United States Department of Transportation
Federal Aviation Administration

LAS VEGAS AREA OPTIMIZATION

Optimization of Air Traffic Routes Serving McCarran International Airport, Henderson Executive Airport, and North Las Vegas Airport

Final Environmental Assessment
Appendices

SEPTEMBER 2012

Appendix A

Agency Coordination, Agency Consultation, and Public Review and Comment Period

Appendix A: Agency Coordination, Agency Consultation, and Public Review and Comment Period

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List of Draft EA Review and Comment Period Materials

A.1 Agency Coordination

The FAA coordinated with Native American tribes, key government agencies, and elected officials at several points through the development of the EA, as discussed in this section:

- At initiation of the EA through issuance of an early notification letter (see Section A.1.1),
- During development of the EA through the conduct of a series of coordination meetings (see Section A.1.2), and
- Following completion of the Draft EA through notification of Draft EA availability, conduct of public workshops, and provision of a public comment period (see Section A.1.3).

A.1.1 Early Notification

Early notification letters were sent to Native American tribes, key government agencies, and elected officials by mail on December 18, 2009, and by email on December 23, 2009. The purpose of the early notification was to inform agencies, tribal officials, and elected officials of the FAA's intent to prepare an EA to consider implementation of the optimization of air traffic routes in the Las Vegas area and supplemental information about the Proposed Action, including a map depicting the general area of interest. In total, early notification letters were sent to 109 federal, state, and local agencies and elected officials as well as to 21 tribal representatives. The FAA also published notice of its intention to prepare a Draft EA in the *Las Vegas Review-Journal* on January 3, 2010.

The FAA received one comment in response to the early notification letters from a tribal representative, the Quechan Tribe Historic Preservation Officer, in which the Quechan Cultural Committee deferred comment on the project to those tribes closest to Las Vegas, the Paiutes, and noted their support of any concerns the tribes may have in regards to the proposed project.

A.1.2 Agency Coordination Meetings

Three separate agency coordination meetings were conducted to present the information to tribal representatives, agencies, and elected officials. A total of 162 invitations were sent. The intent of the meetings was to initiate government-to-government consultation and provide an informational overview and timeline of the project. The meetings were not intended to describe specific route changes or noise impacts because the noise analysis was not completed at the time of these meetings.

This section presents a summary of the coordination meetings with tribal representatives, agencies, and elected officials.

A.1.2.1 Tribal Representatives

An agency coordination meeting for tribal representatives was held on January 25, 2012 from 1:00 p.m. to 3:00 p.m. at the Alan Bible Federal Building, 600 Las Vegas Boulevard, Las Vegas, Nevada, 89101. A total of three individuals attended this meeting. FAA provided a project overview presentation along with a map specifically showing the Indian reservations the FAA identified in and surrounding the Generalized Study Area. Information was provided by tribal representatives on the best approach for proceeding with the tribal consultation. They suggested the following:

1) Provide a 30-day notice prior to all meetings to allow for travel preparation.

2) Conduct regional meetings in specific geographic areas with specific tribal bands. Take the meetings to them to allow greater participation by the tribes. FAA representatives agreed to explore this option and conduct regional meetings, if possible.

The FAA conducted three follow-on regional meetings to increase accessibility for tribal representatives, as requested by tribal representatives attending the January 25, 2012 meeting. The purpose of the regional meetings was to provide tribal representatives additional opportunities to meet with FAA representatives to discuss project details and obtain input on tribal concerns and how to effectively address them. Each of the three meetings was scheduled to include two sessions. The first session of the meetings was from 10:00 a.m. to 12:00 p.m. with other tribes in the geographic area to discuss general project topics. The second session was optional from 12:00 p.m. to 2:00 p.m. and provided each tribe with the opportunity to meet individually with an FAA representative to discuss specific tribal topics. The meetings were held at:

- May 1, 2012, Moapa Recreation Center, 1340 E. Highway 168, Moapa Town, Nevada
- May 2, 2012, Kathryn Heidenreich Center, 1776 Airway Ave, #1, Kingman, Arizona
- May 3, 2012, Primm Valley Conference Center, 31900 Las Vegas Boulevard S., Primm, Nevada

Three FAA representatives attended each of the three regional meetings: Ryan Weller, Tony Wylie, and Bill Ruggiero. No tribal representatives attended the meetings and no requests from tribes were received to meet individually with FAA representatives.

A.1.2.2 Elected Officials

An agency coordination meeting for elected officials was held on January 26, 2012 from 9:00 a.m. to 11:00 a.m. at the Alan Bible Federal Building, 600 Las Vegas Boulevard, Las Vegas, NV, 89101. No elected officials attended the meeting. This may be a result of a visit by President to the city, so many local elected officials were likely attending the event with the President.

A.1.2.3 Government Agencies

An agency coordination meeting for agency representatives was held on January 26, 2012 from 1:00 p.m. to 3:00 p.m. at the Alan Bible Federal Building, 600 Las Vegas Boulevard, Las Vegas, Nevada, 89101. A total of eight agency representatives attended this meeting. There was discussion of the details of the environmental process and the concepts of air traffic routes in the Las Vegas area. The agency representatives were interested in some of the secondary benefits that may result from this project. FAA was careful to highlight that the environmental studies that show the impacts of the proposal were not yet complete and the Environmental Consequences section of the EA was not yet complete. Discussions on the upcoming public workshops were focused on where the workshops would take place and times of day. During that meeting, it was noted that FAA is planning two workshops in two different locations, one would likely be a mid-day workshop and the second, an evening workshop.

General comments were also received about the difficulty with parking and access into the building due to security.

A.1.3 Draft EA Notification of Availability

Over 130 electronic copies of the Draft EA (on CD-ROM) along with an announcement of the Draft EA availability, public workshops, and public comment period were transmitted to tribes, agencies, and elected officials on June 29, 2012. The lists of tribes, agencies, and elected officials receiving a copy of the Draft EA are provided in Appendix B, Tables B-1 through B-3.

A public comment period of over 30 days—from July 1, 2012 to August 6, 2012—was provided for tribes, agencies, and elected officials. Comments received from tribes, agencies, and elected officials during the public comment period are provided in Section A.3.

A.2 Agency Consultation

The FAA, in accordance with Section 106 of the National Historic Preservation Act of 1966 and implementing regulations of 36 CFR Part 800, initiated consultation with the Nevada State Historic Preservation Office (SHPO) regarding the Proposed Action. A copy of the FAA's Section 106 consultation letter to the Nevada SHPO is provided on page A-5.

The Nevada SHPO reviewed the subject undertaking and the results of the analysis and concurred with the FAA's determination that the area of potential effect should be adequate to identify historic properties that could be affected by the undertaking; concurred with the FAA's determination that the identification efforts are adequate for the scale of the undertaking; and concurred with the FAA's finding that the proposed undertaking will not pose an adverse effect to historic properties. A copy of the Nevada SHPO's letter is provided on page A-12.

The FAA provided the U.S. Fish and Wildlife Service and the National Park Service with copies of the Draft EA for review and comment during the public comment period. No comments were received from either agency.

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

Office of the Air Traffic Organization
Western Service Area

1601 Lind Avenue Southwest
Renton, Washington 98057

JUN 2 8 2012

Mr. Ronald M. James
State Historic Preservation Officer
100 North Stewart Street
Carson City, Nevada 89701-4285

RE: Section 106 Consultation for proposed redesign of air traffic routes at McCarran International Airport (LAS), Henderson Executive Airport (HND) and North Las Vegas (VGT) Airport, Environmental Assessment

Dear Mr. James,

The Federal Aviation Administration (FAA), in accordance with Section 106 of the National Historic Preservation Act of 1966 and implementing regulations 36 C.F.R. Part 800, would like to invite you to participate in consultation for the proposed air traffic route redesign project in the Las Vegas, Nevada area. The proposed action is summarized below.

Site Location and Description
The Proposed Action will redesign the air traffic routes over a wide area. The Proposed Action Generalized Study Area (GSA) under the National Environmental Policy Act (NEPA) encompasses a large radius around the three airports (LAS, VGT and HND). The GSA was designed to capture flight paths identified in the radar data and Proposed Action design up to the point at which 95 percent of aircraft operating along these paths are above 10,000 feet above ground level. No land acquisition, construction, or other ground disturbance would occur under the Proposed Action.

Proposed Action and Area of Potential Effect (APE)
To assess the potential indirect effects of the Proposed Action on historic resources, an APE was defined. Federal regulations define the APE as the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist. The area of potential effects is influenced by the scale and nature of an undertaking and may be different for different kinds of effects caused by the undertaking.

The Proposed Action is not expected to result in visual or light emissions effects; therefore, the APE was defined based on potential noise effects on historic resources. FAA conducted an investigation to identify historic properties in the GSA. Historic properties were defined as resources that are in or eligible for listing in the National Register of Historic Places (NRHP) or relevant State Historic Preservation Office (SHPO) listings, or that have been identified through tribal consultation. The potential Section 106 properties identified within the GSA are depicted on Exhibit 1. Characteristics of the 37 historic properties identified in the GSA are summarized in Table 1. Noise exposure levels were calculated at points within the GSA representing the potential Section 106 properties. The APE for potential Section 106 properties was then defined as the specific areas encompassing the those properties identified within the GSA that would be exposed to Day Night Average Sound Levels (DNL) of 45 and higher, under the Proposed Action either in 2012 or 2017, the years evaluated in the EA. The properties comprising the APE based on this criterion are identified in Exhibit 2.

The analysis of historic resources considered a change in noise exposure measured in decibels (dB), when comparing the Proposed Action with the No Action Alternative, of:

- DNL 1.5 dB in areas exposed aircraft noise of DNL 65 and higher,
- DNL 3.0 dB in areas exposed to aircraft noise from DNL 60 to 65, or
- DNL 5.0 dB in areas exposed to aircraft noise from DNL 45 to 60.

As indicated in Table 2, no changes in noise levels, according to the criteria noted above, occurred at historic properties were found that would affect historic resources in 2012 or 2017. Therefore, based on our consideration that this Proposed Action will not have adverse effects on historic properties, we have determined that the proposed undertaking has no potential to cause adverse effects on archaeological or historic properties listed or eligible for listing on the National Register of Historic Places.

A Draft Environmental Assessment in accordance with the NEPA is currently being prepared for release. The noise analysis has been conducted and the Proposed Action does not significantly increase threshold noise. Based on the above discussion, we would like to recommend a finding of *no historic properties or other archaeological or cultural resources adversely affected* for the Proposed Action.

We look forward to your response within 30 days. If you should need any further information or wish to discuss the project, please contact Ryan Weller at (425) 203-4544.

Sincerely,

Robert E. Henry

fn John Warner
Manager, Operations support Group
Western Service Center

Attachments: Exhibit 1, Potential Section 106 properties within the Generalized Study Area
Exhibit 2, Potential Section 106 Properties – Area of Potential Effects
Table 1, Characteristics of Potential Section 106 Properties
Table 2, Noise Exposure at Potential Section 106 Properties

Table 1 (1 of 2)

Characteristics of Potential Section 106 Properties

Site Number	Site Name	Current Use	Primary Areas of Significance	Aircraft Noise Exposure (DNL)
1	Las Vegas Mormon Fort	Museum	• Architecture • Aboriginal-Historic	41.0
2	Kiel Ranch	Agriculture	• Architecture • Landscape Architecture	41.5
3	Las Vegas High School Academic Building and Gymnasium	Office	• Architecture • Education	
4	Jay Dayton Smith House	Commercial	• Architecture	41.1
5	Moulin Rouge Hotel	Hotel and Theater	• Ethnic Heritage: Black	41.6
6	Huntridge Theater	Recreation and Culture	• Entertainment and Recreation • Architecture	41.1
7	Clark Avenue Railroad Underpass	Transportation	• Social History • Ethnic Heritage: Black	41.2
8	Las Vegas High School Neighborhood Historic District	Education	• Architecture • Community Planning and Development	
9	John S. Park Historic District	Residential	• Community Planning and Development • Architecture	42.4
10	Washington School	Education	• Architecture	41.8
11	Railroad Cottage Historic District	Residential	• Architecture • Exploration/Settlement	41.0
12	Woodlawn Cemetery	Cemetery	• Community Planning and Development • Social History	41.4
13	Berkley Square Historic District	Residential	• Ethnic Heritage: Black • Community Planning and Development	42.2
14	Morelli House	Office, Museum and Gallery	• Architecture	40.3
15	Las Vegas Boulevard Grammar School	Government	• Architecture • Education	
16	D Street Grammar School	Government	• Architecture • Education	41.6
17	Green Shack	Commercial	• Commerce	40.8
18	U.S. Post Office and Courthouse	Government	• Architecture • Politics/Government	40.7
19	Little Church of the West	Commercial	• Commerce • Architecture	58.6
20	The "Welcome to Fabulous Las Vegas" Sign	Sign	• Entertainment and Recreation	61.6
21	Las Vegas Springs	Recreation and Culture	• Archaeology: Prehistoric • Agriculture	42.1
22	Eureka Locomotive	Transportation	• Transportation • Engineering	42.0

Table 1 (2 of 2)

Historic, Architectural, and Cultural Resources within the GSA

Site Number	Site Name	Current Use	Primary Areas of Significance	Aircraft Noise Exposure (DNL)
23	Tule Springs Ranch	Park	• Agriculture • Commerce	23.4
24	Boulder Dam Hotel	Hotel	• Commerce	32.6
25	The Old Boulder City Hospital	Resort	• Social/Humanitarian	32.6
26	Willow Beach Gauging Station	Park	• Engineering	34.7
27	Boulder City Historic District	Commercial	• Architecture • Community Planning	32.6
28	Hoover Dam	Energy Facility and Water Works	• Commerce • Engineering	35.2
29	Goodsprings Schoolhouse	Education	• Education • Architecture	32.8
30	Pioneer Saloon	Commercial and Entertainment	• Commerce • Entertainment and Recreation	33.0
31	Camp Lee Canyon	Camp	• Government and Politics	22.6
32	Sandstone Ranch	Agriculture	• Agriculture • Economics	33.2
33	Walking Box Ranch	Education	• Agriculture • Architecture	20.9
34	Mormon Well Spring	Government	• Aboriginal-Historic/Prehistoric • Cattle and Horse Ranching	3.9
35	Potosi	Commercial and Industrial	• Engineering • Industry/Commerce	36.7
36	Hidden Forest Cabin	Government/Wildlife Refuge	• Agriculture • Bootlegging	2.1
37	Old Spanish Trail—Mormon Road Historic Trail District	Recreation	• Event • Information Potential	

Sources: U.S. Department of Interior, National Park Service, National Register of Historic Places, http://nrhp.focus.nps.gov/natreghome.do?searchtype=natreghome, (accessed May, 23 2010); William Collins, State Historic Preservation Office, Arizona State Parks, "RE Arizona State Historic State Listings," email to Joel E. Donham, Ricondo & Associates, Inc., May 5, 2010 (Arizona historic resources); California State Parks Office of Historic Preservation Registration Programs, Inyo County and San Bernardino County, http://www.parks.ca.gov/listed_resources/, (accessed May 12, 2010) (California historic resources); Nevada Department of Museums, Library and Arts, "Morelli House Nevada Register of Historic Places registration Form," October 11, 2001 (Nevada historic resources); Nevada Department of Museums, Library and Arts, "Pioneer Nevada Register of Historic Places registration Form," December 11, 2007 (Nevada historic resources); Karyn de Dufour, Nevada Department of Cultural Affairs, "RE: State of Nevada Historical Registry GIS data," email to Joel E. Donham, Ricondo & Associates, Inc., May 10,2010 (Nevada historic resources); and Karyn de Dufour, Nevada Department of Cultural Affairs, "RE: State of Nevada Historical Registry GIS data," email to Joel E. Donham, Ricondo & Associates, Inc., May 12,2010 (Nevada historic resources).

Prepared by: Ricondo & Associates, Inc., July 2010.

Table 2: Noise Exposure at Potential Section 106 Properties in the Area of Potential Effects

			Location		DNL						
					2009	2012			2017		
ID No.	Historic Property Name [1/]	Grid ID	Latitude	Longitude	Existing Conditions	No Action	Proposed Action	Change	No Action	Proposed Action	Change
1	Las Vegas Mormon Fort	HS0000000000001	36.1802	-115.13	41.0	43.6	40.0	(3.6)	44.4	40.8	(3.7)
2	Kiel Ranch	HS0000000000002	36.2033	-115.14	41.5	44.1	38.6	(5.5)	45.0	38.6	(6.4)
3	Las Vegas High School District	HS0000000000016	36.1626	-115.14	40.8	45.2	41.8	(3.4)	45.7	42.6	(3.1)
4	Jay Dayton Smith House	HS0000000000008	36.162	-115.14	41.1	45.9	42.0	(3.9)	46.5	42.9	(3.6)
5	Moulin Rouge Hotel	HS0000000000010	36.1775	-115.15	41.6	44.9	41.8	(3.1)	45.7	42.3	(3.3)
6	Huntridge Theater	HS0000000000011	36.1584	-115.14	41.1	45.0	42.1	(2.9)	45.6	42.9	(2.7)
7	Clark Avenue Railroad Underpass	HS0000000000013	36.1772	-115.14	41.2	44.1	40.9	(3.2)	44.9	41.6	(3.3)
8	Las Vegas High School District	HS0000000000007	36.164	-115.14	40.6	44.3	41.6	(2.7)	45.0	42.4	(2.6)
9	John S. Park Historic District	HS0000000000017	36.1564	-115.14	42.4	47.1	43.0	(4.1)	47.6	43.8	(3.8)
10	Washington School	HS0000000000018	36.1955	-115.13	41.8	44.4	38.5	(5.9)	45.3	39.0	(6.3)
11	Railroad Cottage Historic District	HS0000000000021	36.1641	-115.15	41.0	45.8	42.1	(3.7)	46.4	42.8	(3.6)
12	Woodlawn Cemetary	HS0000000000023	36.1873	-115.13	41.4	44.0	39.0	(5.0)	45.0	39.8	(5.1)
13	Berkley Square Historic District	HS0000000000026	36.1905	-115.15	42.2	44.9	40.9	(4.0)	45.8	41.0	(4.8)
14	Morelli House	HS0000000000029	36.1653	-115.14	40.3	43.7	41.5	(2.3)	44.4	42.3	(2.2)
15	Las Vegas Grammar School	HS0000000000030	36.1653	-115.14	40.8	44.9	41.7	(3.2)	45.6	42.5	(3.1)
16	D Street Grammar School	HS0000000000031	36.1809	-115.15	41.6	44.4	41.1	(3.3)	45.2	41.5	(3.7)
17	Green Shack	HS0000000000035	36.158	-115.12	40.8	43.2	42.2	(1.0)	44.0	43.0	(1.0)
18	U.S. Post Office and Courthouse	HS0000000000036	36.1725	-115.14	40.7	43.8	41.0	(2.8)	44.6	41.9	(2.7)
19	**Little Church of the West**	HS0000000000009	36.0862	-115.17	58.6	62.2	62.3	0.1	62.9	63.0	0.1
20	**The "Welcome to Fabulous Las Vegas" Sign**	HS0000000000027	36.0835	-115.17	61.6	65.3	65.5	0.2	66.0	66.1	0.2
21	**Las Vegas Springs**	HS0000000000003	36.1707	-115.19	42.1	45.3	44.5	(0.8)	45.8	45.0	(0.9)
22	Eureka Locomotive	HS0000000000012	36.2275	-115.21	42.0	45.3	42.5	(2.8)	44.5	42.2	(2.3)
23	Tule Springs Ranch	HS0000000000022	36.3207	-115.27	23.4	25.8	33.7	8.0	25.7	33.6	7.8
24	Boulder Dam Hotel	HS0000000000004	35.978	-114.83	32.6	42.4	43.9	1.5	43.3	44.9	1.6
25	The Old Boulder City Hospital	HS0000000000005	35.9793	-114.83	32.6	42.4	43.8	1.4	43.3	44.8	1.5
26	Willow Beach Gauging Station	HS0000000000006	35.8923	-114.69	34.7	38.8	37.3	(1.5)	39.9	38.6	(1.3)
27	Boulder City Historic District	HS0000000000014	35.9779	-114.84	32.6	42.4	43.9	1.5	43.3	44.9	1.7
28	Hoover Dam	HS0000000000025	36.0161	-114.74	35.2	41.0	38.5	(2.5)	41.9	39.6	(2.3)
29	Goodsprings Schoolhouse	HS0000000000019	35.8315	-115.44	32.8	37.2	35.6	(1.6)	37.7	36.3	(1.4)
30	Pioneer Saloon	HS0000000000028	35.8325	-115.43	33.0	37.4	35.9	(1.5)	37.9	36.6	(1.3)
31	Camp Lee Canyon	HS0000000000015	36.309	-115.68	22.6	36.3	26.2	(10.1)	36.7	19.1	(17.6)
32	Sandstone Ranch	HS0000000000020	36.0694	-115.46	33.2	33.3	32.3	(1.0)	34.1	33.0	(1.1)
33	Walking Box Ranch	HS0000000000024	35.4888	-115.04	20.9	20.6	22.3	1.8	21.0	22.9	1.9
34	Mormon Well Spring	HS0000000000032	36.6442	-115.1	3.9	7.0	4.6	(2.4)	7.9	5.2	(2.7)
35	Potosi	HS0000000000033	35.9668	-115.54	36.7	36.4	31.8	(4.5)	36.7	32.1	(4.6)
36	Hidden Forest Cabin	HS0000000000034	36.6318	-115.22	2.1	5.1	3.5	(1.6)	6.0	4.1	(1.9)

Notes:

DNL 1.5 db increase in areas exposed to aircraft noise of DNL 65 and higher under the Proposed Action

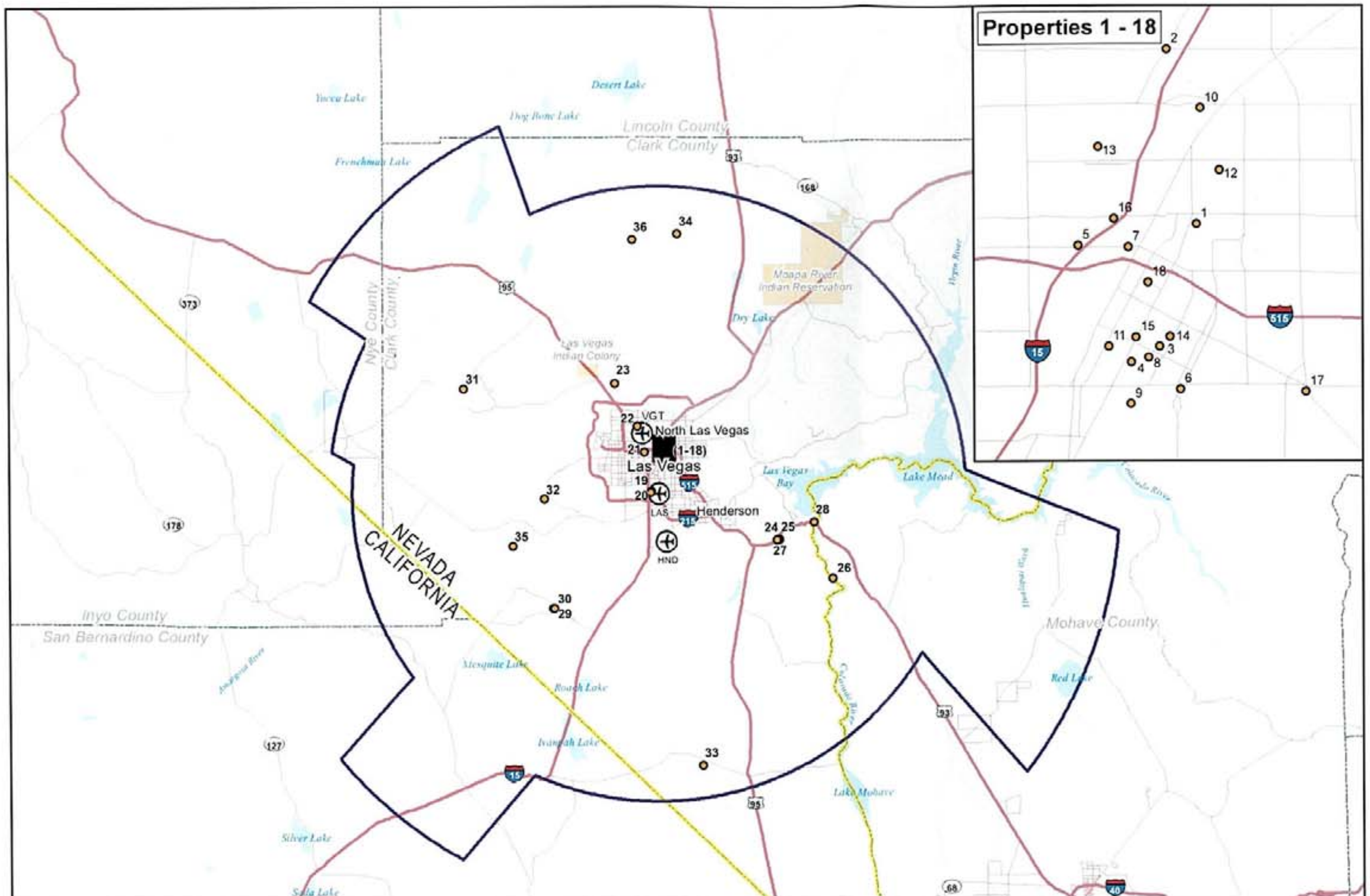
DNL 3.0 dB increase in areas exposed to aircraft noise of DNL 60-65 under the Proposed Action

DNL 5.0 dB increase in areas exposed to aircraft noise of DNL 45-60 under the Proposed Action

Historic Property Indicates historic properties in Area of Potential Effects

1/ Several routes of the Old Spanish Trail traverse the Area of Potential Effects (APE) in a primarily northeast-southwest orientation. Based on the results of a grid point noise analysis over federal lands in the APE (i.e., Potential Section 4(f) properties managed by agencies such as the National Park Service, the National Forest Service, and the Bureau of Land Management), federal lands through which the Old Spanish Trail traverses, the Old Spanish Trail is not expected to experience changes in noise exposure that would be considered significant or otherwise warrant disclosure under the Proposed Action.

Source: Ricondo & Associates, Inc., based on Metron Aviation, March 2012.
Prepared by: Ricondo & Associates, Inc., April 2012.



LEGEND

- EA Airports
- State Boundaries
- County Boundaries
- Highways
- Major Roads
- Rivers
- Water Bodies
- Generalized Study Area Boundary
- Indian Reservation
- Historic Properties

List of Properties

1	Las Vegas Mormon Fort
2	Kiel Ranch
3	Las Vegas High School Academic Building and Gymnasium
4	Jay Dayton Smith House
5	Moulin Rouge Hotel
6	Huntridge Theater
7	Clark Avenue Railroad Underpass
8	Las Vegas High School Neighborhood Historic District
9	John S. Park Historic Park
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27	Boulder City Historic District
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29	Goodsprings Schoolhouse
30	Pioneer Saloon
31	Camp Lee Canyon
32	Sandstone Ranch
33	Walking Box Ranch
34	Mormon Well Spring
35	Potosi
36	Hidden Forest Cabin
37	Old Spanish Trail*

Notes:
EA - Environmental Assessment
LAS - McCarran International Airport
VGT - North Las Vegas Airport
HND - Henderson Executive Airport
*Old Spanish Trail passes through the GSA and central Las Vegas. Not shown on map.

Projection: State Plane, Nevada East Zone

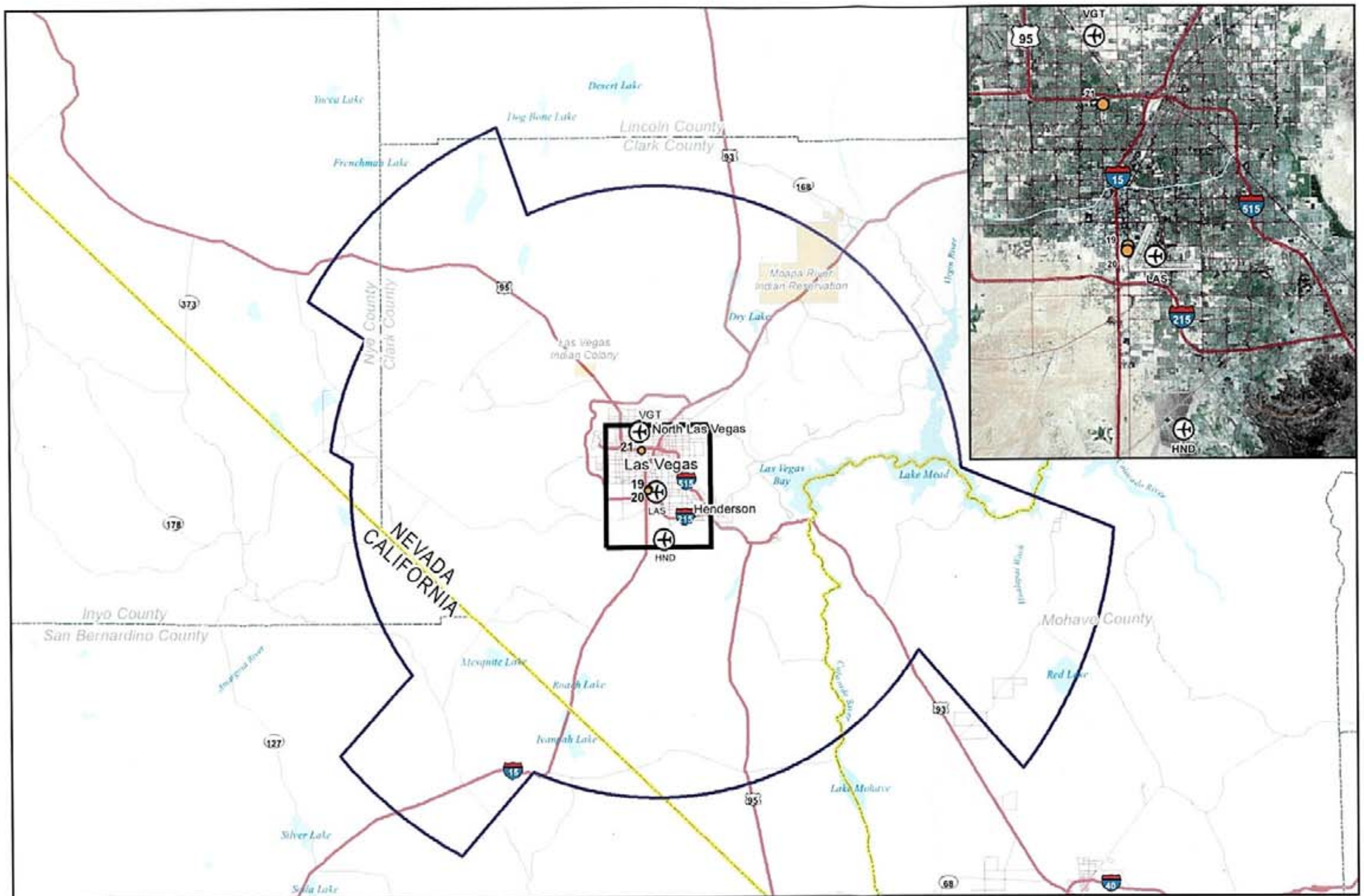
Sources: U.S. Department of the Interior, National Park Service, National Register of Historic Places, 2007 (historic resources); Nevada State Historic Preservation Office, 1998, 1999, 2001, 2007 (historic resources); Metron Aviation, July 2010 (generalized study area boundary); U.S. Geological Survey, 2009 (state boundaries, county boundaries, water bodies); Clark County Geographic Information Systems Management Office, 2001 (airports); Environmental Systems Research Institute, 2008 (roads, rivers).
Prepared by: Ricondo & Associates, Inc., August 2010.

0 15 NM

north

Exhibit 1

Potential Section 106 Properties within the Generalized Study Area



LEGEND

- EA Airports
- State Boundaries
- County Boundaries
- Highways
- Major Roads
- Rivers
- Water Bodies
- Generalized Study Area Boundary
- Indian Reservation
- Historic Properties - Area of Potential Effects

List of Properties

19	Little Church of the West
20	The "Welcome to Fabulous Las Vegas" Sign
21	Las Vegas Springs

Notes:
EA - Environmental Assessment
LAS - McCarran International Airport
VGT - North Las Vegas Airport
HND - Henderson Executive Airport
*Old Spanish Trail passes through the GSA and central Las Vegas. Not shown on map.

Projection: State Plane, Nevada East Zone

Sources: U.S. Department of the Interior, National Park Service, National Register of Historic Places, 2007 (historic resources); Nevada State Historic Preservation Office, 1998, 1999, 2001, 2007 (historic resources); Metron Aviation, July 2010 (generalized study area boundary); U.S. Geological Survey, 2009 (state boundaries, county boundaries, water bodies); Clark County Geographic Information Systems Management Office, 2001 (airports); Environmental Systems Research Institute, 2008 (roads, rivers).
Prepared by: Ricondo & Associates, Inc., August 2010.

Exhibit 2

0 15 NM

north

Potential Section 106 Properties - Area of Potential Effects

LEO M. DROZDOFF, P.E.
Director
Department of Conservation and
Natural Resources

RONALD M. JAMES
State Historic Preservation Officer

BRIAN SANDOVAL
Governor

STATE OF NEVADA

Address Reply to:
901 S. Stewart Street, Suite 5004
Carson City, NV 89701-5248
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www.nvshpo.org

DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES

STATE HISTORIC PRESERVATION OFFICE

July 24, 2012

John Warner
Manager, Operations Support Group
Western Service Center
Federal Aviation Administration
1601 Lind Avenue Southwest
Renton WA 98057

RECEIVED JUL 31 2012

RE: Redesign of Air Traffic Routes at McCarran International Airport, Henderson Executive Airport, and North Las Vegas Airport, Clark County (Undertaking #2012-2218).

Dear Mr. Warner:

The Nevada State Historic Preservation Office (SHPO) reviewed the subject undertaking for Federal Aviation Administration compliance with Section 106 of the National Historic Preservation Act of 1966, as amended. The SHPO concurs with the Federal Aviation Administration's determination that the area of potential effect for the subject undertaking should be adequate to identify historic properties that could be affected by the undertaking.

The SHPO concurs with the Federal Aviation Administration's determination that the identification efforts described in the attached document are adequate for the scale of the undertaking.

The SHPO concurs with the Federal Aviation Administration's finding that the proposed undertaking will not pose an adverse effect to historic properties.

If, however, the actual DNL rises above the expected level described in this submission and illustrated on Table 2 and an interested member of the public or tribal government contacts this office, additional consultation would be necessary.

If you have any questions concerning this correspondence, please feel free to contact me at (775) 684-3443 or by e-mail at rlpalmer@shpo.nv.gov.

Sincerely,

Rebecca Lynn Palmer, Deputy
State Historic Preservation Officer

5/6/12 - RX

A.3 Public Review and Comment Period

The FAA conducted a public involvement program, the scope of which was announced in a public notice. The public involvement program included:

- Initiation of the public review and comment period by making the Draft EA available for public review and by announcing the Draft EA's availability, where it could be reviewed, the duration of the public comment period, and the conduct of public workshops;
- Conduct of public workshops; and
- Receipt and consideration of public comments on the Draft EA.

The elements of the public involvement program are discussed in this section.

A.3.1 Draft EA Public Review and Comment Period

The FAA advertised notice of the availability of the Draft EA for public review, the duration of the public comment period, and the conduct of public workshops. The notice was advertised in the *Las Vegas Review Journal* on July 1, 2012, and July 3, 2012, and was posted on the LAS Optimization EA project website.

The Draft EA was made available at 22 libraries in the Las Vegas area, as documented in Appendix B, Section B.2, and was posted on the LAS Optimization EA project website.

The Draft EA comment review period was open from July 1, 2012 through August 6, 2012, a period of over 30 calendar days.

Copies of the following items are included in this appendix to document the Draft EA public review and comment period announcement:

- Draft EA Availability Announcement (see page A-20)
- *Las Vegas Review-Journal* Affidavit of Publication of the Public Notice (see page A-22)
- LAS Optimization EA website (see page A-23)

A.3.2 Public Workshops

The FAA conducted two public workshops in an open house format. Informational handouts were provided to workshop attendees and display boards were available to present an overview of the Proposed Action, alternatives considered, potential environmental effects, and the EA review process. FAA personnel and other preparers of the EA were available at the workshops to answer questions. The two public workshops were:

- Monday, July 23, 2012, 4:00 p.m. to 7:00 p.m. at the Paseo Verde Library, 280 South Green Valley Parkway, Henderson, Nevada.
- Tuesday, July 24, 2012, 11:00 a.m. to 3:00 p.m. at the Las Vegas Public Library, 833 Las Vegas Boulevard North, Las Vegas, Nevada.

Attendance at the public workshops was five persons at the July 23 workshop at the Paseo Verde Library in Henderson and seven persons at the July 24 workshop at the Las Vegas Public Library. Workshop attendees were invited to submit written comments using a comment form provided at the workshop, to submit written comments via mail or email through the end of the comment period, or to submit oral comments to a court reporter that was available for the duration of the two public workshops. No workshop attendees submitted written or oral comments at either of the public workshops.

Copies of the following items are included in this appendix to document the materials available at the public workshops:

- Public Workshop Sign-in Sheets (see page A-25)
- Public Workshop Handout (see page A-28)
- Public Workshop Display Boards (see page A-29)
- Example of a Comment Form (see page A-36)
- Photo Documentation of the Workshops (see page A-38)

A.3.3 Comments Received on the Draft EA

As noted above, a public comment period of over 30 calendar days was provided for the review and submittal of comments on the Draft EA, from July 1, 2012 through August 6, 2012.

During the Draft EA public comment period, the FAA received written comments from four agencies, a written comment from one tribe, and a written comment from one member of the public. As noted in Section A.3.2, no written or oral comments were received during the public workshops. The commenters, nature of the comments, and FAA responses are summarized below in **Tables A-1, A-2,** and **A-3** for agencies, tribes, and the public, respectively. Notations in the tables identify the page in this appendix on which a copy of the comment letter is provided.

The FAA updated several items in the Final EA to improve document clarity, such as reorganization of several sections[1]; updates to several tables and an exhibit[2]; revisions to the presentation of methodology for the aircraft noise, potential Section 4(f) resources, and historic resources analyses[3] to improve consistency among these discussions; and clarification of information presented in the noise change analyses[4]. A discussion was added to Appendix E to explain the methodology employed to develop the future year (2012 and 2017) average annual runway configuration use for LAS.[5]

In addition to the updates to the Draft EA, the FAA made several other changes to the Final EA. These changes do not affect the FAA's conclusions presented in the Draft EA:

- Appendices A and B were updated to reflect documentation of the public outreach effort conducted for the Draft EA.
- The Draft EA incorrectly identified the census block centroid developed in hotel and commercial land uses (7 persons) exposed to the DNL 3 dB change criterion as a single census block. Although the number of persons exposed to this criterion was correctly presented, the 7 persons were associated with two census block centroids developed in hotel and commercial land uses. The text was corrected in the Final EA to reference the proper

1 Draft EA Section 2.3.1 is Section 2.4 in the Final EA; Draft EA Section 2.3.2 is Section 2.5 in the Final EA; Draft EA Section 4.3.5 is Section 4.3.6 in the Final EA; Draft EA Section 4.3.6 is Section 4.3.5 in the Final EA; and Appendices F.3 and F.4 in the Draft EA were removed and information is now presented in Section 5.3 and 5.4.

2 Information was clarified in Tables IV-4, IV-5, IV-14, and V-8, and on Exhibit IV-9.

3 See Sections 5.1.2, 5.3.2, and 5.4.2.

4 See Sections 5.1.3 and 5.14 and Exhibits V-3 and V-6.

5 See Appendix E, Section E.7.2.4, page E-27.

number of population centroids and additional detail on the hotel and commercial land uses was provided.

- Following release of the Draft EA to the public, several changes were made to FAA's modeling software NIRS that affect aircraft fuel burn calculations, and, thus, the fuel burn results that are presented in the discussions of natural resources and energy supply of the Draft EA. Furthermore, the aircraft fuel burn results formed the basis of findings for the air quality and climate analyses. The error in the NIRS fuel burn calculation resulted in the overstatement of fuel burn values in the Draft EA.[6] Although the absolute values of reported aircraft fuel burn have been revised to lower values for both the Proposed Action and the No Action Alternative in the Final EA, the finding documented in the Draft EA that the Proposed Action would result in lower quantities of fuel burned when compared with the No Action Alternative remains unchanged in the Final EA. Correspondingly, the lower quantities of fuel burned under the Proposed Action as compared with the No Action Alternative correlate to lower quantities of air pollutants and greenhouse gases emitted; thus, even with lower quantities of reported fuel burn, the conclusions for the air quality and climate analyses remain unchanged. **Table A-4** presents the changes in reported values for quantities of fuel burned and CO_2e emissions for the Draft EA and Final EA, and notes in which section of the Final EA the revised results are presented.

6 Michael Johnson, Metron Aviation, "RE: LAS Opti – Final EA (Change of Exposure DNL and New Fuel Burn values)," email to Lisa Reznar, Ricondo & Associates, Inc., Donna Warren, Federal Aviation Administration, and Ryan Weller, Federal Aviation Administration, August 22, 2012.

Table A-1

Draft EA Comment Summary and FAA Response—Agencies

Comment Number	Commenting Individual or Organization	Date	Comment	FAA Response	Copy of Letter Provided on
A.1	U.S. Department of Homeland Security, Federal Emergency Management Agency (FEMA)	July 3, 2012	Comment 1: FEMA notified the FAA of the need to the review of applicable Flood Insurance Rate Maps (FIRMs) and consideration of National Flood Insurance Program (NFIP) floodplain management building requirements.	Comment 1: The Proposed Action and the No Action Alternative would not involve ground disturbance, facility development, or construction activities. Thus, potential effects on floodplains and NFIP floodplain management building requirements are not applicable to the FAA's evaluation of the effects of implementing the Proposed Action. No updates to the EA were made in response to this comment.	Page A-40
A.2	Nevada State Clearinghouse	July 17, 2012	Comment 2: Nevada State Clearinghouse notice to government agencies of the availability of the FAA LAS Optimization Draft EA for review and comment. The notice requested agencies to evaluate the project's effects on agency plans and programs and other issues that may be pertinent to applicable laws and regulations, and requested agencies to reply to the Nevada State Clearinghouse by August 3, 2012.	Comment 2: Comment noted.	Page A-42
A.3	State of Nevada (NV), Department of Conservation and Natural Resources, State Historic Preservation Office (SHPO)	July 23, 2012	Comment 3: In response to Nevada State Clearinghouse notice (see Comment Number A.2), the Nevada SHPO stated that it supports the document as written.	Comment 3: Comment Noted	Page A-45

Table A-1 (Continued)

Draft EA Comment Summary and FAA Response—Agencies

Comment Number	Commenting Individual or Organization	Date	Comment	FAA Response	Copy of Letter Provided on
A.4	State of Nevada (NV), Department of Conservation and Natural Resources, State Historic Preservation Office (SHPO)	July 24, 2012	Comment 4: The NV SHPO concurred with the FAA determination that the identification effects are adequate for the scale of the undertaking and concurred with the FAA's finding that the Proposed Action will not pose an adverse effect to historic properties.	Comment 4: Comment noted. A summary discussion of the Section 106 consultation process with the NV SHPO was added to Section 5.4.1 of the Final EA.	Page A-12
			Comment 5: If the actual DNL rises above the expected level described in the Draft EA, and an interested member of the public or tribal government contacts the NV SHPO, additional consultation would be necessary.	Comment 5: Comment noted.	
A.5	Clark County Department of Air Quality (DAQ)	August 6, 2012	Comment 6: Clark County is an attainment/maintenance area for CO, and an attainment/unclassifiable area for lead (Pb), sulfur dioxide (SO_2), and nitrogen oxides (NO_X).	Comment 6: The attainment/nonattainment information presented on Table IV-13 was obtained from the EPA's Green Book Nonattainment Areas for Criteria Pollutants on May 7, 2010. For purposes of clarification, the title of the table was revised to indicate that the contents of the table represent data as of May 2010. A footnote has been added stating that on September 27, 2010, Clark County was redesignated as attainment/maintenance for CO.	Page A-48
			Comment 7: Clark County is an attainment/unclassifiable area for lead (Pb), sulfur dioxide (SO2), and nitrogen oxides (NOx).	Comment 7: The dash marks indicated on Table IV-13 are noted to represent attainment with respect to the applicable pollutant. To accommodate the comment, the note has been modified to state that the dashes indicate "attainment/unclassifiable" areas.	

Table A-1 (Continued)

Draft EA Comment Summary and FAA Response—Agencies

Comment Number	Commenting Individual or Organization	Date	Comment	FAA Response	Copy of Letter Provided on
A.5 (Continued)			Comment 8: Table IV-13 lists nitrogen oxides as NO_2.	Comment 8: Table IV-13 in the Draft EA and Final EA lists NO_X. However, rather than NO_X, the table should list NO_2 (nitrogen dioxide), since NO_2 is the applicable criteria pollutant. NO_X has been changed to NO_2, which does not change the resulting status for any of the counties identified in the table.	
			Comment 9: In Table IV-14, the 2009 24-hour maximum concentration values for particulate matter less than 10 microns in diameter should be 81 $\mu g/m^3$ at the Jean site and 78 $\mu g/m^3$ at the J.D. Smith site.	Comment 9: This comment has been treated as a correction to the data listed on the table for 2009 in the Draft EA, and as such, the applicable values for the Jean site and J.D. Smith site have been revised accordingly in the Final EA.	

Sources: U.S. Department of Transportation, Federal Aviation Administration, correspondence received on the Draft EA between July 1, 2012 through August 6, 2012 (comment); U.S. Department of Transportation, Federal Aviation Administration, August 2012 (response).
Prepared by: Ricondo & Associates, Inc., August 2012.

Table A-2

Draft EA Comment Summary and FAA Response—Tribes

Comment Number	Commenting Individual or Organization	Date	Comment	FAA Response	Copy of Letter Provided on
T.1	The Cocopah Indian Tribe, Cultural Resource Department	July 9, 2012	The Cultural Resources Department of the Cocopah Indian Tribe had no comments regarding the Draft EA and stated that they would defer to the more local tribe(s) and concur with their determinations on the Draft EA.	Comment noted.	Page A-49

Sources: U.S. Department of Transportation, Federal Aviation Administration, correspondence received on the Draft EA between July 1, 2012 through August 6, 2012 (comment); U.S. Department of Transportation, Federal Aviation Administration, August 2012 (response).
Prepared by: Ricondo & Associates, Inc., August 2012.

Table A-3

Draft EA Comment Summary and FAA Response—Public

Comment Number	Commenting Individual or Organization	Date	Comment	FAA Response	Copy of Letter Provided on
P.1	Jim Gans, Las Vegas resident	Received August 7, 2012	The Draft EA was thorough, professional, and organized. Improving the efficiency of aircraft operating in the area should reduce impacts of concern to the public such as noise and real estate concerns. Commenter believes the no action alternative would allow safety to erode and not improve the general environmental concerns. Commenter believes that a three-dimensional presentation of the project would have provided a better understanding of the analysis.	Comment noted.	Page A-50

Sources: U.S. Department of Transportation, Federal Aviation Administration, correspondence received on the Draft EA between July 1, 2012 through August 6, 2012 (comment); U.S. Department of Transportation, Federal Aviation Administration, August 2012 (response).
Prepared by: Ricondo & Associates, Inc., August 2012.

Table A-4

Changes in Reported Fuel Burn Values and CO_2 Emissions in the Final EA

Scenario	Draft EA	Final EA	Refer to Section
Fuel Burn (kilograms)			
2009	1,276,426	683,225	4.3.7
2012 No Action Alternative	1,184,711	751,802	5.7.3
2012 Proposed Action	1,017,185	683,176	5.7.3
2017 No Action Alternative	1,403,907	892,588	5.7.3
2017 Proposed Action	1,234,215	815,954	5.7.3
CO2 Emissions (kilograms)			
2009	3,998,162	2,155,575	4.3.9.2
2012 No Action Alternative	3,737,764	2,371,937	5.9.3
2012 Proposed Action	3,209,219	2,155,420	5.9.3
2017 No Action Alternative	4,429,328	2,816,117	5.9.3
2017 Proposed Action	3,893,947	2,574,336	5.9.3

Sources: Metron Aviation, March 21, 2012 and August 20, 2012.
Prepared by: Ricondo & Associates, Inc., August 2012.

Federal Aviation Administration

Draft Environmental Assessment and Public Meetings for the Las Vegas Area Optimization
McCarran International Airport, Henderson Executive Airport, and North Las Vegas Airport

The purpose of this notice is to announce the availability of the Draft Environmental Assessment (EA) for the proposed Federal Aviation Administration (FAA) Las Vegas Area Optimization (LAS Optimization) project to improve the efficiency of the airspace in the Las Vegas region serving McCarran International Airport (LAS), Henderson Executive Airport (HND), and North Las Vegas Airport (VGT), together the EA Airports, and to announce the public meetings for review of the Draft EA.

In accordance with the National Environmental Policy Act (NEPA), the Draft EA was prepared to address the potential environmental impacts that could result from the implementation of new and revised arrival and departure air traffic routes to and from the EA Airports, associated with LAS Optimization. LAS Optimization is intended to improve the efficiency of the Las Vegas Area airspace while maintaining and enhancing the safety of the airspace system. The EA has been prepared in accordance with FAA Order 1050.1E, *Environmental Impacts: Policies and Procedures,* and addresses the required environmental impact categories, including aircraft noise exposure.

The Draft EA is available online at www.lasoptimization.com.

The Draft EA will be available for review in hardcopy beginning **Monday, July 2, 2012**, during standard operating hours at:

- Clark County Law Library, 309 South Third Street, Fourth Floor, Las Vegas, Nevada 89101
- Centennial Hills Library, 6711 N. Buffalo Drive, Las Vegas, Nevada 89131
- Clark County Library, 1401 E. Flamingo Road, Las Vegas, Nevada 89119
- Enterprise Library, 25 E. Shelbourne Avenue, Las Vegas, Nevada 89123
- Las Vegas Library, 833 Las Vegas Boulevard North, Las Vegas, Nevada 89101
- Meadows Library, 251 West Boston Avenue, Las Vegas, Nevada 89102
- Rainbow Library, 3150 North Buffalo Drive, Las Vegas, Nevada 89128
- Sahara West Library, 9600 West Sahara Avenue, Las Vegas, Nevada 89117
- Spring Valley Library, 4280 South Jones Boulevard, Las Vegas, Nevada 89103
- Summerlin Library, 1771 Inner Circle Drive, Las Vegas, Nevada 89134
- Sunrise Library, 5400 Harris Avenue, Las Vegas, Nevada 89110
- West Charleston Library, 6301 West Charleston Boulevard, Las Vegas, Nevada 89146
- West Las Vegas Library, 951 West Lake Mead Boulevard, Las Vegas, Nevada 89106
- Whitney Library, 5175 East Tropicana Avenue, Las Vegas, Nevada 89122
- Windmill Library, 7060 West Windmill Lane, Las Vegas, Nevada 89113
- Green Valley Library, 2797 North Green Valley Parkway, Henderson, Nevada 89014
- James I. Gibson Library, 100 West Lake Mead Parkway, Henderson, Nevada 89015
- Paseo Verde Library, 280 South Green Valley Parkway, Henderson, Nevada 89012
- North Las Vegas Library, 2300 Civic Center Drive, North Las Vegas, Nevada 89030
- Aliante Library, 2400 West Deer Springs Way, North Las Vegas, Nevada 89084
- Boulder City Library, 701 Adams Boulevard, Boulder City, Nevada 89005
- UNLV Library, 4505 South Maryland Parkway, Las Vegas, Nevada 89154

Public meetings for the Draft EA will be held at the following times and locations:

Monday, July 23, 2012 – 4:00 p.m. until 7:00 p.m.
Paseo Verde Library
280 South Green Valley Parkway
Henderson, Nevada

Tuesday, July 24, 2012 – 11:00 a.m. until 3:00 p.m.
Las Vegas Public Library
833 Las Vegas Boulevard North
Las Vegas, Nevada

The meetings will be held in open house format with FAA personnel available to answer questions. The same information will be presented at each of the meetings.

The FAA encourages interested parties to review the Draft EA and provide comments during the public comment period. Written comments will be accepted by the FAA until **Monday, August 6, 2012**. The public is invited to comment at the meetings to a certified court reporter or by comment form, or by mail or email to the following address:

Operations Support Group
Western Service Center
Federal Aviation Administration
1601 Lind Ave. SW
Renton, WA 98057
LasVegasOPTI@faa.gov

Before including your address, phone number, email address, or other personal identifying information in your comment, be advised that that your entire comment – including your personal identifying information – may be made publicly available at any time. While you can ask us in your comment to withhold from public review your personal identifying information, we cannot guarantee that we will be able to do so.

AFFIDAVIT OF PUBLICATION

STATE OF NEVADA)
COUNTY OF CLARK) SS:

Stacey M. Lewis, being 1st duly sworn, deposes and says: That she is the Legal Clerk for the Las Vegas Review-Journal and the Las Vegas Sun, daily newspapers regularly issued, published and circulated in the City of Las Vegas, County of Clark, State of Nevada, and that the advertisement, a true copy attached for,

RICONDO & ASSOCIATES, INC 2534554RIC 7986317

was continuously published in said Las Vegas Review-Journal and / or Las Vegas Sun in 2 edition(s) of said newspaper issued from 07/01/2012 to 07/03/2012, on the following days:

07/01/2012
07/03/2012

MARY A. LEE
Notary Public State of Nevada
No. 09-8941-1
My appt. exp. Nov. 13, 2012

Signed: Stacey M. Lewis

SUBSCRIBED AND SWORN BEFORE ME THIS, THE

3rd day of July, 2012.

Mary Lee

Notary Public

Federal Aviation Administration
Draft Environmental Assessment and Public Meetings for the Las Vegas Area Optimization McCarran International Airport, Henderson Executive Airport, and North Las Vegas Airport

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Enterprise Library, 25 E. Shelbourne Avenue, Las Vegas, Nevada 89123
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Meadows Library, 251 West Boston Avenue, Las Vegas, Nevada 89102
Rainbow Library, 3150 North Buffalo Drive, Las Vegas, Nevada 89128
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Aliante Library, 2400 West Deer Springs Way, North Las Vegas, Nevada 89084
Boulder City Library, 701 Adams Boulevard, Boulder City, Nevada 89005
UNLV Library, 4505 South Maryland Parkway, Las Vegas, Nevada 89154

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The FAA encourages interested parties to review the Draft EA and provide comments during the public comment period. Written comments will be accepted by the FAA until Monday, August 6, 2012. The public is invited to comment at the meetings to a certified court reporter or by comment form, or by mail or email to the following address:

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LasVegasOPTI@faa.gov

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PUB: July 1, 3, 2012
LV Review-Journal

LAS Optimization Environmental Assessment Website Screenshots

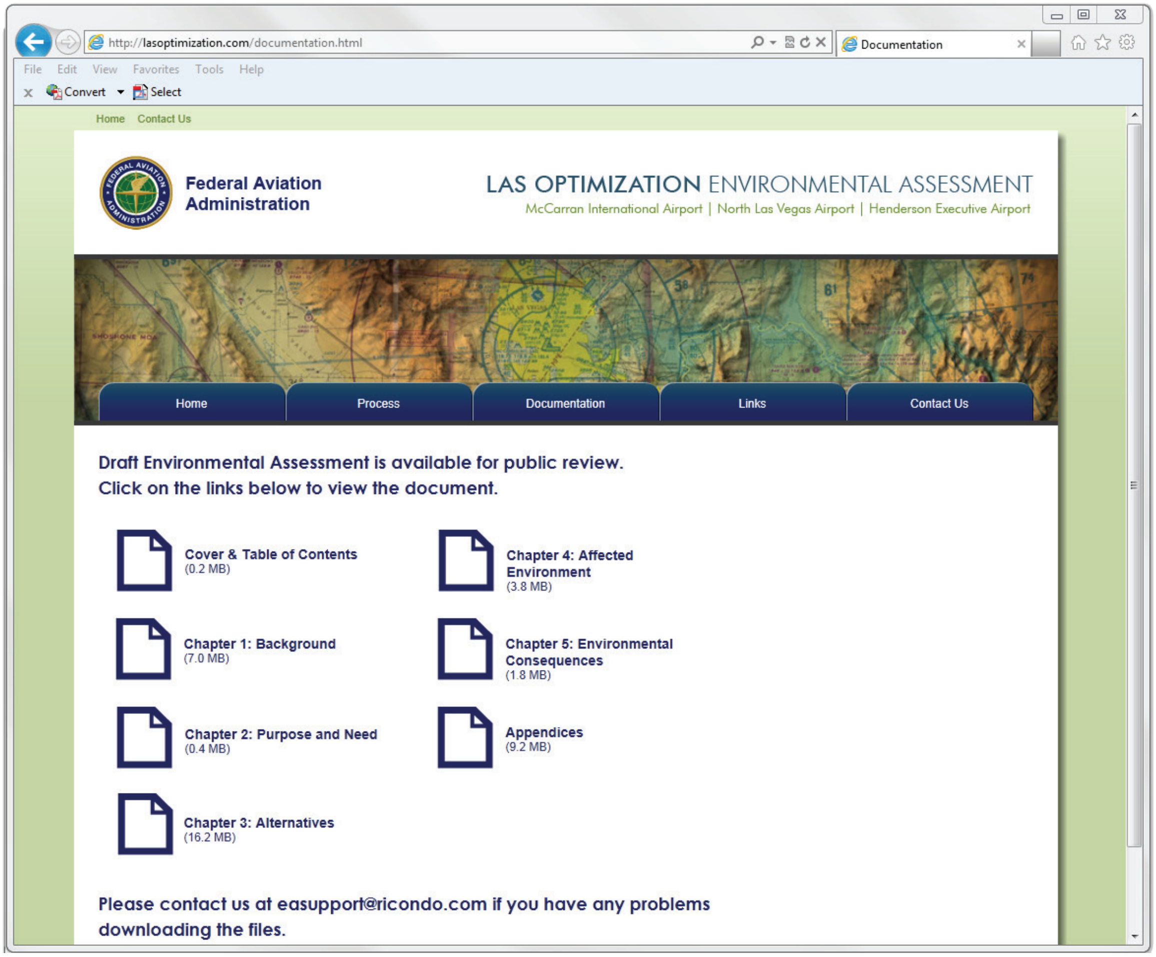
Home Page, with links to:

A. Documentation Page

B. Draft EA Availability Announcement

C. Email address for submission of comments on the Draft EA

Documentation Page (A)



Draft EA Availability Announcement (B)

Federal Aviation Administration

Draft Environmental Assessment and Public Meetings for the Las Vegas Area Optimization

McCarran International Airport, Henderson Executive Airport, and North Las Vegas Airport

The purpose of this notice is to announce the availability of the Draft Environmental Assessment (EA) for the proposed Federal Aviation Administration (FAA) Las Vegas Area Optimization (LAS Optimization) project to improve the efficiency of the airspace in the Las Vegas region serving McCarran International Airport (LAS), Henderson Executive Airport (HND), and North Las Vegas Airport (VGT), together the EA Airports, and to announce the public meetings for review of the Draft EA.

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Before including your address, phone number, email address, or other personal identifying information in your comment, be advised that your entire comment – including your personal identifying information – may be made publicly available at any time. While you can ask us in your comment to withhold from public review your personal identifying information, we cannot guarantee that we will be able to do so.

Public Workshop

Las Vegas Area Optimization Draft Environmental Assessment

Paseo Verde Library, 280 South Green Valley Parkway, Henderson, Nevada, 89012

July 23, 2012 ♦ 4:00 to 7:00 pm

NAME (*Please Print*)	ORGANIZATION (if applicable)	ADDRESS (*Street, City, Zip Code*)	E-MAIL
E. JAMES GANS	STATE ENVIRONMENTAL COM	10703 HAWES END CT, LV, NV	jgans@cox.net
Jeff Jacquart	Clark County (Aviation)	5757 Wayne Newton Blvd.	jeffj@mccarran.com
MINDY WARKINS		3062 VIA DEL CORSO Ct. HDN, NV	mindy@ungerdev.com
NANCY HAUTH		2175 Stanton Lane Reno 89502	n.hauth@gmail.com
Vija Vaughan	airline employee	2396 Kenneth Ave Henderson NV 89052	

Public Workshop

Las Vegas Area Optimization Draft Environmental Assessment

Las Vegas Public Library, 833 Las Vegas Boulevard North, Las Vegas, Nevada, 89101

July 24, 2012 ♦ 11:00 am to 3:00 pm

NAME (*Please Print*)	ORGANIZATION (if applicable)	ADDRESS (*Street, City, Zip Code*)	E-MAIL
CHARLES HALL	DOA	—— CCDOA	[illegible]
Brandi Kjose	FAA		brandi.a.kjose@faa.gov
MARK SILVERSTEIN	CLARK COUNTY DEPT OF AVIATION		marksi@mccarran.com
RAUL Navarro			EMAILME@NETZERO.com
Cheri Davis		215 Madsion 89106	
Jeff Jacquart	CC DOA	5757 Wayne Novton Blvd	JeffJ@mccarran.com

Public Workshop

Las Vegas Area Optimization Draft Environmental Assessment

Las Vegas Public Library, 833 Las Vegas Boulevard North, Las Vegas, Nevada, 89101

July 24, 2012 ♦ 11:00 am to 3:00 pm

NAME (*Please Print*)	ORGANIZATION (if applicable)	ADDRESS (*Street, City, Zip Code*)	E-MAIL
HASSA Griffin	810 E. Street	810 E. Street	

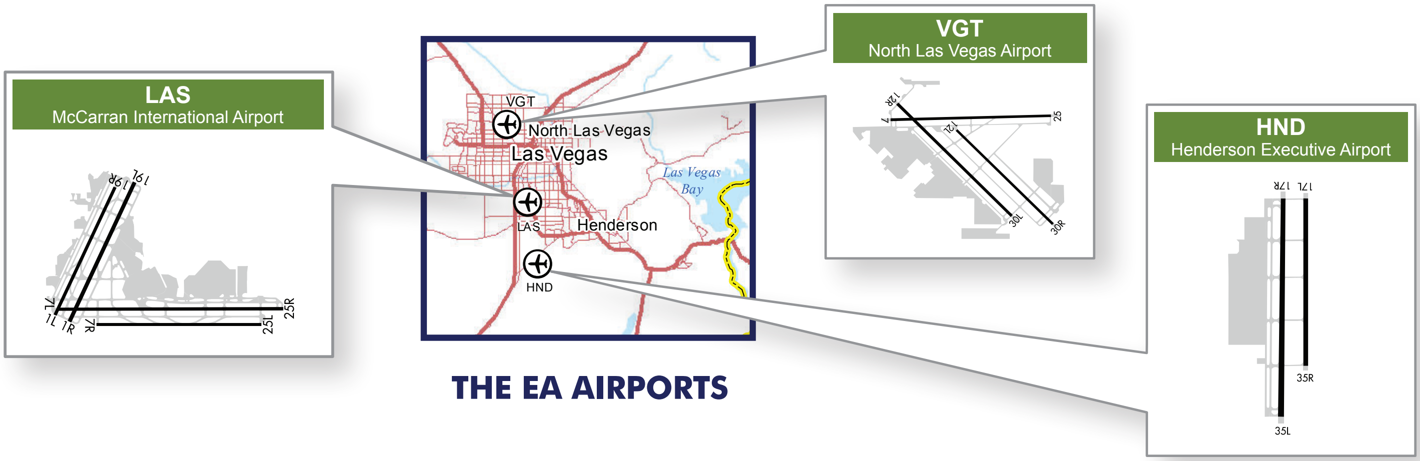
PUBLIC WORKSHOPS • July 23–24, 2012

LAS OPTIMIZATION DRAFT ENVIRONMENTAL ASSESSMENT

Welcome to the Federal Aviation Administration's (FAA's) Public Workshop for the Las Vegas Area Optimization project (LAS Optimization), an open forum to discuss the environmental effects of implementing LAS Optimization. At today's workshop, you will have the opportunity to learn about LAS Optimization and provide comments.

LAS OPTIMIZATION OVERVIEW

The FAA proposes to improve the efficiency of the airspace in the Las Vegas area by optimizing air traffic routes serving aircraft operating under instrument flight rules (IFR) in the Las Vegas area. The majority of IFR flights in the Las Vegas area operate at three airports, referred to as the EA Airports.



THE EA AIRPORTS

LEARN ABOUT LAS OPTIMIZATION

- Review the display boards located throughout the room. The display boards provide information on the FAA's Draft Environmental Assessment (EA).
- Ask FAA staff and representatives stationed at the display boards questions about LAS Optimization.
- For more detailed project information, copies of the FAA's Draft EA are available today for review and online at www.lasoptimization.com.

HOW TO PROVIDE COMMENTS

The FAA encourages interested parties to review the Draft EA and provide comments during the public comment period (July 1, 2012 through August 6, 2012). Written comments will be accepted by the FAA until **Monday, August 6, 2012.**

The public is invited to comment by:

- Providing oral comments to a court reporter during today's Public Workshop
- Completing and submitting a comment form at today's Public Workshop
- Providing written comments to the FAA by mail or email by August 6, 2012:

MAIL

Operations Support Group
Western Service Center
Federal Aviation Administration
1601 Lind Avenue SW
Renton, WA 98057

EMAIL

LasVegasOPTI@faa.gov

Before including your address, phone number, email address, or other personal identifying information in your comment, be advised that your entire comment–including your personal identifying information–may be made publicly available at any time. While you can ask us in your comment to withhold from public review your personal identifying information, we cannot guarantee that we will be able to do so.

For more information, please visit www.lasoptimization.com

WELCOME

to the Public Workshop for the
DRAFT ENVIRONMENTAL ASSESSMENT

for **LAS VEGAS AREA OPTIMIZATION**

Optimization of Air Traffic Routes Serving McCarran International Airport, Henderson Executive Airport, and North Las Vegas Airport

July 23-24, 2012

Federal Aviation Administration

TODAY'S PUBLIC WORKSHOP

Welcome to the FAA's Public Workshop for the Las Vegas Area Optimization project (LAS Optimization), an open forum to discuss the environmental effects of implementing LAS Optimization

WHAT TO DO AT THE PUBLIC WORKSHOP:

1. Please sign in
2. Learn about LAS Optimization
   - Review the display boards located throughout the room (the display boards provide information on the FAA's Draft Environmental Assessment [EA])
   - Ask FAA staff and representatives stationed at the display boards questions about LAS Optimization
   - For more detailed project information, copies of the FAA's Draft EA are available for review
3. Provide comments*
   - Provide oral comments to a court reporter during today's Public Workshop
   - Complete and submit a comment form at today's Public Workshop
   - Provide written comments to the FAA by mail or email by August 6, 2012

Before including your address, phone number, email address, or other personal identifying information in your comment, be advised that your entire comment—including your personal identifying information—may be made publicly available at any time. While you can ask us in your comment to withhold from public review your personal identifying information, we cannot guarantee that we will be able to do so.

OVERVIEW OF LAS OPTIMIZATION

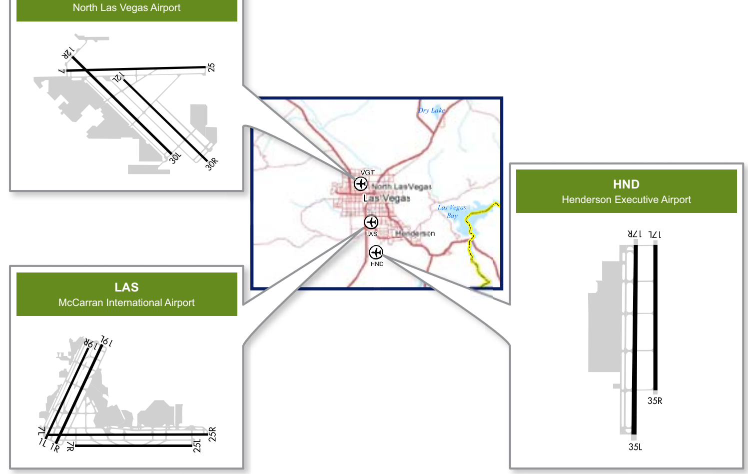
The Federal Aviation Administration (FAA) is preparing an **Environmental Assessment** (EA) pursuant to the National Environmental Policy Act of 1969 (NEPA).

The EA documents the FAA's assessment of the potential environmental effects associated with the optimization of air traffic routes serving aircraft operating under instrument flight rules (IFR) in the Las Vegas area.

Three airports (the **EA Airports**) serve the majority of IFR-filed flights in the Las Vegas area.

The proposed project is referred to as Las Vegas Area Optimization or **LAS Optimization**.

