APPENDIX E

ALTERNATIVE D AIRSIDE ANALYSIS

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Appendix E

ALTERNATIVE D AIRSIDE ANALYSIS

The Draft LAX Master Plan evaluated multiple alternatives in order to derive four shortlisted alternatives. Airside performance was measured at two major phases of development. The initial development phase was associated with the year 2005 and the final phase with 2015. Appendix J of the Draft LAX Master Plan documented the simulation analysis for the four Master Plan alternatives.

A fifth alternative (Alternative D) was developed after the Draft LAX Master Plan was issued that would improve existing facilities without adding additional capacity. This appendix documents the airside analysis for Alternative D.

The Alternative D facilities were simulated for the analysis years of 2005 and 2015 in order to evaluate the Alternative D performance against the other alternatives and to provide data for the Supplement to the Draft EIS/EIR. Two additional interim years (2008 and 2013) were needed for the Alternative D analysis for the Draft EIS/EIR which was later incorporated into the Final EIS/EIR. Section 1 of this appendix documents the Alternative D 2005 and 2015 airside analysis. Section 2 documents the additional interim year analysis for Alternative D.

E.1 ALTERNATIVE D 2005 AND 2015 AIRSIDE ANALYSIS

The following sections describe the 2005 and 2015 Alternative D airside operating assumptions and the simulation results.

E.1.1 AIRSIDE FACILITIES

This section presents the airside facilities for Alternative D. Airfield, terminal, cargo, and general aviation facilities are described for 2005 and 2015.

E.1.1.1 AIRFIELD FACILITIES

The description of airfield facilities focuses on the runway system, associated taxiways, and aircraft ramp areas. **Figures E-1 and E-2** illustrate the runway and taxiway layout for Alternative D in 2015 and

2005 respectively. The maximum Airplane Design Group that the taxiways are designed for is noted in these figures.

E.1.1.1.1 2015 Airfield Facilities

In Alternative D, the existing four runways would be maintained with modifications made to both the runways in the north airfield and one of the runways in the south airfield. On the north airfield, in its existing location, Runway 24R would be extended to 10,420 feet in length. Runway 24L would be moved approximately 1,280 feet east and 338 feet south of its existing location. The runway would be extended to 11,700 feet long and 200 feet wide. On the south airfield, no changes would be made to Runway 25R. Runway 25L would be moved 50 feet south of the existing 25L centerline. The dimensions of the runway would be 11,096 feet long and 200 feet wide.

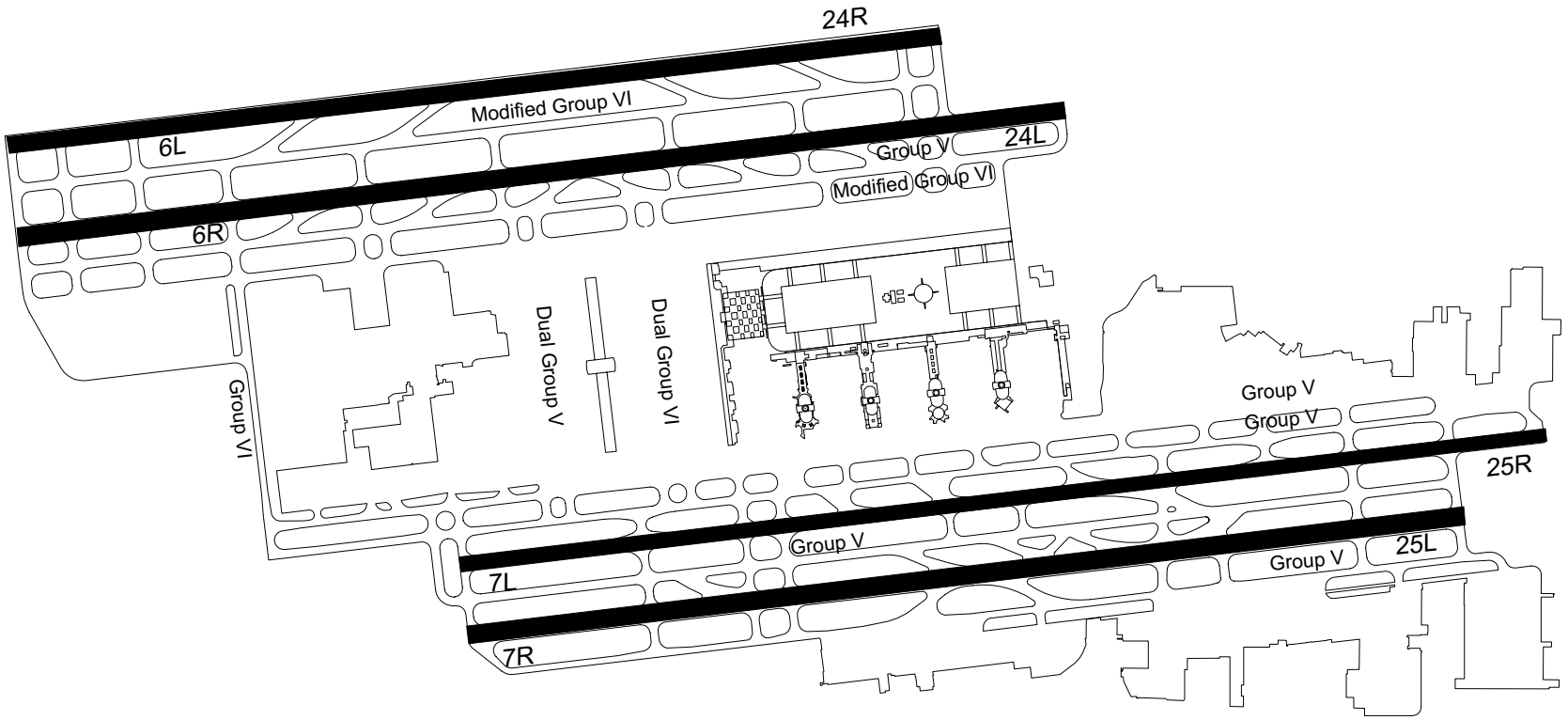
The taxiways in Alternative D would be designed to accommodate the Boeing 747-400 as a design aircraft with operational and modified Group VI standards for the anticipated operation of limited numbers of the New Large Aircraft (NLA). A parallel taxiway would be developed between each set of adjacent runways as well as full-length dual parallel taxiways between the inboard runways on the north and south complexes and terminal area.

E.1.1.1.2 2005 Airfield Facilities

In 2005, construction of the relocated Runway 25L and a new parallel taxiway between the two south runways would begin. Depending on how the construction is phased, up to 7,000 feet of runway length could be available during construction. However, because of the limited use that could be expected from the shortened runway, the necessary relocation of the glide slope, and safety issues (runway incursions), Runway 25L is assumed to be closed during construction. Closure of the runway would also allow for a shorter construction period. Runway 25R would be used as a mixed-operations runway while Runway 25L is closed.

