5 DEVELOPMENT OF NOISE CONTOURS

The CNEL contours contained in these NEMs were prepared using the most recent release of the FAA's Integrated Noise Model (INM) available at the time the contours were prepared; i.e., "Version 7.0b." The INM requires inputs in the following categories:

- Physical airport layout parameters
- Meteorological data
- Number and mix of aircraft operations
- Aircraft noise and performance characteristics
- Runway utilization rates
- Prototypical flight track descriptions and accompanying utilization rates

Sections 5.1.2 through 5.1.7 present this information (in the order listed above) for the noise contours presented in the preceding figures.

5.1.1 Changes in Modeling Assumptions from 2011 to 2016

The noise modeling assumptions used in developing the 2011 and 2016 contours differ only in terms of the level and mix of aircraft activity in the two years, since there are no known reasons for assuming any changes in the other five categories of modeling inputs listed above.

The aircraft noise and performance inputs discussed in Section 5.1.5 include "user-defined" modeling inputs reflecting benefits of the most commonly used "noise abatement departure profile" (NADP) procedures at VNY. To a large extent, these FAA-approved modeling refinements reflect the results of actions major operators have taken in response to the "fly-friendly" target noise level element of the VNY noise abatement program summarized in Section 3.2.1. As discussed in that section, LAWA is in the process of implementing enhancements to the program that it expects will lead to further NADP adjustments. The enhancements will commence officially in 2012. Detailed analyses of the existing program suggest that the adjustments will result in further reduction in single event noise levels over time. However, since it is impossible to predict what adjustments operators will make to their operating practices or the noise reduction that will result, the 2016 modeling inputs reflect current NADP procedures.

5.1.2 VNY Physical Parameters

Figure 9 presents a copy of the FAA's official "airport diagram." It includes airfield geometry data to supplement the required information depicted on the NEM figures.

The INM includes an internal database on the airport layout, including runway locations, orientation, start of takeoff roll points, runway end elevations, landing thresholds, approach angles, etc. These data were verified with internal LAWA sources and published FAA data to ensure the most current values were used for all modeling inputs.

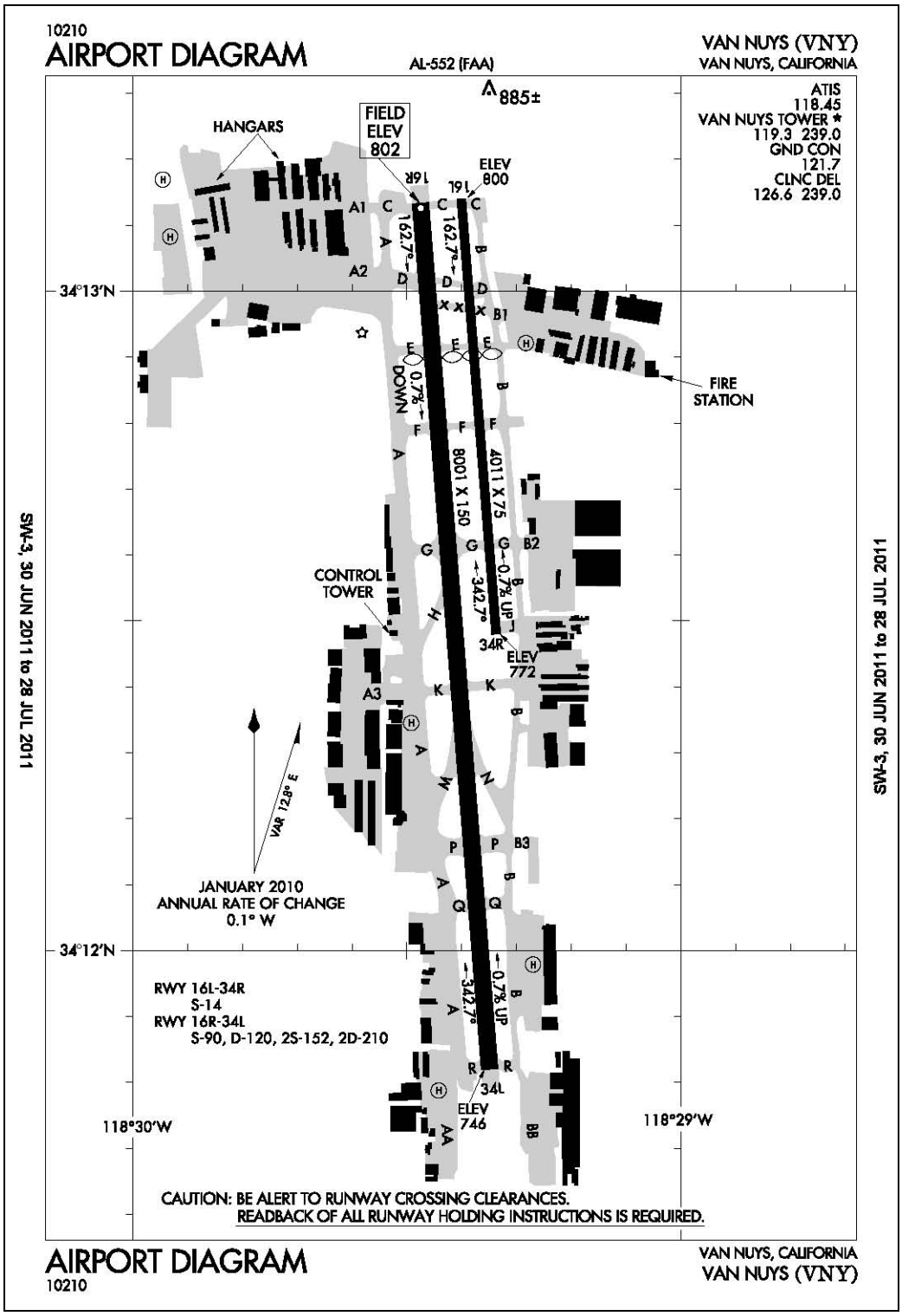
VNY has two parallel operational runways: Runway 16R/34L and Runway 16L/34R. The primary runway, Runway 16R/34L, is 8,001 feet long and 150 feet wide. Runway 16L/34R is 4,011 feet long and 75 feet wide. Both runways have a negative gradient of 0.7% from north to south. The published airport elevation is 799 feet above mean sea level. Both Runways 16R and 16L have displaced arrival thresholds of 1,431 feet.

Runway 16R has an approach angle of 3.9º, while the other runways have the INM default approach angle of 3.0º. As discussed in Section 5.1.5.3, LAWA submitted a request to the FAA, and received approval, for modification of the INM inputs to model the "non-standard" 3.9º approach.

Based on information from the ATCT, it was assumed that propeller aircraft conducted takeoffs that started at the taxiway intersections listed below (i.e., rather than using the full runway length) 15% of the time. The intersections are labeled in Figure 9 as follows:

- Intersection E for Runway 16L
- Intersection G for Runway 16R
- Intersection K for Runway 34L
- Intersection G for Runway 34R

Figure 9 FAA Airport Diagram for VNY
Source: FAA, 2011



5.1.3 Meteorological Data

Average daily meteorological data values for VNY were acquired from the National Climatic Data Center for the most recent complete five calendar years (2005 – 2010) and used to calculate annual average values for temperature (66.0°F), relative humidity (48.9%), and pressure (29.96 inches Hg) for input to the INM.

5.1.4 Aircraft Operations

Appendix I presents copies of documentation related to FAA review and approval of the airport activity forecasts used in preparing these NEMs, including: (1) the FAA approval letter, (2) the LAWA request for FAA's review, and (3) a detailed technical memorandum summarizing the forecast analyses and results.

Table 4 and Table 5 present detailed aircraft modeling fleet mixes for the existing (2011) and five-year forecast (2016) condition NEMs, respectively.

The tables present fleet mix detail broken down by type of operation (departures, arrivals, and touch-and-go cycles), the CNEL day (7:00 a.m.–7:00 p.m.), evening (7:00 p.m.–10:00 p.m.), and night (10:00 p.m.–7:00 a.m.), as discussed in Appendix Section C.9, and INM database aircraft types, including FAA-approved modeling "substitutes" and "user-defined" aircraft profiles, as discussed in Section 5.1.5.