EA AIRPORTS



EA PROCESS AND LAS OPTIMIZATION SCHEDULE

WE ARE HERE

1. FORMULATE PROPOSED ACTION AND ALTERNATIVES TO MEET PURPOSE AND NEED — 2008–2012
2. COLLECT BACKGROUND DATA — 2008–2012
3. DETERMINE NEED FOR EA — 2009
4. OPTIONAL SCOPING IF APPROPRIATE TO DETERMINE ISSUES AND ALTERNATIVES TO BE ADDRESSED
5. PREPARE DRAFT EA — 2009–2012
6. **CIRCULATE AND REVIEW DRAFT EA** — JULY 1, 2012–AUGUST 6, 2012
7. REVISE DRAFT EA
8. CIRCULATE AND REVIEW FINAL EA
9. DETERMINE SIGNIFICANCE OF IMPACTS

- Impacts are significant → Proceed with an EIS
- Impacts are *NOT* significant → Prepare and issue FONSI/ROD → Proceed with Action, and if applicable, mitigation and monitoring

THE DRAFT EA REVIEW STEP WAS INITIATED WITH THE DISTRIBUTION OF THE DRAFT EA ON JULY 1, 2012

Over 130 electronic copies of the Draft EA were distributed to various government agencies, tribes, and elected officials

The Draft EA is available at 22 libraries across the Las Vegas metropolitan area

The Draft EA is available on the web: www.lasoptimization.com

THE FAA IS CONDUCTING 2 PUBLIC WORKSHOPS

July 23, 2012, from 4pm to 7pm at the Paseo Verde Library 280 South Green Valley Parkway, Henderson

July 24, 2012, from 11am to 3pm at the Las Vegas Public Library, 833 Las Vegas Boulevard North, Las Vegas

PUBLIC COMMENTS WILL BE ACCEPTED DURING ENTIRE DRAFT EA REVIEW STEP

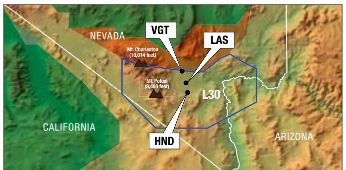
Comments will be accepted from July 1, 2012 through August 6, 2012, and can be submitted in writing or orally at the public workshops, or in writing by mail or email

TERMINOLOGY:
FONSI – Finding of No Significant Impact
ROD – Record of Decision
EIS – Environmental Impact Statement

LAS OPTIMIZATION DRAFT ENVIRONMENTAL ASSESSMENT

PURPOSE AND NEED FOR LAS OPTIMIZATION

L30 PHYSICAL CONSTRAINTS



MOUNTAINOUS TERRAIN
MAN-MADE OBSTACLES (NOT SHOWN)
SPECIAL USE AIRSPACE
NELLIS ATCF AIRSPACE

INFLUENCE

DESIGN OF AIR TRAFFIC ROUTES

FAA'S DESIGN CAPABILITIES HAVE IMPROVED WITH NEW TECHNOLOGY AND WITH AIRCRAFT EQUIPMENT IMPROVEMENTS

EXISTING DESIGN is complex and does not take advantage of efficiencies provided by new technologies:

- Procedures lack flexibility needed to efficiently transfer aircraft between the en route and terminal airspace
- Aircraft arriving at and departing from the EA Airports share entry and exit points and arrival and departure routes
- Current procedures do not take full advantage of RNAV capabilities
- Lack of published procedures to and from airport runways
- Complex converging interactions between arrival and departure flight routes

LAS OPTIMIZATION provides an opportunity to improve efficiency and reduce complexity by:

- Improving the flexibility in transitioning aircraft between the en route and the terminal airspace
- Improving the predictability of air traffic flow in the terminal airspace
- Improving the segregation of arrivals and departures in the terminal and the en route airspace

TERMINOLOGY:
L30 – The FAA air traffic control facility at which controllers manage aircraft operating in the Las Vegas Area (the "terminal airspace").
RNAV – A method of air navigation that allows aircrafts to fly a direct course within a network of navigational aids, rather than point-to-point navigation.

ALTERNATIVES AND THE PROPOSED ACTION

ALTERNATIVES CONSIDERED

- INCREASE USE OF OTHER AIRPORTS
- IMPROVE AIRPORT INFRASTRUCTURE
- IMPLEMENT AIR TRAVEL DEMAND MANAGEMENT PROGRAMS
- INCREASE USE OF ALTERNATIVE MODES OF TRANSPORTATION & TELECOMMUNICATION
- USE OF IMPROVED AIR TRAFFIC CONTROL TECHNOLOGY

→ **ELIMINATED**

Alternative does not address Purpose and Need to remove constraints on air traffic routes serving the EA Airports

OPTIMIZE AIR TRAFFIC ROUTES

- Add terminal airspace entry and exit points
- Segregate LAS traffic from HND and VGT traffic via entry and exit points
- Design procedures that define air traffic routes using RNAV technology
- Increase the number of RNAV procedures as well as the number of RNAV procedures providing full guidance through the terminal airspace (between the entry/exit gate and the runway)

→ **CARRIED FORWARD**

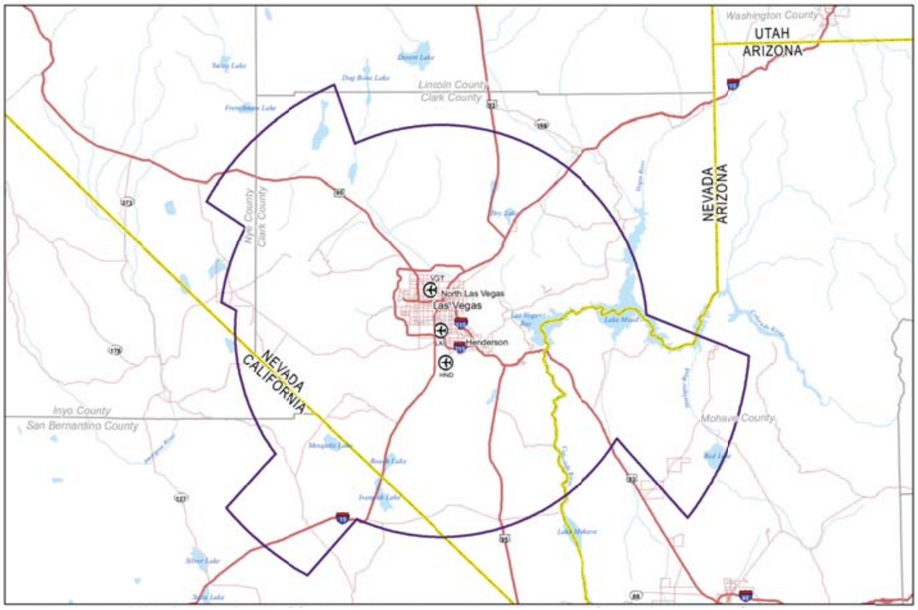
Alternative addresses Purpose and Need, and was identified as the **PROPOSED ACTION**

MAINTAIN EXISTING AIRCRAFT PROCEDURES (DO NOTHING)

→ **CARRIED FORWARD** as the **NO ACTION ALTERNATIVE**

LAS OPTIMIZATION DRAFT ENVIRONMENTAL ASSESSMENT

GENERALIZED STUDY AREA



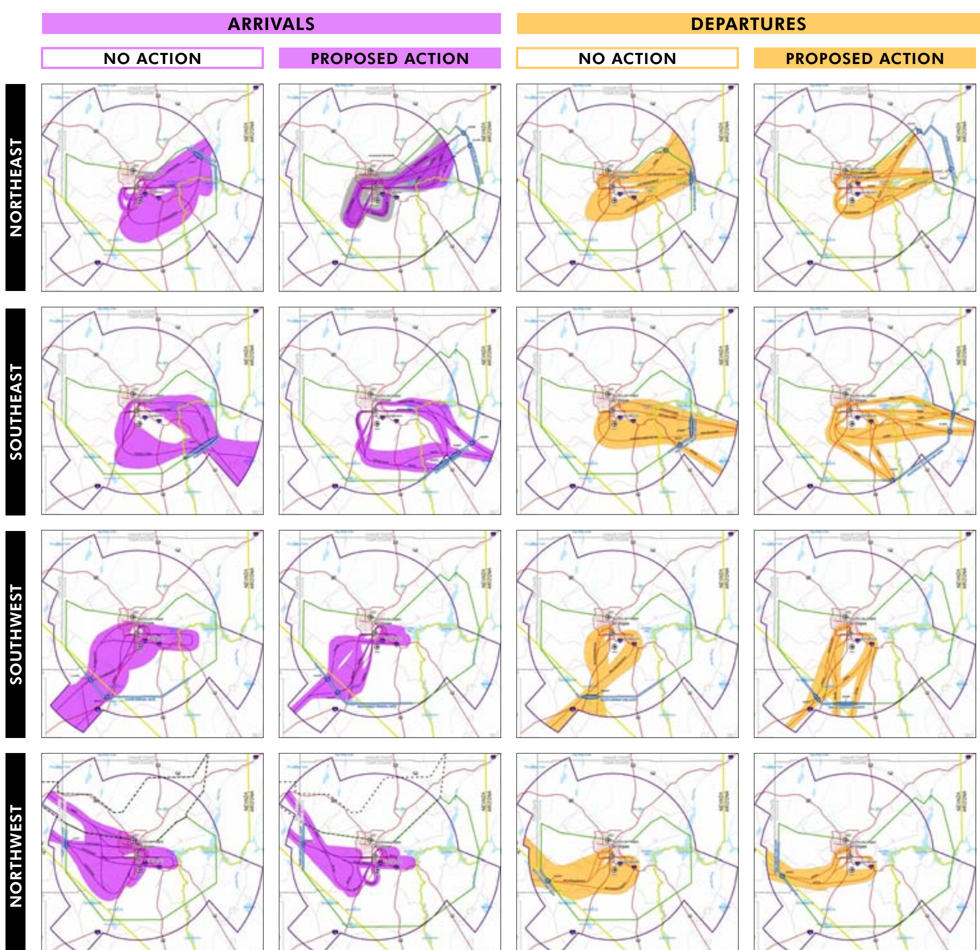
LEGEND

- EA Airports
- State Boundaries
- County Boundaries
- Highways
- Major Roads
- Rivers
- Water Bodies
- Generalized Study Area Boundary

A Generalized Study Area (GSA) was defined to evaluate the potential impacts of the proposed air traffic route changes under the Proposed Action

LAS OPTIMIZATION DRAFT ENVIRONMENTAL ASSESSMENT

MCCARRAN INTERNATIONAL AIRPORT AIRCRAFT TRAFFIC FLOWS

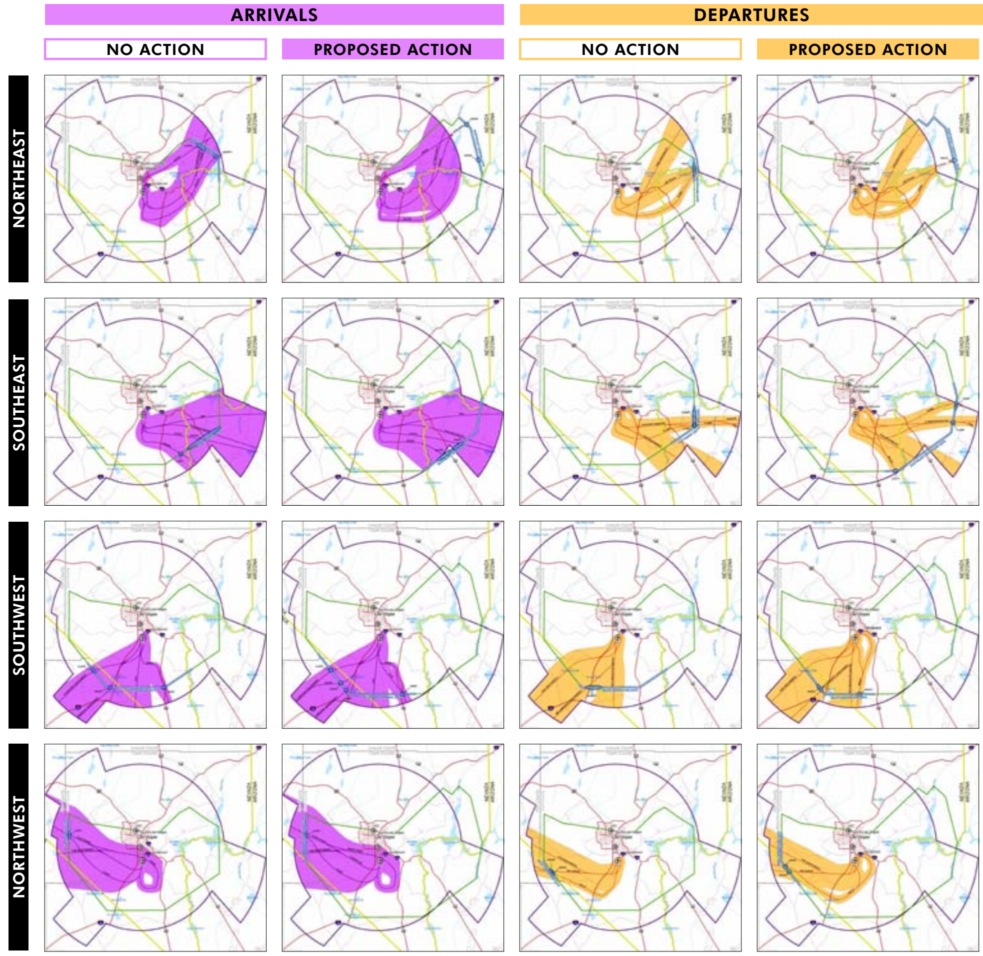


LEGEND

- EA Airports
- State Boundaries
- County Boundaries
- Community Boundaries
- Highways
- Major Roads
- Runways
- Rivers
- Water Bodies
- Generalized Study Area Boundary
- L30 Terminal Airspace Boundary
- Departure Corridors
- Representative Departure Corridor Centerlines
- Arrival Corridors
- Conventional Arrival Corridors (Proposed Action Only)
- Representative Arrival Corridor Centerlines
- Gate and Exit/Entry Point

LAS OPTIMIZATION
DRAFT ENVIRONMENTAL ASSESSMENT

HENDERSON EXECUTIVE AIRPORT AIRCRAFT TRAFFIC FLOWS



LEGEND

- EA Airports
- State Boundaries
- County Boundaries
- Community Boundaries
- Highways
- Major Roads
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- Generalized Study Area Boundary
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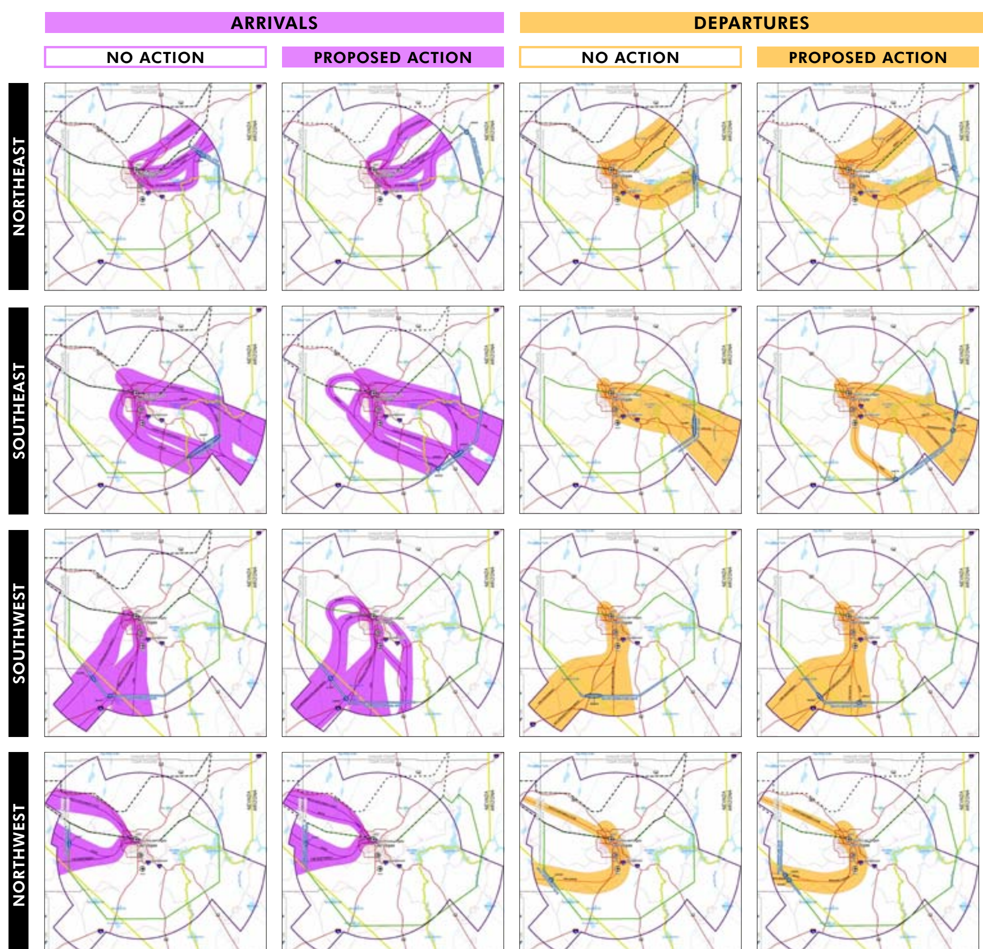
- Arrival Corridors
- Conventional Arrival Corridors (Proposed Action Only)
- Representative Arrival Corridor Centerlines
- Gate and Exit/Entry Point

LAS OPTIMIZATION
DRAFT ENVIRONMENTAL ASSESSMENT

NORTH LAS VEGAS AIRPORT AIRCRAFT TRAFFIC FLOWS



LEGEND

- EA Airports
- State Boundaries
- County Boundaries
- Community Boundaries
- Highways
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- Generalized Study Area Boundary
- L30 Terminal Airspace Boundary
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- Arrival Corridors
- Conventional Arrival Corridors (Proposed Action Only)
- Representative Arrival Corridor Centerlines
- Gate and Exit/Entry Point

LAS OPTIMIZATION
DRAFT ENVIRONMENTAL ASSESSMENT

POTENTIAL ENVIRONMENTAL EFFECTS OF THE PROPOSED ACTION

ENVIRONMENTAL RESOURCE CATEGORIES CONSIDERED

POTENTIALLY AFFECTED CATEGORIES

Potential effects related to changes in the location of air traffic routes:

- Aircraft Noise
- Compatible Land Use
- Department of Transportation Act, Section 4(f)
- Historic, Architectural, Archaeological, and Cultural Resources
- Environmental Justice and Children's Environmental Health and Safety Risks
- Fish, Wildlife, and Plants
- Light Emissions and Visual Impacts

Potential effects related to changes in air traffic route distance and climb/descent profiles:

- Natural Resources and Energy Supply
- Air Quality
- Climate Change

NON-ISSUE CATEGORIES

Categories that typically involve impacts resulting from construction and ground disturbance activities that would not be affected by the Proposed Action:

- Coastal Resources
- Construction Impacts
- Farmlands
- Floodplains
- Hazardous Materials, Pollution Prevention, and Solid Waste
- Secondary (Induced) Impacts
- Water Quality
- Wetlands
- Wild and Scenic Rivers

ANALYSIS

RESULTS: NO SIGNIFICANT IMPACTS IDENTIFIED

AIRCRAFT NOISE EXPOSURE (POPULATION)

POPULATION EXPOSED TO AIRCRAFT NOISE

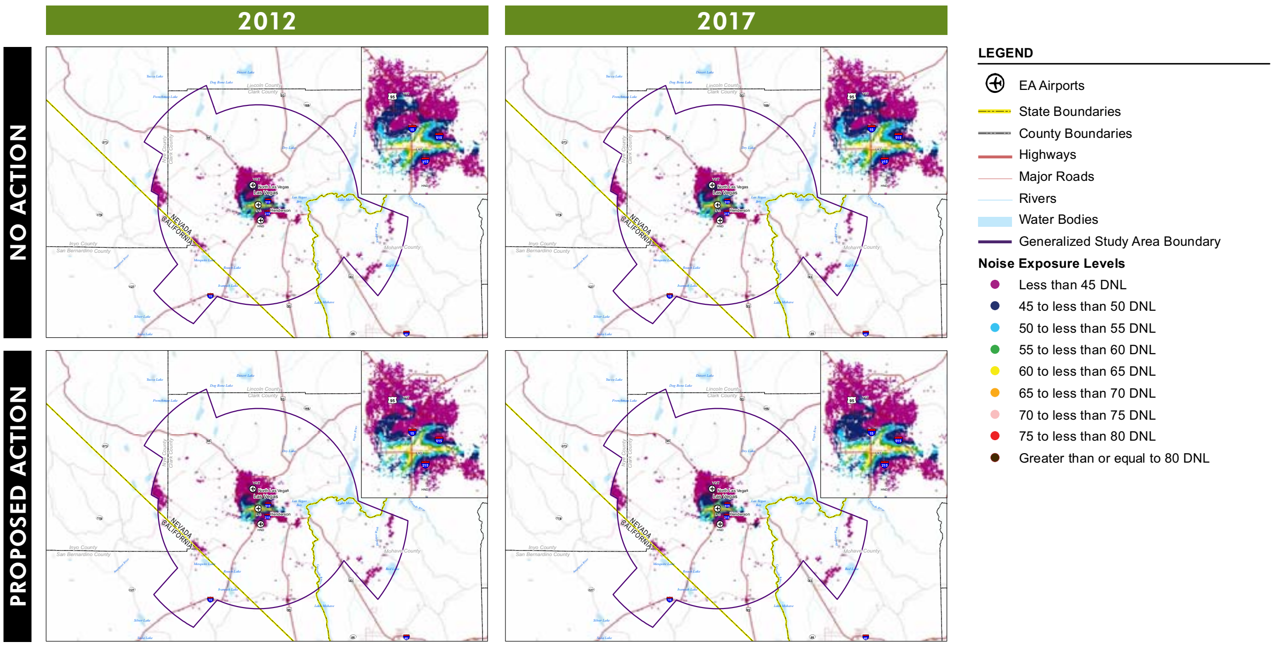
2012 DNL NOISE EXPOSURE RANGE	POPULATION		
	NO ACTION ALTERNATIVE	PROPOSED ACTION	PERCENT CHANGE
DNL 65 and higher	3,124	3,018	-3.4%
DNL 60 to 65	19,905	18,857	-5.3%
DNL 45 to 60	756,157	657,471	-13.1%
Total above DNL 45	779,186	679,346	-12.8%

2017 DNL NOISE EXPOSURE RANGE	POPULATION		
	NO ACTION ALTERNATIVE	PROPOSED ACTION	PERCENT CHANGE
DNL 65 and higher	3,313	3,205	-3.3%
DNL 60 to 65	27,667	21,649	-21.8%
DNL 45 to 60	840,133	758,379	-9.7%
Total above DNL 45	871,113	783,233	-10.1%

DETERMINATION OF NOISE IMPACT

DNL NOISE EXPOSURE RANGE UNDER PROPOSED ACTION	INCREASE IN DNL WITH PROPOSED ACTION	AIRCRAFT NOISE EXPOSURE CHANGE CONSIDERATION	POPULATION EXPOSED TO THRESHOLD INCREASE	
			2012	2017
DNL 65 and higher	DNL 1.5 dB or greater	Exceeds Threshold of Significance	0	0
DNL 60 to 65	DNL 3.0 dB or greater	Considered When Evaluating Air Traffic Actions	0	7
DNL 45 to 60	DNL 5.0 dB or greater	Information Disclosed When Evaluating Air Traffic Actions	0	0

AIRCRAFT NOISE EXPOSURE AT POPULATION CENTROIDS



NEXT STEPS – PUBLIC COMMENT PROCESS

➜ **PUBLIC COMMENTS**

The FAA encourages interested parties to review the Draft EA and provide comments during the public comment period. Written comments will be accepted by the FAA until **MONDAY, AUGUST 6, 2012.**

The public is invited to comment*

- Provide oral comments to a court reporter during today's Public Workshop
- Complete and submit a comment form at today's Public Workshop
- Provide written comments to the FAA by mail or email by August 6, 2012

Before including your address, phone number, email address, or other personal identifying information in your comment, be advised that your entire comment–including your personal identifying information–may be made publicly available at any time. While you can ask us in your comment to withhold from public review your personal identifying information, we cannot guarantee that we will be able to do so.

➜ **FAA WILL DEVELOP FINAL EA** (August-September 2012)

➜ **ISSUE FINAL EA** (anticipated September 2012)

➜ IF FAA issues a Finding of No Significant Impact (FONSI)/Record of Decision (ROD), FAA will begin implementation of **LAS OPTIMIZATION** in late 2012

LAS OPTIMIZATION DRAFT ENVIRONMENTAL ASSESSMENT

Las Vegas Area Optimization
Draft Environmental Assessment

PUBLIC WORKSHOP

July 23, 2012– 4:00-7:00 PM
Paseo Verde Library, Henderson

July 24, 2012– 11:00-3:00 PM
Las Vegas Public Library

COMMENT FORM

This form is provided to receive your comments regarding the Draft Environmental Assessment for the Las Vegas Area Optimization. Please use the space provided below attaching additional pages if necessary. Either deposit the form in the comment box, or mail it to the address provided. **Comments must be received by, Monday, August 6, 2012.**

Comments:____

Before including your address, phone number, email address, or other personal identifying information in your comment, be advised that your entire comment–including your personal identifying information–may be made publicly available at any time. While you can ask us in your comment to withhold from public review your personal identifying information, we cannot guarantee that we will be able to do so.

Mail your comments by August 6, 2012 to:

Operations Support Group
Western Service Center
Federal Aviation Administration
1601 Lind Ave. SW
Renton, WA 98057

Please Print:

Your Name______________________________

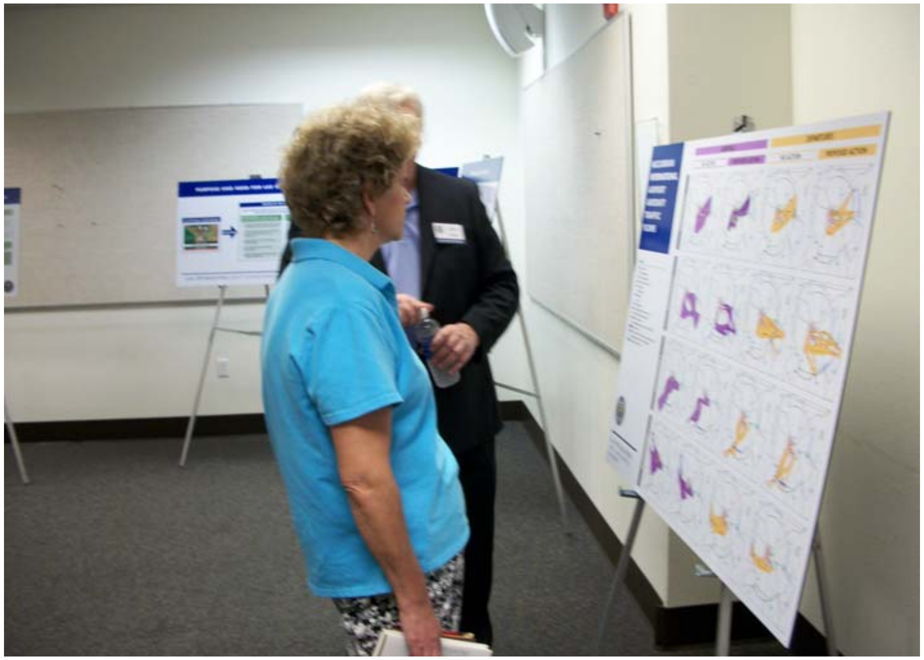
Address________________________________

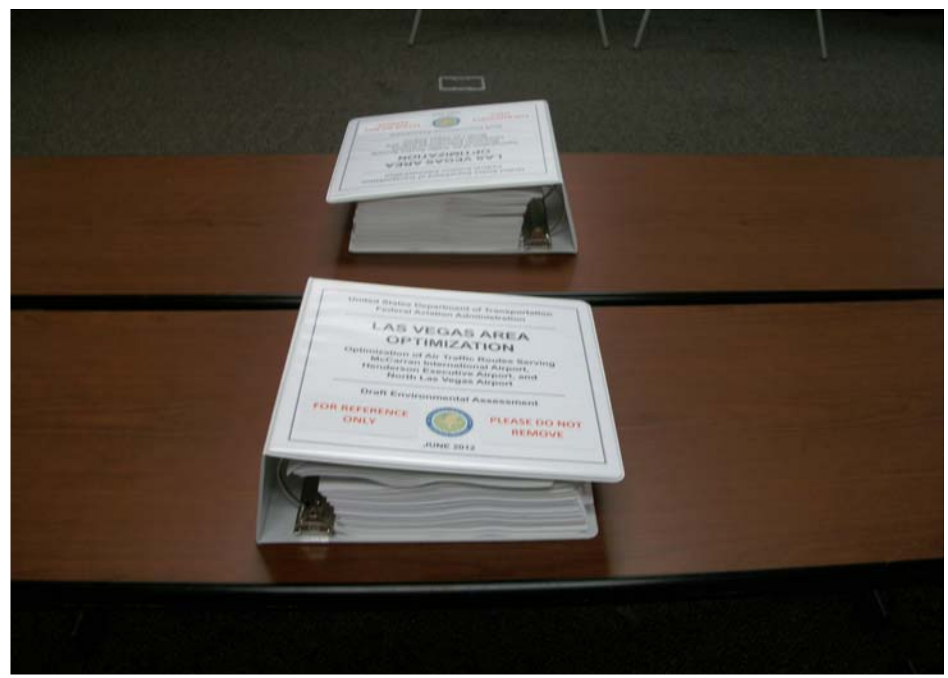
Stamp
Here

Operations Support Group
Western Service Center
Federal Aviation Administration
1601 Lind Ave. SW
Renton, WA 98057

----------Fold Here--Fold Here--

Public Workshop Photos – Paseo Verde Library, July 23, 2012





Public Workshop Photos – Las Vegas Public Library, July 24, 2012

U.S. Department of Homeland Security
FEMA Region IX
1111 Broadway, Suite 1200
Oakland, CA. 94607-4052

FEMA

July 3, 2012

John Warner, Group Manager
Operations Support Group
Western Service Center
Federal Aviation Administration
1601 Lind Avenue SW
Renton, Washington 98057

Dear Mr. Warner:

This is in response to your request for comments on the Draft Environmental Assessment for the Las Vegas Area Optimization project.

Please review the current effective countywide Flood Insurance Rate Maps (FIRMs) for the County of Clark (Community Number 320003), and Cities of Boulder (Community Number 320004), Las Vegas (Community Number 325276, North Las Vegas (Community Number 320007, and Henderson (Community Number 320005), Maps revised November 16, 2011. Please note that the Cities of Las Vegas, North Las Vegas, and Henderson, Clark County, Nevada are participants in the National Flood Insurance Program (NFIP). The minimum, basic NFIP floodplain management building requirements are described in Vol. 44 Code of Federal Regulations (44 CFR), Sections 59 through 65.

A summary of these NFIP floodplain management building requirements are as follows:

- All buildings constructed within a riverine floodplain, (i.e., Flood Zones A, AO, AH, AE, and A1 through A30 as delineated on the FIRM), must be elevated so that the lowest floor is at or above the Base Flood Elevation level in accordance with the effective Flood Insurance Rate Map.

- If the area of construction is located within a Regulatory Floodway as delineated on the FIRM, any ***development*** must not increase base flood elevation levels. **The term *development* means any man-made change to improved or unimproved real estate, including but not limited to buildings, other structures, mining, dredging, filling, grading, paving, excavation or drilling operations, and storage of equipment or materials.** A hydrologic and hydraulic analysis must be performed *prior* to the start of development, and must demonstrate that the development would not cause any rise in base flood levels. No rise is permitted within regulatory floodways.

- Upon completion of any development that changes existing Special Flood Hazard Areas, the NFIP directs all participating communities to submit the appropriate hydrologic and hydraulic data to FEMA for a FIRM revision. In accordance with 44 CFR, Section 65.3, as soon as practicable, but not later than six months after such data becomes available, a community shall notify FEMA of the changes by submitting technical data for a flood map revision. To obtain copies of FEMA's Flood Map Revision Application Packages, please refer to the FEMA website at http://www.fema.gov/business/nfip/forms.shtm.

Please Note:

Many NFIP participating communities have adopted floodplain management building requirements which are more restrictive than the minimum federal standards described in 44 CFR. Please contact the local community's floodplain manager for more information on local floodplain management building requirements. The Boulder floodplain manager can be reached by calling Scott Hanson, Public Works Director, at (702) 293-9200. The Las Vegas floodplain manager can be reached by calling Randy Fultz, Assistant City Engineer, at (702) 229-2176. The North Las Vegas floodplain manager can be reached by calling Jennifer Doody, Development and Flood Control Manager, at (702) 633-1223. The Henderson floodplain manager can be reached by calling Albert Jankowiak, Floodplain Manager, at (775) 267-3024. The Clark County floodplain manager can be reached by calling Denis Cedarburg, Director, Department of Public Works, at (702) 455-6020.

If you have any questions or concerns, please do not hesitate to call Michael Hornick of the Mitigation staff at (510) 627-7260.

Sincerely,

Gregor Blackburn, CFM, Branch Chief
Floodplain Management and Insurance Branch

cc:
Scott Hanson, Public Works Director, City of Boulder City
Jennifer Doody, Development and Flood Control Manager, City of North Las Vegas
Randy Fultz, Assistant City Engineer, City of Las Vegas
Albert Jankowiak, Floodplain Manager, City of Henderson
Denis Cedarburg, Director, Department of Public Works, Clark County
Kim Davis, NFIP State Coordinator, NV Department of Conservation and Natural Resources, Division of Water Resources
Michael Hornick, NFIP Planner, DHS/FEMA Region IX
Alessandro Amaglio, Environmental Officer, DHS/FEMA Region IX

Skip Canfield

From: Brad Hardenbrook
Sent: Wednesday, July 25, 2012 5:00 PM
To: Skip Canfield
Subject: RE: Nevada State Clearinghouse Notice E2013-009

From: scanfield@lands.nv.gov [mailto:scanfield@lands.nv.gov]
Sent: Tuesday, July 17, 2012 2:30 PM
To: Alan Jenne; Alisanne Maffei; bthompson@dot.state.nv.us; clytle@lincolnnv.com; brian.hunsaker@us.army.mil; Brad Hardenbrook; dmouat@dri.edu; djohnston@dps.state.nv.us; ed.rybold@navy.mil; gderks@dps.state.nv.us; James Morefield; Jason Woodruff; Jennifer Scanland; kirk.bausman@us.army.mil; cohnl@nv.doe.gov; Mark Harris; deborah.macneill@nellis.af.mil; escomm2@citlink.net; Octavious.Hill@nellis.af.mil; Pete Konesky; Rebecca Palmer; Robert K. Martinez; Sandy Quilici; Steven Siegel; tcompton@dot.state.nv.us; Richard Ewell; tmueller@dot.state.nv.us; Tod.oppenborn@nellis.af.mil; William.Cadwallader@nellis.af.mil; zip.upham@navy.mil; Alex Lanza; Dave Marlow; Michael Visher; Kevin J. Hill; dziegler@lcb.state.nv.us; Richard A. Wiggins; Robert Gregg; Shimi.Mathew@nellis.af.mil; Skip Canfield; whenderson@nvnaco.org; Tim Rubald
Subject: Nevada State Clearinghouse Notice E2013-009

NEVADA STATE CLEARINGHOUSE
Department of Conservation and Natural Resources, Division of State Lands
901 S. Stewart St., Ste. 5003, Carson City, Nevada 89701-5246
(775) 684-2723 Fax (775) 684-2721

TRANSMISSION DATE: 07/17/2012

U.S. Federal Aviation Administration

Nevada State Clearinghouse Notice E2013-009

Project: DEA - FAA Las Vegas Area Optimization of Airspace

Follow the link below to find information concerning the above-mentioned project for your review and comment.

E2013-009 - http://www.lasoptimization.com/documentation.html

- **Please evaluate this project's effects on your agency's plans and programs and any other issues that you are aware of that might be pertinent to applicable laws and regulations.**

- **Please reply directly from this e-mail and attach your comments.**

- **Please submit your comments no later than Friday August 3rd, 2012.**

Clearinghouse project archive

Questions? Skip Canfield, Program Manager, (775) 684-2723 or nevadaclearinghouse@lands.nv.gov

____No comment on this project _XX_Proposal supported as written

AGENCY COMMENTS:

Signature: D. Bradford Hardenbrook
Supervisory Habitat Biologist
NDOW – Southern Region

Date: 25 July 2012

Requested By:
Barry FranklinKeith LuskAugustin Moses, PEDoug PomeroyAndy RichardsPatrick Walsh

---

Distribution:
- Division of Emergency Management
Alan Jenne - Department of Wildlife, Elko
Alex Lanza -
Alisanne Maffei - Department of Administration
Bill Thompson - Department of Transportation, Aviation
CPT Brian Brian Hunsaker - Nevada National Guard
Cory Lytle - Lincoln County
D. Bradford Hardenbrook - Department of Wildlife, Las Vegas
Dave Marlow -
Dave Ziegler - LCB
David Mouat - Desert Research Institute
Denesa Johnston - Fire Marshal
Ed Rybold - NAS Fallon
Gary Derks - Division of Emergency Management
James D. Morefield - Natural Heritage Program
Jason Woodruff - Public Utilities Commission
Jennifer Scanland - Division of State Parks
Kevin Hill - Nevada State Energy Office
Kirk Bausman - Hawthorne Army Depot
Linda Cohn - National Nuclear Security Administration
Mark Harris, PE - Public Utilities Commission
Michael Visher - Division of Minerals
Ms. Deborah MacNeill - Nellis Air Force Base
Nancy Boland - Esmeralda County
Octavious Q. Hill - Nellis Air Force Base
Pete Konesky - State Energy Office
Rebecca Palmer - State Historic Preservation Office
Richard A. Wiggins - State energy office
Robert Gregg - NTRT
Robert Martinez - Division of Water Resources
Sandy Quilici - Department of Conservation & Natural Resources
Shimi Mathew - Nellis AFB
Skip Canfield, AICP - Division of State Lands
Steve Siegel - Department of Wildlife, Director's Office

Terri Compton - Department of Transportation
Terry Rubald - Nevada Department of Taxation, Local Government, Centrally Assessed Property
Tim Rubald - Conservation Districts
Timothy Mueller - Department of Transportation
Tod Oppenborn - Nellis Air Force Base
Wes Henderson - NACO
William Cadwallader - Nellis Air Force Base
Zip Upham - NAS Fallon

Skip Canfield

From: Rebecca Palmer
Sent: Monday, July 23, 2012 3:23 PM
To: Skip Canfield
Subject: RE: Nevada State Clearinghouse Notice E2013-009

The SHPO supports this document as written.

Rebecca Lynn Palmer
Deputy Historic Preservation Officer
901 South Stewart Street, Suite 5004
Carson City NV 89701
Phone (775) 684-3443
Fax (775) 684-3442

Please note, my email is rlpalmer@shpo.nv.gov

From: scanfield@lands.nv.gov [mailto:scanfield@lands.nv.gov]
Sent: Tuesday, July 17, 2012 2:30 PM
To: Alan Jenne; Alisanne Maffei; bthompson@dot.state.nv.us; clytle@lincolnnv.com; brian.hunsaker@us.army.mil; Brad Hardenbrook; dmouat@dri.edu; djohnston@dps.state.nv.us; ed.rybold@navy.mil; gderks@dps.state.nv.us; James Morefield; Jason Woodruff; Jennifer Scanland; kirk.bausman@us.army.mil; cohnl@nv.doe.gov; Mark Harris; deborah.macneill@nellis.af.mil; escomm2@citlink.net; Octavious.Hill@nellis.af.mil; Pete Konesky; Rebecca Palmer; Robert K. Martinez; Sandy Quilici; Steven Siegel; tcompton@dot.state.nv.us; Richard Ewell; tmueller@dot.state.nv.us; Tod.oppenborn@nellis.af.mil; William.Cadwallader@nellis.af.mil; zip.upham@navy.mil; Alex Lanza; Dave Marlow; Michael Visher; Kevin J. Hill; dziegler@lcb.state.nv.us; Richard A. Wiggins; Robert Gregg; Shimi.Mathew@nellis.af.mil; Skip Canfield; whenderson@nvnaco.org; Tim Rubald
Subject: Nevada State Clearinghouse Notice E2013-009

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Department of Conservation and Natural Resources, Division of State Lands
901 S. Stewart St., Ste. 5003, Carson City, Nevada 89701-5246
(775) 684-2723 Fax (775) 684-2721

TRANSMISSION DATE: 07/17/2012

U.S. Federal Aviation Administration

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Project: DEA - FAA Las Vegas Area Optimization of Airspace

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Clearinghouse project archive

Questions? Skip Canfield, Program Manager, (775) 684-2723 or nevadaclearinghouse@lands.nv.gov

____No comment on this project ____Proposal supported as written

AGENCY COMMENTS:

Signature:

Date:

Requested By:
Barry FranklinKeith LuskAugustin Moses, PEDoug PomeroyAndy RichardsPatrick Walsh

---

Distribution:
- Division of Emergency Management
Alan Jenne - Department of Wildlife, Elko
Alex Lanza -
Alisanne Maffei - Department of Administration
Bill Thompson - Department of Transportation, Aviation
CPT Brian Brian Hunsaker - Nevada National Guard
Cory Lytle - Lincoln County
D. Bradford Hardenbrook - Department of Wildlife, Las Vegas
Dave Marlow -
Dave Ziegler - LCB
David Mouat - Desert Research Institute
Denesa Johnston - Fire Marshal
Ed Rybold - NAS Fallon

Gary Derks - Division of Emergency Management
James D. Morefield - Natural Heritage Program
Jason Woodruff - Public Utilities Commission
Jennifer Scanland - Division of State Parks
Kevin Hill - Nevada State Energy Office
Kirk Bausman - Hawthorne Army Depot
Linda Cohn - National Nuclear Security Administration
Mark Harris, PE - Public Utilities Commission
Michael Visher - Division of Minerals
Ms. Deborah MacNeill - Nellis Air Force Base
Nancy Boland - Esmeralda County
Octavious Q. Hill - Nellis Air Force Base
Pete Konesky - State Energy Office
Rebecca Palmer - State Historic Preservation Office
Richard A. Wiggins - State energy office
Robert Gregg - NTRT
Robert Martinez - Division of Water Resources
Sandy Quilici - Department of Conservation & Natural Resources
Shimi Mathew - Nellis AFB
Skip Canfield, AICP - Division of State Lands
Steve Siegel - Department of Wildlife, Director's Office
Terri Compton - Department of Transportation
Terry Rubald - Nevada Department of Taxation, Local Government, Centrally Assessed Property
Tim Rubald - Conservation Districts
Timothy Mueller - Department of Transportation
Tod Oppenborn - Nellis Air Force Base
Wes Henderson - NACO
William Cadwallader - Nellis Air Force Base
Zip Upham - NAS Fallon

Protecting the air we share
Air Quality
CLARK COUNTY • DEPARTMENT OF AIR QUALITY
4701 W. Russell Road 2nd floor • Las Vegas, NV 89118-2231
(702) 455-5942 • Fax (702) 383-9994
Lewis Wallenmeyer Director • Tina Gingras Assistant Director

August 6, 2012

RECEIVED AUG 13 2012

John Warner, Group Manager
Operations Support Group
Western Service Center
Federal Aviation Administration
1601 Lind Ave. SW
Renton, WA 98057

E-mail: LasVegasOPTI@faa.gov

Re: Draft Environmental Assessment for the Las Vegas Area Optimization Project

Dear Mr. Warner:

The Clark County Department of Air Quality (DAQ) has reviewed the subject draft environmental assessment (DEA) for impacts on ambient air quality in Clark County, Nevada. The Federal Aviation Administration intends to improve the efficiency of the airspace serving McCarran International Airport, the Henderson Executive Airport, and the North Las Vegas Airport. The proposed project involves redesigning standard instrument arrival/departure procedures and the supporting airspace management structure at these airports to improve overall management of air traffic in the Las Vegas Valley.

After reviewing the DEA, DAQ suggests correcting the following discrepancies:

- Clark County is an attainment/maintenance area for carbon monoxide and an attainment/unclassifiable area for lead (Pb), sulfur dioxide (SO_2), and nitrogen oxides (NO_x). Table IV-13 lists nitrogen oxides as NO_2.
- In Table IV-14, the 2009 24-hour maximum concentration values for particulate matter less than 10 microns in diameter should be 81 $\mu g/m^3$ at the Jean site and 78 $\mu g/m^3$ at the J.D. Smith site.

Thank you for the opportunity to review and comment on this DEA. If you have any further questions, please contact Robert Tekniepe at (702) 455-4063.

Sincerely,

L. Wallenmeyer

Lewis Wallenmeyer
Director

THE COCOPAH INDIAN TRIBE
Cultural Resource Department
County 15th & Avenue G
Somerton, Arizona 85350
Telephone (928) 627-2102
Fax (928) 627-3173

Ryan Weller

CCR-006-12-002

July 9, 2012

John Warner
Group Manager
Western Service Center
U.S. Department of Transportation
1601 Lind Ave. SW.
Renton, WA 98057

RE: Request for comments on the Draft Environmental Assessment for Las Vegas Area Optimization

Dear Mr. Warner:

The Cultural Resources Department of the Cocopah Indian Tribe appreciates your consultation efforts on this project. We are pleased that you contacted the Cocopah on this cultural resource issue for the purpose of solicitation of our input and to address our concerns on this matter. At this time we have no comments regarding the Draft Environmental Assessment. We defer to the more local tribe(s) and concur with their determinations on this matter.

If you have any questions or need additional information please feel free to contact the cultural resource department. We will be happy to assist you with any and all future concerns or questions.

Sincerely,

H. Jill McCormick, M.A.

Cultural Resource Manager

Las Vegas Area Optimization
Draft Environmental Assessment

PUBLIC WORKSHOP

July 23, 2012– 4:00-7:00 PM
Paseo Verde Library, Henderson

July 24, 2012– 11:00-3:00 PM
Las Vegas Public Library

RECEIVED AUG 07 2012

COMMENT FORM

This form is provided to receive your comments regarding the Draft Environmental Assessment for the Las Vegas Area Optimization. Please use the space provided below attaching additional pages if necessary. Either deposit the form in the comment box, or mail it to the address provided. **Comments must be received by, Monday, August 6, 2012.**

Comments: Having worked in local government for many years, and having dealt with E.A.s and EISs, I believe the Draft E.A. for the LAS Optimization is thorough, and was handled in a professional and organized manner. From a public standpoint, noise and real estate impacts were of primary importance. Getting large aircraft in and out of the populated area more efficiently and quicker should work to reduce the very impacts that are of concern to the public. In fact, the results of implementing the objectives of the LAS Optimization will improve the overall Las Vegas Valley air traffic situation. My view is the no action alternative would allow safety to erode and not improve general environmental concerns at all. The E.A. provided a wonderful educational opportunity. I remain convinced that a three dimensional presentation of the details would have given an even better understanding of the analysis!

Before including your address, phone number, email address, or other personal identifying information in your comment, be advised that your entire comment–including your personal identifying information–may be made publicly available at any time. While you can ask us in your comment to withhold from public review your personal identifying information, we cannot guarantee that we will be able to do so.

Mail your comments by August 6, 2012 to:

Operations Support Group
Western Service Center
Federal Aviation Administration
1601 Lind Ave. SW
Renton, WA 98057

Please Print:

Your Name JIM GANS

Address 10703 HAWES END CT.
LAS VEGAS, NV 89183

Appendix B

List of Preparers and List of Receiving Parties

Appendix B: List of Preparers and List of Receiving Parties

B.1 List of Preparers

As required by Federal Aviation Administration (FAA) Order 1050.1E, the names and qualifications of the principal persons contributing information to this Environmental Assessment (EA) are identified in this section. The FAA employed the efforts of an interdisciplinary team of scientists, technicians, and experts in various fields to accomplish this study, as required by Section 1502.6 of Council on Environmental Quality (CEQ) regulations. Specialists involved in this EA included FAA and support contractor staff in such fields as air traffic control, airspace planning, noise assessment and abatement, DOT Section 4(f) resources, avian and bat species, and other disciplines. While an interdisciplinary approach has been used to develop the EA, all decisions made with regard to the content and scope of the EA are those of the FAA.

FEDERAL AVIATION ADMINISTRATION

Donna Warren—FAA Air Traffic Organization, Airspace Management Group, Environmental Specialist; B.S. Civil Engineering; over 30 years of experience in environmental and noise modeling working for the FAA, ATO Environmental Tools Program Manager and for over 15 years has led the development of the Noise Integrated Routing System (NIRS) and NIRS Screening Tool (NST). Project responsibilities include Environmental policy and guidance and noise modeling oversight.

Ryan Weller—FAA Environmental/Occupational Safety and Health Specialist, B.S. Environmental Science, 14 years of experience in community involvement, NEPA studies, noise analysis, and tribal coordination. Project responsibilities include NEPA air traffic action, airspace redesign, and project management.

RICONDO & ASSOCIATES, INC. (R&A)

Stephen Smith—Director; B.A. Program of Liberal Studies; 16 years of experience in airport and air traffic operations analysis and noise impact analysis. Project responsibilities include EA Team Project Manager.

John Williams—Senior Vice President; B.S. Civil Engineering, M.S. Civil Engineer; 30 years of experience in airport environmental and physical planning. Project responsibilities include EA Team Project Manager, overall quality assurance/quality control, purpose and need, and alternatives.

Lisa Reznar—Director; B.A. and M.S. Geography; 15 years of experience in airport environmental and physical planning. Project responsibilities include overall documentation, purpose and need, alternatives, affected environment and environmental consequences (air quality, fuel burn, greenhouse gas emissions, and light emissions), and administrative file.

Mark Johnson—Director; B.A. Geography, M.A. Urban and Regional Planning; 25 years of experience in airport environmental planning and noise and land use compatibility studies, and stakeholder involvement. Project responsibilities include Section 4(f) resources and historic properties.

Francois Bijotat—Managing Consultant; B.B.A, M.B.A., and M.P.A.; 10 years of experience in airport planning, airline traffic forecast and schedules, and land use compatibility planning. Project responsibilities include average annual day schedule development and socioeconomic analysis.

Patrick Hickman—Consultant; M.U.R.P., Urban and Regional Planning; B.L.A., Landscape Architecture; 4 years of experience in airport environmental planning and airport land use compatibility planning. Project responsibilities include Research, analysis and documentation of environmental impacts to Section 4(f) properties and historic resources.

Kevin Markwell—Consultant; B.S. Aviation Management; 3 years of experience in airfield and airspace planning. Project responsibilities include alternatives documentation.

Khalid Siddiqi—Senior Consultant; B.A. Geography; is responsible for overall airport planning activities using Geographic Information Systems (GIS). 13 years of broad experience in providing spatial analysis for overall airport planning activities. Project responsibilities include GIS analyses and development of GIS exhibits.

Monika Thorpe—Consultant; B.S. Meteorology and Geography; 4 years of experience in Geographic Information Systems pertaining to aviation project and related tasks. Project responsibilities include development of GIS exhibits.

METRON AVIATION

Stephen J. Augustine—Senior Software Engineer; B.A. Physics & Computer Science; Approximately 16 years of software development, noise modeling, emissions modeling, and related analysis in the aviation domain including system level environmental analysis. Project responsibilities include Airspace redesign intent-environmental modeling fidelity, data preparation, data preparation quality assurance, noise modeling quality assurance.

Meghan Hunt— Senior Associate Analyst; B.A. Mathematics / Minor Information Technology; Approximately 5 years of experience in analysis of environmental data, along with environmental and aviation analysis software testing, and system level environmental analysis. Project responsibilities include Airspace redesign intent-environmental modeling fidelity, noise modeling and analysis along with Administrative File compilation

Michael Johnson—Group Manager, Energy and Environment Group; B.S. Aviation Management. Over 28 years of experience in aviation environmental and National Airspace System (NAS) - air traffic control (ATC) facilities and equipment requirements/evolution analysis, with management of regulatory aviation environmental and system level environmental analysis projects for the last 9 years. Project responsibilities include Project Lead for overall Metron Aviation support to the Las Vegas Airspace Optimization Environmental Assessment (EA) including airspace redesign intent-environmental modeling fidelity, noise modeling and environmental analysis along with Administrative File compilation.

Tyler White—Lead Analyst; B.S. Computer Science, M.S. Strategic Leadership. Approximately 12 years of experience in regional airspace redesign, and environmental modeling and analysis including system level environmental analysis. Project responsibilities include airspace redesign intent-environmental modeling fidelity, data preparation, quality assurance, noise modeling quality assurance, documentation, and administrative file coordination.

Maryam Zavareh—Senior Associate Analyst; B.S. Civil Engineering, M.S. Civil/Environmental Engineering. Approximately 3 years of experience in aviation environmental analysis, including airspace redesign noise analysis and system level environmental analysis, with an additional 3 years of civil/environmental engineering work and research in a university environment. Project responsibilities include airspace redesign intent-environmental modeling fidelity, data preparation, and noise modeling quality assurance.

CDM SMITH

Murray Wade—B&E Sub discipline Leader; Qualified Airport Wildlife Biologist; B.S. Forest Biology and Wildlife Management and M.S. Environmental Science with research in waterfowl; 27 years experience in the environmental field including NEPA and wildlife assessment. Project responsibilities include the affected environment (migratory birds and wildlife hazards), environmental consequences (migratory birds and wildlife hazards), and contribution to the administration record.

Brendan Brown—Environment scientist; B.S. Forest Environmental Resources and M.S. Biological Sciences; 7 years of experience in wetland and wildlife assessment in support of NEPA documentation. Project responsibilities include the affected environment (fish, wildlife, and plants including listed species and wildlife refuges), environmental consequences (fish, wildlife, and plants including listed species and wildlife refuges), and contribution to the administration record.

Robin Ijams—Associate; B.A. Environmental Studies; 26 years of experience in environmental analysis and impact assessment, including 17 years of experience in NEPA and NEPA-like documentation for airports. Project responsibilities include management and quality assurance of the affected environment and environmental consequences analysis associated with fish, wildlife, and plants.

COMMUNITY AWARENESS SERVICES

Jerri Anderson—Public Involvement Specialist; A.A. Business. Project responsibilities include public involvement coordination.

SYNERGY CONSULTANTS, INC.

Mary L. Vigilante—President; B.S. Math. 34 years of experience in airport environmental planning. Project responsibilities include advisory role on DOT Section (4) and climate analyses and documentation.

B.2 Draft EA Notification of Availability

The Draft EA was made available for review at local libraries and on the LAS Optimization EA project website by the public for over 30 calendar days. Following its release, notification of the document's availability was provided through an advertisement in a local newspaper, the *Las Vegas Review-Journal* on July 1, 2012 and July 3, 2012, as documented in Appendix A.

The Draft EA was also distributed to federal, state, and local agencies that have jurisdictional responsibility or an interest in the study. **Tables B-1** through **B-3** list agencies, elected officials, and Native American tribes, respectively, that received a copy of the Draft EA and were notified of the public review period.. Summaries of and FAA responses to the comments received during the public comment period are provided in Appendix A.

The Draft EA was made available for review at the following locations:

- Clark County Law Library, 309 South Third Street, Fourth Floor, Las Vegas, Nevada 89101
- Centennial Hills Library, 6711 N. Buffalo Drive, Las Vegas, Nevada 89131
- Clark County Library, 1401 E. Flamingo Road, Las Vegas, Nevada 89119
- Enterprise Library, 25 E. Shelbourne Avenue, Las Vegas, Nevada 89123
- Las Vegas Library, 833 Las Vegas Boulevard North, Las Vegas, Nevada 89101
- Meadows Library, 251 West Boston Avenue, Las Vegas, Nevada 89102
- Rainbow Library, 3150 North Buffalo Drive, Las Vegas, Nevada 89128
- Sahara West Library, 9600 West Sahara Avenue, Las Vegas, Nevada 89117
- Spring Valley Library, 4280 South Jones Boulevard, Las Vegas, Nevada 89103
- Summerlin Library, 1771 Inner Circle Drive, Las Vegas, Nevada 89134
- Sunrise Library, 5400 Harris Avenue, Las Vegas, Nevada 89110
- West Charleston Library, 6301 West Charleston Boulevard, Las Vegas, Nevada 89146
- West Las Vegas Library, 951 West Lake Mead Boulevard, Las Vegas, Nevada 89106
- Whitney Library, 5175 East Tropicana Avenue, Las Vegas, Nevada 89122
- Windmill Library, 7060 West Windmill Lane, Las Vegas, Nevada 89113
- Green Valley Library, 2797 North Green Valley Parkway, Henderson, Nevada 89014
- James I. Gibson Library, 100 West Lake Mead Parkway, Henderson, Nevada 89015
- Paseo Verde Library, 280 South Green Valley Parkway, Henderson, Nevada 89012
- North Las Vegas Library, 2300 Civic Center Drive, North Las Vegas, Nevada 89030
- Aliante Library, 2400 West Deer Springs Way, North Las Vegas, Nevada 89084
- Boulder City Library, 701 Adams Boulevard, Boulder City, Nevada 89005
- UNLV Library, 4505 South Maryland Parkway, Las Vegas, Nevada 89154

In notifications and other information regarding the Draft EA, it was noted that anyone wishing to comment on the Draft EA was requested to do so in writing during the 30-day review period. Commenters were notified that before including a personal address, phone number, email address, or other personal identifying information in a comment, the entire comment—including personal identifying information—may be made publicly available at any time. Commenters were also notified that they could request the FAA to withhold from public review personal identifying information; however, the FAA could not guarantee that it would be able to do so.

Table B-1 (1 of 5)

Draft EA Notification of Availability to Federal, State, and Local Agencies

Organization Name	Name	Position	Address
Advisory Council on Historic Preservation Office of Federal Agency Programs	Reid Nelson	Director	1100 Pennsylvania Ave, NW, Ste. 803 Washington, DC 20004 rnelson@achp.gov
Bureau of Indian Affairs, Southern Paiute Field Office, Western Region	Kellie Youngbear	Superintendent	P.O. Box 720 St. George, UT 84771
Bureau of Land Management, Las Vegas Field Office	Bob Ross	Field Manager	4701 North Torrey Pines Dr Las Vegas, NV 89130
Bureau of Reclamation, Lower Colorado Regional Office	Lorri Gray-Lee	Regional Director	P.O. Box 61470 Boulder City, NV 89006
Department of the Navy, FAA Western Service Area (ANM-903)	George Covin & Richard Farnsworth	Representative to the FAA, Air Force	1601 Lind Ave SW Renton, WA 98057
Department of the Navy, FAA Western Service Area (ANM-903)	Byron G. "Chewy"Chew	Representative to the FAA	1601 Lind Ave SW Renton, WA 98057 byron.chew@faa.gov
Department of the Navy, FAA Western Service Area (ANM-903)	Pete Kowal	Representative to the FAA, Army	1601 Lind Ave SW Renton, WA 98057
Department of the Navy, FAA Western Service Area (ANM-903)	Douglas K. Switzer	Representative to the FAA, USMC	1601 Lind Ave SW Renton, WA 98057 douglas.switzer@faa.gov
Federal Emergency Management Agency, Region 9	Nancy Ward	Regional Administrator	1111 Broadway, Ste. 1200 Oakland, CA 94607
Federal Highway Administration, Nevada Division	Susan Klekar	Division Administrator	705 N. Plaza St., Ste. 220 Carson City, NV 89701
Federal Railroad Administration, Office of Railroad Development	David Valenstein	Chief, Environment and Systems Planning	1200 New Jersey Avenue SE - Mail Stop 20 Washington, DC 20590
National Oceanic and Atmospheric Administration	Jane Lubchenco	Administrator and Undersecretary of Commerce	1401 Constitution Avenue, NW, Rm. 5128 Washington, DC 20230 jane.lubchenco@noaa.gov
Nellis Air Force Base, Public Partnership Office	Deborah MacNeill	Director	4430 Grissom Ave, Ste. 101, 99ABW/CCY Nellis AFB, NV 89191
Transportation Security Administration, Las Vegas Office	Barbara Culberson	Transportation Security Inspector	375 E. Warm Spring Rd, Ste. 200 Las Vegas, NV 89119 barbara.culberson@dhs.gov

Table B-1 (2 of 5)

Draft EA Notification of Availability to Federal, State, and Local Agencies

Organization Name	Name	Position	Address
U.S. Army Corps of Engineers, Los Angeles District	R. Mark Toy	District Commander	915 Wilshire Blvd, Ste. 1101 Los Angeles, CA 90017
U.S. Department of Housing and Urban Development, Las Vegas Field Office	Kenneth J. LoBene	Field Office Director	300 South Las Vegas Blvd, Ste. 2900 Las Vegas, NV 89101
U.S. EPA, Region 9, Communities and Ecosystem Div., Env. Review Office	Chris Ganson	Environmental Protection Specialist	75 Hawthorne St San Francisco, CA 94105
U.S. Fish & Wildlife Service, Nevada Fish & Wildlife Office	Edward Koch	State Supervisor	1340 Financial Blvd., Ste. 234 Reno, NV 89502
U.S. Forest Service, Intermountain Regional Office	Harv Forsgren	Regional Forester	324 25th St Ogden, UT 84401
U.S. Geological Survey, Pacific Southwest Area	Jeff Keay	Acting Regional Executive	3020 State University Drive East, Modoc Hall Sacramento, CA 95819 jkeay@usgs.gov
U.S. National Park Service, Pacific West Region	Christine Lehnertz	Regional Director	333 Bush St, Ste. 500 San Francisco, CA 94104
Department of Conservation & Natural Resources, Division of Environmental Protection	Tim Murphy	Bureau Chief of Federal Facilities	2030 E. Flamingo Rd., Ste. 230 Las Vegas, NV 89119 tmurphy@ndep.nv.gov
Department of Conservation & Natural Resources, Division of Forestry	John Christopherson	Resource Program Manager	2478 Fairview Dr. Carson City, NV 89701 jchrist@forestry.nv.gov
Department of Conservation & Natural Resources, Division of State Lands	James R. Lawrence	Administrator	901 S. Stewart St., Ste. 5003 Carson City, NV 89701 lawrence@lands.nv.gov
Department of Conservation & Natural Resources, Division of State Parks	Russell Dapsauski	Manager, Southern Region	4747 Vegas Dr Las Vegas, NV 89108 russdapsauski@parks.nv.gov
Department of Conservation & Natural Resources, Division of Water Resources, Las Vegas Office	John Guillory	Supervising Engineer	400 Shadow Ln, Ste. 201 Las Vegas, NV 89106
Department of Conservation & Natural Resources, Natural Heritage Program	Jennifer Newmark	Administrator	901 S. Stewart St, Ste. 5002 Carson City, NV 89701

Table B-1 (3 of 5)

Draft EA Notification of Availability to Federal, State, and Local Agencies

Organization Name	Name	Position	Address
Department of Conservation & Natural Resources, State Conservation Commission	Joseph Fortier	Commissioner	3543 Nicole St Las Vegas, NV 89120 fortier@mojave.biz
Department of Conservation & Natural Resources, State Environmental Commission	E. James Gans	Chairman	10703 Hawes End Ct Las Vegas, NV 89183
Nevada Department of Agriculture	Jim Barbee	Director	405 South 21st St. Sparks, NV 89431
Nevada Department of Business & Industry	Terry Johnson	Director	555 E. Washington Ave, Ste. 4900 Las Vegas, NV 89101 cfoley@business.nv.gov
Nevada Department of Cultural Resources, Historic Preservation Office	Ronald M. James	State Historic Preservation Officer	901 Stewart St. S., Ste. 5004 Carson City, NV 89701 rjames@shpo.nv.gov
Nevada Department of Health & Human Services, Health Care Financing & Policy Division	Charles Duarte	Administrator	4126 Technology Way, Ste. 100 Carson City, NV 89706
Nevada Department of Transportation	Eric Glick	Statewide Aviation Planning/Rail Program Manager	1263 S. Stewart St. Carson City, NV 89712 eglick@dot.state.nv.us
Nevada Department of Wildlife, Southern Region	Brad Hardenbrook	Habitat Supervisor	4747 Vegas Dr. Las Vegas, NV 89108 bhrdnbrk@ndow.org
Nevada Division of State Lands, State Clearinghouse	Skip Canfield		901 S. Stewart St, Ste. 5003 Carson City, NV 89701 scanfield@clearinghouse.nv.gov
Nevada Division of Wildlife, Nevada Wildlife Commission	Scott Raine	Chairman	5100 West Acoma Rd Reno, NV 89511 nbwcinfo@ndow.org
Nevada Office of the Military, Air National Guard	Robert V. Fitch	Commander	2460 Fairview Dr Carson City, NV 89701 robert.fitch@ang.af.mail

Table B-1 (4 of 5)

Draft EA Notification of Availability to Federal, State, and Local Agencies

Organization Name	Name	Position	Address
Nevada State Museum Las Vegas	Dave Millman	Museum Director	309 S. Valley View Blvd Las Vegas, NV 89107 dmillman@nevadaculture.org
Regional Transportation Commission of Southern Nevada	Jacob Snow	General Manager	600 S. Grand Central Parkway, Ste. 350 Las Vegas, NV 89106
Southern Nevada Water Authority	Patricia Mulroy	General Manager	P.O. Box 99956 Las Vegas, NV 89193
Clark County	Don Burnette	County Manager	500 S. Grand Central Parkway Las Vegas, NV 89155
Clark County, Air Quality & Environmental Management	Lewis Wallenmeyer	County Liason	500 S. Grand Central Parkway Las Vegas, NV 89155 wallenmeyer@clarkcountynv.gov
Clark County, Comprehensive Planning	Nancy Lipski	Director	P.O. Box 551744 Las Vegas, NV 89155
Clark County, Department of Aviation	Randall H. Walker	Director	P.O. Box 11005 Las Vegas, NV 89111
Clark County, Department of Water Reclamation District	Richard Mendes	General Manager	5857 E. Flamingo Rd Las Vegas, NV 89122 rmendes@cleanwaterteam.com
Clark County, Dept. of Parks and Recreation Administration	Jane Pike	Director	2601 E. Sunset Rd Las Vegas, NV 89120 jepx@clarkcountynv.gov
Clark County, Fire Department	Bertral Washington	Fire Chief	575 East Flamingo Rd. Las Vegas, NV 89119
City of Henderson	Mark T. Calhoun	City Manager	P.O. Box 95050 Henderson, NV 89009 Mark.Calhoun@cityofhenderson.com
City of Henderson, Community Development	Stephanie Garcia-Vause	Director	P.O. Box 95050 Henderson, NV 89009 stephanie.garcia-vause@cityofhenderson.com
City of Las Vegas	Elizabeth N. Fretwell	City Manager	City Hall, 8th Floor, 400 Stewart Ave Las Vegas, NV 89101

Table B-1 (5 of 5)

Draft EA Notification of Availability to Federal, State, and Local Agencies

Organization Name	Name	Position	Address
City of Las Vegas, Department of Planning and Development	M. Margo Wheeler	Director	731 South 4th St Las Vegas, NV 89101
City of North Las Vegas	Timothy R. Hacker	City Manager	2250 Las Vegas Blvd N. North Las Vegas, NV 89030
City of North Las Vegas, Planning & Zoning Department	Frank Fiori	Director	2250 Las Vegas Blvd N. North Las Vegas, NV 89030
Las Vegas Valley Water District	Patricia Mulroy	General Manager	1001 South Valley View Blvd. Las Vegas, NV 89153

Source: Community Awareness Services, June, 2012.
Prepared by: Community Awareness Services, June, 2012.