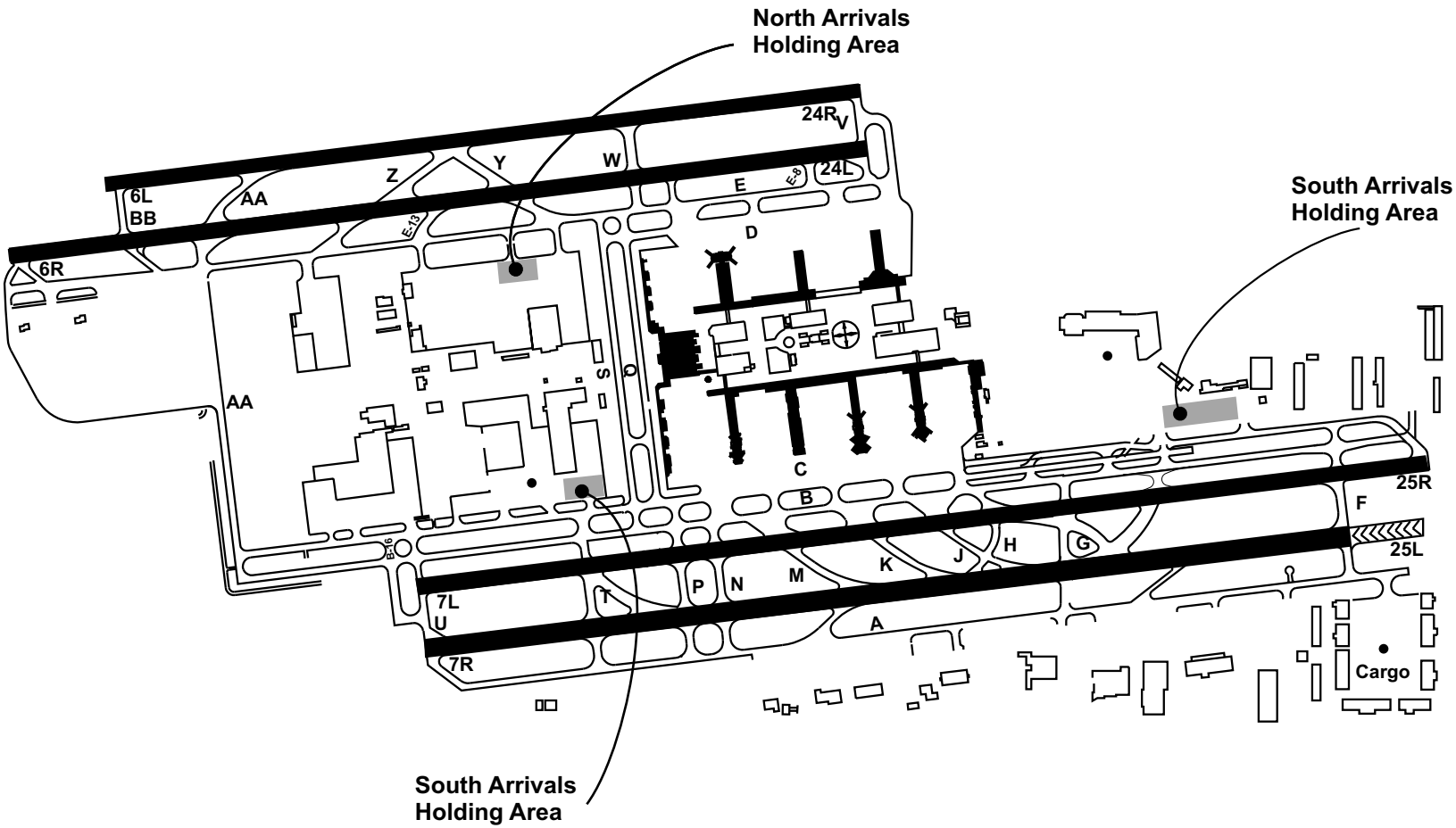
E.1.1.2 TERMINAL FACILITIES

The terminal development assumed for the airside simulations is described in this section. Detailed aircraft parking layouts, including maximum gate size and airline allocations for 2005 and 2015 are included in Section 1.3 of this appendix.



Prepared by: Landrum & Brown
Draft: 12/30/02

Los Angeles International Airport Master Plan	2015 Alternative D Airfield	Figure E-1



LEGEND

Under Construction

Source: LAX Air Traffic Control Tower, On-site observations
Prepared by: Landrum & Brown
Draft: 12/30/02

Los Angeles International Airport Master Plan	**2005 Alternative D Airfield**	**Figure E-2**

E.1.1.2.1 2015 Terminal Facilities

In Alternative D, due to the relocation of Runway 24L and its associated parallel taxiways, existing Terminals 1, 2, 3, and the TBIT north concourses would be demolished and reconfigured into one east/west linear facility with a total of 18 gates. TBIT would be expanded to accommodate aircraft on the west side of the terminal. A new West Satellite Concourse would be constructed west of TBIT and would contain 43 aircraft gates. In total, there would be 32 commuter positions and 121 jet positions in 2015.

E.1.1.2.2 2005 Terminal Facilities

None of the new terminal facilities would be constructed by 2005. Therefore, the 2005 terminal facilities would be identical to the No Action/No Project Alternative (see Appendix J of the Draft LAX Master Plan for a description of the No Action/No Project terminal facilities). Gates located at the terminal would include 3 commuter positions and 112 jet positions. There would be 29 remote commuter positions and 19 remote jet positions.

E.1.1.3 CARGO AND GENERAL AVIATION AREAS

In 2015, one building in the South Cargo Complex would be removed to make room for a proposed general aviation facility. There would be a total of two general aviation facilities in Alternative D. The existing facility north of Imperial Highway and east of Sepulveda Boulevard would remain and a new facility would be located north of Imperial Highway and west of Sepulveda Boulevard.

This development would not be completed by 2005. Therefore, the 2005 cargo and general aviation facilities would be identical to the No Action/No Project Alternative.

E.1.2 DESIGN DAY ACTIVITY

Design day flight schedules were developed for Alternative D for 2005 and 2015. The methodology and assumptions for assigning gates to the flights are discussed in Section 3 of this appendix. Detailed profiles of hourly aircraft operations for Alternative D are contained in Appendix F. The resulting design day operations are summarized in **Table E-1**. For a detailed discussion of the methodology and assumptions used to derive the design day schedules see Section 3 of this Final LAX Master Plan and Appendix D.

Table E-1

DESIGN DAY ACTIVITY SUMMARY COMPARISON

	Design Day Operations	
	2005	2015
Air Carrier	1,113	975
Commuter	435	532
Hawaii	51	53
Total Domestic	**1,599**	**1,560**
International	380	498
Total Commercial	**1,979**	**2,058**
Cargo	117	117
GA and MI	82	104
Total	**2,178**	**2,279**

Note: Canadian passengers and operations are included in the international totals

Commercial operations would be lower in 2005 than in 2015 due to the closure of Runway 25L. Without the use of Runway 25L in 2005, the airlines would most likely choose to schedule fewer flights than they would with four runways available. It is assumed that fewer commuter flights would be scheduled as a result of the temporary runway closure. In addition, general aviation activity is assumed to be lower due to the congestion that would result from the runway closure. If Runway 25L was open, the 2005 No Action/No Project schedule would serve as the 2005 Alternative D schedule.

In 2015, Alternative D was designed to accomodate the same number of total commercial operations as the No Action/No Project Alternative and Alternative C (refer to Chapter V, Section 3.3.2 of the Draft LAX Master Plan for a description of the activity associated with the final iteration alternatives). Alternative D cargo and general aviation operations would be the same as the No Action/No Project Alternative.