Table 4 Forecast 2011 Annual Average Day Operations

Source: SH&E and HMMH, 2011

Aircraft Category	INM Aircraft Type	Departures			Arrivals			Touch & Go Cycles			Total
		Day	Evening	Night	Day	Evening	Night	Day	Evening	Night	
Jet	737700	1.03	0.07	0.10	0.91	0.15	0.15	0.00	0.00	0.00	2.42
	737800	0.01	<0.01	0.00	0.01	0.00	<0.01	0.00	0.00	0.00	0.03
	727LAC	0.04	<0.01	<0.01	0.03	0.01	<0.01	0.00	0.00	0.00	0.09
	A3_RAY	0.31	0.01	0.00	0.29	0.02	0.00	0.00	0.00	0.00	0.63
	CIT3	0.76	0.09	0.06	0.79	0.06	0.05	0.00	0.00	0.00	1.81
	CL600	5.70	0.41	0.61	5.26	0.88	0.60	0.00	0.00	0.00	13.45
	CL601	0.01	0.00	<0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.03
	CNA500	3.84	0.20	0.35	3.33	0.64	0.41	0.00	0.00	0.00	8.76
	CNA55B	2.40	0.25	0.21	2.38	0.27	0.20	0.00	0.00	0.00	5.72
	CNA750	3.74	0.28	0.32	3.49	0.46	0.38	0.00	0.00	0.00	8.67
	CRJ9-ER	0.04	0.00	0.00	0.02	0.00	0.02	0.00	0.00	0.00	0.07
	DC93LW	<0.01	0.00	0.00	<0.01	<0.01	0.00	0.00	0.00	0.00	0.01
	ECLIPSE500	0.57	0.04	0.07	0.51	0.09	0.09	0.00	0.00	0.00	1.38
	EMB145	0.19	0.01	0.01	0.17	0.03	0.02	0.00	0.00	0.00	0.42
	F15E29	<0.01	<0.01	0.00	<0.01	0.00	0.00	0.00	0.00	0.00	0.00
	F16PW9	0.01	<0.01	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.01
	F-18	0.01	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.02
	F5AB	0.01	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.01
	FAL20	0.22	0.03	0.01	0.23	0.01	0.01	0.00	0.00	0.00	0.51
	FAL50	1.21	0.09	0.13	1.16	0.17	0.09	0.00	0.00	0.00	2.84
	FAL900	0.81	0.05	0.08	0.71	0.11	0.12	0.00	0.00	0.00	1.89
	GII	1.19	0.13	0.01	0.96	0.21	0.16	0.00	0.00	0.00	2.66
	GIIB-HKB	1.61	0.16	0.01	1.21	0.33	0.23	0.00	0.00	0.00	3.55
	GIV_AG	9.72	0.70	1.06	7.87	1.93	1.69	0.00	0.00	0.00	22.97
	GV	2.80	0.28	0.30	2.39	0.56	0.44	0.00	0.00	0.00	6.77
	IA1125	2.57	0.20	0.25	2.33	0.41	0.28	0.00	0.00	0.00	6.04
	L25LAC	0.81	0.06	0.02	0.68	0.12	0.09	0.00	0.00	0.00	1.78
	L35LAC	13.35	1.05	1.98	11.60	2.43	2.35	0.00	0.00	0.00	32.76
	LEAR25	0.62	0.03	0.02	0.53	0.05	0.08	0.00	0.00	0.00	1.32
	LEAR35	8.13	0.52	0.60	7.30	1.16	0.80	0.00	0.00	0.00	18.51
	MU3001	7.05	0.50	0.79	6.47	1.00	0.87	0.00	0.00	0.00	16.69
	T-38A	0.10	0.01	0.01	0.12	0.00	0.00	0.00	0.00	0.00	0.25
Jet Subtotal		68.87	5.17	7.00	60.80	11.10	9.14	0.00	0.00	0.00	162.09
Turboprop	C130	0.03	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.06
	CNA208	2.59	0.17	0.21	2.61	0.31	0.04	0.00	0.00	0.00	5.93
	CNA441	8.21	0.42	0.34	7.76	0.83	0.39	0.00	0.00	0.00	17.96
	CVR580	0.00	0.00	<0.01	<0.01	<0.01	<0.01	0.00	0.00	0.00	0.01
	DHC6	17.87	0.85	1.31	16.30	2.34	1.38	0.00	0.00	0.00	40.05
	DHC830	0.02	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.04
	HS748A	0.18	<0.01	0.01	0.16	0.02	0.02	0.00	0.00	0.00	0.39
	PA42	0.18	0.04	<0.01	0.19	0.04	0.00	0.00	0.00	0.00	0.45
	SD330	0.84	0.02	0.04	0.77	0.08	0.05	0.00	0.00	0.00	1.79
Turboprop Subtotal		29.92	1.50	1.91	27.84	3.62	1.88	0.00	0.00	0.00	66.67

Aircraft Category	INM Aircraft Type	Departures			Arrivals			Touch & Go Cycles			Total
		Day	Evening	Night	Day	Evening	Night	Day	Evening	Night	
Twin Piston	BEC58P	116.00	7.41	0.34	110.67	12.65	0.42	53.66	3.59	0.00	362.00
	DC3	0.71	<0.01	<0.01	0.65	0.06	<0.01	0.00	0.00	0.00	1.42
	PA30	0.69	0.30	0.00	0.83	0.15	0.00	0.00	0.00	0.00	1.98
	PA31	3.16	0.31	0.04	2.42	1.07	0.03	0.00	0.00	0.00	7.03
Twin Piston Subtotal		120.56	8.01	0.39	114.57	13.93	0.45	53.66	3.59	0.00	372.42
Single Piston	GASEPF	0.00	0.00	0.00	0.00	0.00	0.00	32.20	2.16	0.00	68.71
	GASEPV	0.23	0.01	0.00	0.23	0.01	0.00	21.31	1.43	0.00	45.95
	T34	0.01	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.02
Single Piston Subtotal		0.24	0.01	0.00	0.24	0.01	0.00	53.50	3.58	0.00	114.68
Piston Subtotal		120.80	8.02	0.39	114.81	13.94	0.45	107.17	7.18	0.00	487.10
Helicopters	A109	0.90	0.14	0.08	0.93	0.10	0.09	0.00	0.00	0.00	2.25
	B206L	10.39	1.58	0.96	10.72	1.21	1.00	0.00	0.00	0.00	25.86
	B212	0.03	<0.01	<0.01	0.03	<0.01	<0.01	0.00	0.00	0.00	0.07
	B222	0.05	0.01	0.01	0.06	0.01	0.01	0.00	0.00	0.00	0.14
	B407	0.52	0.08	0.05	0.53	0.06	0.05	0.00	0.00	0.00	1.29
	BO105	3.09	0.47	0.29	3.19	0.36	0.30	0.00	0.00	0.00	7.70
	CH47D	0.03	<0.01	<0.01	0.03	<0.01	<0.01	0.00	0.00	0.00	0.07
	EC130	0.10	0.02	0.01	0.11	0.01	0.01	0.00	0.00	0.00	0.26
	H500D	0.84	0.13	0.08	0.87	0.10	0.08	0.00	0.00	0.00	2.10
	R22	5.14	0.78	0.47	5.30	0.60	0.50	0.00	0.00	0.00	12.79
	R44	2.41	0.37	0.22	2.48	0.28	0.23	0.00	0.00	0.00	5.99
	S65	0.11	0.02	0.01	0.12	0.01	0.01	0.00	0.00	0.00	0.28
	S76	1.65	0.25	0.15	1.70	0.19	0.16	0.00	0.00	0.00	4.10
	SA330J	0.01	<0.01	<0.01	0.01	<0.01	<0.01	0.00	0.00	0.00	0.02
	SA341G	0.46	0.07	0.04	0.47	0.05	0.04	0.00	0.00	0.00	1.14
	SA350D	17.05	2.59	1.58	17.59	1.98	1.65	0.00	0.00	0.00	42.44
	SA355F	1.31	0.20	0.12	1.35	0.15	0.13	0.00	0.00	0.00	3.26
	SC300C	3.13	0.48	0.29	3.23	0.36	0.30	0.00	0.00	0.00	7.79
Helicopter Subtotal		47.23	7.18	4.36	48.73	5.48	4.57	0.00	0.00	0.00	117.55
Total		266.82	21.87	13.66	252.18	34.14	16.04	107.17	7.18	0.00	833.40

Notes:

1. Total operations are equal to arrivals plus departures, plus two times the number of touch-and-go cycles, since each touch-and-go cycle is counted as two operations.

2. Several of the listed INM aircraft types are FAA-approved modeling substitutes for multiple aircraft types as discussed in Section 5.1.5.1.

3. Aircraft types highlighted in bold font are **"user-defined aircraft"** as discussed in Section 5.1.5.2.

4. Some subtotals may not add due to rounding.

Table 5 Forecast 2016 Annual Average Day Operations

Source: SH&E and HMMH, 2011

Aircraft Category	INM Aircraft Type	Departures			Arrivals			Touch & Go Cycles			Total
		Day	Evening	Night	Day	Evening	Night	Day	Evening	Night	
Jet	737700	1.55	0.11	0.15	1.37	0.23	0.22	0.00	0.00	0.00	3.64
	737800	0.01	0.01	0.00	0.01	0.00	0.01	0.00	0.00	0.00	0.04
	727LAC	0.02	<0.01	<0.01	0.02	0.01	<0.01	0.00	0.00	0.00	0.04
	A3_RAY	0.28	0.01	0.00	0.26	0.02	0.00	0.00	0.00	0.00	0.57
	CIT3	1.11	0.13	0.09	1.16	0.08	0.08	0.00	0.00	0.00	2.65
	CL600	8.46	0.62	0.91	7.80	1.30	0.88	0.00	0.00	0.00	19.95
	CL601	0.01	0.00	0.01	0.02	0.00	0.00	0.00	0.00	0.00	0.04
	CNA500	5.04	0.26	0.45	4.37	0.84	0.54	0.00	0.00	0.00	11.50
	CNA55B	3.52	0.36	0.30	3.49	0.40	0.30	0.00	0.00	0.00	8.37
	CNA750	5.47	0.41	0.47	5.11	0.67	0.56	0.00	0.00	0.00	12.69
	CRJ9-ER	0.06	0.00	0.00	0.03	0.00	0.03	0.00	0.00	0.00	0.11
	DC93LW	<0.01	0.00	0.00	<0.01	<0.01	0.00	0.00	0.00	0.00	0.00
	ECLIPSE500	1.83	0.14	0.23	1.63	0.30	0.28	0.00	0.00	0.00	4.42
	EMB145	0.28	0.01	0.01	0.25	0.04	0.02	0.00	0.00	0.00	0.61
	F15E29	<0.01	<0.01	0.00	<0.01	0.00	0.00	0.00	0.00	0.00	0.00
	F16PW9	0.01	<0.01	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.01
	F-18	0.01	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.02
	F5AB	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	FAL20	0.14	0.02	<0.01	0.15	0.01	0.01	0.00	0.00	0.00	0.33
	FAL50	1.76	0.13	0.19	1.70	0.24	0.14	0.00	0.00	0.00	4.16
	FAL900	1.22	0.07	0.13	1.07	0.16	0.19	0.00	0.00	0.00	2.83
	GII	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	GIIB-HKB	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	GIV_AG	14.59	1.05	1.59	11.80	2.89	2.54	0.00	0.00	0.00	34.47
	GV	4.21	0.42	0.45	3.58	0.84	0.66	0.00	0.00	0.00	10.16
	IA1125	3.76	0.29	0.36	3.41	0.60	0.41	0.00	0.00	0.00	8.84
	L25LAC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	L35LAC	18.60	1.44	2.74	16.17	3.39	3.23	0.00	0.00	0.00	45.56
	LEAR25	0.86	0.04	0.02	0.74	0.06	0.12	0.00	0.00	0.00	1.84
	LEAR35	11.87	0.76	0.88	10.65	1.69	1.17	0.00	0.00	0.00	27.00
	MU3001	9.26	0.66	1.04	8.50	1.32	1.14	0.00	0.00	0.00	21.91
	T-38A	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Jet Subtotal		93.93	6.94	10.03	83.28	15.09	12.52	0.00	0.00	0.00	221.78
Turboprop	C130	0.02	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.05
	CNA208	2.46	0.16	0.20	2.48	0.29	0.04	0.00	0.00	0.00	5.64
	CNA441	7.80	0.40	0.32	7.38	0.78	0.37	0.00	0.00	0.00	17.06
	CVR580	0.00	0.00	<0.01	<0.01	<0.01	<0.01	0.00	0.00	0.00	0.01
	DHC6	16.98	0.81	1.24	15.49	2.23	1.31	0.00	0.00	0.00	38.05
	DHC830	0.02	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.04
	HS748A	0.17	<0.01	0.01	0.15	0.02	0.02	0.00	0.00	0.00	0.37
	PA42	0.17	0.04	<0.01	0.18	0.03	0.00	0.00	0.00	0.00	0.43
	SD330	0.79	0.02	0.04	0.73	0.08	0.05	0.00	0.00	0.00	1.70
Turboprop Subtotal		28.43	1.43	1.82	26.45	3.44	1.79	0.00	0.00	0.00	63.34

