP and PFC Funding Summary for Noise Compatibility Projects, online at: http://www.faa.gov/airports/environmental/airport_noise/part_150/funding/

community groups and business organizations; and any aircraft operators that are known to be interested in providing service to the airport (new entrants). After this notification period, the agreement can be implemented if all current users and any new entrants proposing to serve the airport within 180 days sign on to the proposed restriction.

Stage 2 Restrictions

Subpart C of 14 CFR Part 161 sets forth the requirements for establishing restrictions on Stage 2 aircraft operations. It requires a study of the proposed restriction that must include:

1. an analysis of the costs and benefits of the proposed restriction;
2. a description of the alternative restrictions;
3. a description of the non-restrictive alternatives that were considered and a comparison of the costs and benefits of those alternatives to the costs and benefits of the proposed restriction.

It further requires that the study use the noise methodology and land use compatibility criteria established in 14 CFR Part 150.[2] The study must also use currently accepted economic methodology. Where restrictions on Stage 2 aircraft weighing less than 75,000 pounds are involved, the study must include separate detail on how the restriction would apply to aircraft in this class.

After completing the study, the airport operator must publish a notice of the proposed restriction and an opportunity for public comment in a newspaper of general circulation in the area, post a notice prominently in the airport; and notify the FAA, local governments, all airport tenants whose operations might be affected by the proposed restrictions, and community groups and business organizations.[3] The FAA must publish an announcement of the proposed restriction in the *Federal Register*.[4]

The required study and public notice must be completed at least 180 days before the airport operator implements the proposed restriction.[5] There is no specific provision in ANCA or Part 161 for FAA action on the airport's proposed Stage 2 restriction. In practice, the FAA has reviewed Stage 2 Part 161 Studies for completeness. No specific deadlines for this review process are established in Part 161.

Stage 3 Restrictions

Subpart D of 14 CFR Part 161 establishes the requirements that an airport operator must follow in order to implement a noise or access restriction on Stage 3 aircraft. The required analysis must include the same elements required for a proposed

[2] 14 CFR Part 161, Sec. 161.9, 161.11, and Sec. 161.205(b).
[3] 14 CFR Part 161, Sec. 161.203(b).
[4] 14 CFR Part 161, Sec. 161.203(e).
[5] 14 CFR Part 161, Sec. 161.203(a).

restriction on Stage 2 aircraft. In addition, the required Part 161 Study must demonstrate "by substantial evidence that the statutory conditions are met." These six conditions, specified in ANCA are:

- Condition 1: The restriction is reasonable, non-arbitrary, and non-discriminatory.
- Condition 2: The restriction does not create an undue burden on interstate or foreign commerce.
- Condition 3: The proposed restriction maintains safe and efficient use of the navigable airspace.
- Condition 4: The proposed restriction does not conflict with any existing Federal statute or regulation.
- Condition 5: The applicant has provided adequate opportunity for public comment on the proposed restriction.
- Condition 6: The proposed restriction does not create an undue burden on the national aviation system.[6]

The applicant must also prepare an EA or documentation supporting a categorical exclusion.[7]

After submission by an airport operator of a complete Part 161 application package, the FAA has 30 days to review it for completeness. Notice of the proposed restriction must be published by the FAA in the *Federal Register*. After reviewing the application and public comments, the FAA must issue a decision approving or disapproving the proposed restriction within 180 days after receipt of a complete application. This decision is a final decision of the FAA Administrator for purposes of judicial review.[8]

CONSEQUENCES OF FAILING TO COMPLY WITH PART 161

Subpart F of 14 CFR Part 161 describes the consequences of an airport operator's failure to comply with Part 161. The sanction provided for in Subpart F is the termination of the airport's eligibility to receive airport grant funds and to collect PFCs.[9] Most of Subpart F describes the process for notifying airport operators of apparent violations, dispute resolution, and implementation of the required sanctions.

[6] 14 CFR Part 161, Sec. 161.305(e).
[7] 14 CRF Part 161, Sec. 161.305(c).
[8] 14 CFR Part 161, Sec. 161.313(b)(2).
[9] 14 CFR Part 161, Sec. 161.501.

C.1.7 FEDERAL INTERAGENCY COMMITTEE ON NOISE

FICON was formed in 1990 to review specific elements of the assessment of airport noise impacts and to make recommendations regarding potential improvements. The FICON review focused primarily on the manner in which noise impacts are determined, including:

- whether aircraft noise impacts are fundamentally different from other transportation noise impacts;
- the manner in which noise impacts are described;
- the extent of impacts outside of DNL 65 decibels (dB) that should be reviewed in a National Environmental Policy Act (NEPA) document;
- the range of FAA-controlled mitigation options (noise abatement and flight track procedures) analyzed; and,
- the relationship of the 14 CFR Part 150 process to the NEPA process; including ramifications to the NEPA process if they are separate, and exploration of the means by which the two processes can be handled to maximize benefits.

The committee determined that there are no new descriptors or metrics of sufficient scientific standing to substitute for the present DNL cumulative noise exposure metric. The methodology employing DNL as the noise exposure metric and appropriate dose-response relationships to determine noise impact is considered the proper one for civil and military aviation scenarios in the general vicinity of airports.

The recommended the continued use of DNL as the principle means of assessing noise impacts and encouraged agency discretion in the use of supplemental noise analysis. FICON also recommended continued research on the impact of aircraft noise, and recommended that "a standing federal interagency committee should be established to assist agencies in providing adequate forums for discussion of public and private sector proposals, identifying needed research, and in encouraging the conduct of research and development in these areas."

Federal Interagency Committee on Aviation Noise

The FICAN was formed in 1993 to fulfill the FICON recommendation. The following Federal agencies concerned with aviation noise, including those with policy roles, are represented on the Committee:

- Department of Defense
  - U.S. Air Force
  - U.S. Army
  - U.S. Navy
- Department of Interior
  - National Park Service

- Department of Transportation
    - Federal Aviation Administration
- Environmental Protection Agency
- National Aeronautics and Space Administration (NASA)
- Department of Housing and Urban Development

C.1.8 FEDERAL REQUIREMENTS TO USE DNL IN ENVIRONMENTAL NOISE STUDIES

DNL is the standard metric used for environmental noise analysis in the U.S. This practice originated with the USEPA's effort to comply with the Noise Control Act of 1972. The USEPA designated a task group to "consider the characterization of the impact of airport community noise and develop a community noise exposure measure."[10] The task group recommended using the DNL metric. The USEPA accepted the recommendation in 1974, based on the following considerations:

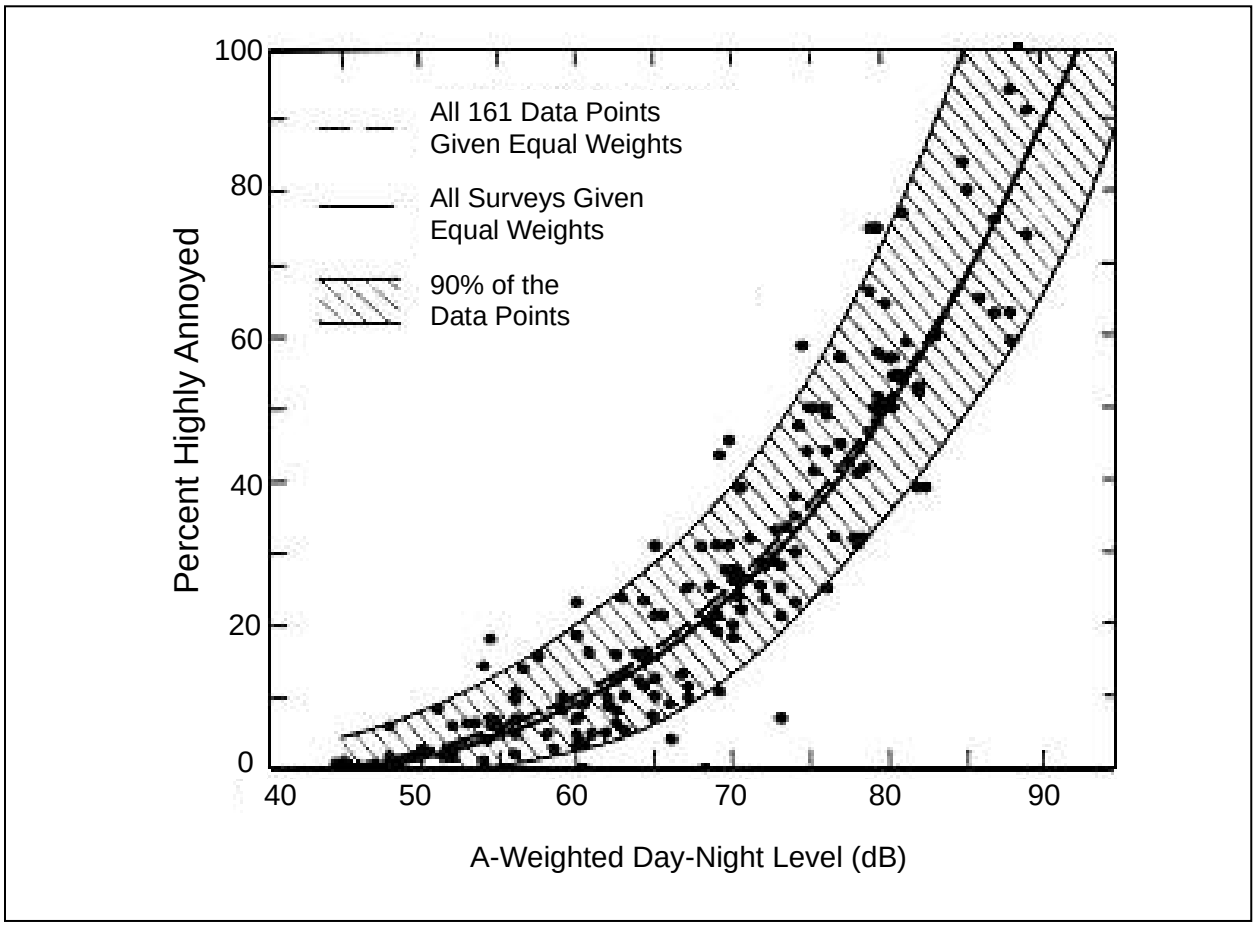
- The measure is applicable to the evaluation of pervasive, long-term noise in various defined areas and under various conditions over long periods of time.
- The measure correlates well with known effects of the noise environment on individuals and the public.
- The measure is simple, practical, and accurate.
- Measurement equipment is commercially available.
- The metric at a given location is predictable, within an acceptable tolerance, from knowledge of the physical events producing the noise.[11]

The Schultz Curve, which is depicted in **Exhibit C-1** was first published by T.J. Schultz in *Synthesis of Social Surveys on Noise Annoyance* in 1978. The curve relates specific DNL levels to the percent of people in a community whom those noise levels highly annoy. The Curve provides a widely-accepted dose-response relationship between cumulative environmental noise and annoyance. Like other Federal agencies that have established Federal land use guidelines for noise, FAA used the Schultz curve, when it designated the DNL 65 dB contour as the cumulative noise exposure level above which residential land uses are not compatible without mitigation. At DNL 65 dBA, the Schultz Curve predicts that approximately 12 percent of the population will be highly annoyed.

[10] *Information on Levels of Environmental Noise Requisite to Protect Health and Welfare with an Adequate Margin of Safety.* U.S. Environmental Protection Agency, Office of Noise Abatement and Control. 1974, P. A-10.

[11] *Information on Levels of Environmental Noise Requisite to Protect Health and Welfare with an Adequate Margin of Safety*. U.S. Environmental Protection Agency, Office of Noise Abatement and Control. 1974, Pp. A-1–A-23.

Exhibit C-1
SCHULTZ CURVE



Source: Noise Control Eng. J 42(1), 1994 Jan—Feb, *Community Announce and Sleep Disturbance: Updated Criteria for Assessing the Impacts of General Transportation Noise on People*, Figure 1, p. 26.

Soon thereafter, the Department of Housing and Urban Development (HUD), Department of Defense, and the Veterans Administration adopted the use of DNL.

At about the same time, the Acoustical Society of America developed a standard (ANSI S3.23-1980) which established DNL as the preferred metric for outdoor environments. This standard was reevaluated in 1990 and they reached the same conclusions regarding the use of DNL (ANSI S12.40-1990).

In 1980, the Federal Interagency Committee on Urban Noise (FICUN) met to consolidate Federal guidance on incorporating noise considerations in local land use planning. The committee selected DNL as the best noise metric for the purpose, thus endorsing the USEPA's earlier work and making it applicable to all Federal agencies.[12]

[12] *Guidelines for Considering Noise in Land Use Planning and Control*. Federal Interagency Committee on Urban Noise (FICUN). 1980.

In response to the requirements of the ASNA Act of 1979 and the recommendations of FICUN and USEPA, the FAA established DNL in 1981 as the single metric for use in airport noise and land use compatibility planning. This decision was incorporated into the final rule implementing ASNA, 14 CFR Part 150, in 1985. Part 150 established the DNL as the noise metric for determining the exposure of individuals to aircraft noise and identified residential land uses as being normally compatible with noise levels below DNL 65 dBA.

In the early 1990s, Congress authorized the creation of a new interagency committee to study airport noise issues. The FICON was formed with membership from the USEPA, the FAA, the U.S. Air Force, the U.S. Navy, HUD, the Department of Veterans Affairs, and others. FICON concluded in its 1992 report that Federal agencies should "continue the use of the DNL metric as the principal means for describing long term noise exposure of civil and military aircraft operations."[13] FICON further concluded that there were no new sound descriptors of sufficient scientific standing to substitute for the DNL cumulative noise exposure metric.[14]

In 1993, the FAA issued its *Report to Congress on Effects of Airport Noise*. Regarding DNL, the FAA stated, "Overall, the best measure of the social, economic, and health effects of airport noise on communities is the Day-Night Average Sound Level (DNL)."[15] According to this report, DNL 65 dBA "…as a criterion of significance, and of the land use compatibility guidelines in in Part 150 is reasonable."[16]

C.1.9 ICAO RULES

The Convention on International Civil Aviation (also known as the *Chicago Convention*), was signed on December 7, 1944 by 52 states. Pending ratification of the Convention by 26 states, the Provisional International Civil Aviation Organization (PICAO) was established. It functioned from June 6, 1945 until April 4, 1947. By March 5, 1947 the 26th ratification was received. ICAO came into being on April 4, 1947. In October of the same year, ICAO became a specialized agency of the United Nations. ICAO is now 185 nations strong.

During 2000 and 2001, ICAO's Committee on Aviation Environmental Protection (CAEP) has evaluated the introduction of a new noise standard. In September 2001, the ICAO Council met and agreed to the following:

- Established a new Stage 4 standard that is 10 dB quieter than Stage 3 for aircraft newly-certified after 2006.

[13] *Federal Agency Review of Selected Airport Noise Analysis Issues*. Federal Interagency Committee on Noise (FICON). August 1992, Pp. 3-1.
[14] *Federal Agency Review of Selected Airport Noise Analysis Issues, Technical Report, Volume 2.* Federal Interagency Committee on Noise (Technical). August 1992, Pp. 2-3.
[15] *Report to Congress on Effects of Airport Noise.* Federal Aviation Administration. 1993, P. 1.
[16] *Report to Congress on Effects of Airport Noise.* Federal Aviation Administration. 1993, P. 13.

- If a member state decides to permit noise restrictions on any Stage 3 aircraft, the ICAO Assembly recommends that such restriction:
  - Be based on the noise performance of the aircraft (the EU has imposed a restriction based on engine by-pass ratio);
  - Be tailored to the noise problem of the airport concerned in accordance with the balanced approach;
  - Be partial in nature, whenever possible, rather than the complete withdrawal of operations at an airport;
  - Take into account possible consequences for air transport services for which there are no suitable alternatives, such as long-haul service;
  - Consider the special circumstances of operators from developing countries in order to avoid undue economic hardship on them and by granting them exemptions;
  - Introduce such restrictions gradually over time, where possible, in order to take into account the economic impact on affected operators;
  - Give operators a reasonable period of advance notice;
  - Take into account the economic and environmental impact on civil aviation in terms of recent events; and
  - Inform ICAO and other states of all such restrictions imposed

The balanced approach to noise management endorsed by the ICAO Assembly consists of "identifying the noise problem at an airport and then analyzing the various measures available to reduce noise through the exploration of four principal elements with the goal of addressing the noise problem in the most cost-effective manner." The four principal elements of the balanced approach are:

- Reduction of noise at the source
- Land-use planning and management
- Noise abatement operational procedures
- Operating restrictions

C.2 NOISE RESEARCH AND DEVELOPMENT ACTIVITY

The National Aeronautics and Space Administration (NASA) has been charged with providing pre-competitive research endeavors in long-term, high-risk, high-payoff technologies and to "provide revolutionary advancements that protect U.S. leadership for future generations. The impact of NASA's research on our national transportation system, our national security, the environment, and our economy demonstrates a clear government role in support of the public good."[17]

[17] Excerpt from NASA's Aeronautics & Space Transportation Technology : Three Pillars for Success, "Message from the Administrator", Daniel S. Goldin, March 1997

To that end, NASA has conducted the Advanced Subsonic Transport (AST) program, which has now transformed into the Quiet Aircraft Technology (QAT) program. To help conduct research, NASA has created the Technical Working Group made up of NASA and FAA experts, industry leaders, and academia.

The goal of the QAT Program is to develop technology that, when implemented, reduces the impact of aircraft noise to benefit airport neighbors, the aviation industry, and travelers. NASA's goals for the QAT program include a balanced approach to noise reduction through determining "Community Noise Impact," "Airframe System Noise Reduction," and "Engine System Noise Reduction."

Noise Reduction Goal: Reduce the perceived noise levels of future aircraft by a factor of two (10 dB) from today's subsonic aircraft within 10 years, and by a factor of four (20 dB) within 25 years relative to 1997 "best in fleet" (757, 777 aircraft).

C.3 FEDERAL LAWS AND POLICIES RELATED TO NOISE/LAND USE COMPATIBILITY

The FAA adopted land use compatibility guidelines relating types of land use to airport sound levels in 1985. These guidelines were promulgated in Title 14 of the Code of Federal Regulations (14 CFR) Part 150. These guidelines, reproduced here as **Table C-1** show the compatibility parameters for the following land use types: residential, noise-sensitive public facilities that include schools, places of worship (churches), nursing homes, hospitals, and libraries, commercial, manufacturing and production, and recreation.

The Part 150 guidelines are the basis for defining areas potentially eligible for Federal funding through the Airport Improvement Program (AIP). The *Airport Improvement Handbook* states, "Noise compatibility projects usually must be located in areas where noise measured in day-night average sound level (DNL) is 65 decibel (dB) or greater."[18] Federal funding is available at noise levels below 65 DNL if the airport operator (Sponsor) determines that incompatible land uses exist below 65 DNL and the FAA concurs with the Sponsor's determination.

As shown in Table 4-1, all land uses within areas below 65 DNL are considered to be compatible with airport operations. Residential land uses are generally incompatible with noise levels above 65 DNL. In some areas, residential land use may be permitted in the 65 to 70 DNL with appropriate sound insulation measures implemented. This is done at the discretion of local communities. Schools and other public use facilities located between 65 and 75 DNL are generally incompatible without sound insulation. Above 75 DNL, schools, hospitals, nursing homes, and places of worship (churches) are considered incompatible land uses. The information presented in Table C-1 is meant to act as a guideline. According to 14 CFR Part 150, "Adjustments or modifications of the descriptions of the land-use categories may be desirable after consideration of specific local conditions."[19]

[18] FAA Order 5300.38C, Chapter 7, paragraph 706.
[19] 14 CFR Part 150, Part B Noise Exposure Map Development, Section A150.101 Noise contours and land usages, paragraph (c).

Table C-1
LAND USE COMPATIBILITY GUIDELINES - 14 CFR PART 150

	YEARLY DAY-NIGHT AVERAGE SOUND LEVEL (DNL) IN DECIBELS					
LAND USE	**BELOW 65**	**65-70**	**70-75**	**75-80**	**80-85**	**OVER 85**
RESIDENTIAL						
Residential, other than mobile homes and transient lodgings	Y	N[1]	N[1]	N	N	N
Mobile home parks	Y	N	N	N	N	N
Transient lodgings	Y	N[1]	N[1]	N[1]	N	N
PUBLIC USE						
Schools, hospitals, 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]	N[4]
Parking	Y	Y	Y[2]	Y[3]	Y[4]	N
COMMERCIAL USE						
Offices, business and professional	Y	Y	25	30	N	N
Wholesale and retail -- building materials, hardware, and farm equipment	Y	Y	Y[2]	Y[3]	Y[4]	N
Retail trade, general	Y	Y	25	30	N	N
Utilities	Y	Y	Y[2]	Y[3]	Y[4]	N
Communication	Y	Y	25	30	N	N
MANUFACTURING AND PRODUCTION						
Manufacturing, general	Y	Y	Y[2]	Y[3]	Y[4]	N
Photographic and optical	Y	Y	25	30	N	N
Agriculture (except livestock) and forestry	Y	Y[6]	Y[7]	Y[8]	Y[8]	Y[8]
Livestock farming and breeding	Y	Y[6]	Y[7]	N	N	N
Mining and fishing, resource production and extraction	Y	Y	Y	Y	Y	Y
RECREATIONAL						
Outdoor sports arenas and spectator sports	Y	Y	Y[5]	N[5]	N	N
Outdoor music shells, amphitheaters	Y	N	N	N	N	N
Nature exhibits and zoos	Y	Y	N	N	N	N
Amusements, parks, resorts, and camps	Y	Y	Y	N	N	N
Golf courses, riding stables, and water recreation	Y	Y	25	30	N	N

The designations contained in this table do not constitute a Federal determination that any use of land covered by the program is acceptable 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.

Table C-1, *Continued*
LAND USE COMPATIBILITY GUIDELINES - 14 CFR PART 150

Key to Table C-1

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

Notes for Table C-1

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 five, 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, 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, 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, office areas, noise-sensitive areas, or where the normal noise level is low.
5. Land use compatible provided special sound reinforcement systems are installed.
6. Residential buildings require a NLR of 25 dB.
7. Residential buildings require a NLR of 30 dB.
8. Residential buildings not permitted.

Source: 14 CFR Part 150 *Airport Noise Compatibility Planning*, Appendix A, Table 1.

Appendix D

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APPENDIX D
NOISE MODELING METHODOLOGY

This appendix sets forth the background material necessary for the reader to understand the principles of noise, the preparation of noise exposure contours and the development of estimates of noise impacts associated with those contours. The data is derived from a variety of sources including, but not limited to, records maintained by the Indianapolis Airport Authority, airport management and the Federal Aviation Administration (FAA), and mapping available from local planning agencies.

Section D.1 provides background information necessary to understand the characteristics and properties of sound and noise, including how noise levels are measured and expressed mathematically.

Section D.2 includes basic information on the noise metric and computer model used to compute noise and a statement relative to the comparability of baseline information and the years indicated on the official noise mapping for the airport.

Section D.3 provides information on how human's respond to sound in different settings.

Section D.4 presents notable research on the health effects of noise, such as potential for sleep deprivation and hearing loss.

D.1 CHARACTERISTICS OF SOUND

Sound is created by a source that induces vibrations in the air. The vibration produces alternating bands of relatively dense and sparse particles of air, spreading outward from the source like ripples on a pond. Sound waves dissipate with increasing distance from the source. Sound waves can also be reflected, diffracted, refracted, or scattered. When the source stops vibrating, the sound waves disappear almost instantly and the sound ceases.

Sound conveys information to listeners. It can be instructional, alarming, pleasant, relaxing, or annoying. Identical sounds can be characterized by different people or even by the same person at different times, as desirable or unwanted. Unwanted sound is commonly referred to as "noise."