E.1.3 AIRCRAFT GATE ASSIGNMENTS

Flights in the design day schedules were classified into general airline groups for the purpose of assigning the aircraft to the gates and allocating passengers to the terminal area. Similar to the other alternatives, the airline groups were formed by classifying the airlines in the schedule according to operating characteristics, while maintaining the dominance of some single carriers at LAX. The airline groups are listed in Chapter V, Appendix A of the Draft LAX Master Plan. The resulting layout, gate size, and airline allocation for

Alternative D for 2015 and 2005 are illustrated in **Figures E-3 and E-4** respectively. Alternative D in 2005 maintains the same gate layout used for the No Action\No Project schedule.

Table E-2 shows the number of gates that can be accommodated in Alternative D in 2015. See Chapter V, Appendix A, Figures V-A.35 through V-A.37, of the Draft LAX Master Plan for the gate layouts and number of gates that can be accommodated in the final iteration alternatives. Alternative D provides fewer gates than the No Action/No Project Alternative (153 compared to 163), however the Alternative D layout would include 6 NLA positions. Alternative C also has six NLA positions but can accommodate more passengers than Alternative D with 168 total gates at a larger overall size.

All flights in the 2005 and 2015 design day schedules for Alternative D were assigned to a gate to determine future terminal loadings and to simulate airside operations. Aircraft gate assignments were made based on the user allocation and maximum gate size assumptions. Ranges of minimum intergate times, dependent on airline group, were assumed between gate uses. The minimum intergate times used in the other alternatives (see Appendix A of the Draft LAX Master Plan) were also applied in this alternative.

The results of the Alternative D gate assignments are illustrated on **Figures E-5 and E-6**. The utilization of each gate throughout the day is shown by solid flight bars that mark the total time that a flight occupies the gate. Upside down triangles at the beginning and end of each bar denote an arrival and departure operation, respectively. The absence of a triangle indicates a tow operation. The aircraft type is displayed on the flight bar, as space permits. The flight bars are color coded by airline group.

Table E-2

2015 ALTERNATIVE D DESIGN DAY
AIRCRAFT GATE REQUIREMENTS – BY AIRLINE GROUP

	Total Gate Requirements (International and Domestic)									
Airline Group	74X	747	MD11	DC10	767	757	MD80	737	Commuter	Total
U1 and I1	1	4	-	6	-	6	4	8	-	29
U2 and I2	-	2	1	4	-	11	4	1	-	23
U3 and I3	2	7	-	9	3	2	3	6	-	32
RE	-	-	-	2	-	1	3	10	-	16
IN	3	9	3	1	1	3	1	-	-	21
C1	-	-	-	-	-	-	-	-	19	19
C2	-	-	-	-	-	-	-	-	19	19
C3	-	-	-	-	-	-	-	-	13	13
Total	**6**	**22**	**4**	**22**	**4**	**23**	**15**	**25**	**32**	**153**

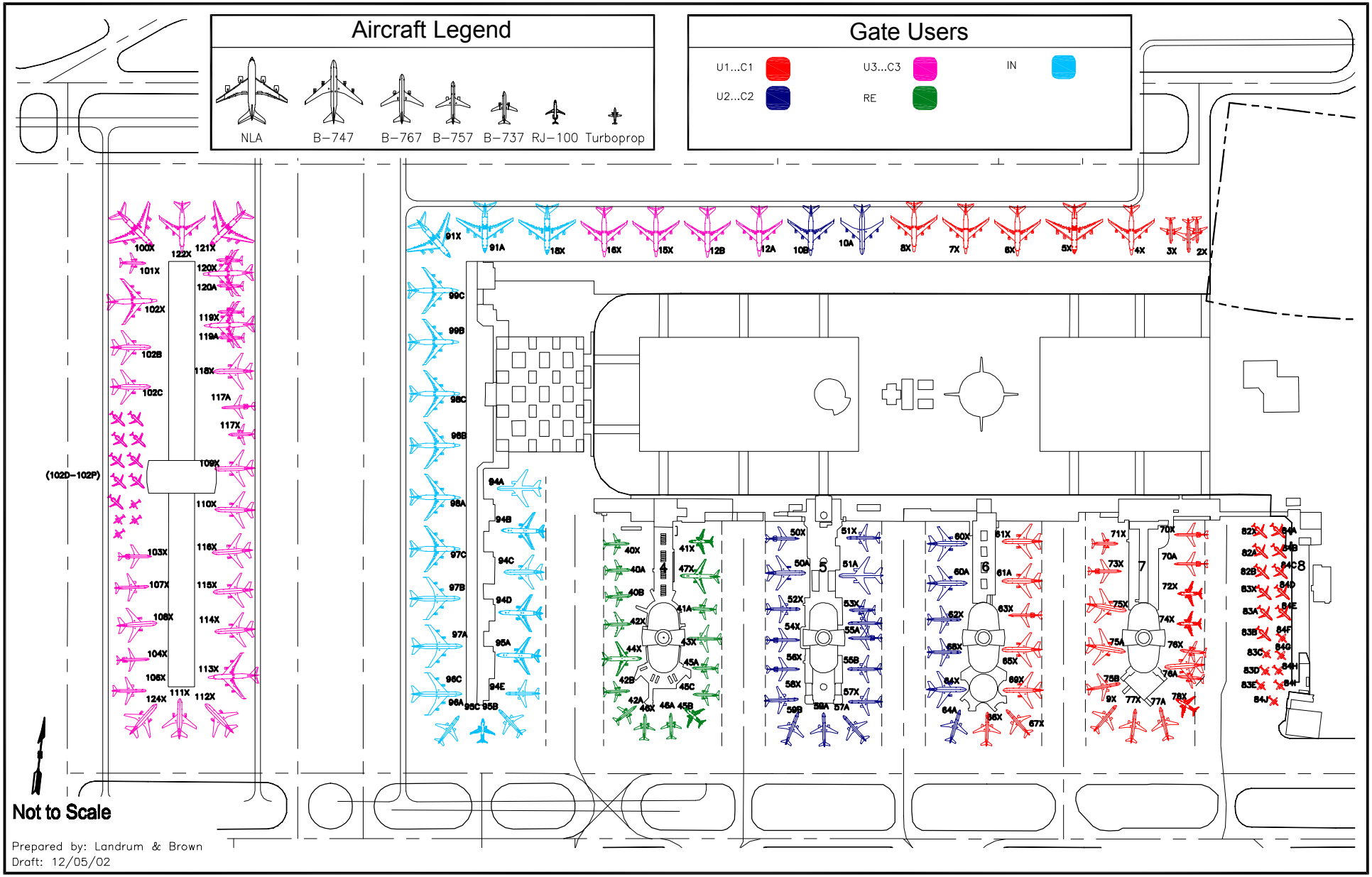
Note: Totals do not sum up due to airlines sharing gates.

The number of passengers on each flight was determined using the load factor and aircraft size assumptions presented in Chapter V of the Draft LAX Master Plan. Tables depicting the number of originating, terminating, and connecting passengers by terminal by hour were created based on this information. These tables were used to determine curbfront and roadway loadings in the ground transportation analysis. Detailed profiles of hourly passengers by terminal and by airline for Alternative D are contained in Appendix F.

1.4 AIRSIDE OPERATING ASSUMPTIONS

Airside operating assumptions for Alternative D are consistent with the other Master Plan alternatives. The assumptions for these alternatives were developed as part of the 3rd iteration analysis by an Airside Study Team composed of airport, airline, and air traffic control representatives. The Airside Study Team developed assumptions regarding the general airspace and taxi flows for use in the simulations.