Aircraft Category	INM Aircraft Type	Departures			Arrivals			Touch & Go Cycles			Total
		Day	Evening	Night	Day	Evening	Night	Day	Evening	Night	
Twin Piston	BEC58P	110.09	7.04	0.32	105.02	12.04	0.40	52.20	3.50	0.00	346.30
	DC3	0.64	<0.01	<0.01	0.59	0.05	<0.01	0.00	0.00	0.00	1.28
	PA30	0.66	0.28	0.00	0.80	0.15	0.00	0.00	0.00	0.00	1.88
	PA31	3.02	0.29	0.04	2.31	1.02	0.02	0.00	0.00	0.00	6.70
Twin Piston Subtotal		114.40	7.62	0.37	108.71	13.26	0.43	52.20	3.50	0.00	356.17
Single Piston	GASEPF	0.00	0.00	0.00	0.00	0.00	0.00	31.32	2.10	0.00	66.83
	GASEPV	0.21	0.01	0.00	0.21	0.01	0.00	20.73	1.39	0.00	44.68
	T34	0.01	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.02
Single Piston Subtotal		0.22	0.01	0.00	0.22	0.01	0.00	52.05	3.49	0.00	111.54
Piston Subtotal		114.62	7.63	0.37	108.93	13.27	0.43	104.25	6.98	0.00	467.71
Helicopters	A109	1.08	0.16	0.10	1.11	0.12	0.10	0.00	0.00	0.00	2.68
	B206L	12.41	1.89	1.15	12.80	1.44	1.20	0.00	0.00	0.00	30.88
	B212	0.04	0.01	<0.01	0.04	<0.01	<0.01	0.00	0.00	0.00	0.09
	B222	0.07	0.01	0.01	0.07	0.01	0.01	0.00	0.00	0.00	0.16
	B407	0.62	0.09	0.06	0.64	0.07	0.06	0.00	0.00	0.00	1.54
	BO105	3.70	0.56	0.34	3.81	0.43	0.36	0.00	0.00	0.00	9.20
	CH47D	0.03	0.01	<0.01	0.04	<0.01	<0.01	0.00	0.00	0.00	0.09
	EC130	0.13	0.02	0.01	0.13	0.01	0.01	0.00	0.00	0.00	0.31
	H500D	1.01	0.15	0.09	1.04	0.12	0.10	0.00	0.00	0.00	2.51
	R22	6.14	0.93	0.57	6.33	0.71	0.59	0.00	0.00	0.00	15.27
	R44	2.88	0.44	0.27	2.97	0.33	0.28	0.00	0.00	0.00	7.16
	S65	0.13	0.02	0.01	0.14	0.02	0.01	0.00	0.00	0.00	0.33
	S76	1.97	0.30	0.18	2.03	0.23	0.19	0.00	0.00	0.00	4.89
	SA330J	0.01	<0.01	<0.01	0.01	<0.01	<0.01	0.00	0.00	0.00	0.02
	SA341G	0.55	0.08	0.05	0.56	0.06	0.05	0.00	0.00	0.00	1.36
	SA350D	20.36	3.09	1.88	21.01	2.36	1.97	0.00	0.00	0.00	50.68
	SA355F	1.57	0.24	0.14	1.61	0.18	0.15	0.00	0.00	0.00	3.90
	SC300C	3.74	0.57	0.35	3.86	0.43	0.36	0.00	0.00	0.00	9.30
Helicopter Subtotal		56.40	8.57	5.21	58.18	6.54	5.45	0.00	0.00	0.00	140.36
Total		293.38	24.56	17.42	276.84	38.34	20.19	104.25	6.98	0.00	893.20

Notes:

1. Total operations are equal to arrivals plus departures, plus two times the number of touch-and-go cycles, since each touch-and-go cycle is counted as two operations.

2. Several of the listed INM aircraft types are FAA-approved modeling substitutes for multiple aircraft types as discussed in Section 5.1.5.1.

3. Aircraft types highlighted in bold font are **"user-defined aircraft"** as discussed in Section 5.1.5.2.

4. Some subtotals may not add due to rounding.

5.1.5 Aircraft Noise and Performance Characteristics

The INM database contains noise and performance data for over one hundred different aircraft types. The program automatically accesses the applicable noise and performance data for operations by those aircraft. Noise data are in the form of SEL (see Appendix C.5) at a range of distances (from 200 feet to 25,000 feet) from a particular aircraft with engines at a specific thrust level. Performance data includes thrust, speed, and altitude profiles for takeoff and landing operations.

To model operations at VNY as accurately as feasible, it was necessary to obtain FAA approval for three "non-standard" INM applications:

- Use of "substitute" aircraft types for aircraft not included in the INM database
- Use of "user-defined" modeling inputs reflecting benefits of the most commonly used "noise abatement departure profile" (NADP) procedures at VNY and user-defined aircraft noise-power-distance (NPD) curve adjustments for the GIII aircraft with hushkits
- A non-standard descent angle to Runway 16R

The following subsections summarize these revisions.

5.1.5.1 INM Aircraft Type Substitutes

The aircraft types listed in the tables in Section 5.1.4 identify operations according to INM database aircraft types. Many of these types represent multiple aircraft models with comparable noise and performance characteristics. The INM database does not include data for every aircraft type. The database includes a lookup table that identifies approved "substitutes" for many types. However, that lookup table does not include some aircraft types modeled at VNY. For those aircraft types, recommendations for INM substitute aircraft were forwarded to the FAA for approval or identification of an alternate approved substitution.

Appendix G presents a copy of the LAWA request to FAA for guidance. Appendix H presents the FAA response. The noise contours presented in this document followed the FAA guidance.

5.1.5.2 User-Defined Aircraft Types

FAA recognizes that in some instances it is appropriate for airports to utilize "user-defined" aircraft noise and performance inputs to supplement standard INM database types. Appendix B in the "INM 7.0 User's Guide and Technical Manual"[39] provides FAA direction for addressing non-standard modeling profiles; other FAA-published policies and procedures provide further guidance.[40]

Appendix F provides copies of the LAWA request to FAA for guidance related to application of user-defined INM inputs for the following aircraft types: (1) Boeing 727, (2) Douglas A-3, (3) Lear

[39] Distributed by the FAA with the INM and updated electronically with each new INM release. See http://www.faa.gov/about/office_org/headquarters_offices/apl/research/models/inm_model/.

[40] Ralph Thompson, Manager, Airport Planning and Environmental Division, APP-400, "AEE and Airports Coordination Policy for Non-Standard Modeling Procedures and Methodology," July 28, 2009, available at http://www.faa.gov/airports/environmental/policy_guidance/media/nonstd_inm_modeling.pdf.

25, (4) Lear 35, (5) Gulfstream IV, and (6) Gulfstream III with hushkit for recertification to Part 36 Stage 3. Appendix H presents the FAA response. The noise contours presented in this document followed the FAA guidance.

5.1.5.3 Non-Standard Descent Angle to Runway 16R

Runway 16R has an approach angle of 3.9º, while the other runways have the INM default approach angle of 3.0º. As required by FAA noise modeling protocol, LAWA submitted a request to the FAA for modification of the INM inputs to model the "non-standard" 3.9º approach on Runway 16R. Appendix F provides copies of the associated LAWA request. Appendix H presents FAA's response approving this request.

5.1.6 VNY Runway Utilization

5.1.6.1 Fixed-Wing Aircraft

Runway utilization was developed from review of the following primary data sources:

- FAA Automated Radar Terminal System (ARTS) data for 2004 through 2010
- Runway use assumptions from the prior Part 150 study
- LAWA quarterly contour models
- LAWA noise and operations monitoring system data
- LAWA annual runway utilization
- Discussions with the FAA's VNY Air Traffic Control Tower (ATCT) manager

Table 6 presents the modeled runway use for arrival and departure operations for all modeled cases for the fixed-wing aircraft split into the CNEL day (7:00 a.m.–7:00 p.m.), evening (7:00 p.m.–10:00 p.m.), and night (10:00 p.m.–7:00 a.m.).