Sound can be defined in terms of three components:

1. Level (amplitude)
2. Pitch (frequency)
3. Duration (time pattern)
4. Propagation of Noise

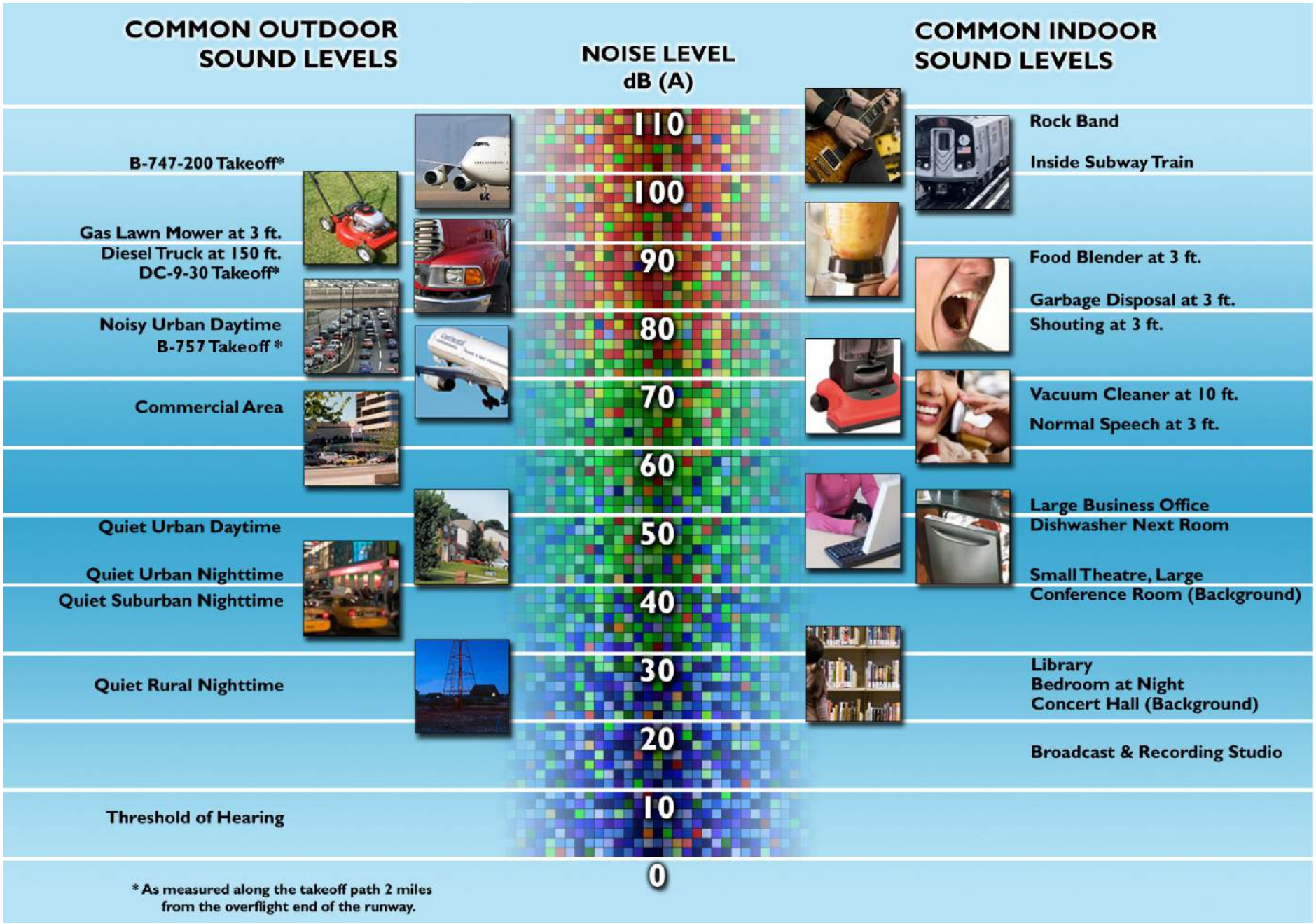
D.1.1 SOUND LEVEL

The level or amplitude of sound is measured by the difference between atmospheric pressure (without the sound) and the total pressure (with the sound). Amplitude of sound is like the relative height of the ripples caused by the stone thrown into the water. Although physicists typically measure pressure using the linear Pascal scale, sound is measured using the logarithmic decibel (dB) scale. This is because the range of sound pressures detectable by the human ear can vary from *1 to 100 trillion units*. A logarithmic scale allows us to discuss and analyze noise using more manageable numbers. The range of audible sound ranges from approximately 1 to 140 dB, although everyday sounds rarely rise above about 120 dB. The human ear is extremely sensitive to sound pressure fluctuations. A sound of 140 dB, which is sharply painful to humans, contains *100 trillion (10^{14}) times more* sound pressure than the least audible sound. **Exhibit D-1** shows a comparison of common sources of indoor and outdoor sounds measured on the dB scale.

By definition, a 10 dB increase in sound is equal to a tenfold (10^1) increase in the mean square sound pressure of the reference sound. A 20 dB increase is a 100-fold (10^2) increase in the mean square sound pressure of the reference sound. A 30 dB increase is a 1,000-fold (10^3) increase in mean square sound pressure.

A logarithmic scale requires different mathematics than used with linear scales. The sound pressures of two separate sounds, expressed in dB, are not arithmetically additive. For example, if a sound of 80 dB is added to another sound of 74 dB, the total is a 1 dB increase in the louder sound (81 dB), not the arithmetic sum of 154 dB (See **Exhibit D-2**). If two equally loud noise events occur simultaneously, the sound pressure level from the combined events is 3 dB higher than the level produced by either event alone.

Logarithmic averaging also yields results that are quite different from simple arithmetic averaging. Consider the example shown in **Exhibit D-3**. Two sound levels of equal duration are averaged. One has a maximum sound level (Lmax) of 100 dB, the other 50 dB. Using conventional arithmetic, the average would be 75 dB. The true result, using logarithmic math, is 97 dB. This is because 100 dB has far more energy than 50 dB (100,000 times as much!) and is overwhelmingly dominant in computing the average of the two sounds.



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Comparison of Sound

Exhibit: **D-1**

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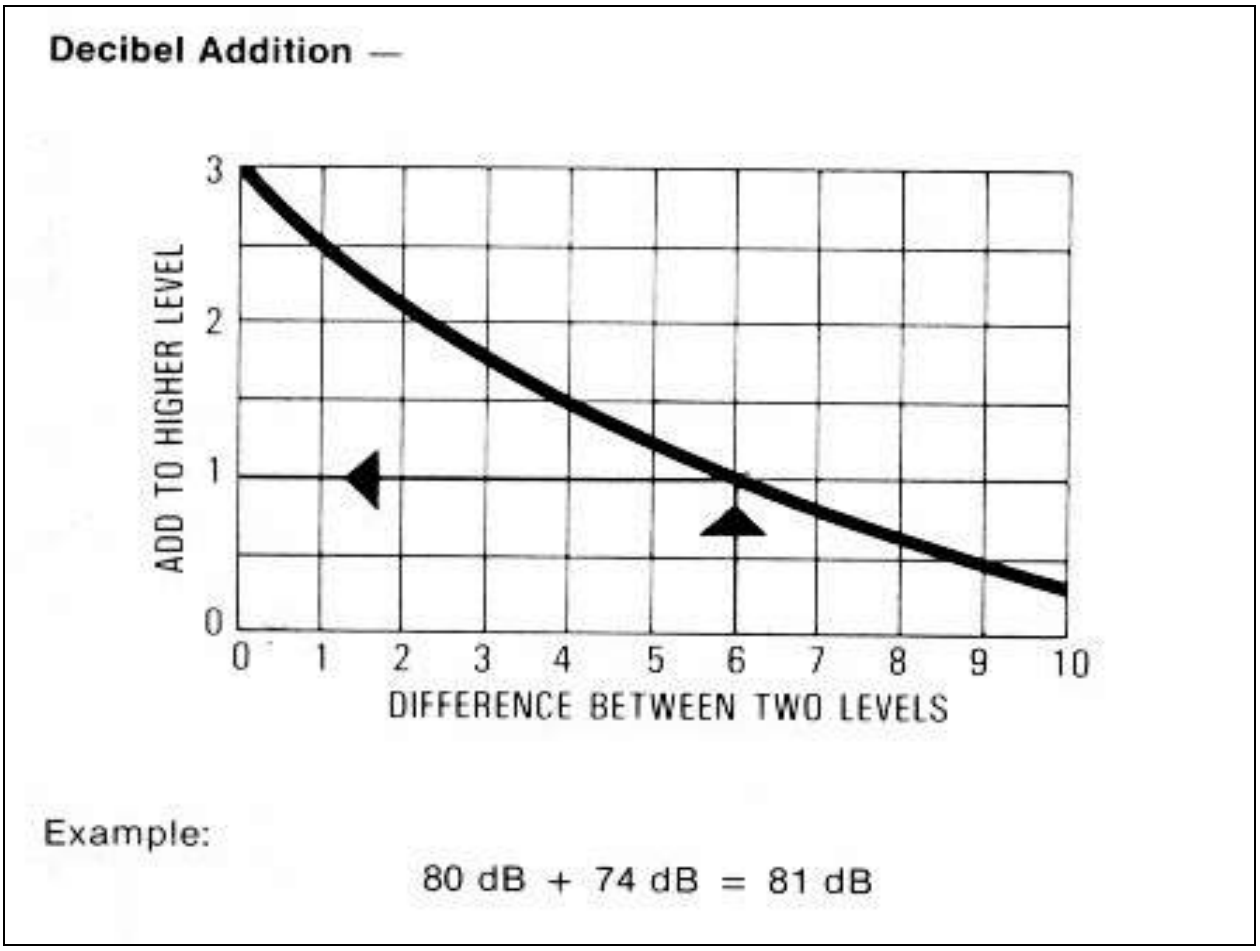
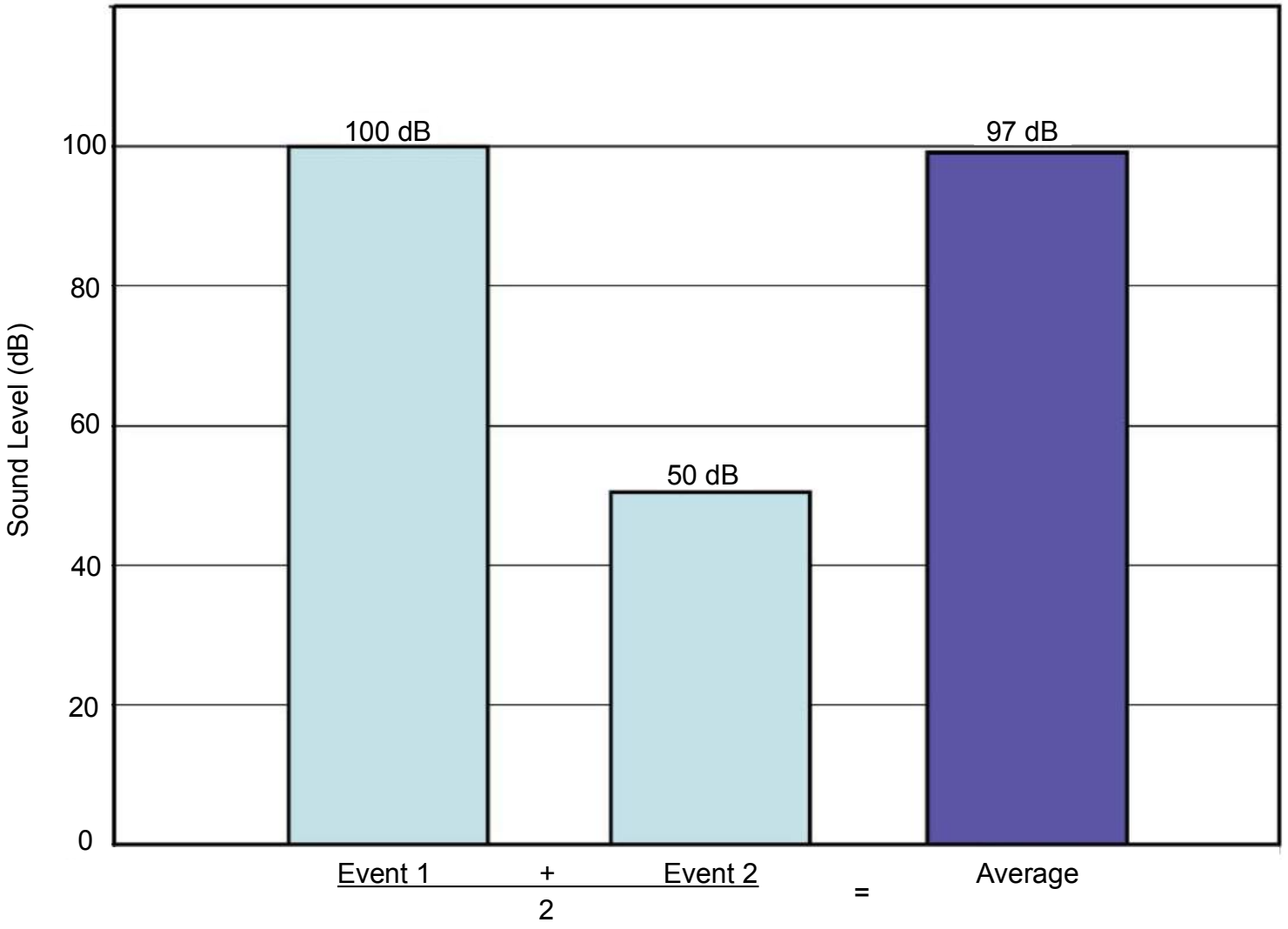
Exhibit D-2
EXAMPLE OF ADDITION OF TWO DECIBEL LEVELS



Source: *Information on Levels of Environmental Noise*. USEPA. March 1974.

BACK OF EXHIBIT

Assume two sound levels of equal duration...
What is the average level?



(100dB + 50dB) / 2 = 97dB

The decibel (dB) scale is logarithmic -
100 dB is 100,000 times more energy than 50 dB!

BACK OF EXHIBIT

Human perceptions of changes in sound pressure are less sensitive than a sound level meter. People typically perceive a tenfold increase in sound pressure, a 10 dB increase, as a doubling of loudness. Conversely, a 10 dB decrease in sound pressure is normally perceived as half as loud. In community settings, most people perceive a 3 dB increase in sound pressure (a doubling of the sound pressure or energy) as just noticeable. (In laboratory settings, people with good hearing are able to detect changes in sounds of as little as 1 dB.)

D.1.2 SOUND FREQUENCY

The pitch (or frequency) of sound can vary greatly from a low-pitched rumble to a shrill whistle. If we consider the analogy of ripples in a pond, high frequency sounds are vibrations with tightly spaced ripples, while low rumbles are vibrations with widely spaced ripples. The rate at which a source vibrates determines the frequency. The rate of vibration is measured in units called "Hertz" -- the number of cycles, or waves, per second. One's ability to hear a sound depends greatly on the frequency composition. Humans hear sounds best at frequencies between 1,000 and 6,000 Hertz. Sound at frequencies above 10,000 Hertz (high-pitched hissing) and below 100 Hertz (low rumble) are much more difficult to hear.

When attempting to measure sound in a way that approximates what our ears hear, we must give more weight to sounds at the frequencies we hear well and less weight to sounds at frequencies we do not hear well. Acousticians have developed several weighting scales for measuring sound. The A-weighted scale was developed to correlate with the judgments people make about the loudness of sounds. The A-weighted decibel scale (dBA) is used in studies where audible sound is the focus of inquiry. **Exhibit D-4** shows the A, B, and C sound weighting scale. The U.S. Environmental Protection Agency (USEPA) has recommended the use of the A-weighted decibel scale in studies of environmental noise.[1] Its use is required by the Federal Aviation Administration (FAA) in airport noise studies.[2] For the purposes of this analysis, dBA was used as the noise metric and dB and dBA are used interchangeably.

D.1.3 DURATION OF SOUNDS

The duration of sounds – their patterns of loudness and pitch over time – can vary greatly. Sounds can be classified as *continuous* like a waterfall, *impulsive* like a firecracker, or *intermittent* like aircraft overflights. Intermittent sounds are produced for relatively short periods, with the instantaneous sound level during the event roughly appearing as a bell-shaped curve. An aircraft event is characterized by the period during which it rises above the background sound level, reaches its peak, and then recedes below the background level.

[1] Information on Levels of Environmental Noise Requisite to Protect Health and Welfare with an Adequate Margin of Safety. U.S. Environmental Protection Agency, Office of Noise Abatement and Control. 1974, P. A-10.

[2] "Airport Noise Compatibility Planning." 14 CFR Part 150, Sec. A150.3.

D.1.4 PROPAGATION OF NOISE

Outdoor sound levels decrease as a function of distance from the source, and as a result of wave divergence, atmospheric absorption, and ground attenuation. If sound is radiated from a source in an homogeneous and undisturbed manner, the sound travels as spherical waves. As the sound wave travels away from the source, the sound energy is distributed over a greater area, dispersing the sound energy of the wave. Spherical spreading of the sound wave reduces the noise level at a rate of 6 dB per doubling of the distance.

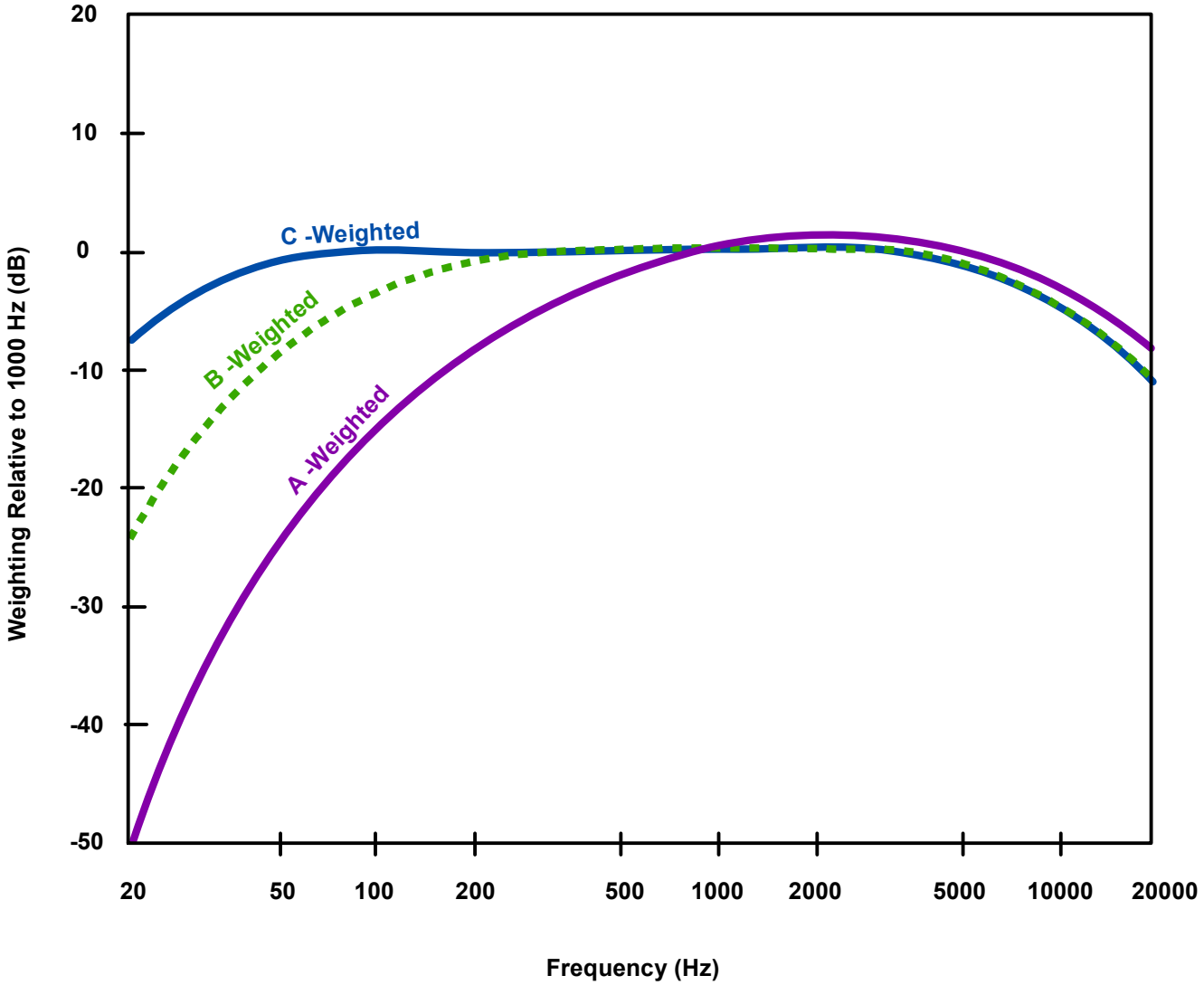
Atmospheric absorption also influences the levels that are received by the observer. The greater the distance traveled, the greater the influence of the atmosphere and the resultant fluctuations. Atmospheric absorption becomes important at distances of greater than 1,000 feet. The degree of absorption is a function of the frequency of the sound as well as the humidity and temperature of the air. For example, atmospheric absorption is lowest at high humidity and higher temperatures. Sample atmospheric attenuation graphs are presented in **Exhibit D-5**. The graphs show noise absorption rates based on temperature, relative humidity, and distance at five different frequency ranges. For example, sounds at a frequency of 2,000 Hz, with a relative humidity of 10 percent and a temperature of 90^{O} Fahrenheit (32^{O} Celsius), will be dissipate by 10 dB per for every 1,000 feet (305 meters) from the source.

The rate of atmospheric absorption varies with sound frequency. The higher frequencies are more readily absorbed than the lower frequencies. Over large distances, the lower frequencies become the dominant sound as the higher frequencies are attenuated.

Turbulence and gradients of wind, temperature, and humidity also play a significant role in determining the degree of attenuation. Certain conditions, such as inversions, can also result in higher noise levels than would result from spherical spreading as a result of channeling or focusing the sound waves.

The effect of ground attenuation on noise propagation is a function of the height of the source and/or receiver and the characteristics of the terrain. The closer the source of noise is to the ground, the greater the ground absorption. Terrain consisting of soft surfaces such as vegetation provide for more ground absorption than hard surfaces. Ground attenuation is important for the study of noise from airfield operations (such as, thrust reversals) and in the design of noise berms or engine run-up facilities.

These factors are an important consideration for assessing in-flight and ground noise in the area around the Airport. Atmospheric conditions will play a significant role in affecting the sound levels on a daily basis and how these sounds are perceived by the population.