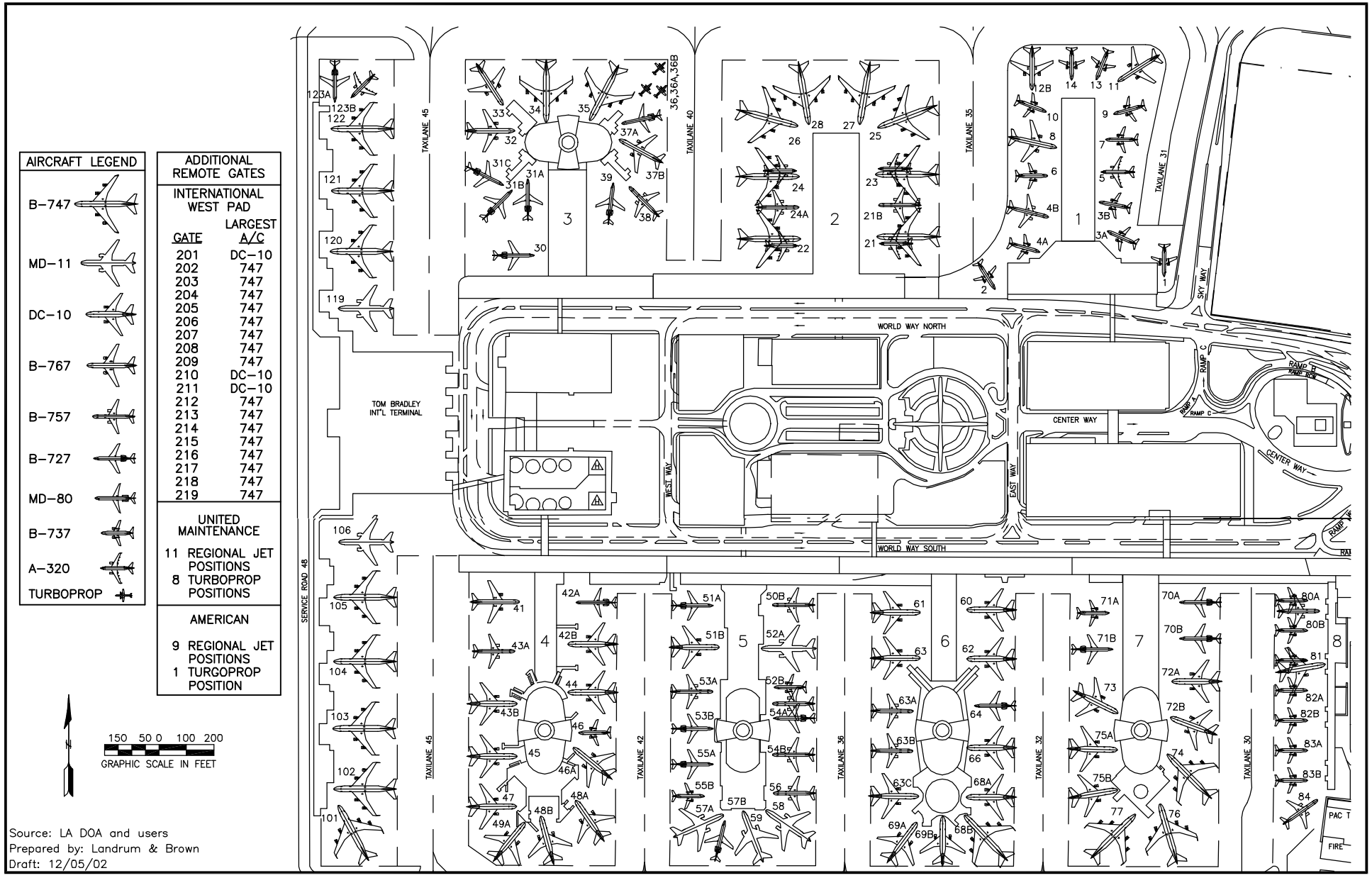
The FAA's SIMMOD model was used to assess the relative performance of Alternative D in terms of capacity and delay at the 2005 and 2015 levels of demand. The SIMMOD model was calibrated as part of the Master Plan's analysis of existing conditions (1994 baseline year and later a calibrated 1996 and 2000 baseline year) to assure that it can accurately depict operating conditions at LAX and produce accurate measures of future performance. Chapter II and Appendix F of the Draft LAX Master Plan, described the 1994 and 1996 baseline simulation analysis, respectively. The calibrated 2000 baseline year is discussed in Appendix B.



Los Angeles International Airport
Master Plan

2015 Alternative D
Gate Layout and Utilization

Figure
E-3



Source: LA DOA and users
Prepared by: Landrum & Brown
Draft: 12/05/02

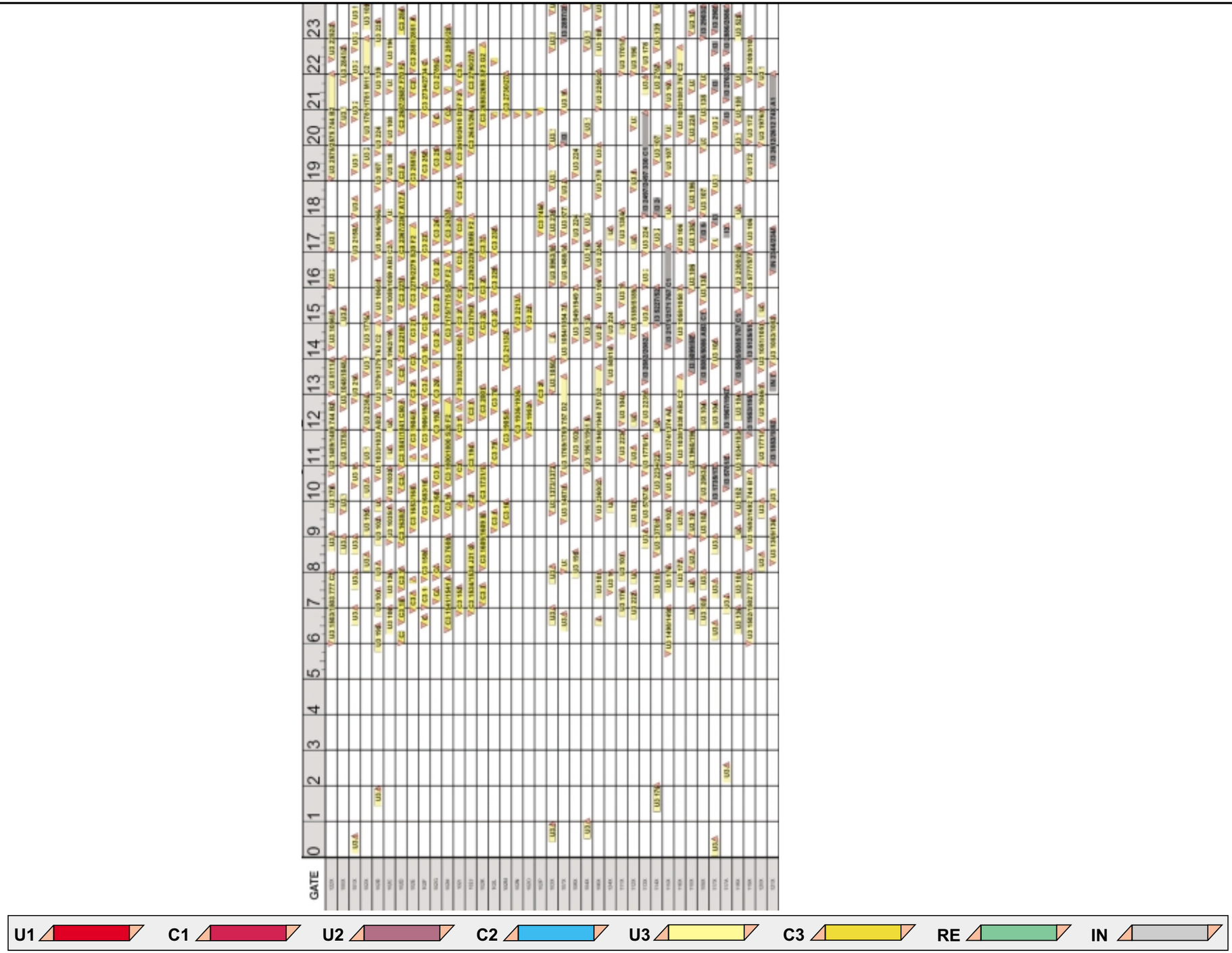
Los Angeles International Airport Master Plan	2005 Alternative D Gate Layout and Utilization	Figure E-4