Table 6 Runway Utilization for Fixed-Wing Aircraft Arrivals and Departures
Source: LAWA, FAA ARTS, and VNY ATCT

Aircraft Group	Runway	Departures			Arrivals		
		Day	Evening	Night	Day	Evening	Night
Jets	16L	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	16R	83.84%	81.80%	78.87%	83.06%	80.49%	85.80%
	34L	16.16%	18.20%	21.13%	16.94%	19.51%	14.20%
	34R	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Large Props (C130, CNA208, CVR580, DC3, DHC6, DHC830, HS748A, and SD330)	16L	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	16R	81.93%	83.80%	80.25%	81.30%	80.03%	79.67%
	34L	18.07%	16.20%	19.75%	18.70%	19.97%	20.33%
	34R	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Small Props	16L	22.93%	31.00%	23.38%	37.29%	24.95%	31.16%
	16R	59.00%	52.80%	56.87%	44.01%	55.08%	48.51%
	34L	11.90%	13.28%	19.75%	10.38%	13.83%	20.33%
	34R	6.17%	2.92%	0.00%	8.32%	6.14%	0.00%

Local pattern operations are limited to propeller aircraft. Approximately 90% of local patterns are flown on Runway 16L/34R, with a pattern altitude of 1,000 feet above field elevation (AFE), with a left pattern for 16L and a right pattern for 34R. Local patterns flown on Runway 16R/34L have a pattern altitude of 1,200 feet AFE, with a right pattern for Runway 16R and a left pattern for Runway 34L. Repetitive operations are not permitted during nighttime hours. Using an 80/20 split for south and north operations, respectively, resulted in the runway utilization rates for local patterns summarized in Table 7.

Table 7 Runway Utilization Rates for Local Pattern Operations
Source: LAWA and FAA ATCT

Runway	Time of Day		
	Day	Evening	Night
16L	72.00%	72.00%	0.00%
16R	8.00%	8.00%	0.00%
34L	2.00%	2.00%	0.00%
34R	18.00%	18.00%	0.00%

5.1.6.2 Helipad Use

As discussed in Section 4.2, VNY helicopter operations operate primarily from the former National Guard ramp in the northwest section of the airport and from the ramp area in the southwest section. Modeling helipads were created in these two locations and are depicted on the 2011 existing condition and 2016 five-year forecast condition NEM figures (Figure 7 and Figure 8, respectively). Historic radar data were used to develop use rates for these two pads, as summarized in Table 8.

Table 8 Helipad Utilization Rates for Helicopter Arrivals and Departures
Source: 2004–2005 ARTS Data, HMMH

Helipad	Departures			Arrivals		
	Day	Evening	Night	Day	Evening	Night
Northwest	52.78%	77.69%	56.03%	35.95%	37.10%	28.28%
Southwest	47.22%	22.31%	43.97%	64.05%	62.90%	71.72%

5.1.7 Flight Track Geometry and Use

FAA ARTS data from 2004 through 2010 were used to sample more than 200,000 actual flight tracks for use in developing INM modeling flight tracks, supplemented by LAWA and FAA ATCT input and reviews, in particular for the development of flight tracks for local pattern activity.

Aircraft were grouped into three major subgroups: jets, propeller aircraft, and helicopters, further broken down by arrivals, departures, and local pattern activity in the following 10 figures:

- Figure 10 Modeled Flight Tracks for Runway 16R and 34L Jet Arrivals
- Figure 11 Modeled Flight Tracks for Runway 16R and 34L Jet Departures
- Figure 12 Modeled Flight Tracks for Runway 16R and 34L Propeller Arrivals

- Figure 13 Modeled Flight Tracks for Runway 16L and 34R Propeller Arrivals
- Figure 14 Modeled Flight Tracks for Runway 16R and 34L Propeller Departures
- Figure 15 Modeled Flight Tracks for Runway 16L and 34R Propeller Departures
- Figure 16 Modeled Flight Tracks for Helicopter Arrivals
- Figure 17 Modeled Flight Tracks for Helicopter Departures
- Figure 18 Modeled Flight Tracks for Runways 16L/16R Local Patterns
- Figure 19 Modeled Flight Tracks for Runways 34L/34R Local Patterns

Tables following the figures define flight track utilization rates.

As required by Part 150, the flight track figures depict the modeled flight tracks out to at least 30,000 feet from brake release. To fit on a standard 8.5" by 11" in this document, they are at the scale of 1" to 8,000'. Part 150 requires that the modeled flight tracks be presented at the same scale as the Noise Exposure Map contours, which are at 1" to 2,000'. FAA guidelines permit airports to present the flight tracks on separate, unbound figures at this scale accompanying the Noise Exposure Map document. To comply with this requirement, each official copy of the document will include enlarged copies of the figures at the prescribed scale, in a sleeve at the end of the document.

To better represent the dispersal of actual operations, the INM permits the development of the central or "backbone" tracks and the addition of "sub-tracks" on either side of each backbone. Arrival and departure tracks were modeled using four subtracks on each side of the associated backbone; pattern operations were modeled using two subtracks on each side of the backbone. The overall width of the subtrack distribution was defined based on the area spanned by the actual radar tracks being modeled. The INM distributes the flight operations associated with each backbone track across the associated nine or five tracks using a "binomial probability distribution," as discussed in the "INM 7.0 User's Guide and Technical Manual."[41]

The flight track nomenclature for fixed-wing aircraft tracks consists of seven or eight characters:

- First digit = aircraft group (Jet or Propeller)
- Second through fourth digits = runway (16L, 16R, 34L, 34R)
- Fifth digit = type of operation (Arrival or Departure)
- Sixth and seventh digits = track number (01, 02, etc.)
- Eighth digit = intersection departure (I), if appropriate

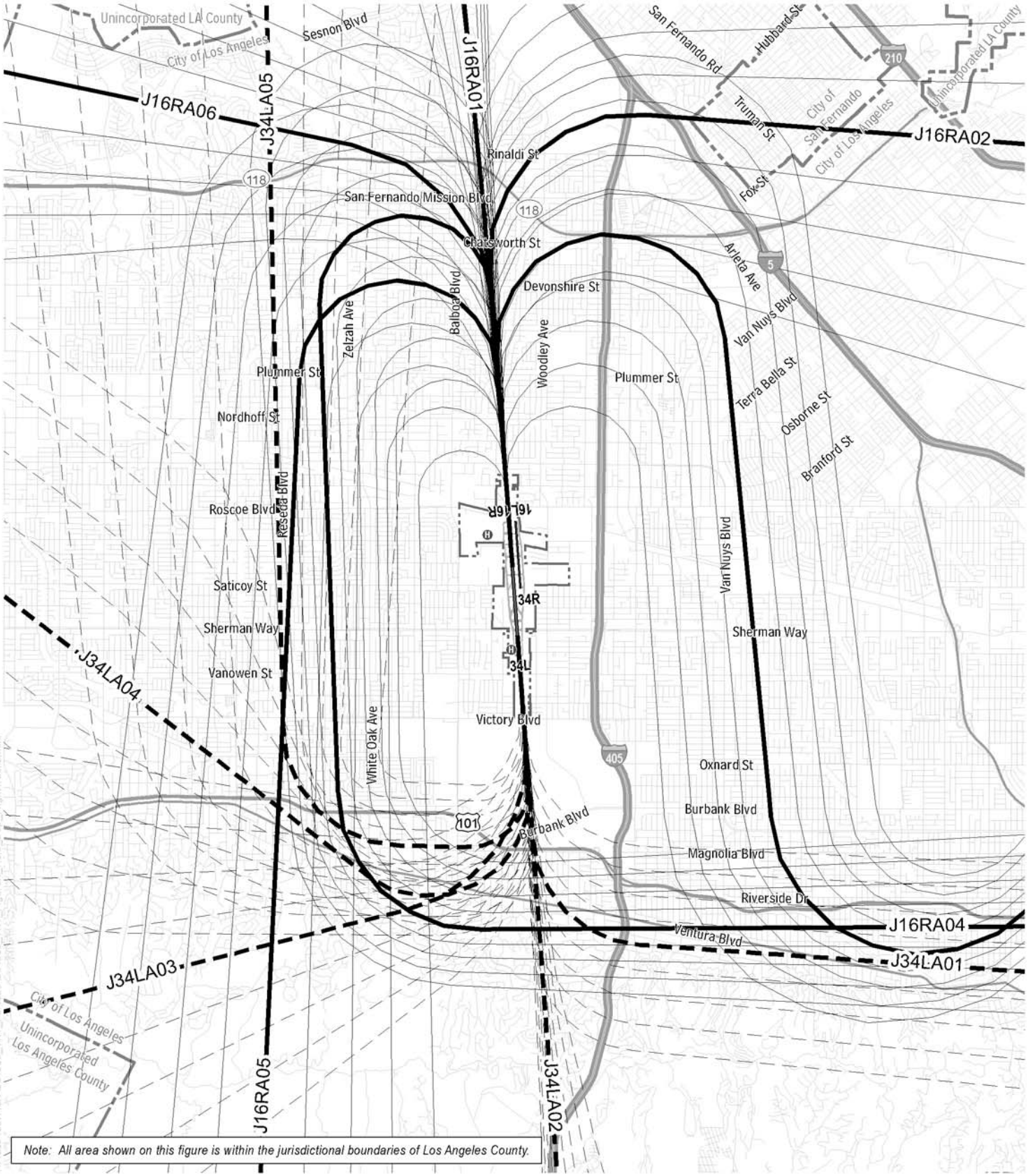
Helicopter track nomenclature consists of HEL followed by three digits representing:

- First digit = operation (Arrival or Departure)
- Second and third digits = track number (01, 02, etc.).

Local pattern flight tracks were modeled using one backbone track for each runway.

Table 9 and Table 10 list the flight track utilization rates for fixed-wing departures and arrivals, respectively. Table 11 presents helicopter flight track utilization rates.

[41] Op cit., page 108.



Note: All area shown on this figure is within the jurisdictional boundaries of Los Angeles County.