Table B-2 (1 of 4)

Draft EA Notification of Availability to Elected Officials

Organization	District	Name	Position	Address	City	ST	Zip	Email
U.S. House of Representatives	District 1	Congresswoman Shelly Berkley	Congresswoman	2340 Paseo Del Prado, Ste. D-106	Las Vegas	NV	89102	
U.S. House of Representatives	District 2	Congressman Mark Amodei	Congressman	400 S. Virginia St, Ste. 502	Reno	NV	89501	
U.S. House of Representatives	District 3	Congressman Joe Heck	Congressman	8485 W. Sunset Rd, Ste. 300	Las Vegas	NV	89113	
U.S. Senate		Senator Dean Heller	Senator	333 Las Vegas Boulevard South, Ste. 8203	Las Vegas	NV	89101	
U.S. Senate		Senator Harry Reid	Senator	333 Las Vegas Boulevard South, Ste. 8016	Las Vegas	NV	89101	
Nevada State Assembly	District 01	Assemblywoman Marilyn Kirkpatrick	Assemblywoman	4747 Showdown Dr	North Las Vegas	NV	89031	mkirkpatrick@asm.state.nv.us
Nevada State Assembly	District 02	Assemblyman John Hambrick	Assemblyman	1930 Village Center Circle, Ste. 3-419	Las Vegas	NV	89134	jhambrick@asm.state.nv.us
Nevada State Assembly	District 03	Assemblywoman Peggy Pierce	Assemblywoman	5304 Gipsy Ave	Las Vegas	NV	89107	ppierce@asm.state.nv.us
Nevada State Assembly	District 04	Assemblyman Richard McArthur	Assemblyman	4640 Panoramic Court	Las Vegas	NV	89129	rmcarthur@asm.state.nv.us
Nevada State Assembly	District 05	Assemblywoman Marilyn Dondero Loop	Assemblywoman	3724 Emerald Bay Circle	Las Vegas	NV	89147	mdonderoloop@asm.state.nv.us

Table B-2 (2 of 4)

Draft EA Notification of Availability to Elected Officials

Organization	District	Name	Position	Address	City	ST	Zip	Email
Nevada State Assembly	District 06	Assemblyman Harvey J. Munford	Assemblyman	809 Sunny Place	Las Vegas	NV	89106	hmunford@asm.state.nv.us
Nevada State Assembly	District 07	Assemblyman Dina Neal	Assemblywoman	3217 Brautigan Court	North Las Vegas	NV	89032	dneal@asm.state.nv.us
Nevada State Assembly	District 08	Assemblywoman Jason Frierson	Assemblyman	P.O. Box 31623	Las Vegas	NV	89173	jfrierson@asm.state.nv.us
Nevada State Assembly	District 09	Assemblyman Tick Segerblom	Assemblyman	700 S. Third St	Las Vegas	NV	89101	rsegerblom@asm.state.nv.us
Nevada State Assembly	District 10	Assemblyman Joseph M. Hogan	Assemblyman	2208 Plaza De La Candela	Las Vegas	NV	89102	jhogan@asm.state.nv.us
Nevada State Assembly	District 11	Assemblyman Olivia Diaz	Assemblywoman	P.O. Box 365072	Las Vegas	NV	89036	odiaz@asm.state.nv.us
Nevada State Assembly	District 12	Assemblyman James Ohrenschall	Assemblyman	P.O. Box 97741	Las Vegas	NV	89193	johrenschall@asm.state.nv.us
Nevada State Assembly	District 13	Assemblyman Scott Hammond	Assemblyman	8408 Gracious Pine Ave	Las Vegas	NV	89143	shammond@asm.state.nv.us
Nevada State Assembly	District 14	Assemblywoman Maggie Carlton	Assemblywoman	5540 East Cartwright Ave	Las Vegas	NV	89110	mcarlton@asm.state.nv.us
Nevada State Assembly	District 15	Assemblywoman Elliot T. Anderson	Assemblyman	3135 South Mojave Rd, Unit 227	Las Vegas	NV	89121	eanderson@asm.state.nv.us
Nevada State Assembly	District 16	Assemblyman John Oceguera	Assemblyman	7655 Chaumont St	Las Vegas	NV	89123	joceguera@asm.state.nv.us
Nevada State Assembly	District 17	Assemblyman Kelvin Atkinson	Assemblyman	5631 Indian Springs St	North Las Vegas	NV	89031	katkinson@asm.state.nv.us
Nevada State Assembly	District 18	Assemblyman Richard Carillo	Assemblyman	4819 Diza Court	Las Vegas	NV	89122	rcarrillo@asm.state.nv.us
Nevada State Assembly	District 19	Assemblyman Steven Brooks	Assemblyman	6007 Turtle River Ave	Las Vegas	NV	89156	sbrooks@asm.state.nv.us
Nevada State Assembly	District 20	Assemblyman Cresent Hardy	Assemblyman	P.O. Box 601	Mesquite	NV	89024	chardy@asm.state.nv.us
Nevada State Assembly	District 21	Assemblyman Mark Sherwood	Assemblyman	2397 Brockton Way	Henderson	NV	89074	msherwood@asm.state.nv.us
Nevada State Assembly	District 22	Assemblywoman Lynn D. Stewart	Assemblyman	2720 Cool Lilac Ave	Henderson	NV	89052	lsteward@asm.state.nv.us
Nevada State Assembly	District 23	Assemblywomoan Melissa Woodbury	Assemblywoman	9500 W. Flamingo Rd, Ste. 203	Las Vegas	NV	89147	mwoodbury@asm.state.nv.us

Table B-2 (3 of 4)

Draft EA Notification of Availability to Elected Officials

Organization	District	Name	Position	Address	City	ST	Zip	Email
Nevada State Assembly	District 28	Assemblywoman Lucy Flores	Assemblywoman	420 North Nellis Blvd, Ste. A3-87	Las Vegas	NV	89110	lflores@asm.state.nv.us
Nevada State Assembly	District 29	Assemblywoman April Mastroluca	Assemblywoman	265 Copper Glow Court	Henderson	NV	89074	amastroluca@asm.state.nv.us
Nevada State Assembly	District 34	Assemblyman William Horne	Assemblyman	2251 North Rampart Blvd #357	Las Vegas	NV	89128	whorne@asm.state.nv.us
Nevada State Assembly	District 37	Assemblyman Marcus Conklin	Assemblyman	2251 N. Rampart Blvd #305	Las Vegas	NV	89128	mconklin@asm.state.nv.us
Nevada State Assembly	District 41	Assemblyman Paul Aizley	Assemblyman	237 East Eldorado Ln	Las Vegas	NV	89123	paizley@asm.state.nv.us
Nevada State Assembly	District 42	Assemblywoman Irene Bustamante Adams	Assemblywoman	3800 Reflection Way	Las Vegas	NV	89147	ibustamanteadams@asm.state.nv.u s
Nevada State Senate	District 01-Clark	Senator John J. Lee	State Senator	3216 Villa Pisani Court	North Las Vegas	NV	89031	jlee@sen.state.nv.us
Nevada State Senate	District 02-Clark	Senator Mo Denis	State Senator	3204 Osage Ave	Las Vegas	NV	89101	mdenis@sen.state.nv.us
Nevada State Senate	District 03-Clark	Senator Valerie Wiener	State Senator	3540 West Sahara, #352	Las Vegas	NV	89102	vwiener@sen.state.nv.us
Nevada State Senate	District 04-Clark	Senator Steven A. Horsford	State Senator	3450 West Cheyenne Ave, Ste. 100	North Las Vegas	NV	89032	shorsford@sen.state.nv.us
Nevada State Senate	District 05-Clark	Senator Shirely A. Breeden	State Senator	284 Kershner Court	Henderson	NV	89074	sbreeden@sen.state.nv.us
Nevada State Senate	District 05-Clark	Senator Michael Roberson	State Senator	P.O. Box 97251	Henderson	NV	89193	mroberson@sen.state.nv.us
Nevada State Senate	District 06-Clark	Senator Allison Copening	State Senator	1821 Montvale Court	Las Vegas	NV	89134	acopening@sen.state.nv.us
Nevada State Senate	District 07-Clark	Senator Mark Manendo	State Senator	4629 Butterfly Circle	Las Vegas	NV	89122	mmanendo@sen.state.nv.us
Nevada State Senate	District 07-Clark	Senator David R. Parks	State Senator	P.O. Box 71887	Las Vegas	NV	89170	dparks@sen.state.nv.us
Nevada State Senate	District 08-Clark	Senator Barbara K. Cegavske	State Senator	6465 Laredo St	Las Vegas	NV	89146	bcegavske@sen.state.nv.us
Nevada State Senate	District 09-Clark	[vacant]	State Senator	8022 South Rainbow Blvd, Ste. 140	Las Vegas	NV	89139	ehalseth@sen.state.nv.us
Nevada State Senate	District 10-Clark	Senator Ruben Kihuen	State Senator	P.O. Box 427	Las Vegas	NV	89125	rkihuen@sen.state.nv.us

Table B-2 (4 of 4)
Draft EA Notification of Availability to Elected Officials

Organization	District	Name	Position	Address	City	ST	Zip	Email
Nevada State Senate	District 11-Clark	Senator Michael A. Schneider	State Senator	6381 Sandpiper Way	Las Vegas	NV	89103	mschneider@sen.state.nv.us
Nevada State Senate	District 12-Clark	Senator Joe Hardy	State Senator	P.O. Box 60306	Boulder City	NV	89006	jhardy@sen.state.nv.us
Nevada State Senate	District-Central Nevada	Senator Mike McGinness	State Senator	770 Wildes Rd	Fallon	NV	89406	mmcginness@sen.state.nv.us
State of Nevada, Office of the Governor		Governor Brian Sandoval	Governor	Grant Sawyer State Office Bldg, 555 East Washington, Ste. 5100	Las Vegas	NV	89101	
Clark County Commissioner's Court		Chairman Susan Brager	Chairman	500 S. Grand Central Parkway	Las Vegas	NV	89155	ccdistf@ClarkCountyNV.gov
City of Henderson		Mayor Andy A. Hafen	Mayor	P.O. Box 95050	Henderson	NV	89009	
City of Las Vegas		Mayor Carolyn G. Goodman	Mayor	City Hall, 10th Floor, 400 Stewart Ave	Las Vegas	NV	89101	
City of North Las Vegas		Mayor Shari L. Buck	Mayor	2250 Las Vegas Blvd N.	North Las Vegas	NV	89030	

Source: Community Awareness Services, June, 2012.
Prepared by: Community Awareness Services, June, 2012.

Table B-3 (1 of 2)
Draft EA Notification of Availability to Native American Tribes

Organization Name	Name	Position	Address	City	ST	Zip	Email
Cedar Band of Paiute Indians	Lora Tom	Chair	P.O. Box 235	Cedar City	UT	84721	ranae_pete@yahoo.com
Chemehuevi Indian Tribe	Charles Wood	Chair	P.O. Box 1976	Chemehuevi Valley	CA	92363	chair1cit@yahoo.com
Cocopah Indian Tribe	Sherry Cordova	Chair	County 15th & Avenue G	Somerton	AZ	85350	
Colorado River Indian Tribes	Eldred Enas	Chair	26600 Mohave Rd	Parker	AZ	85344	
Fallon Paiute Shoshone Tribe, Education Department	Ray Stands	Cultural Coordinator	8955 Mission Road	Fallon	NV	89406	

Table B-3 (1 of 2)

Draft EA Notification of Availability to Native American Tribes

Organization Name	Name	Position	Address	City	ST	Zip	Email
Fort Mojave Indian Tribe	Tim Williams	Chair	500 Merriman Ave	Needles	CA	92363	
Fort Yuma-Quechan Tribe	Mike Jackson, Sr.	President	P.O. Box 1899	Yuma	AZ	85366	
Hopi Tribe	LeRoy Shingoitewa	Chair	P.O. Box 123	Kykotsmovi	AZ	86039	
Hualapai Tribal Council	Louise Benson	Chair	P.O. Box 179	Peach Springs	AZ	86434	
Indian Peaks Band of Paiute Indians	Anthonia Tom	Chair	940 West 526 South	Cedar City	UT	84721	
Kaibab Paiute Tribe	Manuel Savala	Chairman	#1 North Pipe Spring Rd	Fredonia	AZ	86022	
Kanosh Band of Paiute Indians, Housing Department	Corrina Bow	Chair	476 South 700 West	Cedar City	UT	84720	
Koosharem Band of Paiute Indians	Elliott Yazzie	Chair	P.O. Box 205	Richfield	UT	84701	
Las Vegas Paiute Tribe	Tanya Means	Chair	One Paiute Dr	Las Vegas	NV	89106	
Moapa Band of Paiutes	William Anderson	Chair	P.O. Box 340	Moapa	NV	89025	
Pahrump Paiute Tribe	Richard Arnold	Chair	P.O. Box 3411	Pahrump	NV	89041	rwarnold@hotmail.com
Paiute Indian Tribe of Utah	Jeanine Borchardt	Chair	440 N. Paiute Dr	Cedar City	UT	84721	jeanine.borchardt@ihs.gov
Shivwits Band of Paiute Indians	Charlotte Lomeli	Chair	6060 W 3650 N	Ivins	UT	84738	
Timbisha Shoshone Tribe	George Gholson	Chair	1349 Rocking W Dr	Bishop	CA	93514	george@timbisha.com
Torres-Martinez Desert Cahuilla Indians Tribe	Mary L. Resvaloso	Chair	66-725 Martinez St	Thermal	CA	92274	tmchair@torresmartinez.org
Twenty-Nine Palms Band of Mission Indians	Darrell Mike	Chair	46-200 Harrison Place	Coachella	CA	92236	lthomas@palms29.com
Yavapai-Prescott Tribe	Ernest Jones, Sr.	President	530 E. Merritt	Prescott	AZ	86301	

Source: Community Awareness Services, June, 2012.
Prepared by: Community Awareness Services, June, 2012

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Appendix C

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Appendix C: References

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Appendix D

List of Acronyms & Glossary of Terms

Appendix D: Acronyms and Glossary of Terms

Acronyms

A

AAD	Average Annual Day
ACCRI	Aviation Climate Change Research Initiative
ACEC	Area of Critical Environmental Concern
AEE	FAA's Office of Environment and Energy
AGL	Above Ground Level
ALP	Airport Layout Plan
APE	Area of Potential Effect
ARTCC	Air Route Traffic Control Centers, also referred to as "Centers"
ASR	Airport Surveillance Radar
ATADS	Air Traffic Activity Data System
ATC	Air Traffic Control
ATCT	Airport Traffic Control Tower
ATO	Air Traffic Organization (of the Federal Aviation Administration)

B

BLM	Bureau of Land Management
BLS	U.S. Bureau of Labor Statistics

C

CAAA	Clean Air Act Amendments
CARB	California Environmental Protection Agency Air Resources Board
CCDOA	Clark County Department of Aviation

CEQ	Council on Environmental Regulations
CFR	Code of Federal Regulations
CH_4	Methane
CO	Carbon Monoxide
CO_2	Carbon Dioxide

D

dB	Decibel
DME	Distance Measuring Equipment
DNL	Day-Night Average Sound Level
DOT	Department of Transportation
DP	Departure Procedure

E

EA	Environmental Assessment
EIS	Environmental Impact Statement
EO	Executive Order
EOR	Element Occurrence Record
EPA	U.S. Environmental Protection Agency

F

FAA	Federal Aviation Administration
FAR	Federal Aviation Regulations
FICON	Federal Interagency Committee on Noise
FMS	Flight Management System
FONSI	Finding of No Significant Impact
FR	Federal Register

G

GAO U.S. General Accounting Office

GHG Greenhouse Gas

GIS Geographic Information System

GPS Global Positioning System

GSA Generalized Study Area

H

HHS U.S. Department of Health and Human Services

HITL Human-in-the-Loop

HND Henderson Executive Airport

H_2O Water

I

IFR Instrument Flight Rules

ILS Instrument Landing System

IMC Instrument Meteorological Conditions

INM Integrated Noise Model

J

K

L

L30 Las Vegas Terminal Radar Approach Control (TRACON)

LAS Las Vegas McCarran International Airport

LSV Nellis Air Force Base

M

MITRE-CAASD MITRE Corporation's Center for Advanced Aviation System Development

MSA	Metropolitan Statistical Area

N

NAAQS	National Ambient Air Quality Standards
NAICS	North American Industry Classification System
NAS	National Airspace System
NASA	National Aeronautics and Space Administration
NATCF	Nellis Air Traffic Control Facility
NAVAIDS	navigational aids
NCA	National Conservation Area
NEPA	National Environmental Policy Act of 1969
NextGen	Next Generation Air Transportation System
NIRS	Noise Integrated Routing System
NLCD	National Land Cover Database
NM	Nautical Mile
NNHP	Nevada Natural Heritage Program
NO_X	Oxides of Nitrogen
N_2O	Nitrous Oxide
NPIAS	National Plan of Integrated Airport Systems
NPS	National Park Service
NRHP	National Register of Historic Places
NSR	New Source Review
NWR	National Wildlife Refuge

O

O_3	Ozone
OPSNET	The Operations Network

P

Pb	Lead
PBN	Performance-Based Navigation
PL	Public Law
PM	Particulate Matter

Q

R

ROD	Record of Decision
RNAV	Area Navigation
RNP	Required Navigation Performance
RTCA	Radio Technical Commission for Aeronautics

S

SAAAR	Special Aircraft and Aircrew Authorization Required
SFRA	Special Flight Rules Area
SHPO	State Historic Preservation Officer
SID	Standard Instrument Departure
SMS	Safety Management System
SO_X	Oxides of Sulfur
SO_2	Sulfur Dioxide
STAR	Standard Instrument Arrival Route
SUA	Special Use Airspace

T

TAF	Terminal Area Forecast
TARGETS	Terminal Area Route Generation, Evaluation, Traffic and Simulation

TERPS	Terminal Instrument Procedures
THPO	Tribal Historic Preservation Officer
TRACON	Terminal Radar Approach Control

U

U.S.C.	United States Code
USDA	U.S. Department of Agriculture
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
USGS	United States Geological Survey

V

VFR	Visual Flight Rules
VGT	North Las Vegas Airport
VMC	Visual Meteorological Conditions
VOC	Volatile Organic Compounds
VOR	Very High Frequency Omnidirectional Range

W

WCI	Western Climate Initiative
WPSAWG	Western Pacific Subgroup of the Airspace Working Group
WSC	Western Service Center

X

Y

Z

ZAB	Albuquerque Air Route Traffic Control Centers (ARTCC)
ZDV	Denver Air Route Traffic Control Centers (ARTCC)

ZLA Los Angeles Air Route Traffic Control Centers (ARTCC)

ZLC Salt Lake City Air Route Traffic Control Centers (ARTCC)

ZOA Oakland Air Route Traffic Control Centers (ARTCC)

Glossary of Terms

A

A-Weighted Sound Level—The A-weighting scale discriminates against the lower frequencies below 1000 hertz according to a relationship approximating the auditory sensitivity of the human ear. The A-weighted sound level is approximately related to the relative "noisiness" or "annoyance" of many common sounds.

Air Route Traffic Control Center (ARTCC or **Center)—**An FAA facility established to provide air traffic control service to IFR aircraft principally within the en route airspace.

Air Traffic Control—The combination of people and the software, hardware, and facilities used to monitor and to guide or direct aircraft on their routes within the NAS is referred to collectively as air traffic control.

Air Traffic Controller (or **Controller)—**The people who monitor and guide or direct aircraft on their routes within the NAS

Air Traffic Organization (ATO)—The organization within the FAA that is responsible for moving air traffic safely and efficiently within the NAS.

Air Traffic Routes—Any routes through the ATCT, terminal, and en route airspace.

Airfield Throughput—Airfield throughput is a measure of the expected number of operations that multiple runways at an airport can accommodate in one hour, considering the operating dependencies between runways to maintain safe operating standards.

Airport Traffic Control Tower (ATCT)—A facility that provides ATC services to aircraft operating in the vicinity of an airport.

Airspace—Navigable area used by aircraft for purposes of flight.

Airspace Management Structure—The defined volumes of airspace assigned to ATC facilities and the sectors within the ATC facilities for purposes of managing aircraft flow.

Airspace Throughput—A measure of airspace capacity, the number of aircraft that can operate through the airspace in a safe manner based on the design of routes through the airspace and the management structure of the airspace (see also Sustained Airspace Throughput).

Airway—An area of airspace established in the form of a corridor, the centerline of which is defined by NAVAIDs. The network of airways serving aircraft up to but not including 18,000 feet MSL are referred to as Victor Airways. The network of airways serving aircraft operations at or above 18,000 feet MSL are referred to as Jet Airways.

Approach Phase of Flight—The segment of flight during which a pilot follows a standard procedure or series of verbal instructions from an air traffic controller to guide the aircraft to the landing runway.

Area Navigation (RNAV)—A method of air navigation that allows an RNAV-trained pilot operating an RNAV-equipped aircraft to fly a direct course within a network of NAVAIDs, rather than navigating by following a series of NAVAIDs.

Arrival—The act of landing at an airport, also referred to as landing.

Arrival Gate—The general area along the terminal–en route airspace boundary through which aircraft in the descent phase of flight typically pass (note that several entry points may be located along one arrival gate).

Arrival Stream—Procedure in which arriving air traffic is merged into an orderly flow for entering the terminal airspace or landing on a runway. Also see Sequencing.

B

C

Climb or **Climb-out—**The act or instance of increasing altitude.

Controller—(see **Air Traffic Controller**)

Conventional Standard Instrument Procedures (SIDs or **STARs)—**Procedures based on ground-based navigational aids (NAVAIDs), which provide instrument guidance to a pilot as the aircraft flies over each NAVAID, or if they are based on verbal instructions from an air traffic controller.

D

Day-Night Average Sound Level (DNL)—A measure of the annual average noise environment over a 24-hour day. The measure is a 24-hour, logarithmic, (or energy-) average, A-weighted sound pressure level with a 10-decibel penalty applied to nighttime event that occur between 10 p.m. and 7 a.m.

Departure—The act of an aircraft taking off from an airport, also referred to as take-off.

Departure Gate—The general area along the terminal–en route airspace boundary through which aircraft in the departure phase of flight typically pass (note that several exit points may be located along one departure gate).

Departure Phase of Flight—The in-flight transition of an aircraft from take-off to the en route phase of flight, during which the aircraft climbs to its assigned cruising altitude following a standard instrument procedure (predefined set of guidance instructions that define a route for a pilot to follow) or a series of verbally issued instructions from an air traffic controller.

Departure Stream—Procedure in which departing air traffic is merged into an orderly flow to exit the terminal airspace. Also see Sequencing.

Descent—The process of decreasing altitude.

Descent Phase of Flight—The in-flight transition of an aircraft from the assigned cruising altitude to the point at which the pilot initiates the approach to a runway at the destination airport.

E

EA Airports—McCarran International Airport (LAS), North Las Vegas Airport (VGT), and Henderson Executive Airport (HND).

En Route Airspace—A general term used to describe the airspace controlled by an ARTCC.

En Route Phase of Flight—The generally level segment phase of flight ("cruise altitude") between the departure and destination airports.

Entry Point—The point along the terminal airspace – en route airspace boundary – at which the aircraft enters the terminal airspace and exits the en route airspace and control of the aircraft is passed from ARTCC to TRACON controllers.

Environmental Assessment—An EA is a concise document used to describe the environmental impacts of a proposed federal action.

Exit point—The point along the terminal airspace – en route airspace boundary – at which the aircraft exits the terminal airspace and enters the en route airspace and control of the aircraft is passed from TRACON to ARTCC controllers.

F

Federal Aviation Administration (FAA)—The agency of the U.S. government with primary responsibility for the safety of civil aviation. Among its major functions are the regulation of civil aviation to promote safety and fulfill the requirements of national defense and development and operation of a common system of air traffic control and navigation for both civil and military aircraft.

Final Approach—The segment of flight along which an aircraft is aligned with the landing runway and operates along a straight route at a constant descent rate to the runway.

Flight Check—The process of flying new procedures to validate design.

Flight Track—The route used by an aircraft in flight.

G

Global Positioning System (GPS)—A satellite-based radio positioning and navigation system operated by the Department of Defense. The system provides highly accurate position and velocity information and precise time, on a continuous global basis to an unlimited number of properly equipped users.

H

Heading—A compass bearing indicating the direction of travel.

Hold Pattern/Ground Hold—An ATC coordination technique that involves assigning an aircraft to a holding pattern in the air or holding an aircraft on the ground before departure.

I

Instrument Flight Rules (IFR)—Rules governing the procedures for conducting instrument flight in aircraft. Also a term used by pilots and controllers to indicate a type of flight plan.

Instrument Meteorological Conditions (IMC)—Weather conditions with a cloud ceiling height of less than 1,000 feet above ground level (AGL), visibility of less than 3 miles, or the presence of another visual impairment such as rain, snow, fog, and dust.

J

Jet Airway—(see Airway)

K

L

Landing—(see Arrival)

Landing Phase of Flight—The touch-down of the aircraft at the destination airport's runway including taxing and managing taxi flow into gate.

LAS Optimization—(see Las Vegas Area Optimization)

Las Vegas Area Optimization—The proposed project, the subject of this EA, to redesign the air traffic routes in the Las Vegas area serving the EA Airports. The project is referred to as "LAS Optimization."

Lateral separation—The separation between aircraft operating along two separate but proximate flight routes.

Level-off—An ATC coordination technique that involves directing an aircraft that is ascending or descending to maintain a constant altitude. This can be done once the aircraft reaches its cruise altitude in the en route environment, or as a series of steps taken as the aircraft transitions to/from the en route airspace to maintain adequate separation from other aircraft.

Longitudinal Separation—The separation between two aircraft operating along the same flight route referring to the distance between a lead and a following aircraft. Longitudinal separation is also referred to as in-trail separation.

M

Mean Sea Level (MSL)—The height of the surface of the sea for all stages of the tide, used as a reference for elevations or altitude of aircraft flight. Also called sea level datum.

N

National Airspace System (NAS)—The area within which the FAA manages aircraft takeoffs and landings and the flow of aircraft between airports through a system of infrastructure (such as air traffic control facilities), people (such as air traffic controllers, maintenance and support personnel), and technology (sensors such as radar and communications equipment).

Nautical Mile (NM)—A measure of distance equal to 1 minute of arc on the earth's surface (approximately 6,076 feet).

Navigational Aids (NAVAIDS)—A visual or electronic device airborne or on the ground that provides guidance information or position data to aircraft in flight.

Next Generation Air Transportation System (NextGen)—The FAA's plan to modernize the National Airspace System to meet expected future demand for air transportation services.

Noise—Any sound that is undesirable because it interferes with speech and hearing, or is intense enough to damage hearing, or is otherwise annoying.

Noise Exposure—The cumulative acoustic stimulation reaching the ear of a person over a specified period of time (e.g., a year, a work shift, a working life, or a lifetime).

Noise Integrated Routing System (NIRS)—A computer program developed, updated, and maintained by the FAA to evaluate aircraft noise impact for air traffic actions involving multiple airports over broad geographic areas.

O

Operation—The landing or take-off of an aircraft.

Overlay—An overlay is a term used to describe the condition in which a conventional and RNAV standard instrument procedures closely mimic each other to allow for both RNAV-equipped aircraft and aircraft that are not RNAV-equipped to follow a similar route.

P

Performance-Based Navigation—A framework for defining performance requirements in navigation that can be applied to an air traffic route, an instrument procedure, or a defined airspace. Once the performance level is established, the aircraft's capability determines whether the aircraft can safely achieve the specified performance and qualify for the operation. The two main components of PBN framework are Area Navigation (RNAV) and Required Navigation Performance (RNP).

Point-out—An ATC coordination technique that involves pointing out, or notifying an air traffic controller of an adjacent sector of the proximity of an aircraft to the adjacent sector's boundary.

Population Centroid—A point representing the geographic center of a census block defined by the U.S. Bureau of Census.

Preflight Phase of Flight—The phase of flight that includes the preflight planning and checks as well as the ground movement of the aircraft (referred to as "taxiing") to the departure end of a runway.

Q

R

Reroute—An ATC coordination technique that involves rerouting aircraft to manage aircraft flow.

RNAV—See **Area Navigation**.

Runway Operating Configurations—The optimal combinations of use of two or more runways to accommodate arriving and departing aircraft under differing conditions such as weather, prevailing winds, type of traffic (e.g., predominately arrivals or departures), and amount of traffic.

Runway Throughput—A runway can accommodate a defined number of aircraft operations, which can be measured by runway throughput, or the expected number of operations (arrivals and/or departures) that a runway can accommodate in one hour while maintaining safe operating standards.

Runway Transition—The segment of a route (1) defined in a SID that provides guidance from a runway end to an exit point or to a common segment of the SID, or (2) defined in a STAR that provides guidance from an entry point or a common segment of the SID to the final approach to a runway end.

S

Satellite EA Airports—North Las Vegas Airport (VGT) and Henderson Executive Airport (HND).

Section 4(f)—A resource that may be protected under special provisions of the U.S. Department of Transportation Act (49 USC 303(c)).

Sector—A defined volume of airspace, including both lateral and vertical limits, in which a single air traffic controller is responsible for the safe movement of air traffic. A TRACON's or ARTCC's airspace is comprised of multiple sectors.

Separation—Spacing between aircraft. (Also see Vertical, Lateral, or Longitudinal Separation.)

Sequencing—Procedures in which air traffic is merged into an orderly flow. Also see Arrival Stream and Departure Stream.

Special Use Area (SUA)—A volume of airspace that supports activities, often of military nature, that may present a safety hazard for nonparticipating aircraft. Therefore, limitations are imposed on aircraft operations that are not a part of the defined activities, such as requiring nonparticipating aircraft to remain outside of the SUA.

Speed Control—An ATC coordination technique that involves reducing or increasing aircraft speed.

Standard Instrument Arrival Route (STAR)—A procedure that defines for a pilot standard and predictable lateral and vertical guidance to facilitate safe and predictable navigation from a jet airway in the en route airspace through the terminal airspace and to a runway.

Standard Instrument Departure (SID)—A procedure that defines for a pilot standard and predictable lateral and vertical guidance to facilitate safe and predictable navigation from an airport through the terminal airspace (while remaining clear of obstacles such as cell towers, buildings, and trees) and to a jet airway in the en route airspace.

Standard Instrument Procedure—A predefined set of guidance instructions that define a route along which aircraft operate, intended to provide predictable, efficient flight routes to move aircraft through the airspace in an orderly manner and to minimize the need for communication between the controller and pilot.

Sustained Airspace Throughput—The greatest number of operations per hour that can be accommodated in an area of airspace for successive hours without eventually resulting in delays. During some hours, the airspace can accommodate more operations than what is considered to be sustainable; in other words, the higher level of operations that may be accommodated during some hours could not be sustained during every hour of the day.

Sustained Throughput—The greatest number of operations per hour that can be accommodated for *successive hours* without eventually resulting in delays. In other words, a higher level of operations may be accommodated during some hours that could not be sustained during every hour of the day. (See also Throughout).

T

Take-off—See **Departure**.

Takeoff Phase of Flight—The phase of flight in which an aircraft transitions from a runway to flight.

Terminal Airspace—The airspace in which aircraft operating under the control of a terminal radar approach control (TRACON) facility.

Terminal Radar Approach Control (TRACON)—The FAA ATC facility at which controllers manage aircraft operating within the terminal airspace that are transitioning between the airspace under control of an ATCT and the en route airspace.

Throughput—The expected number of aircraft operations (arrivals and/or departures) that a runway, an airfield, or an defined area of airspace can accommodate in one hour while maintaining safe operating standards. (See also Sustained Throughput, Runway Throughput, Airfield Throughput, and Airspace Throughput).

U

V

Vectoring—An ATC coordination technique that involves issuing a series of headings to a pilot to route an aircraft.

Vertical Separation—The separation between aircraft operating at different altitudes.

Victor Airway—(see Airway).

Visual Flight Rules (VFR)—The rules that govern the procedures for conducting flight under Visual Meteorological Conditions (VMC), under which the pilot is responsible to "see-and-avoid."

Visual Meteorological Conditions (VMC)—Conditions that exist during fair to good weather.

W

X

Y

Z

Appendix E

Aircraft Noise

Las Vegas Airspace Optimization Environmental Assessment (EA)

Aircraft Noise Report

VERSION: [VERSION NUMBER]	REVISION DATE: [DATE]
1.1 Draft	04/16/2012
1.2 Draft	05/02/2012
1.3 Draft	06/25/2012 (by Ricondo)

Prepared By: Metron Aviation Incorporated

For

Ricondo and Associates

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Appendix E Aircraft Noise

This appendix provides more details on the noise modeling that was performed for the Las Vegas (LAS) Airspace Optimization Environmental Assessment (EA), and supplements the noise results disclosed in **Section 4.3.1**, **Affected Environment - Noise**, and **Chapter 5.0, Environmental Consequences**. General information on noise and its effects on humans are provided in Sections E.1 – E.5 of this appendix. Sections E.6 – E.9 provide project-specific information including the noise analysis methodology, statistical information on development of the predicted noise levels, information on the impact of noise on people located within the Generalized Study Area (GSA), and information on the impact of noise on Department of Transportation, Section 4(f) locations within the GSA and within the Supplemental Study Area (SSA).

E.1 THE PHYSICS AND MEASUREMENT OF NOISE

The FAA defines noise as a perceived sound. "Sound is a complex vibration transmitted through the air which, upon reaching our ears, may be perceived as beautiful, desirable, or unwanted. It is this unwanted sound which people normally refer to as noise." Hence, "aircraft noise" is unwanted sound caused by aircraft overflights and aircraft engines running on the ground[1].

Noise and sound are one in the same. However, noise is what one would consider to be unwanted sound. The difference between sound and noise depends upon the listener and the overall circumstances. As an example, rock music can be pleasurable sound to one person and an annoying noise to another.

Sound is produced by vibrating objects, and reaches the listener's ears as waves in the air or other media. When an object vibrates, it causes slight changes in air pressure. These air pressure changes travel as waves that spread outward from the source like ripples do on water when a stone is thrown into it. The result of the air movement is sound waves radiating in all directions that can be reflected and scattered. When the source stops vibrating, the sound waves disappear almost instantaneously and the sound stops.

Sound has three main components:

- **Loudness (amplitude),**
- **Pitch (frequency), and**
- **Duration (time pattern).**

Loudness is defined as the difference between the Total Pressure (with sound present) minus the Atmospheric Pressure (with no sound present). The unit of sound pressure is called the "decibel" (dB). Since the sounds that are typically heard by the human ear may vary from **1 to 100 trillion units**, a logarithmic scale is used to make the numbers more manageable.

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1 Steven J. Newman and Kristy R. Beattie, *Aviation Noise Effects* (Washington D.C.: Department of Transportation, Federal Aviation Administration, Office of Environmental and Energy, 1985), 1, FAA-EE-85-2

This “decibel scale” allows loudness to be expressed using numbers that range from **zero to 140**. Most everyday sounds range from zero to 120. The human ear has a wide range of responses to varying sound amplitudes. Sharply painful sound is **100 trillion (10^{14}) times greater** in sound pressure than the least audible sound.

By definition, a sound which has ten times the mean square sound pressure of the reference sound is 10 dB greater than the reference sound, and a sound which has 100 times the mean square sound pressure of the reference sound is 20 dB greater. The usefulness comes from the fact that mean square sound pressure of interest (human perception) extends over a range of **100 trillion to 1**. Such a large number is much more conveniently represented on the logarithmic scale as **140 dB (10 x 14 Bel[2])**.

The sound pressures of two separate sounds cannot be added directly. For example **(see Figure E-1)**, if a sound of 80 dB is added to another sound of 74 dB, the sum of the two sounds is a one decibel increase to 81 dB, and is not 154 dB (80 dB + 74 dB). If two equally loud noises occur simultaneously, the sound pressure level from the two events combined is only 3 dB higher than the level produced by either event alone. The interesting result of logarithmic addition is the greater weight it gives to the higher noise levels compared to quieter levels.

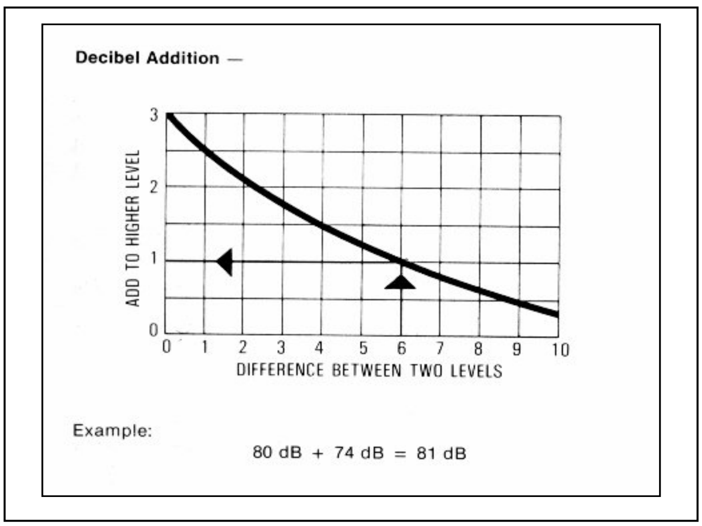

Figure E-1: Example of Decibel Addition

[2] “Bel is a measure of sound intensity where one sound can be compared to that of another of the same frequency by taking the ratio of their powers. When this ratio is 10, the difference in intensity of the sounds is said to be one Bel, a unit named in honor of the United States inventor Alexander Graham Bell. Accordingly, the relative intensities of two sounds in “Bels” are equal to the logarithm of the intensity. Sound intensity is the amount of energy flowing per unit time through a unit area that is perpendicular to the direction in which the sound waves are travelling. Sound intensity may be measured in units of energy or work—*e.g.,* micro joules (10^{-6} joule) per second per square centimeter—or in units of power, as microwatts (10^{-6} watt) per square centimeter. Unlike loudness, sound intensity is objective and can be measured by auditory equipment independent of an observer’s hearing. Source: http://www.britannica.com/facts/5/120927/bel-as-discussed-in-sound-intensity-physics

Logarithmic math also returns interesting results when averaging sound levels. As the example in **Figure E-2** shows, the loudest sound levels are the dominant influence in the averaging process. In the example, two sound levels of equal duration are averaged. One is 100 dB, the other 50 dB. Using linear arithmetic, the result would be 75 dB. The logarithmic result is 97 dB because 100 dB contains 100,000 times the sound energy as 50 dB.

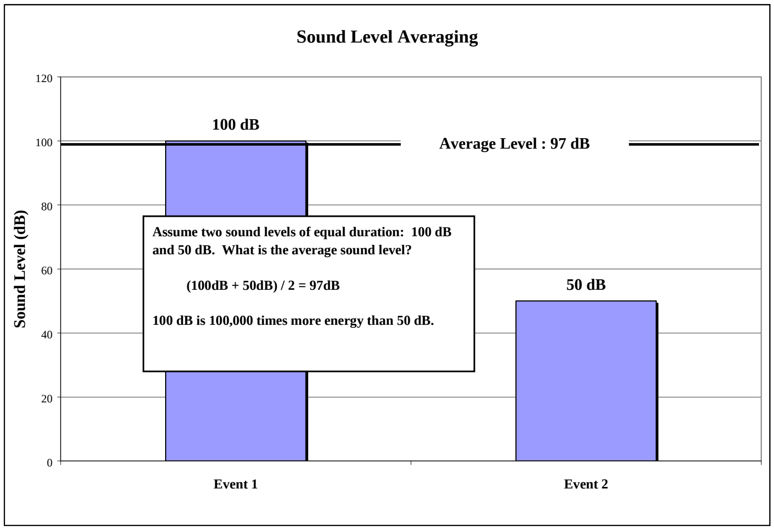

Figure E-2: Example of Sound Level Averaging

The **pitch (or frequency)** of sound can be defined as the rate at which a sound source makes air vibrate, and is comparable to the distance between ripples in water. Closely spaced ripples are analogous to high-pitched sounds like a lifeguard's whistle, whereas widely spread ripples are analogous to something like the sound of a fog horn. The term "Hertz" (Hz) is a unit of measure for the rate of vibration, or the number of cycles/waves per second (1/s, or sec^{-1}). The ability to hear a sound depends greatly on the frequency of that sound. Humans can hear sounds the best when they are at frequencies between 1,000 and 6,000 Hz. Sound at frequencies above 10,000 Hertz (high-pitched hissing) and below 100 Hertz (low rumble) are much more difficult to hear.

In order for us to measure sound that is scaled to the way people actually hear, more weight must be given to frequencies that humans hear more easily, whereas less weight is given to low/high frequencies that are not easy for humans to hear. In the document titled *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety* (Levels Document), prepared by the United States Environmental Protection Agency (USEPA), Office of Noise Abatement and Control, **A-weighting** is recommended so as to describe environmental noise[3]. A-weighting is found to correlate well with people's subjective judgment of the loudness of sounds. All metrics used in this EA are A-weighted scales. The A-weighted metric is shown in **Figure E-3** along with other types of

[3] U.S. Environmental Protection Agency, Office of Noise Abatement and Control, *Information on Levels of Environmental Noise Requisite to Protect Health and Welfare with an Adequate Margin of Safety*, (Washington D.C.: Government Printing Office, March1974)

weighted levels. As shown on the Figure, the B-, C-, and D-weighted scales give more weight to low frequency sound than the A-weighted scale. In quantifying the effects of noise on humans, the metric used should be comparable to what the human ear senses, which is the A-weighted decibel.

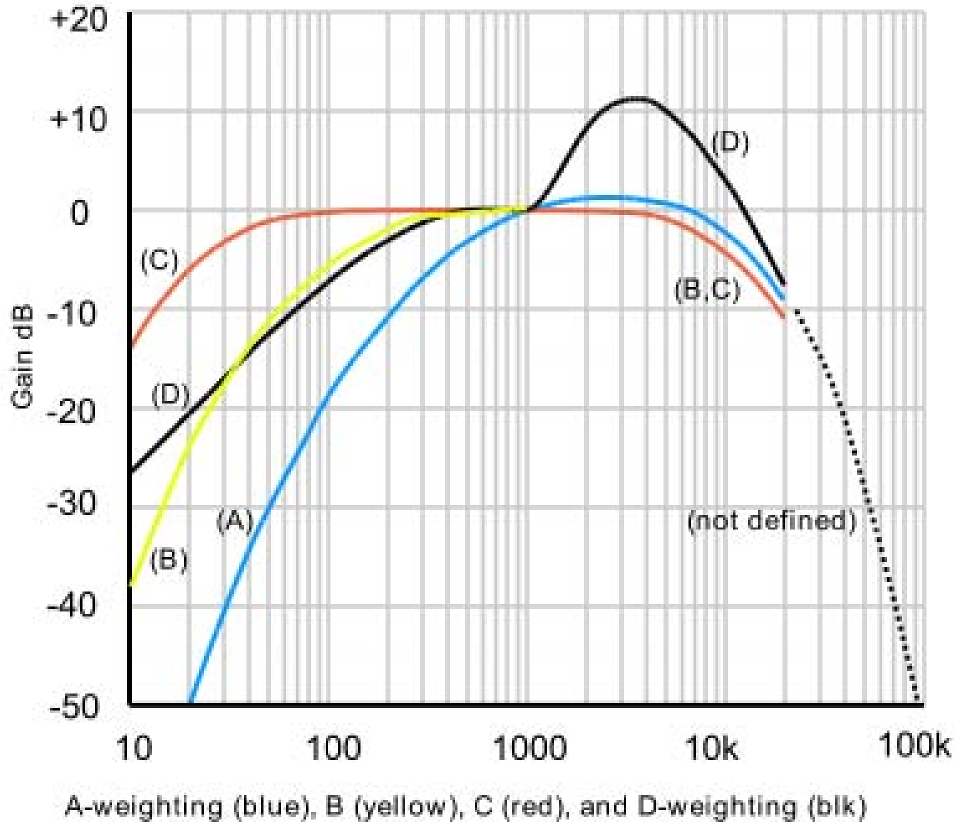

Figure E-3: Decibel Weighting Scales

The **duration** of a sound is described as a pattern of loudness and pitch over a period of time. Furthermore, sounds can be classified as *continuous* like a room fan, *impulsive* like a thunder crash, or *intermittent* like an aircraft overflight. Aircraft takeoffs and landings are intermittent sounds that are produced for short periods, with the loudness taking a shape similar to a Bell-curve. The duration of an intermittent event is defined by the time when the sound energy begins to rise above the background noise level to the point when the sound level falls back below the background level.

Sound Metrics "Rules of Thumb"

The physics and measurement of noise are best understood with the following rules of thumb:

- An increase of 3 dB is noticeable to most people.
- An increase of 10 dB is perceived by people as twice as loud.
- Doubling or halving the distance between a sound source and receiver results in a change of 6 dB.
- Adding two identical sounds produces a total sound level 3 dB higher.
- When two different sound levels are averaged, the result is nearly the same as the higher sound level.

E.2 STANDARD NOISE DESCRIPTORS

There are five common noise descriptors (From Noise Components loudness, frequency and duration):

1 24-Hour Time Above Threshold (**TA**)
2 Equivalent Sound Level (**L_{eq}**)
3 Maximum Level (**L_{max}**)
4 Sound Exposure Level (**SEL**)
5 Day/Night Average Sound Level (**DNL**)

The primary noise descriptor used for this EA is **DNL**. FAA Order 1050.1E, *Policies and Procedures for Considering Environmental Impacts*, and requires that the DNL noise metric be used for evaluating aircraft noise exposure. In addition to DNL, which is used for the general assessment of noise impacts, the other descriptors (**L_{max}**, **SEL**, **L_{eq}** and **TA**) may be used to provide additional information about aircraft noise characteristics.

E.2.1 Supplemental Noise Metrics

The **TA** (time above) metric is the amount of time per day that a location is exposed to a noise level that is greater than a specific decibel threshold (e.g. 85 dB). The measure is used to determine the exposure of noise-sensitive receptors like schools, sleeping quarters, etc., to long periods/levels of noise that may be disruptive to the activities occurring there.

The **SEL (**sound exposure level) metric is used to quantify the total sound of a single noise event, and so, may be considered as an accumulation of the sound energy over the duration of an event. **Figure E-4** displays graphs of three different sound events. Measuring the maximum level (**L_{max}**) of each sound is one way to compare the three events. The L_{max}, however, does not identify the total noise exposure created during each event because it excludes the duration of the noise events. The SEL takes into consideration not only the L_{max}, but also the duration. In **Figure E-4**, the firecracker is quick and very loud whereas the roadway noise has a low L_{max}, but with a much longer duration (15 minutes), and the aircraft flyover has a lower L_{max} than the firecracker, but is one minute longer. All three events have different L_{max} levels and durations, yet the SELs are equal because the three events transmit the same amount of sound energy.

As depicted in **Figure E-5**, SEL compiles all of the noise energy associated with a single event and integrates the energy to a single reference second. Consequently, the SEL will typically be greater than the peak decibel level (Lmax) of the event. Aircraft SELs are normally between 6 and 10 decibels higher than the Lmax for an event.

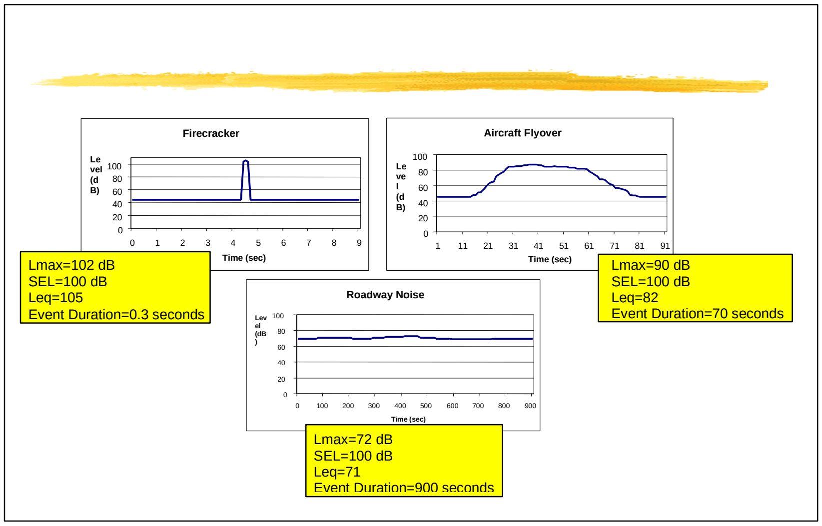

Figure E-4: Comparison of Different Sounds

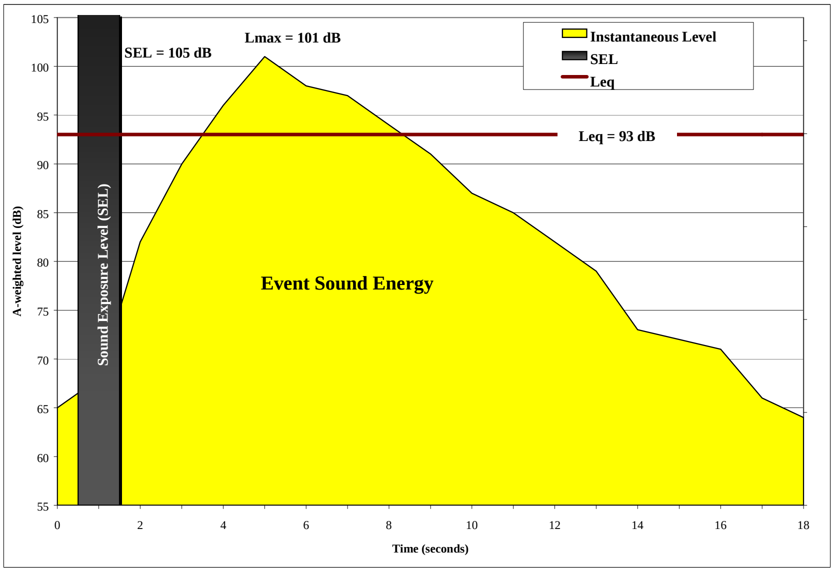

Figure E-5: Relationship among Noise Metrics

The $\mathbf{L_{eq}}$ (equivalent sound level) metric is used to quantify cumulative noise exposure. L_{eq} is a single value of sound level for any desired duration, which includes all of the time-varying sound energy within the measured period. Typical measurement periods are 1-hour, 8-hours, and 24-hours. For example, an 8-hour L_{eq} of 75 A-weighted decibels (dBA) indicates that the amount of sound energy in the 8-hour period is equivalent to the energy in a continuous sound level of 75 dBA. L_{eq} is a useful metric because of a phenomenon known as the "equal energy rule." Scientists have found that a very loud noise with a short duration has the same effect on humans as a quieter noise lasting a longer time when the total energy of both sound events is equal.

E.2.2 Day/Night Average Sound Level

The **DNL** (day-night average sound level) metric is similar to L_{eq}, in that it represents a continuous sound level, but it is only computed over a 24-hour period. In an attempt to quantify the greater annoyance associated with noise events that occur at night, the DNL includes an added weight for nighttime noise. The DNL requires that sound levels occurring during the nighttime (between 10:00 P.M. and 7:00 A.M.) be augmented by 10 dB, which is meant to account for noises that occur during prime sleeping hours and when ambient noise levels are generally lower. Therefore, this type of weighting makes one night flight equal to ten day flights.

Having the DNL become the standard metric for aviation noise analysis is due primarily in part to the EPA's effort to comply with the Noise Control Act of 1972. The EPA designated a task group to "consider the characterization of the impact of airport community noise and develop a community noise exposure measure."[4] The task group recommended DNL as the metric for aircraft noise studies.

In the EPA's *Information of Levels* document (Levels document), the EPA researched the validity of using the DNL for quantifying human exposure to aircraft noise. They began by analyzing the daily variation of aircraft noise by comparing the difference between Ld (daytime noise level) and Ln (nighttime noise level). The EPA plotted 63 sets of measurements that spanned noise environments ranging from the quiet of a wilderness area to the noisiest of airport and highway environments. The results showed that at the lowest levels (DNL around 40-55 dB), Ln is not the primary control in determining DNL because the nighttime ambient noise level is so much lower than in the daytime. At higher DNLs (65-90 dB), the values of Ln are not much lower than those for Ld. Because of the 10 dB nighttime weighting, Ln will control the DNL value. In the report, the EPA concluded, "The choice of the 10 dB nighttime weighting in the computation of DNL has the following effect: In low noise level environments below DNL of approximately 55 dB, the natural drop in Ln values is approximately 10 dB, so that Ld and Ln contribute about equally to DNL. However, in high noise environments, the nighttime noise levels drop relatively little from their daytime values."[5] The EPA had concluded that DNL provides an accurate metric for quantifying "noise," or unwanted annoying sounds.

The EPA ultimately endorsed the use of DNL recommended in the Levels document, based on the following considerations:

1 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.
2 The measure correlates well with known effects of the noise environment on individuals and the public.
3 The measure is simple, practical and accurate. In principle, it is useful for planning.
4 Measurement equipment is commercially available.
5 DNL is closely related to methods currently in use.

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[4] U.S. Environmental Protection Agency, Office of Noise Abatement and Control *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety*, (Washington D.C.: Government Printing Office, March 1974) A-10

[5] Ibid., A-15

6 The metric at a given location is predictable, within an acceptable tolerance, from knowledge of the physical events producing the noise[6].

Typical DNL values for a variety of noise environments are shown in **Figure E-6** to indicate the range of noise exposure levels usually encountered.

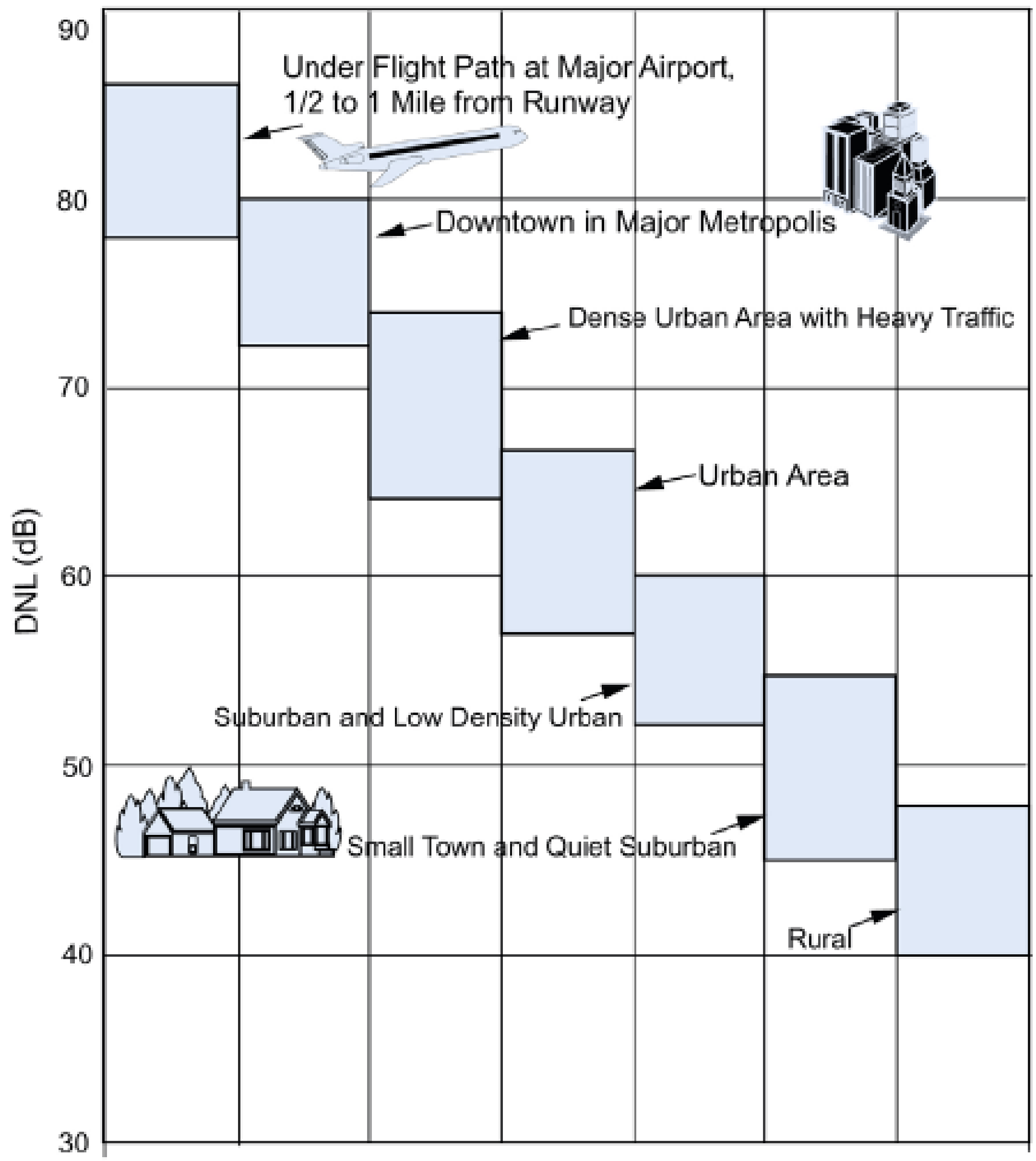

Figure E-6: Typical Range of Outdoor Community Day-Night Average Sound Levels
Source: U.S. Dept of Defense. Depts. of the Air Force, the Army, and the Navy, 1978. ***Planning in the noise Environment.*** **AFM 19-10. TM 5-803-2, and NAVFAC P-970. Washington, D.C.: U.S. DoD**

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6 Ibid, A-1 – A-23.

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 metric for measuring noise for land use planning, thus endorsing the EPA's earlier work and making it applicable to all Federal agencies. Land use compatibility guidelines were established based on DNLs[7].

In response to the requirements of the Aviation Safety and Noise Abatement Act of 1979 and the recommendations of FICUN and EPA, the FAA established DNL as the single system for measuring and evaluating aircraft noise for land use planning and noise impact assessment. The agency also identified land uses that are compatible with various levels of noise exposure. The FAA found DNL to be a workable tool for use in relating aircraft noise to community reaction.

Due to the DNL metric's excellent correlation with the degree of community annoyance from aircraft noise, DNL has been formally adopted by most federal agencies for measuring and evaluating aircraft noise for land use planning and noise impact assessment. Federal interagency committees such as the FICUN and the Federal Interagency on Noise (FICON) which include the EPA, FAA, Department of Defense, Department of Housing and Urban Development (HUD), and Veterans Administration, found DNL to be the best metric for land use planning. They also found no new cumulative sound descriptors or metrics of sufficient scientific standing to substitute for DNL. Other cumulative metrics could be used only to supplement, not replace DNL[8]. Furthermore, FAA Orders 1050.1E and 5050.4B for environmental studies require that DNL be used in describing cumulative noise exposure and in identifying aircraft noise/land use compatibility issues.

In 1993, the FAA issued its *Report to Congress on Effects of Airport Noise*, which studied the social, economic, and health effects of airport noise, and determined the actual level at which noise creates an adverse effect on people. 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)."[9]

Most aviation noise studies, including this EA, utilize computer-generated estimates of average annual day/night noise exposure. DNL values are calculated by adding the predicted SELs of individual aircraft operations that fly over a location during a 24-hour period and weighting nighttime operations (10:00 PM – 07:00 AM) by 10 dB. Numerous studies have confirmed the reasonableness of the predicted values with noise monitoring data.

Measurements of DNL are practical only for obtaining values for a relatively limited number of points. Instead, many noise studies, including this document, are based on estimates of DNL using a FAA-approved computer-based noise model.

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

8 Federal Interagency Committee on Noise (FICON) *Federal Agency Review of Selected Airport Noise Analysis Issues* (1992)

9 U.S. Department of Transportation, Federal Aviation Administration, *Report to Congress on Effects of Airport Noise* (Washington D.C.: Government Printing Office, 1993), 1.

E.3 EFFECTS OF NOISE EXPOSURE ON PEOPLE

It is extremely difficult to assess in a generalized manner the impacts of noise on people because of the wide variations in individual reactions. Research has provided some answers, but some physical and psychological responses to noise are not yet fully understood and are still being debated.

E.3.1 Effects on Hearing

The major health danger posed by noise is hearing loss. The EPA's *Information on Levels* document (1974) concluded that exposure to noise of greater than 70 L_{eq} on a continuous basis, and over a long duration while at the human ear's most damage-sensitive frequency, may result in a very small, but permanent, loss of hearing. Therefore, a noise level of 70 L_{eq} is considered to be the margin of safety for 24-hour noise exposure throughout the year.[10]

Three studies which examined hearing loss among people living near airports are cited in *Aviation Noise Effects*. The studies found that people in the community adjacent to or near an airport are at no significant risk of suffering permanent hearing damage from aircraft noise under normal airport operations.[11]

The Occupational Safety and Health Administration (OSHA) has established permissible noise exposure limits in the workplace to guard against the risk of hearing loss so that when exposure limits are exceeded, hearing protection is required. The standards, shown in **Table E-1**, establish a sliding scale of permissible noise levels by duration of exposure. OSHA permits continuous noise levels of up to 90 dBA for eight hours per day, without requiring hearing protection. However, regulations require employers to establish hearing conservation programs where noise levels exceed 85 L_{eq} during the 8-hour workday. This involves work place noise monitoring, hearing tests for employees, the availability of hearing protection to employees at risk of hearing loss, and the establishment of a training program to inform employees about the effects of work place noise on hearing and the effectiveness of hearing protection devices.

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10 U.S. Environmental Protection Agency, Office of Noise Abatement and Control, *Information on Levels…*, C-17

11 Newman. *Aviation Noise Effects*, 39.

Table E-1: Permissible Noise Exposures – OSHA Standards

Duration per day, hours	Sound Level (dBA) Slow response
8	90
6	92
4	95
3	97
2	100
1 ½	102
1	105
½	110
¼ or less	115

Source: 29 CFR Ch. XVII, Section 1910.95 (b)

With respect to the risk of hearing loss, Taylor and Wilkins' research (1987) concluded, "Those most at risk [of hearing loss] are personnel in the transportation industry, especially airport ground staff. Beyond this group, it is unlikely that the general public will be exposed to sustained high levels of transportation noise sufficient to result in hearing loss. Transportation noise control in the community can therefore not be justified on the grounds of hearing protection." [12]

E.3.2 Non-Auditory Health Effects

Some believe that aviation noise can be both physically and mentally harmful to people in communities located near airports. Due to these concerns, researchers have studied the effects on the cardiovascular system, mortality rates, birth weights, achievement scores, and psychiatric admissions. The question of pathological effects remains unsettled because of conflicting findings based on differing methodologies and uneven study quality. While research is continuing, there is insufficient scientific evidence to support these concerns. [13]

In Taylor and Wilkins' article "Health Effects" published in *Transportation Noise Reference Book*, they conclude the following in their review of the research:

"The evidence of non-auditory effects of transportation noise is more ambiguous, leading to differences of opinion regarding the burden of prudence for noise control. There is no strong evidence that noise has a direct causal effect on such health outcomes as cardiovascular disease, reproductive abnormality, or psychiatric disorder. At the same time, the evidence is not strong enough to reject the hypothesis that noise is in some way involved in the multi-causal process leading to these disorders...But even with necessary improvements in study design, the inherent difficulty of isolating the effect of a low dose agent such as transportation noise within a complex etiological system will remain. It seems unlikely therefore, that research in the near future will yield findings which are definitive in either a positive or negative direction. Consequently, arguments for transportation noise control will probably continue to be based primarily on welfare criteria such as annoyance and activity

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[12] S.M. Taylor and P.A. Wilkins. "Health Effects." *Transportation Noise Reference Book*. Ed. P.M. Nelson. (Butterworths, 1987)

[13] Newman. *Aviation Noise Effects*. 59-62.

disturbance."[14]

Case studies on mental illness and hypertension in the 1990's indicate that the aforementioned conclusion remains valid. Yoshida and Nakamura found that long-term exposure to sound pressure levels above DNL 65 dB may contribute to reported ill effects on mental well-being. This case study, however, concluded that more research is needed because the results also contained some contrary effects, indicating that in some circumstances ill effects were negatively correlated with increasing noise.[15]

Griefahn (1992) studied the impact of noise exposure, ranging from 62 dBA to 80 dBA, on people with hypertension. She found that there is a tendency for vasoconstriction to increase among untreated hypertensive people as noise levels increase. However, she also found that beta blocking medication prevented any increase in vasoconstriction attributable to noise. She concluded that while noise may be related to the onset of hypertension, especially in the presence of other risk factors, hypertensive people do not run a higher risk of ill health effects if they are properly treated.[16]

E.3.3 Sleep Disturbance

Sleep disturbance is another source of annoyance associated with aircraft noise. This is especially true because of the intermittent nature and content of aircraft noise, which is more disturbing than continuous noise of equal energy and neutral meaning. Sleep disturbance can be measured in one of two ways. "Arousal" represents awakening from sleep, while a change in "sleep stage" represents a shift from one of four sleep stages to another stage of lighter sleep without awakening. In general, arousal requires a higher noise level than does a change in sleep stage.

Historically, studies of sleep disturbance have been conducted mainly in laboratories using various indicators of response (i.e., verbal response, button push, and electroencephalographic recordings). However, laboratory studies do not allow generalizations about the potential for sleep disturbance in an actual airport setting, and the impact of these disturbances on the residents.

In recent years, field studies have been done where individuals were exposed to noise in their own homes during the nighttime hours. J.M. Fields reviewed eight studies conducted in homes, four of which examined aircraft noise.[17] Sleep disturbance was correlated with cumulative noise exposure metrics, such as L_{eq}, in the studies. The studies showed a distinct tendency for increased sleep disturbance as cumulative noise exposure increased. Fields notes, however, that sleep disturbance was common regardless of the noise level and was contributed to by numerous factors. Fields states, "The prevalence of sleep disturbance in the absence of noise means that considerable caution must be exercised in interpreting any reports of sleep disturbance in noisy areas."

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14 Taylor. "Health Effects", *Transportation Noise*.

15 T. Yoshida and S. Nakamura. *Community and Health of Inhabitants*. Vol. 2, International Conference on Noise Control Engineering (1990), 1125-1128

16 B. Griefhn, *Hypertension – A particular Risk For Noise Exposure*. Vol. 2, International Conference On Noise Control Engineering. (1992), 1123 – 1126.

17 Fields, J.M. *Cumulative Airport Noise Exposure Metrics: An Assessment of Evidence for Time-of-Day Weighting*. (Washington D.C.: Government Printing Office, 1986) Report No. DOT/FAA/EE-86/10.

A large discrepancy between field study and laboratory results exists as cited by Pearsons in his literature review for the U.S. Air Force.[18] He found that noise-induced awakenings in the home were much less prevalent than in the laboratory. He also concluded that much higher noise levels were required to induce awakenings in the home than in the laboratory. Some experts theorize that the significant number of awakenings in a laboratory environment versus a field environment is caused by a lack of habituation.[19] People are fully habituated to their home environment, including the noise levels. Based on his review, Pearsons found no specific adverse health effects associated with sleep disturbance. However, sleep disturbance itself can be deemed an annoyance, thereby making it an impact caused by noise.

In *Community Annoyance and Sleep Disturbance: Updated Criteria for Assessing the Impacts of General Transportation Noise on People*, Finegold reviewed the data in Pearsons' report of 1990 and developed a regression analysis. As shown in **Figure E-7**, an exponential curve, labeled as "FICON 1992," was found to fit the categorized data reasonably well. Finegold recommended that this curve be used as a provisional means of predicting potential sleep disturbance from aircraft noise. He cautioned that because the curve was derived using laboratory and field data, the predictions of sleep disruption in an actual community setting derived from this curve would likely be high. In 1992, the Federal Interagency Committee on Noise (FICON) recommended Finegold's curve as an interim dose-response curve to predict the percent of the exposed population expected to be awakened as a function of the exposure to single event noise levels expressed in terms of sound exposure level (SEL).

Three more studies were conducted in the United Kingdom in 1992, Los Angeles in 1992, and Denver in 1995. The Federal Interagency Committee on Aviation Noise (FICAN) reviewed the three studies along with previous studies to recommend a revised sleep disturbance relationship with aviation noise.[20] The FICAN 1997 curve shown in **Figure E-7** predicts a "conservative dose-response relationship for the combined field data."[21] The Figure also shows the FICON curve as a comparison. Based on the current studies, the occurrence of aircraft noise-related awakenings for a particular SEL level is significantly overestimated by the FICON curve. The FICAN 1997 curve represents the upper limit of the observed in-home data. Therefore, the FICAN 1997 curve is interpreted as predicting the maximum percentage of the exposed population expected to be "behaviorally" awakened for a given community. "Behavioral awakenings" are defined as awakening by the subject enough to initiate a physical acknowledgment, such as a verbal response. FICAN emphasizes that the recent studies do not establish relationships between aircraft noise and other potential sleep disturbance or related health effects. Currently, FICAN recommends the use of the FICAN 1997 dose-response curve when predicting the percent of the exposed population expected to be awakened by aircraft noise. The equation used to provide predicted numbers is:

$$Awakenings = 0.0087 \times (SEL - 30)^{1.79}$$

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18 K.S. Pearsons, "Predicting noise-induced sleep disturbance," *Journal of the Acoustical Society of America*. (1990), 331-338.

19 L.S. Finegold, "Current status of sleep disturbance research and development of a criterion for aircraft noise exposure," *Journal of the Acoustical Society of America*. (1994), 1807.

20 Federal Interagency Committee on Aircraft Noise (FICAN). *Effects of Aviation Noise on Awakenings from Sleep*. (June 1997), 1.

21 FICAN. *Effects of Aviation Noise*. 9.

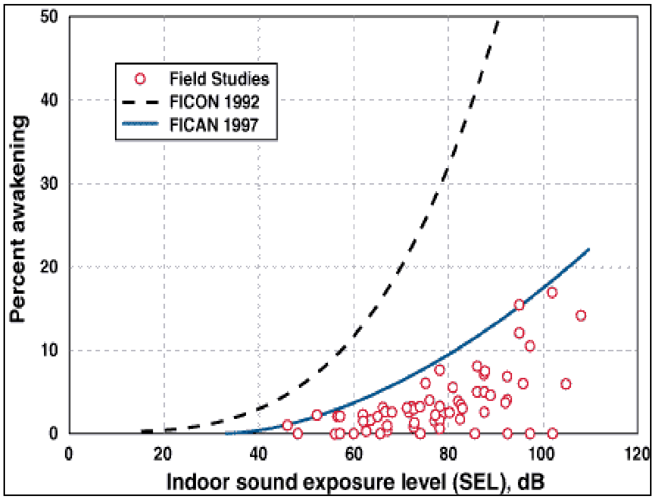


Figure E-7: Sleep Disturbance Curves – FICON 1992 vs FICAN 1997

E.3.4 Speech Interference

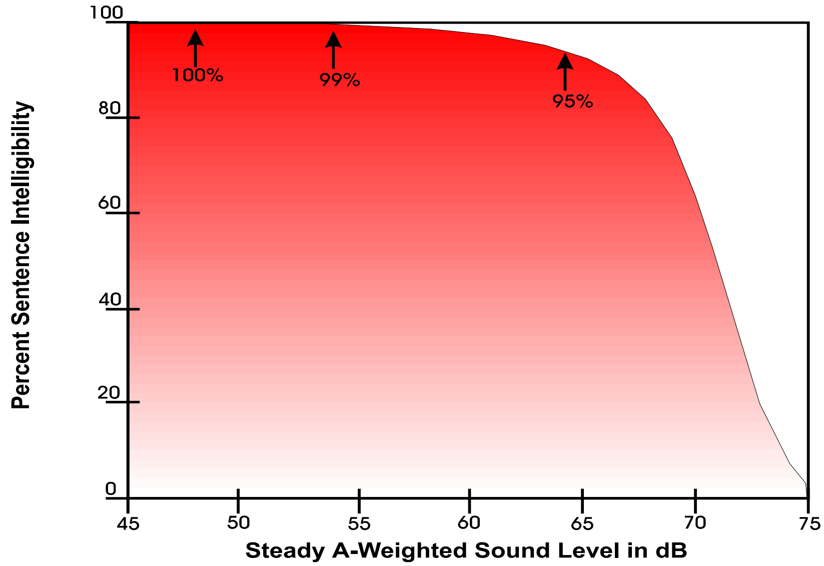
A primary effect of aircraft noise is its tendency to drown out or "mask" speech, making it difficult to carry on a normal conversation. This can have an effect on many activities, including general conversations in the home and outdoors, teaching in schools, listening to radio and television, and telephone conversations. In addition to disrupting recreational and social activities, the masking of speech by airport noise can reduce education time and the performance of work involving speech communication. The degree to which noise interferes with indoor speech depends not only on physical factors, such as noise levels, distance between the speaker and listener, and room acoustics, but also non-physical factors such as the speaker's enunciation and the listener's interest in and familiarity with the topic.

Speech interference caused by aircraft noise is a primary source of annoyance to individuals on the ground. **Figure E-8** shows the impact of noise on speech communications.