Prepared by: Landrum & Brown
Draft: 12/30/02

Los Angeles International Airport Master Plan

Design Day Gate Assignment
2015 Alternative D - East Terminal Area

Figure
E-5
(1 of 2)

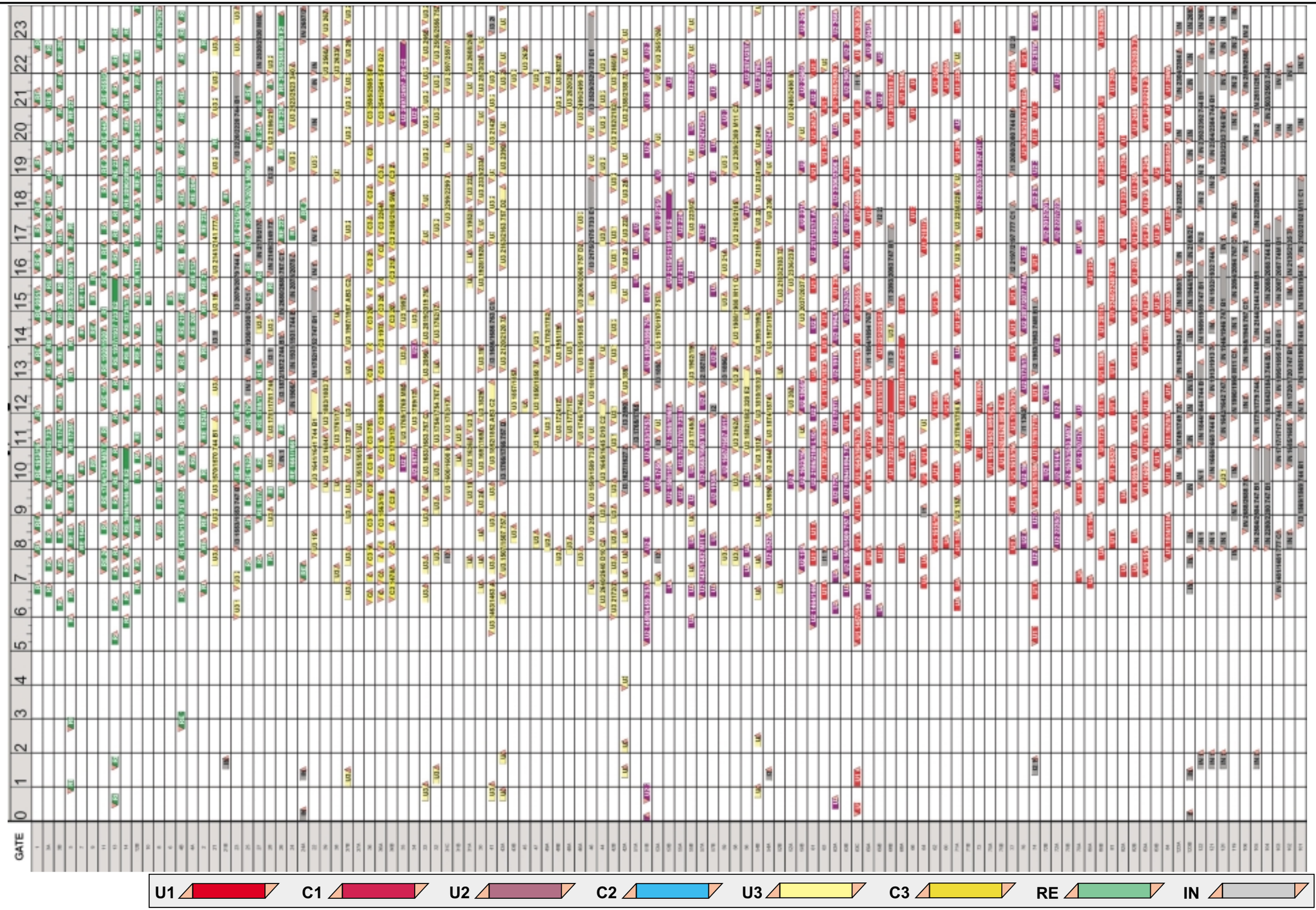


Prepared by: Landrum & Brown
Draft: 12/30/02

Los Angeles International Airport Master Plan

Design Day Gate Assignment
2015 Alternative D - West Terminal Area

Figure
E-5
(2 of 2)