- Modeled Backbone Arrival Track (16R)
- Modeled Dispersed Arrival Track (16R)
- Modeled Backbone Arrival Track (34L)
- Modeled Dispersed Arrival Track (34L)
- Airport Boundary
- Highway
- Road
- Municipal Boundary
- Runway / Taxiway
- Helicopter Pad
- Railroad

Basemap: Los Angeles World Airports (LAWA), Southern California Association of Governments (SCAG), Environmental Systems Research Institute (ESRI), United States Geological Survey (USGS)

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Van Nuys
Los Angeles World Airports

Modeling Flight Tracks - Jet Arrivals
Runway 16R & 34L

Figure: 10

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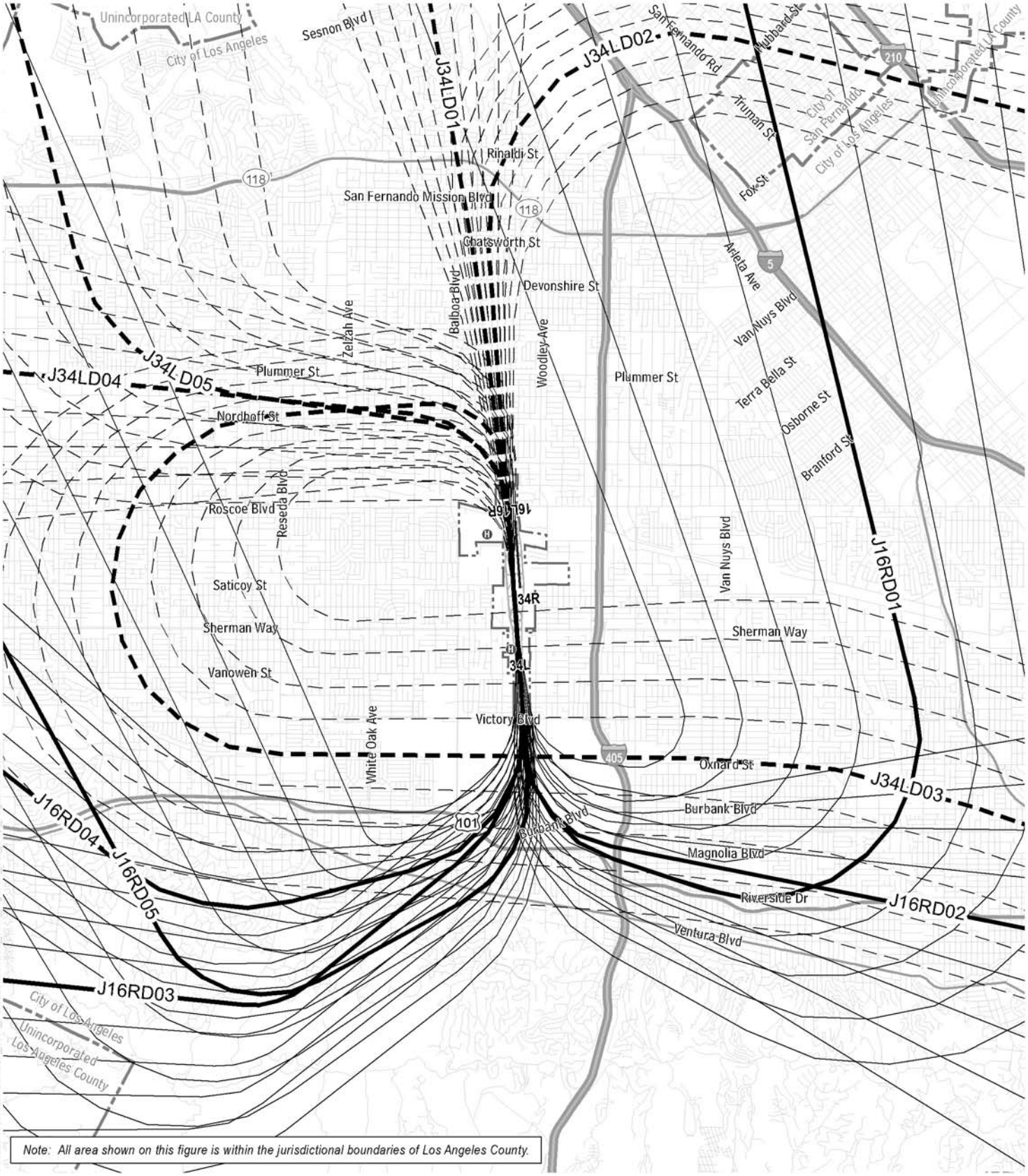

Note: All area shown on this figure is within the jurisdictional boundaries of Los Angeles County.

Modeled Backbone Departure Track (16R)
Modeled Dispersed Departure Track (16R)
Modeled Backbone Departure Track (34L)
Modeled Dispersed Departure Track (34L)
Airport Boundary
Highway
Road
Municipal Boundary
Runway / Taxiway
Helicopter Pad
Railroad

Basemap: Los Angeles World Airports (LAWA), Southern California Association of Governments (SCAG), Environmental Systems Research Institute (ESRI), United States Geological Survey (USGS)

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Los Angeles World Airports

Modeling Flight Tracks - Jet Departures
Runway 16R & 34L

Figure: 11

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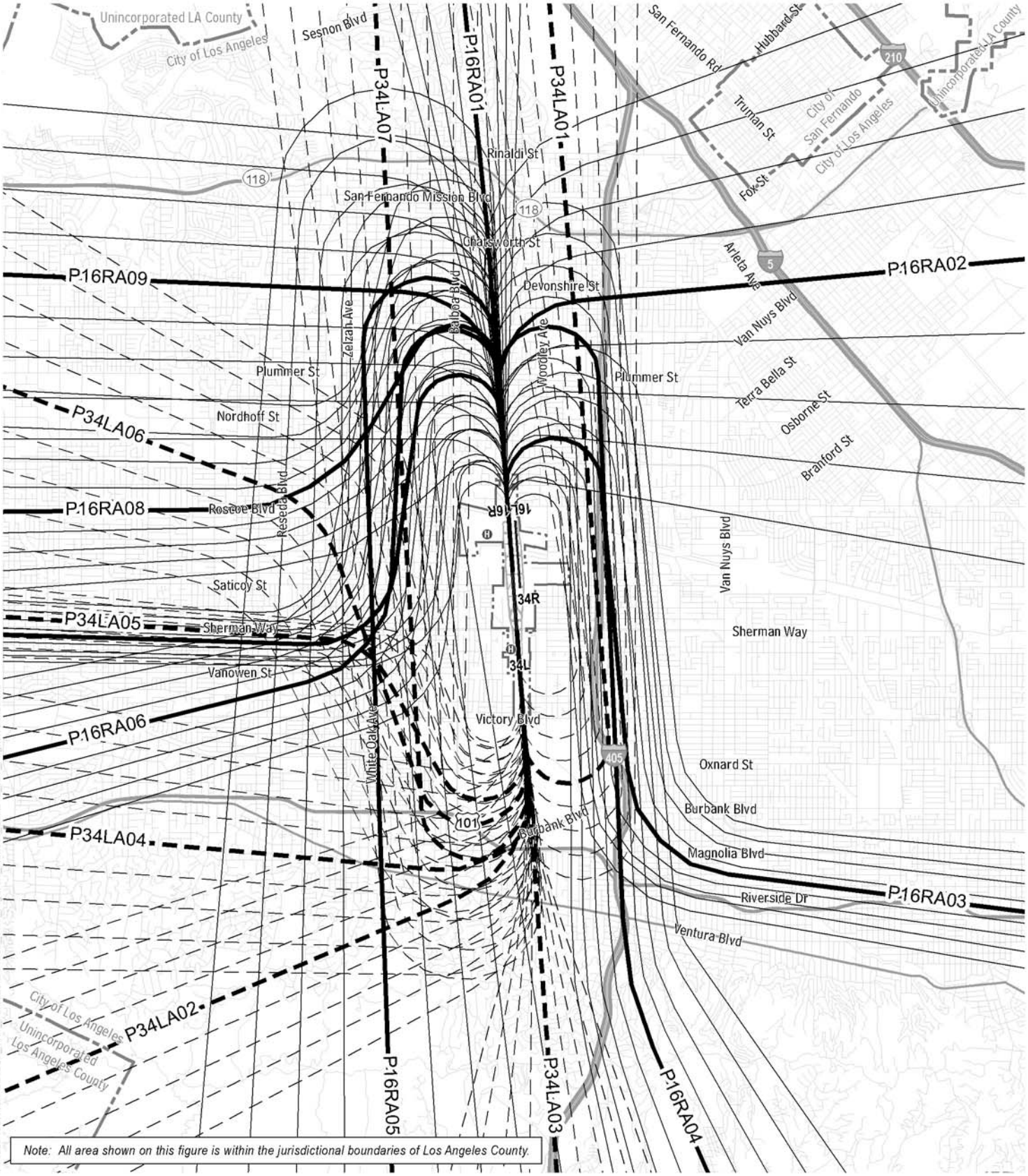

Basemap: Los Angeles World Airports (LAWA), Southern California Association of Governments (SCAG), Environmental Systems Research Institute (ESRI), United States Geological Survey (USGS)