Source: Federal Highway Administation

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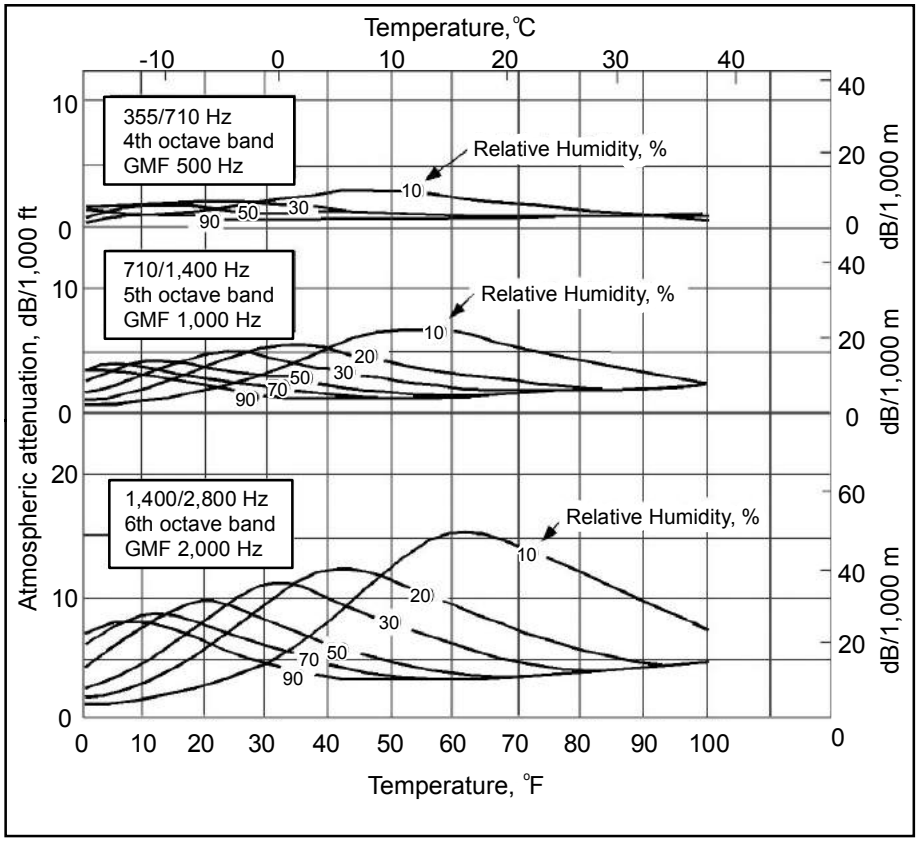

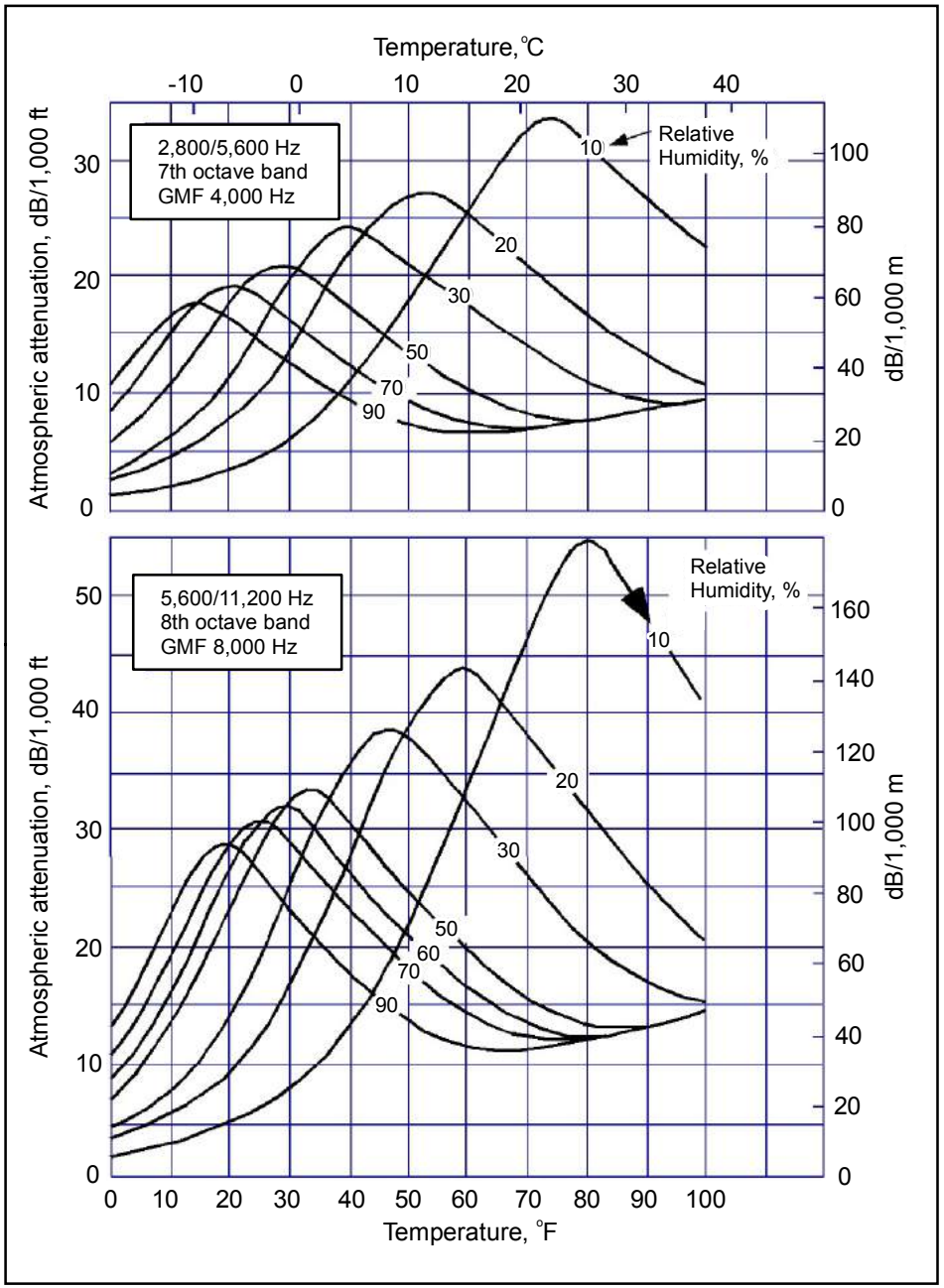

SOURCE: Beranek, 1981

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Sound Attenuation Graphs

Exhibit: **D-5**

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D.2 STANDARD NOISE DESCRIPTORS

Given the multiple dimensions of sound, a variety of descriptors, or metrics, have been developed for describing sound and noise. Some of the most commonly used metrics are discussed in this section. They include:

1. Maximum Level (**Lmax**)
2. Time Above Level (**TA**)
3. Sound Exposure Level (**SEL**)
4. Equivalent Sound Level (**Leq**)
5. Day-Night Average Sound Level (**DNL**)

D.2.1 MAXIMUM LEVEL (Lmax)

Lmax is simply the highest sound level recorded during an event or over a given period of time. It provides a simple and understandable way to describe a sound event and compare it with other events. In addition to describing the peak sound level, Lmax can be reported on an appropriate weighted decibel scale (A-weighted, for example) so that it can disclose information about the frequency range of the sound event in addition to the loudness.

Lmax, however, fails to provide any information about the duration of the sound event. This can be a critical shortcoming when comparing different sounds. Even if they have identical Lmax values, sounds of greater duration contain more sound energy than sounds of shorter duration. Research has demonstrated that for many kinds of sound effects, the total sound energy, not just the peak sound level, is a critical consideration.

D.2.2 TIME ABOVE LEVEL (TA)

The "time above," or TA, metric indicates the amount of time that sound at a particular location exceeds a given sound level threshold. TA is often expressed in terms of the total time per day that the threshold is exceeded. The TA metric explicitly provides information about the duration of sound events, although it conveys no information about the peak levels during the period of observation.

D.2.3 NUMBER OF EVENTS ABOVE LEVEL (NA)

Similar to TA, the Number of Events Above (NA) metric indicates the total number of aircraft events at particular location that exceed a given sound level threshold in dB. The TA metric explicitly provides information about the number of sound events, although it conveys no information about the duration of the event(s).

D.2.4 SOUND EXPOSURE LEVEL (SEL)

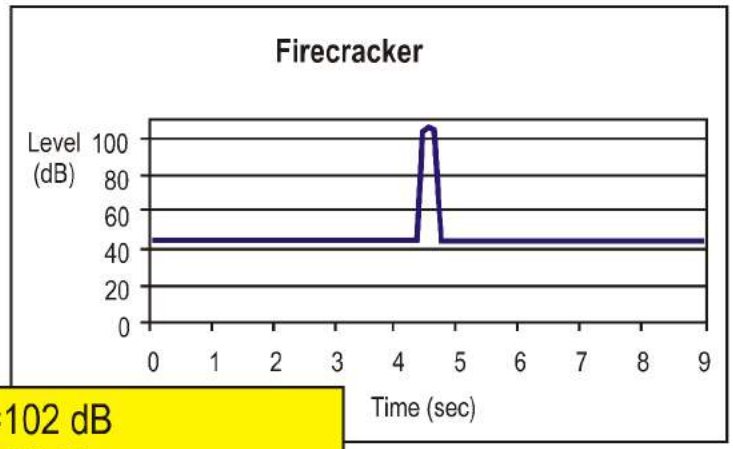
The sound exposure level, or SEL metric, provides a way of describing the total sound energy of a single event. In computing the SEL value, all sound energy occurring during the event, within 10 dB of the peak level (Lmax), is mathematically integrated over one second. (Very little information is lost by discarding the sound below the 10 dB cut-off, since the highest sound levels completely dominate the integration calculation.) Consequently, the SEL is always greater than the Lmax for events with a duration greater than one second. SELs for aircraft overflights typically range from five to 10 dB higher than the Lmax for the event.

Exhibit D-6 shows graphs of instantaneous sound levels for three different events: an aircraft flyover, steady roadway noise, and a firecracker. The Lmax and the duration of each event differ greatly. The pop of the firecracker is quite loud, 102 dB but lasts less than a second. The aircraft flyover has a considerably lower Lmax at 90 dB, but the event lasts for over a minute. The Lmax from the roadway noise is even quieter at only 72 dB, but it lasts for 15 minutes. By considering the loudness and the duration of these very different events simultaneously, the SEL metric reveals that the total sound energy of all three is identical. This can be a critical finding for studies where total noise dosage is the focus of study. As it happens, research has shown conclusively that noise dosage is crucial in understanding the effects of noise on animals and humans.

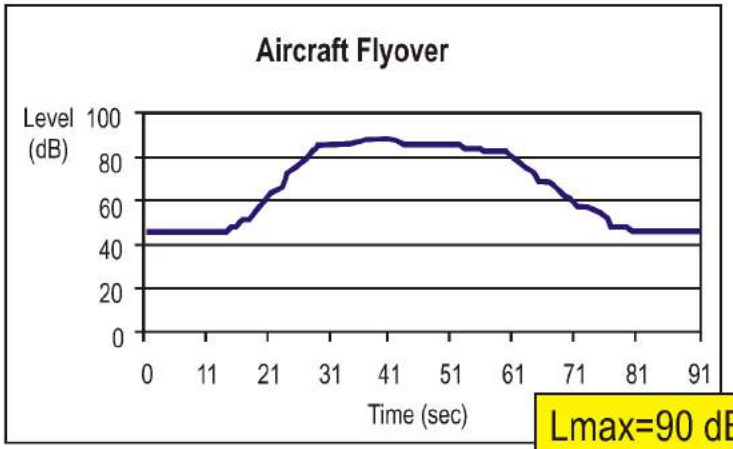
D.2.5 EQUIVALENT SOUND LEVEL (LEQ)

The equivalent sound level (Leq) metric may be used to define cumulative noise dosage, or noise exposure, over a period of time. In computing Leq, the total noise energy over a given period of time, during which numerous events may have occurred, is logarithmically averaged over the time period. The Leq represents the steady sound level that is equivalent to the varying sound levels actually occurring during the period of observation. For example, an 8-hour Leq of 67 dB indicates that the amount of sound energy in all the peaks and valleys that occurred in the 8-hour period is equivalent to the energy in a continuous sound level of 67 dB. Leq is typically computed for measurement periods of 1 hour, 8 hours, or 24 hours, although any time period can be specified.

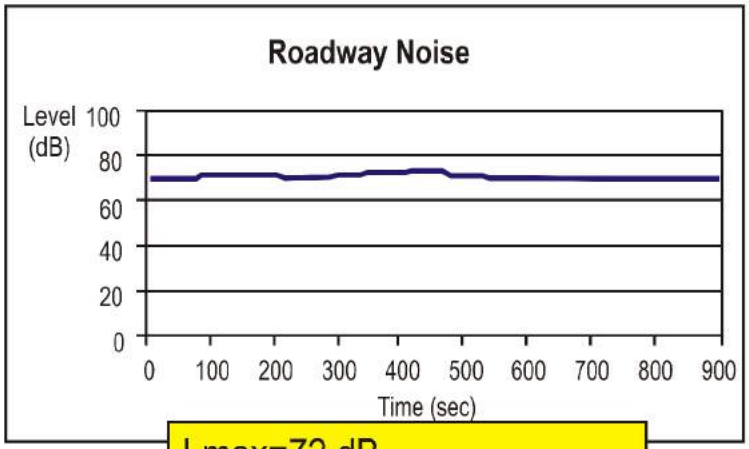
Exhibit D-7 shows the relationship of Leq to Lmax and SEL. In this example, a single aircraft event lasting 18 seconds is represented. The instantaneous noise levels for the event range from 64 to an Lmax of 101 dBA. The area under the curve represents the sound energy accumulated during the entire event. The compression of this energy into a single second results in an SEL of 105 dBA. The Leq average of the sound energy for each second during the event would be 93 dB. If this event were the only event to occur during an hour, the aircraft sound energy for the other 3,582 seconds would be considered to be zero. When converted to an hourly LEQ, the level would be nearly 70 dB of Leq. This again indicates the dominance of loud events in noise summation and averaging computations.



Lmax=102 dB
SEL=100 dB
Leq=105
Event Duration=0.3 seconds



Lmax=90 dB
SEL=100 dB
Leq=82
Event Duration=70 seconds



Lmax=72 dB
SEL=100 dB
Leq=71
Event Duration=900 seconds

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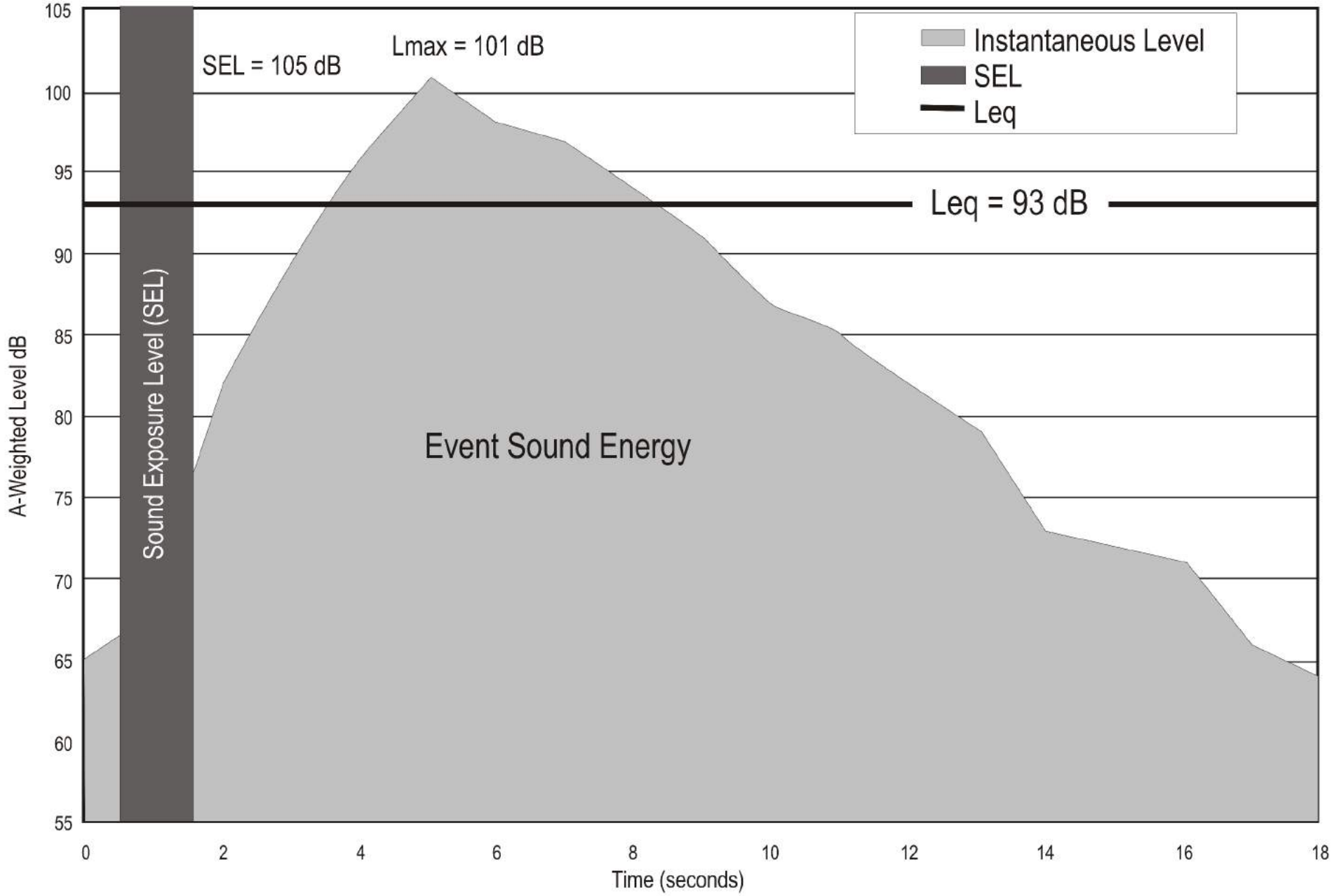

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Relationship Among Sound Metrics

Exhibit:
D-7

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Leq is a critical noise metric for many kinds of analysis where total noise dosage, or noise exposure, is under investigation. As already noted, noise dosage is important in understanding the effects of noise on both animals and people. Indeed, research has led to the formulation of the "equal energy rule." This rule states that it is the total acoustical energy to which people are exposed that explains the effects the noise will have on them. That is, a very loud noise with a short duration will have the same effect as a lesser noise with a longer duration if they have the same total sound energy.

D.2.6 DAY-NIGHT AVERAGE SOUND LEVEL (DNL)

The Day-Night Average Sound Level (DNL) metric is really a variation of the 24-hour Leq metric. Like Leq, the DNL metric describes the total noise exposure during a given period. Unlike Leq, however, DNL, by definition, can only be applied to a 24-hour period. In computing DNL, an extra weight of 10 dB is assigned to any sound levels occurring between the hours of 10:00 p.m. and 7:00 a.m. This is intended to account for the greater annoyance that nighttime noise is presumed to cause for most people. Recalling the logarithmic nature of the dB scale, this extra weight treats one nighttime noise event as equivalent to 10 daytime events of the same magnitude.

As with Leq, DNL values are strongly influenced by the loud events. For example, 30 seconds of sound of 100 dB, followed by 23 hours, 59 minutes, and 30 seconds of silence would compute to a DNL value of 65 dB. If the 30 seconds occurred at night, it would yield a DNL of 75 dB.

This example can be roughly equated to an airport noise environment. Recall that an SEL is the mathematical compression of a noise event into one second. Thus, 30 SELs of 100 dB during a 24-hour period would equal DNL 65 dB, or DNL 75 dB if they occurred at night. This situation could actually occur in places around a real airport. If the area experienced 30 overflights during the day, each of which produced an SEL of 100 dB, it would be exposed to DNL 65 dB. Recalling the relationship of SEL to the peak noise level (Lmax) of an aircraft overflight, the Lmax recorded for each of those overflights (the peak level a person would actually hear) would typically range from 90 to 95 dB.

D.3 FACTORS INFLUENCING HUMAN RESPONSE TO SOUND

Many factors influence how a sound is perceived and whether or not it is considered annoying to the listener. These factors include not only physical (acoustic) characteristics of the sound but also secondary (non-acoustic) factors, such as sociological and external factors.

Sound rating scales are developed to account for the factors that affect human response to sound. Nearly all of these factors are relevant in describing how sounds are perceived in the community. Many of the non-acoustic parameters play a prominent role in affecting individual response to noise. Background sound (ambient noise) is also important in describing sound in rural settings. Some non-acoustic factors that may influence an individual's response to aircraft noise include:

- Predictability of when the sound/noise will occur;
- How the noise affect certain activities;
- Fear of an aircraft crashing;
- Belief that aircraft noise could be prevented or reduced by aircraft designers, pilots, or authorities related to airlines or airports; and
- Sensitivity to noise in general.

Thus, it is important to recognize that non-acoustic factors such as those described above, as well as acoustic factors, contribute to human response to noise.

D.3.1 PERCEIVED NOISE LEVEL

Perceived noise level is another method of rating sound that was originally developed for the assessment of aircraft noise. Perceived noise level is the subjective measure of the degree to which noise is unwanted or causes annoyance to an individual. To determine perceived noise level, individuals are asked to judge in a laboratory setting when two sounds are equally noisy or disturbing if heard regularly in their own environment. These surveys are inherently subjective and thus subject to greater variability. For example, two separate events of equal noise energy may be perceived differently if one sound is more annoying to the listener than the other; or the same noise event may be annoying to one individual yet not another.

D.4 HEALTH EFFECTS OF NOISE

A considerable amount of research has been conducted over the last 30 years to identify, measure, and quantify the potential effects of aviation noise on health. The various methods by which noise can be measured (e.g. single dose, long-term average, number of events above a certain level, etc.), and difficulties in separating other lifestyle factors from the analysis, increases the complexity of determining the health effects of noise, and has caused considerable variability in the results of past studies. The health effects of noise are often divided into the following topics: cardiovascular effects, hearing loss, sleep disturbance, and speech/communication interference.

D.4.1 CARDIOVASCULAR EFFECTS

Several studies have suggested that increased hypertension or other cardiovascular effects, such as increased blood pressure, and change in pulse rate, may be associated with long-term exposure to high levels of environmental noise. When conducting cross-sectional studies of environmental noise exposure, it is difficult to control for other important variables. Subsequent reviews of past research has pointed out that such studies "…are notoriously difficult to interpret. They often report conflicting results, generally do not identify a cause and effect relationship, and often do not report a dose-response relationship between the cause and effect."[3] Therefore, it is not known what, if any, cardiovascular effects are caused by aircraft noise exposure.

D.4.2 HEARING LOSS

The potential for noise-induced hearing loss is commonly associated with occupational noise exposure from working in a noisy work environment or recreational noise such as listening to loud music. Recent studies have concluded that "because environmental noise does not approximate occupational noise levels or recreational noise exposures…it does not have an effect on hearing threshold levels." Furthermore, "aviation noise does not pose a risk factor for child or adolescent hearing loss, but perhaps other noise sources (personal music devices, concerts, motorcycles, or night clubs) are a main risk factor."[4] Because aviation noise levels near airports does not approach levels of occupational or recreational noise exposures associated with hearing loss, hearing impairment is likely not caused by aircraft noise for populations living near an airport.

D.4.3 SLEEP DISTURBANCE

Sleep disturbance is a common complaint from people who live in the vicinity of an airport. A large amount of research has been published on the topic of sleep disturbance caused by environmental noise. This research has produced variable results due to differing definitions of sleep disturbance, different ways for

[3] Airport Cooperative Research Program, Transportation Research Board, Effects of Aircraft Noise: Research Update on Selected Topics, 2008.
[4] Ibid.

measuring sleep disturbance (behavioral awakenings or sleep interruption), and different settings in which to measure it (laboratory setting or field setting). In-home sleep disturbance studies clearly demonstrate that it requires more noise to cause awakenings than was previously theorized based on laboratory sleep disturbance studies.

In 1992, the Federal Interagency Committee on Noise (FICON) recommended an interim dose-response curve to predict the percent of the exposed population expected to be awakened percent awakening) as a function of the exposure to single event noise levels expressed in terms of the Sound Exposure Level (SEL). This interim curve was based on statistical adjustment of previous analysis, and included data from both laboratory and field studies. In 1997, Federal Interagency Committee on Aviation Noise (FICAN) recommended a revised sleep disturbance relationship based on data and analysis from three field studies.[5]

Exhibit D-8 show the results of the 1992 and 1997 analyses. The top graph shows a comparison of the 1992 FICON and 1997 FICAN curves. The 1997 FICAN curve represents the upper limit of the observed field data, and should be interpreted as predicting the "maximum percent of the exposed population expected to be behaviorally awakened", or the "maximum percent awakened" for a given residential population.

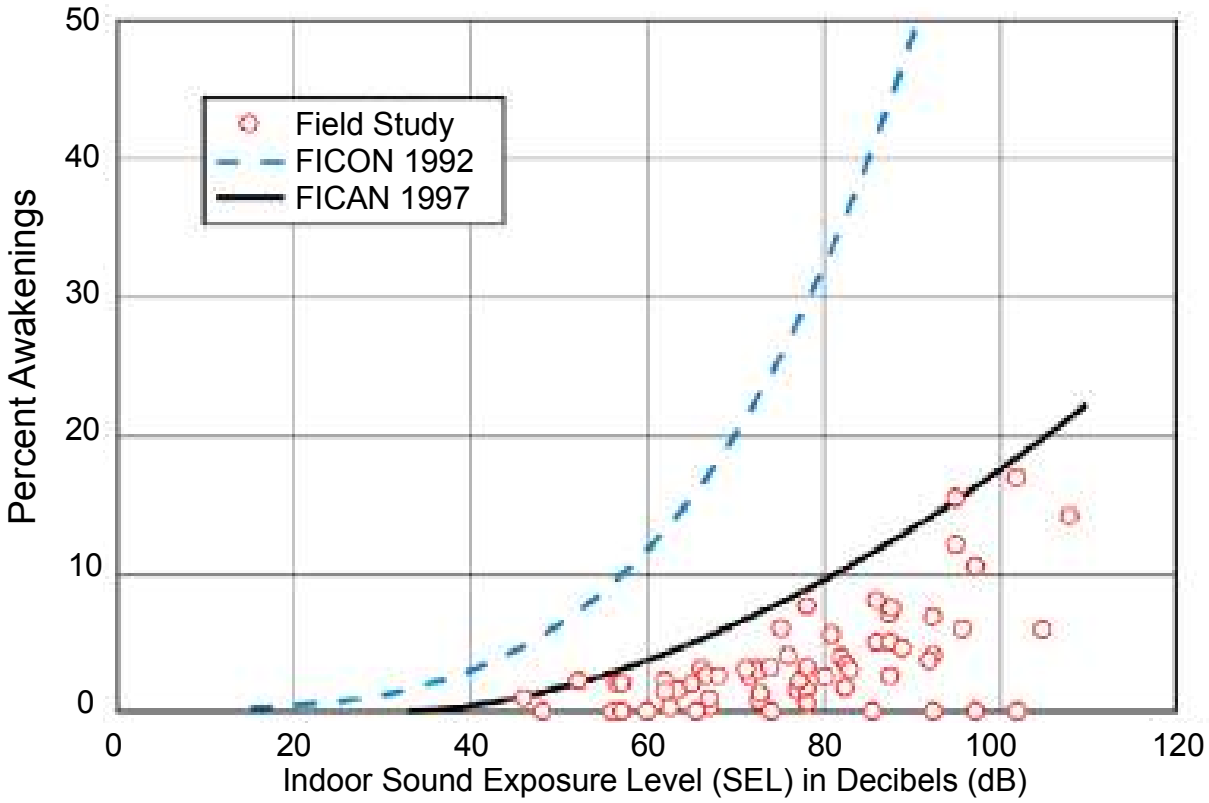
In 2008, FICAN recommended the use of a revised method to predict sleep disturbance in terms of percent awakenings based on data published by the American National Standards Institute (ANSI) in 2008.[6] In contrast to the earlier FICAN recommendation, the 2008 ANSI standard indicates that the probability of awakening is lower for a single noise event in cases where the population is exposed to the given noise source for a long period of time (more than one year) compared to the probability of awakening for sound that is new to an area. In Exhibit 3-6, the lower graph shows these two relationships, with Equation 1 (blue dotted line) representing percent awakenings from long-term noise and Equation B1 (pink dashed line) representing percent awakenings from a new noise source based on the 1997 FICAN results. As shown in this exhibit, at an indoor Sound Exposure Level (SEL) of 100 dB, the probability of awakenings would be expected to exceed 15 percent for a new noise source; yet for long-term noise sources, the probability of awakening is expected to be less than 10 percent.