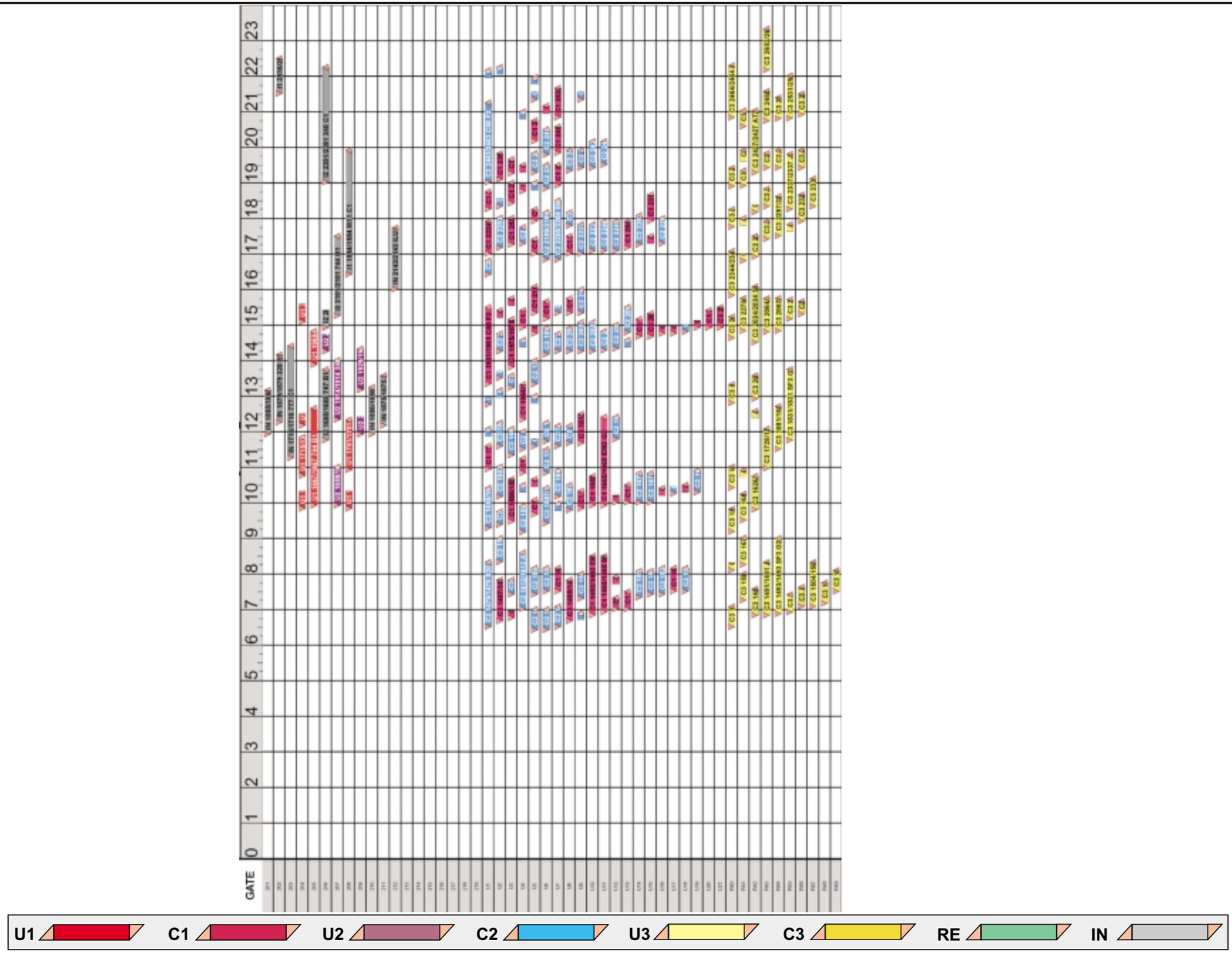


Prepared by: Landrum & Brown
Draft: 12/30/02

Los Angeles International Airport Master Plan

Design Day Gate Assignment
2005 Alternative D - Central Terminal Area

Figure
E-6
(1 of 2)



Prepared by: Landrum & Brown
Draft: 12/30/02

Los Angeles International Airport Master Plan

Design Day Gate Assignment
2005 Alternative D - Remote Gates

Figure
E-6
(2 of 2)

The assumptions used for the Alternative D simulations are described in this section.

E.1.4.1 RUNWAY OPERATING CONFIGURATIONS

Simulations were conducted for the three primary[1] runway operating configurations at LAX at the 2005 and 2015 levels of activity:

- West Flow Visual Approaches (Visual)
- West Flow VFR Instrument Approaches (ILS/LDA)
- West Flow IMC (IFR)

The anticipated use of the runways for arrivals and departures under each operating plan for the final iteration alternatives and Alternative D in 2015 and 2005 is shown in **Figures E-7** and **E-8**.

All alternatives with four runways would operate like the existing airfield. This is the case for 2015 Alternative D, Alternative C, and the No Action/No Project Alternative. The primary use of the runways is assumed to be arrival operations on the outboard runways 24R/6L and 25L/7R and departure operations on the inboard runways 24L/6R and 25R/7L. Simultaneous approaches to the outboard and inboard runways are conducted only in west flow under visual approach procedures.

In 2005, Alternative D would have only three runways due to the temporary closure of Runway 25L for construction. The north runways, 24R/6L and 24L/6R would operate similar to the assumptions used in the four runway cases. Runway 24R/6L is assumed to be primarily an arrival runway, and Runway 24L/6R a departure runway. Runway 25R/7L would be operated as a mixed operations runway with both arrivals and departures.

E.1.4.2 AIRSPACE OPERATING ASSUMPTIONS

Airspace routes for Alternative D would be the same as the No Action/No Project Alternative and Alternative C. Airspace arrival routes were defined from each arrival fix to the runway ends and departure routes were defined from each runway to each departure fix. Routes were also defined for local traffic from Ontario, Santa Ana, Santa Barbara and Burbank Airports.

[1] East flow performance was not modeled due to its low annual occurrence. Rather, east flow performance was estimated based on previous simulations.

E.1.4.2.1 West Flow

Figure E-9 illustrates the primary airspace routes from and to the airspace fixes as well as the local airports for west flow. Existing patterns at Santa Monica, Hawthorne, and El Monte Airports are included in these illustrations as a reference. These locations were identified as the most likely to be impacted by changes to the LAX airspace.

The routes correspond to anticipated patterns under instrument approaches. In visual procedures, the north approach may be intercepted about 5 or 6 nautical miles closer to the airport. The arrival routes in Alternative D would be the same as the No Action/No Project Alternative where an addition of a second Civet outer fix has been incorporated.

E.1.4.2.2 East Flow

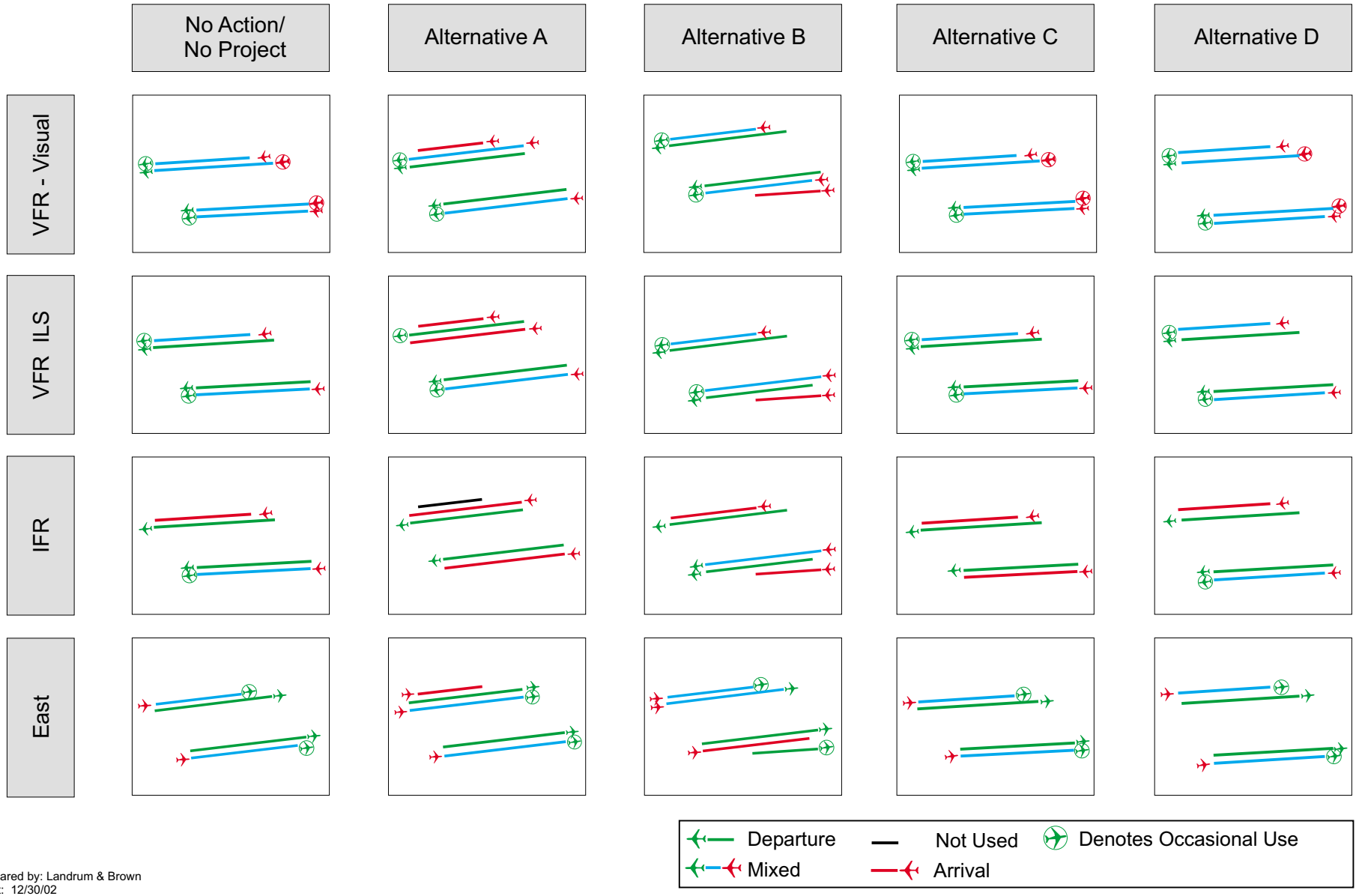
Figure E-10 illustrates the primary airspace routes from and to the airspace fixes as well as the local airports for east flow. The east flow airspace assumptions are similar to that of the west flow. The east flow performance was estimated based on the performance of the west flow ILS configuration and final iteration simulated east flow cases (see Appendix J of the Draft LAX Master Plan) and the east flow airspace was not modeled for Alternative D.