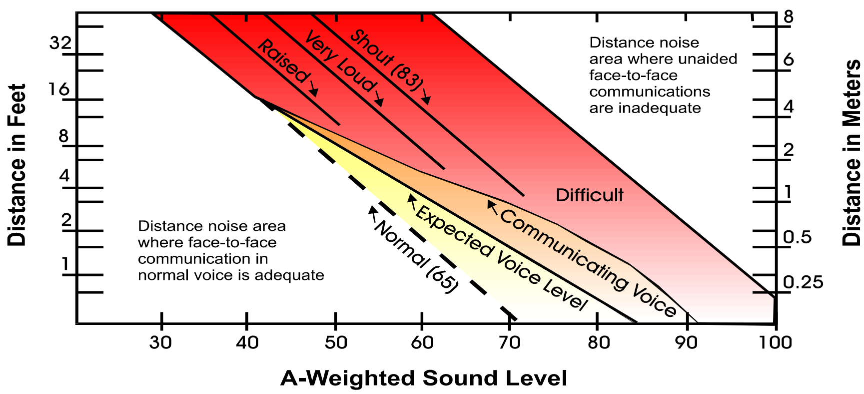
In general, people begin to experience difficulty with speech communication when background noise levels exceed 55 dBA.[22] Once the A-weighted sound pressure level of a noise event increases above 70 dBA, telephone communication becomes difficult and people talking at distances greater than three feet apart may have to shout. The highest noise that allows conversation with 100 percent intelligibility at normal voice levels throughout an average room is 45 dB, but 99 percent intelligibility is possible at 55 dB and 95 percent is possible at 65 dB.

The second graph within **Figure E-8** depicts the level of communication required within a given distance to have a satisfactory face-to-face conversation. Using the graph, once the A-weighted sound pressure level of a noise event increases above 70 dBA, people talking at distances greater than three feet apart may have to raise their voice level to nearly a shout. As the noise event level increases, the voice level necessary to maintain a satisfactory conversation increases, especially for longer distances between the listener and the speaker. Once the noise event level increases beyond 90 dBA, unaided face-to-face communication becomes inadequate no matter the distance between the listener and speaker.

22 *Airport Noise Report*, 1041-83818 (July 9, 1990).



Intelligibility of Speech with Varying Background Sound Levels.



Voice Levels Needed to Rise Above Ambient Noise for Satisfactory Communication Between Talker and Listener at Varying Distances.

Source: Federal Aviation Administration, 1992.

Figure E-8: Impacts on Speech Intelligibility

E.3.5 Vibration

Structural vibration from aircraft noise in the low frequency band is a common concern for airport neighbors. While vibration contributes to annoyance reported by residents near airports, especially when accompanied by high audible sound levels, it rarely carries enough energy to damage safely constructed structures. High-impulse sounds such as blasting, thunder, or sonic booms are more likely to cause damage than continuous sounds such as aircraft noise.

Risk of structural damage from aircraft noise was studied as part of the environmental assessment of the Concorde supersonic jet transport. Probability of damage from Concorde overflights was found to be extremely low. Actual overflight noise measurements of a Concorde overflight at Sully Plantation near Dulles International Airport in Fairfax County, Virginia, were recorded at 115 dBA. No damage to the historic structures was found. Because the Concorde caused significantly more vibration than conventional commercial jet aircraft, the risk of structural damage caused by aircraft noise near airports is considered to be negligible.[23] [24]

E.3.6 Fear of Accidents

In some cases, noise is only an indirect indicator of the real concern of airport neighbors: safety. The sound of an approaching aircraft may cause apprehension in some people about the possibility of an aircraft accident occurring over their area. This fear is a factor motivating some complaints of annoyance in neighborhoods near airports around the country.[25] This effect tends to be most pronounced in areas directly beneath frequently used flight tracks.[26] There is no known research on the mental effects on airport neighbors that might result from perceived threats to personal safety. However, comments routinely received from the public in forums conducted for airport noise studies around the nation confirm the concern.

E.3.7 Residential Property Values

Another frequent concern of residents of noise-exposed areas is the possible impact of noise on real estate values. A limited number of studies have attempted to quantify the impact of noise on property values. Studies conducted conclude that airport noise has only a slight impact on property values. Additionally, comparison of older studies to more recent studies indicates that the impact was greater in the 1960’s when jet aircraft were introduced into the fleet, than in the 1980’s. This presumably is the result of stabilization of the real estate market following an initial adjustment to noisier jets and of noise reduction in more modern aircraft.

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[23] R.L. Hershey, et al. *Analysis of the Effect of Concorde Aircraft Noise on Historic Structures*. (Washington D.C.: Government Printing Office, 1975), FAA-RD-75-118.

[24] J.H. Wiggins. *The Influence of Concorde Noise on Structural Vibrations*. (Washington D.C.: Government Printing Office, 1975), FA-75-1241-1.

[25] K.D. Kryter. *Physiological, Psychological, and Social Effects of Noise*. (NASA Reference Publication 1115, 1984), 533

[26] T. Gjestland. *Aircraft Noise Annoyance,* Vol. 2 1989 International Conference On Noise Control Engineering. (1989) 903 – 908.

A FAA summary report on aviation noise effects states:

Studies have shown that aircraft noise does decrease the value of residential property located around airports. Although there are many socio-economic factors which must be considered because they may negatively affect property values themselves, all research conducted in the area found negative effects from aviation noise, with effects ranging from 0.6 to 2.3 percent decrease in property value per decibel increase of cumulative noise exposure…The studies can be divided into two groups and some conclusions drawn. The first group of estimates…was based on 1960 data (and included New York, Los Angeles and Dallas) and suggests a range of 1.8 to 2.3 percent decreases in value per decibel (DNL). The second group estimates, covering the period from 1967 to 1970, suggests a mean of 0.8 percent devaluation per decibel change in DNL…The bottom line is that noise has been shown to decrease the value of property by only a small amount – approximately one percent decrease per decibel (DNL). At a minimum, the depreciation of a home due to aircraft noise is equal to the cost of moving to a new residence. Because there are many other factors that affect the price and desirability of a residence, the annoyance of aircraft noise remains just one of the considerations that affect the market value of a home.[27]

E.3.8 Work Performance

The EPA found that continuous exposure to high noise levels could affect work performance, especially in high stress occupations.[29/] Based on the FAA's land use compatibility guidelines under FAR Part 150, these adverse effects are most likely to occur within the DNL 75 dB contour.

E.4 AVERAGE COMMUNITY RESPONSE TO NOISE

Individual human response to noise is highly variable and influenced by emotional and physical factors. Emotional factors include: feelings about the necessity or preventability of the noise; judgments about the value of the activity creating the noise; an individual's activity at the time the noise is heard; general sensitivity to noise; beliefs about the impact of noise on health; and sense of fear associated with the source of the noise. Physical factors influencing reaction to noise include: background noise in the community, time of day, season of the year, predictability of the noise, and the individual's control over the noise source.

Although individual responses to noise can vary greatly, the average response among a group of people is much less variable. This allows for a general analysis about the effect of the average noise exposure levels caused by aircraft on a community, despite the wide variations in individual response.

Several experts in the field have examined average residential community response to noise, focusing on the relationship between annoyance and noise exposure. The studies have produced similar findings that annoyance is most directly related to cumulative noise exposure rather than single event exposure.

As depicted in **Figure E-9**, annoyance has been found to increase along an S-shaped or logistic curve as cumulative noise exposure increases. The curve was developed by Finegold

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[27] Newman. Aviation Noise Effects, 100.

et al. (1992 and 1994)[28]. It is based on data derived from a number of transportation noise studies. The curve shows the relationship between DNL levels and the percentage of population highly annoyed. The curve is known as the "Updated Schultz Curve" after the original concept developed by Schultz in 1978.[29] In 1992, FICON recognized this curve to be the best available source of data for the noise dosage-response.[30]

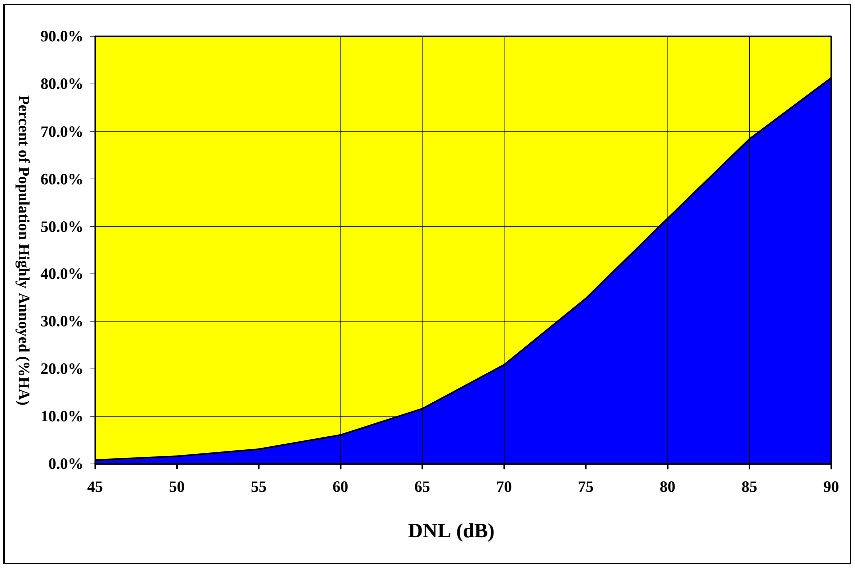

Figure E-9: Percentage of Population Highly Annoyed by General Transportation Noise
The "Updated Schultz Curve" shows that annoyance is measurable beginning at DNL 45 dB, where 0.8 percent of people are highly annoyed. The ratio increases gradually to 6.1 percent at DNL 60 dB. Starting at DNL 65 dB, the percent of people highly annoyed increases steeply from 11.6 percent up to 68.4 percent at DNL 85 dB.

E.5 NOISE IMPACT CRITERIA

The FAA has considered the matter of threshold levels above which aircraft noise causes an adverse impact on people. The agency has established DNL 65 dB as the threshold above which aircraft noise is considered to be not compatible in residential areas. In addition, the FAA has determined that a significant impact occurs if a proposed action would result in an increase of DNL 1.5 dB or more on any noise-sensitive area within the DNL 65 dB exposure level.[31]

In 1992, the Federal Interagency Committee on Noise (FICON) recommended that noise increases of DNL 3 dB or more between DNL 60 and 65 dB be evaluated in environmental studies when increases of DNL 1.5 dB or more occur at noise-sensitive locations at or above

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[28] L.S. Finegold. Et al. "Community Annoyance and Sleep Disturbance: Updated Criteria for Assessing the Impacts of General Transportation Noise on People," Noise Control Engineering Journal. Vol. 42, No. 1 (Jan.-Feb. 1994).

[29] T.J. Schultz. "Synthesis of Social Surveys on Noise Annoyance," Journal of Acoustical Society of America. Vol. 64, No. 2 (1978), 377– 405.

[30] FICON, Federal Agency Review. 3-5

[31] FAA Order 1050.1E; FAR Part 150 Section 150.21(a)(2)(d); FICON 1992, Pp. 3-5.

DNL 65 dB. Increases of this magnitude below DNL 65 dB are not to be considered as "significant impacts," but they are to receive consideration. The FAA adopted FICON's recommendation into FAA Order 1050.1E.

In 1990, the FAA issued a noise screening procedure for determining whether certain airspace actions above 3,000 feet above ground level (AGL) might increase DNL levels by five decibels or more.[32] The procedure served as a response to FAA experience that increases in noise of DNL 5 dB or more at cumulative levels well below DNL 65 dB could be disturbing to people and become a source of public concern. In the Environmental Impact Statement for the Expanded East Coast Plan (EECP), the FAA evaluated noise levels down to the DNL 45 dB level for potential increases in DNL noise exposure of 5 dB or more. In the EECP study, the FAA determined that the DNL 45 dB level is the minimum level at which noise needed to be considered because "even distant ambient noise sources and natural sounds such as wind in trees can easily exceed this [DNL 45 dB] value."[33] This threshold of change was subsequently used in the Chicago Terminal Airspace Project (CTAP) EIS and the Potomac Consolidated TRACON Airspace Redesign EIS. The FAA formalized the use of this threshold of change in the recent release of FAA Order 1050.1E.

For the purpose of this EA, increases of DNL 3 dB between DNL 60 and 65 dB are considered when evaluating air traffic actions such as the Proposed Action, and increases of DNL 5 dB or greater at levels between DNL 45 dB to DNL 60 dB are disclosed. The increase in noise at these levels is enough to be noticeable and potentially disturbing to some people, but the cumulative noise level is not high enough to constitute a "significant impact." **Table E-2** summarizes the criteria utilized to assess the level of change in noise exposure attributable to the LAS AIRSPACE OPTIMIZATION EA alternatives.

Table E-2: Criteria for Determining Impact of Increases in Aircraft Noise

DNL Noise Exposure with Proposed Action	Minimum Increase in DNL with Proposed Action	Change in Noise Exposure Level	Reference
65 dB	1.5 dB	Exceeds Threshold of Significance	FAA Order 1050.1E, Apdx. A, §14.3 14 CFR Part 150.21(2)(d) FICON 1992
60 to 65 dB	3.0 dB	Considered When Evaluating Air Traffic Actions	FAA Order 1050.1E, Apdx A, §14.4c FICON 1992
45 to 60 dB	5.0 dB	Information Disclosed When Evaluating Air Traffic Actions	FAA Order 1050.1E, Apdx A, §14.5e FAA Notice 7210.360

E.6 LAS AIRSPACE OPTIMIZATION EA NOISE ANALYSIS OBJECTIVES

The Las Vegas area airspace presents a detailed exercise in noise modeling for the following three serviced airports: McCarran International Airport, Henderson Executive

32 FAA Notice 7210.360. September 14, 1990.

33 Expanded East Coast Plan – Changes in Aircraft Flight Patterns Over the State of New Jersey; Federal Aviation Administration 1995, Pp. 5-9.

Airport, and North Las Vegas Airport (LAS, HND, and VGT). Because of the size of the study area, and the number and variety of aircraft entering and exiting the GSA, over 45,000 radar flight tracks were evaluated as part of the noise model input development. The following objectives outlined from Sections E.6.1 through E.6.7 were determined to ensure a detailed and accurate assessment of noise exposure throughout the study area.

E.6.1 Evaluate Changes in Noise Levels

FAA has developed specific guidance and requirements for the assessment of aircraft noise in order to comply with NEPA requirements. This guidance, specified in FAA Order 1050.1E, requires that aircraft noise be analyzed in terms of the yearly Day-Night Average Sound Level (DNL) metric. In practice, this requirement means that DNLs are computed for the Average Annual Day (AAD) of operations for the year of interest.

Beyond requiring the use of the DNL metric, the FAA endorses the use of supplemental noise metrics on a case-by-case basis to describe aircraft noise impacts for specific noise-sensitive locations.

The FAA requires that aircraft noise be evaluated using one of several authorized computer noise models. Specifically, for air traffic actions such as those proposed in LAS AIRSPACE OPTIMIZATION EA, the Noise Integrated Routing System (NIRS) model was be used. For a detailed description of the NIRS program, refer to **Section E.7.1**.

Noise exposure contours only describe noise impacts in the immediate vicinity of airports (three to five miles). The FAA's NIRS model provides a more detailed modeling tool to evaluate the effects of high-altitude airspace changes from the ground level up to 18,000 feet Above Field Elevation (AFE) on noise-sensitive areas, and to determine whether more detailed analysis would be required. For this EA, a detailed analysis of current and future noise from aircraft operating between the surface and 10,000 feet above ground level (AGL) was conducted in the GSA.

The following scenarios were evaluated:

1 2009 Existing Conditions– routes as flown in the 2009 calendar year.
2 2012 Future No Action– routes as will be flown in the year 2012 if no Proposed Action airspace changes are implemented.
3 2012 Future Proposed Action– routes as will be flown in the year 2012 if the Proposed Action is implemented.
4 2017 Future No Action– routes as will be flown in the year 2017 if no Proposed Action airspace changes are implemented.
5 2017 Future Proposed Action– routes as will be flown in the year 2017 if the Proposed Action is implemented.

Information disclosed in this study includes the number of people within predefined noise exposure ranges, including any resulting net increases or decreases in the number of people exposed to that level of noise for the scenarios previously listed.

E.6.2 Model All Traffic Routes over Entire Study Area

Over 45,000 radar flight tracks were used to evaluate and model typical flight routes and flows throughout the GSA and SSA. The three airports and their associated runways that are included in the modeling are listed in **Section E.7.2.1**. The set of radar flight tracks included all Instrument Flight Rules (IFR) flights that operated at or below 10,000 feet AGL in the GSA or at or below 18,000 feet AGL in the SSA. Model flight tracks were developed directly from this radar data.

E.6.3 Model Day/Night Noise Levels at Population Centroids

Within the study area, 22,417 individual population grid points were evaluated representing a total population of 1,939,523. These grid points, each of which represents a specific number of people, are referred to as population centroids. The smallest centroid has a population of 1, and the largest centroid has a population of 25,075. Data from the 2000 U.S. Census with updates to provide more current information serves as the source for the centroid location and population counts (Reference Appendix F.2, Average Annual Day Flight Schedules). For each of the five modeling scenarios, yearly DNL values were calculated at all population centroids within the GSA.

E.6.4 Model Day/Night Noise Levels at Selected Department of Transportation Section 4(f) Resources

An additional grid point analysis was performed to evaluate noise levels at sites or lands potentially protected under Department of Transportation Section 4(f) (herein referred to as 4[f] lands or sites). More detail can be found regarding what constitutes 4(f) analysis points in Section 4.3.3, within the GSA. The sites were initially identified as single point locations within the Study Area. In some cases, the 4(f) lands covered a large area (usually large parks or wilderness areas) that was not well represented by a single analysis point. In these cases a uniformly spaced grid of points was defined over each area to provide adequate coverage.

E.6.5 Use Standard Procedure Profiles with Air Traffic Control (ATC) Altitude Control Points

Aircraft within Nevada area operate in accordance with standardized air traffic control procedures. To model existing and proposed procedures, arrival and departure profiles were designed to meet certain altitude restrictions above 3,000 feet AFE as set by air traffic control, and to use standard procedure profile data provided by the FAA’s Integrated Noise Model (INM) below 3,000 feet AFE.

E.6.6 Identify and Quantify Noise Impact Changes and Causes Thereof

DNLs were calculated for each centroid and grid point, differences in noise exposure between the Proposed Action and the No Action alternative for each of the future analysis years were quantified, and the causes of change in noise exposure were explained. Criteria set to meet this objective are described in **Section E.5, Noise Impact Criteria.**

E.6.7 Produce Easily Interpretive and Informative Tables and Graphics to Report Results

The complexity (number of flight routes, airports, operations, etc.) of the study created challenges in reporting noise modeling results in a useful format for analysis. Tables and graphics were designed to be understandable to the public.

E.7 NOISE MODELING AND ANALYSIS

This section describes the model used in the analysis, the data required for input into the model, noise model development procedures, and the outputs from the modeling process. **Section E.8** and **Section E.9** provide the modeling results and analysis of those results.

E.7.1 Noise Model Program

Prior to the development of NIRS, limited technology was available to examine noise impacts associated with high-altitude air traffic changes. The FAA-accepted methodology to examine high altitude noise impacts was published in FAA Notice 7210.360, *Noise Screening for Certain Air Traffic Actions Above 3,000 Feet AGL*, on September 14, 1990. The process outlined in this notice was subsequently converted to the Air Traffic Noise Screening (ATNS) computer model v.1.0 in 1995. This model was further revised to its current form as v.2.0 in early 1999. However, the ATNS noise screening program was limited in its application because it could examine only one route at a time. The FAA recognized that there was a need to evaluate multiple proposed high-altitude air traffic changes simultaneously, and also to evaluate changes in noise levels due to flights at or below 3,000 feet when more efficient arrival and departure procedures are proposed. Consequently, the FAA expended considerable time, effort, and expense in combining airspace design criteria and noise modeling technology to examine the cumulative effect of multiple route changes and their effect on noise levels over a large geographical area containing multiple airports. The end product is a noise modeling program called the Noise Integrated Routing System (NIRS).

NIRS was initially developed in 1995 by the FAA Office of Environment and Energy (AEE-120), in cooperation with FAA Air Traffic (ATA-300), for assessing potential regional airspace design noise impacts. Its purpose is to assist the FAA in evaluating the environmental noise impacts of airspace routing and procedural alternatives designed to improve system safety and efficiency. It is specifically tailored to evaluate complex air traffic applications involving high-altitude routing (up to 18,000 feet AFE), broad area airspace changes affecting multiple airports, and other airspace modifications in the terminal and en route environments that cannot be assessed using other methods, most notably the Air Traffic Noise Screening Model (ATNS-7210.360) and the INM. NIRS evaluates noise impact by calculating DNLs for specific locations on the ground, based on population centroids and grid points.[34] NIRS Version 1.0 was released in June, 1998 as a prototype model. The version of NIRS which was used for LAS AIRSPACE OPTIMIZATION EA is NIRS Version 7.0b, Build 1, the current version at the time the analysis was completed.

It must be noted that AEDT has presently been adopted for regional airspace environmental analysis, and has recently subsumed NIRS functionality in being identified as the officially

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34 2000 Census Data, U.S. Census Bureau, with Ricondo & Associates update to 2000 Census data for the Las Vegas Airspace Optimization Environmental Assessment (EA); Applied Geographic Solutions, *2010 U.S. Census Block Data*, April 2010.

endorsed FAA tool for environmental modeling and analysis metrics (Noise, Fuel Burn and Emissions) output for regional airspace redesign/analysis projects. The LAS OPTIMIZATION EA is grandfathered to use NIRS as are a number of regional airspace redesign initiatives under the Optimization of Airspace and Procedures in a Metroplex (OAPM) umbrella that have been initiated prior to the official release of AEDT 2a on March, 21, 2012[35]. Testing of AEDT relative to noise and fuel burn metrics have substantiated that the new tool provides environmental metrics output results that are in concert with results that are expected when using the NIRS tool for regional airspace redesign analysis projects. "In 2014, AEDT 2b will also become the next generation aviation environmental consequence tool, further replacing the current public-use aviation air quality and noise analysis tools such as the INM) (single airport noise analysis) and the Emissions and Dispersion Modeling System (EDMS – single airport emissions analysis)[36]" as expanded capability of the AEDT tool from the regional airspace environmental analysis functionality in AEDT 2a is implemented[37].

With respect to NIRS, the tool provides a powerful computational environment and graphical user interface, and provides the following major capabilities:

- Provides automated quantitative comparison of noise impacts across alternative airspace designs.
- Imports and displays track and operation data from airspace models, and population and community data from other sources.
- Enables users to specify air traffic control altitudes, and automatically calculates required aircraft thrusts and speeds necessary for noise using the same up-to-date database used for the INM.[38]
- Calculates predicted noise impacts at all population centroids (or other specially defined points) in large study areas.
- Provides automated means of annualizing noise impact based on different operational configurations and/or runway usage statistics.
- Identifies and maps all areas of change in noise impact.
- Identifies traffic elements that are the principal causes of change in noise impact in each area of change.
- Provides data for quantification of mitigation goals and identification of mitigation opportunities.
- Assembles tables and figures for noise-impact data analysis and report generation.
- Applies multiple layers of data checking and quality control.

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[35] FAA Order 1050.1E, Change 1, Guidance Memo #4: Date - March 21, 2012; Subject-Guidance on Using AEDT 2a to Conduct Environmental Modeling for FAA Air Traffic and Procedure Actions; Source http://www.faa.gov/about/office_org/headquarters_offices/apl/environ_policy_guidance/guidance/media/AEDT_Guidance_Memo.pdf

[36] AEDT FAA Web Page, Third paragraph; http://www.faa.gov/about/office_org/headquarters_offices/apl/research/models/aedt/

[37] Per the AEE-400 memo dated March 21, 2012, "Guidance on Using AEDT 2a to Conduct Environmental Modeling for FAA Air Traffic Airspace and Procedure Actions," AEDT 2a replaces NIRS as the required model for aircraft noise, fuel burn and emissions modeling for FAA air traffic airspace and procedure actions. There is an exemption for projects whose environmental analysis began before March 1, 2012 hence the Las Vegas Airspace Optimization Environmental Assessment (EA) used the latest version of NIRS.

[38] NIRS v.70b utilizes the INM 7.0b version database.

NIRS was validated by the FAA's Office of Environment and Energy against the INM tool in 1997. This process involved providing both models with identical inputs, and performing a detailed comparison of the resulting outputs for representative jet, turboprop, and propeller aircraft for both arrival and departure operations. The models were found to give the same results in terms of both final noise values and intermediate aircraft state parameters (position, altitude, thrust, and speed). An on-going program ensures compatibility of the two models. Based on these results and on technical oversight of the NIRS development process, the FAA Office of Environment and Energy (AEE) approved the use of NIRS for airspace applications.

The NIRS noise assessment methodology, interpretation guidelines, and population-impact results have been briefed at several levels throughout the FAA and U.S. Environmental Protection Agency (USEPA). In addition, within the FAA, the Environmental Policy Team, within the Airspace Policy & ATC Procedures Group, Mission Support Services (AJV) and the Office of Environment and Energy (AEE) assure that model integrity is maintained in terms of noise standards and equations, consistency with airport methodology, and reliability of use. NIRS has historically been the best available tool to model noise exposure changes for a study of this magnitude and meet FAA's environmental responsibilities in an accurate and cost-effective manner until the recent release of the Aviation Environmental Design Tool (AEDT) as previously mentioned.

E.7.2 Input Requirements

Noise modeling requires several types of input data: airport/runway locations, operational levels, day/night distributions, fleet mix, runway usage, noise-power-distance relationships, climb/descent profiles, aircraft weights, flight tracks, track dispersion information, population and grid locations, and boundaries of local jurisdictions. Details of the input data to NIRS for the LAS AIRSPACE OPTIMIZATION EA project are discussed below.

E.7.2.1 Airport and Runway Data

Three airports (LAS, HND, and VGT) within the LAS AIRSPACE OPTIMIZATION EA study area were evaluated in this analysis. All runways at these airports were assumed to be available for traffic assignments in NIRS. Standard approach slopes of three degrees were used for arrivals at all airports. The runways modeled are shown in **Table E-3**.

Table E-3: Modeled Airports

Airport	State	Name	Modeled Runways
Major:			
LAS	NV	Mc Carran International	01L/19R, 01R/19L, 07L/25R, 07R/25L
Satellite:			
VGT	NV	North Las Vegas	7/25, 12L/30R, 12R/30L
HND	NV	Henderson Executive	17R/35L, 17L/35R

E.7.2.2 Local Environmental Variables

In order to calculate noise levels specific to the conditions in the area of investigation, the NIRS model uses several local environmental variables. These include temperature, atmospheric pressure, humidity, airport average headwind, airport elevation, and terrain. For this analysis, twenty-five years (1985-2010) of daily weather observations collected at LAS were used to determine the long-term average weather conditions in the Las Vegas area. **Table E-4** summarizes the weather data used for the NIRS analysis.

Table E-4: Environmental Variables – Weather

Variable	Annual Average
Temperature (F)	68.68
Barometric Pressure (in-Hg)	29.92
Relative Humidity (%)	31.03
Headwind	n/a

The airport elevation for LAS at 2181' MSL was selected as the NIRS study elevation for the analysis. Detailed terrain data for the entire Study Area was incorporated from the United States Geological Survey (USGS) 1 degree Digital Elevation Model (DEM) database for the US[39]. This database provides elevation data at ground points separated by 3 arc-seconds (approximately 100 nm east-west and 100 nm north-south in the Las Vegas area). The elevation values for each point are provided at a 1-meter resolution.

E.7.2.3 Operation Levels and Day/Night Distribution

IFR operation levels for each study airport were based on the Aviation Activity Forecasts, presented in **Appendix A**. The information contained in these forecasts, which is necessary for noise modeling, includes: the type of aircraft, origin and destination airport, daytime or nighttime operation time, and the average number of daily operations. The detailed operation tables which comprise the forecast were developed for the year 2009 as well as for the forecast years 2012 and 2017. For this analysis, each forecast represents the average day (annual/365) of traffic for the year of interest. The IFR operation totals modeled for LAS AIRSPACE OPTIMIZATION EA are presented in **Table E-5**.

Table E-5: Modeled Average Annual Day IFR Operation Totals

Airport	2009	2012	2017
HND	34.6	37.2	42.3
LAS	1142.0	1184.0	1409.1
VGT	36.6	38.6	41.9

E.7.2.4 Runway Use

Generally, the primary factors determining runway use at an airport are the weather and prevailing wind conditions at the time of a flight. Additionally, several key secondary factors

[39] Source: U.S Department of the Interior, U.S. Geological Survey, National Elevation Dataset; http://ned.usgs.gov/

also have a strong influence on runway selection. These factors include runway safety issues (taxiing aircraft crossing active runways or Land and Hold Short-LAHSO rules), the current composition of the traffic (many arrivals or many departures), and even the flight's origin or destination. This latter factor is also based on safety from the standpoint that traffic is easier to sort on the ground (taxi for direction) than it is in the air.

Typically, arriving and departing aircraft are assigned to a specific fix. These fixes, in turn, may have a preferred arrival or departure runway assignment and a secondary arrival or departure runway assignment. As controllers attempt to balance delay and runway utilization by time of delay based on the demand, there are times when arriving and departing aircraft are diverted to a secondary runway. This is especially true when an airport has multiple parallel runways as is the case at LAS. This allows the airfield to operate in the most efficient and safest manner.

It is important to note that within the context of all of these factors, the future runway use at an airport is; at best, an estimate. Simple changes over time such as airlines changing the markets (destinations) that they serve can have a notable effect on actual runway use in the future.

For LAS AIRSPACE OPTIMIZATION EA airports, the runway use for the future conditions was developed primarily based on analysis of the available archived radar data which was accurate enough to determine runway use based on operation type, aircraft category, time of day, and origin/destination. The radar sample archive which met these criteria was collected between May 2009 and November 2009 (i.e., data reflects complete days of radar data available at the time of the request that represented a good cross section of yearly operations at LAS, HND, and VGT). From discussions with local FAA LAS/L30 air traffic personnel, it was determined that this representative sample was sufficient from a yearly seasonal variation perspective in that it captured a representative cut of operations and runway use configurations so as to adequately reflect an average annual day of LAS operations. The sufficiency of this radar data sample was explained from the perspective that LAS is under primarily visual meteorological conditions (VMC) (i.e., approximately 98% of the time), and again the sample captured the runway use configurations typically experienced at LAS and associated satellite airports from an average annual day perspective.

Table E-6 represents the overall existing Airport configuration usage based on analysis of 2009 radar data (note runway arrival/ departure detail by configuration in Table E-7).

Table E-6: 2009 Existing Conditions Historical Runway Configuration Usage

LAS	LAS Arriavals-Departures Runways		No Action
Configuratiuon	Arrivals	Departures	Day/Night *
Configuration 1	25L/25R, 19L/19R	25L/25R,19L/19R	60%
Configuration 2	07L, 01L/01R	07L, 01L/01R	2%
Configuration 3	01L/01R, 25L	01L/01R	25%
Configuration 4	07L/07R, 19L/19R	07L/07R	13%
			100%
* Same percentages used for both day and night operations for 2009 Existing Conditions			

Table E-7 present summaries of the modeled Airport configuration use and runway use percentages for LAS arrivals and departures respectively by daytime and nighttime for the No Action and Proposed Action. Runway use statistics for 2009 Existing Conditions and 2012 and 2017 No Action and Proposed Action scenarios are presented separately because there are major differences in overall runway use between 2009 Existing Conditions runway use by configuration and the No Action and Proposed Action scenarios. While overall city-pair factors for flights that are predicted to evolve over time based on the forecasts are used to determine airspace fix assignment and airspace fix locations for the No Action alternative, Airspace Optimization design criteria were used for the runway distribution of individual annualized operations at LAS. This was done based on optimizing ATC flows with moderate changes to runway use based on configuration (note the heavier use of Configuration 2 and lower use of Configuration 4 in the Proposed Action compared with the No Action Alternative).

The 2009 existing conditions average annual configuration use for LAS as presented in **Table E-6**, reflects average runway usage as sampled over 38 days in 2009 from May 5th through November 14th providing a representative statistical sampling of runway use information that has been verified by local Las Vegas ATCT (LAS) and Las Vegas TRACON (L30) air traffic control specialists as being representative of existing conditions runway usage[40]. The average annual configuration use for LAS as presented in **Table E-7** for the 2012 and 2017 No Action scenarios is based on historical runway configuration use over a period from January 2000 through September 2009. The average annual configuration use for 2012 and 2017 Proposed Action is based on estimates provided by air traffic controllers based on anticipated changes in configuration use with the new procedures in place. Note that differences in configuration use between those used in this study and other studies may result given the use of different time periods to derive the No Action configuration use and as a result, assumptions about future configuration use.

[40] Reference Chapter 4, Section 4.3.1.1 Noise Modeling Methodology

Table E-7: LAS - Runway to Configuration Usage and Runway Use for LAS No Action and Proposed Action Noise Modeling (2012 & 2017)

LAS Configuratiuon	LAS Arriavals-Departures Runways		No Action		Proposed Action	
	Arrivals	Departures	Day	Night	Day	Night
Configuration 1	25L/25R, 19L/19R	25L/25R,19L/19R	78%	92%	78%	92%
Configuration 2	07L, 01L/01R	07L, 01L/01R	3%	2%	14%	7%
Configuration 3	01L/01R, 25L	01L/01R	7%	5%	1%	1%
Configuration 4	07L/07R, 19L/19R	07L/07R	12%	1%	7%	0%
			100%	100%	100%	100%

McCarran International Airport - No Action and Proposed Action Runway Use

		2012										2017									
		Heavy Jet		Jets		Props		Small Jets		Turboprops		Heavy Jet		Jets		Props		Small Jets		Turboprops	
Scenario	Rwy	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night
No Action Arrivals	1L	3%	2%	4%	2%	7%	6%	8%	5%	8%	4%	2%	2%	4%	2%	9%	6%	4%	2%	6%	4%
	1R	3%	1%	3%	1%	2%	0%	1%	1%	1%	1%	3%	1%	2%	1%	1%	0%	3%	1%	2%	1%
	7L	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	7R	8%	1%	7%	0%	4%	0%	3%	0%	8%	0%	7%	1%	7%	0%	6%	0%	7%	0%	6%	1%
	19L	5%	1%	10%	4%	15%	6%	1%	0%	10%	5%	8%	1%	10%	4%	12%	1%	11%	4%	5%	2%
	19R	2%	2%	12%	20%	59%	82%	78%	91%	51%	75%	4%	5%	15%	20%	64%	86%	13%	19%	39%	43%
	25L	78%	79%	63%	64%	14%	6%	8%	3%	21%	15%	75%	77%	60%	64%	8%	6%	62%	65%	41%	45%
	25R	1%	15%	1%	8%	0%	0%	0%	0%	0%	0%	1%	14%	1%	9%	0%	0%	1%	8%	1%	5%
	Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
No Action Departures	1L	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	1R	7%	5%	7%	5%	7%	5%	7%	5%	7%	5%	7%	5%	7%	5%	7%	5%	7%	5%	7%	5%
	7L	15%	3%	15%	3%	14%	3%	15%	3%	15%	3%	15%	3%	15%	3%	15%	3%	15%	3%	15%	3%
	7R	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	19L	4%	5%	14%	5%	40%	47%	20%	29%	32%	56%	3%	5%	15%	7%	37%	63%	15%	8%	16%	15%
	19R	0%	0%	9%	11%	10%	36%	55%	62%	8%	31%	0%	0%	10%	12%	9%	27%	11%	16%	21%	22%
	25L	0%	5%	0%	4%	0%	0%	0%	0%	0%	0%	0%	6%	0%	4%	0%	0%	0%	3%	0%	2%
	25R	73%	81%	54%	71%	29%	9%	3%	1%	38%	5%	74%	81%	53%	69%	32%	2%	52%	65%	41%	52%
	Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Proposed Action Arrivals	1L	7%	3%	8%	5%	7%	3%	6%	3%	7%	4%	7%	3%	8%	5%	7%	2%	6%	3%	7%	4%
	1R	7%	4%	7%	3%	8%	5%	8%	4%	8%	4%	8%	5%	7%	3%	7%	5%	8%	4%	8%	4%
	7L	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	7R	2%	0%	3%	0%	4%	0%	4%	0%	5%	0%	2%	0%	3%	0%	4%	0%	4%	0%	5%	0%
	19L	0%	0%	9%	10%	12%	10%	12%	13%	8%	12%	0%	0%	9%	10%	13%	8%	13%	14%	8%	13%
	19R	5%	0%	7%	5%	15%	11%	10%	6%	10%	13%	5%	0%	7%	5%	16%	9%	10%	6%	11%	14%
	25L	72%	80%	63%	74%	52%	70%	57%	71%	57%	62%	72%	80%	64%	74%	51%	74%	56%	70%	57%	62%
	25R	7%	13%	3%	3%	3%	2%	2%	3%	5%	5%	7%	13%	3%	3%	3%	2%	2%	3%	4%	4%
	Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Proposed Action Departures	1L	1%	1%	1%	1%	1%	1%	1%	0%	1%	0%	1%	1%	1%	1%	1%	1%	1%	0%	1%	1%
	1R	2%	1%	2%	2%	2%	2%	2%	1%	1%	1%	2%	1%	2%	2%	2%	1%	2%	1%	1%	1%
	7L	17%	5%	18%	5%	21%	7%	18%	6%	18%	5%	16%	5%	18%	5%	18%	5%	18%	5%	19%	6%
	7R	2%	1%	1%	1%	1%	1%	1%	1%	1%	0%	2%	1%	1%	1%	1%	1%	1%	1%	1%	0%
	19L	3%	3%	19%	21%	19%	22%	20%	24%	19%	25%	3%	3%	19%	22%	20%	23%	20%	24%	18%	24%
	19R	1%	2%	13%	16%	14%	16%	13%	16%	12%	18%	1%	2%	13%	16%	14%	17%	13%	17%	12%	18%
	25L	6%	7%	2%	3%	2%	3%	3%	3%	2%	3%	5%	7%	2%	3%	2%	3%	3%	3%	2%	3%
	25R	68%	81%	44%	52%	40%	48%	42%	48%	47%	48%	69%	80%	44%	52%	42%	49%	42%	48%	46%	47%
	Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Table E-8: LAS - Runway Usage for HND and VGT No Action and Proposed Action Noise Modeling (2012 & 2017)

Las Vegas Satellite Airports - No Action and Proposed Action Runway Use										
			Jets		Props		Small Jets		TurboProps	
Airport	Operation	Runway	DAY	NIGHT	DAY	NIGHT	DAY	NIGHT	DAY	NIGHT
HND	Arrival	17L	0%	0%	1%	1%	0%	0%	0%	1%
		17R	47%	47%	47%	47%	47%	47%	47%	47%
		35L	51%	52%	51%	51%	51%	52%	52%	51%
		35R	1%	1%	1%	1%	1%	1%	1%	1%
		Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**
	Departure	17R	44%	43%	47%	45%	45%	43%	48%	43%
		35L	55%	56%	53%	54%	54%	57%	50%	57%
		35R	1%	1%	1%	1%	1%	1%	2%	0%
		Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**
VGT	Arrival	25	7%	9%	8%	9%	8%	8%	8%	10%
		12L	3%	1%	4%	4%	4%	2%	4%	7%
		12R	73%	63%	68%	65%	68%	69%	69%	62%
		30L	17%	27%	20%	22%	20%	22%	19%	20%
		Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**
	Departure	7	7%	14%	13%	13%	10%	13%	14%	7%
		25	27%	33%	22%	23%	29%	28%	27%	24%
		12R	54%	41%	55%	53%	48%	44%	47%	59%
		30L	11%	13%	11%	12%	13%	14%	11%	10%
		Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

E.7.2.5 Aircraft Fleet Mix

Fleet mix assumptions were developed for LAS AIRSPACE OPTIMIZATION EA as part of the forecasting effort documented in **Appendix F.2**. **Table E-9** presents the forecasted NIRS model fleet mixes for 2012 and 2017 for operations at the LAS and the satellite airports for both the No Action and Proposed Action alternatives. The table presents the aircraft types as used in the NIRS model. Not all specific aircraft types that were present in the forecast are available aircraft types in the NIRS model. For those cases the best possible substitute was chosen based on noise characteristics[41]. There are no differences between the fleet mixes of the No Action and Proposed Action alternatives for a given model year (2012 or 2017).

[41] Reference Appendix F.2, "Average Annual Day Flight Schedules" for information on aircraft substitutions

Table E-9: Forecast Fleet Mix for Noise Modeling
LAS AIRSPACE OPTIMIZATION (2012 and 2017)

Aircraft		LAS		HND		VGT	
Cat	NIRS Type	Arr.	Dep.	Arr.	Dep.	Arr.	Dep.
Heavy Jets	707	0.0025%	0.0025%				
	707320	0.0093%	0.0093%				
	74720B	0.0005%	0.0005%				
	747400	0.1831%	0.1830%				
	747SP	0.0107%	0.0106%				
	757PW	5.3398%	5.3396%				
	767300	1.1066%	1.1063%				
	767400	0.0164%	0.0164%				
	767CF6	0.0101%	0.0102%				
	777200	0.1041%	0.1040%				
	777300	0.0005%	0.0005%				
	A300-622R	0.1758%	0.1759%				
	A310-304	0.0049%	0.0049%				
	A330-343	0.0520%	0.0520%				
	A340-211	0.1180%	0.1180%				
	DC1010	0.1345%	0.1345%				
	DC870	0.0069%	0.0069%				
	KC135R	0.0151%	0.0151%				
	L1011	0.0005%	0.0005%				
	MD11GE	0.0015%	0.0015%				
Jets	717200	0.2582%	0.2582%				
	727EM1	0.0029%	0.0029%				
	727EM2	0.1161%	0.1162%				
	7373B2	9.0719%	9.0717%				
	737400	0.0303%	0.0305%				
	737500	2.6300%	2.6298%				
	737700	31.7067%	31.7067%				
	737800	5.4621%	5.4621%				
	737N17	1.0515%	1.0515%				
	757300	1.2691%	1.2692%				
	A319-131	8.3185%	8.3184%				
	A320-211	11.0193%	11.0189%				
	A320-232	0.8189%	0.8187%				
	BAC111	0.0036%	0.0035%				
	BAE146	0.0353%	0.0353%	0.0251%	0.0252%	0.0099%	0.0098%
	CL600	1.1085%	1.1094%	1.7113%	1.7021%	0.2266%	0.2270%
	CL601	0.2288%	0.2287%	0.0210%	0.0211%		
	CNA55B	0.0341%	0.0341%	0.0736%	0.0737%	0.0690%	0.0689%
	DC93LW	0.0147%	0.0148%				
	EMB145	0.2651%	0.2651%	0.0584%	0.0585%		
	F10062	0.0146%	0.0146%				
	GIIB	0.2534%	0.2530%	0.7462%	0.7425%	0.6037%	0.6028%

Aircraft		LAS		HND		VGT	
Cat	**NIRS Type**	**Arr.**	**Dep.**	**Arr.**	**Dep.**	**Arr.**	**Dep.**
	GIV	1.2273%	1.2276%	0.7409%	0.7425%	0.2167%	0.2166%
	GV	2.2665%	2.2658%	1.3855%	1.3844%	0.0514%	0.0509%
	LEAR35	1.9341%	1.9353%	7.9278%	7.9113%	2.5063%	2.5102%
	MD81	0.0339%	0.0339%				
	MD82	1.1418%	1.1417%				
	MD83	4.1175%	4.1178%				
	MD9025	0.1710%	0.1710%				
Small Jets	**CIT3**	0.3514%	0.3505%	2.1521%	2.1561%	0.7838%	0.7839%
	CNA500	0.4958%	0.4965%	5.9520%	5.9611%	3.0788%	3.0725%
	CNA750	0.4562%	0.4545%	0.5932%	0.5886%	0.2135%	0.2133%
	FAL20	0.0796%	0.0800%	1.9110%	1.9186%	0.0142%	0.0142%
	IA1125	0.2468%	0.2465%	0.9202%	0.9198%	0.1861%	0.1871%
	LEAR25	0.2456%	0.2464%	0.7030%	0.6975%	0.1171%	0.1176%
	MU3001	1.8347%	1.8362%	8.0592%	8.0289%	4.9857%	4.9750%
Props	**1900D**	0.2413%	0.2413%	4.5740%	4.5838%	0.0197%	0.0197%
	BEC58P	0.1671%	0.1667%	8.3663%	8.3460%	12.2708%	12.2595%
	C130	0.0606%	0.0607%			0.0071%	0.0071%
	CNA172	0.0511%	0.0509%	3.3683%	3.3773%	12.5943%	12.5729%
	CNA206	0.0853%	0.0852%	6.2737%	6.3016%	10.6709%	10.6819%
	CNA441	0.3499%	0.3496%	6.2521%	6.2665%	3.1308%	3.1338%
	DHC6	0.9121%	0.9118%	8.8170%	8.8042%	6.9233%	6.9229%
	DHC8	0.2065%	0.2066%	0.0607%	0.0614%	2.1100%	2.1087%
	DHC830	0.1047%	0.1055%	0.5249%	0.5237%	0.1199%	0.1182%
	EMB120	1.2187%	1.2187%	0.0210%	0.0211%		
	GASEPF	0.3055%	0.3055%	1.6185%	1.6184%	3.2441%	3.2525%
	GASEPV	0.6010%	0.6006%	21.9284%	21.9358%	27.3719%	27.3847%
	HS125B	0.0405%	0.0402%	0.0631%	0.0620%	0.0197%	0.0197%
	HS748A	0.0049%	0.0049%	0.0525%	0.0521%		
	PA28	0.0262%	0.0261%	2.2987%	2.3012%	3.1828%	3.1907%
	PA30	0.0123%	0.0124%	2.2987%	2.3135%	1.4565%	1.4621%
	PA31	0.0018%	0.0018%	0.3497%	0.3481%	3.8057%	3.8061%
	SD330	0.0019%	0.0019%	0.1518%	0.1515%	0.0099%	0.0098%
	SF340	0.0004%	0.0004%				
		100.00%	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**

E.7.2.6 Aircraft Noise-Power-Distance (NPD) Curves

Both NIRS and INM use tables of sound exposure levels for specific aircraft and associated engines that determine how the sound level varies with the power setting of the engines and with the distance from the engine to the observer. These tables are termed noise-power-distance (NPD) curves. The NPD curves developed by the FAA for Release 7.0b.2 of INM and Release 7.0b.2 of NIRS were used in this analysis.

The NPD curves are accessed during NIRS noise calculations to determine the noise levels at each population or grid location. The contribution of each operation assigned to every flight track is calculated for every location depending on the power setting for each flight segment in each track, and upon the distance to the aircraft on each segment. The total noise exposure at each location is determined by aggregating the effects across all operations[42] [43].

E.7.2.7 Aircraft Climb/Descent Profiles

In order to accurately model noise exposure, NIRS has the capability to include specified altitude restrictions incorporated in the flight track and operations data. The modeled aircraft trajectory in NIRS will reflect altitude information provided by the airspace designer, rather than following a standard procedure profile, as is ordinarily done in INM studies. NIRS automatically generates profiles for each aircraft operation on each flight track that are consistent both with the specified altitudes and the NIRS aircraft-performance database.

The altitude-following capability is only applied above altitudes of 3,000 feet above field elevation (5,181 feet MSL for this study).[44] This means that for all flight tracks that contain points with altitudes greater than 3,000 feet above field elevation (AFE), the NIRS standard procedure profile will be used up to 3,000 feet AFE. At higher altitudes, the profile will follow the specified air traffic control design. Four types of altitude control have been encoded in the input files as follows: (1) no altitude control; (2) fly to a specified altitude or higher; (3) fly to a specified altitude; and (4) fly to a specified altitude or lower.

All routes are checked for violations of general profile constraints, such as maximum climb and descent angles. If necessary, the route is flagged for further modification to remedy such violations.

Once each profile meets all constraints, thrust is calculated according to whether the aircraft is climbing or descending along different parts of the route. NIRS climb calculations use maximum climb thrust from 10,000 feet to 18,000 feet AFE. NIRS descent calculations use a straight-line geometric descent from higher altitudes (i.e., above 6,000 feet AFE) as specified in the air traffic control design. Below 10,000 feet AFE for departures and below 6,000 feet AFE for arrivals, NIRS uses the thrusts required to fly the profile specified in the airspace design data.

Routes that have no altitudes higher than 3,000 feet AFE (5,181 feet MSL) are treated as special "low altitude route" cases. They are processed as follows:

Procedure 1 - The highest altitude on a particular flight track is identified.

Procedure 2 - For departures, the standard-procedure profile is used until reaching the track distance associated with that highest altitude. Altitude controls after that point are followed in order to maintain the subsequent descent.

Procedure 3 - For arrivals, altitude controls prior to the track distance associated with the highest altitude are followed (in order to maintain an initial climb, for example). The standard procedure profile is followed from the highest altitude to the runway.

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42 NIRS User's Guide, Version 7.0b.2, Federal Aviation Administration, Washington D.C. February 2012

43 INM Technical Manual, Version 7.0. Federal Aviation Administration, Washington D.C. January 2008

44 Noise Screening Procedures for Certain Air Traffic Actions Above 3,000 Feet AGL, FAA Notice 7210.360. Federal Aviation Administration, Washington D.C. September 14, 1990

E.7.2.8 Aircraft Stage Length

Stage length is the term used in NIRS to refer to the length of the trip planned for each departure operation from origin to destination. The trip length is needed in noise calculations because it influences the take-off weight of the aircraft, which is higher for longer trips, and lower for shorter trips. The great-circle distance is used to calculate a stage length for each aircraft operation. Seven categories for departure stage length and one for arrival stage length are used in NIRS, as shown in **Table E-11**.

Table E-10: Stage Length and Trip Distance

Stage Length Category	Approximate Trip Distance (NM)
Departures:	
D-1	**Less than 500**
D-2	**500 to 999**
D-3	**1000 to 1499**
D-4	**1500 to 2499**
D-5	**2500 to 3499**
D-6	**3500 to 4499**
D-7	**Greater than 4500**
Arrivals:	
A-1	**Any Distance (3° Approach)**

E.7.2.9 Flight Track Definitions

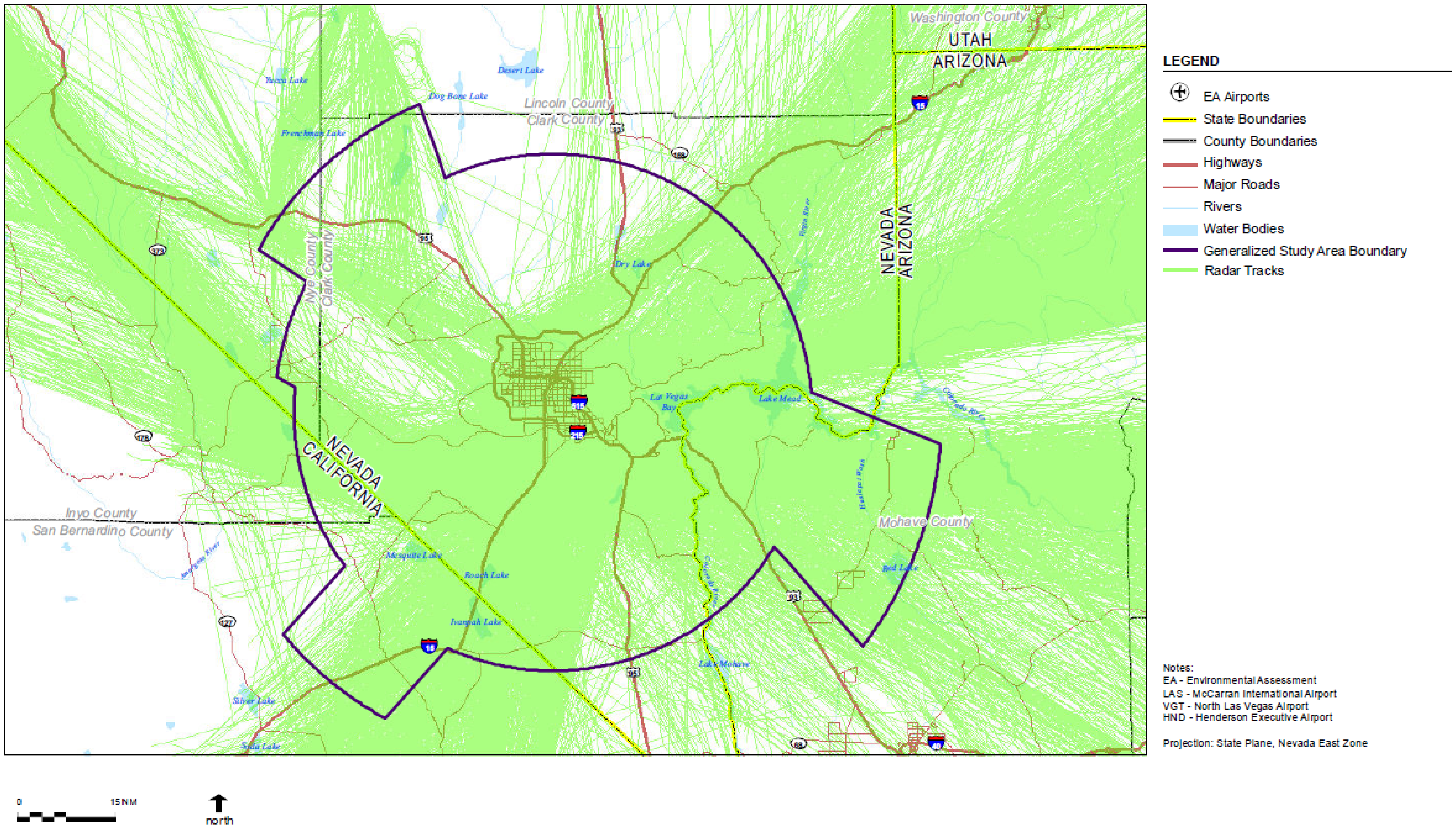
To determine projected noise levels on the ground, it is necessary to determine not only how many aircraft are present, but also where they fly. Therefore, flight route information is a key element of the NIRS input data. In order to ensure that the NIRS modeling accurately reflects local conditions in the Las Vegas area it is necessary to develop noise modeling tracks from a sample of detailed radar data. A radar sample of 38 available days between May 2009 and October 2009 was acquired and analyzed for operations encompassing the three airports in the LAS AIRSPACE OPTIMIZATION EA study. This detailed information allowed for the development of a sufficiently rigorous database of flight tracks for the noise modeling effort representing average annual day conditions as substantiated by local air traffic control subject matter experts for the Las Vegas ATCT (LAS) and the Las Vegas TRACON (L30) air traffic control personnel.

Figure E-10 presents radar data for the 38-day sample of radar departure tracks for all three LAS AIRSPACE OPTIMIZATION EA study airports. The sample provided some 23,630 departure flight tracks for analysis. The tracks are shown over the base map of the area. As the tracks indicate, a number of commonly used departure routes are evident. However, in the areas closer in to the Las Vegas, departure traffic traverses much of the region at one time or another.

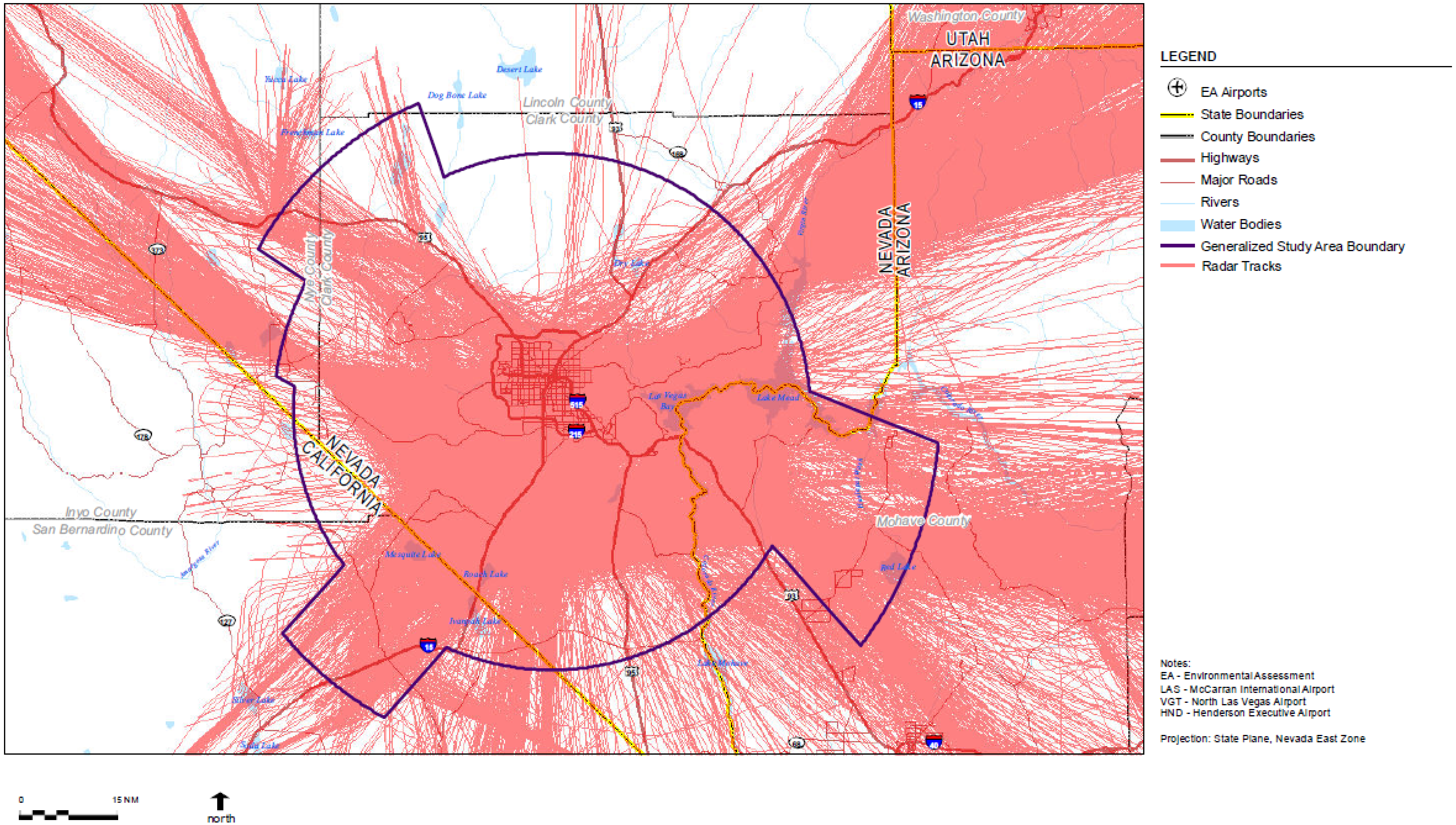
Figure E-11 presents radar data for the 38-day sample of radar arrival tracks for the LAS AIRSPACE OPTIMIZATION EA study airports. There were some 25,416 arrival tracks included in the sample. Again, the distinct arrival corner posts are evident near the outer edges of the image. As with the departures, the areas closer in to the Las Vegas are extensively traversed by arrivals to the three airports.

The software tool Terminal Area Route Generation, Evaluation, and Traffic Simulation (TARGETS), developed by The MITRE Corporation, was utilized for the detailed analysis of radar data for each LAS AIRSPACE OPTIMIZATION EA airport. The data was separated first by airport and operation type (i.e. arrival, departure). TARGETS was then used to develop bundles of radar tacks based on runway, aircraft category (i.e. jet, prop), and route similarity. The radar bundling process also included a review of the 3-dimensional aspect of each group of radar tracks. Bundles were split as necessary to isolate groups of tracks with restricted climb or descent profiles. Such groups generally represent flights that experienced specific ATC climb or descent procedures. Once the radar track bundles were complete, the development of noise modeling input tracks was initiated.

The TARGETS program allows for the development of primary, or backbone, flight tracks for each radar track bundle. The system also allows for the simultaneous computation of sub-tracks that are located adjacent to the backbone track. These sub-tracks account for the dispersion of actual flights about the primary flight corridor based on the distribution of radar tracks within each bundle. The system utilizes the user-input number of sub-tracks and distributional factors in combination with the statistical lateral distribution of the radar tracks at many locations along the flight corridor to determine the appropriate spacing between the sub-tracks at each location. The number of sub-tracks and the distributional factors associated with each model track are chosen by the user based on the number of radar tracks in the bundle and their general spread throughout the route.



LAS AIRSPACE OPTIMIZATION EA
Figure E-10: Las Vegas Area Departure Radar Tracks



LAS AIRSPACE OPTIMIZATION EA
Figure E-11: Las Vegas Area Arrival Radar Tracks

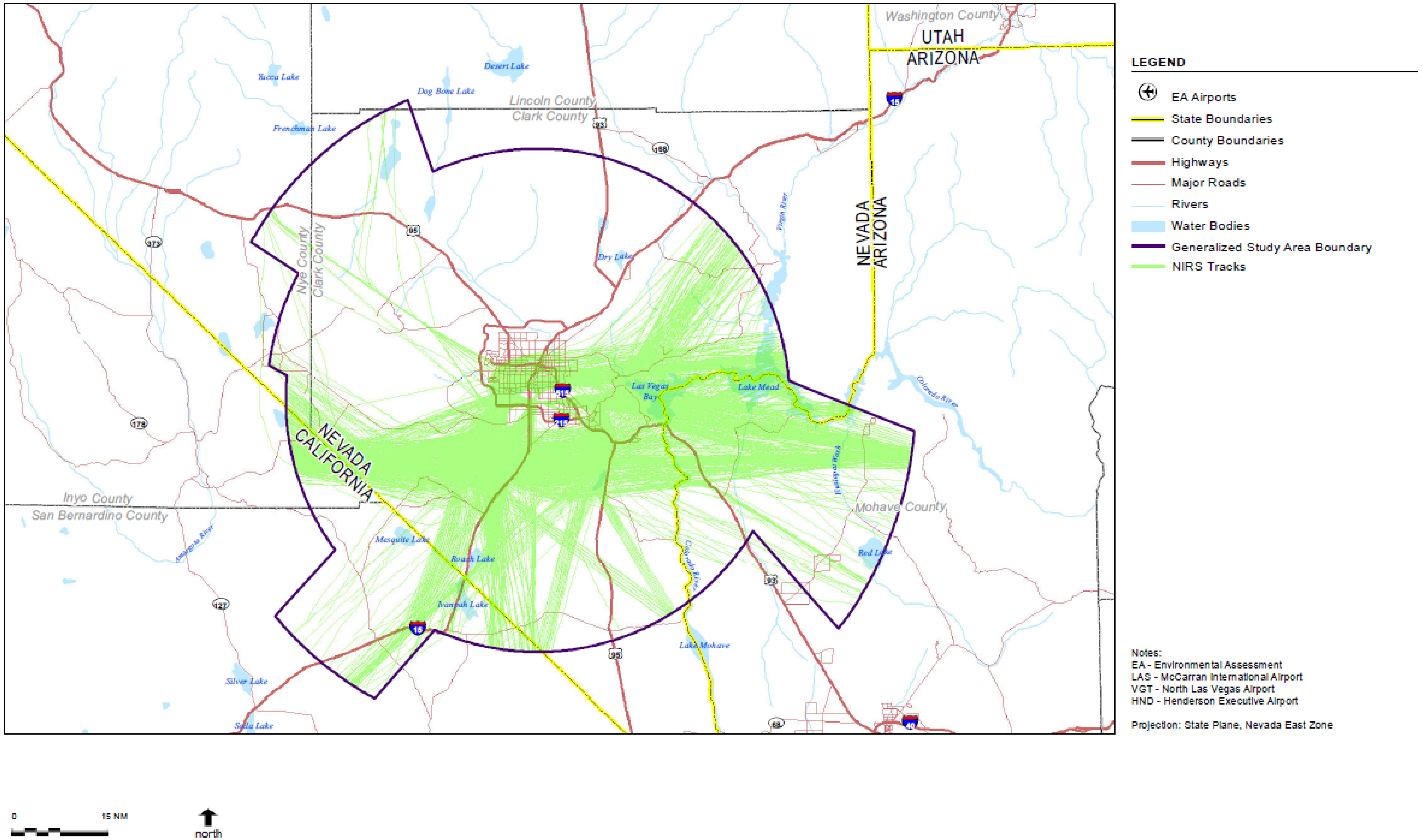
The radar data analysis resulted in the development of some 6,055 unique departure tracks for NIRS model input (backbones and sub-tracks). **Figure E-12** presents an overview of the Las Vegas area NIRS departure tracks used in the modeling of 2009 Existing Conditions. The analysis also resulted in the development of some 5,242 unique arrival tracks that were developed for NIRS model input (backbones and sub-tracks). **Figure E-13** presents the resulting Las Vegas area NIRS arrival tracks used in the modeling of 2009 Existing Conditions.

For the most part, the routing in No Action airspace procedures in 2012 and 2017 is anticipated to be exactly the same as the 2009 Existing Conditions routing with the exception of those procedures identified as being previously implemented as enumerated in Chapter 4, Affected Environment, Section 4.4, Past Present and Reasonably Foreseeable Future Actions, **Table IV-14** (pages IV-48 through IV-50), provides a summary of Past, Present and Reasonably Foreseeable Future Actions (Regional Airspace and other Projects) for which the appropriate level of environmental screening has already been accomplished and documented. In this light, the model backbones and sub-tracks created from current condition radar data including the procedures previously approved and analyzed for environmental acceptability were used directly in the modeling of No Action scenarios.

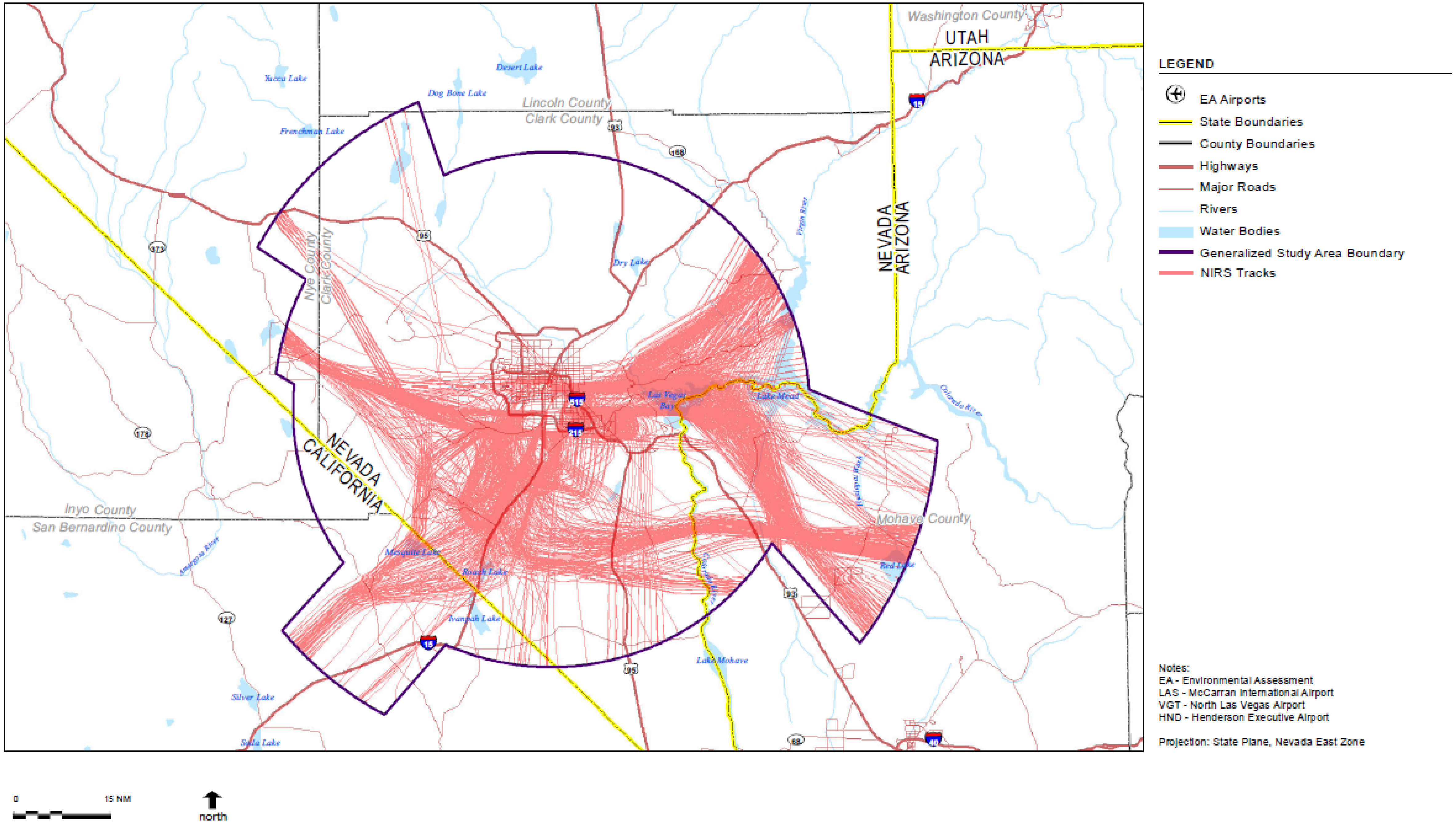
No overflights were modeled in this analysis for the LAS AIRSPACE OPTIMIZATION EA, because non origin-destination overflights of the GSA were above the GSA altitude cut-off of 21,918 MSL. The 38-day radar sample provided no overflight tracks below an altitude of 10,000 feet above the highest geographic reference point (i.e., Mount Charleston @ 11,918 equating to 21,918 MSL with the additional 10,000 feet) for the analysis, and as such no overflights were modeled. Lack of overflights is due to the fact that non Las Vegas origin-destination overflight type flight tracks are at higher altitude flight levels and typically do not intersect the GSA.

E.7.2.10 E.7.2.10 Flight Track Assignment

The final step in developing the flight track input data for the NIRS model is the assignment of aircraft to specific flight tracks. The radar data sample acquired for the flight track analysis was used as a basis for this analysis. The flight data associated with the bundle of radar data used to make the NIRS backbone track was retained as an attribute of each backbone track. This data included aircraft type, time-of-day (day or night), and flight origin or destination.