No definitive conclusions have been drawn on the percent of a population that is estimated to be awakened by a certain level of aircraft noise and recent studies have cautioned about the over-interpretation of the data.

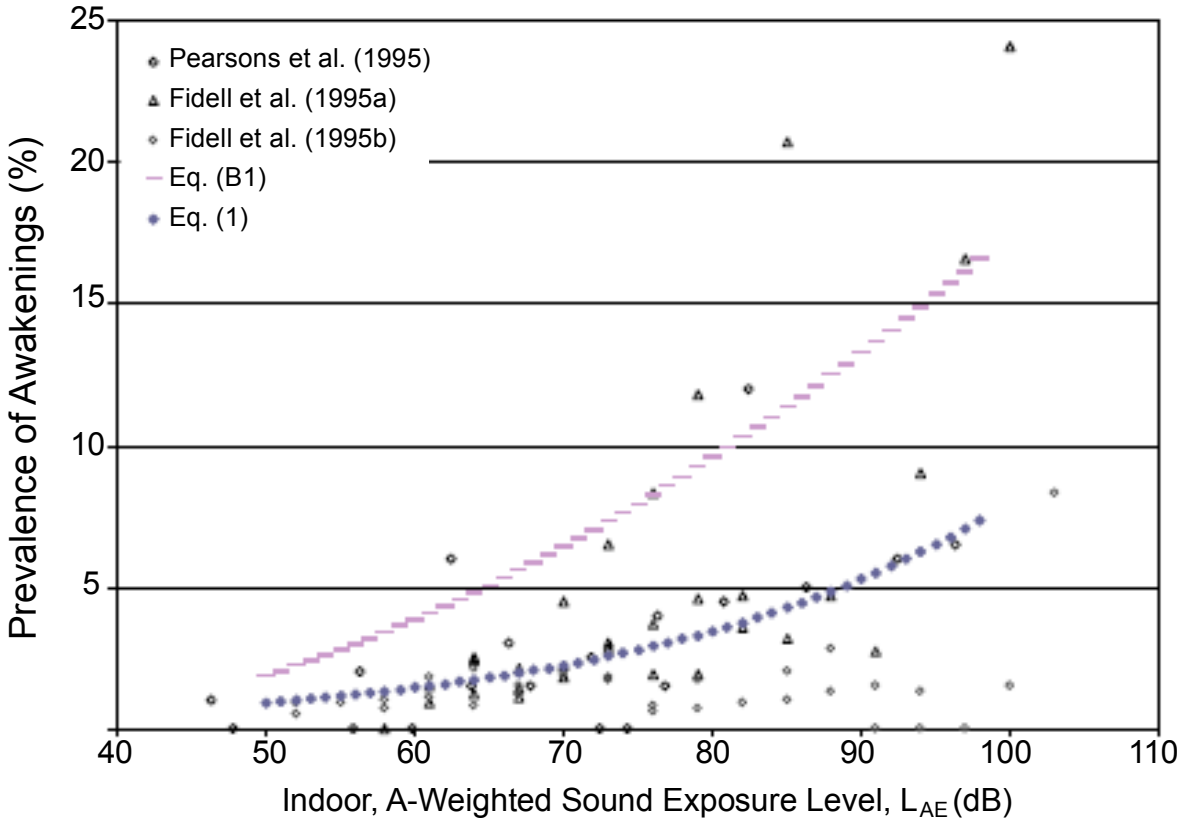
[5] See Appendix C, *FAA Policies, Guidance, and Regulations,* for more information about FICON and FICAN.

[6] ANSI S12.9-2008, Quantities and Procedures for Description and Measurement of Environmental Sound — Part 6: Methods for Estimation of Awakenings Associated with Outdoor Noise Events Heard in Homes, 2008.

FICAN 1997 Recommended Sleep Disturbance Dose-Response Relationship



ANSI 2008 Recommended Sleep Disturbance Dose-Response Relationship



Sources: Federal Interagency Committee on Aviation Noise (FICAN), June 1997; American National Standards Institute, 2008.

Noise Exposure Map Update
Indianapolis International Airport

FINAL
12/4/2013 Prepared by Landrum & Brown
Filename: Y:\IND\NEM Update Study\E-L&B Work Product\2-GIS\MXD\C-FINAL\D-8_Sleep_Disturbance_Curves_V2.mxd

Sleep Disturbance Dose-Response Curves

Exhibit: **D-8**

BACK OF EXHIBIT

D.4.4 COMMUNICATION INTERFERENCE

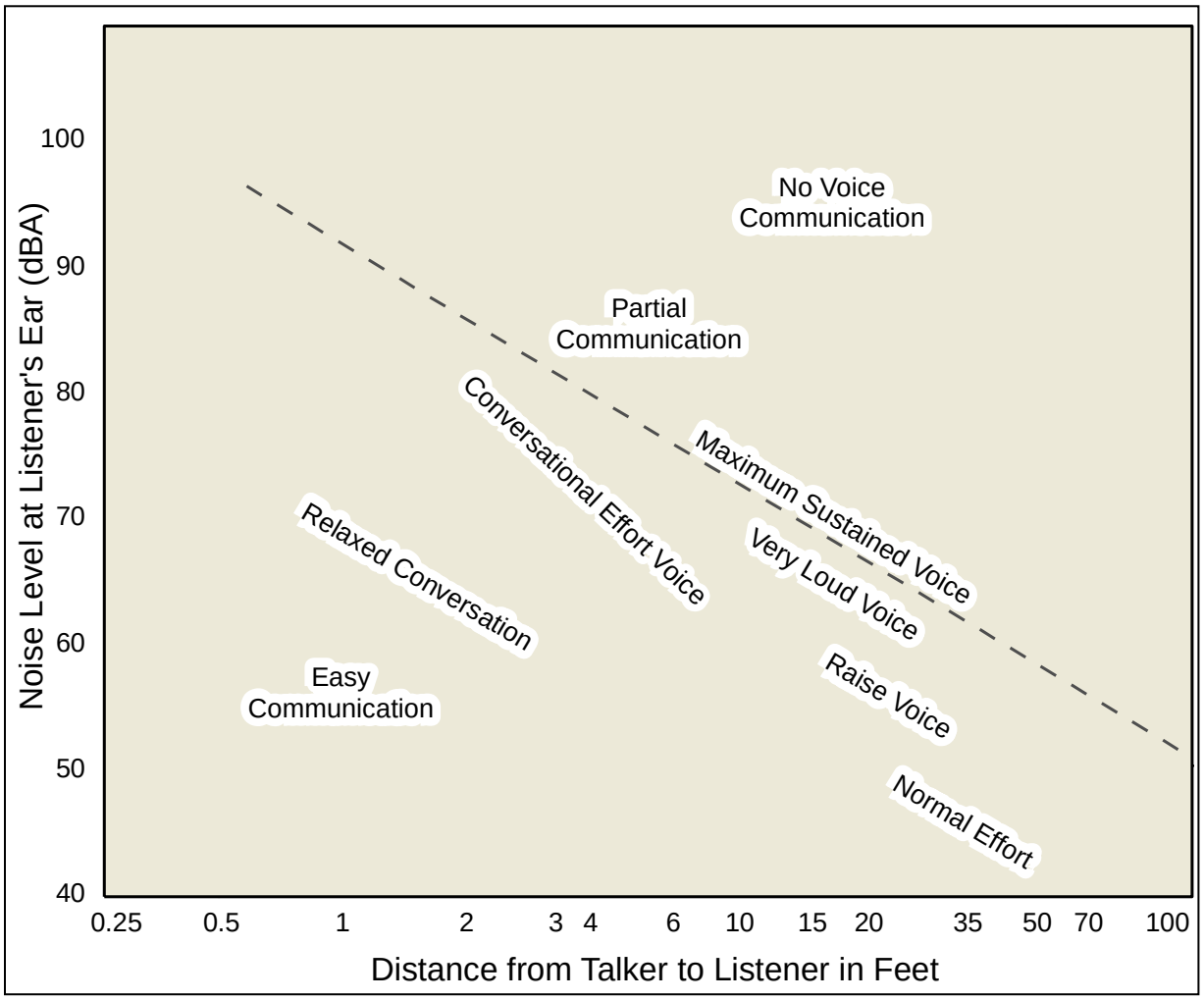
Communication interference can impact activities such as personal conversations, classroom learning, and listening to radio and television. Most studies have focused on communication interference due to continual noise sources. In 1974, the USEPA published *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety*, which is one of the few studies to focus on intermittent noise. The study concluded that for voice communication, an indoor Leq of 45 dB allows normal conversation at distances up to 2 meters with 95 percent sentence intelligibility. **Exhibit D-9** shows the required distance between talker and listener based on the type of speech communication (normal voice, loud voice, etc.) and the environmental noise level from the 1974 USEPA report.

Noise can also impact communication between student and teacher necessary for learning in a classroom setting. It is usually accepted that noise levels above a certain Leq may affect a child's learning experiences. Research has shown a "decline in reading when outdoor noise levels equal or exceed Leq of 65 dBA."[7] Furthermore, a study conducted by FICAN in 2007 found: "(1) a substantial association between noise reduction and decreased failure (worst-score) rates for high-school students, and (2) significant association between noise reduction and increased average test scores for student/test subgroups. In general, the study found little dependence upon student group and upon test type."[8]

[7] Airport Cooperative Research Program, Transportation Research Board, Effects of Aircraft Noise: Research Update on Selected Topics, 2008.

[8] Federal Interagency Committee on Aviation Noise (FICAN), Findings of the FICAN Pilot Study on the Relationship between Aircraft Noise Reduction and Changes in Standardized Test Scores, July 2007.

Exhibit D-9
NOISE EFFECTS ON DISTANCE NECESSARY FOR SPEECH COMMUNICATION



Source: FICON, 1992; from USEPA, 1974.

Appendix E

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APPENDIX E
NOISE COMPLAINTS AND NOISE MEASUREMENT PROGRAM

This appendix documents the results of temporary noise monitoring conducted to provide information for the development of noise contour modeling and noise complaint information documented by the airport's management staff.

E.1 NOISE MEASUREMENTS

A noise measurement program was conducted in the vicinity of the Indianapolis International Airport (IND or Airport) from August 20, 2013 through August 30, 2013 in support of the Noise Exposure Map (NEM) Update. Two methods of noise measurement data collection were used, short-term field measurements and long-term field measurements. Short-term field measurements were collected at 44 sites around the Airport to provide numerous measurements of individual aircraft overflight events. Short-term noise measurements were collected for daytime and nighttime periods. These measurements concentrated on the collection of a variety of single overflight noise information, with emphasis on the noise generated by nighttime cargo operations.

Measurements made for short periods are unique to that one period, and may not represent the average of the events that would occur at that location over a longer period of time. The relationship between field measurements and computer-modeled average noise levels is comparable to that between a book and its cover. While the cover (single-event measurements) may indicate something of the character of a book, and receive inordinate attention based on its color or graphics, the total story (average noise level) is in all the words that constitute the story. It is on the total story that the critic makes his assessment. In other words, the modeling process simulates overall average annual conditions (the book) while field measurements (the cover) reflect only a small part of the whole story.

Long-term measurements were conducted at nine sites around the Airport. Noise measurement equipment was placed at these sites to record continual noise levels for seven full days. Long-term measurements provided a greater understanding of average aircraft and ambient noise levels.

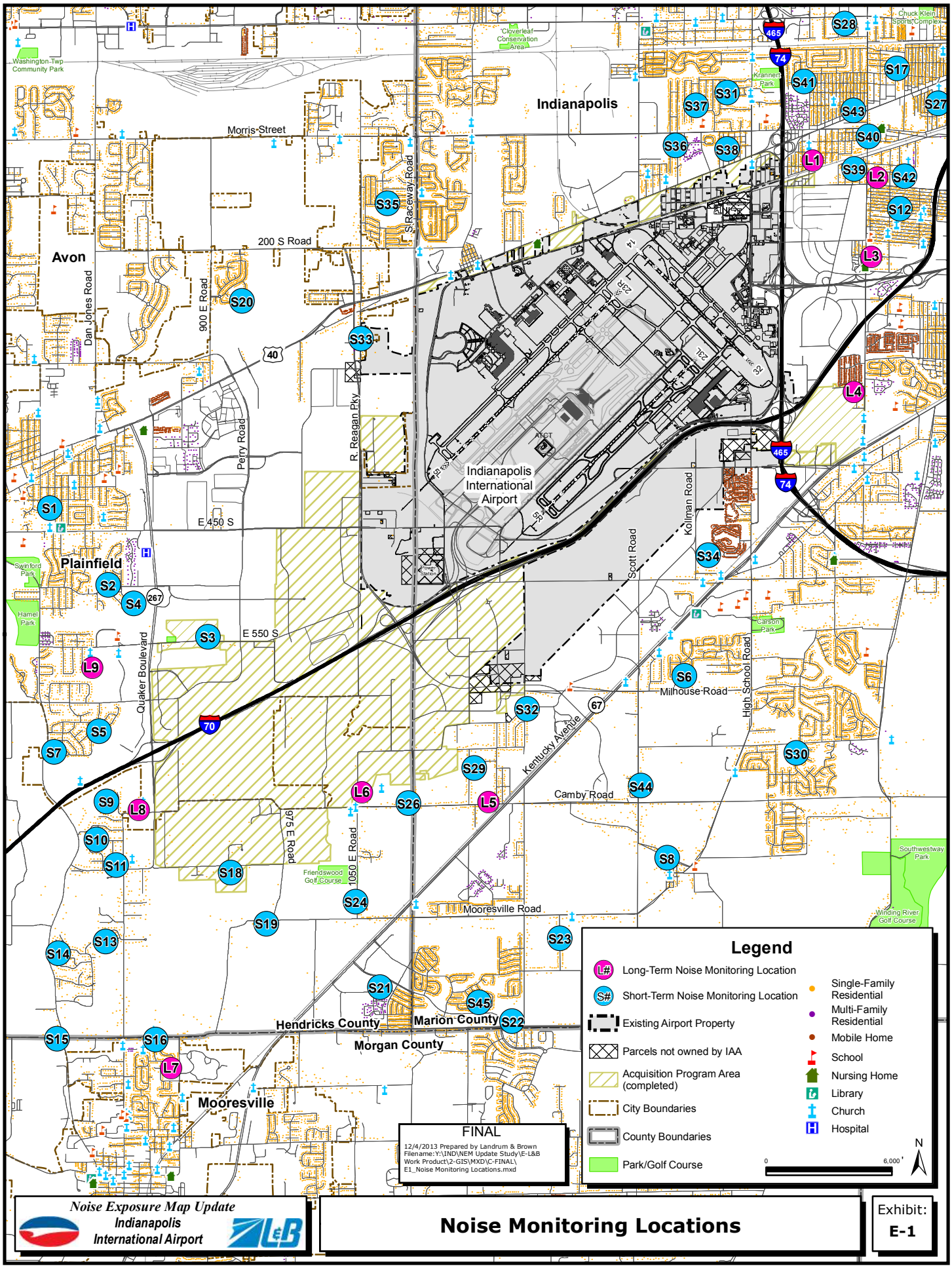
The short-term and long-term noise measurement data was compared with pre-existing data base information related to aircraft noise level and performance characteristics. The information collected during the measurement program included acoustical output, as measured at the noise measurement sites, as well as flight trajectory data (the aircraft's three-dimensional location) relative to the noise measurement site.

E.1.1 NOISE MEASUREMENT LOCATIONS

Short-term noise measurements were conducted for approximately one- to two-hour periods at 44 different sites. Short-term noise measurements were conducted at some of the 44 sites more than once to obtain measurements from different types of events (arrivals or departures) or at different times of day or night. The sites were chosen at based on their proximity to the Airport, the flow of aircraft operations during the measurement program, and areas of past noise concerns. General sites were selected on the basis of ambient noise level (or more specifically, the absence of loud ambient noise such as vehicular traffic), locations of flight tracks derived from radar data, locations of noise complaints received by the Airport, and the locations of concentrations of residential land uses that experience high numbers of aircraft overflights. Specific locations were suggested by Airport staff, as well as through application of consultant experience. Attempts were also made to select sites where noise measurements were taken during previous noise studies. Specific selection criteria included the following:

- Emphasis on areas of numerous aircraft noise events according to earlier evaluations;
- Representative sampling of all major types of operations and aircraft operating at IND;
- Screening of each site for local noise sources or unusual terrain characteristics, which could affect measurements;
- Location in or near areas from which complaints about aircraft noise were received, or where there are concentrations of people exposed to numerous aircraft overflights; and
- Location adjacent to, or in the proximity of, concentrated ground movements by aircraft producing high ramp, run-up and idle thrust noise levels.

The nine long-term noise measurement sites were selected using the same criteria; however, additional emphasis was placed upon the location of flight corridors for operations arriving and departing each runway end. While there is no end to the number of locations available for monitoring, the selected sites fulfill the above criteria and provide a representative sampling of the varying aircraft noise conditions in the vicinity of the Airport. **Exhibit E-1** illustrates the locations of both the short-term and long-term noise measurement sites.


Indianapolis
Avon
Plainfield
Mooresville
Indianapolis International Airport
Morris Street
200 S Road
E 450 S
E 550 S
Milhouse Road
Camby Road
Mooresville Road
Hendricks County
Marion County
Morgan County
Dan Jones Road
900 E Road
R. Reagan Pky
Perry Road
Quaker Boulevard
Scott Road
Kolliman Road
Kentucky Avenue
High School Road
975 E Road
1050 E Road
S Raceway Road
Washington Twp Community Park
Cloverleaf Conservation Area
Chuck Klein Sports Complex
Krannert Park
Swinford Park
Hamel Park
Carson Park
Friendswood Golf Course
Southwestway Park
Winding River Golf Course
Legend
Long-Term Noise Monitoring Location
Short-Term Noise Monitoring Location
Existing Airport Property
Parcels not owned by IAA
Acquisition Program Area (completed)
City Boundaries
County Boundaries
Park/Golf Course
Single-Family Residential
Multi-Family Residential
Mobile Home
School
Nursing Home
Library
Church
Hospital
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12/4/2013 Prepared by Landrum & Brown
Filename:Y:\IND\NEM Update Study\E-L&B Work Product\2-GIS\MXD\C-FINAL\E1_Noise Monitoring Locations.mxd
Noise Exposure Map Update
Indianapolis International Airport
Noise Monitoring Locations
Exhibit:
E-1

BACK OF EXHIBIT

E.2 NOISE MEASUREMENTS METHODOLOGY

This section provides a technical description of the noise measurements that were performed for this NEM Update Study. Described here are the instrumentation that was employed, calibration procedures followed, and related data collection items and procedures.

E.2.1 INSTRUMENTATION

Acoustical instrumentation and analysis equipment was used in order to obtain acoustical data to compare with standard data associated with aircraft noise. The major instrumentation that was used for collecting short-term and long-term measurements is listed in **Table E-1**.

Table E-1
ACOUSTICAL MEASUREMENT INSTRUMENTATION
NOISE MEASUREMENT PROGRAM
Indianapolis International Airport

Method	Equipment Type		
	Sound Level Meter	**Microphone**	**Pre-amp**
Long-Term	Larson Davis 831 Sound Level Meter w/ Windscreen, Cabling, and Tripod	377B02	PRM831
Short-Term	Larson Davis 824 Sound Level Meter w/ Windscreen	377B02	PRM902

Source: Landrum & Brown, 2013.

E.2.2 SHORT-TERM MEASUREMENT PROCEDURES

Aircraft noise levels were recorded using the equipment indicated in the above table for each of the 44 short-term sites. Radar data was obtained from the IND AOMS system to correspond to the times of measurement. The noise-measurement program was designed to provide a sampling of single events throughout the study area. It was not designed to record cumulative noise levels. The monitors were attended while active to ensure that only aircraft noise events were recorded, or to note instances where a non-aircraft noise event was recorded simultaneously with an aircraft noise event. The monitoring procedure called for the operator to enable the noise monitor when an aircraft noise event first became audible and continue monitoring that event until the noise level receded back to ambient levels, usually lasting a duration of 30-90 seconds. After the event, the operator recorded the average noise level (Leq), the sound exposure level (SEL), the event duration, and the maximum sound level (Lmax). Other event information, such as aircraft type and operational characteristics, was also annotated, as available. Ambient noise levels, without aircraft noise or intermittent community noise, were recorded at each site.

The short-term noise measurement program provided for the collection of a large number of single-event measurements at a variety of locations throughout the community at distances ranging from several hundred feet to several miles between the aircraft and the monitoring site. This information, when correlated with the AOMS records and operating schedules, allowed for a comparison to the determination of applicable noise curves and performance characteristics within the Integrated Noise Model (INM) database for the most significant aircraft and operators. Section E.3.3 discusses the analysis of short-term noise measurement data and comparison to INM aircraft profiles based on the initial results of the noise measurement data correlation and further investigation of average aircraft weights upon departure.

E.2.3 LONG-TERM MEASUREMENT PROCEDURES

For the long-term measurement program, noise measurement equipment was placed at nine sites and ran continuously for over seven days, from 12:00 a.m. on August 23, 2013 through 6:00 a.m. on August 30, 2013. Information collected at the long-term noise measurement sites included the single-event SEL, Lmax, Leq, duration, and time of occurrence of each event.[1] Also recorded was the average 10-second Leq at each site.

E.2.4 WEATHER INFORMATION

The noise measurements taken during this study were obtained during a period of the year that has historically represented an average of the annual weather conditions. The measurements were recorded during both clear and overcast sky conditions. The general weather pattern varied throughout the measurement period, with occasional wind shifts that provided samples of departure and approach operations to/from both ends of the primary runways (5L/23R and 5R/23L). Weather conditions did not dictate the consistent use of the crosswind runway by any large jet aircraft during the measurement period, although smaller aircraft used this runway in a pattern consistent with historic average-annual use. The predominant wind pattern during the measurement period favored the use of Runways 23R/L for departures, as does the annual wind pattern. During the monitoring period, wind conditions were such that nighttime arrivals occurred from both the northeast and the southwest, providing late night single event level measurements of arrivals in those areas.

[1] A noise event was defined as occurring when the noise level exceeded 65 decibels for a period of two seconds or more.

E.3 NOISE MEASUREMENT RESULTS

The following sections discuss the results of both the short-term and long-term noise measurement collection and data analysis.

E.3.1 SHORT-TERM NOISE MEASUREMENT RESULTS SUMMARY

The noise measurement program revealed a wide range of noise exposure levels from aircraft activity in the airport environs. The measured noise levels from departing aircraft tended to produce peak decibel levels several decibels higher than those of arriving aircraft. This difference is caused by two characteristics of the separate operations. First, exposure to noise above the background levels from arriving aircraft is typically shorter than from departing aircraft. Second, the power settings used during approach are lower than those necessary to climb during the takeoff, resulting in noise levels for arrivals of several decibels less than measured at similar locations during departure. It should be noted that the Lmax noise levels represent the peak noise level for each individual aircraft event and should not be confused with the average Day-Night Level (DNL) contours that are used for determining the threshold of significance per Federal guidelines.