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Los Angeles World Airports

Modeling Flight Tracks - Non-Jet Arrivals
Runway 16R & 34L

Figure: 12

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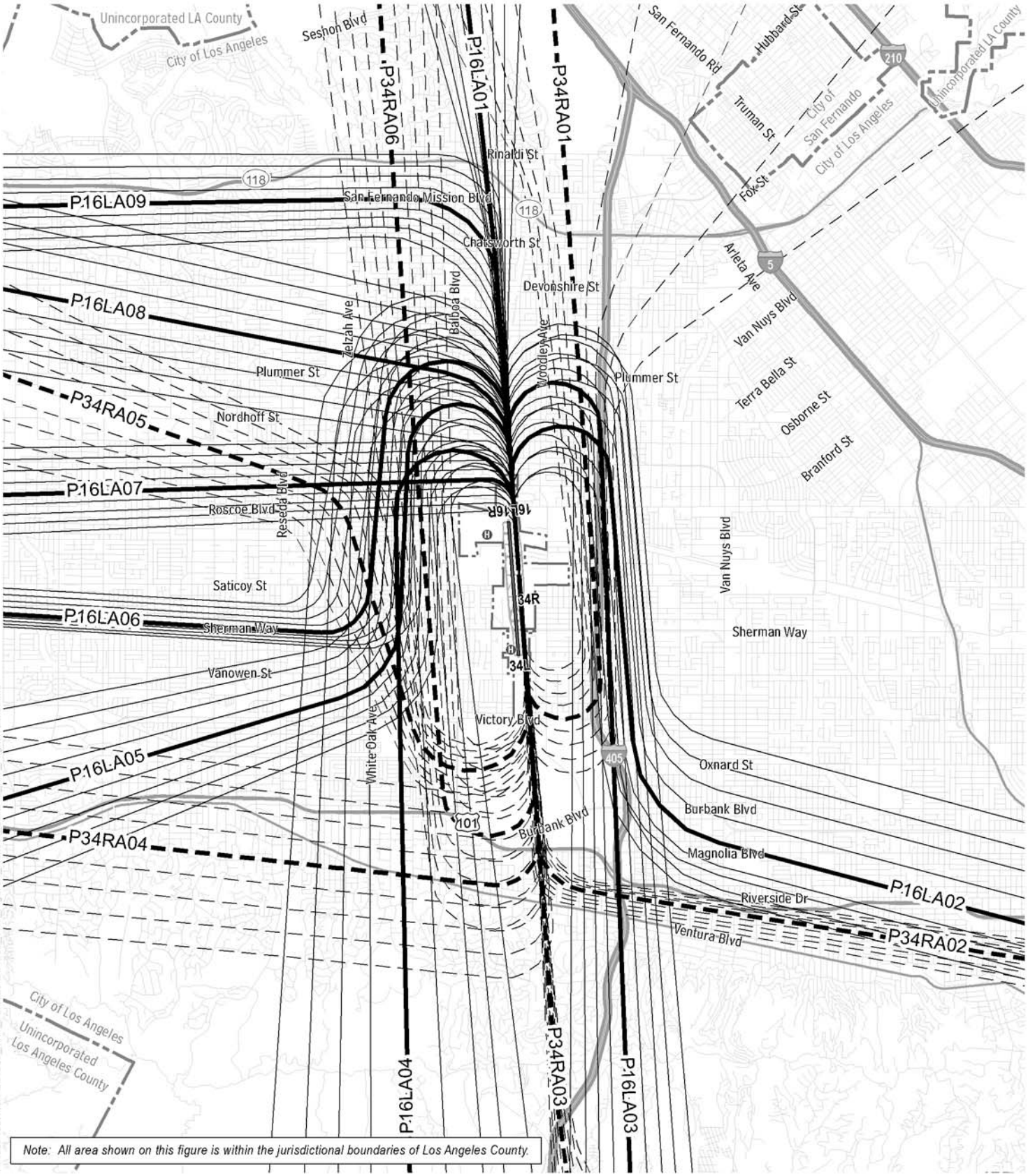

Van Nuys
Los Angeles World Airports

Modeling Flight Tracks - Non-Jet Arrivals
Runway 16L & 34R

Figure: 13

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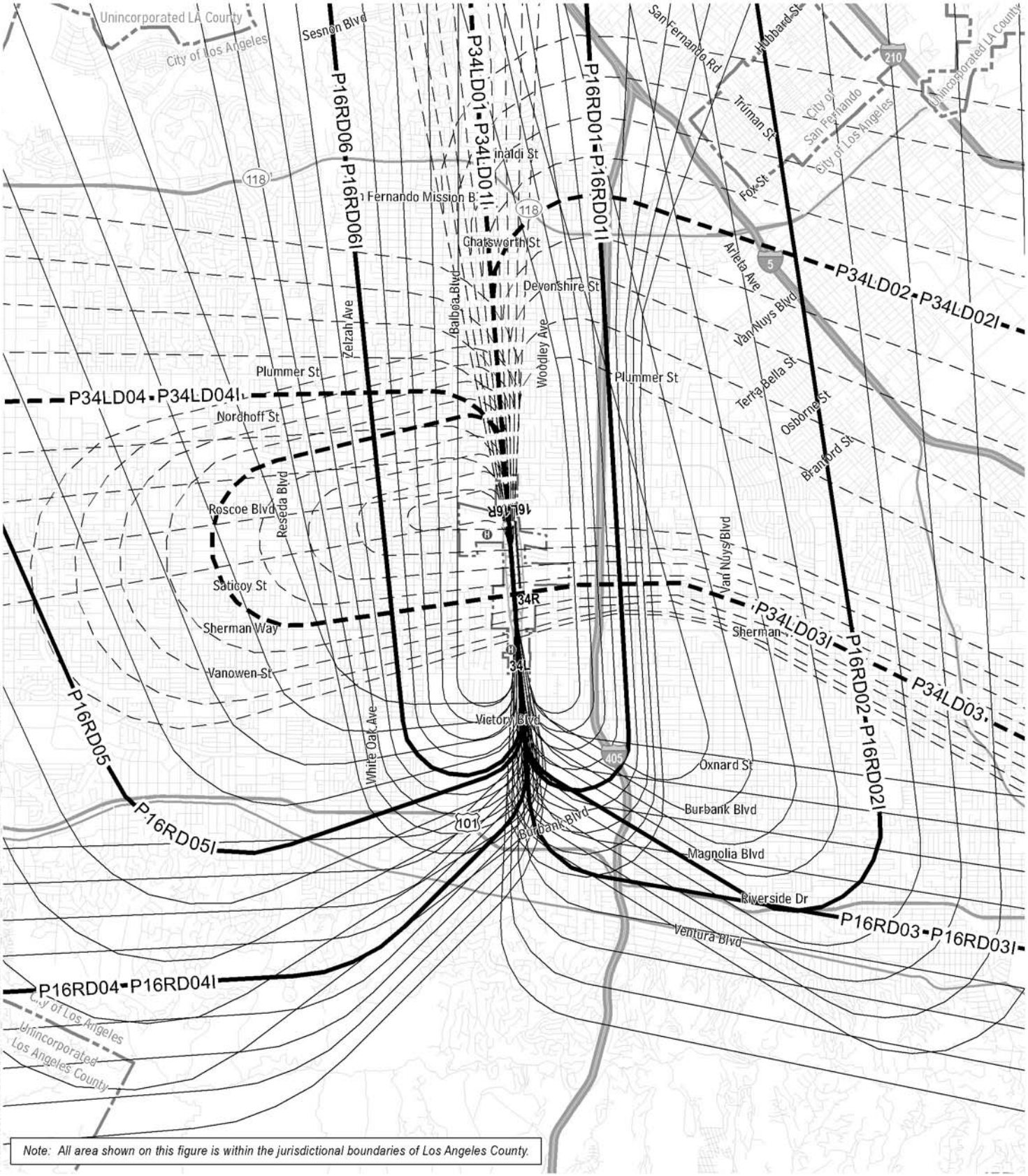

Note: All area shown on this figure is within the jurisdictional boundaries of Los Angeles County.

- Modeled Backbone Departure Track (16R)
- Modeled Dispersed Departure Track (16R)
- Modeled Backbone Departure Track (34L)
- Modeled Dispersed Departure Track (34L)
- Airport Boundary
- Highway
- Road
- Municipal Boundary
- Runway / Taxiway
- Helicopter Pad
- Railroad

Basemap: Los Angeles World Airports (LAWA), Southern California Association of Governments (SCAG), Environmental Systems Research Institute (ESRI), United States Geological Survey (USGS)

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Los Angeles World Airports

Modeling Flight Tracks - Non-Jet Departures
Runway 16R & 34L

Figure: 14

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Note: All area shown on this figure is within the jurisdictional boundaries of Los Angeles County.

- Modeled Backbone Departure Track (16R)
- Modeled Dispersed Departure Track (16R)
- Modeled Backbone Departure Track (34L)
- Modeled Dispersed Departure Track (34L)
- Airport Boundary
- Highway
- Road
- Municipal Boundary
- Runway / Taxiway
- Helicopter Pad
- Railroad

Basemap: Los Angeles World Airports (LAWA), Southern California Association of Governments (SCAG), Environmental Systems Research Institute (ESRI), United States Geological Survey (USGS)