LAS AIRSPACE OPTIMIZATION EA
Figure E-12: Las Vegas NIRS Departure Tracks – Existing Conditions



LAS AIRSPACE OPTIMIZATION EA
Figure E-13: Las Vegas NIRS Arrival Tracks – Existing Conditions

The flights to be modeled for 2012 and 2017 at each airport were provided as part of the forecasts. These forecasts also included aircraft type, time-of-day, and origin/destination data. Each of the flights in the design-day schedule was parsed into fractions of operations assigned to a specific runway based on the aforementioned runway use percentages. Once parsed by runway, the flights were then further parsed to each NIRS backbone based on the proportion of radar tracks that match the aircraft category (jet, turboprop, prop), time-of-day (day or night) and the airspace fix predominately used by the origin/destination of the scheduled flight. Thus the weighting of the flight tracks and routes was closely tied to the real-world radar data from the Las Vegas area. The process of track assignments continued until all forecasted operations for each airport had been assigned. Once assigned to a specific backbone, the operations are further parsed to make the proportional assignments to the sub-tracks associated with each backbone.

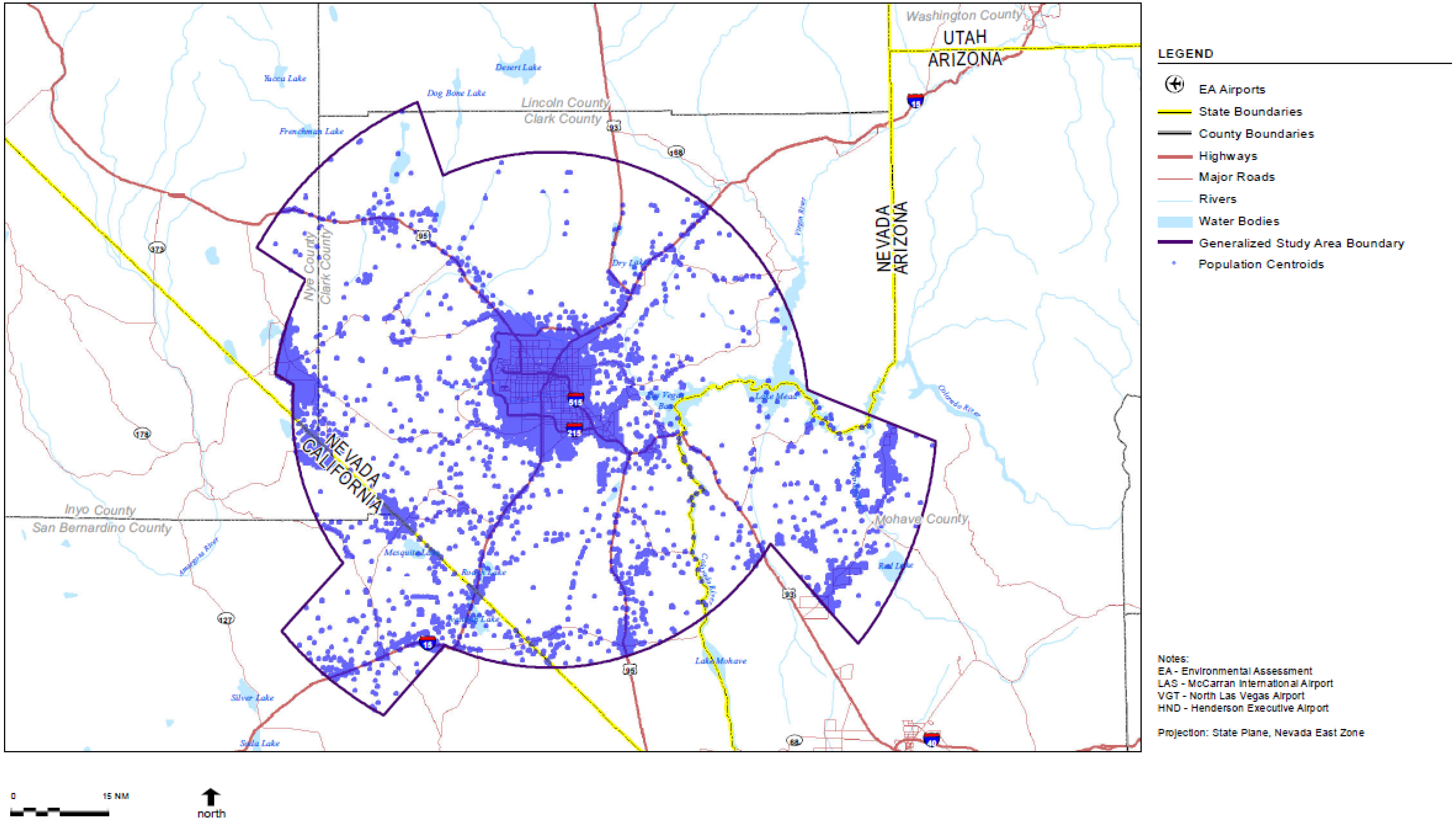
E.7.2.11 E.7.2.11 Population Data

Population locations were extracted from the 2000 U.S. Census data for the entire GSA with updates based on updated 2000 Census Data[45] [46].The census data were incorporated into the analysis at its most refined level. Known as census blocks, these divisions represent the smallest area within the database where population data is defined. While census blocks vary in size, they tend to represent city block areas in urban zones, and larger areas in rural regions. The Census data also provides a centralized position within each block known as a centroid which was the single position used within each block for noise computation. The centroids where population values were non-zero numbered some 12,856 within the study area.

Figure E-14 depicts the study area and extracted population centroids. The centroids are color-coded based on the updated 2000 U.S. Census population levels at each centroid.

[45] *2000 Census of Population and Housing*, Public Law 94-171. U.S. Department of Commerce, Bureau of the Census, Data User Services Division. Washington, D.C.

[46] 2000 Census Data, U.S. Census Bureau, with Ricondo & Associates update to 2000 Census data for the Las Vegas Airspace Optimization Environmental Assessment (EA) with updates through Applied Geographic Solutions, 2010 U.S. Census Block Data, April 2010



LAS AIRSPACE OPTIMIZATION EA
Figure E-14: LAS Airspace Optimization Study Area Population

E.8 Noise Modeling Procedures

NIRS processes flight-track and operation data through several major steps: data integration and quality control, calculation of flight dynamics (i.e., thrust and speed), noise exposure computation, annualization of noise exposures, change of exposure analysis, and report generation. Key aspects of this processing are discussed below.

E.8.1 Model Input

The input for the NIRS modeling effort was developed in accordance with the data, sources, and methodologies presented in the previous sections. The input representing the average annual day of operations for the No Action alternative was fed to the NIRS model unchanged from the results described in the earlier sections. The input for each alternative was modified according to the LAS AIRSPACE OPTIMIZATION EA procedures designed for each alternative. Details relating to these modifications are presented in subsequent sections of this appendix.

E.8.2 Data Integrity Checks

Before noise calculations are carried out, the NIRS pre-processor is run on all data components that contribute to the noise for a given annualized scenario. The resulting operation counts are checked against expected counts, and modeled fleet mix tables are reviewed for consistency with the noise modeling assumptions.

Profiles and operations were checked during the same pre-noise calculations, and profiles that violate the following rules were flagged:

Flag Type	Rule
Climb/Descent	No angles greater than 30 degrees
Altitude Controls	There must be at least one altitude set above ground level
Aircraft	There must be an INM profile aircraft type
Runways	Assigned runways must be longer than aircraft takeoff distance

Track/aircraft combinations with flagged profiles are rejected by NIRS prior to noise calculations. Elements of the input data that failed the above tests or that were not readable due to format errors were reviewed and modified.

E.8.3 Develop Output Reports for Impact Analysis

After all noise calculations are complete, NIRS is used to determine noise impacts by locating and categorizing changes in noise values between scenarios.

Using FAA scoring criteria, maps depicting zones of various types of change in annualized noise exposure between scenarios are typically produced within NIRS for the entire study area. These maps will not be depicted for LAS AIRSPACE OPTIMIZATION EA because there were no change levels of sufficient magnitude to significantly impact FAA scoring criteria. Instead, two types of tables are produced that compare the changes in noise exposures across the study area, as follows:

Impact Table – Summarizes the distribution of population into DNL bands under two different scenarios, encompassing a baseline construct (No Action) and the Proposed Action Alternative. The function of the impact table is to compare the noise impacts due to these two different alternatives. This table is a spreadsheet showing how the population in the study area was distributed according to the values of the No Action and Proposed Action DNL values at each centroid. By considering a specific column corresponding to a certain exposure range under the No Action scenario, one can see how the distribution of exposures would change under the Proposed Action for people in this exposure range. The results are aggregated into four bands for both No Action and Optimization (Proposed Action) DNL:

DNL $<$ 45 dB
DNL 45 to $<$ 60 dB
DNL 60 to $<$ 65 dB
DNL $>$ 65 dB

Impact Graph - Distribution of population with scoring criteria applied. This graph shows the distribution after the change of exposure scoring criteria has been applied. It also tabulates total increases and decreases above DNL 65 dB, total population above DNL 65 dB, and total population receiving increases or decreases. The construction and use of this graph is described later in this section, particularly with regard to tabulation of various aggregate measures.

The FAA scoring criteria is used to compare DNL changes at the population centroids in the study area. For each scenario, all population in the study area is divided into three categories: (1) those receiving an increase in noise exposure relative to the baseline (No Action); (2) those receiving a decrease; and (3) those having no change. The rules defining the increase decrease, and no change categories and the sources for each rule were presented in **Section E.5, Noise Impact Criteria.**

The impact graph is based on a comparative noise analysis where each population centroid has two noise exposure values associated with it: No Action and Proposed Action. Using No Action noise exposure for the horizontal axis and Proposed Action noise exposure for the vertical axis, each centroid can be plotted at a specific location on the graph shown in **Figure E-15**. The scoring criteria define the zone of “no change” that gets progressively narrower moving from the upper left to the lower right on the graph. This narrowing reflects the tightening of the criteria from a DNL 5.0 dB threshold at lower exposure levels to a DNL 1.5 dB threshold at higher exposure levels.

Several informative aggregate measures can be derived easily from the impact graph by summing population (and/or centroids) in specific regions of the graph. Referring to **Figure E-15**, and noting that change is described in terms of Proposed Action noise exposure relative to No Action noise exposure, the following descriptions apply:

- Total population receiving “no change” - All population that falls in the central diagonal zone defined by the scoring criteria;
- Total population receiving a decrease - All population above and to the right of the “no change” zone;
- Total population receiving an increase - All population below and to the left of the “no change” zone;
- Total population above DNL 65 dB (No Action) - All population to the right of the vertical line denoting No Action exposure of 65 dB;
- Total population above DNL 65 dB (No Action) receiving a decrease - All population in the green area;
- Total population above DNL 65 dB (No Action) receiving an increase - All population in the red area to the right of the vertical No Action-exposure 65 dB line and below the “no change” zone;
- Total population above DNL 65 dB (Proposed Action) - All population below the horizontal line denoting Proposed Action exposure of DNL 65 dB;
- Total population above DNL 65 dB (Proposed Action) receiving an increase. - All population in the red area;
- Total population receiving an increase to above DNL 65 dB with No Action below 65 dB (“newly impacted”) - All population in the red area to the left of the “no-change” zone, and to the left of the vertical No Action-exposure DNL 65 dB line

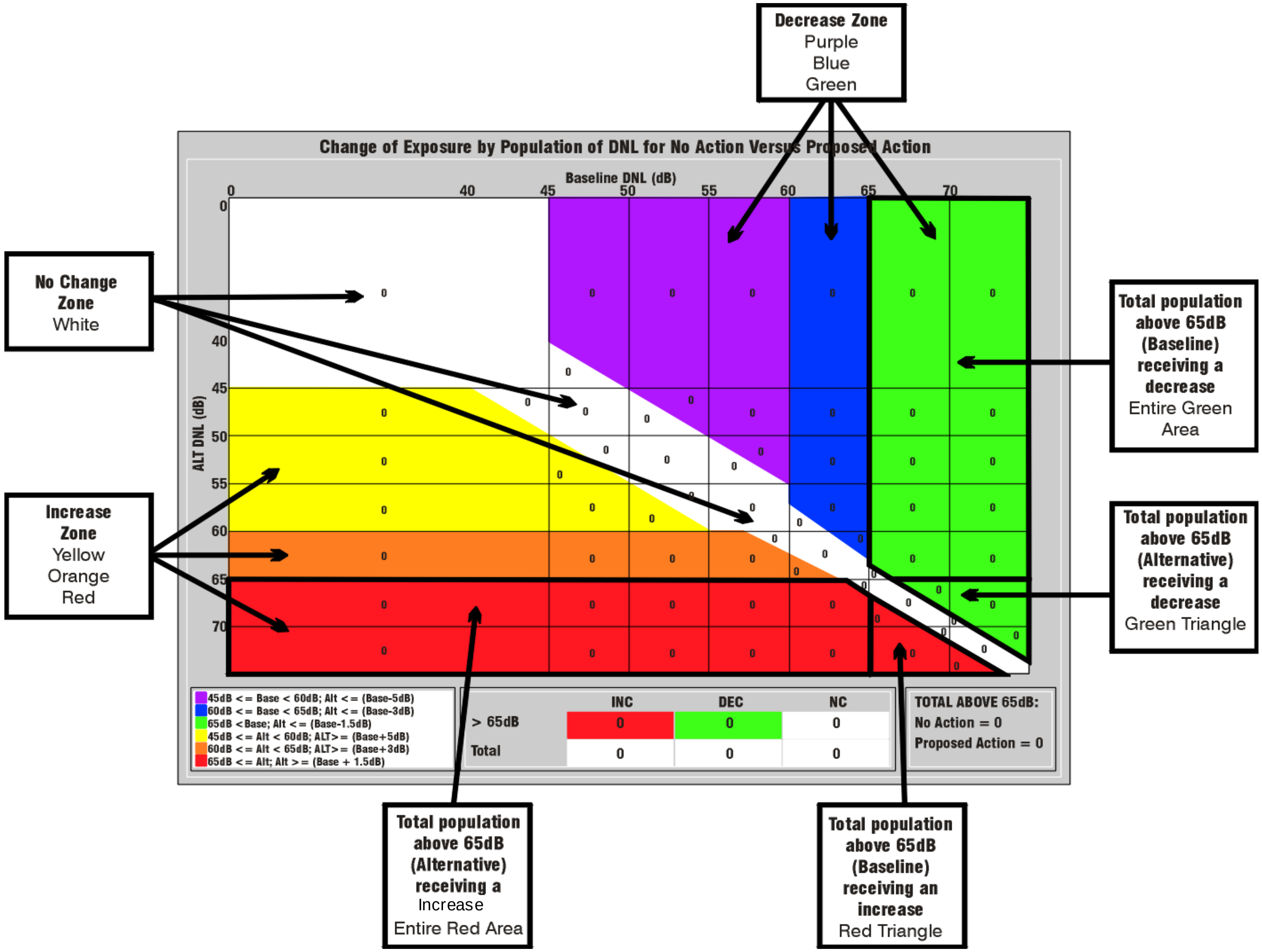


Figure E-15: Impact Graph Example

E.9 NIRS ANALYSIS

NIRS model analysis was conducted for each of the five scenarios outlined in Section E.6.1. Noise impact results were tabulated based on the potential implementation of the Proposed Action compared to the No Action Alternative at the previously described population centroids and supplemental grid points.

The following sections present both a summary of the NIRS input modifications made to model the Proposed Action and the results of the noise analysis for each scenario.

E.9.1 Existing Conditions and No Action Conditions

The existing conditions for 2009 and the No Action conditions for 2012 and 2017 were modeled in NIRS. For the purposes of this study, the 2012 and 2017 No Action conditions vary slightly from 2009 aircraft flight trajectories in that they include air traffic actions having independent utility that were implemented after the 2009 baseline data was collected, but that were implemented between 2009 and 2011. These newer existing procedures became part of the No Action baseline for both 2012 and 2017, and are considered as existing procedures when analyzed against the Optimization procedures being assessed as part of this EA. Again, the difference between the 2009 Existing conditions and the No Action Conditions for 2012 and 2017 are the implemented airspace procedures having independent utility that were put in place between 2009 and 2011 that have previously been environmentally analyzed and disclosed through separate environmental analysis documentation, and are identified in this EA study in Chapter 4, Section 4.4, Past, Present and Reasonably Foreseeable Future Actions[47].

E.9.1.1 No Action Noise Model Input

For the No Action conditions the NIRS input was directly based on the radar data analysis presented in previous sections as well as those procedures that have been previously analyzed for potential environmental impact as identified in Chapter 4, Affected Environment, Section 4.4 referenced above. Procedures for the optimization of arrivals and departures for the various airspace configurations at LAS which would be present in 2012 and 2017 were based on input from the Las Vegas Airspace Design Team comprised of air traffic control specialists from Las Vegas Tower (LAS), Las Vegas TRACON (L30) and the Los Angeles Air Route Traffic Control Center (ARTCC) designated ZLA. No changes to the data analysis were made beyond their inclusion. With the exception of the operational levels, fleet mix, and city-pairs, the model input for both 2012 and 2017 was the same.

E.9.1.2 No Action Noise Results

The NIRS noise analysis typically focuses on aircraft noise exposure in areas affected by DNL 45 dB and greater as this is the threshold with a minimum increase in 5.0 dB within the 45 to 65 dB range, which is disclosed pursuant to FAA Order 1050.1E[48] . While NIRS can and does provide noise levels below 45 DNL, these values are typically not reported given the standards referenced above unless special considerations need to be assessed.

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[47] Reference Chapter IV Affected Environment, Section 4.4, Past, Present, and Reasonably Foreseeable Future Actions, p IV-47; also reference Table IV-14, Summary of Past, Present and Reasonably Foreseeable Future Actions, pp. IV-48 through IV-50, Chapter 4, Affected Environment

[48] Reference FAA Order 1050.1E, Appendix A, paragraph 14.5e.

Table E-12 presents the maximum potential population exposed to noise by DNL ranges for the 2009 Existing Conditions, and 2012 and 2017 No Action conditions. As the table indicates, approximately 779,186 people within the GSA are expected to be exposed to noise levels of DNL 45 dB and greater due to aircraft noise in 2012 if no design changes are made. By the year 2017, it is estimated that the population exposed to noise levels above DNL 45 dB will increase to about 871,113 people. These increases are due to the expected increases in aircraft operations in the area through 2017 and the associated increases in cumulative noise.

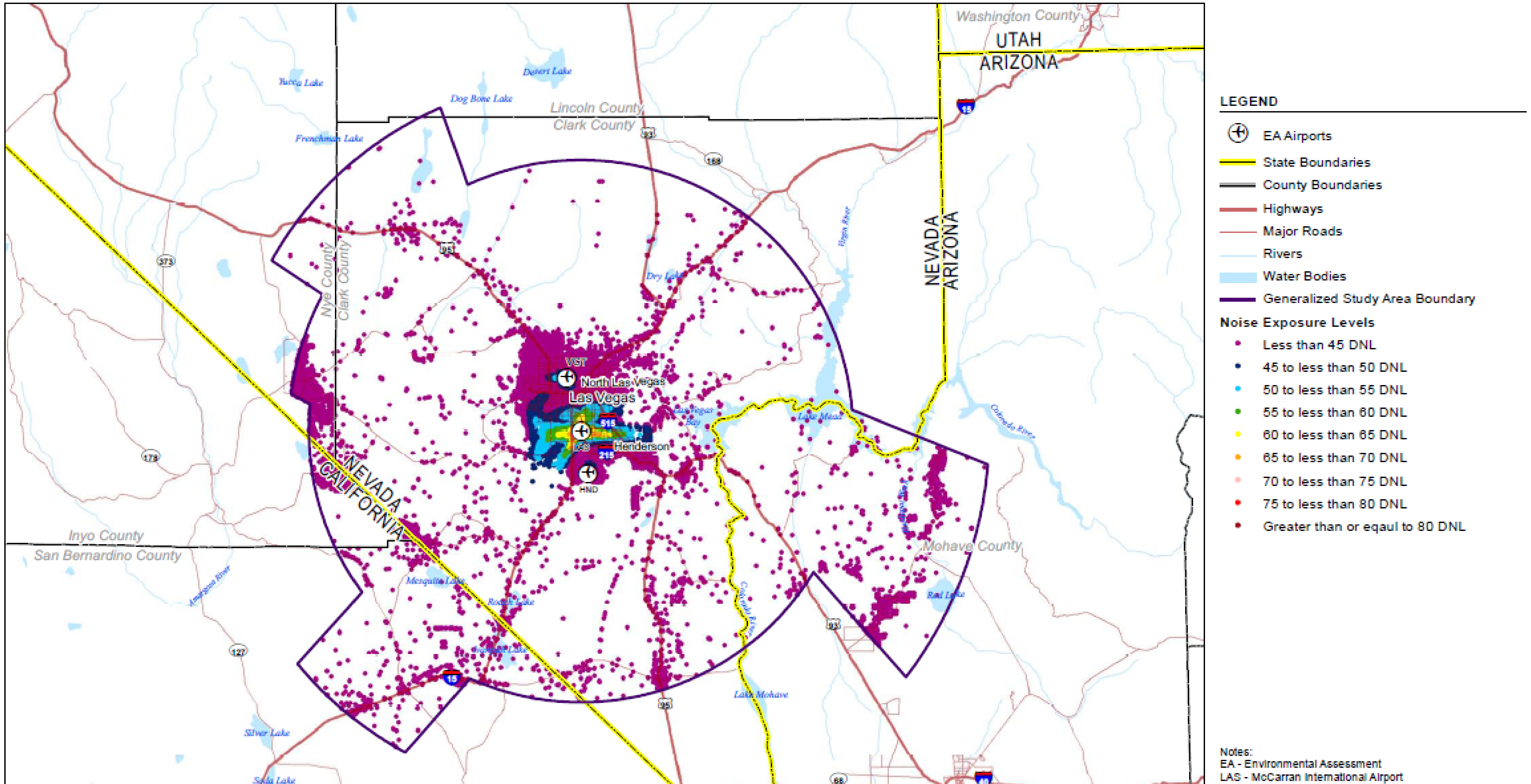
Table E-11: Maximum Population Exposed to Aircraft Noise (DNL 45 dB and greater)

	Population Exposure		
DNL Range	**2009 Existing Conditions**	**2012 No Action**	**2017 No Action**
45-60 dB	560,560	756,157	758,379
60-65 dB	11,092	19,905	27,667
65+ dB	73	3,124	3,313
Total Above 45 dB	571,725	779,186	871,113

The No Action noise levels were also computed for noise sensitive and 4(f) sites represented by 2,807 grid points in the GSA and 337 grid points in the SSA. In the SSA, there were no DNL values which reached 45 dB. In the GSA, the total number of 4(f) grid points above DNL 45 dB was 131 under 2009 Existing Conditions, 212 in the No Action 2012 condition, and 272 for No Action 2017 condition.

Figure E-16 presents a map of the 2009 existing No Action noise exposure at the population centroids within the study area. The map is color coded based on the DNL noise level range that each centroid falls within. Areas that are exposed to noise below the FAA scoring criteria (less than DNL 45 dB) are indicated by the light purple coloring on the centroids. As the Figure indicates, the noise levels due to air traffic throughout most of the study are below DNL 45 dB. The higher noise levels indicated by the blue through red colors are concentrated in areas relatively close to each of the study airports.

Similar maps are presented in **Figures E-17 and E-18** for the No Action conditions in 2012 and 2017 respectively. Again, the areas that are exposed to noise below the FAA scoring criteria (less than DNL 45 dB) are indicated by the light purple coloring on the centroids. As the Figure indicates, the noise levels in 2012 and 2017 are very similar to those shown for 2009. Only small changes are evident in the higher noise levels indicated by the blue through red colors that are still concentrated in areas relatively close to each of the study airports.



Sources: Metron Aviation, July-August 2010 (generalized study area boundary, noise exposure levels); U.S. Geological Survey, 2009 (state boundaries, county boundaries, water bodies); Clark County Geographic Information Systems Management Office, 2001 (airports); Environmental Systems Research Institute, 2008 (roads, rivers).
Prepared by: Ricondo & Associates, Inc., August 2010.

Notes:
EA - Environmental Assessment
LAS - McCarran International Airport
VGT - North Las Vegas Airport
HND - Henderson Executive Airport

Projection: State Plane, Nevada East Zone

0 15 NM

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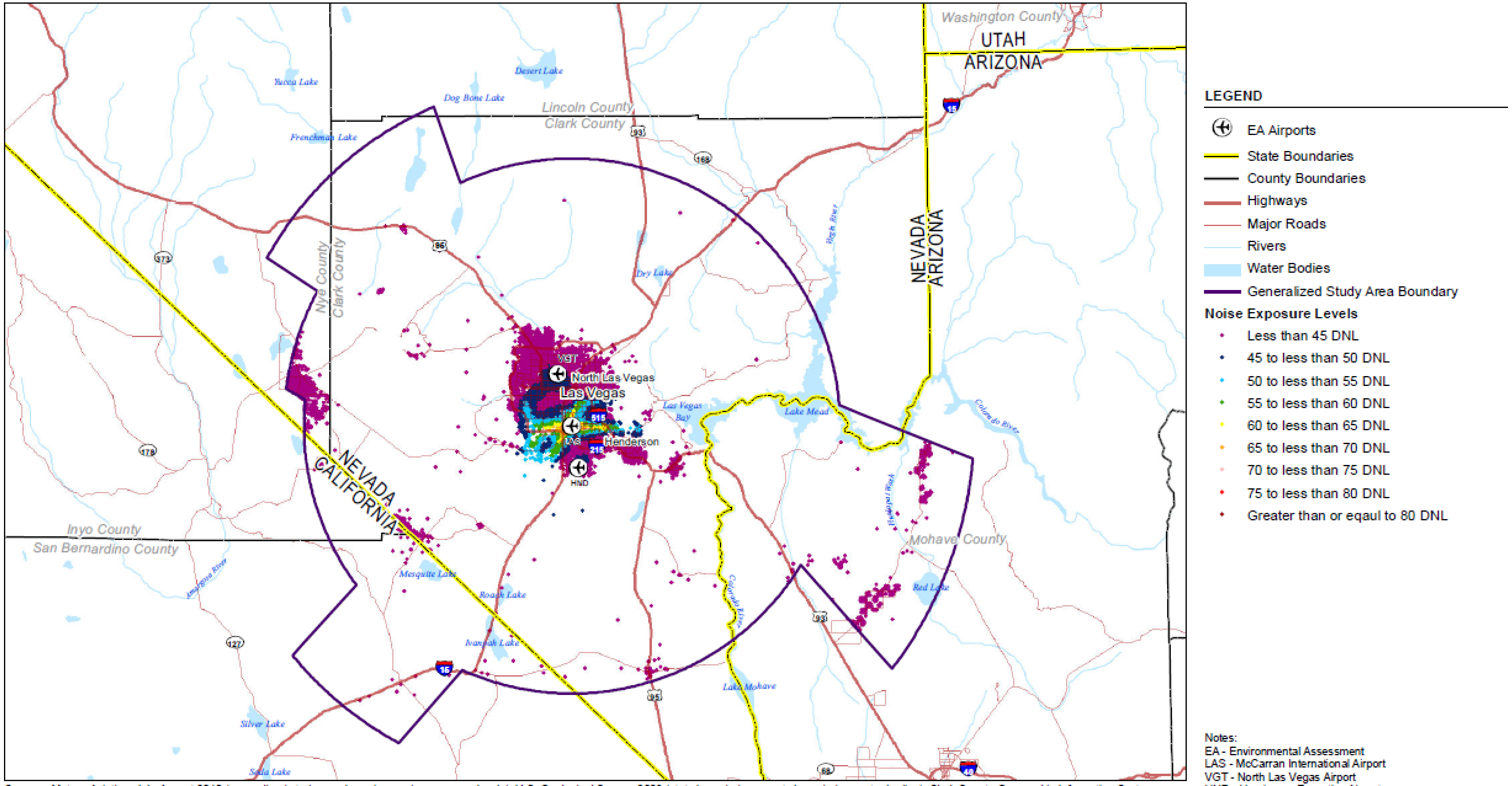
Figure E-16: Noise Exposure Populations Centroids –2009 Existing Conditions



Sources: Metron Aviation, July-August 2010 (generalized study area boundary, noise exposure levels); U.S. Geological Survey, 2009 (state boundaries, county boundaries, water bodies); Clark County Geographic Information Systems Management Office, 2001 (airports); Environmental Systems Research Institute, 2008 (roads, rivers).
Prepared by: Ricondo & Associates, Inc., August 2010.

Notes:
EA - Environmental Assessment
LAS - McCarran International Airport
VGT - North Las Vegas Airport
HND - Henderson Executive Airport

Projection: State Plane, Nevada East Zone

0 15 NM

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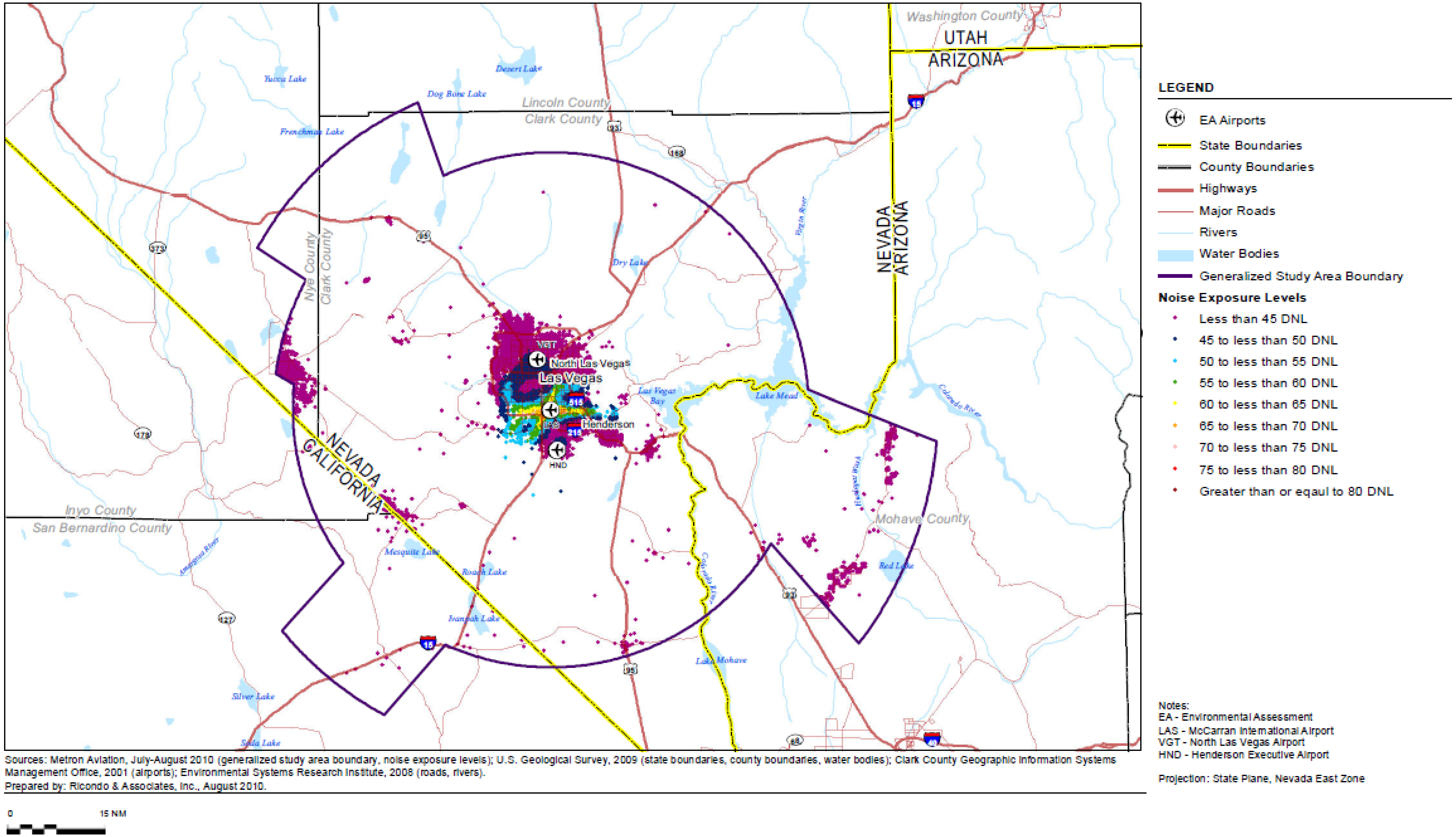
Figure E-17: Noise Exposure Populations Centroids – No Action 2012



Sources: Metron Aviation, July-August 2010 (generalized study area boundary, noise exposure levels); U.S. Geological Survey, 2009 (state boundaries, county boundaries, water bodies); Clark County Geographic Information Systems Management Office, 2001 (airports); Environmental Systems Research Institute, 2008 (roads, rivers).
Prepared by: Ricondo & Associates, Inc., August 2010.

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Figure E-18: Noise Exposure Populations Centroids – No Action 2017

E.9.2 Proposed Action

The Proposed Action consists of several modifications to the No Action airspace as discussed in the main body of the EA in Chapter III, Alternatives (**Section 3.4.2)**. Those modifications were implemented in the noise modeling through adjustments to the flight track routing at the three study area airports. The following sections present further discussion and Figures of the flight track adjustments.

<u>LAS – Arrivals</u>

The major routing flow differentials for LAS arrivals between the Proposed Action (**L**eft) and No Action (**R**ight) are compared in **Figures E-19** through **E-22** depicting major routing flows from Chapter III, Alternatives (No Action arrival corridors are depicted in Section 3.4.1 and Proposed Action arrival corridors in Section 3.4.2). The Proposed Action (i.e., Optimization) changes constitute a general trend away from radar vector operational ATC procedures for portions of the arrival trajectory, towards increased use of area navigation (RNAV) and conventional STARS for greater use of standardized procedures that increase routing predictability and decrease fuel burn in the aggregate (Reference Chapter V, Environmental Consequences, Sections 5.8 Air Quality and 5.9 Climate). The changes between Proposed Action and No Action routing for NIRS arrival tracks to LAS are presented in **Figure E-23**. Proposed Action routes are depicted in Blue, and No Action routes are depicted in a transparent Light Red, with the tracks common between Proposed and No Action Routing (i.e., overlap) depicted in Purple.

Figure E-19: LAS Proposed Action NE Arrivals (L) vs. LAS No Action NE Arrivals (R)

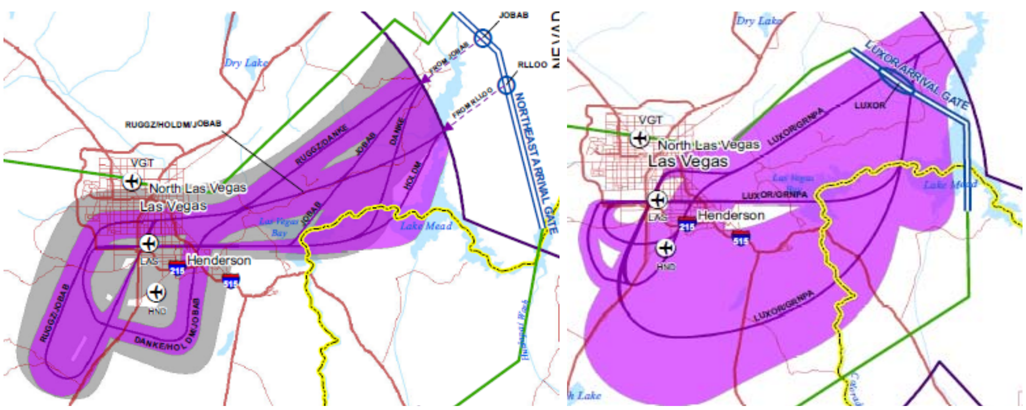


Figure E-20: LAS Proposed Action SE Arrivals (L) vs. LAS No Action SE Arrivals (R)

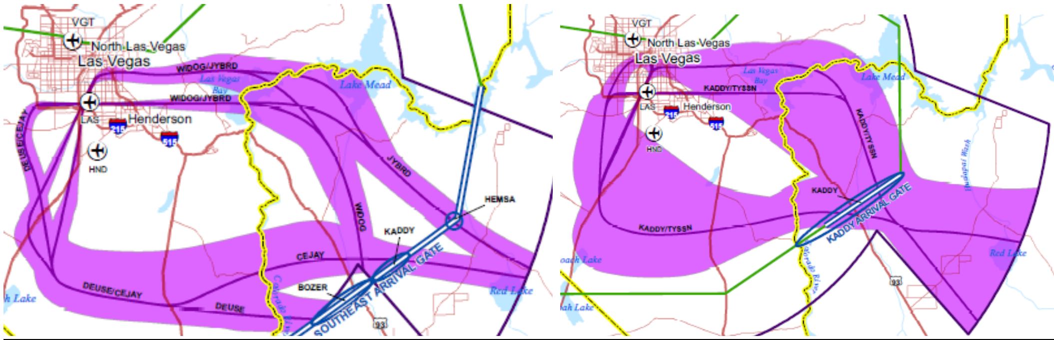


Figure E-21: LAS Proposed Action SW Arrivals (L) vs LAS No Action SW Arrivals (R)

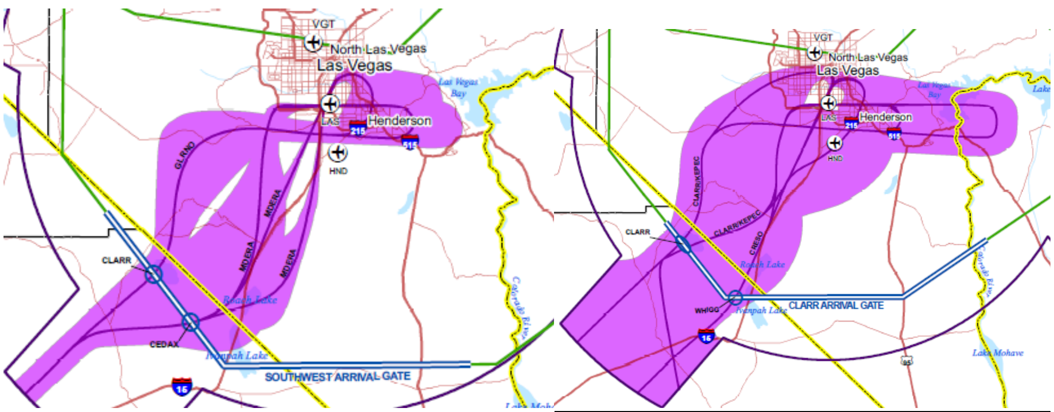
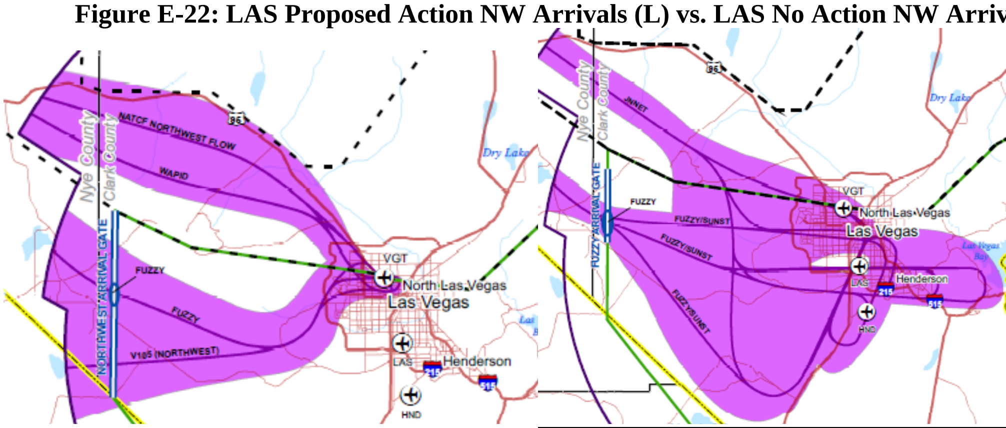
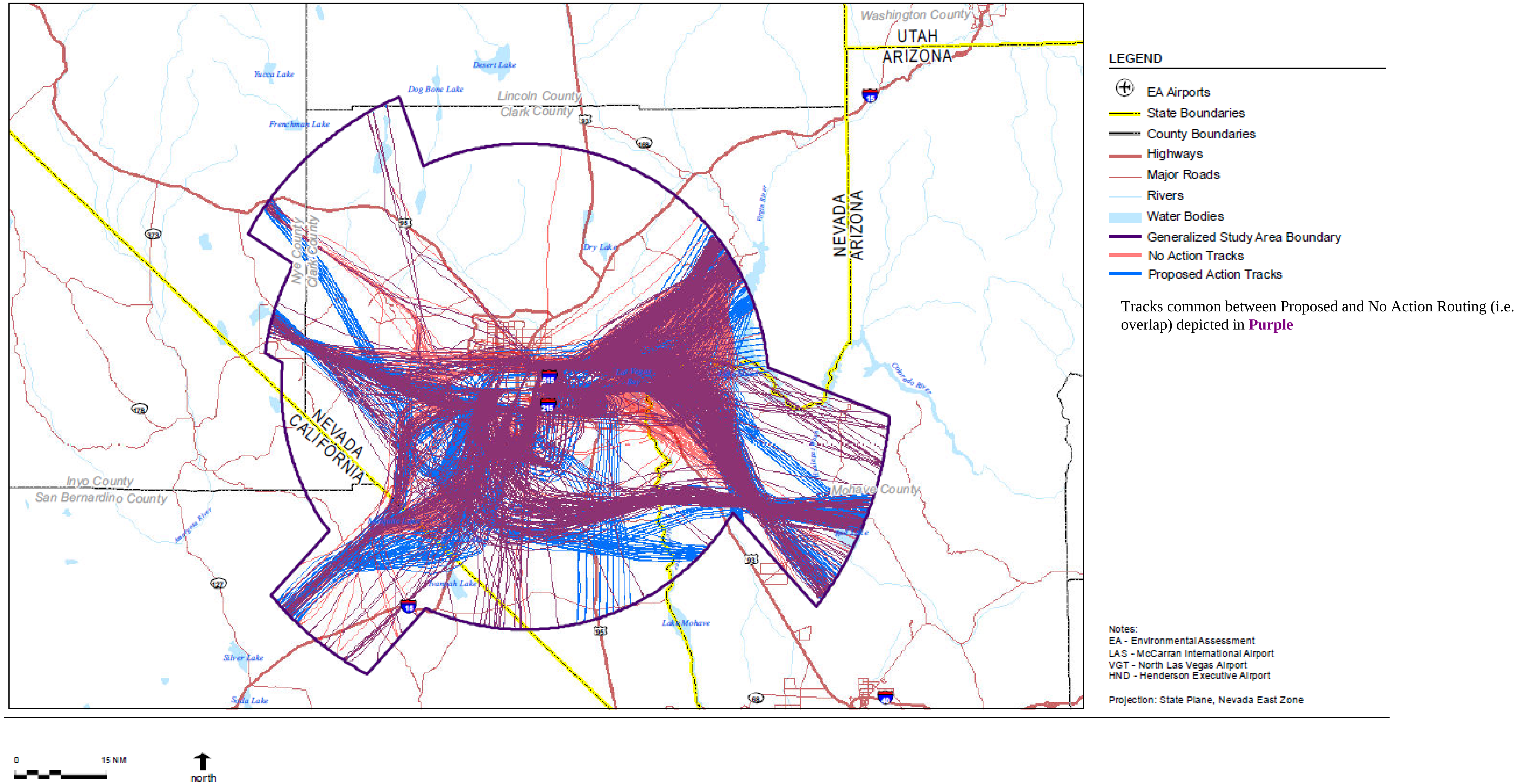


Figure E-22: LAS Proposed Action NW Arrivals (L) vs. LAS No Action NW Arrivals (R)





LAS AIRSPACE OPTIMIZATION EA
Figure E-23: LAS No-Action/LAS Proposed Action NIRS Tracks - LAS Arrivals

LAS – Departures

The major routing flow differentials for LAS departures between the Proposed Action (**L**eft) and No Action (**R**ight) are compared in **Figures E-24** through **E-27** depicting major routing flows from Chapter III, Alternatives (No Action departures corridors are depicted in Section 3.4.1 and Proposed Action departure corridors in Section 3.4.2). The Proposed Action (i.e., Optimization) changes constitute a general trend away from radar vector operational ATC procedures for portions of the departure trajectory, towards increased use of area navigation (RNAV) and conventional SIDS for greater use of standardized procedures that increase routing predictability and decrease fuel burn in the aggregate (Reference Chapter V, Environmental Consequences, Sections 5.8 Air Quality and 5.9 Climate). The changes between Proposed Action and No Action routing for departures from LAS are presented in **Figure E-28**. Proposed Action routes are depicted in Blue, and No Action routes are depicted in a transparent Light Red, with the tracks common between Proposed and No Action Routing (i.e., overlap) depicted in Purple.

Figure E-24: LAS Proposed Action NE Departures (L) vs. LAS No Action NE Departures (R)

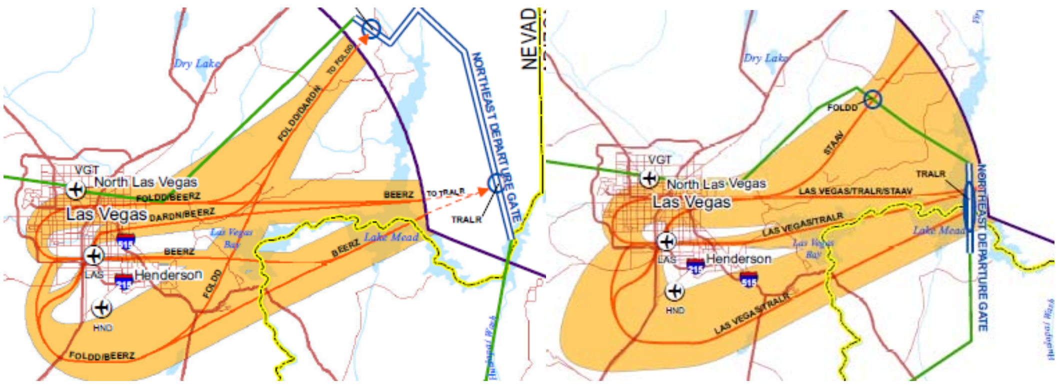


Figure E-25: LAS Proposed Action SE Departures (L) vs. LAS No Action SE Departures (R)

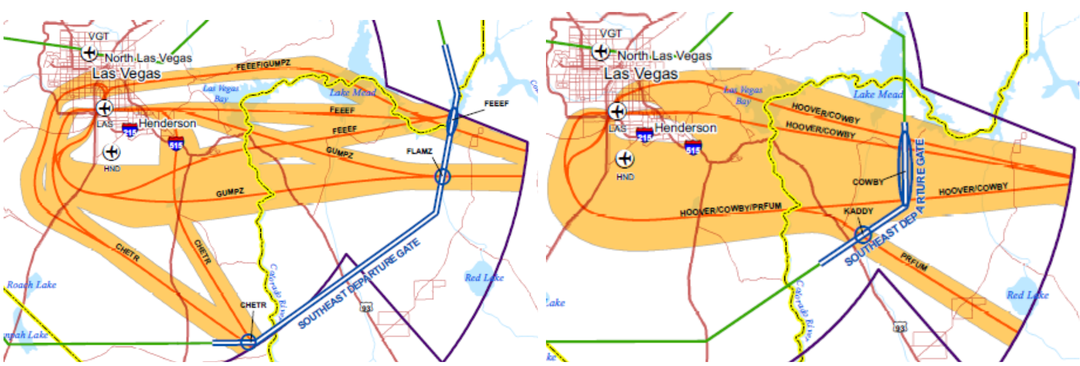


Figure E-26: LAS Proposed Action S Departures (L) vs. LAS No Action S Departures (R)

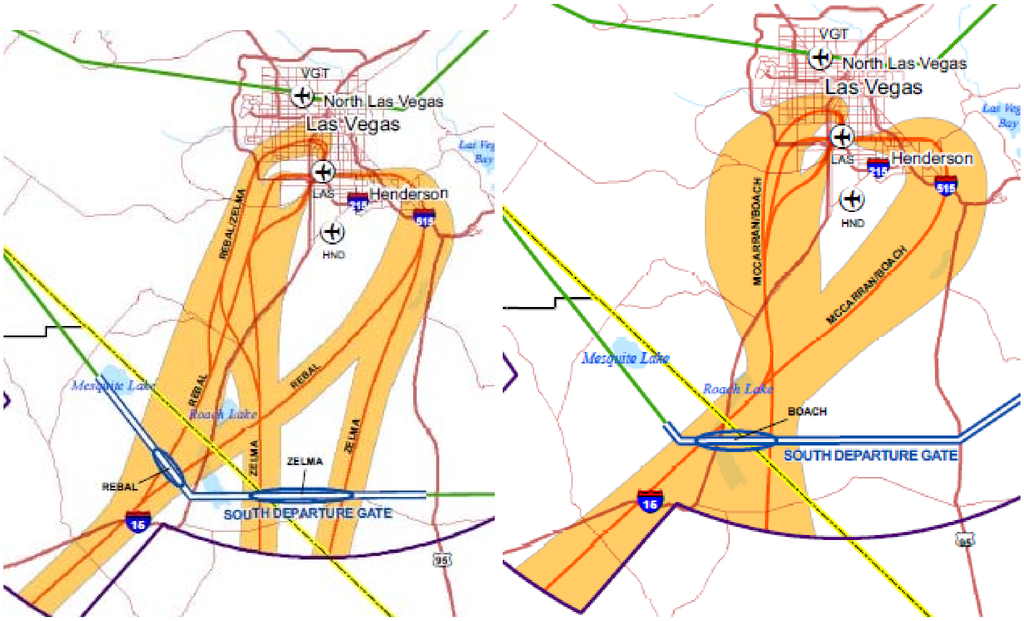
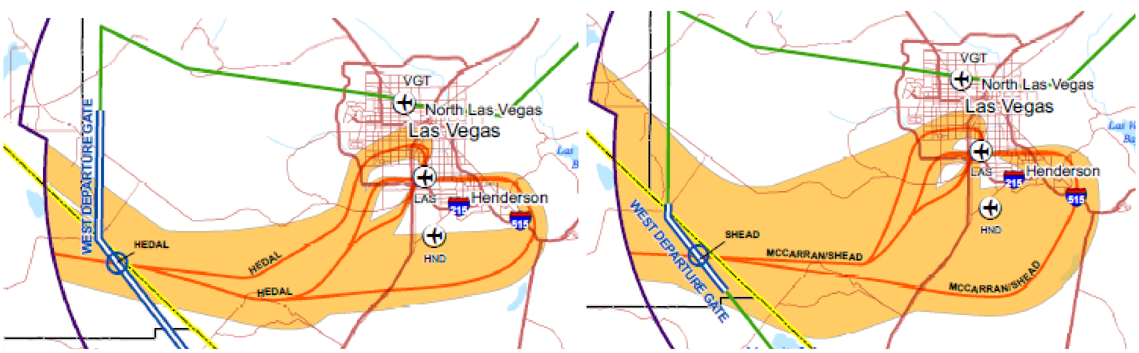
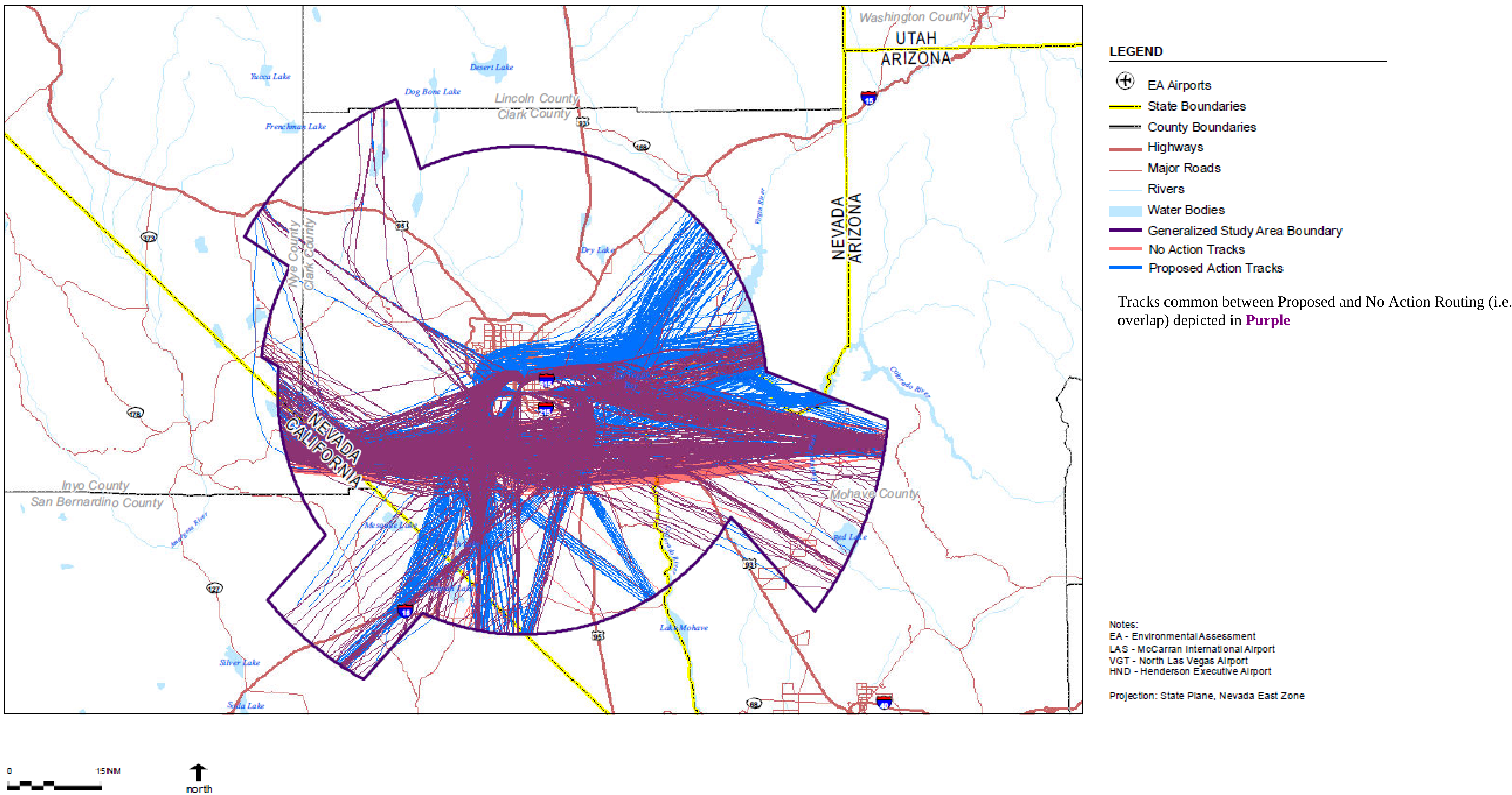


Figure E-27: LAS Proposed Action W Departures (L) vs. LAS No Action W Departures (R)





LAS AIRSPACE OPTIMIZATION EA
Figure E-28: LAS No Action/LAS Proposed Action NIRS Tracks – LAS Departures

HND – Arrivals

The major routing flow differentials for HND arrivals between the Proposed Action (**L**eft) and No Action (**R**ight) are compared in **Figures E-29** through **E-32** depicting major routing flows from Chapter III, Alternatives (No Action arrival corridors are depicted in Section 3.4.1 and Proposed Action arrival corridors in Section 3.4.2). The Proposed Action (i.e., Optimization) changes constitute a general trend away from radar vector operational ATC procedures for portions of the arrival trajectory, towards increased use of area navigation (RNAV) and conventional STARS for greater use of standardized procedures that increase routing predictability and decrease fuel burn in the aggregate (Reference Chapter V, Environmental Consequences, Sections 5.8 Air Quality and 5.9 Climate). The changes between the Proposed Action and No Action routing for arrivals to HND are presented in **Figure E-33**. Proposed Action routes are depicted in Blue, and No Action routes are depicted in a transparent Light Red, with the tracks common between Proposed and No Action Routing (i.e., overlap) depicted in Purple.

Figure E-29: HND Proposed Action NE Arrivals (L) vs. HND No Action NE Arrivals (R)

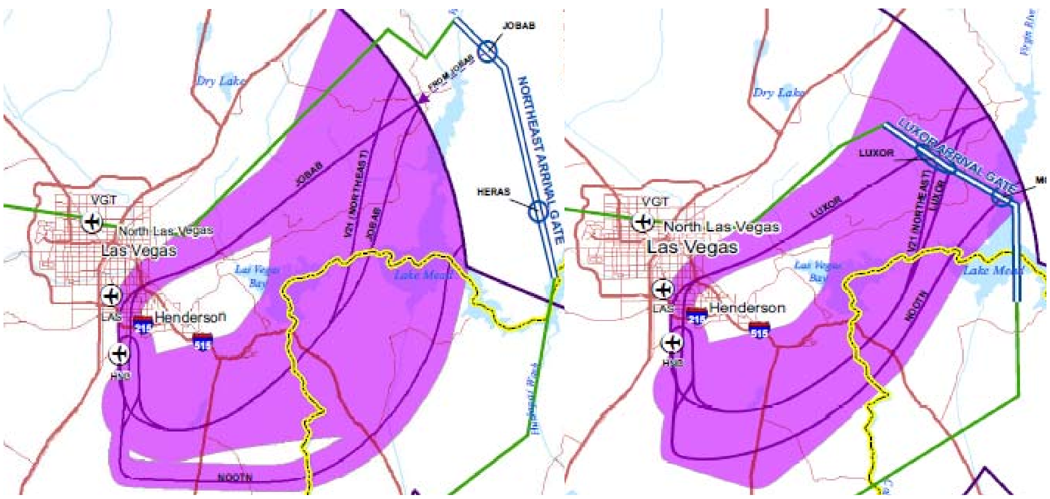


Figure E-30: HND Proposed Action SE Arrivals (L) vs. HND No Action SE Arrivals (R)

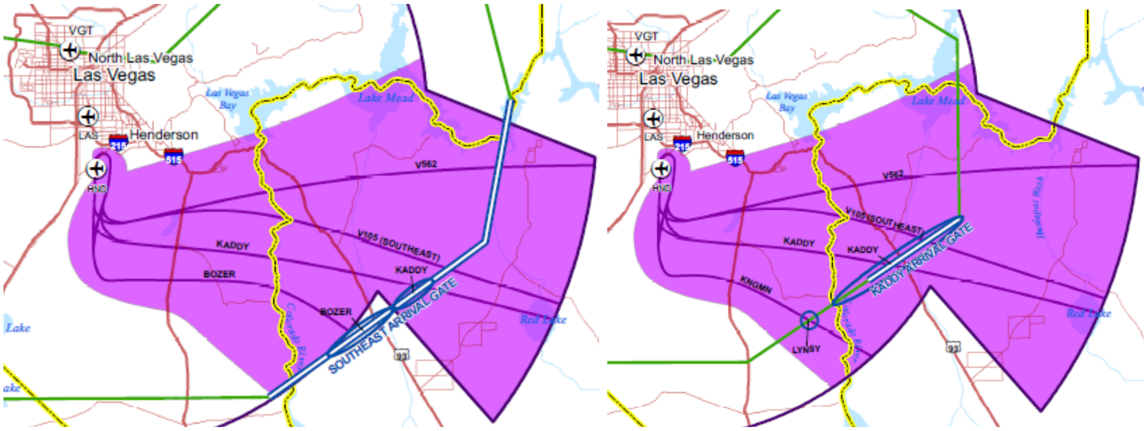


Figure E-31: HND Proposed Action SW Arrivals (L) vs. HND No Action SW Arrivals (R)

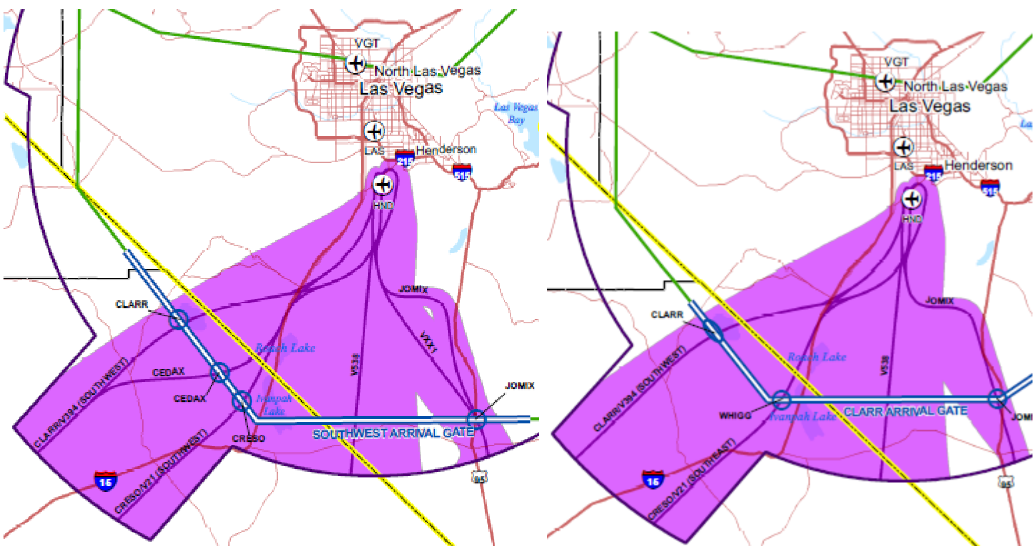
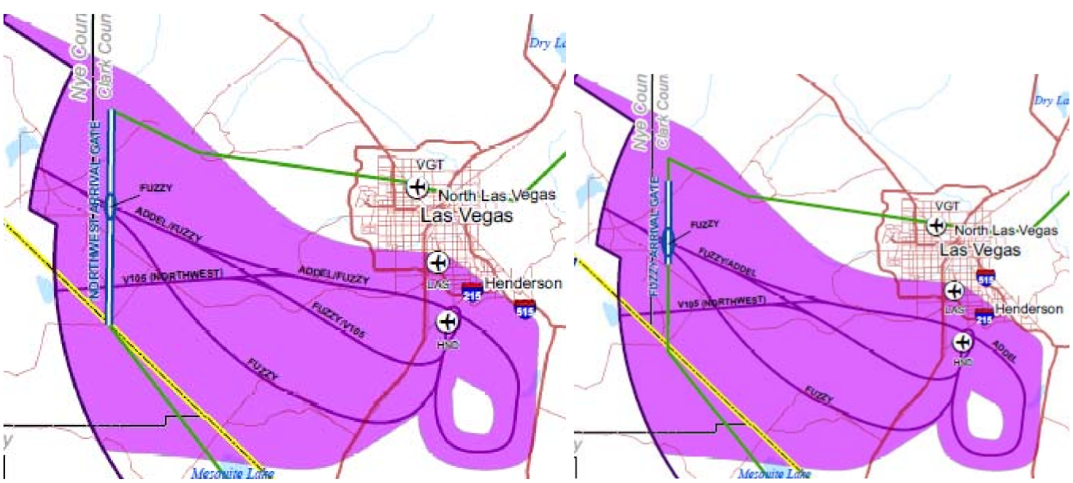
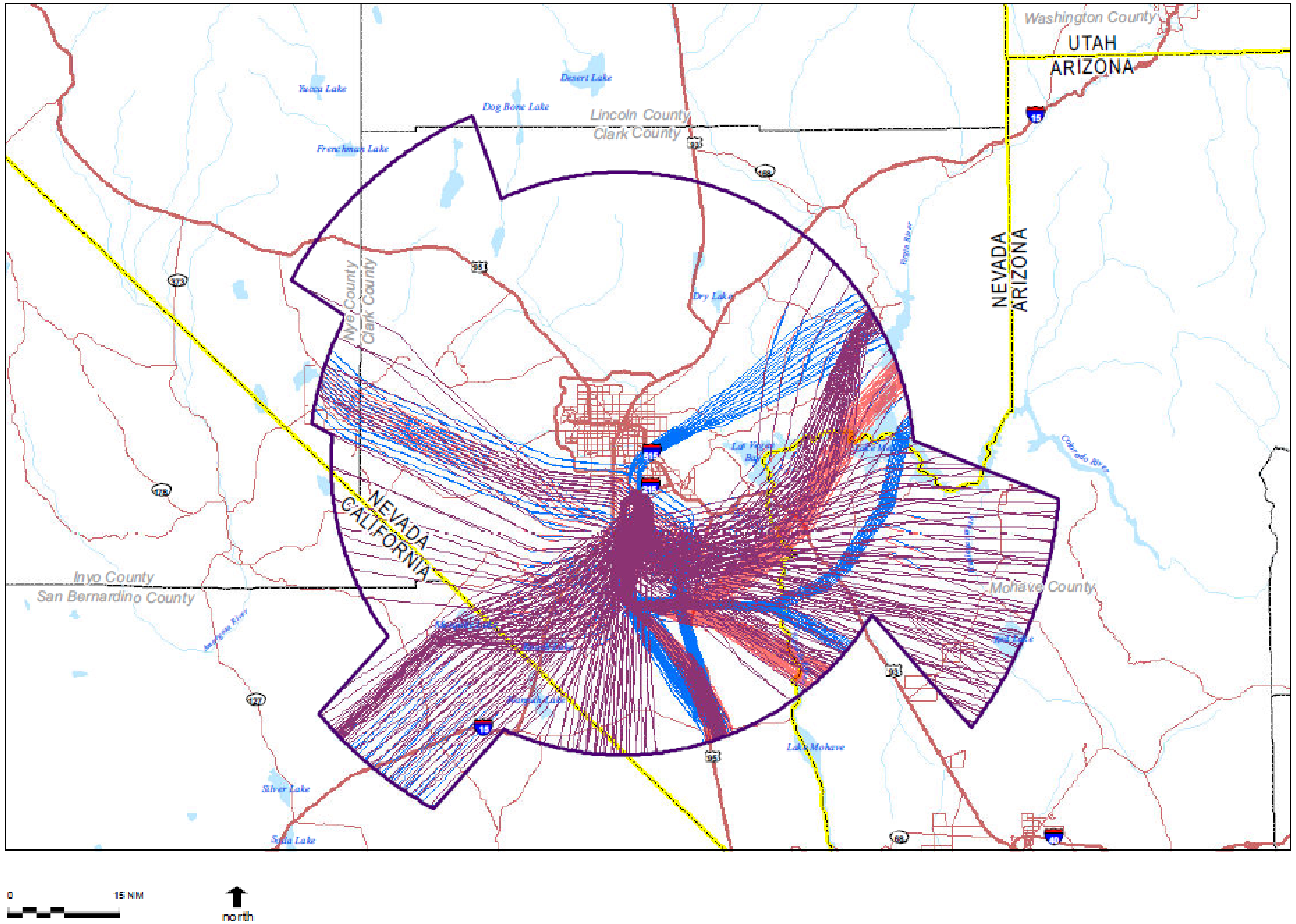


Figure E-32: HND Proposed Action NW Arrivals (L) vs. HND No Action NW Arrivals (R)





LEGEND

- EA Airports
- State Boundaries
- County Boundaries
- Highways
- Major Roads
- Rivers
- Water Bodies
- Generalized Study Area Boundary
- No Action Tracks
- Proposed Action Tracks

Tracks common between Proposed and No Action Routing (i.e., overlap) depicted in **Purple**

Notes:
EA - Environmental Assessment
LAS - McCarran International Airport
VGT - North Las Vegas Airport
HND - Henderson Executive Airport

Projection: State Plane, Nevada East Zone

LAS AIRSPACE OPTIMIZATION EA
Figure E-33: HND No Action/HND Proposed Action NIRS Tracks - HND Arrivals

HND – Departures

The major routing flow differentials for HND departures between the Proposed Action (**L**eft) and No Action (**R**ight) are compared in **Figure E-34** through **E-37** depicting major routing flows from Chapter III, Alternatives (No Action departures corridors are depicted in Section 3.4.1 and Proposed Action departure corridors in Section 3.4.2). The Proposed Action (i.e., Optimization) changes constitute a general trend away from radar vector operational ATC procedures for portions of the departure trajectory, towards increased use of area navigation (RNAV) and conventional SIDS for greater use of standardized procedures that increase routing predictability and decrease fuel burn in the aggregate (Reference Chapter V, Environmental Consequences, Sections 5.8 Air Quality and 5.9 Climate). The changes between the Proposed Action and No Action routing for departures from HND are presented in **Figure E-38**. Proposed Action routes are depicted in Blue, and No Action routes are depicted in a transparent Light Red, with the tracks common between Proposed and No Action Routing (i.e., overlap) depicted in Purple.