Most of the monitoring sites were located within southwest Marion County or southeast Hendricks County. The peak aircraft noise level (Lmax) of 89.6 dB was recorded at Site S32, at the intersection of Flynn Road and Trotter Road in the Camby area. This peak level was recorded at night during the take-off of an Airbus A306 from Runway 23L. The high and low SEL levels for events at this site during this nighttime period ranged from 70.7 dB to 92.8 dB.

The peak level from an aircraft upon arrival was 84.5 at Site S27, near the intersection of Ray Street and Denison Street in Indianapolis. This peak event was recorded at night during an arrival of an Airbus A306 on approach to Runway 23L. The high and low SEL levels for events at this site ranged from 83.2 dB to 92.9 dB.

In the City of Plainfield, the highest peak noise level recorded was 75.4 at site S7, at Andrews Pass. This peak level was triggered by a McDonnell Douglas MD-11 upon departure from Runway 23R. The SEL levels at this site ranged from 70.8 to 87.3.

The highest recorded Lmax in Mooresville area was 72.8, which was produced by an Airbus A306 on departure at Site S15 at State Route 267 near the Hendricks County line. SEL levels for events at this site ranged from 73.2 to 80.5.

Cumulative noise levels, as measured by the DNL noise metric, are not necessarily a function of the loudness of individual events, but rather the frequency of and average noise levels from aircraft operations. As a result, peak levels will generally be higher than average daily cumulative levels due to the intermittent nature of aircraft events over the course of an entire 24-hour period. **Table E-2** provides a summary of the short-term noise measurement results. The sponsor will retain copies of the measurement logs recorded at each location.

E.3.2 LONG-TERM NOISE MEASUREMENT RESULTS SUMMARY

Long-term noise measurements were conducted at 9 sites for a period of seven full days. The methods for choosing these sites were similar to the methods used for choosing the short-term sites, however additional emphasis was placed upon selecting sites that were under or near the extended centerlines off of each runway end.

Noise measurement programs must be conducted for relatively long sampling periods (at least one week per location several times a year), and at a large number of dispersed locations before they can be used to define the location of Day-Night Average Sound Level (DNL) noise contours. Even then, a computer-generated set of noise contours is necessary and long-term measurement data can be used to refine the inputs to the computer noise model. For this Study, the noise contours were not created by or adjusted to reflect long-term measured data; however, the measurement data was used to indicate the potential need to further investigate the default inputs in the computer noise model as compared to actual aircraft departure weights and flight profiles.

Table E-3 shows the average noise levels measured at the nine long-term sites compared to the noise levels modeled by the INM. The results show that at all but two of the nine sites, the difference between the measured and modeled average noise levels was less than 2.0 dB. The average noise level across all of the sites was measured at 59.1 DNL; while the average modeled noise level was 58.4 DNL (a difference of 0.8 DNL). Because a difference of 1.2 dB is generally imperceptible to the human ear, it was determined that the modeled and measured noise levels are within an acceptable tolerance. The INM modeled noise levels were lower by more than 2.0 dB at two of the nine sites, L1 and L9, meaning that the noise model is over predicting the noise levels compared to the measurement data at these two locations. These differences may be due to differences in runway use between the measurement period and the modeled data as well as differences in the frequency of flight track use between the actual operations during the measurement period and the input data into the noise model.

Table E-2
SHORT-TERM NOISE MEASUREMENT RESULTS
Indianapolis International Airport

Site Number	Location	Date Monitored (start date)	Time Monitored	Ambient Noise Level (dB)	Type of Events	Number of Aircraft Events	Loudest Aircraft Event (Lmax)	Loudest Aircraft	Aircraft SEL Range
S18	County Road 750 at Rost Road	8/20/2013	10:15 pm - 11:10 pm	59.7-60.3	Departures	2	74.1	Airbus A306	76.7 - 85.6
S39	Near Intersection of Martha & Norfolk St.	8/20/2013	11:45 pm - 12:45 am	54.4	Arrivals	23	79.0	McDonnell Douglas MD-11	71.4 - 89.8
S42	Maplewood Elementary	8/21/2013	10:00 pm - 11:40 pm	51.0-51.6	Arrivals	26	81.4	Douglas DC10	67.0 - 90.1
S12	Near Intersection of Beulah and Melrose	8/21/2013	12:55 am - 2:20 am	56.5	Arrivals	16	76.8	Douglas DC10	83.0 - 87.7
S10	8045 Dogwood Court	8/21/2013	3:35 am - 4:40 am	51.6-51.9	Departures	24	77.8	Airbus A306	71.2 - 88.2
S7	7701 Andrews Pass	8/21/2013	4:55 am - 5:30 am	49.2-51.1	Departures	10	75.4	McDonnell Douglas MD-11	70.8 - 87.3
S42	Maplewood Elementary	8/26/2013	10:30 pm - 11:00 pm	52.0	Arrivals	6	75.6	Boeing 757-200	66.8 - 86.9
S41	Cloverleaf Baptist Church - 616 S. Mickley Ave.	8/26/2013	11:14 pm - 12:21 am	52.6	Arrivals	35	82.9	Douglas DC10	68.1 - 92.2
S39	Intersection of Martha & Norfolk	8/26/2013	11:15 pm - 12:32 am	54.3	Arrivals	34	76.3	Airbus A306	66.5 - 88.0
S17	Rhoades Elementary School	8/26/2013	11:15 pm - 12:45 am	49.7	Arrivals	40	75.0	Boeing 757-200	72.6 - 85.5
S38	Dukane Ct. north of Morris St.	8/26/2013	11:22 pm - 12:22 pm	50.2	Arrivals	29	76.3	Douglas DC10	59.2 - 87.5
S35	Corner of Laura Ln. and Zimmerman Dr.	8/26/2013	4:00 pm - 5:00 pm	43.6-44.3	Arrivals	9	69.7	Boeing 737-700	51.5 - 67.5
S27	Intersection of Ray & Denison	8/27/2013	1:00 am - 2:30 am	51.6	Arrivals	19	84.5	Airbus A306	83.2 - 92.9
S20	Amberleigh Drive	8/27/2013	1:14 pm to 2:14 pm	42.9	Departures	3	56.2	Unknown	57.5 - 66.0
S38	Dukane off of Morris	8/27/2013	1:17 pm - 1:58 pm	45.7	Arrivals	13	72.9	Business Jet	55.5 - 78.9

Table E-2, *Continued*
SHORT-TERM NOISE MEASUREMENT RESULTS
Indianapolis International Airport

Site Number	Location	Date Monitored (start date)	Time Monitored	Ambient Noise Level (dB)	Type of Events	Number of Aircraft Events	Loudest Aircraft Event (Lmax)	Loudest Aircraft	Aircraft SEL Range
S43	1022 Biltmore Ave, - near intersection of Washington St.	8/27/2013	1:24 am - 2:26 am	48.4	Arrivals	13	75.1	Airbus A306	60.0 - 84.5
S11	8108 Timberwood	8/27/2013	1:36 pm - 2:38 pm	43.0	Departures	9	67.9	Bombardier CRJ-900	58.9 - 77.8
S32	Intersection of Flynn Rd. & Trotter Rd.	8/27/2013	1:38 pm to 1:50 pm	52.9	Departures	4	69.4	Business Jet	64.2 - 76.9
S44	West Newton United Methodist Church	8/27/2013	1:55 pm - 2:45 pm	42.7	Departures	4	55.0	McDonnell Douglas MD-90	60.0 - 66.6
S2	Stanley Rd./ Classic Creek, Plainfield Apostolic Church	8/27/2013	10:47 am - 11:47 am	55.5	Departures & Arrivals	7	64.2	Embraer E135	63.3 - 74.8
S31	6501 Bower Drive - near Pergola Lane	8/27/2013	10:55 pm - 12:55 am	51.2	Arrivals	24	73.7	Embraer E45X	65.3 - 78.6
S4	1220 American Avenue	8/27/2013	10:58 am - 11:58 am	42.2	Departures	9	75.0	Boeing 737-700	60.3 - 71.5
S45	8710 Blooming Gardens Court	8/27/2013	11:00 am to 11:40 am	43.3	Departures	5	73.0	Embraer 170	58.1 - 68.8
S3	County Road 550 & Bradley	8/27/2013	11:03 am - 12:12 pm	60.0	Departures	4	73.9	Boeing 737-300	79.1 - 84.1
S1	First Baptist Church	8/27/2013	12:04 pm - 13:04 pm	52.1	Departures	4	60.5	McDonnell Douglas MD-83	72.5 - 64.3
S31	6501 Bower Drive - near Pergola Lane	8/27/2013	12:11 pm - 1:11 pm	43.0	Departures & Arrivals	18	67.9	Embraer E170	49.8 - 72.2
S5	7085 Hunters Ridge	8/27/2013	12:20 pm - 1:23 pm	51.9	Departures	6	74.9	McDonnell Douglas MD-83	70.4 - 84.9
S28	88 Biltmore Ave, near Intersection with Walton St.	8/27/2013	12:40 am - 1:13 am	50.5	Arrivals	7	62.3	Airbus A306	65.6 - 72.8

Table E-2, *Continued*
SHORT-TERM NOISE MEASUREMENT RESULTS
Indianapolis International Airport

Site Number	Location	Date Monitored (start date)	Time Monitored	Ambient Noise Level (dB)	Type of Events	Number of Aircraft Events	Loudest Aircraft Event (Lmax)	Loudest Aircraft	Aircraft SEL Range
S40	1620 N Lynhurst Drive	8/27/2013	12:50 am - 2:31 am	50.7	Arrivals	24	80.2	Douglas DC10	75.6 - 89.3
S36	Glenhall Circle	8/27/2013	2:14 pm - 3:14 pm	45.5	Departures & Arrivals	25	63.9	Boeing 737-300	54.5 - 71.5
S35	Corner of Laura Ln. and Zimmerman Dr.	8/27/2013	2:22 pm - 3:22 pm	42.1	Departures	4	57.3	Business Jet	60.7 - 66.6
S34	Intersection of Kohlman Rd. and Kohlman Ct.	8/27/2013	3:00 pm to 3:30 pm	49.7	Departures	4	59.2	Boeing 717-200	62.5 - 67.4
S8	Near Intersection of Mendenhall Rd. and Wise St.	8/27/2013	3:02 am - 4:30 am	54.8	Departures	13	60.1	McDonnell Douglas MD-11	68.4 - 77.4
S8	Near intersection of Mendenhall Rd. and Wise St.	8/27/2013	3:10 pm - 4:10 pm	44.6	Departures	12	59.9	Business Jet	58.1 - 72.7
S32	Intersection of Flynn Rd. & Trotter Rd.	8/27/2013	3:15 am - 4:45 am	52.5	Departures	21	89.6	Airbus A306	70.7 - 92.8
S26	Intersection of Raceway Rd & Camby Rd.	8/27/2013	3:25 am - 4:25 am	58.3	Departures	13	80.3	McDonnell Douglas MD-11	78.0 - 89.7
S30	Corner of Mills and High School Road at St. Ann's Church	8/27/2013	3:35 am - 4:39 am	48.5	Departures	18	71.6	Airbus A306	47.7 - 82.6
S21	Heartland Crossing - Ogden Dunes Court	8/27/2013	4:45 am - 5:45 am	49.2	Departures	25	72.0	Douglas DC10	61.7 - 81.9
S19	CR 800 South - 1/10th mile west of 975 E. Rd	8/27/2013	4:45 am - 5:45 am	53.3	Departures	20	74.6	Airbus A306	71.5 - 82.5
S6	Corner of Decatur Ridge Dr. and Wooden Branch Dr.	8/27/2013	4:48 am - 5:33 am	49.2	Departures	22	70.3	Airbus A306	57.1 - 81.1

Table E-2, *Continued*
SHORT-TERM NOISE MEASUREMENT RESULTS
Indianapolis International Airport

Site Number	Location	Date Monitored (start date)	Time Monitored	Ambient Noise Level (dB)	Type of Events	Number of Aircraft Events	Loudest Aircraft Event (Lmax)	Loudest Aircraft	Aircraft SEL Range
S29	6647 Stanley Road	8/27/2013	4:50 am - 5:35 am	51.0-52.9	Departures	25	81.9	Airbus A306	53.1 - 90.5
S16	Eternal Life Church	8/27/2013	9:30 am - 10:30 am	44.3	Departures	5	62.1	Airbus A320	59.7 - 68.0
S9	8214 Cottonwood Ct.	8/27/2013	9:35 am - 10:39 am	54.0	Departures	5	73.9	Airbus A320	71.5 - 83.4
S13	8242 Filly	8/27/2013	9:36 am - 10:36 am	49.8	Departures	9	71.5	Business Jet	57.8 - 80.3
S33	Ronald Reagan Parkway	8/28/2013	11:30 pm - 12:32 am	44.7	Arrivals	12	61.9	Embraer E170	70.4 - 74.4
S37	739 Arbor Woods Drive	8/28/2013	12:55 am - 2:25 am	50.4	Arrivals	18	62.3	Boeing 757-200	67.5 - 72.9
S14	8582 Hickory Hill Trail	8/28/2013	3:15 am - 4:30 am	51.4	Departures	20	76.0	Douglas DC10	68.4 - 86.6
S15	SR 267 and Hendricks County Line	8/28/2013	4:45 am - 5:30 am	53.2	Departures	14	72.8	Airbus A306	73.2 - 80.5
S24	County Road 1050, Close to County Road 800	8/29/2013	1:07 am - 2:08 am	60.9	Arrivals	13	64.6	McDonnell Douglas MD-11	78.3 - 83.5
S23	Alan Drive and Cedar Drive	8/29/2013	4:13 am - 5:12 am	50.3	Departures	29	60.8	Airbus A306	64.4 - 75.3
S22	County Line Road and Heartland Blvd.	8/29/2013	5:20 am - 5:49 am	42.4	Departures	3	54.1	Airbus A310	56.1 - 67.9

Note: Ambient (background) noise levels were recorded at each site for a duration of time when aircraft events were not audible. In some cases intermittent community noise events, such as infrequent automobile traffic or other non-aircraft noise event occurred during the recording of ambient noise. In these cases, a range is reported to show times of no community noise (with the exception of continuous noise such as constant vehicle traffic on major highways in the distance) to times of intermittent community noise.

Source: Landrum & Brown, 2013.

Table E-3
LONG-TERM NOISE MEASUREMENT RESULTS
Indianapolis International Airport

Site Number	Location	Ambient Noise Level	Measured Aircraft DNL	INM Modeled DNL	Difference between Measured and Modeled Noise Level
L1	St. Joseph Church, 1375 South Mickley Av. Indianapolis	55.1	54.0	56.1	-2.1
L2	Boys and Girls Club, 5228 West Minnesota St. Indianapolis	53.2	66.2	64.6	1.6
L3	5255 West Kelly Street Indianapolis	55.1	55.9	57.8	-1.9
L4	Corner of Seerley Road and Manhattan Av.	57.9	52.5	51.9	0.6
L5	Camby Community Church 8604 Camby Rd	52.9	53.6	53.6	0.0
L6	6861 S. County Rd 1050 E.	51.3	60.6	59.8	0.8
L7	Mooresville United Methodist Church 900 Indianapolis Rd. Mooresville	46.8	52.1	53.1	-1.0
L8	8364 County Road 700 S Plainfield	55.0	58.8	57.7	1.1
L9	Plainfield Baptist Church 1575 Reeves Rd. Plainfield	51.3	49.0	52.5	-3.5
AVERAGE		**54.1**	**59.1**	**58.4**	**0.8**

Notes: 1. The measured aircraft DNL represents the average cumulative noise levels at each site over the seven-day period for noise events determined to be cause by aircraft operations. This determination was made by setting the noise measurement equipment to record an event if the noise level at the site exceeded a threshold above 65 dB for a period of at least two seconds. These noise events were then correlated to radar data from the AOMS system at IND to determine if an aircraft was operating in the vicinity of the noise monitoring site around the time the noise event was recorded. The noise measurement equipment also recorded community events which, in some cases lasted between 2 minutes up to 50 minutes. To avoid over reporting the noise levels, these community events were excluded from the calculation of the measured aircraft DNL. However, in cases were the radar data indicated an aircraft passed over the noise measurement site during a community event, the loudest recorded noise level of that particular aircraft type was substituted in the calculation.

2. The INM Modeled DNL represents the modeled DNL level at a grid point location corresponding to the actual long-term measurement location using the Existing (2013) conditions input data, including average-annual day runway use, actual runway use patterns that occurred during the 7-day monitoring period varied from the average-annual day runway use, causing differences in the measured and predicted DNL levels.

Source: Landrum & Brown, 2013.

E.3.3 FLIGHT PROCEDURES AND DEPARTURE PROFILES

The primary objective of the noise measurement program was to collect a sampling of noise and operational data for specific aircraft events to compare with standard profiles for aircraft included in the INM database. The INM includes standard flight procedure data for each aircraft that represents each phase of flight to or from an airport. Information related to aircraft speed, altitude, thrust settings, flap settings, and track distance are available and used by the INM to calculate noise levels on the ground. Standard aircraft departure profiles are supplied from the runway (field elevation) up to 10,000 feet above field elevation (AFE). Aircraft arrival profiles are supplied from 6,000 feet AFE down to the runway including the application of reverse thrust and rollout. The Federal Aviation Administration (FAA) requires that these standard arrival and departure profiles be used unless there is evidence that they are not applicable.

The INM uses a distance of flight as a surrogate for assigning departure profiles that determine aircraft weight, as well as speed, thrust, and altitude during different stages of flight.[1] The INM groups trip lengths into seven categories; these categories are:

Stage Category	Stage Length
1	0-500 nautical miles
2	500-1000 nautical miles
3	1000-1500 nautical miles
4	1500-2500 nautical miles
5	2500-3500 nautical miles
6	3500-4500 nautical miles
7	4500+ nautical miles

Where the modeled and measured noise levels of particular aircraft types varied by a certain degree above tolerable levels. additional analysis of the departures at IND was conducted. For this analysis, average aircraft weights and measured noise levels were compared with aircraft weights and predicted noise levels generated by the INM. The results of the analysis indicated that average calculated aircraft departure weights[2] for several aircraft were higher than what was predicted by the INM for those particular aircraft using the distance-based method.

For example, as shown in **Table E-4**, an Airbus A310-304 departing to a destination with a stage length of two (500 to 1,000 nm) would be assigned a Stage 2 profile by the INM based upon a predicted takeoff weight of 253,000 lbs. However, the average calculated weight of the aircraft to a destination between 500 and 1,000 nautical miles is 259,414 pounds, which more closely matches the weight that the INM would assign to an A310-304 departing to a destination with a

[1] INM standard stage length assumptions are described in the INM 7.0 Users Guide.

[2] The average calculated aircraft departure weight equals the sum of the average payload for each aircraft type as reported to the U.S. Department of Transportation, the estimated fuel load needed to reach the average destination of the aircraft, and the operating empty weight (OEW) of the aircraft as reported by the aircraft manufacturer and/or operator.

Table E-4
SELECTION OF DEPARTURE PROFILES/AIRCRAFT DEPARTURE WEIGHTS
Indianapolis International Airport

INM Aircraft ID	Actual Stage Length[1]	Average Calculated Aircraft Weight[2]	Measured Noise Level	DISTANCE-BASED METHOD				AVERAGE AIRCRAFT WEIGHT ADJUSTMENT				
				INM Prediction		Difference		Modified Stage Length[3]	INM Prediction		Difference	
				Aircraft Weight	Noise Level (SEL)	Aircraft Weight	Noise Level (SEL)		Aircraft Weight	Noise Level (SEL)	Aircraft Weight	Noise Level (SEL)
A310-304	2	260,456	79.6	253,000	76.7	-7,456	-2.9	3	262,900	76.9	2,444	-2.7
DC1010	2	394,323	88.5	340,000	87.7	-54,323	-0.8	3	360,000	89.0	-34,323	0.5
MD11PW	2	444,117	85.3	410,000	79.1	-34,117	-6.2	3	425,000	79.2	-19,117	-6.1
MD11GE	2	444,117	78.1	410,000	77.4	-34,117	-0.7	3	425,000	77.7	-19,117	-0.4

Notes:
1. Actual stage length represents the stage length per the distance from IND to the destination airport of the particular flight.
2. Average Calculated Aircraft Weight equals the sum of the average payload reported to the U.S. Department of Transportation, the estimated fuel load needed to reach the average destination of the aircraft, and the operating empty weight (OEW) of the aircraft as reported by the aircraft manufacturer and or operator.
3. Modified stage length represents the INM flight profile and predicted aircraft weight that most closely aligned with the calculated aircraft weight. The observed weight is the INM assigned weight according to its stage length.

Source: U.S. Department of Transportation, FedEx, Boeing, Airbus, Landrum & Brown analysis, 2013.

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stage length of three (262,900 lbs.). Therefore all A310-304 aircraft departures were assigned a profile 1 stage higher (up to the maximum stage profile) than would be assigned by the distance-based method. This adjustment also resulted in an INM predicted noise level that was closer to the measured noise level for the particular aircraft. Similar adjustments were made based on the analysis of average departure weights for the following INM aircraft types: DC1010, MD11GE, and MD11PW. Per guidance issued by the FAA, Office of Environment and Energy (AEE) on July 2, 2009, use of estimated takeoff weight is an acceptable method for determining stage length and does not require approval.[1]

E.4 NOISE COMPLAINT HISTORY

The IAA maintains an extensive database of noise complaints dating back to 1995. This noise complaint database was used in conjunction with the subsequent noise analysis to assist in the identification of noise concerns, as well as to identify locations for noise measurement used in this study. An assessment of recent noise complaint data was performed to better understand the noise exposure environment around IND. From January 1, 2008 through December 31, 2012, the Airport received 555 total noise complaints, an average of 111 per year. In 2012, the Airport received 23 total complaints. **Table E-5** summarizes the noise complaint data collected at IND from 2008 through 2012. **Exhibit E-2** illustrates the geographic distribution of the noise complaints received within the airport environs from 2008 through 2012 and **Table E-6** through **Table E-11** provide detailed information regarding the number and locations of the noise complaints for each of these years. As the exhibit and tables illustrates, a majority of the complaints occur in the immediate vicinity of the airport, distributed in all directions from the airport. There are also sporadic complaints spread throughout the four-county region.

The majority of complaints came from the Indianapolis/Marion County area, however it should be noted that in many cases two or three callers have inflated the total number of complaints received. For example, three individuals, two from Indianapolis/Marion County and one from Plainfield, were responsible for 277 (more than half of) of the total complaints from 2008 through 2012. Because of this potential for the results of noise complaint data to be affected by one or two callers, the data was reviewed to assist in determining relevant noise measurement locations.