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Los Angeles World Airports

Modeling Flight Tracks - Non-Jet Departures
Runway 16L & 34R

Figure: 15

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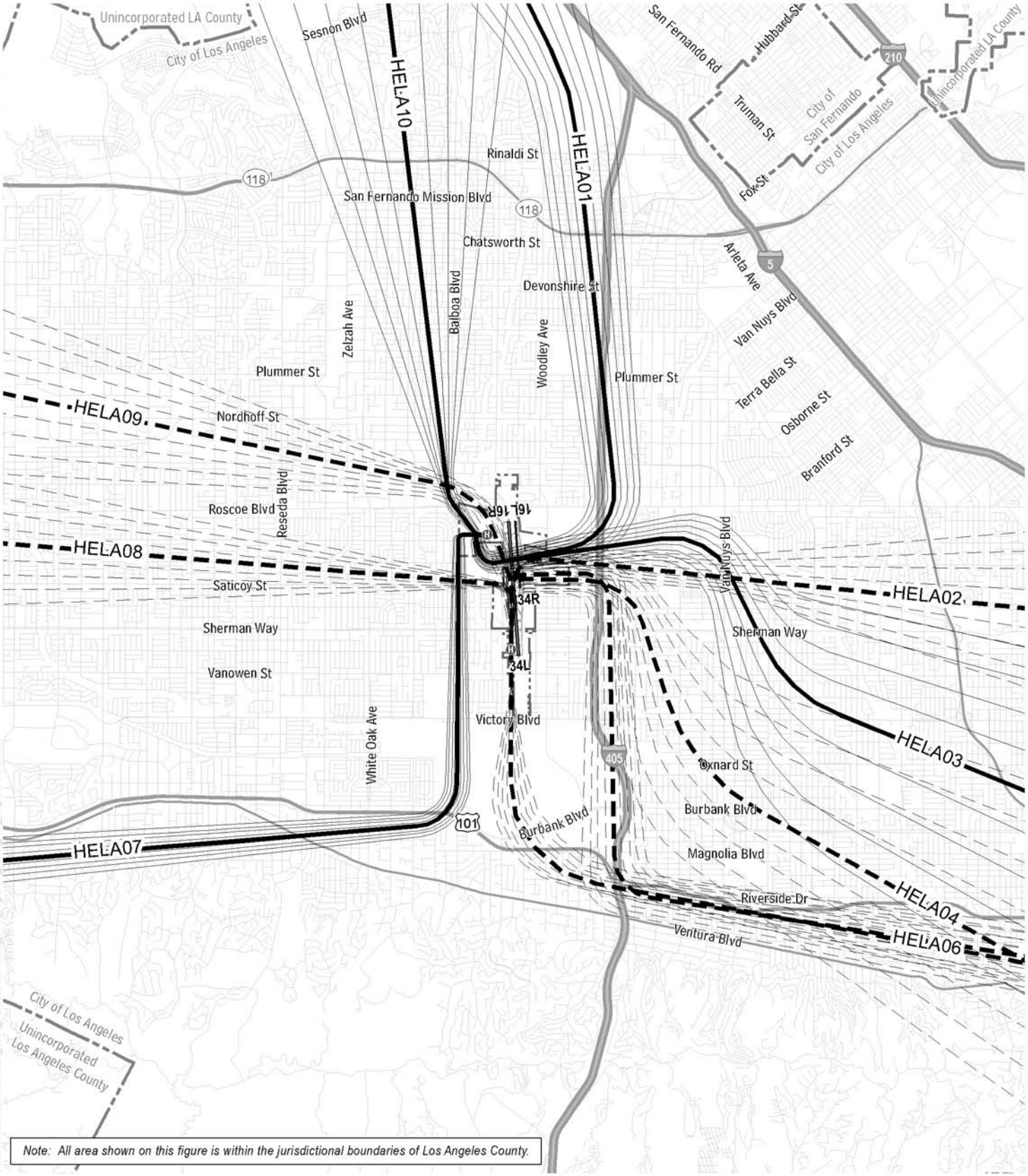

Note: All area shown on this figure is within the jurisdictional boundaries of Los Angeles County.

- Modeled Backbone Arrival Track (HNW)
- Modeled Dispersed Arrival Track (HNW)
- Modeled Backbone Arrival Track (HSW)
- Modeled Dispersed Arrival Track (HSW)
- Airport Boundary
- Highway
- Road
- Municipal Boundary
- Runway / Taxiway
- Helicopter Pad
- Railroad

Basemap: Los Angeles World Airports (LAWA), Southern California Association of Governments (SCAG), Environmental Systems Research Institute (ESRI), United States Geological Survey (USGS)

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Van Nuys
Los Angeles World Airports

Modeling Flight Tracks - Helicopter Arrivals

Figure: 16

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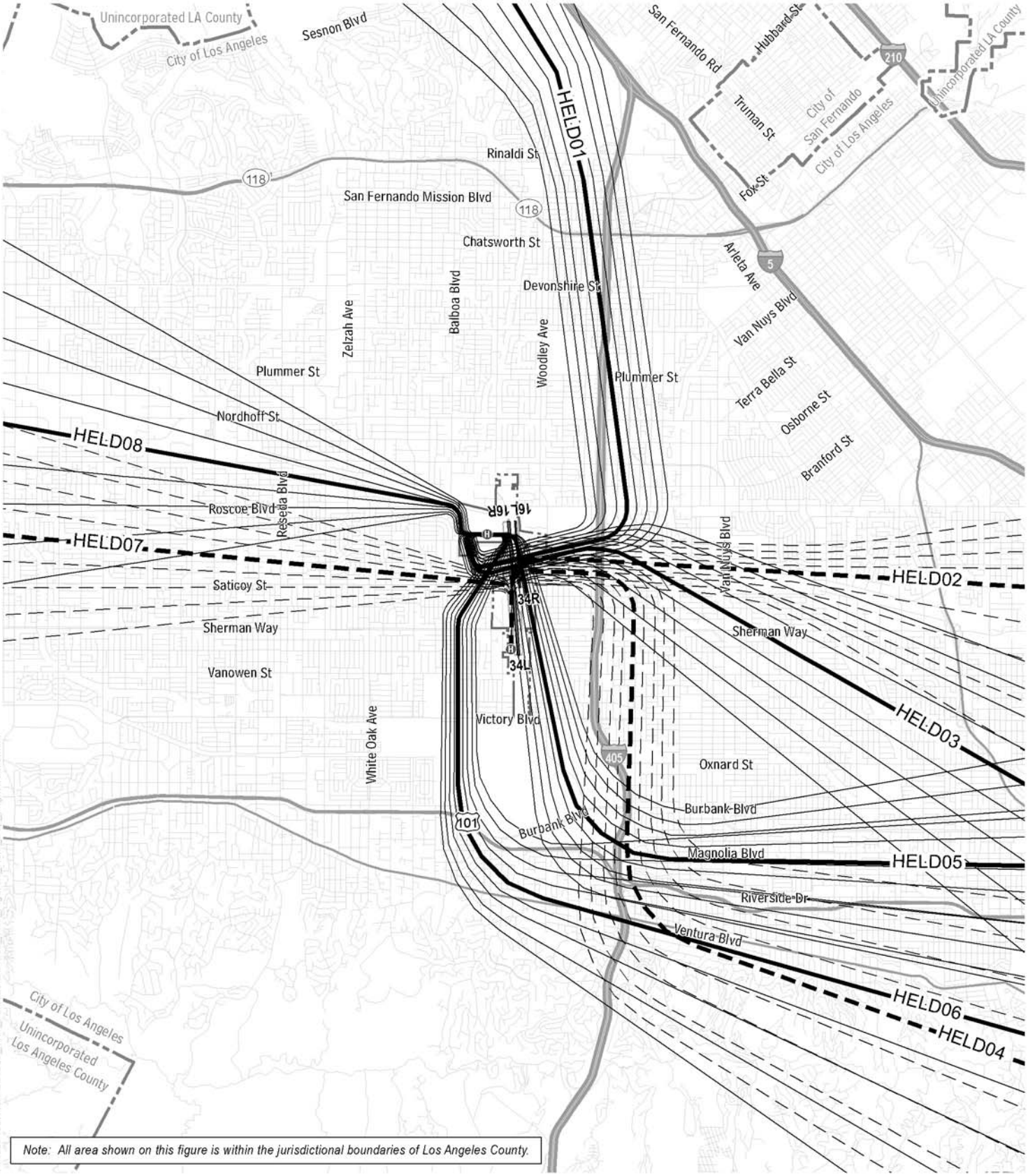

Basemap: Los Angeles World Airports (LAWA), Southern California Association of Governments (SCAG), Environmental Systems Research Institute (ESRI), United States Geological Survey (USGS)

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Modeling Flight Tracks - Helicopter Departures

Figure: 17

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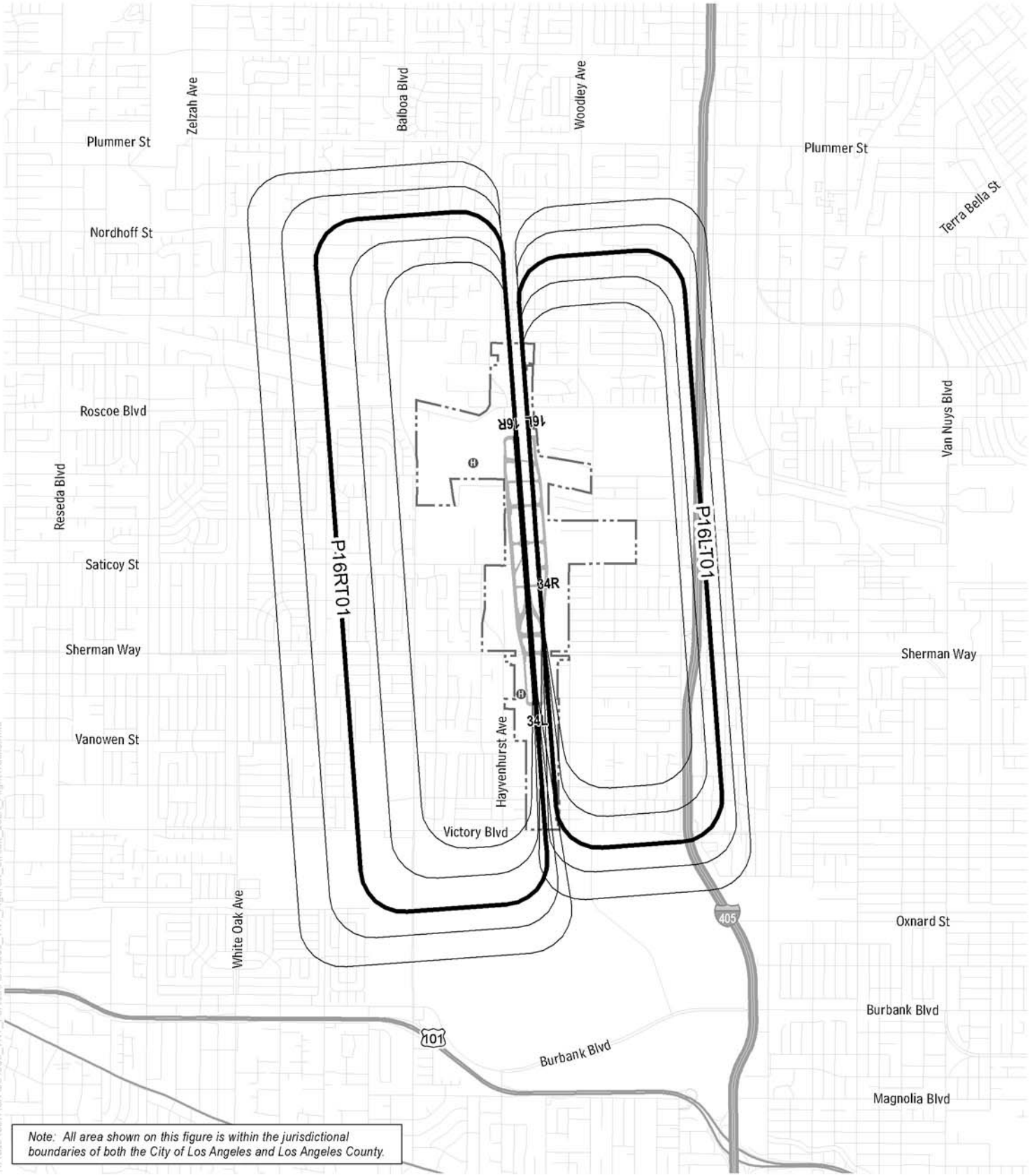