Figure E-34: HND Proposed Action NE Departures (L) vs. HND No Action NE Departures (R)

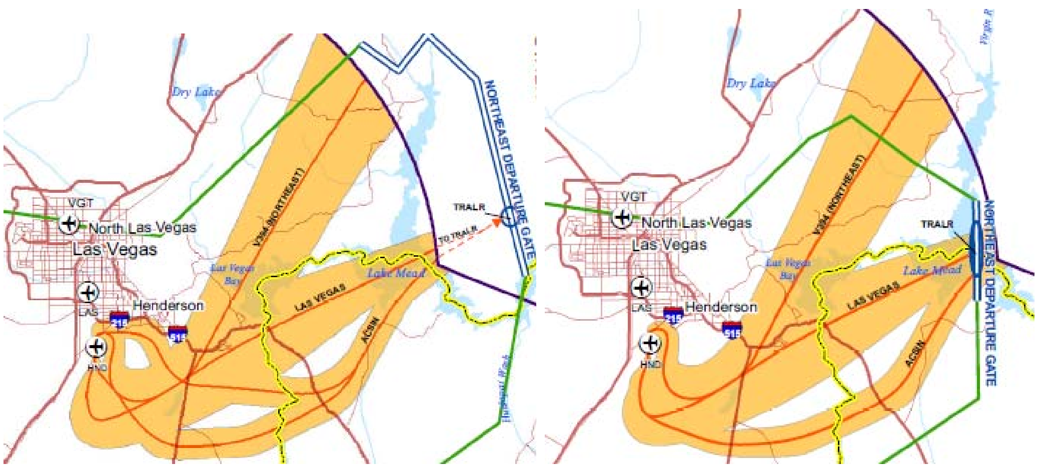


Figure E-35: HND Proposed Action SE Departures (L) vs. HND No Action SE Departures (R)

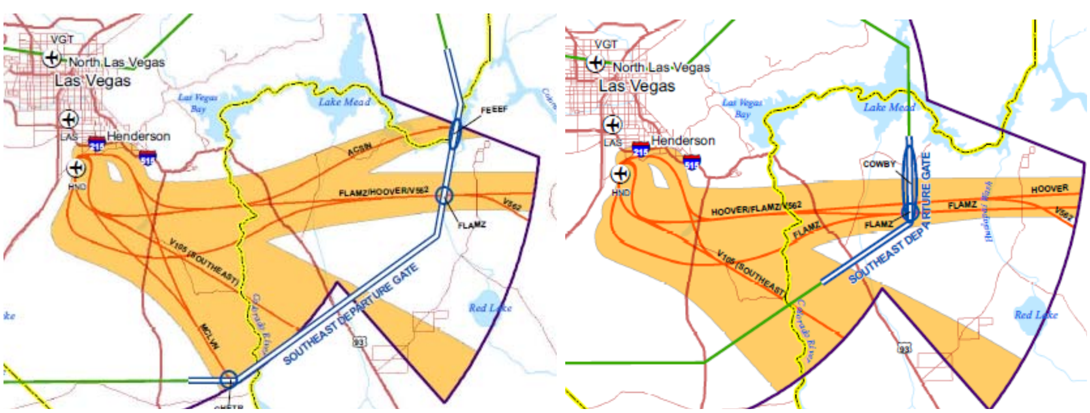


Figure E-36: HND Proposed Action S Departures (L) vs. HND No Action S Departures (R)

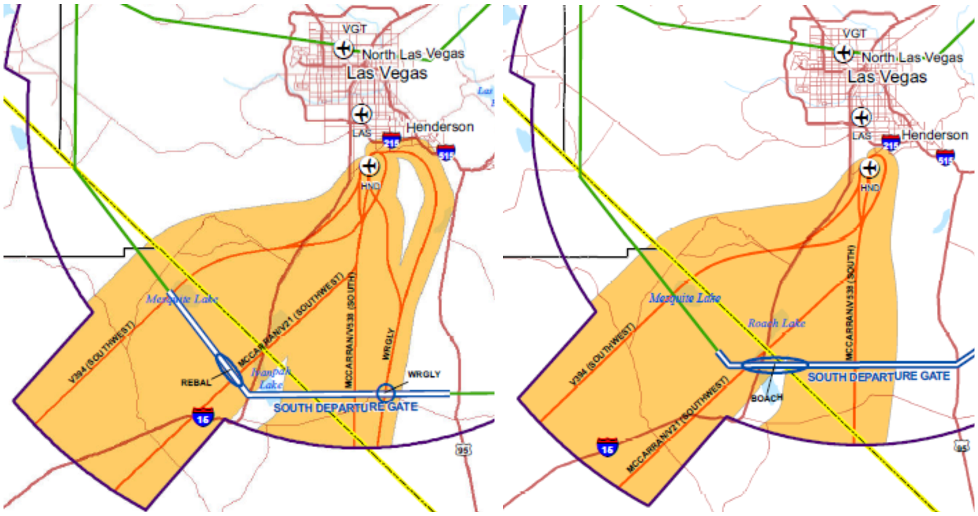
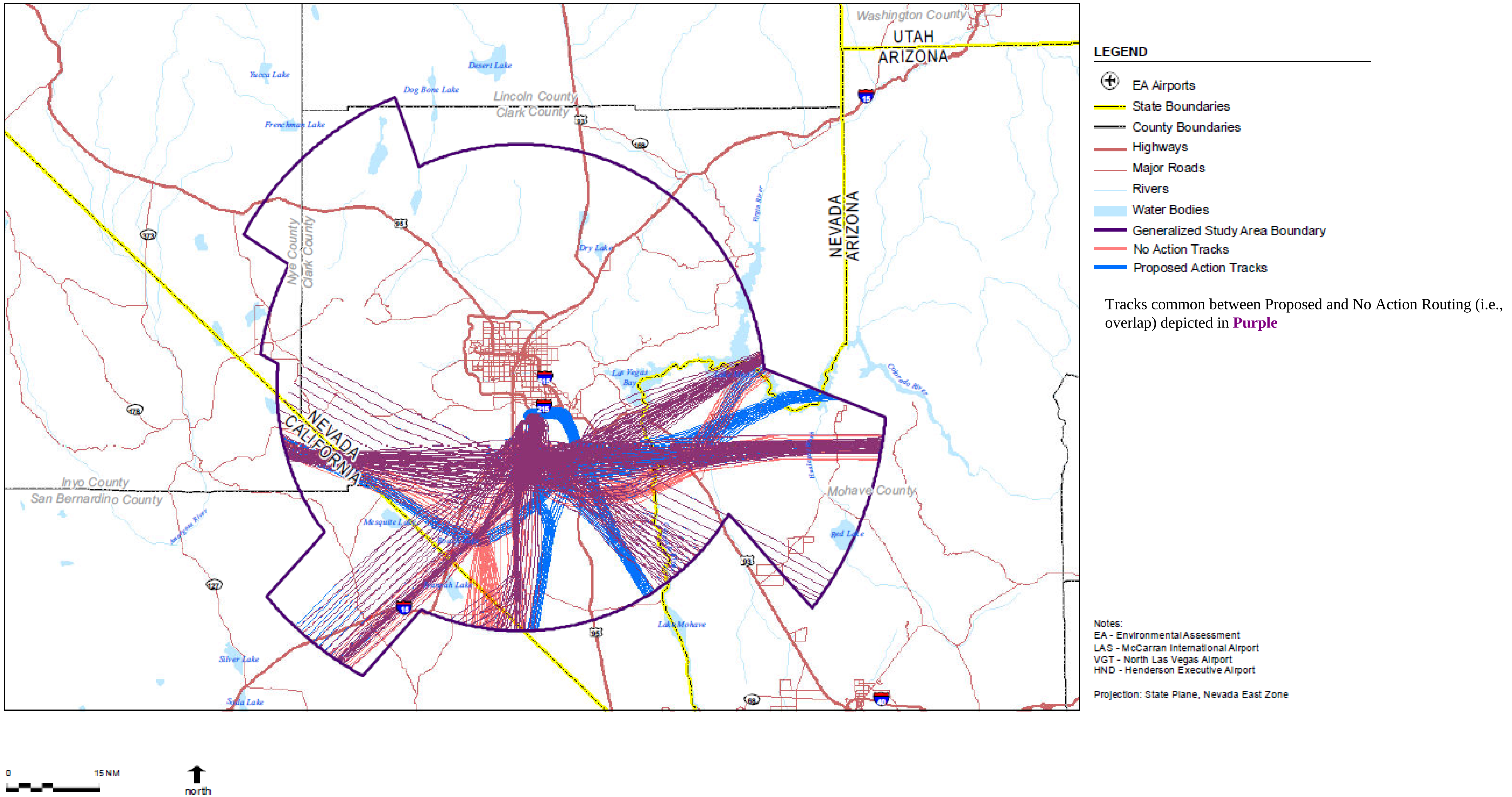


Figure E-37: HND Proposed Action W Departures (L) vs. HND No Action W Departures (R)



LAS AIRSPACE OPTIMIZATION EA
Figure E-38: HND No-Action/HND Proposed Action NIRS Tracks – HND Departures

VGT – Arrivals

The major routing flow differentials for VGT arrivals between the Proposed Action (**L**eft) and No Action (**R**ight) are compared in **Figure E-39** through **E-42** depicting major routing flows from Chapter III, Alternatives (No Action arrival corridors are depicted in Section 3.4.1 and Proposed Action arrival corridors in Section 3.4.2). The Proposed Action (i.e., Optimization) changes constitute a general trend away from radar vector operational ATC procedures for portions of the arrival trajectory, towards increased use of area navigation (RNAV) and conventional STARS for greater use of standardized procedures that increase routing predictability and decrease fuel burn in the aggregate (Reference Chapter V, Environmental Consequences, Sections 5.8 Air Quality and 5.9 Climate). The changes between the Proposed Action and No Action routing for arrivals to VGT is presented in **Figure E-43**. Proposed Action routes are depicted in Blue, while No Action routes are depicted in Purple. Note that there are not any No Action routes common to the Proposed (Optimization) Action Alternative, hence no overlap as in the routing depictions for LAS and HND.

Figure E-39: VGT Proposed Action NE Arrivals (L) vs. VGT No Action NE Arrivals (R)

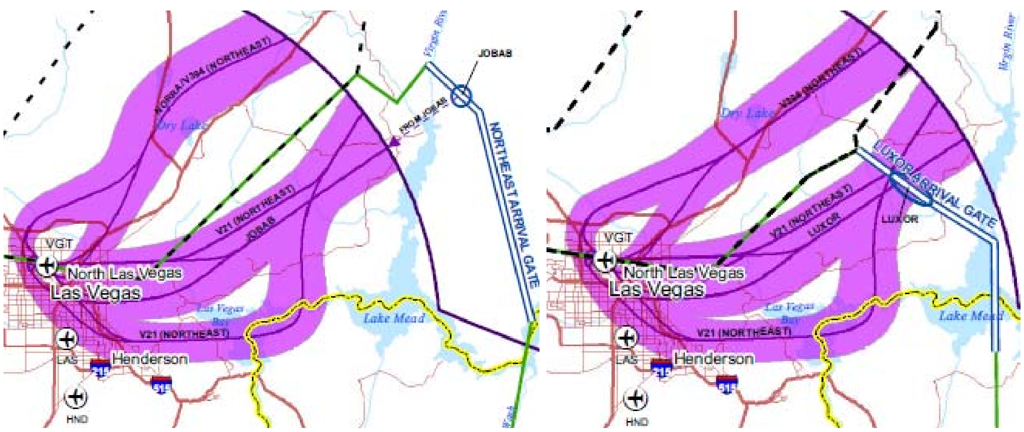


Figure E-40: VGT Proposed Action SE Arrivals (L) vs. VGT No Action SE Arrivals (R)

Figure E-41: VGT Proposed Action SW Arrivals (L) vs. VGT No Action SW Arrivals (R)

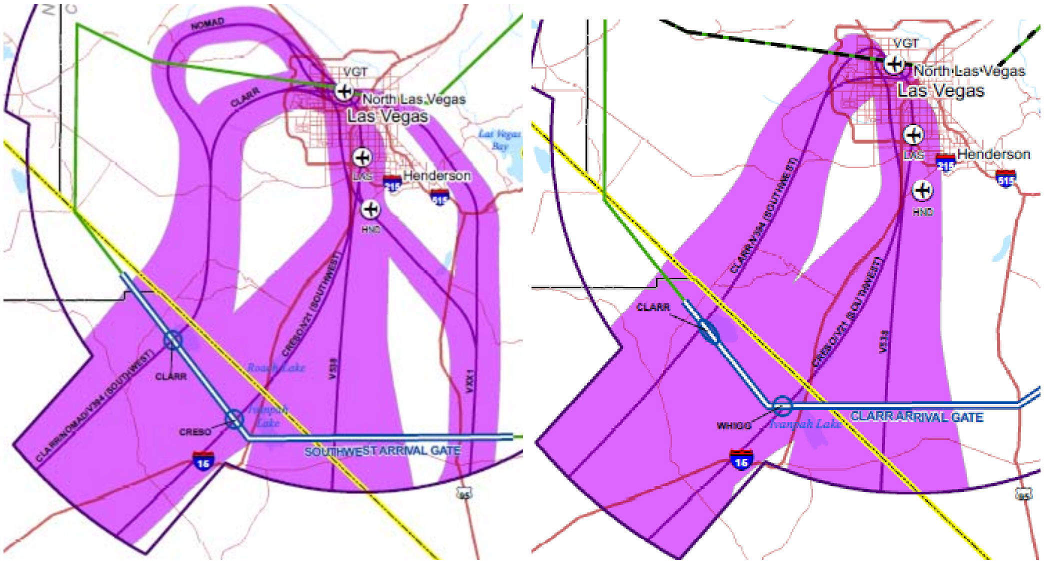
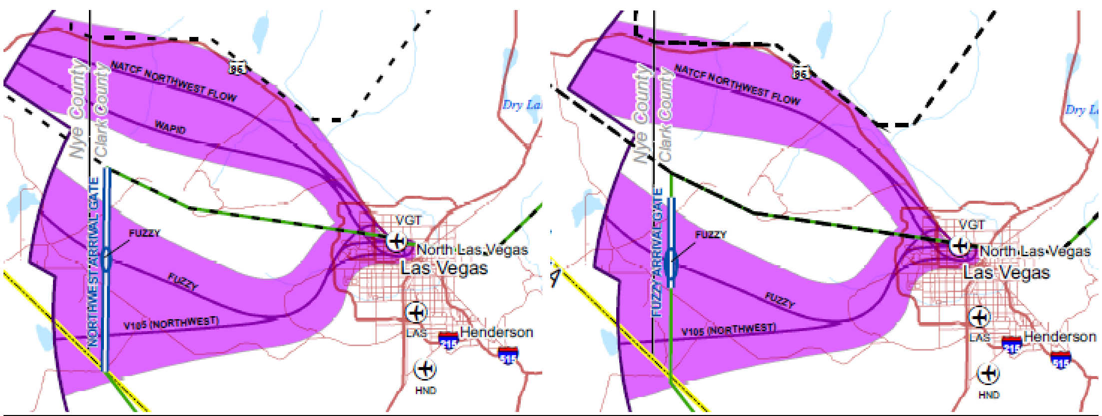
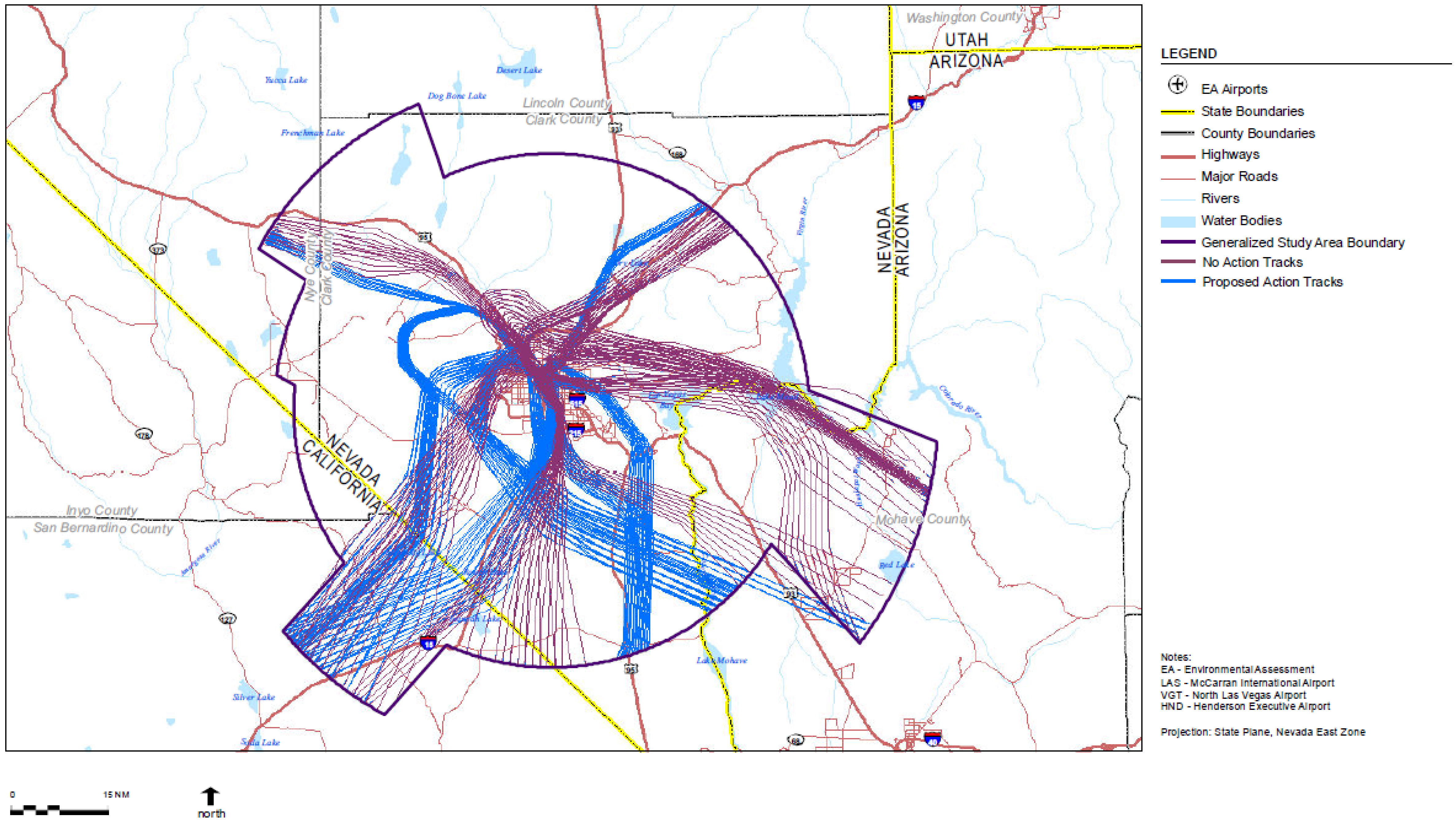


Figure E-42: VGT Proposed Action NW Arrivals (L) vs. VGT No Action NW Arrivals (R)





LAS AIRSPACE OPTIMIZATION EA
Figure E-43: VGT No Action/VGT Proposed Action NIRS Tracks – VGT Arrivals

VGT – Departures

The major routing flow differentials for VGT departures between the Proposed Action (**L**eft) and No Action (**R**ight) are compared in **Figure E-44** through **E- 47** depicting major routing flows from Chapter III, Alternatives (No Action departures corridors are depicted in Section 3.4.1 and Proposed Action departure corridors in Section 3.4.2).. The Proposed Action (i.e., Optimization) changes constitute a general trend away from radar vector operational ATC procedures for portions of the departure trajectory, towards increased use of area navigation (RNAV) and conventional SIDS for greater use of standardized procedures that increase routing predictability and decrease fuel burn in the aggregate (Reference Chapter V, Environmental Consequences, Sections 5.8 Air Quality and 5.9 Climate). The changes between the Proposed Action and No Action routing for departures VGT is presented in **Figure E-48**. Proposed Action routes are depicted in Blue, while No Action routes are depicted in Purple. Note that there are not any No Action routes common to the Proposed (Optimization) Action Alternative, hence no overlap as in the routing depictions for LAS and HND.

Figure E-44: VGT Proposed Action NE Departures (L) vs. VGT No Action NE Departures (R)

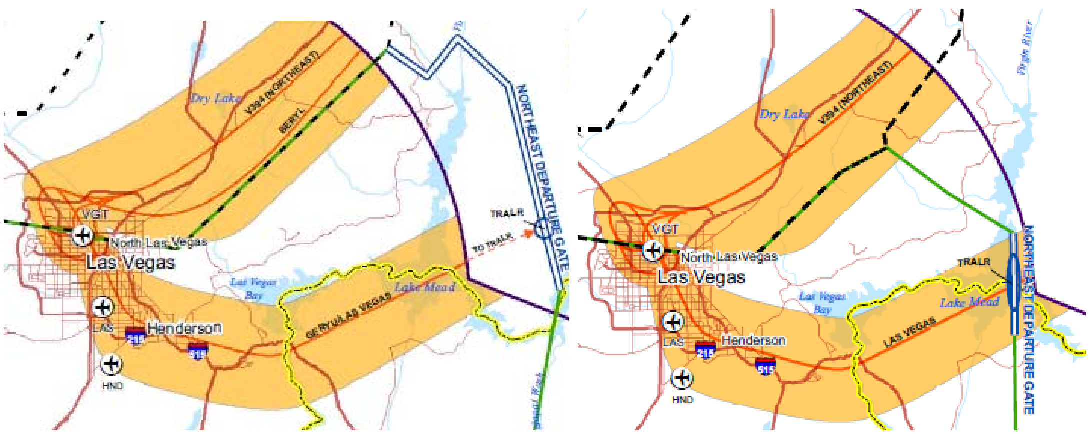


Figure E-45: VGT Proposed Action SE Departures (L) vs. VGT No Action SE Departures (R)

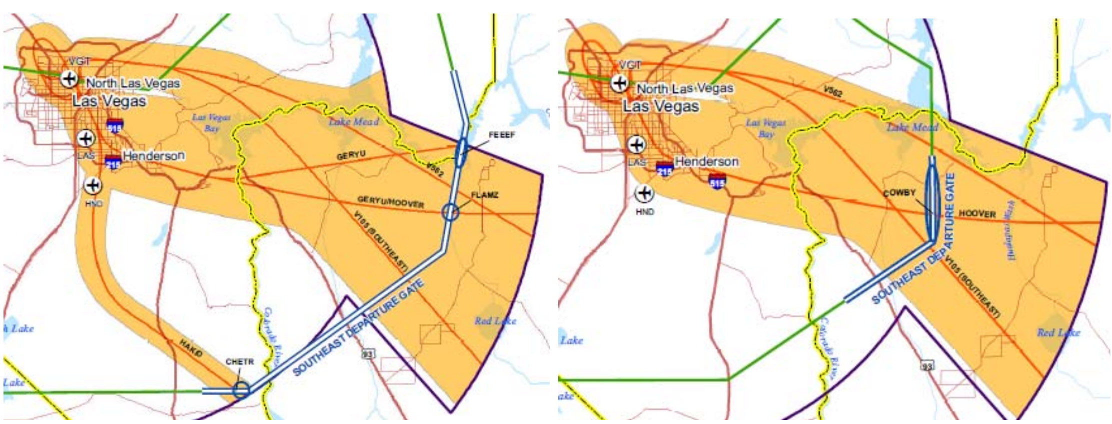


Figure E-46: VGT Proposed Action S Departures (L) vs. VGT No Action S Departures (R)

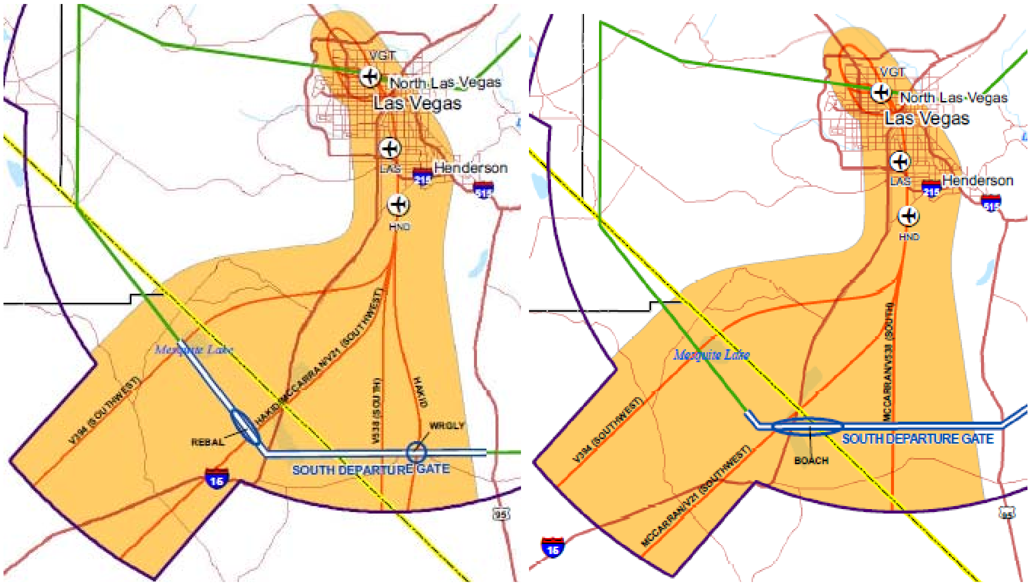
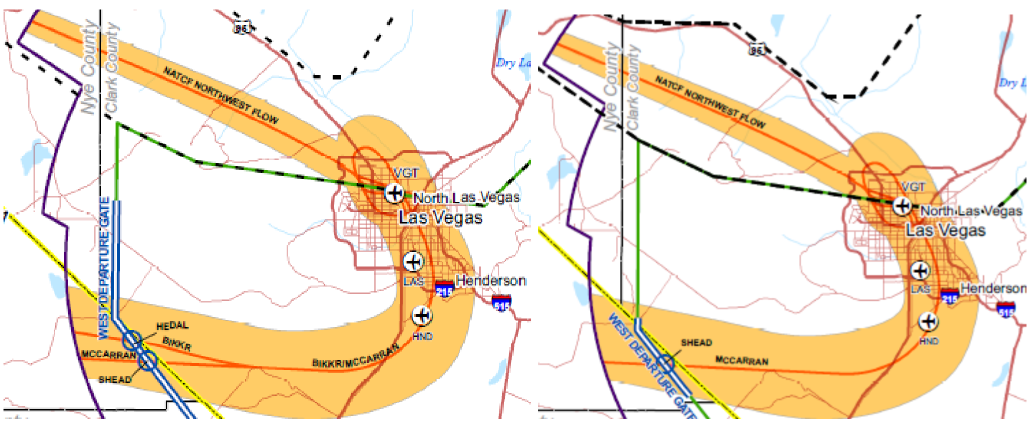


Figure E-47: VGT Proposed Action W Departures (L) vs. VGT No Action W Departures (R)



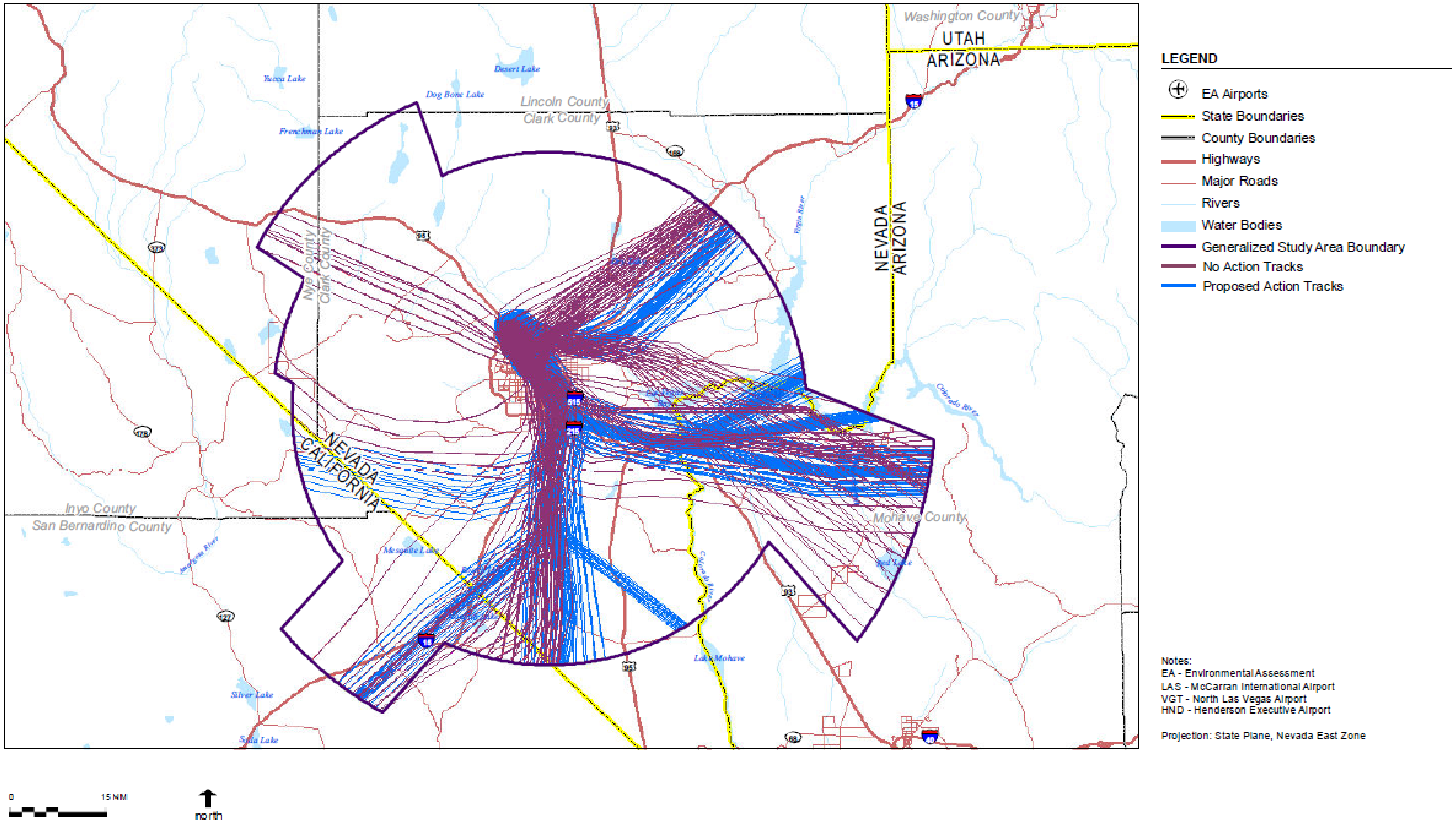


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Figure E-48: VGT No Action/VGT Proposed Action NIRS Tracks – VGT Departures

E.9.2.1 Proposed Action Noise Results

Table E-13 and **Table E-14** present a summary of the population exposed to noise levels for the Proposed Action as compared to the No Action scenario for 2012 and 2017, respectively. The route and procedural changes for the Proposed Action result in a 12.8 percent decrease in the number of people expected to be exposed to noise levels of DNL 45 dB or greater in 2012 versus the No Action Alternative. By 2017 the Proposed Action is expected to decrease the estimated people exposed to aircraft noise above DNL 45 dB by 10.1 percent below that of the No Action condition. Within DNL 65 dB and greater, a population impact decrease of 3.4 percent is expected in 2012 whereas in 2017 the Proposed Action would result in a decrease of approximately 3.3 percent of people in the DNL 65 dB and greater zones.

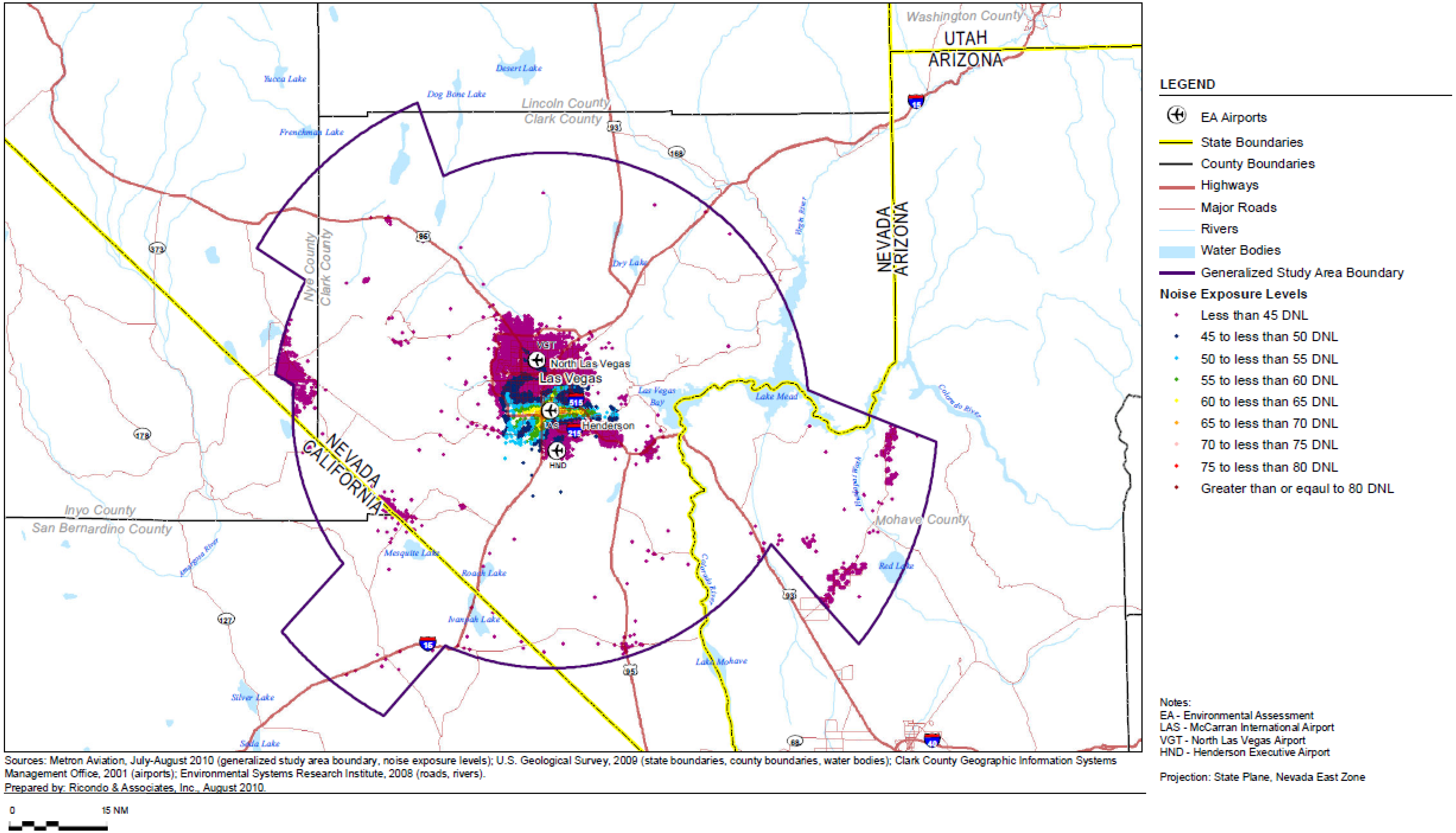
Table E-12: COMPARISON OF POTENTIAL POPULATION EXPOSED TO AIRCRAFT NOISE 2012

DNL Noise Exposure Level	2012 No-Action Alternative	2012 Proposed Action Alternative	Change
45 to 60 dB	756157	657471	-13.1%
60 to 65 dB	19905	18857	-5.3%
65 dB or higher	3124	3018	-3.4%
Total above 45 dB	779186	679346	-12.8%

Table E-13: COMPARISON OF POTENTIAL POPULATION EXPOSED TO AIRCRAFT NOISE 2017

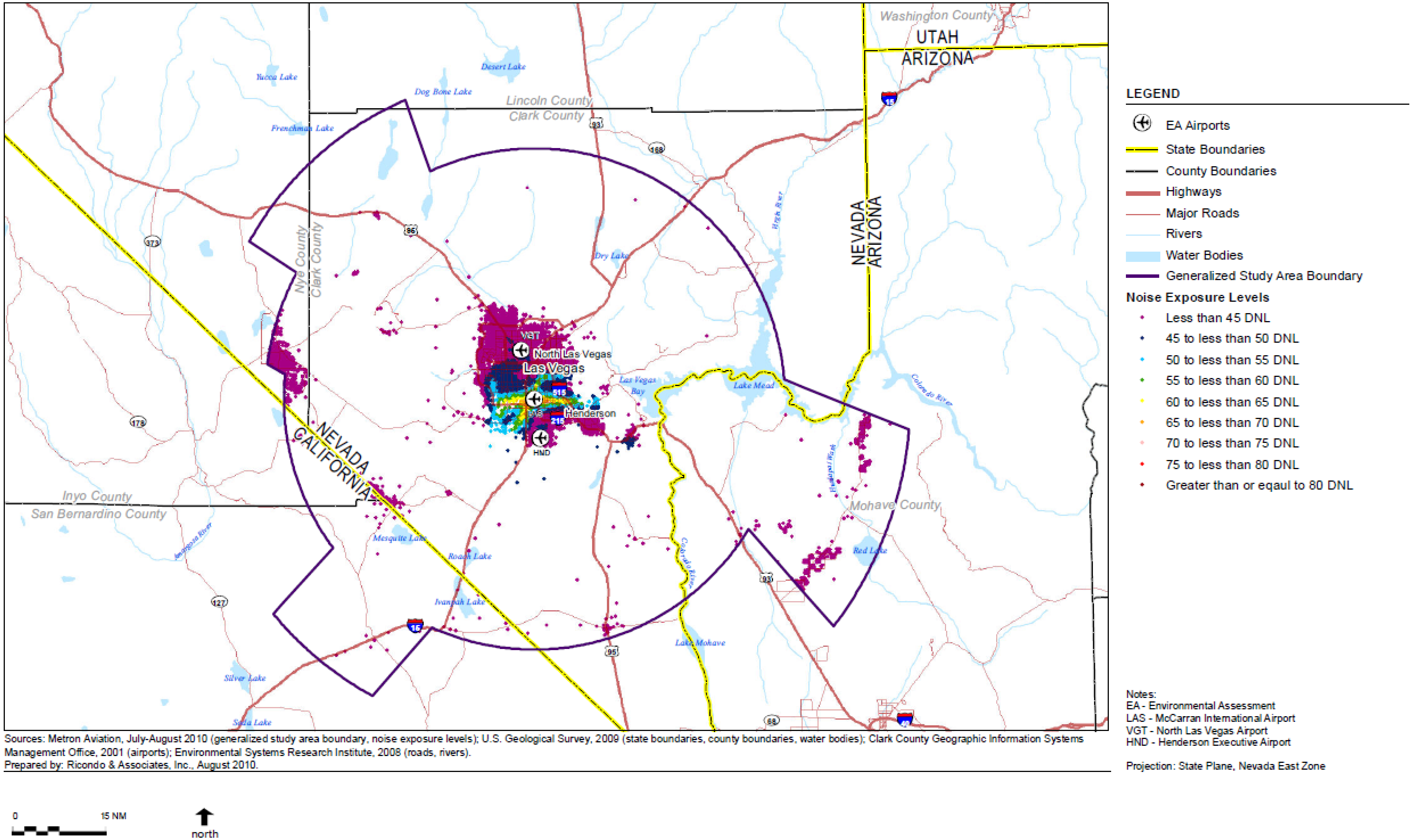
DNL Noise Exposure Level	2017 No-Action Alternative	2017 Proposed Action Alternative	Change
45 to 60 dB	840133	758379	-9.7%
60 to 65 dB	27667	21649	-21.8%
65 dB or higher	3313	3205	-3.3%
Total above 45 dB	871113	783233	-10.1%

The Proposed Action noise levels were also computed for noise sensitive and 4(f) locations represented by 2807 grid points the GSA and 337 grid points in the SSA. In the GSA, the total number of 4(f) grid points above DNL 45 dB was 183 under the Proposed Action in 2012 and 232 for the Proposed Action in 2017. These represent a decrease in the number of 4(f) grid points exposed to DNL 45 dB or greater when comparing the Proposed Action with the No Action (decrease of 29 points in 2012 and a decrease of 40 points in 2017) with the Proposed Action having fewer impact points. **Figures E-49** and **E-50** present maps of the Proposed Action noise exposure at the population centroids within the GSA for 2012 and 2017, respectively. The maps are color coded based on the DNL range that each centroid falls within. Areas that are exposed to noise below the FAA scoring criteria (less than DNL 45 dB) are indicated by the light purple coloring on the centroids. As the Figures indicate, the noise levels due to air traffic throughout the study period are below DNL 45 dB. The higher noise levels indicated by the blue through red colors are concentrated in areas relatively close to each of the study airports. The exposure levels shown in the maps are very similar to the noise exposure shown for the No Action scenarios in **Section E.4.1.2**.



Sources: Metron Aviation, July-August 2010 (generalized study area boundary, noise exposure levels); U.S. Geological Survey, 2009 (state boundaries, county boundaries, water bodies); Clark County Geographic Information Systems Management Office, 2001 (airports); Environmental Systems Research Institute, 2008 (roads, rivers).
Prepared by: Ricondo & Associates, Inc., August 2010.

LAS AIRSPACE OPTIMIZATION EA
Figure E-49: Noise Exposure at Populations Centroids 2012 - Proposed Action



Sources: Metron Aviation, July-August 2010 (generalized study area boundary, noise exposure levels); U.S. Geological Survey, 2009 (state boundaries, county boundaries, water bodies); Clark County Geographic Information Systems Management Office, 2001 (airports); Environmental Systems Research Institute, 2008 (roads, rivers).
Prepared by: Ricondo & Associates, Inc., August 2010.

LAS AIRSPACE OPTIMIZATION EA
Figure E-50: Noise Exposure at Populations Centroids 2017 - Proposed Action

The analysis of the changes relative to FAA's noise impact criteria found that there were no changes resulting in significant impacts from the Proposed Action in 2012 and only minor changes in the 60 to 65 dB range for 2017 that affect approximately 7 people in the study area. **Figure E-51** presents the NIRS impact graph for the population based on the FAA scoring criteria for the 2012 condition.

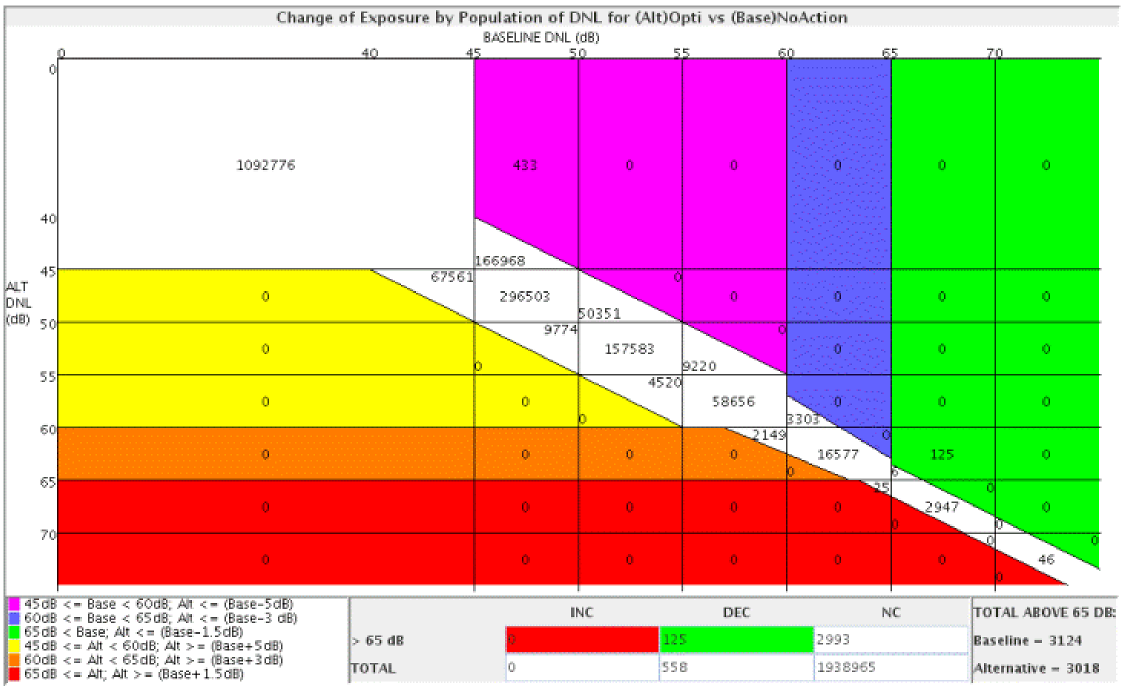


Figure E-51: NIRS Impact Graph - Proposed Action 2012

The values inside the colored zones of the impact graph show the number of people that would experience changes in noise levels meeting the FAA scoring criteria. It can be seen that these numbers are zero in all instances except in the decrease in the 65-70 DNL range of 125 people and a decrease in the 45-50 DNL range of 433 people. The majority of the population falls with the white diagonal strip in the graph indicating that overall changes are minimal and positive, with 99.97123 % of the population experiencing no change and 0.02877 % of the population experiencing a noise decrease. **Table E-15** shows the population exposed to change in 2012 under the Proposed Action, while **Table E-16** is a representation of the values within the NIRS Impact Graph.

Table E-14: NOISE IMPACT CHANGE SUMMARY - 2012 PROPOSED ACTION

DNL Noise Exposure with Proposed Action	Minimum Change in DNL with Proposed Action	Change in Noise Exposure Level	Population Exposed to Change
65 dB or Higher	+1.5 dB	Exceeds Threshold of Significance	0
60 to 65 dB	+3.0 dB	Considered When Evaluating Air Traffic Actions	0
45 to 60 dB	+5.0 dB	Information Disclosed When Evaluating Air Traffic Actions	0

Table E-15: NOISE IMPACT GRAPH SUMMARY - 2012 PROPOSED ACTION

DNL Levels	Noise Increase	Noise Decrease	No Change		
0 - 45 DNL			1,092,776		0
>=45, and <60 DNL		433	166,968		45
			67,561		
			296,503		
			50,351		
			9,774		
			157,583	1,935,972	No Change <=65
			9,220		
			4,520		
			58,656		
>=60, and <65 DNL			3,303		60
			2,149		
			16,577		
>=65 DNL		125	6		65
			25		
			2,947		
			0		
			0	2,993	No Change >65
			46		
100.00000%	0.00000%	0.02877%	99.97123%		
	0	558	1,938,965		
		1,939,523	Total Population in GSA		

A further detailed analysis for 2012 showed that at noise levels of DNL 65 dB and higher, the changes resulting from the Proposed Action Alternative are 0.6 dB or less at all points with an average change of 0.1 dB. At noise levels from DNL 60 to 65 dB, the Proposed Action Alternative changes range from a maximum of 2.9 dB to a minimum of -3.4 dB with an average change of 0.1 dB for population points in this range. At the lower noise levels of DNL 45 to 60 dB the Proposed Action Alternative changes range from a maximum of -4.9 dB to a minimum of 4.7 dB with an average change of -0.4 dB. Overall, these numbers further confirm that the Proposed Action Optimization Alternative design creates only little or no change in noise within the GSA.

Figure E-52 presents the NIRS impact graph based on the FAA scoring criteria for the 2017 condition**.**

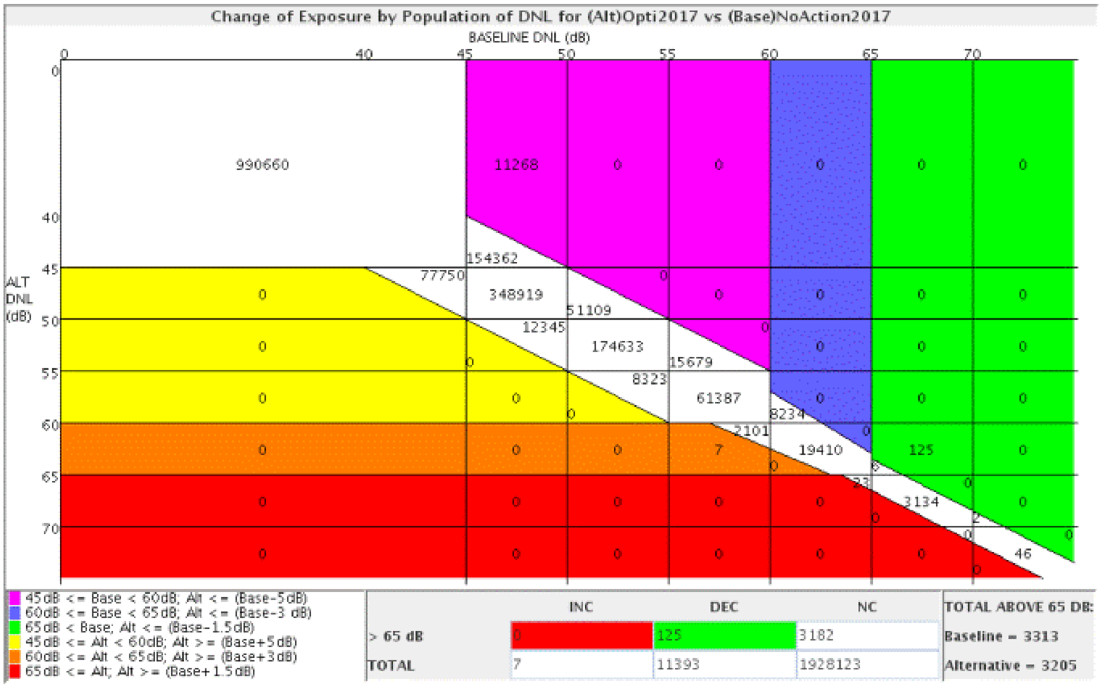


Figure E-52: NIRS Impact Graph - Proposed Action 2017

The majority of people inside the colored zones on the 2017 impact graph for the Proposed Action are zero, with the exception of the increase in the >= 60, but <65dB range where there is a +3dB change accounting for 7 additional people. In the areas of decrease, there are 11,268 people who would experience a reduction of noise in the <= -5dB change in the >= 45dB, but <60dB range, and 125 people who would experience a <= -1.5dB change in the >65db range. A majority of the population falls with the white diagonal strip in the graph indicating that overall changes are minimal, with 99.41223 % of the population experiencing no change and 0.58742 % experiencing a noise decrease, while a very small 0.00036% would experience an increase at a level at which the FAA considers in the evaluation of project effects. **Table E-17** shows the population exposed to change in 2017 under the Proposed Action while **Table E-18** is a representation of the values within the NIRS Impact Graph.

Table E-16: NOISE IMPACT CHANGE SUMMARY - 2017 PROPOSED ACTION

DNL Noise Exposure with Proposed Action	Minimum Change in DNL with Proposed Action	Change in Noise Exposure Level	Population Exposed to Change
65 dB or Higher	+1.5 dB	Exceeds Threshold of Significance	0
60 to 65 dB	+3.0 dB	Considered When Evaluating Air Traffic Actions	7
45 to 60 dB	+5.0 dB	Information Disclosed When Evaluating Air Traffic Actions	0

Table E-17: NOISE IMPACT GRAPH SUMMARY - 2017 PROPOSED ACTION

DNL Levels	Noise Increase	Noise Decrease	No Change		
0 - 45 DNL			990,660		0
>=45, and <60			154,362		45
			77,750		
		11,268	348,919		
			51,109		
			12,345		
			174,633	1,924,941	
			15,679		
			8,323		
			61,387		
>=60, and <65	7		8,234		60
			2,101		
			19,410		
>=65		125	6		65
			23		
			3,134		
			2		
			0	3,182	No Change >65
			46		
100.00000%	0.00036%	0.58741%	99.41223%		
	7	11,393	1,928,123		
		1,939,523	Total Population in GSA		

A further detailed analysis for 2017 showed that at noise levels of 65 DNL and higher, the changes resulting from the Proposed Action Alternative are 0.8 dB or less at all points with a minimum change of -1.1 dB. At noise levels from 60 to 65 DNL, the Proposed Action Alternative changes range from a maximum of 3.5 dB to a minimum of -3.2 dB with an average change of 0.2 dB for population points in this range. At the lower noise levels of DNL 45 to 60 dB the Proposed Action Alternative changes range from a maximum of 4.9 dB to a minimum of -4.6 dB with an average change of -0.4 dB. Overall, these numbers further confirm that the Proposed Action Alternative design creates only little or no change in noise within the GSA.

Appendix F

Supporting Data

Appendix F.1

Definition of Generalized Study Area

Working Document

Las Vegas Airspace Optimization Environmental Assessment

Study Area Definition

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7/2/10	5.0	Revisions	T. Lewis, C. Murphy, T. White	

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List of Acronyms

AGL ....Above Ground Level
ASPM...................Aviation System Performance Metrics
CEQ......................Council on Environmental Quality
EA ....Environmental Assessment
EIS........................Environmental Impact Statement
ETMS ....Enhanced Traffic Management System
FAA......................Federal Aviation Administration
FONSI ....Finding of No Significant Impact
FSA ....Flight Schedule Analyzer
GDP......................Ground Delay Program
GSA......................General Study Area
HND.....................Las Vegas Henderson Executive Airport
IVP ....Ivanpah Valley Airport
L30 ....Las Vegas TRACON
LAS ....Las Vegas – McCarran International Airport
MSL ....Mean Sea Level
NEPA ....National Environmental Policy Act
NIRS ....Noise Integrated Routing System
NM ....Nautical Miles
NSIF.....................NIRS Standard Input Format
TARGETS............Terminal Area Route Generation, Evaluation, and Traffic Simulation
TMI ....Traffic Management Initiative
TRACON ....Terminal Radar Control
SNSA ....Southern Nevada Supplemental Airport
ROD ....Record of Decision
USGS ....United States Geological Survey
VGT ....North Las Vegas Airport

1 Generalized Study Area

A Generalized Study Area (GSA) is developed to define the area that may be affected by implementation of the Proposed Action. Specifically, the GSA should capture areas where potentially significant changes in aircraft noise between the existing conditions and Proposed Action may occur.

For the Las Vegas – McCarran International Airport (LAS) Optimization Environmental Assessment (EA), the following objectives were identified to guide the geographic definition of the GSA:

- Ninety-five percent of the aircraft serving LAS in both the existing conditions and the Proposed Action should enter/exit the GSA at least 10,000 feet Above Ground Level (AGL), considering local terrain, which is varied in the Las Vegas Area. Federal Aviation Administration (FAA) Order 1050.1E requires that the upper bounds of the GSA be at least 10,000 feet AGL for airspace actions that extend beyond the immediate vicinity of the airport or serve more than one airport.

- While meeting the first objective, the lateral extent of the GSA should be concisely defined to minimize the extent of analysis required for the EA; therefore, the GSA definition should focus on areas of existing traffic patterns and should account for changes prescribed in the Proposed Action, while capturing at least 95% of the aircraft serving LAS and operating below 10,000 feet AGL.

Aircraft operating at the satellite airports, Las Vegas Henderson Executive Airport (HND) and North Las Vegas Airport (VGT), were not included in the GSA development analysis because they share the same arrival and departure fixes with LAS. Therefore, since all airspace changes must meet the same criteria, there is only a need to evaluate tracks to and from LAS.

Two methodologies were employed to define a GSA that achieves the objectives for this project. These methodologies, discussed in Sections 1.1 and 1.2 of this report, are:

1. Range-Altitude Methodology: The GSA is a three-dimensional space designed to capture most aircraft operations to and from the EA airports below 10,000 feet AGL. The top elevation of the GSA is defined by an altitude (10,000 feet) above ground level and the lateral dimension defined by the point at which most aircraft (i.e., 95 percent as defined in the objectives) penetrate the 10,000-foot AGL altitude based on analysis of historical radar data and proposed arrival and departure routes for the Proposed Action. Initially, the highest point in the Las Vegas area was identified and used to define the preliminary top elevation of the study area; however, given the varied terrain in the vicinity of the EA airports, this range-altitude methodology was applied on a quadrant level to more closely reflect terrain conditions in the areas of the four primary aircraft flow patterns to and from the EA airports (i.e., to/from the northeast, southeast, southwest, and northwest). Applying this methodology by quadrant defined the lateral extents of the GSA within each quadrant to capture the terrain and flight characteristics of each quadrant.

2. Aircraft Flow Methodology: To evaluate the ability to minimize the lateral extents of the GSA while still capturing 95 percent of aircraft operating below 10,000 feet AGL, areas of primary arrival and departure flows were identified. The lateral extents of the GSA were then defined to capture areas of dense aircraft flow, while minimizing the extent of the GSA in areas of no to low aircraft flows.

3. Once the preliminary dimensions of the GSA were determined based on existing radar data, Metron Aviation evaluated the routes associated with the Proposed Action to confirm that the GSA boundaries capture areas that may be affected by the Proposed Action.

1.1 Range-Altitude Methodology

Historical radar data covering September 27, 2009 through October 15, 2009 and within a 100 nm box of LAS were selected because they were the most recent dates available at the time of the data request and because they represent typical operations. Date selection is driven by choosing dates that would represent operations at LAS throughout the year. The key variables in this selection process are runway configuration and traffic volume.

Runway configuration is a key variable because the choice of runways determines the final approach and initial departure phases for all flights. These phases of flight occur at low altitudes and are responsible for much of the ground noise exposure that may occur. Furthermore, the runway configuration variable also captures variances in weather conditions as weather factors are the primary driver behind runway selection. In the case of LAS, four runway configurations (commonly known as configurations 1, 2, 3 and 6) account for nearly 98% of all flight operations. These configurations occur in a ratio of approximately 75% / 5% / 14% / 4% (1/2/3/6) throughout the year (based on FAA ATADS data, Runway Configuration Usage, 2007 through 2009, uploaded September 8, 2009). This split is based on 35 days of data, however, radar data was only available for the 19 days mentioned above. The split for the 19-day period was approximately 74% / 0% /21% / 5%. Therefore, the sample data approximated the annual runway configuration split.

The second variable is traffic volume which is critical to capture since the volume of flights is a significant driver behind noise exposure. Since traffic volume can vary both by the day of the week and season, our date samples were selected to represent all seven days of the week's operations, plus take into account any seasonal variations in volume. This process ensures that the sample represents typical annual operations at LAS without selecting any outliers (e.g. holidays, weather-related closures). Las Vegas does not experience much seasonal variability; therefore, it was not necessary to acquire data for different times of the year.

The data were collected from the FAA Aeronautical Information Management (AIM) Laboratory and Enhanced Traffic Management System (ETMS) archived data. This data were converted to Noise Integrated Routing System (NIRS) Standard Input Format (NSIF) and loaded into the Airspace Design Tool (ADT). ADT is a proprietary tool developed by Metron Aviation that provides 3-D/4-D data integration and visualization, and the ability to graphically modify airspace design components to assess impacts of design modifications. Generally, ADT is used on airspace projects that require airspace redesign and modeling.

Using a feature of ADT, the point at which flight tracks from the historical data set cross specified elevations can be identified. Initially, a single upper bound elevation for the GSA as a whole was identified. The upper bound was subsequently refined by looking at elevations on a finer scale within the GSA. This identification and refinement process and the corresponding definition of the lateral bounds of the GSA are discussed in this section.

To define a single upper bound for the GSA that would capture all arrival and departure operations within 10,000 feet AGL, the highest elevation in the Las Vegas region was identified. The highest point is Mount Charleston (11,800 feet mean sea level [MSL]), which is located 30 nautical miles (nm) northwest of LAS (see **Figure 1**). The 10,000-foot AGL dimension was added to the Mount Charleston peak elevation (and rounded up) to establish a preliminary upper bounds of the GSA at 22,000 feet MSL.

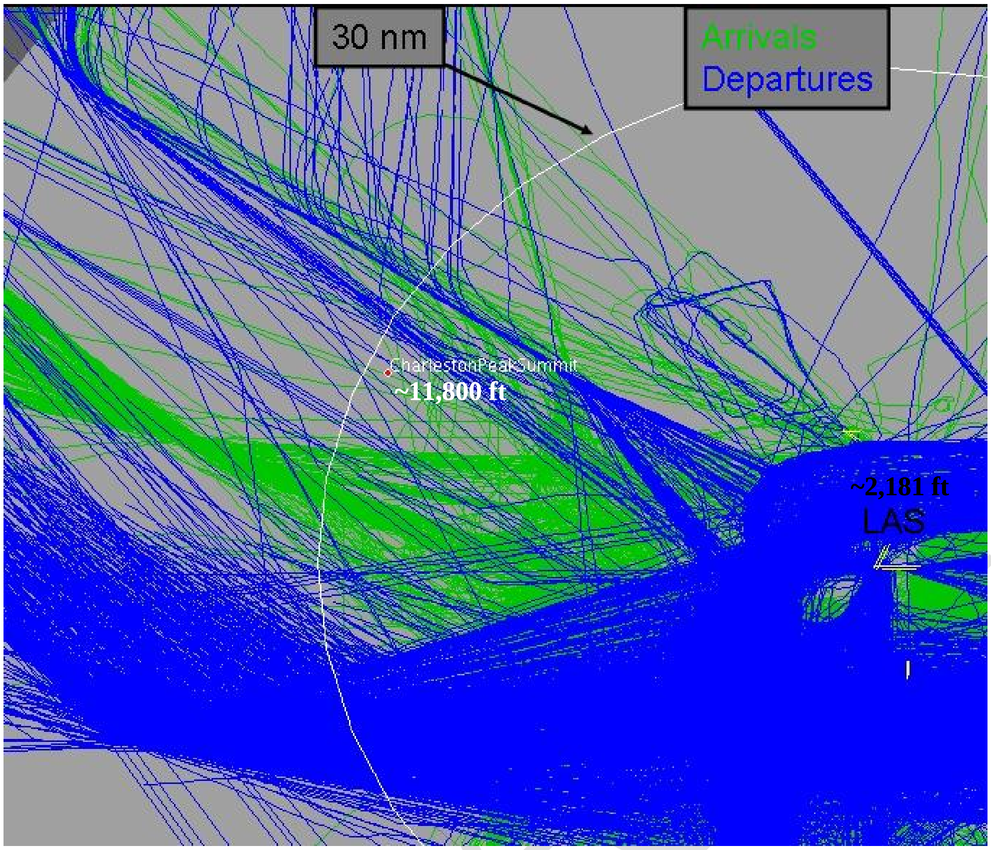

Figure 1 Highest point within 30 nm of LAS (Data source: AIM Lab & ETMS radar data, 9/27 – 10/15/2009)

To identify the lateral extents of a study area for an airspace project, the lateral distance from the study airport at which the majority of aircraft arriving to and departing from are above 10,000 feet AGL is identified. To define the lateral extents of the GSA for the LAS Optimization EA, Metron Aviation started with a cylinder-shaped study area centered on LAS and increased the radius of the cylinder in an attempt to define a lateral dimension that captured 95% of flights entering and exiting the GSA through the top, meaning that 95% of the flights are at 22,000 feet MSL when they cross the lateral boundary of the study area.

Table 1 describes the percentage of arrivals and departures that exceed the 22,000–foot upper bound threshold for five different radii that were tested. These radii ranged from 50 nm to 70 nm, a range considered reasonable based on FAA's experience with airspace actions at other airports. The 50 nm ring was used to start because the percentage of flights above 22,000 ft for departures was within a reasonable starting range of the 95% requirement. However, there were no arrivals meeting the requirement so it did not make sense to go below 50 nm. At 70 nm, 92% of arrivals and 93% of departures were above 22,000 feet MSL, which did not meet the objective that 95% of all traffic enter/exit the GSA at or above 22,000 ft MSL.

Table 1: Percentage of flights above the 22,000-foot MSL altitude threshold (Data source: AIM Lab & ETMS radar data, 9/27 – 10/15/2009)

	Percent of flights above 22,000 feet MSL	
Mile ring	Arrivals	Departures
50 nm	0%	85%
55 nm	7%	92%
60 nm	16%	93%
65 nm	56%	93%
70 nm +	92%	93%

Given the varied terrain in the Las Vegas area, an attempt to define the lateral extent of the GSA needed to capture 95% of flights within the 10,000-foot AGL dimension was explored by establishing the upper bounds of the GSA based on the peak ground elevation within each of the four quadrants surrounding LAS. The four quadrants represent the four primary aircraft flow patterns to and from the LAS airport (to/from the northeast, southeast, southwest, and northwest). Applying the range-altitude methodology by quadrant allows for the upper bound of the GSA to more closely reflect the terrain and flight characteristics within each quadrant.

To evaluate terrain elevation by quadrant, a grid of 0.5 nm squares covering a 200 nm by 200 nm area with LAS at the center was constructed. United States Geological Survey (USGS) data were used to define the elevation at each 0.5 nm grid crossing. The grid area was then split into northeast, southeast, southwest, and northwest quadrants and distance bands were drawn every 20 nm from the airport center. Within each 20 nm band by quadrant, the highest grid point elevation was identified. The purpose of this evaluation was to determine the altitude and distance band for calculating the percentage of flights above 10,000 ft AGL per quadrant.

Metron Aviation examined arrivals and departures in turn to create a study area that considered the unique features of arrival and departure flows within each quadrant. Using discrete range rings between 35 and 70 nm instead of 20-nm ranges as shown above, the AGL value of the arriving and departing flights were analyzed to determine the number of flights in the radar data set with tracks above or below 10,000 feet AGL for each quadrant. The range between 35 nm and 70 nm was selected because few flight tracks were above 10,000 ft AGL at 35 nm or less, and most flights were above 10,000 ft AGL at or beyond 70 nm. The following discusses the analysis of arrival flights first and then departure flights.

The plot in Figure 2 compares the percent of arriving flights above 10,000 feet AGL for each quadrant at one-nautical mile ranges from LAS. The vertical lines mark the point at which 95% of the arrival flights for that particular quadrant are above 10,000 ft AGL. The vertical bars are color-coordinated to match the lines in the graph.

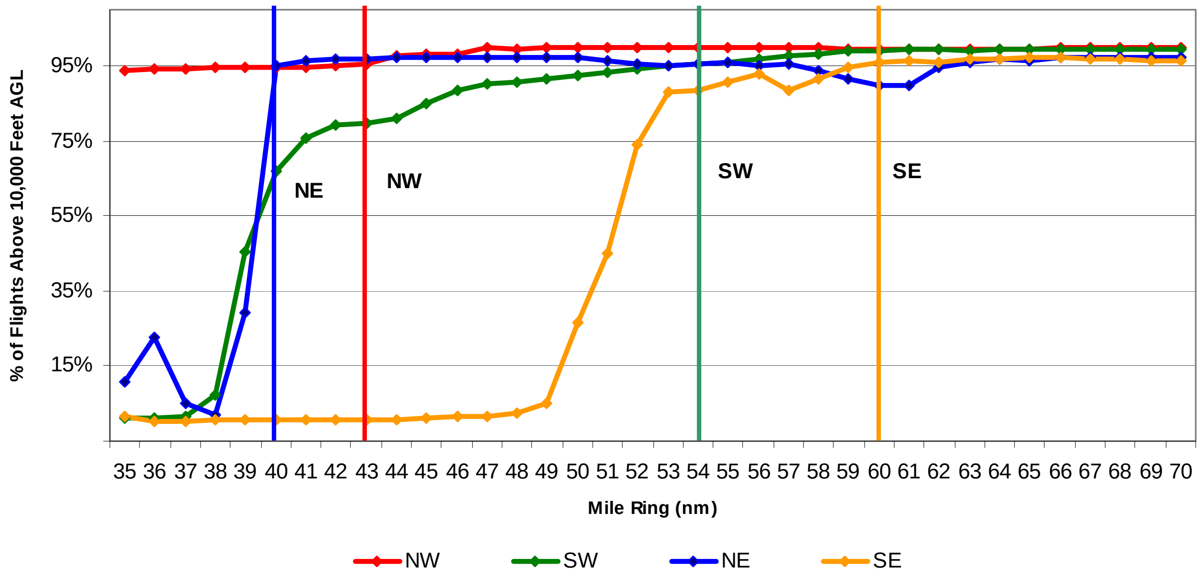

Figure 2 Arrival flights above 10,000 ft AGL per quadrant (Data source: AIM Lab & ETMS radar data, 9/27 – 10/15/2009)

The minimum range that satisfies the objective of capturing at least 95% of the flights entering the study area at 10,000 feet AGL within each quadrant is approximately 60 nautical miles (the point at which all four quadrants meet or exceed the 95% threshold). The distance at which each quadrant achieves the 95% level of flights above 10,000 feet AGL is shown in Table 2.

Table 2 Minimum distance from LAS at which 95% of arrivals enter the study area at 10,000 feet AGL by quadrant (Data source: AIM Lab & ETMS radar data, 9/27 – 10/15/2009)

	Distance from LAS (nm)
NW	43
SW	54
NE	40
SE	60

Figure 3 shows the percent of departing flights above 10,000 feet AGL by quadrant at one-nautical mile ranges. The minimum range required to ensure that at least 95% percent of departing flights are above 10,000 feet AGL in each quadrant is shown in Table 3. Nearly all departing traffic was above 10,000 feet AGL at 35 nautical miles except for the northwest quadrant in which the 95% objective was achieved at 52 nautical miles.

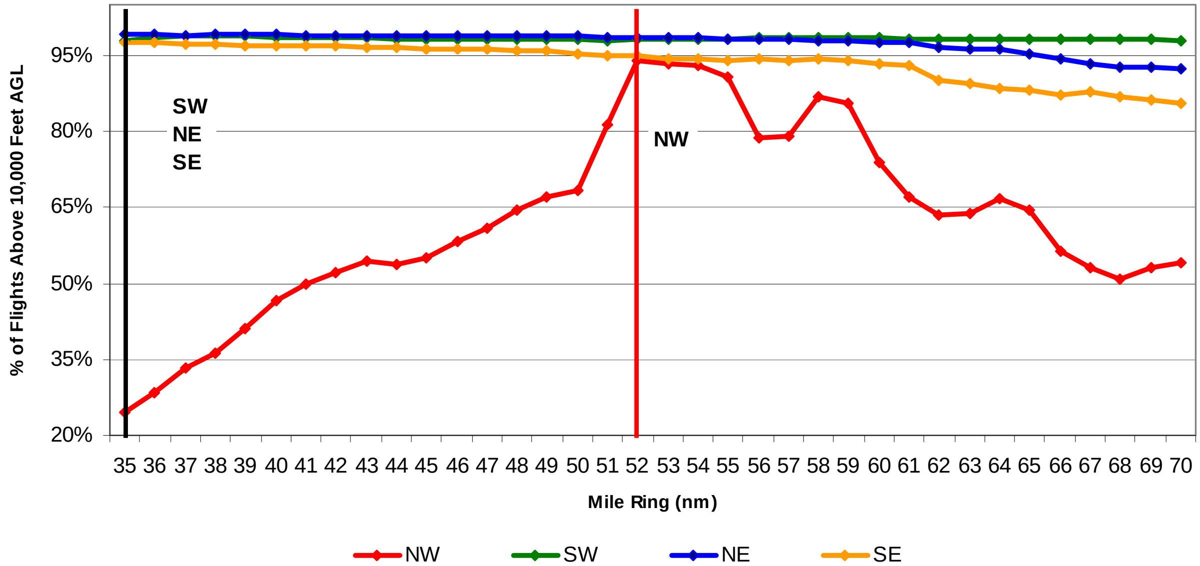

Figure 3 LAS percent departures above 10,000 ft AGL by range and quadrant (Data source: AIM Lab & ETMS radar data, 9/27 – 10/15/2009)

Table 3 Minimum distance from LAS at which 95% of departures enter the study area at 10,000 feet AGL by quadrant (Data source: AIM Lab & ETMS radar data, 9/27 – 10/15/2009)

	Distance from LAS (nm)
NW	52
SW	35
NE	35
SE	35

1.2 Aircraft Flow Methodology

The range-altitude methodology, applied to the four quadrants around LAS, resulted in defined areas that capture 95% of the arrivals and departures operating below 10,000 feet AGL. The resulting lateral extents of the GSA by quadrant were refined by considering areas of dense arrival and departure aircraft flow.