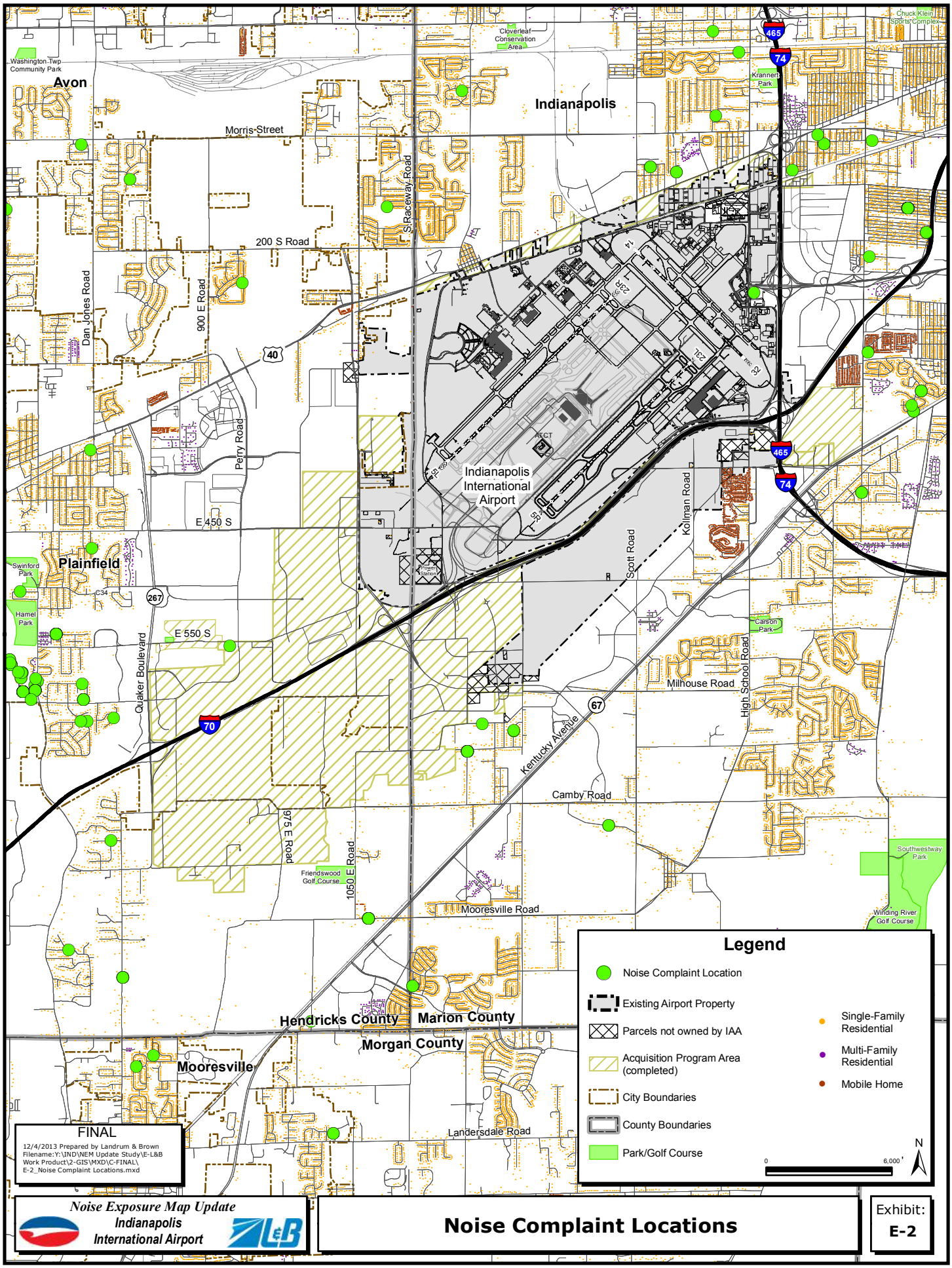
During the five-year period from 2008 through 2012, over 48 percent of noise complaints were made in regards to daytime operations, while approximately 52 percent of complaints were due to nighttime operations. Overall, approximately 46 percent of the total complaints received originated in the Indianapolis/Marion County, while the City of Plainfield and Hendricks County accounted for 34 percent and 12 percent of the complaints, respectively. Complaints from Morgan County, Johnson County/Greenwood, and other areas or complaints in which no address was given account for the remaining 8 percent combined.

[1] *AEE and Airports Coordination Policy for Non-Standard Modeling Procedures and Methodology*, July 2, 2009.

Table E-5
NOISE COMPLAINT LOCATIONS, 2008 – 2012
Indianapolis International Airport

Complaint Location	Year					Total	Annual Average
	2008	2009	2010	2011	2012		
Indianapolis/Marion County	152	66	19	13	7	257	51
Hendricks County	38	17	8	3	1	67	13
Plainfield	8	19	70	75	15	187	37
Johnson County/ Greenwood	7	1	2	0	0	10	2
Morgan County	1	20	4	2	0	27	5
Other/Address not Given	3	2	0	2	0	7	1
Total	**209**	**125**	**103**	**95**	**23**	**555**	**111**

Source: Indianapolis Airport Authority Noise Complaint Logs 2001-2007, Landrum & Brown analysis, 2013.


Avon
Indianapolis
Plainfield
Mooresville
Indianapolis International Airport
Morris Street
200 S Road
E 450 S
E 550 S
Dan Jones Road
900 E Road
Perry Road
S Raceway Road
Scott Road
Kollman Road
Quaker Boulevard
Milhouse Road
High School Road
Kentucky Avenue
Camby Road
975 E Road
1050 E Road
Mooresville Road
Landersdale Road
Hendricks County
Marion County
Morgan County
Washington Twp Community Park
Cloverleaf Conservation Area
Chuck Klein Sports Complex
Krannert Park
Swinford Park
Hamel Park
Carson Park
Friendswood Golf Course
Southwestway Park
Winding River Golf Course
Legend
Noise Complaint Location
Existing Airport Property
Parcels not owned by IAA
Acquisition Program Area (completed)
City Boundaries
County Boundaries
Park/Golf Course
Single-Family Residential
Multi-Family Residential
Mobile Home
N
0
6,000
FINAL
12/4/2013 Prepared by Landrum & Brown
Filename:Y:\IND\NEM Update Study\E-L&B Work Product\2-GIS\MXD\C-FINAL\E-2_Noise Complaint Locations.mxd
Noise Exposure Map Update
Indianapolis International Airport
Noise Complaint Locations
Exhibit: E-2

BACK OF EXHIBIT

Table E-6
2008 NOISE COMPLAINT DATA SUMMARY
Indianapolis International Airport

Date of Complaint		
January	12	6%
February	18	9%
March	34	16%
April	27	13%
May	15	7%
June	1	0%
July	18	9%
August	23	11%
September	33	16%
October	18	9%
November	7	3%
December	3	1%
	209	100%

Time of Disturbance		
Daytime	88	42%
Nighttime	121	58%
	209	100%

Complaint by Jurisdiction		
Indianapolis/Marion County	152	73%
Morgan County	1	0%
City of Plainfield	8	4%
Hendricks County	38	18%
Johnson County/Greenwood	7	3%
Other/Address not Given	3	1%
	209	100%

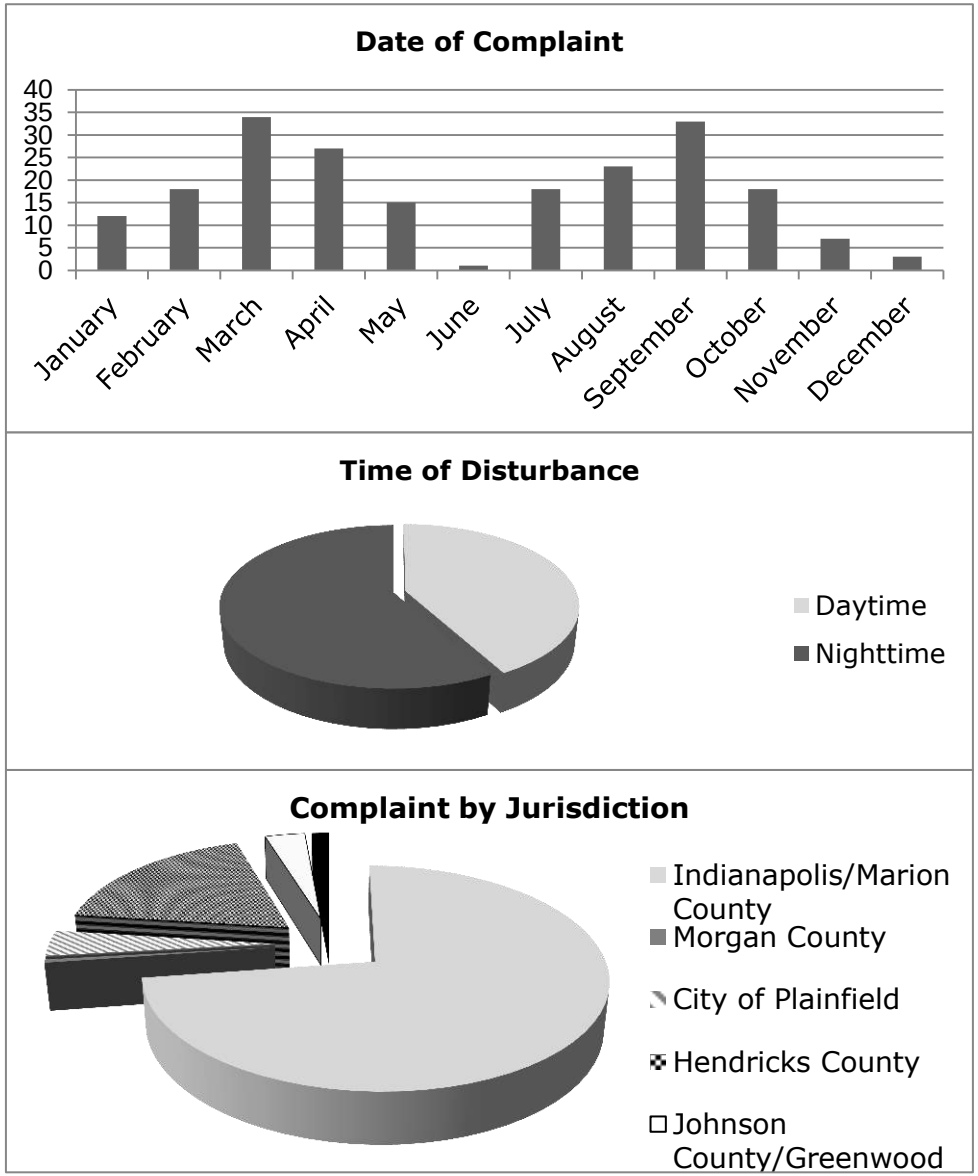


Table E-7
2009 NOISE COMPLAINT DATA SUMMARY
Indianapolis International Airport

Date of Complaint		
January	23	18%
February	19	15%
March	13	10%
April	6	5%
May	6	5%
June	16	13%
July	9	7%
August	9	7%
September	8	6%
October	10	8%
November	3	2%
December	3	2%
	125	100%

Time of Disturbance		
Daytime	58	46%
Nighttime	67	54%
	125	100%

Complaint by Jurisdiction		
Indianapolis/Marion County	66	53%
Morgan County	20	16%
City of Plainfield	19	15%
Hendricks County	17	14%
Johnson County/Greenwood	1	1%
Other/Address not Given	2	2%
	125	100%

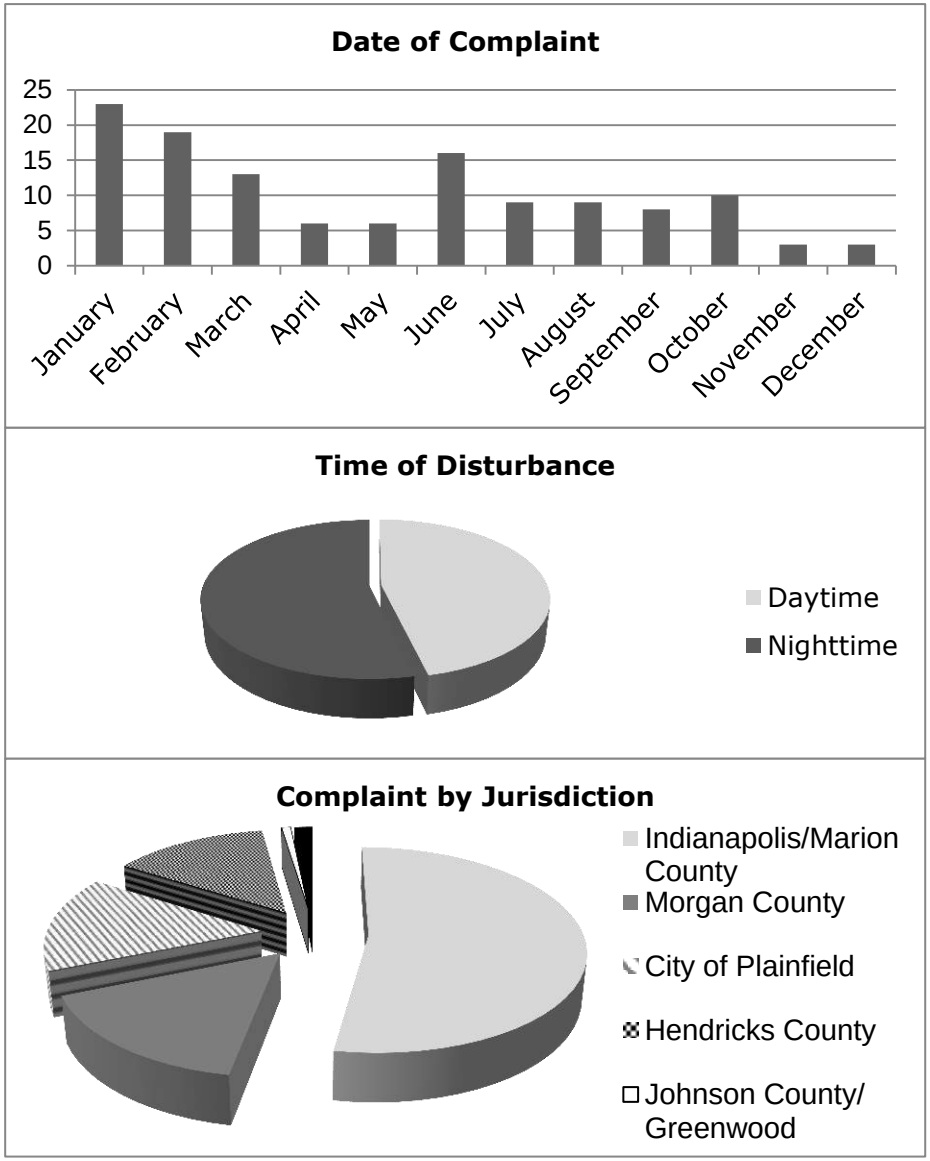


Table E-8
2010 NOISE COMPLAINT DATA SUMMARY
Indianapolis International Airport

Date of Complaint		
January	0	0%
February	0	0%
March	8	8%
April	15	15%
May	10	10%
June	7	7%
July	7	7%
August	6	6%
September	15	15%
October	10	10%
November	15	15%
December	10	10%
	103	100%

Time of Disturbance		
Daytime	63	61%
Nighttime	40	39%
	103	100%

Complaint by Jurisdiction		
Indianapolis/Marion County	19	18%
Morgan County	4	4%
City of Plainfield	70	68%
Hendricks County	8	8%
Johnson County/Greenwood	2	2%
	103	100%

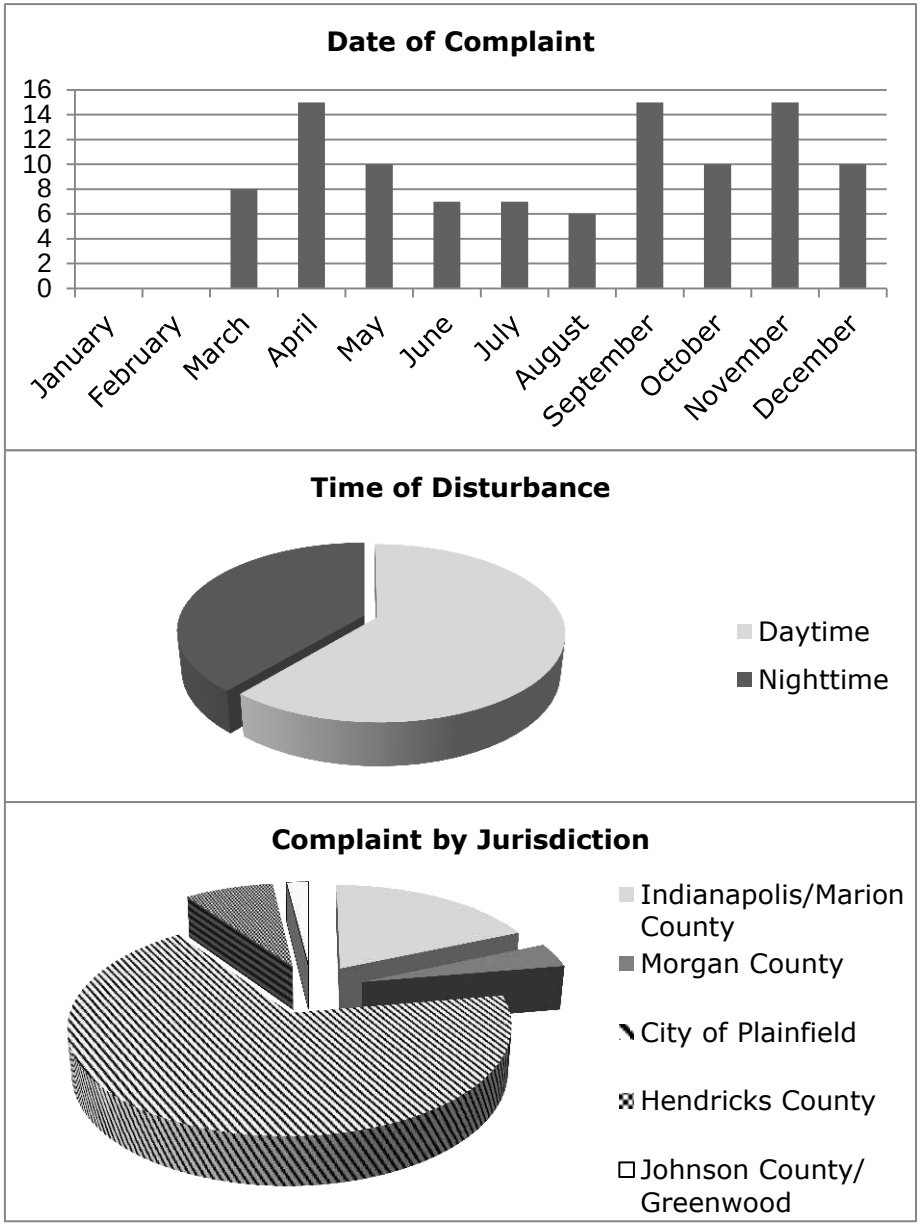


Table E-9
2011 NOISE COMPLAINT DATA SUMMARY
Indianapolis International Airport

Date of Complaint		
January	2	2%
February	3	3%
March	9	9%
April	10	11%
May	7	7%
June	6	6%
July	7	7%
August	14	15%
September	13	14%
October	11	12%
November	7	7%
December	6	6%
	95	100%

Time of Disturbance		
Daytime	49	52%
Nighttime	46	48%
	95	100%

Complaint by Jurisdiction		
Indianapolis/Marion County	13	14%
Morgan County	2	2%
City of Plainfield	75	79%
Hendricks County	3	3%
Other/Address not Given	2	2%
	95	100%

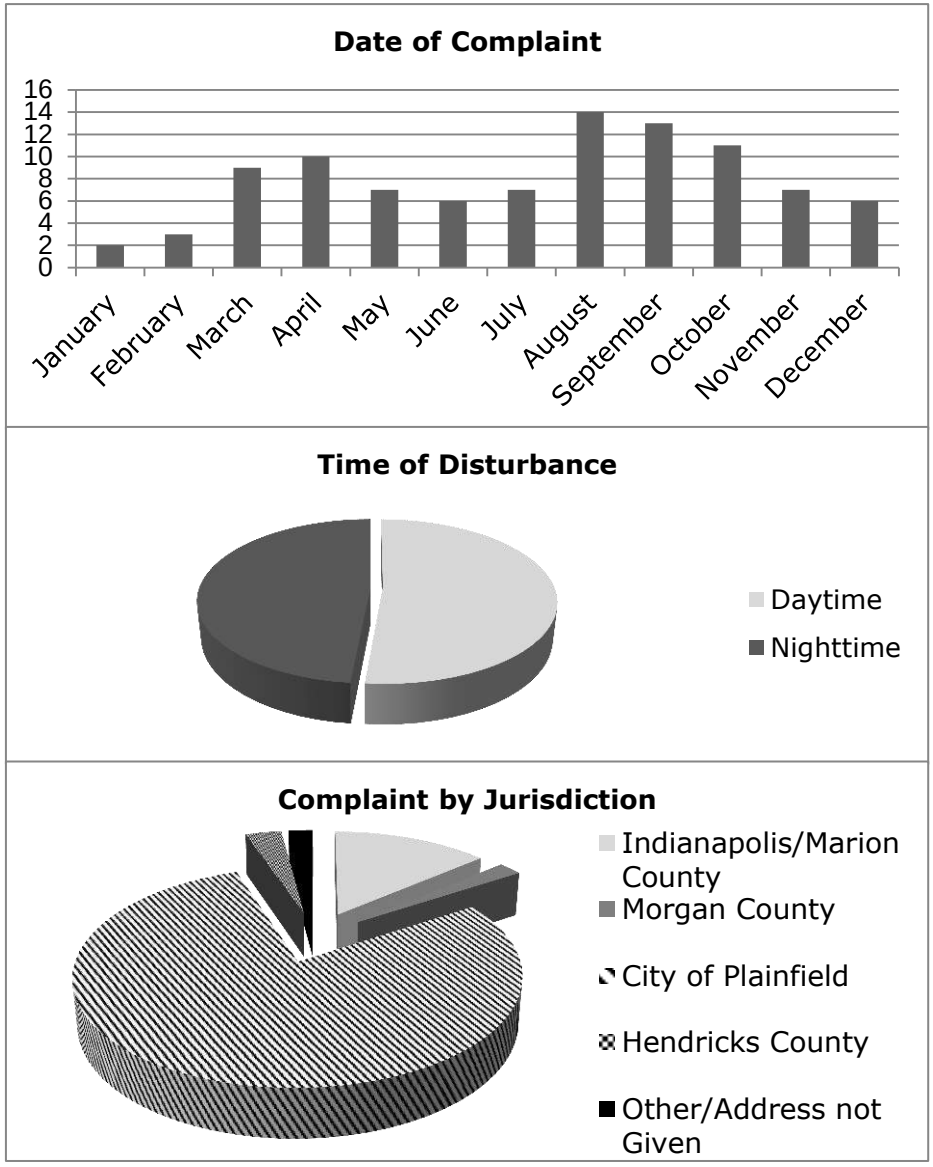


Table E-10
2012 NOISE COMPLAINT DATA SUMMARY
Indianapolis International Airport

Date of Complaint		
January	5	22%
February	2	9%
March	6	26%
April	0	0%
May	1	4%
June	1	4%
July	1	4%
August	1	4%
September	1	4%
October	5	22%
November	0	0%
December	0	0%
	23	100%

Time of Disturbance		
Daytime	9	39%
Nighttime	14	61%
	23	100%

Complaint by Jurisdiction		
Indianapolis/Marion County	7	30%
City of Plainfield	15	65%
Hendricks County	1	4%
	23	100%