Van Nuys
Los Angeles World Airports

Modeled Flight Tracks - Runway 16 Traffic Pattern

Figure: 18

Basemap: Los Angeles World Airports (LAWA), Southern California Association of Governments (SCAG), Environmental Systems Research Institute (ESRI), United States Geological Survey (USGS)

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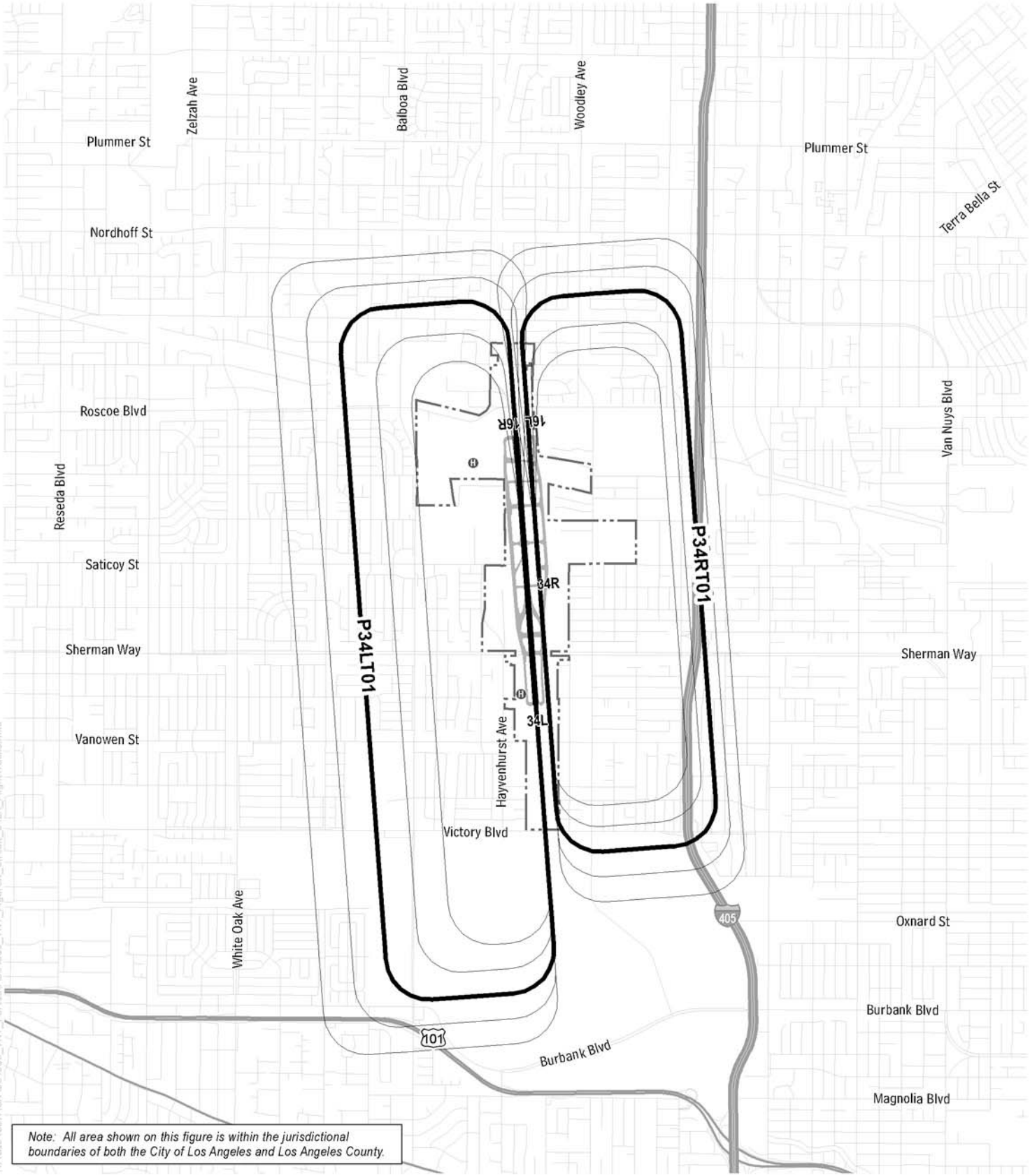

Van Nuys
Los Angeles World Airports

Modeled Flight Tracks - Runway 34 Traffic Pattern

Figure: 19

Basemap: Los Angeles World Airports (LAWA), Southern California Association of Governments (SCAG), Environmental Systems Research Institute (ESRI), United States Geological Survey (USGS)

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Table 9 Fixed-Wing Departure Flight Track Utilization Rates

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

Aircraft Group	Runway/ Helipad	Track Name	Day	Evening	Night
Jet	16R	J16RD01	0.5469	0.5043	0.5673
		J16RD02	0.1331	0.2155	0.1714
		J16RD03	0.0939	0.0560	0.0082
		J16RD04	0.0185	0.0216	0.0327
		J16RD05	0.2076	0.2026	0.2204
	34L	J34LD01	0.1053	0.1154	0.3334
		J34LD02	0.0351	0.0000	0.0000
		J34LD03	0.0947	0.0769	0.0588
		J34LD04	0.2912	0.3846	0.2745
		J34LD05	0.4737	0.4231	0.3333
Propeller	16L	P16LD01	0.1545	0.0000	0.0000
		P16LD01I	0.0273	0.0000	0.0000
		P16LD02	0.0773	0.0000	0.0000
		P16LD02I	0.0136	0.0000	0.0000
		P16LD03	0.2575	0.8500	0.8500
		P16LD03I	0.0455	0.1500	0.1500
		P16LD04	0.2318	0.0000	0.0000
		P16LD04I	0.0409	0.0000	0.0000
		P16LD05	0.1288	0.0000	0.0000
		P16LD05I	0.0228	0.0000	0.0000
	16R	P16RD01	0.0139	0.0065	0.0177
		P16RD01I	0.0025	0.0011	0.0031
		P16RD02	0.0887	0.0392	0.1240
		P16RD02I	0.0157	0.0069	0.0219
		P16RD03	0.2996	0.3794	0.3010
		P16RD03I	0.0529	0.0670	0.0531
		P16RD04	0.2494	0.1373	0.0531
		P16RD04I	0.0440	0.0242	0.0094
		P16RD05	0.1300	0.2354	0.3365
		P16RD05I	0.0229	0.0415	0.0594
		P16RD06	0.0683	0.0523	0.0177
		P16RD06I	0.0121	0.0092	0.0031
	34L	P34LD01	0.1337	0.1417	0.1889
		P34LD01I	0.0236	0.0250	0.0333
		P34LD02	0.2340	0.2361	0.0000
		P34LD02I	0.0413	0.0417	0.0000
		P34LD03	0.1003	0.1889	0.0000
		P34LD03I	0.0177	0.0333	0.0000
		P34LD04	0.3820	0.2833	0.6611
		P34LD04I	0.0674	0.0500	0.1167
	34R	P34RD01	0.0507	0.0000	0.0000
		P34RD01I	0.0089	0.0000	0.0000
		P34RD02	0.1142	0.2125	0.0000
		P34RD02I	0.0202	0.0375	0.0000
		P34RD03	0.1015	0.1063	0.1308
		P34RD03I	0.0179	0.0188	0.0231
		P34RD04	0.5836	0.5312	0.7192
		P34RD04I	0.1030	0.0937	0.1269

Table 10 Fixed-Wing Arrival Flight Track Utilization Rates
Source: ARTS 2004–2005 data, FAA ATCT, HMMH

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

Table 11 Helicopter Flight Track Utilization Rates
Source: ARTS 2004–/2005 data, FAA ATCT, HMMH

Operation	Helipad	Track Name	Day	Evening	Night
Departures	Northwest	HELD01	0.1272	0.2673	0.1231
		HELD03	0.3991	0.4850	0.5076
		HELD05	0.3158	0.1090	0.1077
		HELD06	0.0702	0.0793	0.0308
		HELD08	0.0877	0.0594	0.2308
	Southwest	HELD02	0.1176	0.2760	0.2941
		HELD04	0.5197	0.3102	0.2549
		HELD07	0.3627	0.4138	0.4510
Arrivals	Northwest	HELA01	0.3179	0.4494	0.3171
		HELA03	0.4271	0.3188	0.4146
		HELA07	0.1722	0.1159	0.1463
		HELA10	0.0828	0.1159	0.1220
	Southwest	HELA02	0.1190	0.2137	0.2115
		HELA04	0.2881	0.1966	0.2982
		HELA05	0.1840	0.2649	0.1346
		HELA06	0.1710	0.1880	0.2597
		HELA08	0.1022	0.0769	0.0384
		HELA09	0.1357	0.0599	0.0576

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