The aircraft flow methodology involved the examination of the unique features, such as flight profiles and trajectories, of each of the arrival and departure flows.

An initial study area extending 40 nm from LAS was established based on the standard radar coverage of Terminal Radar Approach Control (TRACON) radar. TRACON range of control falls within a 30 to 50 mile radius up to 10,000 feet, and includes any aircraft flying over that airspace. LAS facility radar extends to approximately 40 nm so this ensured that we at least covered the terminal area with the GSA.

To cover the area beyond the 40 nm of the terminal area, the distances in Table 2 and Table 3 were used to determine where at least 95% of traffic was above 10,000 feet AGL for each quadrant. If these distances were greater than 40 nm, the study area for that quadrant was extended from 40 nm to the distance indicated. These extended areas were drawn along the areas of densest traffic flows, using the radar track lines pictured in Figure 4 as a guide. These areas were then tested to ensure at least 95% of flights beyond 40 nm and below 10,000 feet AGL were captured in the extended areas per quadrant. Some flows beyond 40 nm were excluded if they were not needed to reach this 95% threshold. The resulting GSA that captures arrival activity is shown in **Figure 4**.

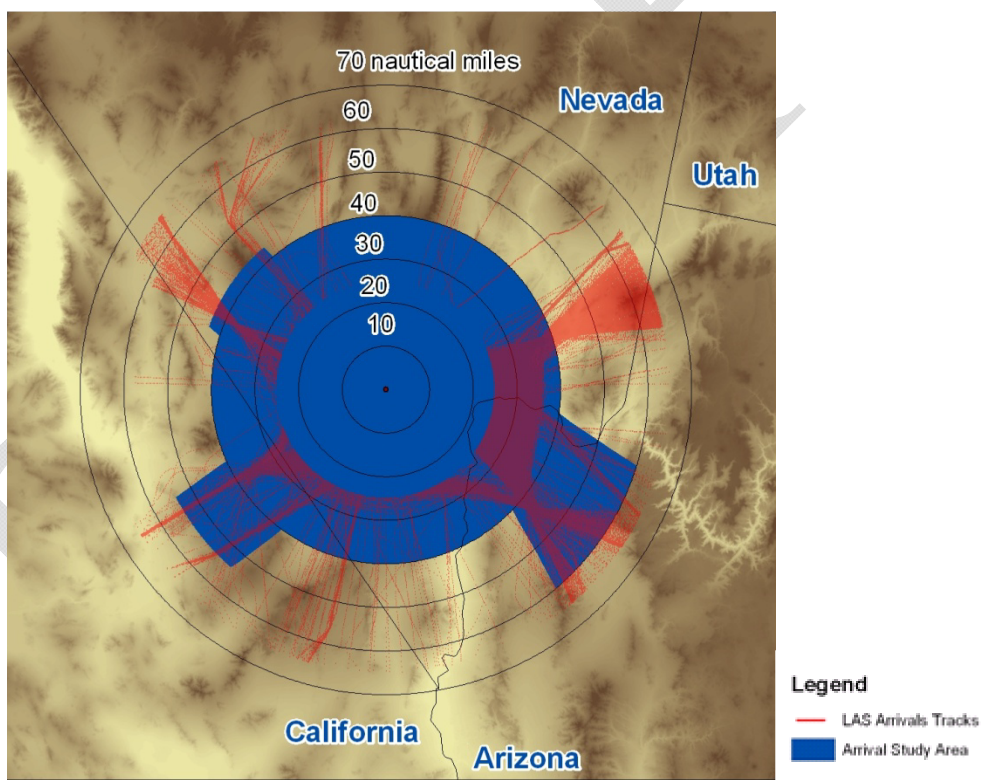

Figure 4 LAS arrivals GSA with extended areas by quadrant flows (Data source: AIM Lab & ETMS radar data, 9/27 – 10/15/2009)

The same analysis was performed on departures. Combining the areas of densest flows and the range-altitude information, the GSA created for departures is shown in **Figure 5**. The GSA contains the 40-nm initial study area, and only the northwest quadrant required an extended wedge since 95 percent of departing flights were above 10,000 AGL by time they reached 40 nm from the airport center. It was confirmed that the initial 40-nmi area and the extended wedge in the northwest contains at least 95% of the departure traffic in the northwest quadrant that is below 10,000 feet AGL.

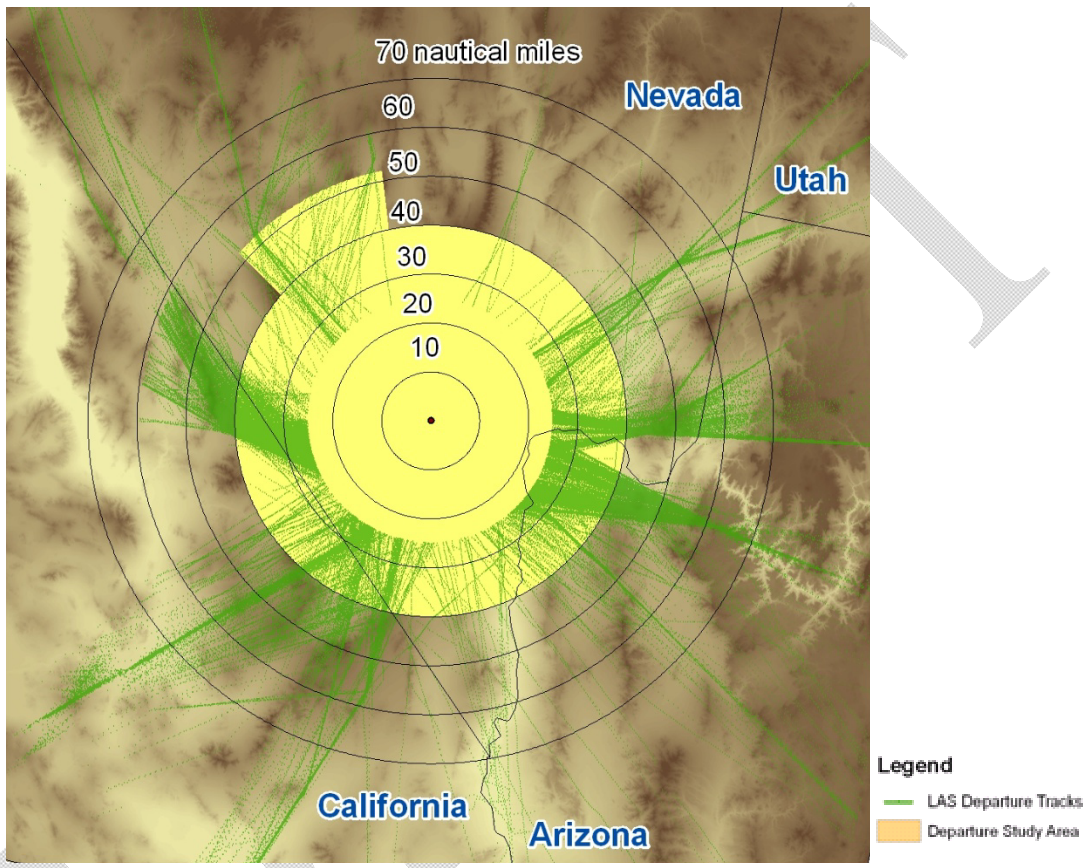

Figure 5 LAS departures GSA with extended areas by quadrant flows (Data source: AIM Lab & ETMS radar data, 9/27 – 10/15/2009)

1.3 Alternative Flight Routes

The previous sections used historical radar data to construct a preliminary study area. In order to define a study area where changes to routes are also included, routes from the Proposed Action were analyzed.

Metron Aviation received Terminal Area Route Generation Evaluation and Traffic Simulation (TARGETS) trajectory data from the LAS airspace design team. The trajectory data represent what the proposed alternative will look like. The trajectories were exported from the TARGETS tool and compared to historical radar data within ADT. Metron Aviation then identified where the airspace changes would occur, if any. Lateral and altitudes changes were identified, however, it was determined that the changes in the proposed alternative at the edge of the defined study area exceeded the 10,000 ft (AGL) criteria.

1.4 The Generalized Study Area

The GSA is defined by combining the study areas developed for arrivals and departures, as shown in **Figure 6**. This represents the union of the study areas identified when analyzing arrivals and departures. The northeast, southeast, and southwest wedges define extensions to the 40 nm base study area to accommodate arrival flows, and the northwest wedge defines an extension that accommodates both arrivals and departures with the wedge accommodating the departure flow encompassing the arrival flow wedge.

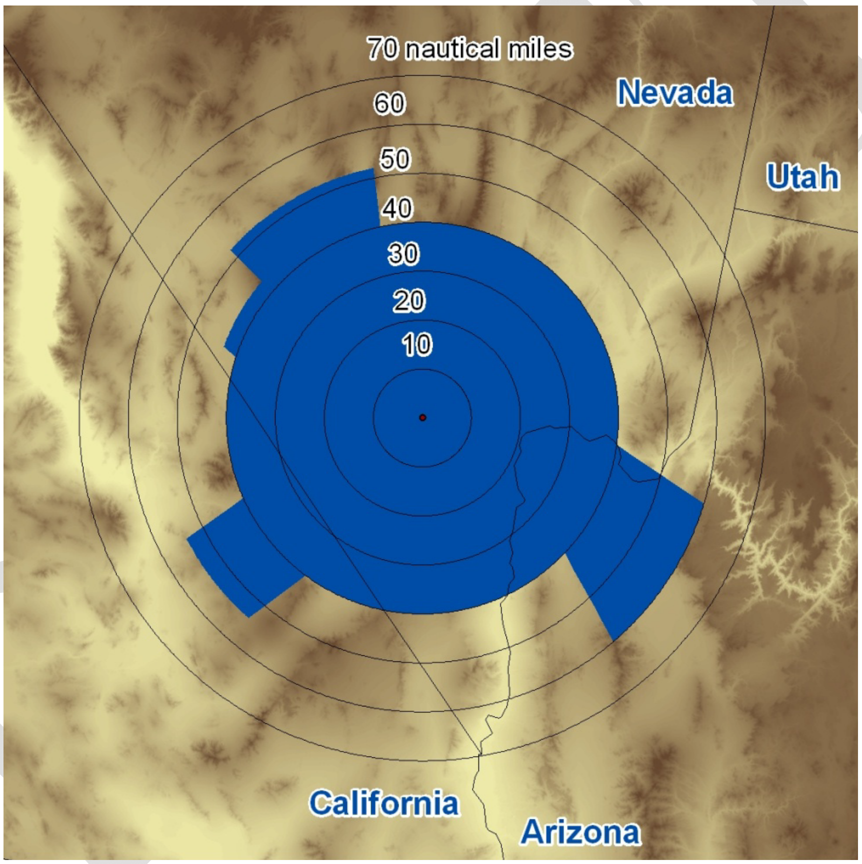

Figure 6 Generalized study area

The following figures show how traffic above 10,000 feet AGL and below 10,000 AGL fit over the study area. Figure 7 shows arrival tracks and Figure 8 shows departure tracks. Each extended area contains at least 95% of the traffic below 10,000 feet AGL in each quadrant out to the distances established in Table 2 and Table 3.

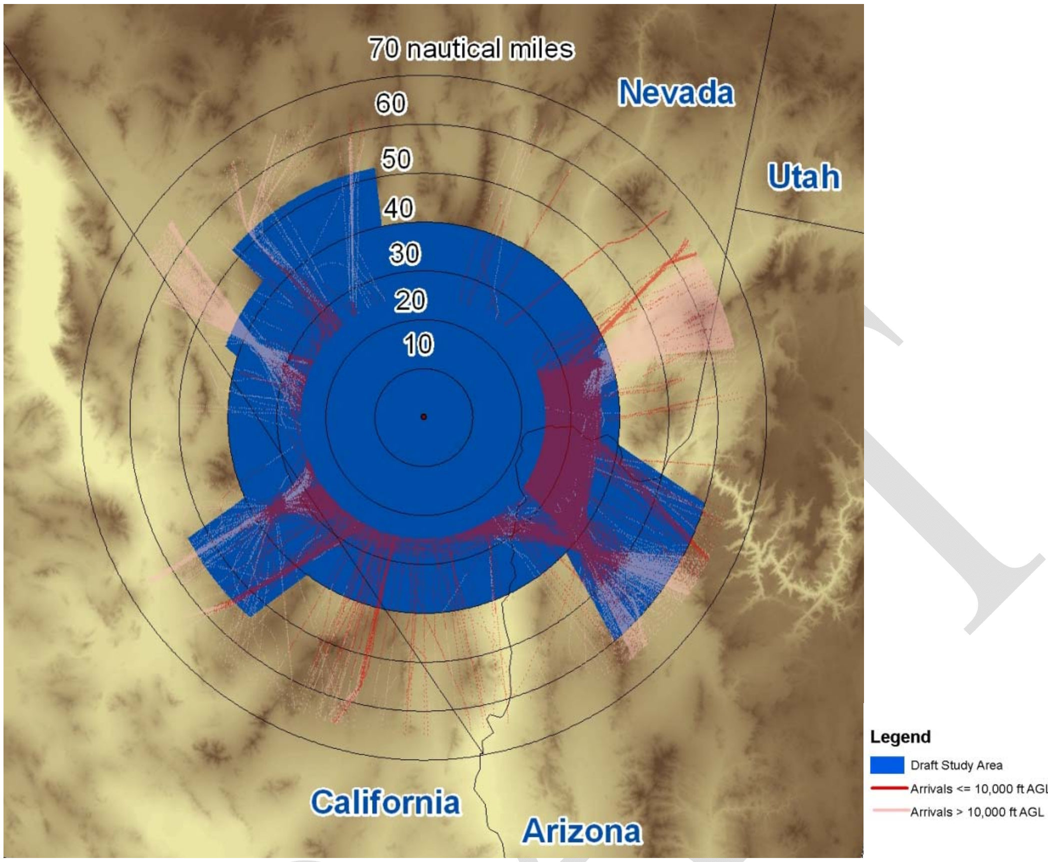

Figure 7 Generalized study area and arrival tracks (Data source: AIM Lab & ETMS radar data, 9/27 – 10/15/2009)

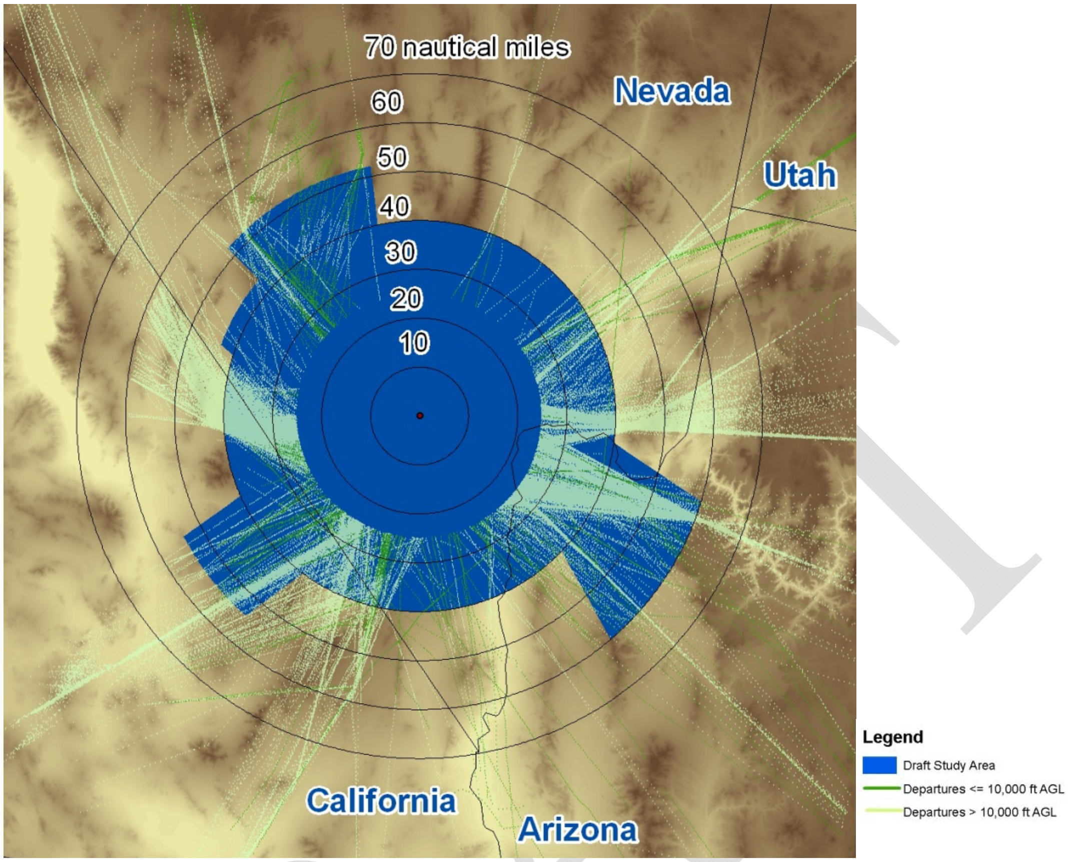

Figure 8 Generalized study area and departure tracks (Data source: AIM Lab & ETMS radar data, 9/27 – 10/15/2009)

2 References

NIRS Federal Aviation Administration and Metron Aviation, Inc. *NIRS User Guide.* 2009.

ADT Metron Aviation, Inc. *Airspace Design Tool.* 2009.

FAA1050 Federal Aviation Administration, *FAA Order 1050.1E, Chg 1, Environmental Impacts: Policies and Procedures*. 2006.

Appendix F.2

Average Annual Day Flight Schedules

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Appendix F-2: Average Annual Day Flight Schedules

F-2.1 Introduction

Aircraft flight schedules were prepared to support the aircraft noise analysis for the Las Vegas Area Optimization (LAS Optimization) Environmental Assessment (EA). A flight schedule lists aircraft activity for a design day, which for purposes of this EA, is an average annual day (AAD) at McCarran International Airport (LAS), North Las Vegas Airport (VGT), and Henderson Executive Airport (HND) (the EA Airports). The flight schedules serve as an input to the aircraft noise analysis presented in **Appendix E** of the LAS Optimization EA.

Three flight schedules were developed to represent AAD flight activity at the EA Airports, corresponding to the years assessed for aircraft noise conditions:

- The 2009 AAD flight schedule was developed based on actual 2009 activity and used to model 2009 conditions aircraft noise exposure (see Section 4.3.1 of the LAS Optimization EA).
- Two future AAD flight schedules were developed to represent activity for the years 2012 and 2017 and used to model future aircraft noise exposure (see Section 5.1 of the LAS Optimization EA). The two future AAD flight schedules were developed based on the 2009 Federal Aviation Administration (FAA) Terminal Area Forecast (TAF), which was released in December 2009. The TAF is the official forecast of aviation activity at FAA facilities and is updated annually.[1]

The following key assumptions are relevant to the development of the AAD flight schedules:

- The FAA tracks three types of aircraft operations in the TAF: local operations (those that depart from and land at the same airport), overflight operations (those that pass in the vicinity of but do not land at an EA Airport), and itinerant operations (those that either depart from or arrive at an EA Airport, operating to or from airports located outside of the local area airspace). The AAD flight schedules developed for this EA include only *itinerant* operations, because the Proposed Action involves the redesign of standard instrument arrival and departure procedures that are only used by aircraft performing itinerant operations.
- The AAD flight schedules only include operations conducted by aircraft operating under Instrument Flight Rules (IFR) because the Proposed Action involves the redesign of standard instrument arrival and departure procedures, which are only used by aircraft operating under IFR.
- The 2012 and 2017 flight schedules represent future itinerant IFR AAD activity for both the Proposed Action and the No Action Alternative. As stated in Section 2.3 of the LAS Optimization EA, the Proposed Action would not result in an increase in the numbers of aircraft operations at the EA Airports, but would increase the throughput of the terminal airspace to match the throughout for which the EA Airport runways were designed. In other words, the total numbers of aircraft operations for the future itinerant IFR AADs are expected to be the same under both the Proposed Action and the No Action Alternative.

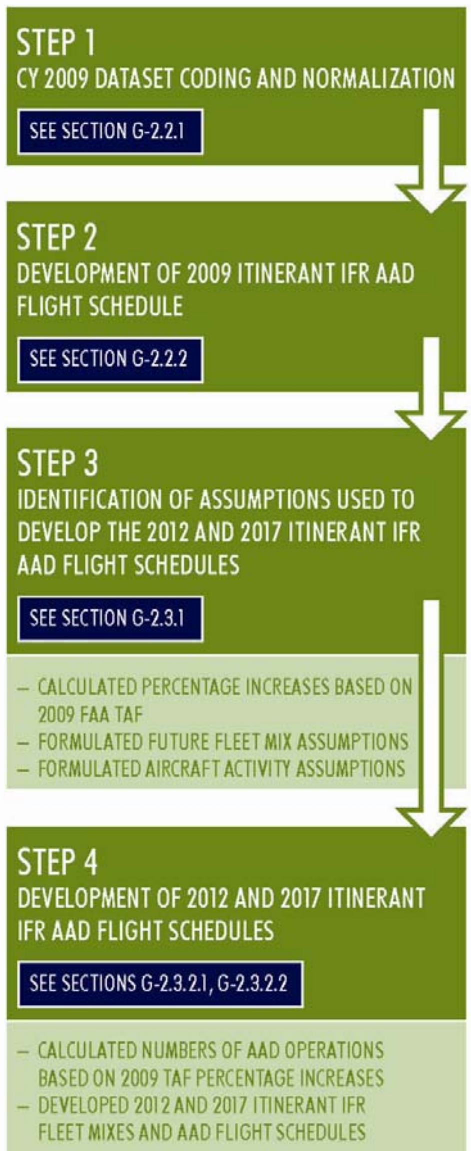
[1] At the time this analysis was initiated in early 2010, the most recent available TAF was the 2009 TAF dated December 2009 and released in early 2010. See Section F-2.4 for a sensitivity assessment of the validity of the 2012 and 2017 flight schedules in the light of the newly released 2011 TAF.

This appendix presents the methodology used to develop the itinerant IFR AAD flight schedules as well as summary data for the itinerant IFR AAD flight schedules for each EA Airport. **Exhibit F-2-1** depicts the process for developing the itinerant IFR AAD flight schedules, along with references to the corresponding section numbers of this appendix.

This appendix also presents a sensitivity assessment conducted to evaluate the extent to which the design day flight schedules prepared for the LAS Optimization EA remain valid in light of the newly released 2011 TAF, dated and released in January 2012.

Exhibit F-2-1

Itinerant IFR AAD Flight Schedules Development Process



Notes: AAD = Average Annual Day; CY = Calendar Year; IFR = Instrument Flight Rules

Source: Ricondo & Associates, Inc., January 2012.
Prepared by: Ricondo & Associates, Inc., January 2012.

F-2.2 2009 Average Annual Day Flight Schedule

The 2009 itinerant IFR AAD flight schedule was developed from a dataset of IFR flight activity for the EA Airports for the full calendar year (CY) 2009. The CY 2009 dataset was obtained from the Clark County Department of Aviation noise monitoring system, and included data on itinerant IFR flight operations to and from the EA Airports, including arrival/departure time, aircraft type, origin and destination airport, etc.[2]

F-2.2.1 Methodology

Processing the full 2009 itinerant IFR dataset included the following steps:

(1) **Dataset coding—**Using data in the CY 2009 dataset, several additional fields were coded to provide additional information to aid in the analysis, as follows:

- **Type of operation—**arrival or departure, coded using the origin/destination cities listed in the original dataset.
- **Time of day—**daytime (departing or arriving between 7:00 a.m. and 9:59 p.m.) or nighttime (departing or arriving between 10:00 p.m. and 6:59 a.m.), coded using the arrival/departure time listed in the original dataset.
- **Aircraft category—**per categories defined by the FAA,[3] coded using the aircraft identifier in the dataset:
    - Air carrier—an aircraft with seating capacity of more than 60 seats or a maximum payload capacity of more than 18,000 pounds carrying passengers or cargo for hire or compensation, and having a company three-letter code designator in the dataset. This includes U.S. and foreign flag carriers.
    - Air Taxi—an aircraft designed to have a maximum seating capacity of 60 seats or less or a maximum payload capacity of 18,000 pounds or less carrying passengers or cargo for hire or compensation, and having a company three-letter code designator in the dataset.
    - General Aviation—all civil aircraft, except those classified as air carriers or air taxis.
    - Military—all classes of military aircraft operating at FAA facilities.
- **Aircraft type for noise modeling—**per the aircraft database included in the FAA's Noise Integrated Routing System model (NIRS) 7.0b, coded based on the aircraft identifier in the dataset. NIRS is an FAA-approved computer model that evaluates aircraft noise in the vicinity of airports and is used to evaluate changes in noise exposure related to air traffic procedure changes. The NIRS aircraft database includes most, but not all, aircraft types. If an aircraft in the CY 2009 dataset was included in the NIRS aircraft database, the matching aircraft type was used; however, if an aircraft in the CY 2009 dataset was not included in the NIRS aircraft dataset, it was necessary to identify an equivalent, representative aircraft approved for use by the FAA, referred to as an aircraft substitution. Because the CY 2009 dataset consisted of a full year of data, the CY 2009 dataset included a wide range of unique aircraft types, not all of which were in the NIRS aircraft database, requiring some FAA-approved aircraft substitutions.

2 Clark County, Nevada, CY 2009 noise monitoring system data, March 2010.

3 Federal Aviation Administration, Aviation System Performance Metrics, Glossary of Terms; http://aspmhelp.faa.gov/index.php/Glossary (accessed November 30, 2011).

- **Terminal airspace arrival or departure gate**[4]**—**coded using a spatial analysis that assigned each departure operation to a Standard Instrument Departure (SID) exiting a specific L30 gate, and each arrival operation to a Standard Terminal Arrival Route (STAR) entering a specific L30 gate based on the location of the origin or destination airport:
- **Stage Length—**the distance that a departing aircraft is traveling nonstop. Distances in nautical miles were calculated through a GIS analysis using great circle distances and a corresponding stage length value was assigned to each city pair (e.g., LAS-BOS) and coded according to the destination city for aircraft departing one of the EA Airports, as follows:
  - Departure stage length 1: 0 to 500 nautical miles (great circle distance)
  - Departure stage length 2: 501 to 1,000 nautical miles
  - Departure stage length 3: 1,001 to 1,500 nautical miles
  - Departure stage length 4: 1,501 miles to 2,500 nautical miles
  - Departure stage length 5: 2,501 miles to 3,500 nautical miles
  - Departure stage length 6: 3,501 miles to 4,500 nautical miles
  - Departure stage length 7: 4,501 miles to 5,500 nautical miles
  - Departure stage length 8: 5,501 miles to 6,500 nautical miles
  - Departure stage length 9: over 6,501 nautical miles
  - Arrival stage length 1: all arrivals

(2) **Dataset normalization—**Finally, the numbers of operations by aircraft category in the CY 2009 dataset was adjusted to match the actual numbers of 2009 operations by aircraft category. The source for the actual numbers of 2009 aircraft operations by aircraft category was data published by the FAA in the Air Traffic Activity System (ATADS) standard report for CY 2009.[5] This adjustment allowed for the cleaned CY 2009 dataset (following the deletion of incomplete entries) to reflect the total annual itinerant IFR operations at the EA Airports. Adjustments were also made to ensure that arrivals and departures were balanced (i.e., each type of operation representing 50 percent of the total operations). Through the normalization process, the fleet mix percentages within each aircraft category remained unchanged.

F-2.2.2 Average Annual Day Itinerant IFR Aircraft Operations

Table F-2-1 presents the 2009 annual and AAD numbers of itinerant IFR aircraft operations for each of the EA Airports by aircraft category (air carrier, air taxi, general aviation and military), as published in the ATADS standard report for CY 2009 for each of the EA Airports. The numbers of itinerant IFR AAD aircraft operations for each category at each airport were derived by dividing the numbers of annual itinerant IFR aircraft operations by 365 days. Accordingly, the 2009 itinerant IFR AAD flight schedule included 1,142 itinerant IFR operations for LAS, 37 itinerant IFR operations for VGT, and 34 itinerant IFR operations for HND.

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4 Federal Aviation Administration. Los Angeles Air Traffic Control Center, *Las Vegas Terminal Radar Approach Control and Las Vegas Air Traffic Control Tower: Terminal Area Control Letter of Agreement,* June 30, 2011. Refer to Sections 3.4.1.2 and 3.4.1.3 of the LAS Optimization EA for descriptions of the arrival and departure gates, respectively, serving the L30 airspace.

5 Federal Aviation Administration Air Traffic Activity Data System (ATADS), Airport Operations Report for 2009, http://aspm.faa.gov/opsnet/sys/Main.asp?force=atads (accessed March 2010).

Table F-2-1

Itinerant IFR Annual and AAD Aircraft Operations by Aircraft Category – 2009

	LAS		VGT		HND	
Aircraft Category	Annual Operations	AAD [1/] Operations	Annual Operations	AAD [1/] Operations	Annual Operations	AAD [1/] Operations
Air Carrier	357,884	981	1	0	0	0
Air Taxi	23,772	65	2,141	6	1,359	4
General Aviation	33,959	93	10,982	30	11,099	30
Military	1,188	3	225	1	19	0
Totals	416,803	1,142	13,349	37	12,477	34

Note:

1/ The numbers of itinerant IFR AAD operations were derived by dividing the numbers of annual operations by 365 days, rounded to the nearest whole operation.

Sources: Federal Aviation Administration Air Traffic Activity Data System (ATADS), Airport Operations Report for 2009, http://aspm.faa.gov/opsnet/sys/Main.asp?force=atads, accessed March 2010 (annual itinerant IFR operations by aircraft category); Ricondo & Associates, Inc., March 2010 (calculated numbers of itinerant IFR AAD operations by aircraft category).

Prepared by: Ricondo & Associates, Inc., January 2012.

Tables F-2-2 through **F-2-4** present the 2009 numbers of itinerant IFR AAD aircraft operations for each aircraft category (air carrier, air taxi, general aviation and military) by type of operation (arrivals and departures) and time of day (daytime and nighttime) for each of the three EA Airports. Tables F-2-2 through F-2-4 also present the percentages of daytime and nighttime operations by type of operation and total aircraft operations for each aircraft category at each airport. For example, as shown in Table F-2-2, 92 percent of all arrivals at LAS were daytime arrivals, the remaining eight percent being nighttime arrivals.

Table F-2-2

LAS Itinerant IFR AAD Aircraft Operations by Aircraft Category, Type of Operation, and Time of Day – 2009

	AAD Arrivals			AAD Departures			Total AAD Operations		
Aircraft Category	Daytime	Nighttime	Total	Daytime	Nighttime	Total	Daytime	Nighttime	Total
Air Carrier	447.97	42.28	490.25	435.05	55.20	490.25	883.02	97.48	980.50
	91%	9%	100%	89%	11%	100%	90%	10%	100%
Air Taxi	31.14	1.43	32.56	30.42	2.15	32.56	61.55	3.58	65.13
	96%	4%	100%	93%	7%	100%	95%	5%	100%
General Aviation	43.07	3.45	46.52	41.68	4.84	46.52	84.74	8.30	93.04
	93%	7%	100%	90%	10%	100%	91%	9%	100%
Military	1.58	0.05	1.63	1.53	0.10	1.63	3.11	0.15	3.25
	97%	3%	100%	94%	6%	100%	95%	5%	100%
Totals	523.75	47.21	570.96	508.67	62.29	570.96	1,032.42	109.50	1,141.93
	92%	8%	100%	89%	11%	100%	90%	10%	100%

Notes:

1/ Daytime operations arrive or depart between 7:00 a.m. and 9:59 p.m.; nighttime operations arrive or depart between 10:00 p.m. and 6:59 a.m.

2/ For documentation purposes, the numbers of operations are presented to a precision of two digits after the decimal point to show numbers of operations that are greater than zero but less than 1.

3/ Totals may not add up due to rounding.

Source: Ricondo & Associates, Inc., April 2010, based on CY 2009 noise monitoring system data (flight activity data organized among aircraft categories, types of operations, time of day itinerant IFR AAD operations).

Prepared by: Ricondo & Associates, Inc., January 2012.

Table F-2-3

VGT Itinerant IFR AAD Aircraft Operations by Aircraft Category, Type of Operation, and Time of Day – 2009

	AAD Arrivals			AAD Departures			Total AAD Operations		
Aircraft Category	Daytime	Nighttime	Total	Daytime	Nighttime	Total	Daytime	Nighttime	Total
Air Carrier	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0%	0%	0%	0%	0%	0%	0%	0%	0%
Air Taxi	2.30	0.63	2.93	2.72	0.21	2.93	5.02	0.84	5.86
	78%	22%	100%	93%	7%	100%	86%	14%	100%
General Aviation	14.39	0.66	15.04	14.10	0.95	15.04	28.48	1.60	30.09
	96%	4%	100%	94%	6%	100%	95%	5%	100%
Military	0.31	0.00	0.31	0.31	0.00	0.31	0.62	0.00	0.62
	100%	0%	100%	100%	0%	100%	100%	0%	100%
Totals	17.00	1.29	18.28	17.13	1.15	18.28	34.13	2.44	36.57
	93%	7%	100%	94%	6%	100%	93%	7%	100%

Notes:

1/ Daytime operations arrive or depart between 7:00 a.m. and 9:59 p.m.; nighttime operations arrive or depart between 10:00 p.m. and 6:59 a.m.

2/ For documentation purposes, the numbers of operations are presented to a precision of two digits after the decimal point to show numbers of operations that are greater than zero but less than 1.

3/ Totals may not add up due to rounding.

Source: Ricondo & Associates, Inc., April 2010, based on CY 2009 noise monitoring system data provided by (flight activity data organized among aircraft categories, types of operations, time of day itinerant IFR AAD operations).

Prepared by: Ricondo & Associates, Inc., January 2012.

Table F-2-4

HND Itinerant IFR AAD Aircraft Operations by Aircraft Category, Type of Operation, and Time of Day – 2009

	AAD Arrivals			AAD Departures			Total AAD Operations		
Aircraft Category	Daytime	Nighttime	Total	Daytime	Nighttime	Total	Daytime	Nighttime	Total
Air Carrier	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0%	0%	0%	0%	0%	0%	0%	0%	0%
Air Taxi	1.76	0.11	1.86	1.75	0.11	1.86	3.51	0.21	3.72
	94%	6%	100%	94%	6%	100%	94%	6%	100%
General Aviation	14.67	0.54	15.20	14.44	0.77	15.20	29.10	1.30	30.41
	96%	4%	100%	95%	5%	100%	96%	4%	100%
Military	0.03	0.00	0.03	0.03	0.00	0.03	0.05	0.00	0.05
	100%	0%	100%	100%	0%	100%	100%	0%	100%
Totals	16.45	0.64	17.09	16.22	0.88	17.09	32.67	1.52	34.18
	96%	4%	100%	95%	5%	100%	96%	4%	100%

Notes:

1/ Daytime operations arrive or depart between 7:00 a.m. and 9:59 p.m.; nighttime operations arrive or depart between 10:00 p.m. and 6:59 a.m.

2/ For documentation purposes, the numbers of operations are presented to a precision of two digits after the decimal point to show numbers of operations that are greater than zero but less than 1.

3/ Totals may not add up due to rounding.

Source: Ricondo & Associates, Inc., April 2010, based on CY 2009 noise monitoring system data provided by (flight activity data organized among aircraft categories, types of operations, time of day itinerant IFR AAD operations).

Prepared by: Ricondo & Associates, Inc., January 2012.

Table F-2-A1 in **Attachment A** to this Appendix presents details of the 2009 itinerant IFR AAD aircraft operations by aircraft category and aircraft type (i.e., by each individual NIRS aircraft type used for noise modeling purposes).

F-2.3 2012 and 2017 Average Annual Day Flight Schedules

Aircraft activity growth rates by aircraft category at each of the EA Airports calculated from the 2009 TAF were used to derive the itinerant IFR AAD numbers of operations for 2012 and 2017. The 2012 itinerant IFR AAD schedule represents the year during which the Proposed Action would be implemented and 2017 serves as a five year outlook after implementation. This section describes the assumptions and steps taken to derive the future itinerant IFR AAD schedules and presents summary flight schedule data for each EA Airport.

F-2.3.1 Assumptions

The assumptions used to develop the 2012 and 2017 itinerant IFR AAD flight schedules are presented in the following sections.

F-2.3.1.1 Assumed Percentage Increases in Operations

The 2009 TAF provided the forecast numbers of annual itinerant aircraft operations by aircraft category for fiscal years (FY) 2012 and 2017. The TAF reports the numbers of total annual itinerant aircraft operations, but it does not include a breakdown of IFR versus non-IFR itinerant aircraft operations. Therefore, it was assumed that the proportion of IFR versus non-IFR itinerant aircraft operations would remain constant from 2009 to 2012 and 2017, and percentage increases were calculated based on the total numbers of annual itinerant aircraft operations in the 2009 TAF and applied to the numbers of itinerant IFR aircraft operations in 2009 at each EA Airport.

Table F-2-5 presents the projected numbers of annual itinerant aircraft operations for 2009, 2012 and 2017 and associated calculated percentage increases for the periods of 2009-2012, 2012-2017, and 2009-2017 for each aircraft category at each of the EA Airports.

F-2.3.1.2 Future Fleet Mix Assumptions

The future fleet mixes—the mix of aircraft types projected to operate at the EA Airports in 2012 and 2017—were developed beginning with the 2009 itinerant IFR AAD fleet mix. Assumptions were made regarding fleet mix changes as a result of anticipated aircraft retirements of older and less fuel-efficient aircraft types, as well as new aircraft acquisitions. The future fleet mix assumptions were developed using aircraft types already designated in NIRS aircraft types (as described in Section F-2.2.1).

General professional judgment and expertise related to industry trends was used to identify the types of aircraft that would be assumed to be completely or partially replaced by newer and more fuel-efficient aircraft types by 2012 and 2017. Examples of those NIRS aircraft types included the 727EM1 and 727EM2 (Boeing 727); 737500 (Boeing 737-500); MD81, MD82, and MD83 (McDonnell Douglas MD-80), GIIB (Gulfstream IIB); and LEAR25 (Learjet 25).

In the air carrier and air taxi aircraft categories, operations by aircraft types identified as newer or more fuel-efficient aircraft were maintained in the 2012 and 2017 flight schedules. In the general aviation and military aircraft categories, no new aircraft types were assumed in the 2012 and 2017 flight schedules when compared with those operated in 2009.

Table F-2-5

Percentage Increases of Annual Itinerant Aircraft Operations by Aircraft Category

Aircraft Category	Calculated Percentage Increases over Period		
	2009-2012	2012-2017	2009-2017
LAS			
Air Carrier	2.6%	20.0%	23.2%
Air Taxi	16.2%	14.2%	32.7%
General Aviation	6.0%	13.1%	19.9%
Military	0.0%	0.0%	0.0%
VGT			
Air Carrier	0.0%	0.0%	0.0%X
Air Taxi	1.1%	1.9%	3.0%
General Aviation	6.5%	10.1%	17.3%
Military	0.0%	0.0%	0.0%
HND			
Air Carrier	0.0%	0.0%	0.0%
Air Taxi	2.9%	5.0%	8.1%
General Aviation	9.5%	14.8%	25.7%
Military	0.0%	0.0%	0.0%

Note: no growth was forecast under the military aircraft category.

Sources: Federal Aviation Administration, 2009 Terminal Area Forecast Detail Report for numbers of annual itinerant IFR operations, http://aspm.faa.gov/main/taf.asp (accessed in March 2010; verified in August 2010); Ricondo & Associates, Inc., March 2010, based on 2009 TAF Detail Report (calculated percentage increases).
Prepared by: Ricondo & Associates, Inc., January 2012.

Table F-2-6 presents a list of the NIRS aircraft types deemed to be completely or partially replaced by 2012 and 2017. It also identifies order of magnitude percentages of total operations assumed to be replaced by newer and more fuel efficient aircraft types identified in the columns named "Replacement Aircraft Type."

Table F-2-6

Aircraft Type Replacement Assumptions – 2012 and 2017

	2012		2017	
2009 NIRS Aircraft Types	Percentage of Operations Replaced by 2012	Replacement Aircraft Type	Percentage of Operations Replaced by 2017	Replacement Aircraft Type
727EM1	50%	757PW	100%	757PW
727EM2	50%	757PW	100%	757PW
7373B2	10%	737700	25%	737700
737500	75%	737700	100%	737700
DC1010	0%	n/a	100%	767CF6
DC93LW	0%	n/a	100%	737700
GIIB	10%	GIV	50%	GIV
L1011	0%	n/a	100%	767CF6
LEAR25	50%	LEAR35	50%	LEAR35
MD11GE	0%	n/a	100%	A300622R
MD81	17%	737800	17%	737800
MD82	17%	737800	17%	737800
MD83	17%	737800	17%	737800
MD9025	25%	737800	50%	737800

Note: n/a = no change in aircraft type.

Source: Ricondo & Associates, Inc., May 2011 (assessment of older and less fuel-efficient replaced NIRS aircraft types, percentages and replacement NIRS aircraft types).
Prepared by: Ricondo & Associates, Inc., January 2012.

F-2.3.1.3 Aircraft Activity Assumptions

Two major assumptions were used to develop the future itinerant IFR AAD flight schedules:

- It was assumed for noise modeling purposes that the numbers of itinerant IFR AAD arrivals and departures would be balanced (i.e., each type of operation representing 50 percent of the total operations). This assumption is consistent with the assumption made for the 2009 itinerant IFR AAD flight schedule, as described in Section F-2.2.1.
- It was assumed that the percentages of 2012 and 2017 itinerant IFR AAD operations occurring during daytime and nighttime hours by aircraft category and type of operation would remain constant for each EA Airport from 2009 to 2012 and 2017.

F-2.3.2 Methodology and Results

Based on the assumptions listed in Section F-2.3.1, the 2012 and 2017 itinerant IFR AAD flight schedules were developed following the methodology and steps described in the following sections.

F-2.3.2.1 2012 Average Annual Day Flight Schedule

The 2012 itinerant IFR AAD flight schedule was developed as follows:

(1) Calculation of the numbers of itinerant IFR AAD operations for 2012—For each EA Airport, each itinerant IFR AAD aircraft operation (by aircraft category, aircraft type and time of day) included in the 2009 itinerant IFR AAD flight schedule was multiplied by the percentage increase for the period of 2009-2012 identified in Table F-2-5. **Table F-2-7** presents the numbers of itinerant IFR AAD aircraft operations by airport and aircraft category for 2012, along with the 2009 itinerant IFR AAD aircraft operations and percentage increases calculated using the 2009. For example, each itinerant IFR AAD air carrier operation at LAS was multiplied by 2.6 percent to derive the corresponding 2012 number of itinerant IFR AAD air carrier operations.

(2) Development of 2012 itinerant IFR AAD flight schedule fleet mix—Based on the fleet mix assumptions for 2012, each aircraft type was assessed to be either retained in the 2012 fleet, or to be replaced by newer aircraft, based on the fleet assumptions presented in Table F-2-6. For example, 75 percent of the B737-500 operations were replaced by B737-700 operations in the 2012 flight schedule.

(3) Flight schedule verification—Summary results and tables were generated and verified throughout the process to ensure that the numbers of arrivals and departures remain balanced (i.e., each set representing 50 percent of the total operations) and that the percentages of day and night operations were consistent with the 2009 itinerant IFR AAD flight schedule for each aircraft category at each of the airports. **Tables F-2-8** through **F-2-10** present the numbers of itinerant IFR AAD aircraft operations for 2012 by aircraft category and type of operation. Tables F-2-8 through F-2-10 also present the percentages of daytime and nighttime operations by type of operation and total aircraft operations for each aircraft category at each airport.

Table F-2-7

Itinerant IFR AAD Aircraft Operations by Aircraft Category – 2012

Aircraft Category	2009 Operations	Percentage Increase	2012 Operations
LAS			
Air Carrier	981	2.6%	1,006
Air Taxi	65	16.2%	76
General Aviation	93	6.0%	99
Military	3	0.0%	3
Totals	1,142	3.7%	1,184
VGT			
Air Carrier	0	0.0%	0
Air Taxi	6	1.1%	6
General Aviation	30	6.5%	32
Military	1	0.0%	1
Totals	37	5.4%	39
HND			
Air Carrier	0	0.0%	0
Air Taxi	4	2.9%	4
General Aviation	30	9.5%	33
Military	0	0.0%	0
Totals	34	8.8%	37

Sources: Federal Aviation Administration (FAA) Air Traffic Activity Data System (ATADS), Airport Operations Report for 2009, http://aspm.faa.gov/opsnet/sys/Main.asp?force=atads, accessed June 2010 (numbers of annual itinerant IFR operations for 2009 by aircraft category); Ricondo & Associates, Inc., April 2010, based on FAA ATADS Airport Operations Report for 2009 (2009 numbers of itinerant IFR AAD aircraft operations and 2012 numbers of itinerant IFR AAD aircraft operations based on calculated growth rates identified in Table F-2-4).

Prepared by: Ricondo & Associates, Inc., January 2012.

Table F-2-8

LAS Itinerant IFR AAD Aircraft Operations by Aircraft Category, Type of Operation, and Time of Day – 2012

	AAD Arrivals			AAD Departures			Total AAD Operations		
Aircraft Category	Daytime	Nighttime	Totals	Daytime	Nighttime	Totals	Daytime	Nighttime	Totals
Air Carrier	459.69	43.55	503.24	446.23	57.01	503.24	905.92	100.55	1,006.47
	91%	9%	100%	88%	12%	100%	90%	10%	100%
Air Taxi	35.97	1.87	37.84	35.22	2.62	37.84	71.20	4.49	75.68
	95%	5%	100%	93%	7%	100%	94%	6%	100%
General Aviation	45.63	3.66	49.29	44.16	5.13	49.29	89.79	8.79	98.58
	93%	7%	100%	90%	10%	100%	91%	9%	100%
Military	1.58	0.05	1.63	1.53	0.10	1.63	3.11	0.15	3.25
	97%	3%	100%	94%	6%	100%	95%	5%	100%
Totals	542.87	49.12	591.99	527.13	64.86	591.99	1,070.01	113.98	1,183.98
	92%	8%	100%	89%	11%	100%	90%	10%	100%

Notes:

1/ Daytime operations arrive or depart between 7:00 a.m. and 9:59 p.m.; nighttime operations arrive or depart between 10:00 p.m. and 6:59 a.m.

2/ For noise modeling purposes, the numbers of itinerant IFR AAD aircraft operations were developed to a precision of six digits after the decimal point. For documentation purposes, the numbers of operations are presented to a precision of two digits after the decimal point to show numbers of operations that are greater than zero but less than 1.

3/ Totals may not add up due to rounding.

Source: Ricondo & Associates, Inc., May 2011 (2012 itinerant IFR AAD flight schedule).
Prepared by: Ricondo & Associates, Inc., January 2012.

Table F-2-9

VGT Itinerant IFR AAD Aircraft Operations by Aircraft Category, Type of Operation, and Time of Day – 2012

	AAD Arrivals			AAD Departures			Total AAD Operations		
Aircraft Category	Daytime	Nighttime	Totals	Daytime	Nighttime	Totals	Daytime	Nighttime	Totals
Air Carrier	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0%	0%	0%	0%	0%	0%	0%	0%	0%
Air Taxi	2.33	0.64	2.97	2.76	0.21	2.97	5.08	0.85	5.93
	78%	22%	100%	93%	7%	100%	86%	14%	100%
General Aviation	15.32	0.70	16.02	15.01	1.01	16.02	30.33	1.71	32.04
	96%	4%	100%	94%	6%	100%	95%	5%	100%
Military	0.31	0.00	0.31	0.31	0.00	0.31	0.62	0.00	0.62
	100%	0%	100%	100%	0%	100%	100%	0%	100%
Totals	17.95	1.34	19.29	18.07	1.22	19.29	36.03	2.56	38.58
	93%	7%	100%	94%	6%	100%	93%	7%	100%

Notes:

1/ Daytime operations arrive or depart between 7:00 a.m. and 9:59 p.m.; nighttime operations arrive or depart between 10:00 p.m. and 6:59 a.m.

2/ For noise modeling purposes, the numbers of itinerant IFR AAD aircraft operations were developed to a precision of six digits after the decimal point. For documentation purposes, the numbers of operations are presented to a precision of two digits after the decimal point to show numbers of operations that are greater than zero but less than 1.

3/ Totals may not add up due to rounding.

Source: Ricondo & Associates, Inc., May 2011 (2012 itinerant IFR AAD flight schedule).
Prepared by: Ricondo & Associates, Inc., January 2012.

Table F-2-10

HND Itinerant IFR AAD Aircraft Operations by Aircraft Category, Type of Operation, and Time of Day – 2012

	AAD Arrivals			AAD Departures			Total AAD Operations		
Aircraft Category	Daytime	Nighttime	Totals	Daytime	Nighttime	Totals	Daytime	Nighttime	Totals
Air Carrier	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0%	0%	0%	0%	0%	0%	0%	0%	0%
Air Taxi	1.81	0.11	1.92	1.80	0.11	1.92	3.61	0.22	3.83
	94%	6%	100%	94%	6%	100%	94%	6%	100%
General Aviation	16.06	0.59	16.64	15.81	0.84	16.64	31.86	1.43	33.29
	96%	4%	100%	95%	5%	100%	96%	4%	100%
Military	0.03	0.00	0.03	0.03	0.00	0.03	0.05	0.00	0.05
	100%	0%	100%	100%	0%	100%	100%	0%	100%
Totals	17.89	0.70	18.59	17.63	0.95	18.59	35.52	1.65	37.17
	96%	4%	100%	95%	5%	100%	96%	4%	100%

Notes:

1/ Daytime operations arrive or depart between 7:00 a.m. and 9:59 p.m.; nighttime operations arrive or depart between 10:00 p.m. and 6:59 a.m.

2/ For noise modeling purposes, the numbers of itinerant IFR AAD aircraft operations were developed to a precision of six digits after the decimal point. For documentation purposes, the numbers of operations are presented to a precision of two digits after the decimal point to show numbers of operations that are greater than zero but less than 1.

3/ Totals may not add up due to rounding.

Source: Ricondo & Associates, Inc., May 2011 (2012 itinerant IFR AAD flight schedule).
Prepared by: Ricondo & Associates, Inc., January 2012.

Table F-2-A2 in Attachment A presents 2012 itinerant IFR AAD operations by individual NIRS aircraft types used for noise modeling purposes.

F-2.3.2.2 2017 Average Annual Day Flight Schedule

Once the 2012 itinerant IFR AAD flight schedule was finalized, the 2017 itinerant IFR AAD flight schedule was developed following the same steps presented at the beginning of Section F-2-3.2.1, using the percentage increases from 2012 to 2017 presented in Table F-2-5 and the future aircraft fleet mix assumptions presented in Table F-2-6.

Table F-2-11 presents the numbers of itinerant IFR AAD aircraft operations by aircraft category for 2017, along with the 2012 itinerant IFR AAD aircraft operations and the percentage increases identified in Table F-2-5 calculated based on the 2009 TAF.

Tables F-2-12 through **F-2-14** present, a breakdown of the number of itinerant IFR AAD aircraft operations for the 2017 conditions by aircraft category and type of operation. Tables F-2-12 through F-2-14 also present the percentages of daytime and nighttime operations by type of operation and total aircraft operations for each aircraft category at each airport. **Table F-2-A3** in Attachment A presents details of the 2017 itinerant IFR AAD operations by aircraft type (i.e., by each individual NIRS aircraft type used for noise modeling purposes).

Table F-2-11

Itinerant IFR AAD Aircraft Operations by Aircraft Category – 2017

Aircraft Category	2012 Operations	Percentage Increases	2017 Operations
LAS			
Air Carrier	1,006	20.0%	1,208
Air Taxi	76	14.2%	86
General Aviation	99	13.1%	112
Military	3	0.0%	3
Totals	1,184	19.0%	1,409
VGT			
Air Carrier	0	0.0%	0
Air Taxi	6	1.9%	6
General Aviation	32	10.1%	35
Military	1	0.0%	1
Totals	39	7.7%	42
HND			
Air Carrier	0	0.0%	0
Air Taxi	4	5.0%	4
General Aviation	33	14.8%	38
Military	0	0.0%	0
Totals	37	13.5%	42

Source: Ricondo & Associates, Inc., May 2011 (numbers of itinerant IFR AAD aircraft operations for 2012 based on results identified in Table F-2-6, and 2017 numbers of itinerant IFR AAD aircraft operations based on calculated growth rated identified in Table F-2-4).
Prepared by: Ricondo & Associates, Inc., January 2012.

Table F-2-12

LAS Itinerant IFR AAD Aircraft Operations, by Aircraft Category, Type of Operation, and Time of Day, 2017

	AAD Arrivals			AAD Departures			Total AAD Operations		
Time of Day	Daytime	Nighttime	Totals	Daytime	Nighttime	Totals	Daytime	Nighttime	Totals
Air Carrier	550.60	53.36	603.96	532.96	71.00	603.96	1,083.56	124.36	1,207.91
	91%	9%	100%	88%	12%	100%	90%	10%	100%
Air Taxi	40.92	2.30	43.22	40.12	3.10	43.22	81.04	5.40	86.44
	95%	5%	100%	93%	7%	100%	94%	6%	100%
General Aviation	51.63	4.14	55.77	49.96	5.80	55.77	101.59	9.95	111.53
	93%	7%	100%	90%	10%	100%	91%	9%	100%
Military	1.58	0.05	1.63	1.53	0.10	1.63	3.11	0.15	3.25
	97%	3%	100%	94%	6%	100%	95%	5%	100%
Totals	644.72	59.85	704.57	624.57	80.00	704.57	1,269.29	139.85	1,409.14
	92%	8%	100%	89%	11%	100%	90%	10%	100%

Notes:

1/ Daytime operations arrive or depart between 7:00 a.m. and 9:59 p.m.; nighttime operations arrive or depart between 10:00 p.m. and 6:59 a.m.

2/ For noise modeling purposes, the numbers of itinerant IFR AAD aircraft operations were developed to a precision of six digits after the decimal point. For documentation purposes, the numbers of operations are presented to a precision of two digits after the decimal point to show numbers of operations that are greater than zero but less than 1.

3/ Totals may not add up due to rounding.

Source: Ricondo & Associates, Inc., May 2011 (2017 itinerant IFR AAD flight schedule).
Prepared by: Ricondo & Associates, Inc., January 2012.

Table F-2-13

VGT Itinerant IFR AAD Aircraft Operations, by Aircraft Category, Type of Operation, and Time of Day, 2017

	AAD Arrivals			AAD Departures			Total AAD Operations		
Time of Day	Daytime	Nighttime	Totals	Daytime	Nighttime	Totals	Daytime	Nighttime	Totals
Air Carrier	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0%	0%	0%	0%	0%	0%	0%	0%	0%
Air Taxi	2.37	0.65	3.02	2.81	0.21	3.02	5.18	0.86	6.04
	78%	22%	100%	93%	7%	100%	86%	14%	100%
General Aviation	16.87	0.77	17.64	16.53	1.11	17.64	33.40	1.88	35.28
	96%	4%	100%	94%	6%	100%	95%	5%	100%
Military	0.31	0.00	0.31	0.31	0.00	0.31	0.62	0.00	0.62
	100%	0%	100%	100%	0%	100%	100%	0%	100%
Totals	19.55	1.42	20.97	19.65	1.32	20.97	39.20	2.74	41.94
	93%	7%	100%	94%	6%	100%	93%	7%	100%

Notes:

1/ Daytime operations arrive or depart between 7:00 a.m. and 9:59 p.m.; nighttime operations arrive or depart between 10:00 p.m. and 6:59 a.m.

2/ For noise modeling purposes, the numbers of itinerant IFR AAD aircraft operations were developed to a precision of six digits after the decimal point. For documentation purposes, the numbers of operations are presented to a precision of two digits after the decimal point to show numbers of operations that are greater than zero but less than 1.

3/ Totals may not add up due to rounding.

Source: Ricondo & Associates, Inc., May 2011 (2017 itinerant IFR AAD flight schedule).
Prepared by: Ricondo & Associates, Inc., January 2012.

Table F-2-14

HND Itinerant IFR AAD Aircraft Operations, by Aircraft Category, Type of Operation, and Time of Day, 2017

	AAD Arrivals			AAD Departures			Total AAD Operations		
Time of Day	Daytime	Nighttime	Totals	Daytime	Nighttime	Totals	Daytime	Nighttime	Totals
Air Carrier	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0%	0%	0%	0%	0%	0%	0%	0%	0%
Air Taxi	1.90	0.11	2.01	1.89	0.12	2.01	3.79	0.23	4.02
	94%	6%	100%	94%	6%	100%	94%	6%	100%
General Aviation	18.44	0.68	19.11	18.15	0.96	19.11	36.59	1.64	38.22
	96%	4%	100%	95%	5%	100%	96%	4%	100%
Military	0.03	0.00	0.03	0.03	0.00	0.03	0.05	0.00	0.05
	100%	0%	100%	100%	0%	100%	100%	0%	100%
Totals	20.36	0.79	21.15	20.07	1.08	21.15	40.43	1.87	42.30
	96%	4%	100%	95%	5%	100%	96%	4%	100%

Notes:

1/ Daytime operations arrive or depart between 7:00 a.m. and 9:59 p.m.; nighttime operations arrive or depart between 10:00 p.m. and 6:59 a.m.

2/ For noise modeling purposes, the numbers of itinerant IFR AAD aircraft operations were developed to a precision of six digits after the decimal point. For documentation purposes, the numbers of operations are presented to a precision of two digits after the decimal point to show numbers of operations that are greater than zero but less than 1.

3/ Totals may not add up due to rounding.

Source: Ricondo & Associates, Inc., May 2011 (2017 itinerant IFR AAD flight schedule).
Prepared by: Ricondo & Associates, Inc., January 2012.

F-2.4 2011 Terminal Area Forecast Sensitivity Assessment

The projections of 2012 and 2017 itinerant IFR AAD operations were based on the most recent FAA TAF available at the time this analysis was initiated in early 2010. At such time, the most recent available TAF was the 2009 TAF dated December 2009 and released in early 2010.

A sensitivity assessment was conducted to evaluate the extent to which the design day flight schedules prepared for the LAS Optimization EA remain reasonably valid in the light of the newly released 2011 TAF, dated and released in January 2012.

Table F-2-15 presents a comparison of the numbers of itinerant IFR AAD operations used in the LAS Optimization EA to those published in the 2011 TAF. Table F-2-15 also presents the percentage variances between the numbers of itinerant IFR AAD operations developed for the LAS Optimization EA and presented in Sections F-2.3.2.1 and F-2.3.2.2 and those projected in the 2011 TAF for each EA Airport.

Table F-2-15

Comparison of LAS Optimization and 2011 TAF Numbers of Itinerant IFR AAD Operations by Year and by EA Airport

	LAS			VGT			HND		
Years	LAS EA	2011 TAF	Percentage Variance	LAS EA	2011 TAF	Percentage Variance	LAS EA	2011 TAF	Percentage Variance
2012	1,184	1,150	3.0%	39	37	6.2%	37	35	4.8%
2017	1,409	1,347	4.6%	42	37	13.9%	42	41	2.9%

Sources: Federal Aviation Administration, *2011 Terminal Area Forecast Detail Report*, http://aspm.faa.gov/main/taf.asp (accessed on January 24, 2012); Ricondo & Associates, Inc., January 2012, based on FAA 2011 *Terminal Area Forecast Detail Reports* (calculated AAD TAF numbers of operations and percentage differences).
Prepared by: Ricondo & Associates, Inc., January 2012.

FAA Order 5090.3C entitled *Field Formulation of the National Plan of Integrated Airport Systems* provides guidance related to the review of an airport sponsor's forecast when compared to FAA's TAF.[6] Note that this Order provides guidance for the review of aircraft operation forecasts primarily developed for aviation system plans, airport master plans, or airport layout plan updates. However, it provides a reliable order of magnitude threshold of variance consistent with FAA guidance. Since the 2009 FAA TAF was used to project future activity levels for the purposes of the LAS Optimization EA, this sensitivity assessment ultimately compares the results of two FAA TAFs among themselves: the 2009 and 2011 TAFs.

Per FAA Order 5090.3C, a sponsor's forecast should not vary significantly from the FAA's TAF, i.e. not more than 10 percent.[7] As shown in Table F-2-15, all percentage variances except for VGT in 2017 are below the recommended 10 percent threshold of variance.

[6] Federal Aviation Administration, FAA Order 5090.3C "*Field Formulation of the National Plan of Integrated Airport Systems*", December 2000.

[7] Federal Aviation Administration, FAA Order 5090.3C "*Field Formulation of the National Plan of Integrated Airport Systems*", December 2000, Section 3-2 Forecasts, p. 20.

At VGT, the LAS Optimization EA assumed a projected number of itinerant IFR AAD operations in 2017 to be 42 daily operations, compared with 37 daily operations as projected by the 2011 TAF. Per FAA Order 5090.3C, a difference of 10 percent or less would mean that the LAS Optimization EA number of itinerant IFR AAD operations should be between approximately 33 and 41 daily operations. The number of operations used for the LAS Optimization EA is therefore only one operation beyond the 10-percent threshold of variance. This variance is not considered to be significant for the purposes of the LAS Optimization EA.

Based on the results of this sensitivity assessment, it is determined that the design day flight schedules developed for the LAS Optimization EA remain reasonably valid based on the results of a comparison between the 2009 FAA TAF and the 2011 FAA TAF, and represent reasonable projected aircraft activity at the EA Airports for the purposes of the LAS Optimization EA.