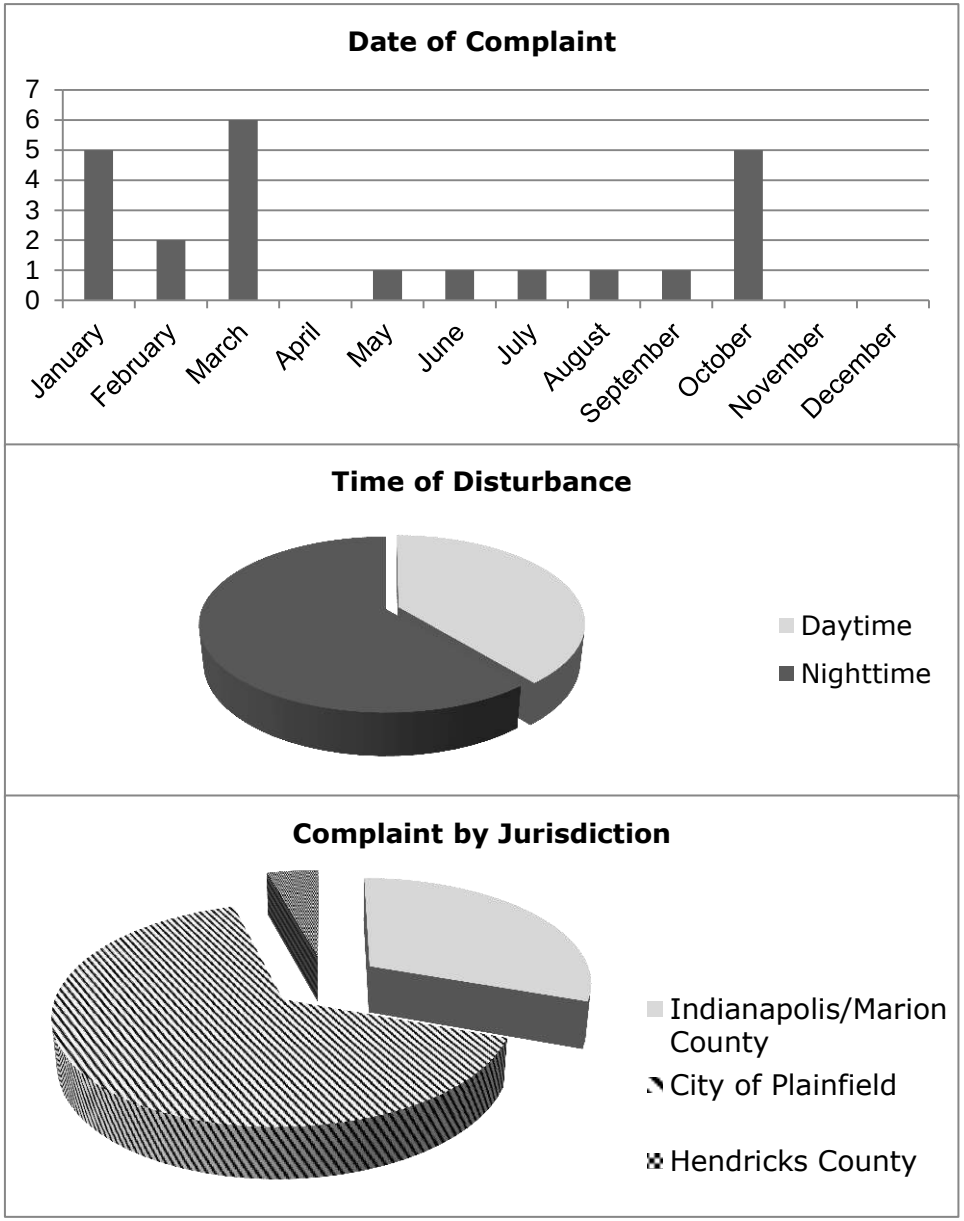
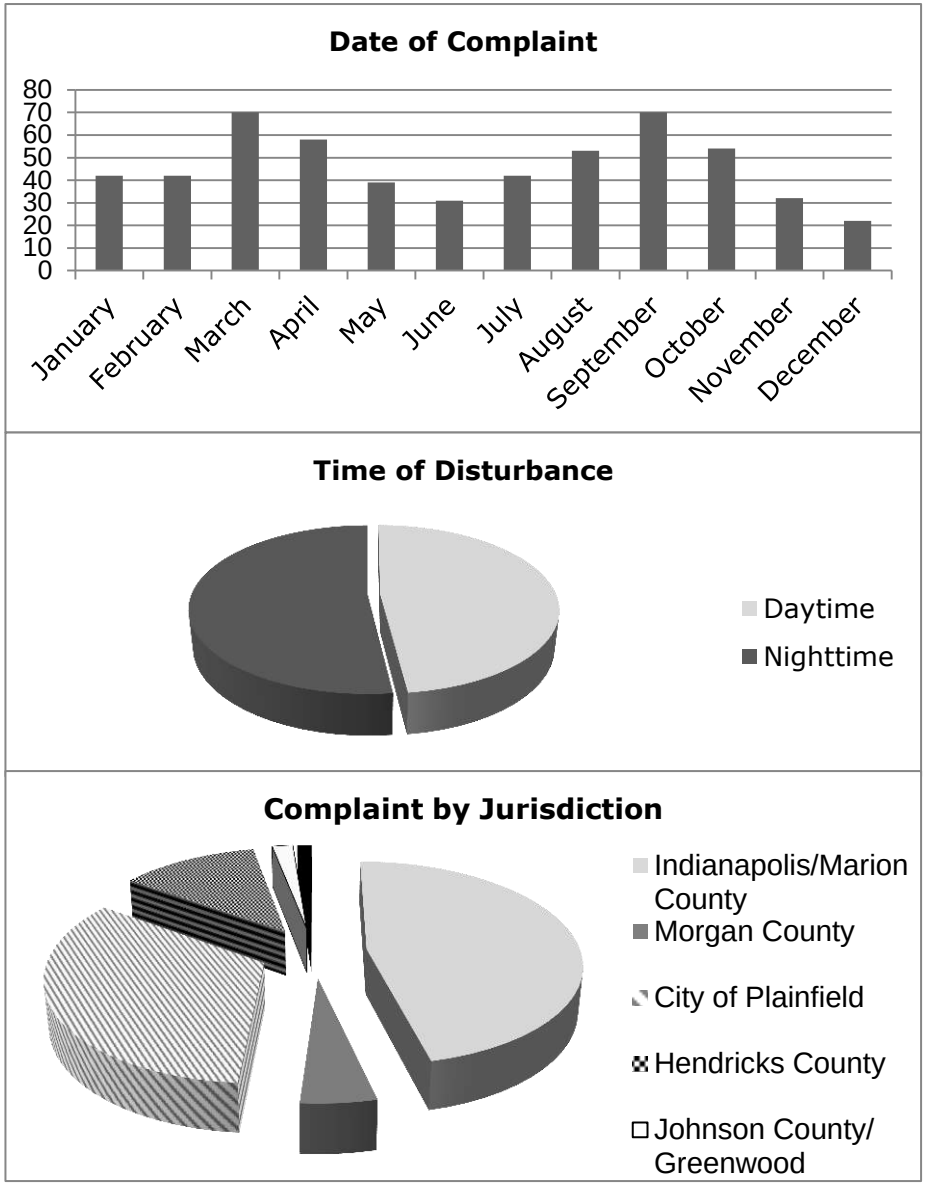


Table E-11
2008-2012 NOISE COMPLAINT DATA SUMMARY
Indianapolis International Airport

Date of Complaint		
January	32	8%
February	42	8%
March	70	13%
April	58	10%
May	39	7%
June	31	6%
July	42	8%
August	53	10%
September	70	13%
October	54	10%
November	32	6%
December	22	4%
	555	100%

Time of Disturbance		
Daytime	267	48%
Nighttime	288	52%
	555	100%

Complaint by Jurisdiction		
Indianapolis/Marion County	257	46%
City of Plainfield	187	34%
Hendricks County	67	12%
Morgan County	27	5%
Johnson County/Greenwood	10	2%
Other/Address not Given	7	1%
	555	100%



Appendix F

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APPENDIX F
LAND USE ASSESSMENT METHODOLOGY

Identifying and evaluating land uses within the airport environs is an important step in the Noise Exposure Map update process. This evaluation is necessary to identify residential and other noise-sensitive land uses in the airport environs. The land use assessment includes examining land use classifications and verifying existing land uses. A Geographic Information System (GIS) land use database was developed to facilitate the identification of land uses that are incompatible with airport operations.

F.1 AIRPORT ENVIRONS

The airport environs refer to the regional area that may experience the broader effects from the noise of aircraft overflight as well as social or socioeconomic impacts. All land uses below the noise level measured as 65 DNL are generally considered compatible with airport operations. Consequently, the boundary of the airport environs was formed by assessing both the location of flight tracks and the general area where noise levels would drop below 65 DNL. Areas outside the airport environs were not excluded from this process and were assessed, however detailed land use assessments were focused on the area within the airport environs.

F.1.1 LAND USE CLASSIFICATIONS

Existing land use data was collected from previous noise and environmental studies prepared for the airport, as well as from the local jurisdictions located around the airport. For this study, land use classifications were organized into generalized categories:

- Single-Family Residential
- Multi-Family Residential
- Noise-Sensitive Facilities (Schools, Churches, Libraries, Nursing Homes, Hospitals)
- Parks/Open Space
- Compatible Land (Commercial, Office, Industrial, etc.)

F.1.2 LAND USE MAPPING

Data Compilation: Efforts were made to acquire the most up-to-date Geographic Information System data from local municipalities for this study. Data was collected and used to reflect current conditions. Base map information, including roads, county and municipal boundaries, and land use were compiled using ESRI ArcMap GIS, version 10.1. ArcMap is an analytical software which allows manipulation and analysis of data from a variety of different sources. Land use was verified through field surveys. The base map information was supplemented by an

AutoCAD drawing of Indianapolis International Airport, flight tracks and noise contours generated by the Integrated Noise Model, version 7.0d, and other data obtained from the land use planning jurisdictions around IND.

The 2010 U.S. Census data, at the block level, was combined with the GIS land use file to calculate the population and housing incompatibilities within the noise contours. For each census block, the ratio of population to housing was determined and that ratio was applied to each dwelling unit. The housing and population incompatibilities for each of the noise contours were determined by merging the noise contour data files with the GIS land use file. The number of residential structures and population within each DNL noise contour level were then determined by an automated count.

Noise-Sensitive Public Facilities: Noise-sensitive public facilities include schools, churches, libraries, hospitals, and nursing homes. Noise sensitive public facilities were derived from previous studies and field verified for accuracy. **Table F-1** lists these noise-sensitive public and community facilities that are also identified on **Exhibit F-1,** *Existing Noise-Sensitive Facilities* or the official Noise Exposure Maps (NEMs) included with this document.

Table F-1
EXISTING NOISE-SENSITIVE FACILITIES
Indianapolis International Airport

MAP ID	FACILITY NAME
Schools	
S1	Avon High School
S2	Ben Davis University High School
S3	Brentwood School
S4	Bridgeport Elementary School
S5	Clarks Creek Elementary
S6	Damar Charter Academy
S7	Decatur Central High School
S8	Decatur Discovery Academy
S9	Decatur Intermediate Learning Center
S10	Decatur Middle School
S11	Garden City Elementary
S12	George W Julian School 57
S13	Liberty Elementary
S14	Lynhurst 7th & 8th Grade Center
S15	Maple Elementary School
S16	Maplewood Elementary
S17	McClelland Elementary
S18	Mooresvilles Consolidated High
S19	Newby Memorial Elementary School

Table F-1, *Continued*
EXISTING NOISE-SENSITIVE FACILITIES
Indianapolis International Airport

MAP ID	FACILITY NAME
S20	Northwood Elementary School
S21	Paul Hadley Middle School
S22	Pine Tree Elementary School
S23	Plainfield Christian School
S24	Plainfield Community Middle School
S25	Plainfield High School
S26	Rhoades Elementary School
S27	Sanders School
S28	St. Susanna School
S29	Valley Mills Elementary
S30	Van Buren School
S31	Wayne Enrichment Center
S32	West Newton Elementary
S33	White Oak Elementary School
Libraries	
L1	Avon Washington Township Library
L2	Decatur Library
L3	Mooresville Public Library
L4	Plainfield Library
L5	Wayne Library
Hospitals	
H1	Hendricks Community Hospital
H2	Hendricks Regional Health Avon
H3	IU Health West Hospital
Nursing Homes	
N1	Bridge at Garden Plaza
N2	Harborside Healthcare
N3	Harborside Healthcare Decatur
N4	Lakeview Manor Inc
N5	Lynhurst Healthcare
N6	Meadow Lake of Mooresville
N7	Miller's Merry Manor
N8	Plainfield Health Care
N9	Southerncare Indianapolis
N10	Westside Retirement Village
N11	Worthington House

Table F-1, *Continued*
EXISTING NOISE-SENSITIVE FACILITIES
Indianapolis International Airport

MAP ID	FACILITY NAME
Churches	
C1	Aldersgate United Methodist Church
C2	Ben Davis Christian Church
C3	Bethel Faith Temple Pentecostal Church Of God
C4	Biltmore Gardens Church of Christ
C5	Bridgeport Central Baptist Church
C6	Bridgeport United Methodist Church
C7	Camby Community Church
C8	Cloverleaf Baptist Church
C9	Church Of Jesus Christ of Latter Day Saints
C10	Church of Nazarene
C11	Eternal Life Baptist Church
C12	Faith Lutheran Church
C13	First Baptist Church
C14	Fairfield Church
C15	First Baptist Church Of Plainfield
C16	Friendswood Baptist Church
C17	Garden City Christian Church
C18	Grace Baptist Church Of Sterling Heights
C19	Bethel Worship Center
C20	Garden Baptist Church
C21	Calvary Chapel on the Horizon
C22	Hope United Presbyterian Church
C23	Iglesia Nuevas Degozo
C24	Islamic Society Of North America
C25	Jehovah's Witnesses-Airport Congregation
C26	Lakeview Christian Center
C27	Lynhurst Baptist Church
C28	Mars Hill Baptist Bible Church
C29	Mount Olive United Methodist Church
C30	Marwood Baptist Church
C31	Mt Pleasant Baptist Church
C32	New Life Assembly Of God
C33	Pleasant Heights Baptist Church
C34	Plainfield Apostolic Church
C35	Plainfield Baptist Church
C36	Plainfield United Methodist Church

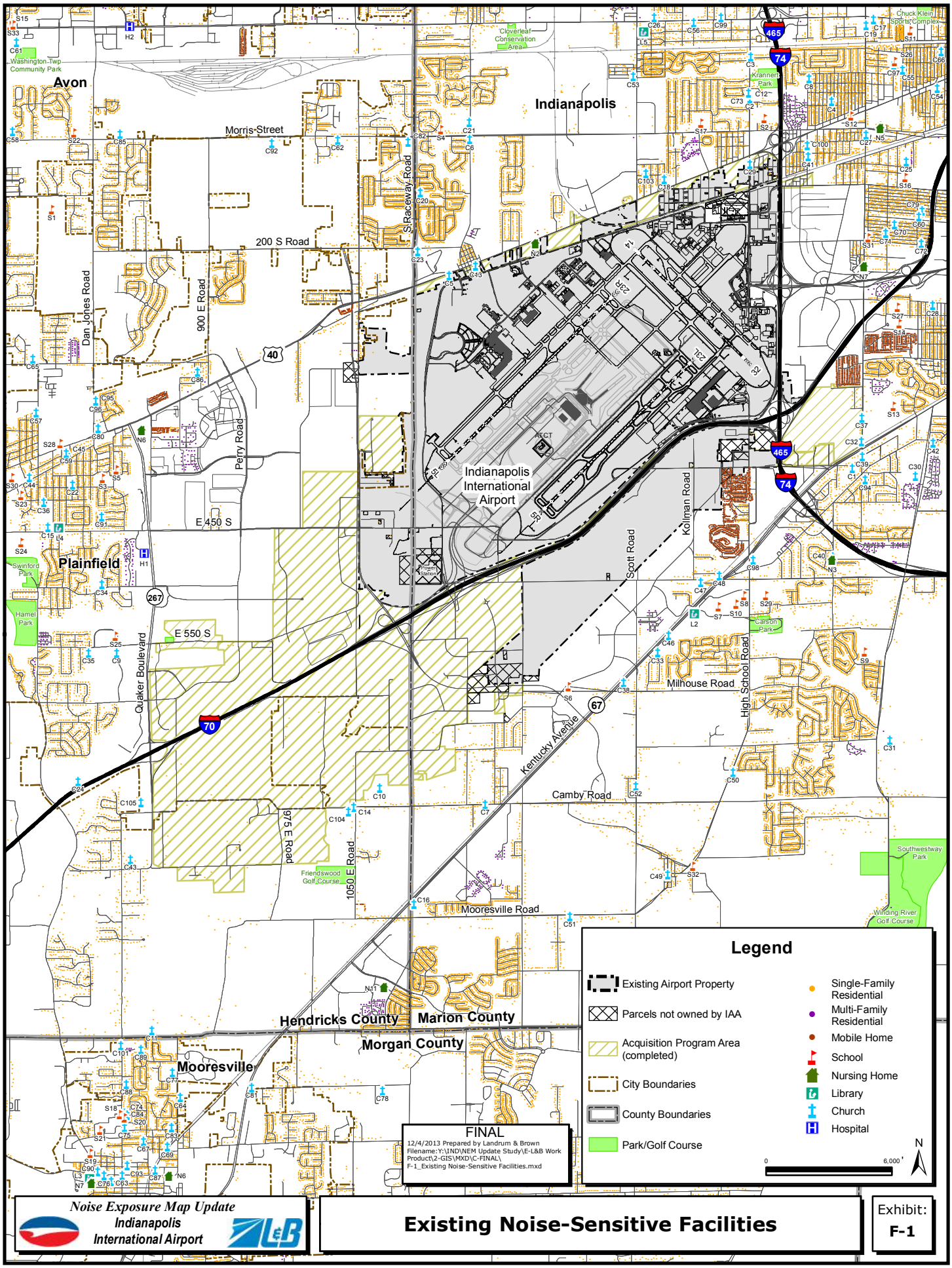
Table F-1, *Continued*
EXISTING NOISE-SENSITIVE FACILITIES
Indianapolis International Airport

MAP ID	FACILITY NAME
C37	Seerley Creek Christian Church
C38	Southwest Church of God
C39	Southwest Church of the Nazarene
C40	Southwest Church of the Nazarene
C41	St Joseph's Catholic Church
C42	Seventh-Day Adventist Church
C43	Souls Harbor Assembly Of God
C44	St Mark's Episcopal Church
C45	St Susanna Church
C46	Valley Mills Christian Church
C47	Valley Mills Friends Church
C48	Valley Mills Community Church
C49	West Newton Church of Christ
C50	West Newton Friends Church
C51	West Newton Full Gospel Church
C52	West Newton United Methodist Church
C53	West Parkview Missionary Baptist Church
C54	Westbrook Church of The Nazarene
C55	Westbrook New Testament Baptist Church
C56	Westlake Community Church of God
C57	The Journey Church
C58	Avon Christian Church
C59	Calvary Bible Wesleyan Church
C60	Celestial Church of Christ
C61	Christadelphian Ecclesiastical
C62	Church By the Side of the Road
C63	Church In Mission
C64	Church of Christ
C65	Church of Christ at Plainfield
C66	Church of The Nazarene
C67	Church of the Ancient Way Inc
C68	Community Church of Mooresville
C69	Crossroads Apostolic Church
C70	Drexel Garden Apostolic
C71	Drexel Gardens Christian Church
C72	Eternal Life Tabernacle
C73	Faith Lutheran Church

Table F-1, *Continued*
EXISTING NOISE-SENSITIVE FACILITIES
Indianapolis International Airport

MAP ID	FACILITY NAME
C74	First Baptist Church
C75	First Christian Church
C76	First Christian Church
C77	First United Methodist Church
C78	Grace Church
C79	Grace Community Church
C80	Grace Fellowship Church
C81	Grace Missionary Church
C82	Grace Point Church of the Nazarene
C83	Harvest Lutheran Church
C84	Jordan Apostolic Church
C85	Light and Life Free Methodist Church
C86	Maple Grove Baptist Church
C87	Mooresville Church of God
C88	Mooresville Church of the Nazarene
C89	Mooresville Free Methodist Church
C90	Mooresville Friends Church
C91	Mott Ministries
C92	New Faith Bible Church
C93	New Life In Christ Church
C94	Pilgrim Nazarene Church
C95	Plainfield Bible Church
C96	Plainfield Christian Church
C97	Salem Park Church
C98	Salvage Yard Church
C99	Scientology the Church-Central
C100	St Joseph's Church-Airport
C101	St Thomas More Church
C102	Way of the Cross Baptist Church
C103	Wesleyan Holiness Church
C104	Fairfield Friends Meeting
C105	Cathedral of Prayer Baptist Church

Note: Map ID corresponds to labels on Exhibit F-1 *and/or official NEMs*
Source: Landrum & Brown, 2013


Avon
Indianapolis
Plainfield
Indianapolis International Airport
Morris Street
200 S Road
E 450 S
E 550 S
Dan Jones Road
900 E Road
Perry Road
S Raceway Road
Scott Road
Kollman Road
Quaker Boulevard
975 E Road
1050 E Road
Milhouse Road
High School Road
Kentucky Avenue
Camby Road
Mooresville Road
Hendricks County
Marion County
Morgan County
Mooresville
Washington Twp Community Park
Cloverleaf Conservation Area
Chuck Klein Sports Complex
Krannert Park
Swinford Park
Hamel Park
Carson Park
Friendswood Golf Course
Southwestway Park
Wilding River Golf Course
Power Station
ATCT
Legend
Existing Airport Property
Parcels not owned by IAA
Acquisition Program Area (completed)
City Boundaries
County Boundaries
Park/Golf Course
Single-Family Residential
Multi-Family Residential
Mobile Home
School
Nursing Home
Library
Church
Hospital
0
6,000'
N
FINAL
12/4/2013 Prepared by Landrum & Brown
Filename:Y:\IND\NEM Update Study\E-L&B Work Product\2-GIS\MXD\C-FINAL\F-1_Existing Noise-Sensitive Facilities.mxd
Noise Exposure Map Update
Indianapolis International Airport
Existing Noise-Sensitive Facilities
Exhibit:
F-1

BACK OF EXHIBIT F-1

F.2 HISTORIC SITES

Per 14 CFR Part 150 guidance, sites of historic significance within the vicinity of IND are identified through a search of the National Register of Historic Places (NRHP). The NRHP is the official list of properties recognized by the Federal government as worthy of preservation for their local, state, or national significance in American history, architecture, archaeology, engineering, or culture. The location of historic sites is shown on **Exhibit F-2** and the sites are listed in **Table F-2**.

Table F-2
HISTORIC SITES
Indianapolis International Airport

MAP ID	RESOURCE NAME
H1	Joel Jessup Farm
H2	Kellum-Jessup-Chandler Farm
H3	Kellum, Noah and Hannah Hadley, House
H4	Mooresville Friends Academy Building
H5	Mooresville Gymnasium
H6	Mooresville Historic Commercial District
H7	Nicholson-Rand House
H8	Smith Farm

Note: Map ID corresponds to Exhibit F-2 *Historic Sites*.
Source: U.S. National Park Service, 2013

F.3 FAA LAND USE PLANNING INITIATIVES

In 1999, the FAA announced a package of land-use planning initiatives designed to reduce problems in aviation noise around airports. Those initiatives are based on responses from local communities, aviation interests, and environmental groups. Of particular concern is the loss of noise reductions through the phase out of Stage 2 aircraft by permitting new noise-sensitive uses in areas where the noise contours are shrinking as a result of the phase out.

The purpose of the initiatives is to enable communities and airports to work together to manage the land use areas to be economically productive and protective of the airport's futures. The five packages include communication improvements for conveying FAA noise policies and noise compatibility information to communities near airports and state aviation organizations.

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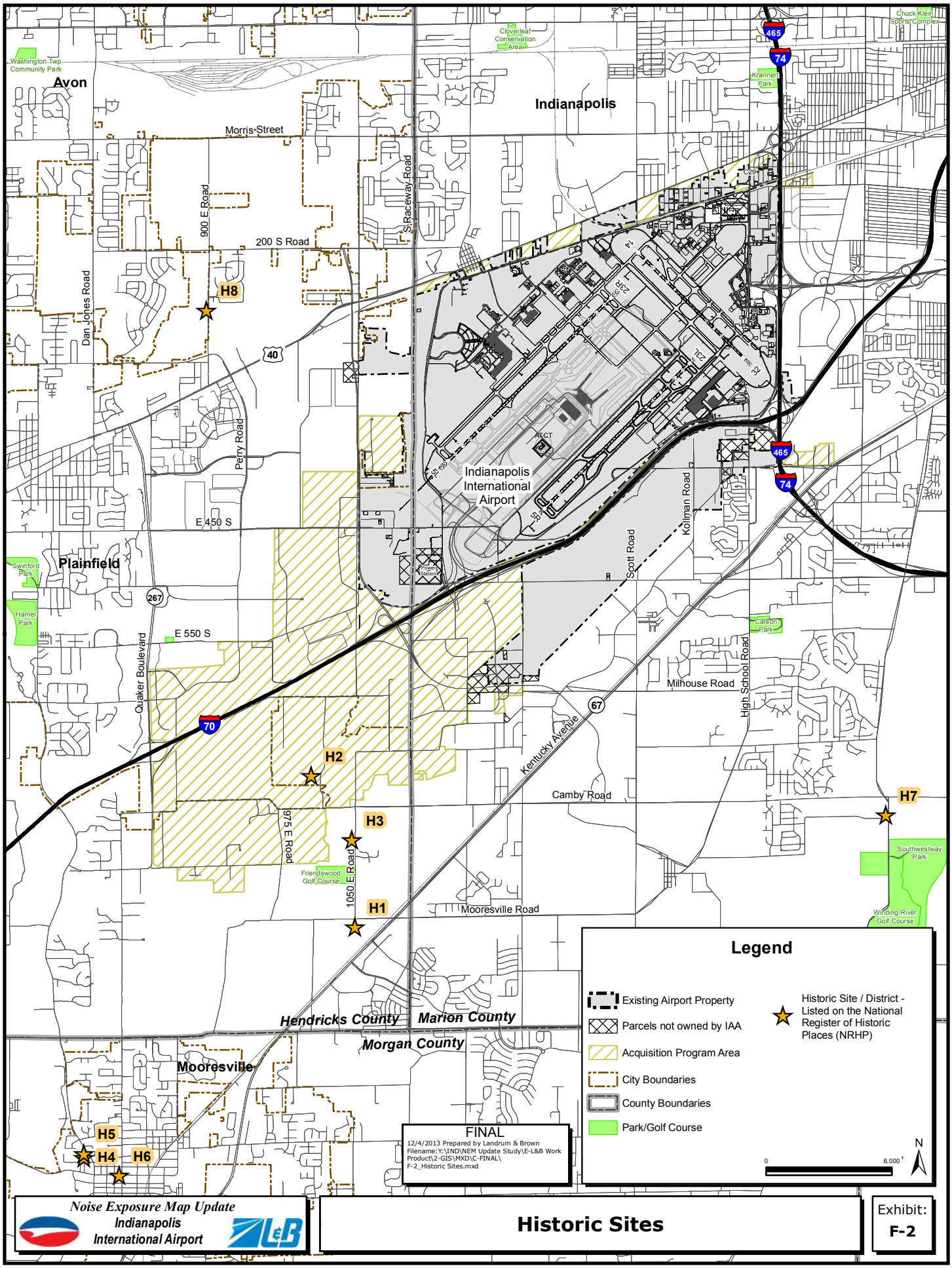
Avon
Indianapolis
Plainfield
Mooresville
Indianapolis International Airport
Morris Street
200 S Road
E 450 S
E 550 S
900 E Road
Dan Jones Road
Perry Road
S Raceway Road
Scott Road
Kollman Road
Quaker Boulevard
975 E Road
1050 E Road
Kentucky Avenue
Milhouse Road
High School Road
Camby Road
Mooresville Road
Hendricks County
Marion County
Morgan County
H1
H2
H3
H4
H5
H6
H7
H8
Legend
Existing Airport Property
Parcels not owned by IAA
Acquisition Program Area
City Boundaries
County Boundaries
Park/Golf Course
Historic Site / District - Listed on the National Register of Historic Places (NRHP)
FINAL
12/4/2013 Prepared by Landrum & Brown
Filename:Y:\IND\NEM Update Study\E-L&B Work Product\2-GIS\MXD\C-FINAL\ F-2_Historic Sites.mxd
N
0
6,000
Noise Exposure Map Update
Indianapolis International Airport
Historic Sites
Exhibit: F-2

BACK OF EXHIBIT

Appendix G

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APPENDIX G
FORECAST

The Indianapolis Airport Authority prepared a forecast of aviation activity for the Indianapolis International Airport in support of the Airport Master Plan Update. This forecast is based on the Federal Aviation Administration (FAA) 2012 Terminal Area Forecast (TAF). A copy of the 2012 TAF from 2013 through 2018 is included in this appendix.