F-2.5 Attachment A: Detailed Tables

Table F-2-A1 (1 of 7)

AAD Itinerant IFR Aircraft Operations, by Aircraft Category, Aircraft Type and Time of Day, 2009

LAS 2009	Arrivals			Departures			Total Operations		
Aircraft Type	Daytime	Nighttime	Total	Daytime	Nighttime	Total	Daytime	Nighttime	Total
Air Carrier									
707320	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.01
717200	1.43	0.04	1.47	1.22	0.25	1.47	2.65	0.29	2.95
737400	0.16	0.02	0.17	0.15	0.02	0.17	0.30	0.04	0.35
737500	13.30	1.72	15.02	11.99	3.02	15.02	25.29	4.74	30.03
737700	171.39	9.65	181.04	169.95	11.09	181.04	341.33	20.74	362.07
737800	27.26	3.92	31.19	25.05	6.14	31.19	52.31	10.06	62.37
747400	1.04	0.00	1.05	1.04	0.00	1.05	2.08	0.01	2.09
757300	6.69	0.56	7.25	5.78	1.47	7.25	12.47	2.03	14.49
767300	3.66	2.66	6.32	4.33	1.98	6.32	7.99	4.64	12.63
767400	0.08	0.02	0.09	0.07	0.02	0.09	0.15	0.03	0.19
777200	0.59	0.00	0.59	0.47	0.13	0.59	1.06	0.13	1.19
777300	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01
727EM1	0.02	0.00	0.02	0.01	0.00	0.02	0.03	0.00	0.03
727EM2	0.07	0.59	0.66	0.06	0.60	0.66	0.13	1.19	1.32
7373B2	49.41	2.39	51.80	48.53	3.27	51.80	97.93	5.66	103.59
737N17	4.93	1.07	6.00	4.20	1.80	6.00	9.13	2.87	12.01
74720B	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.01
747SP	0.06	0.00	0.06	0.04	0.02	0.06	0.10	0.02	0.12
757PW	26.57	3.92	30.49	25.19	5.30	30.49	51.75	9.22	60.97
767CF6	0.05	0.00	0.06	0.05	0.01	0.06	0.10	0.01	0.12
A300-622R	0.79	0.21	1.00	0.83	0.18	1.00	1.62	0.39	2.01
A310-304	0.03	0.00	0.03	0.02	0.00	0.03	0.05	0.00	0.06
A319-131	44.31	3.19	47.50	42.58	4.91	47.50	86.89	8.10	94.99
A320-211	55.75	7.17	62.92	52.39	10.52	62.92	108.14	17.69	125.83
A320-232	4.14	0.54	4.68	3.37	1.30	4.68	7.51	1.84	9.35
A330-343	0.30	0.00	0.30	0.29	0.01	0.30	0.58	0.01	0.59
A340-211	0.67	0.00	0.67	0.65	0.02	0.67	1.33	0.02	1.35
DC1010	0.13	0.57	0.70	0.58	0.11	0.70	0.71	0.68	1.39
DC93LW	0.02	0.00	0.02	0.02	0.00	0.02	0.04	0.00	0.04
DHC8	0.01	0.00	0.01	0.01	0.00	0.01	0.01	0.00	0.01
F10062	0.08	0.00	0.08	0.07	0.01	0.08	0.15	0.01	0.17
GV	7.69	0.20	7.89	7.33	0.56	7.89	15.02	0.75	15.77
L1011	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
MD11GE	0.01	0.00	0.01	0.00	0.01	0.01	0.01	0.01	0.02
MD81	0.17	0.03	0.19	0.18	0.01	0.19	0.34	0.04	0.39

Table F-2-A1 (2 of 7)

AAD Itinerant IFR Aircraft Operations, by Aircraft Category, Aircraft Type and Time of Day, 2009

LAS 2009	Arrivals			Departures			Total Operations		
Aircraft Type	Daytime	Nighttime	Total	Daytime	Nighttime	Total	Daytime	Nighttime	Total
MD82	6.47	0.05	6.52	6.46	0.06	6.52	12.93	0.11	13.04
MD83	19.75	3.76	23.51	21.20	2.30	23.51	40.95	6.06	47.01
MD9025	0.97	0.01	0.98	0.92	0.06	0.98	1.89	0.07	1.95
Air Carrier Total	447.97	42.28	490.25	435.05	55.20	490.25	883.02	97.48	980.50
Air Taxi									
1900D	0.69	0.00	0.69	0.67	0.02	0.69	1.36	0.02	1.38
BAE146	0.02	0.00	0.02	0.02	0.00	0.02	0.03	0.00	0.03
BEC58P	0.01	0.01	0.01	0.01	0.00	0.01	0.02	0.01	0.03
C130	0.02	0.00	0.02	0.02	0.00	0.02	0.04	0.00	0.04
CIT3	1.07	0.02	1.09	1.00	0.08	1.09	2.07	0.10	2.17
CL600	1.89	0.10	1.99	1.84	0.15	1.99	3.74	0.25	3.99
CL601	1.07	0.03	1.10	1.04	0.06	1.10	2.11	0.09	2.19
CNA206	0.01	0.00	0.01	0.01	0.00	0.01	0.03	0.00	0.03
CNA441	0.29	0.15	0.45	0.31	0.13	0.45	0.60	0.29	0.89
CNA500	0.31	0.02	0.33	0.30	0.03	0.33	0.61	0.04	0.66
CNA750	1.74	0.08	1.82	1.68	0.15	1.82	3.42	0.23	3.65
DHC6	2.76	0.26	3.02	2.80	0.22	3.02	5.56	0.48	6.04
DHC8	1.13	0.00	1.14	1.13	0.01	1.14	2.26	0.01	2.28
DHC830	0.02	0.00	0.03	0.03	0.00	0.03	0.05	0.00	0.06
EMB120	6.95	0.01	6.96	6.94	0.01	6.96	13.89	0.02	13.92
EMB145	0.91	0.04	0.95	0.86	0.08	0.95	1.77	0.12	1.90
FAL20	0.02	0.00	0.02	0.02	0.00	0.02	0.03	0.01	0.04
GASEPF	1.63	0.00	1.63	1.35	0.28	1.63	2.99	0.28	3.27
GASEPV	0.21	0.06	0.27	0.18	0.09	0.27	0.39	0.15	0.54
GIIB	0.22	0.02	0.23	0.21	0.03	0.23	0.42	0.04	0.47
GIV	0.34	0.03	0.37	0.31	0.06	0.37	0.65	0.09	0.74
GV	1.35	0.10	1.45	1.34	0.11	1.45	2.69	0.20	2.89
IA1125	0.07	0.01	0.08	0.07	0.02	0.08	0.14	0.03	0.17
LEAR25	0.23	0.04	0.27	0.24	0.04	0.27	0.47	0.07	0.55
LEAR35	3.04	0.17	3.21	2.94	0.26	3.21	5.98	0.43	6.41
MU3001	5.12	0.28	5.40	5.09	0.32	5.40	10.21	0.60	10.81
SD330	0.01	0.00	0.01	0.01	0.00	0.01	0.02	0.00	0.02
Air Taxi Total	31.14	1.43	32.56	30.42	2.15	32.56	61.55	3.58	65.13
General Aviation									
1900D	0.61	0.08	0.69	0.23	0.46	0.69	0.84	0.54	1.38
727EM2	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.01
BAC111	0.02	0.00	0.02	0.02	0.00	0.02	0.04	0.00	0.04

Table F-2-A1 (3 of 7)

AAD Itinerant IFR Aircraft Operations, by Aircraft Category, Aircraft Type and Time of Day, 2009

LAS 2009	Arrivals			Departures			Total Operations		
Aircraft Type	Daytime	Nighttime	Total	Daytime	Nighttime	Total	Daytime	Nighttime	Total
BAE146	0.18	0.01	0.18	0.18	0.00	0.18	0.36	0.01	0.37
BEC58P	0.82	0.12	0.94	0.73	0.21	0.94	1.55	0.33	1.88
CIT3	0.88	0.04	0.91	0.88	0.04	0.91	1.76	0.07	1.83
CL600	4.00	0.34	4.34	4.08	0.26	4.34	8.08	0.60	8.68
CL601	0.18	0.03	0.21	0.18	0.03	0.21	0.36	0.06	0.42
CNA172	0.27	0.02	0.29	0.24	0.06	0.29	0.50	0.08	0.58
CNA206	0.44	0.03	0.47	0.43	0.04	0.47	0.88	0.07	0.95
CNA441	1.48	0.07	1.55	1.26	0.29	1.55	2.74	0.36	3.11
CNA500	2.32	0.19	2.51	2.29	0.22	2.51	4.61	0.41	5.02
CNA55B	0.19	0.01	0.20	0.20	0.00	0.20	0.39	0.01	0.39
CNA750	0.72	0.06	0.78	0.70	0.07	0.78	1.42	0.13	1.56
DHC6	1.99	0.13	2.13	1.81	0.32	2.13	3.81	0.45	4.26
DHC830	0.53	0.03	0.56	0.52	0.04	0.56	1.05	0.06	1.11
EMB145	0.52	0.04	0.56	0.55	0.02	0.56	1.07	0.06	1.13
FAL20	0.41	0.03	0.44	0.41	0.03	0.44	0.82	0.05	0.87
GASEPF	0.10	0.01	0.11	0.10	0.01	0.11	0.21	0.02	0.22
GASEPV	2.98	0.11	3.09	2.77	0.32	3.09	5.75	0.43	6.18
GIIB	1.12	0.09	1.21	1.08	0.13	1.21	2.20	0.22	2.42
GIV	5.91	0.73	6.64	6.13	0.51	6.64	12.03	1.25	13.28
GV	3.23	0.37	3.61	3.31	0.30	3.61	6.54	0.68	7.21
HS125B	0.22	0.01	0.23	0.21	0.02	0.23	0.43	0.03	0.46
HS748A	0.03	0.00	0.03	0.03	0.00	0.03	0.05	0.00	0.06
IA1125	1.27	0.04	1.31	1.23	0.08	1.31	2.51	0.12	2.63
LEAR25	0.41	0.03	0.44	0.42	0.02	0.44	0.83	0.06	0.88
LEAR35	7.21	0.57	7.78	6.82	0.97	7.78	14.03	1.53	15.56
MU3001	4.81	0.24	5.04	4.68	0.37	5.04	9.48	0.60	10.09
PA28	0.14	0.01	0.15	0.12	0.03	0.15	0.26	0.04	0.30
PA30	0.06	0.01	0.07	0.06	0.01	0.07	0.13	0.02	0.14
PA31	0.01	0.00	0.01	0.01	0.00	0.01	0.02	0.00	0.02
SD330	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.01
SF340	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
General Aviation Total	43.07	3.45	46.52	41.68	4.84	46.52	84.74	8.30	93.04
Military									
707	0.01	0.00	0.01	0.01	0.00	0.01	0.03	0.00	0.03
707320	0.05	0.00	0.05	0.05	0.00	0.05	0.10	0.00	0.10
C130	0.31	0.01	0.33	0.29	0.04	0.33	0.60	0.05	0.65
DC1010	0.06	0.01	0.07	0.02	0.05	0.07	0.08	0.06	0.14

Table F-2-A1 (4 of 7)

AAD Itinerant IFR Aircraft Operations, by Aircraft Category, Aircraft Type and Time of Day, 2009

LAS 2009	Arrivals			Departures			Total Operations		
Aircraft Type	Daytime	Nighttime	Total	Daytime	Nighttime	Total	Daytime	Nighttime	Total
DC1030	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.01
DC870	0.04	0.00	0.04	0.04	0.00	0.04	0.08	0.00	0.08
DC93LW	0.06	0.00	0.06	0.06	0.00	0.06	0.13	0.00	0.13
DHC6	0.06	0.00	0.06	0.06	0.00	0.06	0.11	0.00	0.11
DHC8	0.04	0.00	0.04	0.04	0.00	0.04	0.07	0.00	0.07
DHC830	0.01	0.00	0.01	0.01	0.00	0.01	0.03	0.00	0.03
GASEPV	0.07	0.00	0.07	0.07	0.00	0.07	0.14	0.00	0.14
IA1125	0.01	0.00	0.01	0.01	0.00	0.01	0.02	0.00	0.02
KC135R	0.09	0.00	0.09	0.08	0.01	0.09	0.16	0.01	0.17
LEAR25	0.68	0.01	0.69	0.69	0.00	0.69	1.37	0.01	1.38
LEAR35	0.06	0.00	0.06	0.06	0.00	0.06	0.12	0.00	0.12
MU3001	0.03	0.00	0.03	0.03	0.01	0.03	0.06	0.01	0.06
Military Total	1.58	0.05	1.63	1.53	0.10	1.63	3.11	0.15	3.25
Grand Total	523.75	47.21	570.96	508.67	62.29	570.96	1,032.42	109.50	1,141.93

VGT 2009	Arrivals			Departures			Total Operations		
Aircraft Type	Daytime	Nighttime	Total	Daytime	Nighttime	Total	Daytime	Nighttime	Total
Air Taxi									
BEC58P	0.17	0.09	0.26	0.21	0.05	0.26	0.38	0.13	0.52
C130	0.001	0.000	0.001	0.001	0.000	0.001	0.003	0.000	0.003
CIT3	0.02	0.00	0.02	0.02	0.00	0.02	0.03	0.00	0.03
CL600	0.02	0.00	0.02	0.02	0.00	0.02	0.05	0.00	0.05
CNA172	0.02	0.00	0.02	0.02	0.00	0.02	0.04	0.00	0.04
CNA206	0.23	0.01	0.24	0.23	0.02	0.24	0.46	0.02	0.49
CNA441	0.04	0.01	0.05	0.05	0.00	0.05	0.10	0.01	0.11
CNA500	0.003	0.000	0.003	0.003	0.000	0.003	0.005	0.000	0.005
CNA750	0.01	0.00	0.01	0.01	0.00	0.01	0.01	0.00	0.01
DHC6	0.44	0.24	0.69	0.64	0.05	0.69	1.08	0.29	1.37
DHC8	0.37	0.01	0.38	0.34	0.04	0.38	0.71	0.05	0.76
FAL20	0.003	0.000	0.003	0.003	0.000	0.003	0.005	0.000	0.005
GASEPF	0.09	0.14	0.23	0.19	0.03	0.23	0.28	0.18	0.45
GASEPV	0.01	0.00	0.01	0.01	0.00	0.01	0.02	0.00	0.02
GIIB	0.004	0.000	0.004	0.000	0.000	0.000	0.004	0.000	0.004
GV	0.004	0.000	0.004	0.004	0.000	0.004	0.008	0.000	0.008
LEAR25	0.01	0.00	0.01	0.01	0.00	0.01	0.01	0.00	0.01
LEAR35	0.04	0.00	0.04	0.04	0.00	0.04	0.08	0.00	0.08
MU3001	0.14	0.01	0.16	0.14	0.02	0.16	0.28	0.03	0.31
PA30	0.01	0.11	0.12	0.12	0.00	0.12	0.13	0.11	0.24

Table F-2-A1 (5 of 7)

AAD Itinerant IFR Aircraft Operations, by Aircraft Category, Aircraft Type and Time of Day, 2009

VGT 2009	Arrivals			Departures			Total Operations		
Aircraft Type	Daytime	Nighttime	Total	Daytime	Nighttime	Total	Daytime	Nighttime	Total
PA31	0.66	0.01	0.67	0.66	0.01	0.67	1.32	0.01	1.34
Air Taxi Total	2.30	0.63	2.93	2.72	0.21	2.93	5.02	0.84	5.86
General Aviation									
1900D	0.004	0.000	0.004	0.004	0.000	0.004	0.007	0.000	0.007
BAE146	0.002	0.000	0.002	0.002	0.000	0.002	0.004	0.000	0.004
BEC58P	1.71	0.07	1.78	1.69	0.09	1.78	3.40	0.16	3.56
CIT3	0.12	0.01	0.13	0.12	0.01	0.13	0.24	0.02	0.26
CL600	0.02	0.00	0.02	0.02	0.00	0.02	0.03	0.00	0.04
CNA172	2.14	0.14	2.28	2.14	0.14	2.28	4.28	0.28	4.56
CNA206	1.63	0.08	1.71	1.56	0.15	1.71	3.19	0.23	3.42
CNA441	0.49	0.03	0.52	0.48	0.04	0.52	0.97	0.08	1.04
CNA500	0.55	0.01	0.56	0.53	0.03	0.56	1.07	0.05	1.12
CNA55B	0.01	0.00	0.01	0.01	0.00	0.01	0.03	0.00	0.03
CNA750	0.03	0.00	0.03	0.03	0.00	0.03	0.06	0.00	0.06
DHC6	0.56	0.02	0.58	0.53	0.05	0.58	1.09	0.07	1.16
DHC8	0.01	0.00	0.01	0.01	0.00	0.01	0.01	0.00	0.01
DHC830	0.02	0.00	0.02	0.02	0.00	0.02	0.04	0.01	0.04
GASEPF	0.35	0.01	0.37	0.34	0.02	0.37	0.70	0.04	0.73
GASEPV	4.85	0.14	4.99	4.72	0.27	4.99	9.57	0.41	9.98
GIIB	0.004	0.000	0.004	0.004	0.000	0.004	0.007	0.000	0.007
GIV	0.03	0.01	0.04	0.04	0.00	0.04	0.07	0.01	0.08
GV	0.01	0.00	0.01	0.01	0.00	0.01	0.01	0.00	0.01
HS125B	0.004	0.000	0.004	0.004	0.000	0.004	0.007	0.000	0.007
IA1125	0.03	0.00	0.03	0.03	0.00	0.03	0.06	0.01	0.07
LEAR25	0.02	0.00	0.02	0.02	0.00	0.02	0.03	0.00	0.03
LEAR35	0.37	0.05	0.42	0.39	0.03	0.42	0.76	0.08	0.84
MU3001	0.72	0.04	0.75	0.71	0.04	0.75	1.43	0.08	1.51
PA28	0.53	0.05	0.58	0.54	0.05	0.58	1.07	0.09	1.16
PA30	0.15	0.00	0.15	0.14	0.01	0.15	0.28	0.01	0.29
PA31	0.03	0.00	0.03	0.03	0.00	0.03	0.05	0.00	0.05
SD330	0.002	0.000	0.002	0.002	0.000	0.002	0.004	0.000	0.004
General Aviation Total	14.39	0.66	15.04	14.10	0.95	15.04	28.48	1.60	30.09
Military									
BEC58P	0.21	0.00	0.21	0.21	0.00	0.21	0.41	0.00	0.41
GIIB	0.10	0.00	0.10	0.11	0.00	0.11	0.21	0.00	0.21
Military Total	0.31	0.00	0.31	0.31	0.00	0.31	0.62	0.00	0.62
Grand Total	17.00	1.29	18.28	17.13	1.15	18.28	34.13	2.44	36.57

Table F-2-A1 (6 of 7)

AAD Itinerant IFR Aircraft Operations, by Aircraft Category, Aircraft Type and Time of Day, 2009

HND 2009	Arrivals			Departures			Total Operations		
Aircraft Type	Daytime	Nighttime	Total	Daytime	Nighttime	Total	Daytime	Nighttime	Total
Air Taxi									
1900D	0.45	0.00	0.45	0.45	0.00	0.45	0.89	0.00	0.89
BAE146	0.002	0.000	0.002	0.002	0.000	0.002	0.005	0.000	0.005
BEC58P	0.02	0.00	0.02	0.02	0.00	0.02	0.04	0.00	0.04
CIT3	0.09	0.00	0.10	0.09	0.01	0.10	0.18	0.01	0.19
CL600	0.05	0.00	0.05	0.05	0.00	0.05	0.11	0.00	0.11
CNA206	0.02	0.00	0.02	0.02	0.00	0.02	0.04	0.00	0.04
CNA441	0.14	0.04	0.18	0.15	0.03	0.18	0.29	0.07	0.36
CNA500	0.02	0.00	0.02	0.02	0.00	0.02	0.04	0.00	0.04
CNA750	0.05	0.00	0.05	0.05	0.00	0.05	0.11	0.00	0.11
DHC6	0.33	0.03	0.36	0.34	0.01	0.36	0.67	0.04	0.72
EMB145	0.01	0.00	0.01	0.01	0.00	0.01	0.02	0.00	0.02
FAL20	0.01	0.00	0.01	0.01	0.00	0.01	0.01	0.00	0.01
GASEPF	0.002	0.002	0.005	0.002	0.002	0.005	0.005	0.005	0.010
GASEPV	0.02	0.00	0.02	0.02	0.00	0.02	0.04	0.00	0.04
GIIB	0.01	0.00	0.01	0.01	0.00	0.01	0.02	0.00	0.02
GIV	0.005	0.000	0.005	0.000	0.005	0.005	0.005	0.005	0.010
GV	0.04	0.00	0.04	0.03	0.01	0.04	0.07	0.01	0.08
LEAR25	0.03	0.00	0.03	0.03	0.00	0.03	0.06	0.00	0.06
LEAR35	0.10	0.00	0.11	0.10	0.01	0.11	0.20	0.02	0.22
MU3001	0.32	0.02	0.34	0.32	0.02	0.34	0.64	0.05	0.68
PA31	0.002	0.000	0.002	0.002	0.000	0.002	0.005	0.000	0.005
SD330	0.02	0.00	0.02	0.02	0.00	0.02	0.04	0.00	0.04
Air Taxi Total	1.76	0.11	1.86	1.75	0.11	1.86	3.51	0.21	3.72
General Aviation									
1900D	0.33	0.01	0.34	0.34	0.00	0.34	0.67	0.01	0.67
BAE146	0.002	0.000	0.002	0.002	0.000	0.002	0.004	0.000	0.004
BEC58P	1.38	0.03	1.41	1.38	0.03	1.41	2.75	0.06	2.81
CIT3	0.25	0.02	0.27	0.24	0.03	0.27	0.49	0.05	0.54
CL600	0.23	0.01	0.24	0.20	0.03	0.24	0.43	0.04	0.47
CL601	0.002	0.002	0.004	0.004	0.000	0.004	0.005	0.002	0.007
CNA172	0.55	0.03	0.58	0.55	0.02	0.58	1.10	0.05	1.15
CNA206	1.02	0.04	1.05	1.00	0.06	1.05	2.01	0.10	2.11
CNA441	0.84	0.05	0.89	0.86	0.03	0.89	1.70	0.08	1.78
CNA500	0.96	0.04	1.00	0.96	0.04	1.00	1.92	0.07	1.99
CNA55B	0.01	0.00	0.01	0.01	0.00	0.01	0.02	0.00	0.02
CNA750	0.04	0.00	0.05	0.04	0.00	0.05	0.09	0.01	0.09
DHC6	1.08	0.06	1.14	1.06	0.08	1.14	2.13	0.14	2.28
DHC8	0.002	0.000	0.002	0.002	0.000	0.002	0.004	0.000	0.004

Table F-2-A1 (7 of 7)

AAD Itinerant IFR Aircraft Operations, by Aircraft Category, Aircraft Type and Time of Day, 2009

HND 2009	Arrivals			Departures			Total Operations		
Aircraft Type	Daytime	Nighttime	Total	Daytime	Nighttime	Total	Daytime	Nighttime	Total
DHC830	0.09	0.00	0.09	0.08	0.01	0.09	0.17	0.01	0.18
EMB120	0.004	0.000	0.004	0.004	0.000	0.004	0.007	0.000	0.007
FAL20	0.32	0.00	0.32	0.29	0.03	0.32	0.61	0.03	0.64
GASEPF	0.27	0.01	0.27	0.27	0.01	0.27	0.53	0.01	0.54
GASEPV	3.64	0.09	3.73	3.53	0.20	3.73	7.18	0.29	7.46
GIIB	0.11	0.00	0.11	0.09	0.01	0.11	0.20	0.02	0.22
GIV	0.11	0.01	0.12	0.11	0.01	0.12	0.22	0.02	0.24
GV	0.19	0.01	0.19	0.19	0.00	0.19	0.38	0.01	0.39
HS125B	0.01	0.00	0.01	0.01	0.00	0.01	0.02	0.00	0.02
HS748A	0.01	0.00	0.01	0.01	0.00	0.01	0.02	0.00	0.02
IA1125	0.16	0.00	0.16	0.15	0.00	0.16	0.31	0.00	0.31
LEAR25	0.09	0.00	0.09	0.09	0.00	0.09	0.17	0.00	0.17
LEAR35	1.18	0.07	1.25	1.15	0.09	1.25	2.33	0.16	2.49
MU3001	1.01	0.02	1.03	1.00	0.03	1.03	2.01	0.06	2.07
PA28	0.36	0.04	0.39	0.38	0.02	0.39	0.73	0.05	0.78
PA30	0.38	0.01	0.39	0.38	0.02	0.39	0.76	0.03	0.79
PA31	0.06	0.00	0.06	0.06	0.00	0.06	0.11	0.00	0.11
SD330	0.004	0.000	0.004	0.004	0.000	0.004	0.007	0.000	0.007
General Aviation Total	14.67	0.54	15.20	14.44	0.77	15.20	29.10	1.30	30.41
Military									
DHC6	0.01	0.00	0.01	0.01	0.00	0.01	0.02	0.00	0.02
DHC8	0.01	0.00	0.01	0.01	0.00	0.01	0.02	0.00	0.02
GIIB	0.01	0.00	0.01	0.01	0.00	0.01	0.02	0.00	0.02
Military Total	0.03	0.00	0.03	0.03	0.00	0.03	0.05	0.00	0.05
Grand Total	16.45	0.64	17.09	16.22	0.88	17.09	32.67	1.52	34.18

Note: For noise modeling purposes, the numbers of AAD itinerant IFR aircraft operations were developed to a precision of six digits after the decimal point. For the purposes of this detailed table, the numbers of operations are presented to a precision of two digits after the decimal point. For instances where the number of operations is less than 0.00, a precision of three digits after the decimal point is used.

Source: Ricondo & Associates, Inc., May 2011.
Prepared by: Ricondo & Associates, Inc., December 2011.

Table F-2-A2 (1 of 7)

AAD Itinerant IFR Aircraft Operations, by Aircraft Category, Aircraft Type and Time of Day, 2012

LAS 2012	Arrivals			Departures			Total Operations		
Aircraft Type	Daytime	Nighttime	Total	Daytime	Nighttime	Total	Daytime	Nighttime	Total
Air Carrier									
707320	0.003	0.000	0.003	0.003	0.000	0.003	0.006	0.000	0.006
737400	0.12	0.01	0.13	0.11	0.02	0.13	0.23	0.03	0.27
737500	10.14	1.31	11.45	9.15	2.30	11.45	19.29	3.62	22.91
737700	181.73	10.47	192.20	179.90	12.30	192.20	361.63	22.77	384.40
737800	30.28	3.69	33.98	28.15	5.82	33.98	58.43	9.52	67.95
737900	1.40	0.20	1.61	1.29	0.32	1.61	2.69	0.52	3.22
747400	1.07	0.00	1.07	1.07	0.00	1.07	2.14	0.01	2.14
757300	6.85	0.59	7.44	5.94	1.50	7.44	12.79	2.09	14.88
767300	4.19	2.89	7.09	4.93	2.16	7.09	9.12	5.05	14.17
767400	0.12	0.04	0.16	0.12	0.04	0.16	0.24	0.08	0.33
777200	0.62	0.00	0.63	0.48	0.15	0.63	1.10	0.15	1.25
777300	0.000	0.003	0.003	0.000	0.003	0.003	0.000	0.006	0.006
727EM2	0.03	0.30	0.34	0.03	0.30	0.34	0.07	0.60	0.67
7373B2	50.28	2.84	53.12	49.06	4.07	53.12	99.33	6.91	106.24
737N17	2.50	0.54	3.04	2.13	0.91	3.04	4.63	1.45	6.08
74720B	0.003	0.000	0.003	0.003	0.000	0.003	0.006	0.000	0.006
747SP	0.08	0.00	0.08	0.04	0.04	0.08	0.12	0.04	0.16
757PW	28.88	4.54	33.41	27.28	6.13	33.41	56.16	10.67	66.83
767CF6	0.06	0.00	0.06	0.05	0.01	0.06	0.10	0.02	0.12
A300-622R	0.86	0.23	1.09	0.90	0.19	1.09	1.76	0.42	2.18
A310-304	0.01	0.00	0.01	0.01	0.00	0.01	0.03	0.00	0.03
A319-131	44.45	3.25	47.70	42.71	5.00	47.70	87.16	8.24	95.40
A320-211	58.18	7.45	65.63	54.65	10.98	65.63	112.83	18.43	131.25
A320-232	4.37	0.56	4.93	3.56	1.37	4.93	7.93	1.93	9.86
A330-343	0.30	0.00	0.30	0.30	0.01	0.30	0.60	0.01	0.61
A340-211	0.69	0.00	0.69	0.67	0.02	0.69	1.36	0.02	1.38
DC1010	0.10	0.46	0.56	0.47	0.09	0.56	0.57	0.55	1.12
DC93LW	0.01	0.00	0.01	0.01	0.00	0.01	0.03	0.00	0.03
DHC8	0.01	0.00	0.01	0.01	0.00	0.01	0.01	0.00	0.01
GV	9.37	0.25	9.62	8.78	0.84	9.62	18.15	1.09	19.23
MD11GE	0.004	0.000	0.004	0.001	0.003	0.004	0.006	0.003	0.009
MD81	0.17	0.03	0.19	0.18	0.01	0.19	0.34	0.04	0.39
MD82	3.37	0.04	3.41	3.37	0.04	3.41	6.74	0.08	6.83
MD83	18.43	3.82	22.26	19.95	2.31	22.26	38.38	6.14	44.52
MD9025	0.99	0.01	0.99	0.93	0.06	0.99	1.92	0.07	1.99
Air Carrier Total	459.69	43.55	503.24	446.23	57.01	503.24	905.92	100.55	1,006.47

Table F-2-A2 (2 of 7)

AAD Itinerant IFR Aircraft Operations, by Aircraft Category, Aircraft Type and Time of Day, 2012

LAS 2012	Arrivals			Departures			Total Operations		
Aircraft Type	Daytime	Nighttime	Total	Daytime	Nighttime	Total	Daytime	Nighttime	Total
Air Taxi									
1900D	0.72	0.00	0.72	0.70	0.02	0.72	1.41	0.02	1.43
BAE146	0.02	0.00	0.02	0.02	0.00	0.02	0.03	0.00	0.03
BEC58P	0.01	0.01	0.01	0.01	0.00	0.01	0.02	0.01	0.03
C130	0.03	0.00	0.03	0.03	0.00	0.03	0.07	0.00	0.07
CIT3	1.37	0.02	1.39	1.29	0.10	1.39	2.65	0.12	2.78
CL600	2.61	0.30	2.91	2.69	0.23	2.91	5.29	0.53	5.83
CL601	1.12	0.03	1.15	1.09	0.06	1.15	2.21	0.09	2.30
CNA206	0.01	0.00	0.01	0.01	0.00	0.01	0.03	0.00	0.03
CNA441	0.31	0.16	0.47	0.33	0.14	0.47	0.64	0.30	0.94
CNA500	0.36	0.02	0.38	0.35	0.03	0.38	0.71	0.05	0.76
CNA750	2.36	0.10	2.46	2.25	0.21	2.46	4.61	0.31	4.92
DHC6	2.94	0.27	3.22	2.97	0.24	3.22	5.92	0.52	6.43
DHC8	1.17	0.00	1.17	1.16	0.01	1.17	2.33	0.01	2.35
DHC830	0.05	0.00	0.05	0.05	0.00	0.05	0.10	0.00	0.10
EMB120	6.82	0.01	6.83	6.82	0.01	6.83	13.64	0.02	13.67
EMB145	1.52	0.05	1.58	1.46	0.12	1.58	2.98	0.17	3.15
FAL20	0.02	0.01	0.03	0.02	0.00	0.03	0.05	0.01	0.06
GASEPF	1.81	0.00	1.81	1.50	0.31	1.81	3.31	0.31	3.62
GASEPV	0.23	0.06	0.29	0.20	0.10	0.29	0.43	0.16	0.59
GIIB	0.20	0.01	0.21	0.18	0.03	0.21	0.38	0.04	0.42
GIV	0.73	0.04	0.77	0.66	0.11	0.77	1.38	0.16	1.54
GV	1.76	0.13	1.89	1.75	0.14	1.89	3.51	0.27	3.78
IA1125	0.13	0.02	0.15	0.12	0.03	0.15	0.25	0.04	0.29
LEAR25	0.12	0.02	0.14	0.12	0.02	0.14	0.24	0.04	0.27
LEAR35	3.90	0.26	4.16	3.80	0.36	4.16	7.70	0.62	8.32
MU3001	5.66	0.32	5.98	5.61	0.37	5.98	11.27	0.68	11.96
SD330	0.01	0.00	0.01	0.01	0.00	0.01	0.02	0.00	0.02
Air Taxi Total	35.97	1.87	37.84	35.22	2.62	37.84	71.20	4.49	75.68
General Aviation									
1900D	0.64	0.09	0.73	0.24	0.49	0.73	0.89	0.57	1.46
727EM2	0.003	0.000	0.003	0.003	0.000	0.003	0.005	0.000	0.005
BAC111	0.02	0.00	0.02	0.02	0.00	0.02	0.04	0.00	0.04
BAE146	0.19	0.01	0.20	0.20	0.00	0.20	0.39	0.01	0.39
BEC58P	0.87	0.12	1.00	0.77	0.22	1.00	1.64	0.35	1.99
CIT3	0.93	0.04	0.97	0.93	0.04	0.97	1.86	0.08	1.94
CL600	4.24	0.36	4.60	4.32	0.28	4.60	8.56	0.64	9.19
CL601	0.19	0.03	0.22	0.19	0.03	0.22	0.38	0.07	0.45
CNA172	0.28	0.02	0.31	0.25	0.06	0.31	0.53	0.08	0.62

Table F-2-A2 (3 of 7)

AAD Itinerant IFR Aircraft Operations, by Aircraft Category, Aircraft Type and Time of Day, 2012

LAS 2012	Arrivals			Departures			Total Operations		
Aircraft Type	Daytime	Nighttime	Total	Daytime	Nighttime	Total	Daytime	Nighttime	Total
CNA206	0.47	0.03	0.50	0.46	0.04	0.50	0.93	0.07	1.00
CNA441	1.57	0.07	1.65	1.34	0.31	1.65	2.91	0.38	3.29
CNA500	2.46	0.20	2.66	2.42	0.23	2.66	4.88	0.43	5.31
CNA55B	0.20	0.01	0.21	0.21	0.00	0.21	0.41	0.01	0.41
CNA750	0.76	0.06	0.82	0.75	0.08	0.82	1.51	0.14	1.65
DHC6	2.11	0.14	2.25	1.92	0.34	2.25	4.03	0.48	4.51
DHC830	0.56	0.03	0.59	0.55	0.04	0.59	1.12	0.06	1.18
EMB145	0.55	0.05	0.60	0.58	0.02	0.60	1.13	0.06	1.20
FAL20	0.43	0.03	0.46	0.43	0.03	0.46	0.87	0.06	0.92
GASEPF	0.11	0.01	0.12	0.11	0.01	0.12	0.22	0.02	0.24
GASEPV	3.16	0.12	3.27	2.94	0.34	3.27	6.09	0.45	6.55
GIIB	1.01	0.08	1.09	0.97	0.12	1.09	1.98	0.20	2.18
GIV	6.44	0.79	7.23	6.66	0.57	7.23	13.10	1.36	14.46
GV	3.42	0.40	3.82	3.50	0.32	3.82	6.93	0.72	7.64
HS125B	0.23	0.01	0.24	0.22	0.02	0.24	0.45	0.04	0.49
HS748A	0.03	0.00	0.03	0.03	0.00	0.03	0.06	0.00	0.06
IA1125	1.35	0.04	1.39	1.31	0.09	1.39	2.66	0.13	2.79
LEAR25	0.20	0.02	0.22	0.21	0.01	0.22	0.41	0.03	0.44
LEAR35	7.87	0.62	8.49	7.46	1.04	8.49	15.33	1.66	16.98
MU3001	5.09	0.25	5.34	4.95	0.39	5.34	10.05	0.64	10.69
PA28	0.15	0.01	0.16	0.13	0.03	0.16	0.28	0.04	0.32
PA30	0.07	0.01	0.08	0.07	0.01	0.08	0.13	0.02	0.15
PA31	0.01	0.00	0.01	0.01	0.00	0.01	0.02	0.00	0.02
SD330	0.003	0.000	0.003	0.003	0.000	0.003	0.005	0.000	0.005
SF340	0.003	0.000	0.003	0.000	0.003	0.003	0.003	0.003	0.005
General Aviation Total	45.63	3.66	49.29	44.16	5.13	49.29	89.79	8.79	98.58
Military									
707	0.01	0.00	0.01	0.01	0.00	0.01	0.03	0.00	0.03
707320	0.05	0.00	0.05	0.05	0.00	0.05	0.10	0.00	0.10
C130	0.31	0.01	0.33	0.29	0.04	0.33	0.60	0.05	0.65
DC1010	0.06	0.01	0.07	0.02	0.05	0.07	0.08	0.06	0.14
DC1030	0.004	0.000	0.004	0.004	0.000	0.004	0.007	0.000	0.007
DC870	0.04	0.00	0.04	0.04	0.00	0.04	0.08	0.00	0.08
DC93LW	0.06	0.00	0.06	0.06	0.00	0.06	0.13	0.00	0.13
DHC6	0.06	0.00	0.06	0.06	0.00	0.06	0.11	0.00	0.11
DHC8	0.04	0.00	0.04	0.04	0.00	0.04	0.07	0.00	0.07
DHC830	0.01	0.00	0.01	0.01	0.00	0.01	0.03	0.00	0.03
GASEPV	0.07	0.00	0.07	0.07	0.00	0.07	0.14	0.00	0.14

Table F-2-A2 (4 of 7)

AAD Itinerant IFR Aircraft Operations, by Aircraft Category, Aircraft Type and Time of Day, 2012

LAS 2012	Arrivals			Departures			Total Operations		
Aircraft Type	Daytime	Nighttime	Total	Daytime	Nighttime	Total	Daytime	Nighttime	Total
IA1125	0.01	0.00	0.01	0.01	0.00	0.01	0.02	0.00	0.02
KC135R	0.09	0.00	0.09	0.08	0.01	0.09	0.16	0.01	0.17
LEAR25	0.68	0.01	0.69	0.69	0.00	0.69	1.37	0.01	1.38
LEAR35	0.06	0.00	0.06	0.06	0.00	0.06	0.12	0.00	0.12
MU3001	0.03	0.00	0.03	0.03	0.01	0.03	0.06	0.01	0.06
Military Total	1.58	0.05	1.63	1.53	0.10	1.63	3.11	0.15	3.25
Grand Total	542.87	49.12	591.99	527.13	64.86	591.99	1,070.01	113.98	1,183.98

VGT 2012	Arrivals			Departures			Total Operations		
Aircraft Type	Daytime	Nighttime	Total	Daytime	Nighttime	Total	Daytime	Nighttime	Total
Air Taxi									
BEC58P	0.17	0.09	0.26	0.21	0.05	0.26	0.39	0.13	0.52
C130	0.001	0.000	0.001	0.001	0.000	0.001	0.003	0.000	0.003
CIT3	0.02	0.00	0.02	0.02	0.00	0.02	0.03	0.00	0.03
CL600	0.02	0.00	0.02	0.02	0.00	0.02	0.05	0.00	0.05
CNA172	0.02	0.00	0.02	0.02	0.00	0.02	0.05	0.00	0.05
CNA206	0.24	0.01	0.25	0.23	0.02	0.25	0.47	0.03	0.49
CNA441	0.04	0.01	0.05	0.05	0.00	0.05	0.10	0.01	0.11
CNA500	0.003	0.000	0.003	0.003	0.000	0.003	0.005	0.000	0.005
CNA750	0.01	0.00	0.01	0.01	0.00	0.01	0.01	0.00	0.01
DHC6	0.45	0.25	0.69	0.65	0.05	0.69	1.10	0.29	1.39
DHC8	0.37	0.01	0.38	0.35	0.04	0.38	0.72	0.05	0.77
FAL20	0.003	0.000	0.003	0.003	0.000	0.003	0.005	0.000	0.005
GASEPF	0.09	0.14	0.23	0.19	0.04	0.23	0.28	0.18	0.46
GASEPV	0.01	0.00	0.01	0.01	0.00	0.01	0.02	0.00	0.02
GIIB	0.004	0.000	0.004	0.004	0.000	0.004	0.008	0.000	0.008
GV	0.004	0.000	0.004	0.004	0.000	0.004	0.008	0.000	0.008
LEAR25	0.01	0.00	0.01	0.01	0.00	0.01	0.01	0.00	0.01
LEAR35	0.04	0.00	0.04	0.04	0.00	0.04	0.08	0.00	0.08
MU3001	0.14	0.01	0.16	0.14	0.02	0.16	0.28	0.03	0.32
PA30	0.01	0.11	0.12	0.12	0.00	0.12	0.13	0.11	0.24
PA31	0.67	0.01	0.68	0.67	0.01	0.68	1.34	0.01	1.35
Air Taxi Total	2.33	0.64	2.97	2.76	0.21	2.97	5.08	0.85	5.93

Table F-2-A2 (5 of 7)

AAD Itinerant IFR Aircraft Operations, by Aircraft Category, Aircraft Type and Time of Day, 2012

VGT 2012	Arrivals			Departures			Total Operations		
Aircraft Type	Daytime	Nighttime	Total	Daytime	Nighttime	Total	Daytime	Nighttime	Total
General Aviation									
1900D	0.004	0.000	0.004	0.004	0.000	0.004	0.008	0.000	0.008
BAE146	0.002	0.000	0.002	0.002	0.000	0.002	0.004	0.000	0.004
BEC58P	1.82	0.07	1.90	1.80	0.10	1.90	3.62	0.17	3.79
CIT3	0.13	0.01	0.14	0.12	0.01	0.14	0.25	0.02	0.27
CL600	0.02	0.00	0.02	0.02	0.00	0.02	0.04	0.00	0.04
CNA172	2.28	0.15	2.43	2.28	0.15	2.43	4.56	0.29	4.85
CNA206	1.74	0.08	1.82	1.66	0.16	1.82	3.39	0.24	3.64
CNA441	0.52	0.03	0.55	0.51	0.05	0.55	1.03	0.08	1.11
CNA500	0.58	0.02	0.60	0.56	0.03	0.60	1.14	0.05	1.19
CNA55B	0.01	0.00	0.01	0.01	0.00	0.01	0.03	0.00	0.03
CNA750	0.03	0.00	0.03	0.03	0.00	0.03	0.07	0.00	0.07
DHC6	0.60	0.02	0.62	0.57	0.05	0.62	1.16	0.08	1.24
DHC8	0.01	0.00	0.01	0.01	0.00	0.01	0.01	0.00	0.01
DHC830	0.02	0.00	0.02	0.02	0.00	0.02	0.04	0.01	0.05
GASEPF	0.37	0.02	0.39	0.37	0.02	0.39	0.74	0.04	0.78
GASEPV	5.16	0.15	5.31	5.03	0.29	5.31	10.19	0.44	10.63
GIIB	0.003	0.000	0.003	0.003	0.000	0.003	0.007	0.000	0.007
GIV	0.04	0.01	0.04	0.04	0.00	0.04	0.08	0.01	0.09
GV	0.01	0.00	0.01	0.01	0.00	0.01	0.01	0.00	0.01
HS125B	0.004	0.000	0.004	0.004	0.000	0.004	0.008	0.000	0.008
IA1125	0.03	0.00	0.04	0.03	0.00	0.04	0.07	0.01	0.07
LEAR25	0.01	0.00	0.01	0.01	0.00	0.01	0.02	0.00	0.02
LEAR35	0.41	0.05	0.46	0.42	0.03	0.46	0.83	0.08	0.91
MU3001	0.76	0.04	0.80	0.76	0.04	0.80	1.52	0.08	1.60
PA28	0.57	0.05	0.62	0.57	0.05	0.62	1.14	0.10	1.24
PA30	0.16	0.00	0.16	0.15	0.01	0.16	0.30	0.01	0.31
PA31	0.03	0.00	0.03	0.03	0.00	0.03	0.06	0.00	0.06
SD330	0.002	0.000	0.002	0.002	0.000	0.002	0.004	0.000	0.004
General Aviation Total	15.32	0.70	16.02	15.01	1.01	16.02	30.33	1.71	32.04
Military									
BEC58P	0.21	0.00	0.21	0.21	0.00	0.21	0.41	0.00	0.41
GIIB	0.10	0.00	0.10	0.10	0.00	0.10	0.21	0.00	0.21
Military Total	0.31	0.00	0.31	0.31	0.00	0.31	0.62	0.00	0.62
Grand Total	17.95	1.34	19.29	18.07	1.22	19.29	36.03	2.56	38.58

Table F-2-A2 (6 of 7)

AAD Itinerant IFR Aircraft Operations, by Aircraft Category, Aircraft Type and Time of Day, 2012

HND 2012	Arrivals			Departures			Total Operations		
Aircraft Type	Daytime	Nighttime	Total	Daytime	Nighttime	Total	Daytime	Nighttime	Total
Air Taxi									
1900D	0.46	0.00	0.46	0.46	0.00	0.46	0.92	0.00	0.92
BAE146	0.003	0.000	0.003	0.003	0.000	0.003	0.005	0.000	0.005
BEC58P	0.02	0.00	0.02	0.02	0.00	0.02	0.05	0.00	0.05
CIT3	0.09	0.01	0.10	0.09	0.01	0.10	0.19	0.01	0.20
CL600	0.05	0.00	0.06	0.06	0.00	0.06	0.11	0.00	0.11
CNA206	0.02	0.00	0.02	0.02	0.00	0.02	0.04	0.00	0.04
CNA441	0.14	0.04	0.18	0.15	0.03	0.18	0.30	0.07	0.37
CNA500	0.02	0.00	0.02	0.02	0.00	0.02	0.04	0.00	0.04
CNA750	0.06	0.00	0.06	0.06	0.00	0.06	0.11	0.00	0.11
DHC6	0.34	0.03	0.37	0.35	0.02	0.37	0.69	0.05	0.74
EMB145	0.01	0.00	0.01	0.01	0.00	0.01	0.02	0.00	0.02
FAL20	0.01	0.00	0.01	0.01	0.00	0.01	0.02	0.00	0.02
GASEPF	0.003	0.003	0.005	0.003	0.003	0.005	0.005	0.005	0.010
GASEPV	0.02	0.00	0.02	0.02	0.00	0.02	0.04	0.00	0.04
GIIB	0.01	0.00	0.01	0.01	0.00	0.01	0.02	0.00	0.02
GIV	0.01	0.00	0.01	0.00	0.01	0.01	0.01	0.01	0.01
GV	0.04	0.00	0.04	0.03	0.01	0.04	0.08	0.01	0.09
LEAR25	0.03	0.00	0.03	0.03	0.00	0.03	0.06	0.00	0.07
LEAR35	0.11	0.01	0.11	0.10	0.01	0.11	0.21	0.02	0.22
MU3001	0.33	0.02	0.35	0.33	0.02	0.35	0.66	0.05	0.70
PA31	0.003	0.000	0.003	0.003	0.000	0.003	0.005	0.000	0.005
SD330	0.02	0.00	0.02	0.02	0.00	0.02	0.05	0.00	0.05
Air Taxi Total	1.81	0.11	1.92	1.80	0.11	1.92	3.61	0.22	3.83
General Aviation									
1900D	0.36	0.01	0.37	0.37	0.00	0.37	0.73	0.01	0.74
BAE146	0.002	0.000	0.002	0.002	0.000	0.002	0.004	0.000	0.004
BEC58P	1.51	0.04	1.54	1.51	0.03	1.54	3.01	0.07	3.08
CIT3	0.28	0.02	0.30	0.26	0.04	0.30	0.54	0.05	0.59
CL600	0.25	0.01	0.26	0.22	0.04	0.26	0.47	0.05	0.52
CL601	0.002	0.002	0.004	0.004	0.000	0.004	0.006	0.002	0.008
CNA172	0.60	0.03	0.63	0.61	0.02	0.63	1.21	0.06	1.26
CNA206	1.11	0.04	1.15	1.09	0.06	1.15	2.20	0.11	2.31
CNA441	0.92	0.05	0.97	0.94	0.04	0.97	1.86	0.09	1.95
CNA500	1.05	0.04	1.09	1.05	0.04	1.09	2.10	0.08	2.18
CNA55B	0.01	0.00	0.01	0.01	0.00	0.01	0.03	0.00	0.03
CNA750	0.05	0.00	0.05	0.05	0.01	0.05	0.09	0.01	0.10
DHC6	1.18	0.07	1.25	1.16	0.09	1.25	2.33	0.16	2.49
DHC8	0.002	0.000	0.002	0.002	0.000	0.002	0.004	0.000	0.004

Table F-2-A2 (7 of 7)

AAD Itinerant IFR Aircraft Operations, by Aircraft Category, Aircraft Type and Time of Day, 2012

HND 2012	Arrivals			Departures			Total Operations		
Aircraft Type	Daytime	Nighttime	Total	Daytime	Nighttime	Total	Daytime	Nighttime	Total
DHC830	0.10	0.00	0.10	0.09	0.01	0.10	0.19	0.01	0.20
EMB120	0.004	0.000	0.004	0.004	0.000	0.004	0.008	0.000	0.008
FAL20	0.35	0.00	0.35	0.32	0.03	0.35	0.67	0.03	0.70
GASEPF	0.29	0.01	0.30	0.29	0.01	0.30	0.58	0.01	0.59
GASEPV	3.99	0.10	4.08	3.87	0.22	4.08	7.86	0.31	8.17
GIIB	0.10	0.00	0.11	0.09	0.01	0.11	0.20	0.02	0.21
GIV	0.14	0.01	0.14	0.13	0.01	0.14	0.27	0.02	0.29
GV	0.21	0.01	0.21	0.21	0.00	0.21	0.42	0.01	0.43
HS125B	0.01	0.00	0.01	0.01	0.00	0.01	0.02	0.00	0.02
HS748A	0.01	0.00	0.01	0.01	0.00	0.01	0.02	0.00	0.02
IA1125	0.17	0.00	0.17	0.17	0.00	0.17	0.34	0.00	0.34
LEAR25	0.05	0.00	0.05	0.05	0.00	0.05	0.09	0.00	0.10
LEAR35	1.34	0.07	1.41	1.31	0.10	1.41	2.65	0.17	2.82
MU3001	1.11	0.03	1.13	1.09	0.04	1.13	2.20	0.07	2.26
PA28	0.39	0.04	0.43	0.41	0.02	0.43	0.80	0.06	0.86
PA30	0.42	0.01	0.43	0.41	0.02	0.43	0.83	0.03	0.86
PA31	0.06	0.00	0.06	0.06	0.00	0.06	0.12	0.00	0.12
SD330	0.004	0.000	0.004	0.004	0.000	0.004	0.008	0.000	0.008
General Aviation Total	16.06	0.59	16.64	15.81	0.84	16.64	31.86	1.43	33.29
Military									
DHC6	0.01	0.00	0.01	0.01	0.00	0.01	0.02	0.00	0.02
DHC8	0.01	0.00	0.01	0.01	0.00	0.01	0.02	0.00	0.02
GIIB	0.01	0.00	0.01	0.01	0.00	0.01	0.02	0.00	0.02
Military Total	0.03	0.00	0.03	0.03	0.00	0.03	0.05	0.00	0.05
Grand Total	17.89	0.70	18.59	17.63	0.95	18.59	35.52	1.65	37.17

Note: For noise modeling purposes, the numbers of AAD itinerant IFR aircraft operations were developed to a precision of six digits after the decimal point. For the purposes of this detailed table, the numbers of operations are presented to a precision of two digits after the decimal point. For instances where the number of operations is less than 0.00, a precision of three digits after the decimal point is used.

Source: Ricondo & Associates, Inc., May 2011.
Prepared by: Ricondo & Associates, Inc., December 2011.

Table F-2-A3 (1 of 7)

AAD Itinerant IFR Aircraft Operations, by Aircraft Category, Aircraft Type and Time of Day, 2017

LAS 2017	Arrivals			Departures			Total Operations		
Aircraft Type	Daytime	Nighttime	Total	Daytime	Nighttime	Total	Daytime	Nighttime	Total
Air Carrier									
707320	0.003	0.000	0.003	0.003	0.000	0.003	0.006	0.000	0.006
737400	0.09	0.01	0.10	0.09	0.01	0.10	0.18	0.03	0.21
737500	7.63	0.99	8.62	6.90	1.72	8.62	14.53	2.71	17.25
737700	223.37	13.21	236.58	221.02	15.56	236.58	444.39	28.77	473.16
737800	43.74	4.92	48.65	40.76	7.90	48.65	84.49	12.82	97.31
737900	1.73	0.26	1.99	1.57	0.42	1.99	3.30	0.68	3.98
747400	1.28	0.00	1.28	1.28	0.00	1.28	2.56	0.01	2.57
757300	8.65	0.74	9.39	7.47	1.92	9.39	16.12	2.66	18.78
767300	6.65	4.42	11.08	7.93	3.15	11.08	14.58	7.57	22.16
767400	0.17	0.06	0.22	0.17	0.06	0.22	0.33	0.11	0.45
777200	0.83	0.00	0.83	0.56	0.27	0.83	1.38	0.27	1.66
777300	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01
7373B2	56.95	3.60	60.55	55.22	5.34	60.55	112.17	8.93	121.10
74720B	0.003	0.000	0.003	0.003	0.000	0.003	0.007	0.000	0.007
747SP	0.21	0.00	0.21	0.08	0.13	0.21	0.29	0.13	0.42
757PW	36.41	5.89	42.30	33.99	8.31	42.30	70.40	14.20	84.60
767CF6	0.07	0.00	0.07	0.06	0.02	0.07	0.13	0.02	0.15
A300-622R	1.32	0.33	1.65	1.36	0.29	1.65	2.68	0.62	3.30
A310-304	0.01	0.00	0.01	0.01	0.00	0.01	0.02	0.00	0.02
A319-131	52.97	4.26	57.24	50.76	6.48	57.24	103.73	10.74	114.47
A320-211	69.60	9.09	78.69	65.03	13.66	78.69	134.62	22.75	157.38
A320-232	6.17	0.73	6.91	4.99	1.91	6.91	11.17	2.65	13.81
A330-343	0.37	0.00	0.37	0.35	0.01	0.37	0.72	0.01	0.73
A340-211	0.83	0.00	0.83	0.81	0.02	0.83	1.63	0.03	1.66
DC93LW	0.01	0.00	0.01	0.01	0.00	0.01	0.01	0.00	0.01
DHC8	0.01	0.00	0.01	0.01	0.00	0.01	0.01	0.00	0.01
GV	10.68	0.29	10.97	9.98	0.99	10.97	20.66	1.28	21.94
MD11GE	0.003	0.000	0.003	0.001	0.002	0.003	0.004	0.002	0.005
MD81	0.19	0.03	0.22	0.20	0.02	0.22	0.39	0.05	0.44
MD82	0.15	0.04	0.19	0.17	0.02	0.19	0.32	0.06	0.38
MD83	19.39	4.45	23.85	21.13	2.71	23.85	40.53	7.17	47.69
MD9025	1.13	0.01	1.13	1.06	0.07	1.13	2.19	0.08	2.27
Air Carrier Total	550.60	53.36	603.96	532.96	71.00	603.96	1,083.56	124.36	1,207.91

Table F-2-A3 (2 of 7)

AAD Itinerant IFR Aircraft Operations, by Aircraft Category, Aircraft Type and Time of Day, 2017

LAS 2017	Arrivals			Departures			Total Operations		
Aircraft Type	Daytime	Nighttime	Total	Daytime	Nighttime	Total	Daytime	Nighttime	Total
AT									
1900D	0.74	0.00	0.74	0.72	0.02	0.74	1.47	0.02	1.49
BAE146	0.02	0.00	0.02	0.02	0.00	0.02	0.04	0.00	0.04
BEC58P	0.01	0.01	0.02	0.02	0.00	0.02	0.02	0.01	0.03
C130	0.05	0.00	0.05	0.05	0.00	0.05	0.10	0.00	0.10
CIT3	1.67	0.03	1.70	1.58	0.12	1.70	3.25	0.14	3.39
CL600	3.35	0.50	3.85	3.54	0.30	3.85	6.89	0.80	7.70
CL601	1.17	0.03	1.20	1.14	0.06	1.20	2.31	0.09	2.40
CNA206	0.02	0.00	0.02	0.02	0.00	0.02	0.03	0.00	0.03
CNA441	0.32	0.17	0.49	0.35	0.14	0.49	0.67	0.31	0.98
CNA500	0.41	0.02	0.43	0.40	0.03	0.43	0.81	0.05	0.86
CNA750	2.98	0.13	3.11	2.84	0.27	3.11	5.83	0.40	6.23
DHC6	3.13	0.29	3.42	3.15	0.26	3.42	6.28	0.55	6.83
DHC8	1.21	0.00	1.21	1.20	0.01	1.21	2.41	0.02	2.42
DHC830	0.07	0.00	0.08	0.08	0.00	0.08	0.15	0.00	0.15
EMB120	3.71	0.01	3.71	3.71	0.01	3.71	7.42	0.01	7.43
EMB145	4.08	0.02	4.10	4.05	0.05	4.10	8.13	0.07	8.20
FAL20	0.03	0.01	0.04	0.03	0.00	0.04	0.06	0.01	0.07
GASEPF	2.00	0.00	2.00	1.65	0.34	2.00	3.65	0.34	3.99
GASEPV	0.25	0.07	0.32	0.22	0.10	0.32	0.47	0.17	0.64
GIIB	0.10	0.01	0.11	0.09	0.02	0.11	0.19	0.02	0.21
GIV	1.20	0.06	1.26	1.07	0.19	1.26	2.27	0.25	2.52
GV	3.23	0.22	3.45	3.17	0.28	3.45	6.40	0.50	6.90
IA1125	0.19	0.02	0.21	0.18	0.03	0.21	0.36	0.06	0.42
LEAR25	0.06	0.01	0.07	0.06	0.01	0.07	0.12	0.02	0.14
LEAR35	4.72	0.34	5.06	4.62	0.44	5.06	9.34	0.79	10.13
MU3001	6.20	0.36	6.56	6.15	0.41	6.56	12.36	0.77	13.13
SD330	0.01	0.00	0.01	0.01	0.00	0.01	0.02	0.00	0.02
Air Taxi Total	40.92	2.30	43.22	40.12	3.10	43.22	81.04	5.40	86.44
General Aviation									
1900D	0.73	0.10	0.83	0.28	0.55	0.83	1.00	0.65	1.65
727EM2	0.003	0.000	0.003	0.003	0.000	0.003	0.006	0.000	0.006
BAC111	0.02	0.00	0.02	0.02	0.00	0.02	0.05	0.00	0.05
BAE146	0.22	0.01	0.22	0.22	0.00	0.22	0.44	0.01	0.44
BEC58P	0.99	0.14	1.13	0.87	0.25	1.13	1.86	0.39	2.25
CIT3	1.05	0.05	1.10	1.05	0.04	1.10	2.10	0.09	2.19
CL600	4.80	0.41	5.20	4.89	0.32	5.20	9.68	0.72	10.40
CL601	0.21	0.04	0.25	0.22	0.04	0.25	0.43	0.08	0.50
CNA172	0.32	0.03	0.35	0.28	0.07	0.35	0.60	0.09	0.70

Table F-2-A3 (3 of 7)

AAD Itinerant IFR Aircraft Operations, by Aircraft Category, Aircraft Type and Time of Day, 2017

LAS 2017	Arrivals			Departures			Total Operations		
Aircraft Type	Daytime	Nighttime	Total	Daytime	Nighttime	Total	Daytime	Nighttime	Total
CNA206	0.53	0.03	0.57	0.52	0.05	0.57	1.05	0.08	1.14
CNA441	1.78	0.08	1.86	1.51	0.35	1.86	3.29	0.43	3.72
CNA500	2.78	0.23	3.01	2.74	0.26	3.01	5.52	0.49	6.01
CNA55B	0.23	0.01	0.23	0.23	0.00	0.23	0.46	0.01	0.47
CNA750	0.86	0.07	0.93	0.84	0.09	0.93	1.71	0.16	1.86
DHC6	2.39	0.16	2.55	2.17	0.38	2.55	4.56	0.54	5.10
DHC830	0.64	0.03	0.67	0.63	0.04	0.67	1.26	0.07	1.34
EMB145	0.63	0.05	0.68	0.66	0.02	0.68	1.28	0.07	1.35
FAL20	0.49	0.03	0.52	0.49	0.03	0.52	0.98	0.06	1.04
GASEPF	0.12	0.01	0.13	0.12	0.01	0.13	0.25	0.02	0.27
GASEPV	3.57	0.13	3.70	3.33	0.38	3.70	6.90	0.51	7.41
GIIB	0.50	0.04	0.54	0.49	0.06	0.54	0.99	0.10	1.09
GIV	7.92	0.95	8.87	8.15	0.72	8.87	16.07	1.66	17.74
GV	3.87	0.45	4.32	3.96	0.36	4.32	7.84	0.81	8.65
HS125B	0.26	0.02	0.28	0.25	0.02	0.28	0.51	0.04	0.55
HS748A	0.03	0.00	0.03	0.03	0.00	0.03	0.06	0.00	0.07
IA1125	1.53	0.05	1.58	1.48	0.10	1.58	3.01	0.15	3.15
LEAR25	0.10	0.01	0.11	0.10	0.01	0.11	0.21	0.01	0.22
LEAR35	9.03	0.71	9.75	8.57	1.18	9.75	17.60	1.89	19.49
MU3001	5.76	0.28	6.05	5.61	0.44	6.05	11.37	0.72	12.09
PA28	0.17	0.01	0.18	0.15	0.03	0.18	0.31	0.05	0.36
PA30	0.08	0.01	0.09	0.08	0.01	0.09	0.15	0.02	0.17
PA31	0.01	0.00	0.01	0.01	0.00	0.01	0.02	0.00	0.02
SD330	0.003	0.000	0.003	0.003	0.000	0.003	0.006	0.000	0.006
SF340	0.003	0.000	0.003	0.000	0.003	0.003	0.003	0.003	0.006
General Aviation Total	51.63	4.14	55.77	49.96	5.80	55.77	101.59	9.95	111.53
Military									
707	0.01	0.00	0.01	0.01	0.00	0.01	0.03	0.00	0.03
707320	0.05	0.00	0.05	0.05	0.00	0.05	0.10	0.00	0.10
C130	0.31	0.01	0.33	0.29	0.04	0.33	0.60	0.05	0.65
DC1010	0.06	0.01	0.07	0.02	0.05	0.07	0.08	0.06	0.14
DC1030	0.004	0.000	0.004	0.004	0.000	0.004	0.007	0.000	0.007
DC870	0.04	0.00	0.04	0.04	0.00	0.04	0.08	0.00	0.08
DC93LW	0.06	0.00	0.06	0.06	0.00	0.06	0.13	0.00	0.13
DHC6	0.06	0.00	0.06	0.06	0.00	0.06	0.11	0.00	0.11
DHC8	0.04	0.00	0.04	0.04	0.00	0.04	0.07	0.00	0.07
DHC830	0.01	0.00	0.01	0.01	0.00	0.01	0.03	0.00	0.03
GASEPV	0.07	0.00	0.07	0.07	0.00	0.07	0.14	0.00	0.14

Table F-2-A3 (4 of 7)

AAD Itinerant IFR Aircraft Operations, by Aircraft Category, Aircraft Type and Time of Day, 2017

LAS 2017	Arrivals			Departures			Total Operations		
Aircraft Type	Daytime	Nighttime	Total	Daytime	Nighttime	Total	Daytime	Nighttime	Total
IA1125	0.01	0.00	0.01	0.01	0.00	0.01	0.02	0.00	0.02
KC135R	0.09	0.00	0.09	0.08	0.01	0.09	0.16	0.01	0.17
LEAR25	0.68	0.01	0.69	0.69	0.00	0.69	1.37	0.01	1.38
LEAR35	0.06	0.00	0.06	0.06	0.00	0.06	0.12	0.00	0.12
MU3001	0.03	0.00	0.03	0.03	0.01	0.03	0.06	0.01	0.06
Military Total	1.58	0.05	1.63	1.53	0.10	1.63	3.11	0.15	3.25
Grand Total	644.72	59.85	704.57	624.57	80.00	704.57	1,269.29	139.85	1,409.14

VGT 2017	Arrivals			Departures			Total Operations		
Aircraft Type	Daytime	Nighttime	Total	Daytime	Nighttime	Total	Daytime	Nighttime	Total
Air Taxi									
BEC58P	0.18	0.09	0.27	0.22	0.05	0.27	0.39	0.14	0.53
C130	0.001	0.000	0.001	0.001	0.000	0.001	0.003	0.000	0.003
CIT3	0.02	0.00	0.02	0.02	0.00	0.02	0.03	0.00	0.03
CL600	0.02	0.00	0.02	0.02	0.00	0.02	0.05	0.00	0.05
CNA172	0.02	0.00	0.02	0.02	0.00	0.02	0.05	0.00	0.05
CNA206	0.24	0.01	0.25	0.23	0.02	0.25	0.48	0.03	0.50
CNA441	0.04	0.01	0.05	0.05	0.00	0.05	0.10	0.01	0.11
CNA500	0.003	0.000	0.003	0.003	0.000	0.003	0.005	0.000	0.005
CNA750	0.01	0.00	0.01	0.01	0.00	0.01	0.01	0.00	0.01
DHC6	0.46	0.25	0.71	0.66	0.05	0.71	1.12	0.30	1.41
DHC8	0.38	0.01	0.39	0.35	0.04	0.39	0.73	0.05	0.78
FAL20	0.003	0.000	0.003	0.003	0.000	0.003	0.005	0.000	0.005
GASEPF	0.09	0.14	0.23	0.20	0.04	0.23	0.29	0.18	0.47
GASEPV	0.01	0.00	0.01	0.01	0.00	0.01	0.02	0.00	0.02
GIIB	0.004	0.000	0.004	0.004	0.000	0.004	0.008	0.000	0.008
GV	0.004	0.000	0.004	0.004	0.000	0.004	0.008	0.000	0.008
LEAR25	0.01	0.00	0.01	0.01	0.00	0.01	0.01	0.00	0.01
LEAR35	0.04	0.00	0.04	0.04	0.00	0.04	0.08	0.00	0.08
MU3001	0.15	0.01	0.16	0.14	0.02	0.16	0.29	0.03	0.32
PA30	0.01	0.11	0.12	0.12	0.00	0.12	0.13	0.11	0.25
PA31	0.68	0.01	0.69	0.68	0.01	0.69	1.36	0.01	1.38
Air Taxi Total	2.37	0.65	3.02	2.81	0.21	3.02	5.18	0.86	6.04

Table F-2-A3 (5 of 7)

AAD Itinerant IFR Aircraft Operations, by Aircraft Category, Aircraft Type and Time of Day, 2017

VGT 2017	Arrivals			Departures			Total Operations		
Aircraft Type	Daytime	Nighttime	Total	Daytime	Nighttime	Total	Daytime	Nighttime	Total
General Aviation									
1900D	0.004	0.000	0.004	0.004	0.000	0.004	0.008	0.000	0.008
BAE146	0.002	0.000	0.002	0.002	0.000	0.002	0.004	0.000	0.004
BEC58P	2.01	0.08	2.09	1.98	0.11	2.09	3.99	0.19	4.18
CIT3	0.14	0.01	0.15	0.14	0.01	0.15	0.28	0.02	0.30
CL600	0.02	0.00	0.02	0.02	0.00	0.02	0.04	0.00	0.04
CNA172	2.51	0.16	2.67	2.51	0.16	2.67	5.02	0.32	5.35
CNA206	1.92	0.09	2.00	1.82	0.18	2.00	3.74	0.27	4.01
CNA441	0.57	0.04	0.61	0.56	0.05	0.61	1.13	0.09	1.22
CNA500	0.64	0.02	0.66	0.62	0.04	0.66	1.26	0.06	1.31
CNA55B	0.01	0.00	0.01	0.01	0.00	0.01	0.03	0.00	0.03
CNA750	0.04	0.00	0.04	0.04	0.00	0.04	0.08	0.00	0.08
DHC6	0.66	0.03	0.68	0.62	0.06	0.68	1.28	0.08	1.37
DHC8	0.01	0.00	0.01	0.01	0.00	0.01	0.01	0.00	0.01
DHC830	0.02	0.00	0.03	0.02	0.00	0.03	0.04	0.01	0.05
GASEPF	0.41	0.02	0.43	0.40	0.03	0.43	0.82	0.04	0.86
GASEPV	5.69	0.17	5.85	5.54	0.32	5.85	11.22	0.48	11.71
GIIB	0.002	0.000	0.002	0.002	0.000	0.002	0.004	0.000	0.004
GIV	0.04	0.01	0.05	0.05	0.00	0.05	0.09	0.01	0.10
GV	0.01	0.00	0.01	0.01	0.00	0.01	0.01	0.00	0.01
HS125B	0.004	0.000	0.004	0.004	0.000	0.004	0.008	0.000	0.008
IA1125	0.04	0.00	0.04	0.04	0.00	0.04	0.07	0.01	0.08
LEAR25	0.01	0.00	0.01	0.01	0.00	0.01	0.02	0.00	0.02
LEAR35	0.45	0.05	0.50	0.47	0.04	0.50	0.91	0.09	1.00
MU3001	0.84	0.04	0.88	0.84	0.05	0.88	1.68	0.09	1.77
PA28	0.63	0.06	0.68	0.63	0.05	0.68	1.25	0.11	1.37
PA30	0.17	0.00	0.17	0.16	0.01	0.17	0.33	0.01	0.34
PA31	0.03	0.00	0.03	0.03	0.00	0.03	0.06	0.00	0.06
SD330	0.003	0.000	0.003	0.002	0.000	0.002	0.005	0.000	0.005
General Aviation Total	16.87	0.77	17.64	16.53	1.11	17.64	33.40	1.88	35.28
Military									
BEC58P	0.21	0.00	0.21	0.21	0.00	0.21	0.41	0.00	0.41
GIIB	0.10	0.00	0.10	0.10	0.00	0.10	0.21	0.00	0.21
Military Total	0.31	0.00	0.31	0.31	0.00	0.31	0.62	0.00	0.62
Grand Total	19.55	1.42	20.97	19.65	1.32	20.97	39.20	2.74	41.94

Table F-2-A3 (6 of 7)

AAD Itinerant IFR Aircraft Operations, by Aircraft Category, Aircraft Type and Time of Day, 2017

HND 2017	Arrivals			Departures			Total Operations		
Aircraft Type	Daytime	Nighttime	Total	Daytime	Nighttime	Total	Daytime	Nighttime	Total
Air Taxi									
1900D	0.48	0.00	0.48	0.48	0.00	0.48	0.96	0.00	0.96
BAE146	0.003	0.000	0.003	0.003	0.000	0.003	0.005	0.000	0.005
BEC58P	0.02	0.00	0.02	0.02	0.00	0.02	0.05	0.00	0.05
CIT3	0.10	0.01	0.10	0.10	0.01	0.10	0.20	0.01	0.21
CL600	0.06	0.00	0.06	0.06	0.00	0.06	0.12	0.00	0.12
CNA206	0.02	0.00	0.02	0.02	0.00	0.02	0.04	0.00	0.04
CNA441	0.15	0.04	0.19	0.16	0.03	0.19	0.31	0.07	0.39
CNA500	0.02	0.00	0.02	0.02	0.00	0.02	0.04	0.00	0.04
CNA750	0.06	0.00	0.06	0.06	0.00	0.06	0.12	0.00	0.12
DHC6	0.36	0.03	0.39	0.37	0.02	0.39	0.73	0.05	0.78
EMB145	0.01	0.00	0.01	0.01	0.00	0.01	0.02	0.00	0.02
FAL20	0.01	0.00	0.01	0.01	0.00	0.01	0.02	0.00	0.02
GASEPF	0.003	0.003	0.005	0.003	0.003	0.005	0.005	0.005	0.011
GASEPV	0.02	0.00	0.02	0.02	0.00	0.02	0.04	0.00	0.04
GIIB	0.01	0.00	0.01	0.01	0.00	0.01	0.01	0.00	0.01
GIV	0.01	0.00	0.01	0.01	0.01	0.01	0.02	0.01	0.02
GV	0.05	0.00	0.05	0.03	0.01	0.05	0.08	0.01	0.09
LEAR25	0.03	0.00	0.03	0.03	0.00	0.03	0.07	0.00	0.07
LEAR35	0.11	0.01	0.12	0.11	0.01	0.12	0.22	0.02	0.24
MU3001	0.35	0.02	0.37	0.34	0.03	0.37	0.69	0.05	0.74
PA31	0.003	0.000	0.003	0.003	0.000	0.003	0.005	0.000	0.005
SD330	0.02	0.00	0.02	0.02	0.00	0.02	0.05	0.00	0.05
Air Taxi Total	1.90	0.11	2.01	1.89	0.12	2.01	3.79	0.23	4.02
General Aviation									
1900D	0.41	0.01	0.42	0.42	0.00	0.42	0.84	0.01	0.85
BAE146	0.002	0.000	0.002	0.002	0.000	0.002	0.004	0.000	0.004
BEC58P	1.73	0.04	1.77	1.73	0.04	1.77	3.46	0.08	3.54
CIT3	0.32	0.02	0.34	0.30	0.04	0.34	0.62	0.06	0.68
CL600	0.28	0.01	0.30	0.26	0.04	0.30	0.54	0.06	0.60
CL601	0.002	0.002	0.004	0.004	0.000	0.004	0.007	0.002	0.009
CNA172	0.69	0.04	0.72	0.70	0.03	0.72	1.38	0.06	1.45
CNA206	1.28	0.05	1.33	1.25	0.07	1.33	2.53	0.12	2.65
CNA441	1.06	0.06	1.12	1.08	0.04	1.12	2.13	0.10	2.24
CNA500	1.21	0.04	1.25	1.21	0.04	1.25	2.42	0.09	2.51
CNA55B	0.02	0.00	0.02	0.01	0.00	0.02	0.03	0.00	0.03
CNA750	0.06	0.00	0.06	0.05	0.01	0.06	0.11	0.01	0.12
DHC6	1.35	0.08	1.43	1.33	0.10	1.43	2.68	0.18	2.86

Table F-2-A3 (7 of 7)

AAD Itinerant IFR Aircraft Operations, by Aircraft Category, Aircraft Type and Time of Day, 2017

HND 2017	Arrivals			Departures			Total Operations		
Aircraft Type	Daytime	Nighttime	Total	Daytime	Nighttime	Total	Daytime	Nighttime	Total
DHC8	0.002	0.000	0.002	0.002	0.000	0.002	0.004	0.000	0.004
DHC830	0.11	0.00	0.11	0.10	0.01	0.11	0.22	0.01	0.22
EMB120	0.004	0.000	0.004	0.004	0.000	0.004	0.009	0.000	0.009
FAL20	0.40	0.00	0.40	0.37	0.04	0.40	0.77	0.04	0.80
GASEPF	0.33	0.01	0.34	0.33	0.01	0.34	0.67	0.01	0.68
GASEPV	4.58	0.11	4.69	4.44	0.25	4.69	9.02	0.36	9.38
GIIB	0.07	0.00	0.07	0.06	0.01	0.07	0.13	0.01	0.14
GIV	0.21	0.01	0.22	0.20	0.02	0.22	0.41	0.04	0.44
GV	0.24	0.01	0.24	0.24	0.00	0.24	0.48	0.01	0.49
HS125B	0.01	0.00	0.01	0.01	0.00	0.01	0.02	0.00	0.03
HS748A	0.01	0.00	0.01	0.01	0.00	0.01	0.02	0.00	0.02
IA1125	0.20	0.00	0.20	0.19	0.00	0.20	0.39	0.00	0.39
LEAR25	0.05	0.00	0.05	0.05	0.00	0.05	0.11	0.00	0.11
LEAR35	1.53	0.08	1.62	1.50	0.12	1.62	3.04	0.20	3.24
MU3001	1.27	0.03	1.30	1.26	0.04	1.30	2.53	0.08	2.60
PA28	0.45	0.04	0.49	0.47	0.02	0.49	0.92	0.06	0.99
PA30	0.48	0.02	0.50	0.47	0.02	0.50	0.95	0.04	0.99
PA31	0.07	0.00	0.07	0.07	0.00	0.07	0.14	0.00	0.14
SD330	0.004	0.000	0.004	0.004	0.000	0.004	0.009	0.000	0.009
General Aviation Total	18.44	0.68	19.11	18.15	0.96	19.11	36.59	1.64	38.22
Military									
DHC6	0.01	0.00	0.01	0.01	0.00	0.01	0.02	0.00	0.02
DHC8	0.01	0.00	0.01	0.01	0.00	0.01	0.02	0.00	0.02
GIIB	0.01	0.00	0.01	0.01	0.00	0.01	0.02	0.00	0.02
Military Total	0.03	0.00	0.03	0.03	0.00	0.03	0.05	0.00	0.05
Grand Total	20.36	0.79	21.15	20.07	1.08	21.15	40.43	1.87	42.30

Note: For noise modeling purposes, the numbers of AAD itinerant IFR aircraft operations were developed to a precision of six digits after the decimal point. For the purposes of this detailed table, the numbers of operations are presented to a precision of two digits after the decimal point. For instances where the number of operations is less than 0.00, a precision of three digits after the decimal point is used.

Source: Ricondo & Associates, Inc., May 2011.
Prepared by: Ricondo & Associates, Inc., December 2011.

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