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Table G-1
TERMINAL AREA FORECAST, 2012
Indianapolis International Airport

Fiscal Year	Itinerant Operations					Local Operations			Total Operations
	Air Carrier	Air Taxi & Commuter	General Aviation	Military	Total	Civil	Military	Total	
2013	103,421	36,602	15,583	1,635	157,241	0	0	0	157,241
2014	107,293	36,086	15,583	1,635	160,597	0	0	0	160,597
2015	111,170	35,327	15,583	1,635	163,715	0	0	0	163,715
2016	114,937	34,288	15,583	1,635	166,443	0	0	0	166,443
2017	118,633	33,028	15,583	1,635	168,879	0	0	0	168,879
2018	119,935	32,500	15,583	1,635	169,653	0	0	0	169,653

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Appendix H

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APPENDIX H
RESPONSE TO COMMENTS

The comment period for the Noise Exposure Map Update Study began on November 4, 2013 and ended on December 5, 2012. Two Public Hearings were held on November 18, 2013 and November 19, 2013 to accept written and oral comments from the public. A copy of the transcripts from the two Public Hearings is included in Appendix A, Public Coordination. No other written comments were received. This section includes the responses to each of the comments that were received during the comment period. The number assigned to each comment corresponds to the number noted in the margin of the Public Hearing Transcripts.

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RESPONSE TO COMMENTS

COMMENT NUMBER	COMMENT	RESPONSE
1	Commenter built his home based on airport planning documents from 1986, which did not include plans for the current Runway 5L/23R. Per the commenter, his home was constructed before the runway.	In 1990, the Indianapolis Airport Authority (IAA) commissioned a Master Plan Update to identify a development program that would enable the Airport to meet future facility requirements. The analysis concluded that the midfield terminal complex would best meet the long-term needs. To accommodate that development, the former Runway 5L/23R was proposed for relocation to its current position. In 1992, the Federal Aviation Administration (FAA) completed an Environmental Impact Statement for the proposed Master Plan development, which included mitigation for significant impacts due to the relocation of Runway 5L/23R. Flight procedures were developed and land use mitigation was implemented to reduce significant noise impacts on eligible noise-sensitive land uses. The location of the commenter's house is not located within the 65+ DNL noise contour; therefore, it is not considered to be significantly impacted by aircraft noise per Federal guidelines.
2	For the most part, noise is not a problem except when flights depart Runway 23 and turn north over new State Route 267.	The IAA and the FAA Airport Traffic Control Tower (ATCT) have implemented flight procedures during the nighttime hours (10:00 pm to 7:00 am) designed to minimize flights over non-compatible areas. These procedures are not in effect during the daytime (7:00 am to 10:00 pm). Average-annual noise levels from occasional aircraft departures that make the turn described in the comment were included in the calculation of noise contours for this Noise Exposure Map (NEM) Update.
3	One plane came close to my house and was in violation.	The IAA and the FAA ATCT have implemented flight procedures during the nighttime hours designed to minimize flights over non-compatible areas. A review of radar flight track data was conducted as part of this study. This data shows that the majority of flights are following the noise abatement procedures. The FAA and IAA have the ability to research a flight in question to determine if it did in fact deviate from the standard flight corridor. However, wind/weather, safety, and pilot technique can result in deviations from the approved flight corridors.

RESPONSE TO COMMENTS, *(Continued)*

COMMENT NUMBER	COMMENT	RESPONSE
4	My request is that flights use the nighttime flight procedures during the daytime.	The IAA and the FAA ATCT have implemented flight procedures during the nighttime hours (10:00 pm to 7:00 am) designed to minimize flights over non-compatible areas. These procedures were approved by the FAA to reduce nighttime noise and aircraft overflights near residential areas. The FAA has specific guidelines for the approval of noise abatement procedures for aircraft arriving and departing an airport. Because noise levels from daytime (7:00 am to 10:00 pm) operations do not exceed the Federal threshold of significance, this suggestion would not be approved by the FAA.
5	I don't think it is going to bankrupt an airline if the aircraft go five miles out before making the turn (during the daytime from 7:00 am to 10:00 pm).	Your comment has been noted.
6	We live there and have kids that are sleeping there and should not have this noise above us.	Sleep disturbance due to aircraft noise can be a major concern of residents living near an airport. The extent to which environmental noise disturbs individual sleep patterns varies. The DNL noise metric,[1] which is required for use in NEM Update studies, is designed to take into account higher sensitivity to nighttime noise by applying a 10 dB penalty to flights that occur between 10:00 p.m. and 7:00 a.m. Therefore, the concern that the commenter is expressing is being taken into consideration in the study. The IAA and the FAA ATCT have implemented flight procedures during the nighttime hours designed to minimize flights over non-compatible areas.
7	I say the noise is basically negligible, except when the aircraft make their turns, those are the MD-80s and DC-9s that are loud and they are on the gas when they are making that turn.	The flight paths and aircraft types described in the comment are included in the calculation of average-annual noise levels shown in the noise contours prepared for this NEM Update.

[1] DNL refers to the Day-Night Average Sound level, which is described in Section D.2 of Appendix D of this document.

RESPONSE TO COMMENTS, *(Continued)*

COMMENT NUMBER	COMMENT	RESPONSE
8	I think you are all pretty good neighbors, but I'd like for them to stop this little bit.	The IAA and FAA have implemented procedures during the nighttime hours (10:00 pm to 7:00 am) designed to minimize flights over non-compatible areas.
9	Planes vibrate my house. Usually in the morning from 3:00 am to 7:00 am and some from midnight to 3:00 am.	Aircraft engines produce low-frequency noise (LNF), which can induce structural building response that may cause rattle of windows, fixtures, pictures, and the like, causing annoyance. However, Findings from recent studies of LNF have been inconclusive and at the present time there is no universally accepted method of describing the effects of LFN. Nighttime cargo operations typically occur at IND from midnight to 6:00 am. The noise from these operations is included in the calculation of the noise contours that were prepared for this study. The noise contours include a nighttime penalty for aircraft noise that occurs from 10:00 pm to 7:00 am.
10	Aircraft have set my truck/house alarm off and we have had to pay fines for the false alarms.	Aircraft engines produce low-frequency noise (LNF), which can cause vibrations. To date, there are no conclusive studies on the effect of LNF on home/car alarms as described in the comment.
11	They (FedEx) need to fix something.	A review of radar data indicates that the majority of flights, including FedEx operations, are following the noise abatement procedures. Occasional deviations due to wind/weather, safety, or pilot technique are accounted for in the noise contours that were prepared for this NEM Update.

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FAA Determination

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

Chicago Airports District Office
2300 E. Devon
Des Plaines IL 60018

April 3, 2014

Indianapolis Airport Authority
Indianapolis International Airport
C/O Michael W. Wells, President
2500 S. High School Road
Indianapolis, IN 46241-4941

Dear Mr. Wells:

Indianapolis International Airport

FAA Acceptance of Noise Exposure Maps

This letter is to notify you that the Federal Aviation Administration (FAA) has evaluated and accepted the Noise Exposure Maps and supporting documentation dated December 20, 2013 for the Indianapolis International Airport. In accordance with 49 U.S.C. Section 47503 (formerly the Aviation Safety and Noise Abatement Act of 1979), as amended, we have determined that:

1. The 2013 noise contours and supporting documentation meet the requirements for the current Noise Exposure Map as of the date of submission as set forth in Title 14, Code of Federal Regulations (CFR), Part 150, *Airport Noise Compatibility Planning*, Section 150.21, and are accordingly accepted under this Part.

2. The projected aircraft operations, the 2018 noise contours and supporting documentation are accepted as the description of the future conditions as set forth in Part 150, and are accordingly accepted under this Part.

3. The documentation provides sufficient evidence consultation was accomplished in accordance with section 150.21(b).

FAA's acceptance of the Noise Exposure Maps is limited to the determination that the maps were developed in accordance with the procedures contained in Appendix A of Part 150. Such acceptance does not constitute approval of your data, information, or plans.

The FAA will publish a notice in the *Federal Register* announcing the acceptance of the Noise Exposure Maps for the Indianapolis International Airport. The FAA's acceptance of these Noise Exposure Maps under Part 150 in no way approves or endorses a Noise Compatibility Program, potential related Federal funding of projects identified in such a program, or any related operating restrictions at the subject airport.

Should any questions arise concerning the precise relationship of specific properties to noise exposure contours depicted on the Noise Exposure Maps, you should note that the

FAA will not be involved in any way in the determination of relative locations of specific properties with regard to the depicted noise contours, or in interpreting the maps to resolve questions concerning, for example, which properties should be covered by the provision of 49 U.S.C. 47506. These functions are inseparable from the ultimate land use control and planning responsibilities of local government. These local responsibilities are not changed in any way under Part 150 or through FAA's acceptance of your Noise Exposure Maps Update. Therefore, the responsibility for the detailed overlaying of noise contours onto the maps depicting properties on the surface rests exclusively with you the airport operator, or those public agencies and planning agencies with which consultation is required under 49 U.S.C 47503. The FAA relies on the certification by you under 150.21 of FAR Part 150, that the statutorily required consultation has been accomplished. (14 C.F.R. 150.5)

Your notice of this determination, and the availability of the Noise Exposure Maps, which when published at least three (3) times in a newspaper of general circulation in the county where the affected properties are located, will satisfy the requirements of 49 U.S.C. 47506 of the Act

Your attention is called to the requirements of Section 150.21(d) of Part 150, involving the prompt preparation and submission of revisions to these maps, if any actual or proposed change in the operation of the subject airport might create any substantial, new noncompatible land use in any areas depicted on the maps, or if there would be a significant reduction in noise over existing incompatible land uses that is not reflected in either map already on file with the FAA.

Thank you for your continued interest in noise compatibility planning.

Sincerely,

James Keefer
Manager
Chicago Airports District Office

Office of the United States Trade Representative, 600 17th Street NW., Washington, DC 20508.

SUPPLEMENTARY INFORMATION: Executive Order 12260 (December 31, 1980) implements the 1979 and 1994 Agreement on Government Procurement, pursuant to Title III of the Trade Agreements Act of 1979 as amended (19 U.S.C. 2511–2518). In section 1–201 of Executive Order 12260, the President delegated to the United States Trade Representative the functions vested in the President by sections 301, 302, 304, 305(c) and 306 of the Trade Agreements Act of 1979 (19 U.S.C. 2511, 2512, 2514, 2515(c) and 2516).

The Protocol Amending the Agreement on Government Procurement, done at Geneva on 30 March 2012 (''Protocol''), entered into force on April 6, 2014 for the United States and the following Parties: Canada, Chinese Taipei, Hong Kong, Israel, Liechtenstein, Norway, European Union, Iceland, and Singapore. See **Federal Register** 2014–05719.

The Protocol provides that following its entry into force, the Protocol will enter into force for each additional Party to the 1994 Agreement 30 days following the date on which the Party deposits its instrument of acceptance. On March 17, 2014, Japan deposited its instrument of acceptance to the Protocol. Therefore, the Protocol shall enter into force on April 16, 2014 for Japan. Therefore, for Japan, effective April 16, 2014, all references in Title III of the Trade Agreement Act of 1979 and in Executive Order 12260 to the Agreement on Government Procurement shall refer to the 1994 Agreement as amended by the Protocol.

With respect to those Parties which have not deposited their instruments of acceptance, all references in Title III of the Trade Agreement Act of 1979 and in Executive Order 12260 to the Agreement on Government Procurement shall continue to refer to the 1994 Agreement until 30 days following the deposit by such Party of its instrument of acceptance of the Protocol.

For the full text of the Government Procurement Agreement as amended by the Protocol and the new annexes that set out the procurement covered by all of the Government Procurement Agreement Parties, see GPA–113: *http://www.ustr.gov/sites/default/files/GPA%20113%20Decision%20on%20the%20outcomes%20of%20the%20negotiations%20under%20Article%20XXIV%207.pdf.*

Michael B.G. Froman,

United States Trade Representative.

[FR Doc. 2014–08927 Filed 4–17–14; 8:45 am]

BILLING CODE 3290–F4–P

DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

Acceptance of Noise Exposure Maps for Indianapolis International Airport (IND), Indianapolis, Indiana

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Notice.

SUMMARY: The Federal Aviation Administration (FAA) announces its determination that the updated noise exposure maps submitted by the Indianapolis International Airport (IND) under the provisions of 49 U.S.C. 47501 et. seq (Aviation Safety and Noise Abatement Act) and 14 CFR part 150 are in compliance with applicable requirements.

DATES: This notice is effective April 18, 2014, and applicable April 8, 2014. The public comment period ends May 8, 2014.

FOR FURTHER INFORMATION CONTACT: Ms. Amy Hanson, Environmental Protection Specialist, CHI–603, Federal Aviation Administration, Chicago Airport District Office, 2300 East Devon Avenue, Des Plaines, IL 60018. Telephone number: 847–294–7354.

SUPPLEMENTARY INFORMATION: This notice announces that the FAA finds that the updated noise exposure maps submitted for Indianapolis International Airport (IND) are in compliance with applicable requirements of Title 14 Code of Federal Regulations (CFR) part 150, effective (Note 1). Under 49 U.S.C. 47503 of the Aviation Safety and Noise Abatement Act (hereinafter referred to as ''the Act''), an airport operator may submit to the FAA noise exposure maps which meet applicable regulations and which depict non-compatible land uses as of the date of submission of such maps, a description of projected aircraft operations, and the ways in which such operations will affect such maps. The Act requires such maps to be developed in consultation with interested and affected parties in the local community, government agencies, and persons using the airport. An airport operator who has submitted noise exposure maps that are found by FAA to be in compliance with the requirements of 14 CFR part 150, promulgated pursuant to the Act, may submit a noise compatibility program for FAA approval which sets forth the measures the operator has taken or proposes to take to reduce existing non-compatible uses and prevent the introduction of additional non-compatible uses.

The FAA has completed its review of the updated noise exposure maps and accompanying documentation submitted by Indianapolis International Airport (IND). The documentation that constitutes the ''noise exposure maps'' as defined in section 150.7 of Part 150 includes: Exhibit NEM–1, Existing (2013) Noise Exposure Map; Exhibit NEM–2, Future (2018) Noise Exposure Map; Table 1, Distribution of Average Daily Operations by Aircraft Type Existing (2013) Conditions; Exhibit 2, Noise Abatement Flight Paths (Day—7:00AM to 7:00PM); Exhibit 3, Noise Abatement Flight Paths (Evening and Night—7:00PM to 7:00AM); Exhibit 4, North Flow Large Passenger Jet INM Flight Tracks; Exhibit 5, North Flow Large Cargo Jet INM Flight Tracks; Exhibit 6, North Flow Regional/Air Taxi Jet INM Flight Tracks;

Exhibit 7, North Flow Propeller Aircraft INM Flight Tracks; Exhibit 8, South Flow Large Passenger Jet INM Flight Tracks; Exhibit 9, South Flow Large Cargo Jet INM Flight Tracks; Exhibit 10, South Flow Regional/Air Taxi Jet INM Flight Tracks; Exhibit 11, South Flow Propeller Aircraft INM Flight Tracks; Exhibit 12, Existing (2013) Noise Exposure Contour; Exhibit 13, Existing (2013) Noise Exposure Contour Compared to (Previous) Future 2008 NEM/NCP (from 2008 Update); Exhibit 14, INM Grid Point Locations; Exhibit 15, Future (2018) Noise Exposure Contour; Exhibit 16, Future (2018) Noise Exposure Contour compared to Existing (2013) Noise Exposure Contour; and Exhibit 17, Completed Land Use and Environmental Mitigation Program Boundaries.

The FAA has determined that these updated noise exposure maps and accompanying documentation are in compliance with applicable requirements. This determination is effective on April 3, 2014. FAA's determination on an airport operator's noise exposure maps is limited to a finding that the maps were developed in accordance with the procedures contained in Appendix A of FAR part 150. Such determination does not constitute approval of the applicant's data, information or plans, or a commitment to approve a noise compatibility program or to fund the implementation of that program.

If questions arise concerning the precise relationship of specific properties to noise exposure contours depicted on a noise exposure map submitted under section 47503 of the Act, it should be noted that the FAA is not involved in any way in determining the relative locations of specific properties with regard to the depicted noise contours, or in interpreting the noise exposure maps to resolve questions concerning, for example, which properties should be covered by the provisions of section 47506 of the Act. These functions are inseparable from the ultimate land use control and planning responsibilities of local government. These local responsibilities are not changed in any way under part 150 or through FAA's review of noise exposure maps. Therefore, the responsibility for the detailed overlaying of noise exposure contours onto the map depicting properties on the surface rests exclusively with the airport operator that submitted those maps, or with those public agencies and planning agencies with which consultation is required under section 47503 of the Act. The FAA has relied on the certification by the airport operator, under section 150.21 of FAR part 150, that the statutorily required consultation has been accomplished.

Copies of the full updated noise exposure map documentation and of the FAA's evaluation of the maps are available for examination, upon prior appointment during normal business hours, at the following locations: Indianapolis Airport Authority, 7800 Col. H. Weir Cook Memorial Drive, Indianapolis, Indiana 46241. Federal Aviation Administration, Chicago Airports District Office, 2300 E. Devon, Suite 320, Des Plaines, IL 60018.

Questions may be directed to the individual named above under the heading **FOR FURTHER INFORMATION CONTACT**.

Issued in Des Plaines, IL, April 8, 2014.

James G. Keefer,

Manager, Chicago Airports District Office, FAA Great Lakes Region.

[FR Doc. 2014–08914 Filed 4–17–14; 8:45 am]

BILLING CODE 4910–13–P

DEPARTMENT OF TRANSPORTATION

Federal Highway Administration

Notice of Final Federal Agency Actions on Proposed Highway in Utah

AGENCY: Federal Highway Administration (FHWA), DOT.

ACTION: Notice of Limitation of Claims for Judicial Review of Actions by FHWA and Other Federal Agencies.

SUMMARY: This notice announces actions taken by the FHWA that are final within the meaning of 23 U.S.C. 139(l)(1). The actions relate to the proposed I–15; 24th Street Interchange project in Weber County in the State of Utah. These actions grant approvals for the project.

DATES: By this notice, the FHWA is advising the public of final agency actions subject to 23 U.S.C. 139(l)(1). A claim seeking judicial review of the FHWA actions on the highway project will be barred unless the claim is filed on or before September 15, 2014. If the Federal law that authorizes judicial review of a claim provides a time period of less than 150 days for filing such claim, then that shorter time period still applies.

FOR FURTHER INFORMATION CONTACT: Mr. Paul Ziman, Area Engineer, Region 1, FHWA Utah Division, 2520 West 4700 South, Suite 9A, Salt Lake City, Utah 84129; telephone: 801–955–3525; email: *paul.ziman@dot.gov*. The FHWA Utah Division Office's normal business hours are 7:30 a.m. to 4:30 p.m. (Mountain Standard Time), Monday through Friday, except Federal holidays.

SUPPLEMENTARY INFORMATION: Notice is hereby given that the FHWA has taken final agency action subject to 23 U.S.C. 139(l)(1) by issuing licenses, permits, and approvals for the I–15; 24th Street Interchange project in the State of Utah. The I–15; 24th Street Interchange project proposes to provide transportation improvements at and around I–15 at the 24th Street exit in Weber County, Utah. The project consists of the following improvements: Construct an I–15 northbound on-ramp and a southbound off-ramp from 24th Street in a modified diamond configuration, where the southbound off-ramp is located on 2550 South, and the southbound on-ramp is located on Pennsylvania Avenue; construct northbound and southbound auxiliary lanes on I–15 between the 24th Street and 21st Street Interchanges; widen 24th Street from two lanes to four lanes from the planned intersection of 2550 South and Pennsylvania Avenue to 900 West; restripe 2550 South from two lanes to three lanes; construct a new alignment to the southeast of Midland Drive at Pennsylvania Avenue connecting to the intersection of 1900 West and Midland Drive comprised of four lanes, a center turn lane, paved shoulders, curb, gutter, parkstrip, and sidewalk; realign the access road for the Northern Utah Community Correctional Center to avoid conflicts with the northbound I–15 on-ramp; remove the railroad tracks beneath I–15 at 24th Street and construct additional track on Midland Drive and north of 24th Street. The actions by the FHWA and the laws under which such actions were taken are described in the Environmental Assessment (EA) and Section 4(f) Evaluation and in the Finding of No Significant Impact (FONSI) issued on December 6, 2013.

This notice applies to all FHWA decisions as of the issuance date of this notice and all laws under which such actions were taken. Laws generally applicable to such actions include but are not limited to:

1. General: National Environmental Policy Act (NEPA) [42 U.S.C. 4321–4351; Federal-Aid Highway Act [23 U.S.C. 109].

2. Wildlife: Endangered Species Act [16 U.S.C. 1531–1544 and 1536]; Fish and Wildlife Coordination Act [16 U.S.C. 661–667(d); Migratory Bird Treaty Act [16 U.S.C. 703–712].

3. Cultural Resources: Section 106 of the National Historic Preservation Act of 1966, as amended [16 U.S.C. 470(f) et seq.]; Archaeological and Historic Preservation Act [16 U.S.C. 469–469(c)]; Archaeological Resources Protection Act of 1977 [16 U.S.C. 470(aa)–11].

4. Noise: Federal-Aid Highway Act of 1970 [Pub. L. 91–605, 84 Stat. 1713].

5. Executive Orders: E.O. 11593 Protection and Enhancement of Cultural Resources; E.O. 13287 Preserve America.

(Catalog of Federal Domestic Assistance Program Number 20.205, Highway Planning and Construction. The regulations implementing Executive Order 12372 regarding intergovernmental consultation on Federal programs and activities apply to this program.)

Authority: 23 U.S.C. 139(l)(1)

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Ivan Marrero,

Division Administrator.

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DEPARTMENT OF TRANSPORTATION

Federal Motor Carrier Safety Administration

[Docket No. FMCSA–2013–0415]

Agency Information Collection Activities; Revision of a Currently-Approved Information Collection Request: Request for Revocation of Authority Granted

AGENCY: Federal Motor Carrier Safety Administration (FMCSA), DOT.