E.1.4.3 AIRFIELD OPERATING ASSUMPTIONS

For the simulation of Alternative D in 2005 and 2015, assumptions were made about the direction traffic would flow on the taxiways and about how flights should be gated within the simulation. These assumptions are discussed in the following sections.

E.1.4.3.1 Taxi Flows

The anticipated flow of aircraft between the runways and the terminal gates assumed for the 2015 and 2005 simulation analysis is illustrated in **Figures E-11 and E-12** respectively. These taxi flows are based on the visual west flow operating plan. These general routings are applicable to all of the west flow operating plans. The anticipated taxi flows for east flow are shown in **Figures E-13 and E-14**. The east flow condition was not simulated for Alternative D, rather performance was estimated based on previous simulations.

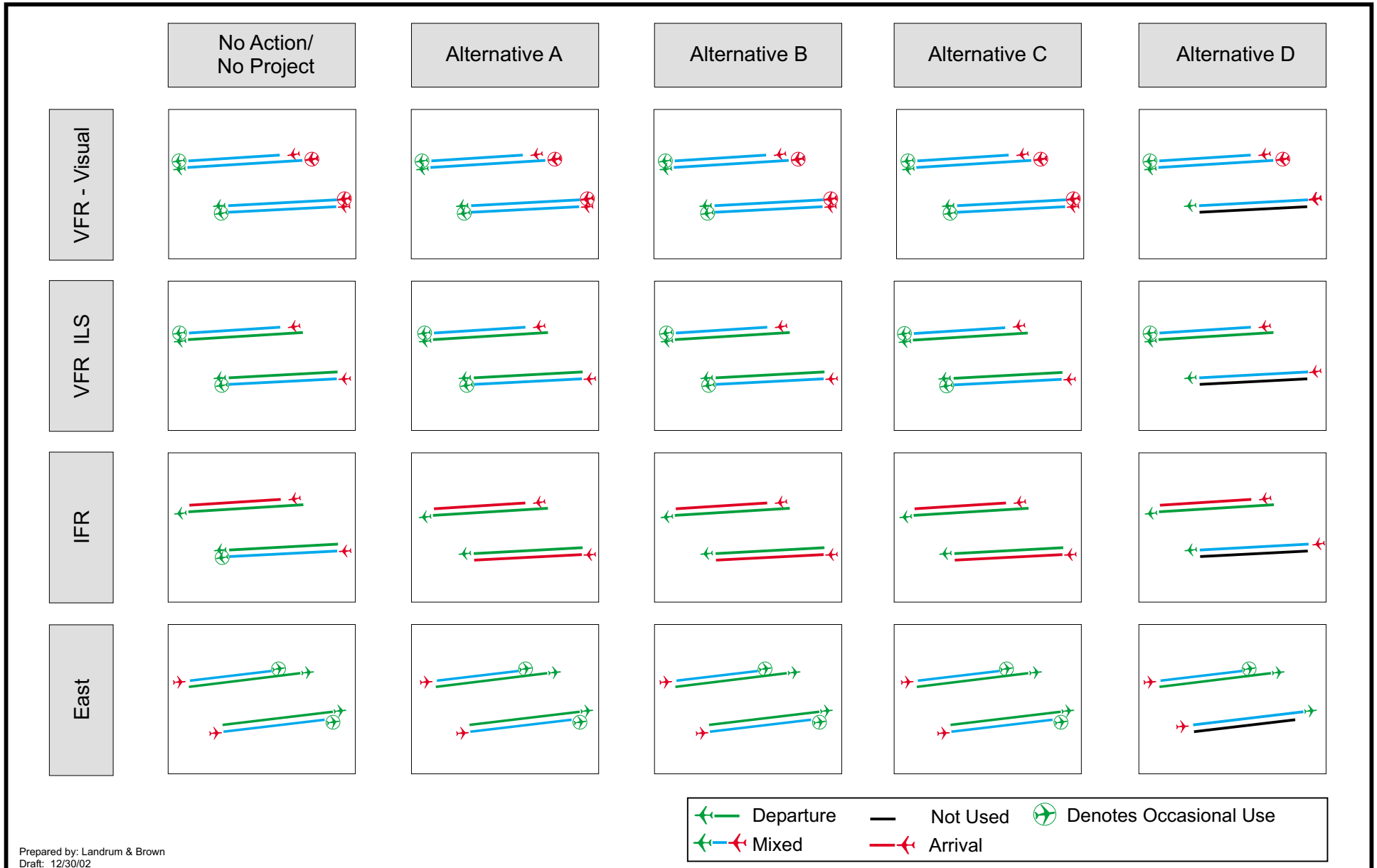


Prepared by: Landrum & Brown
Draft: 12/30/02

Los Angeles International Airport
Master Plan

2015 Airside Alternatives
Runway Operating Plans

Figure
E-7

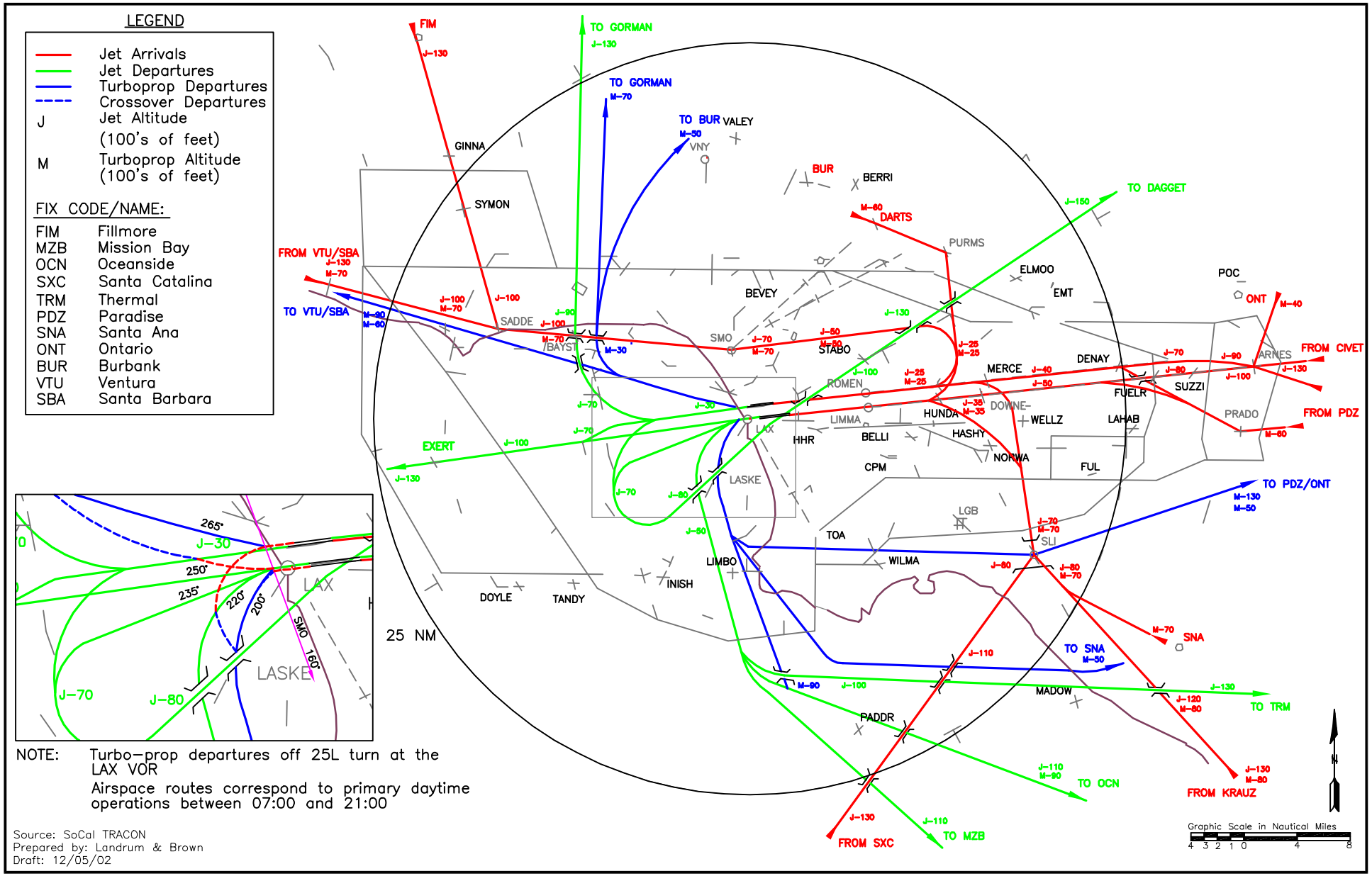


Prepared by: Landrum & Brown
Draft: 12/30/02

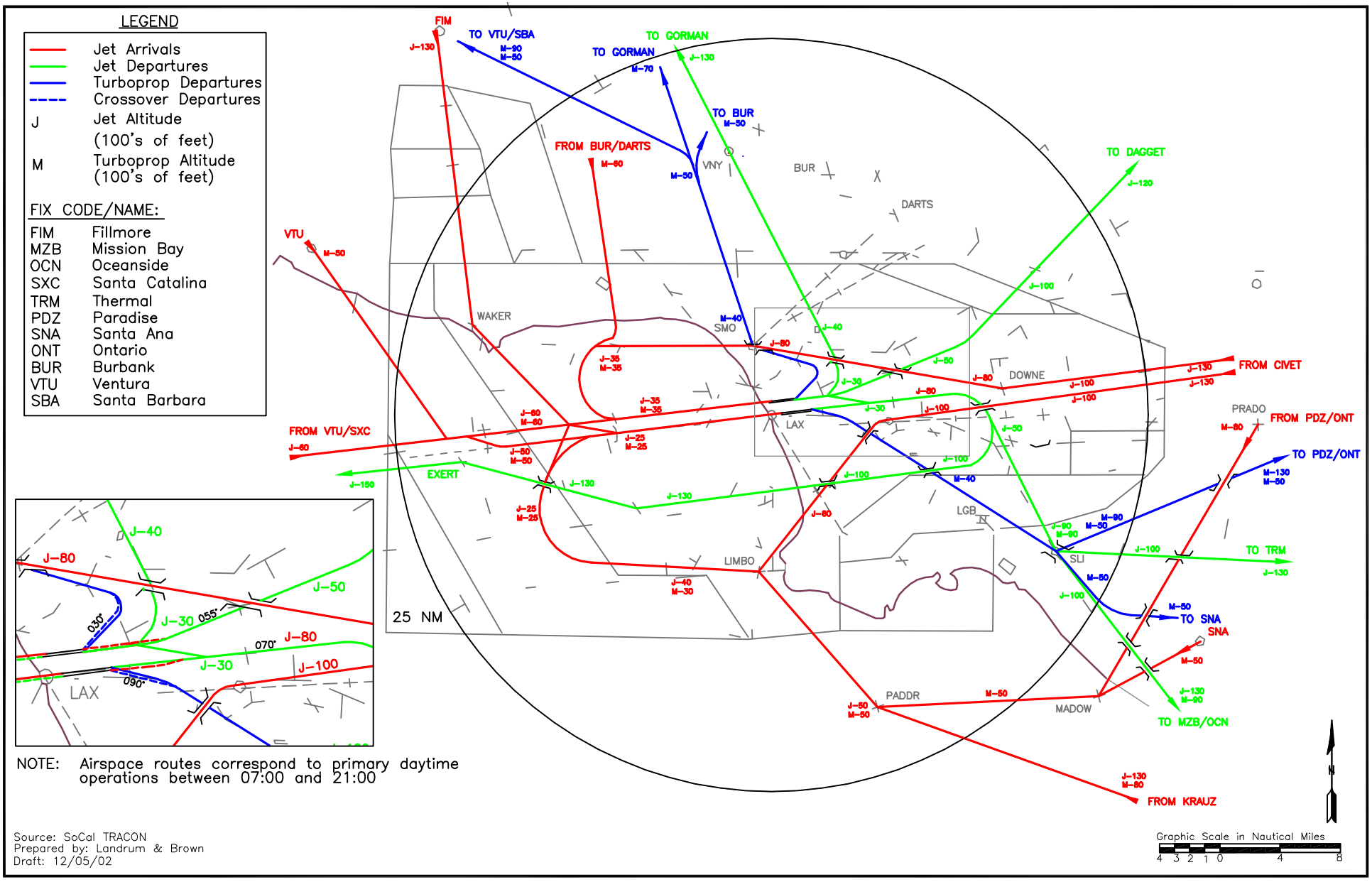
Los Angeles International Airport
Master Plan

2005 Airside Alternatives
Runway Operating Plans

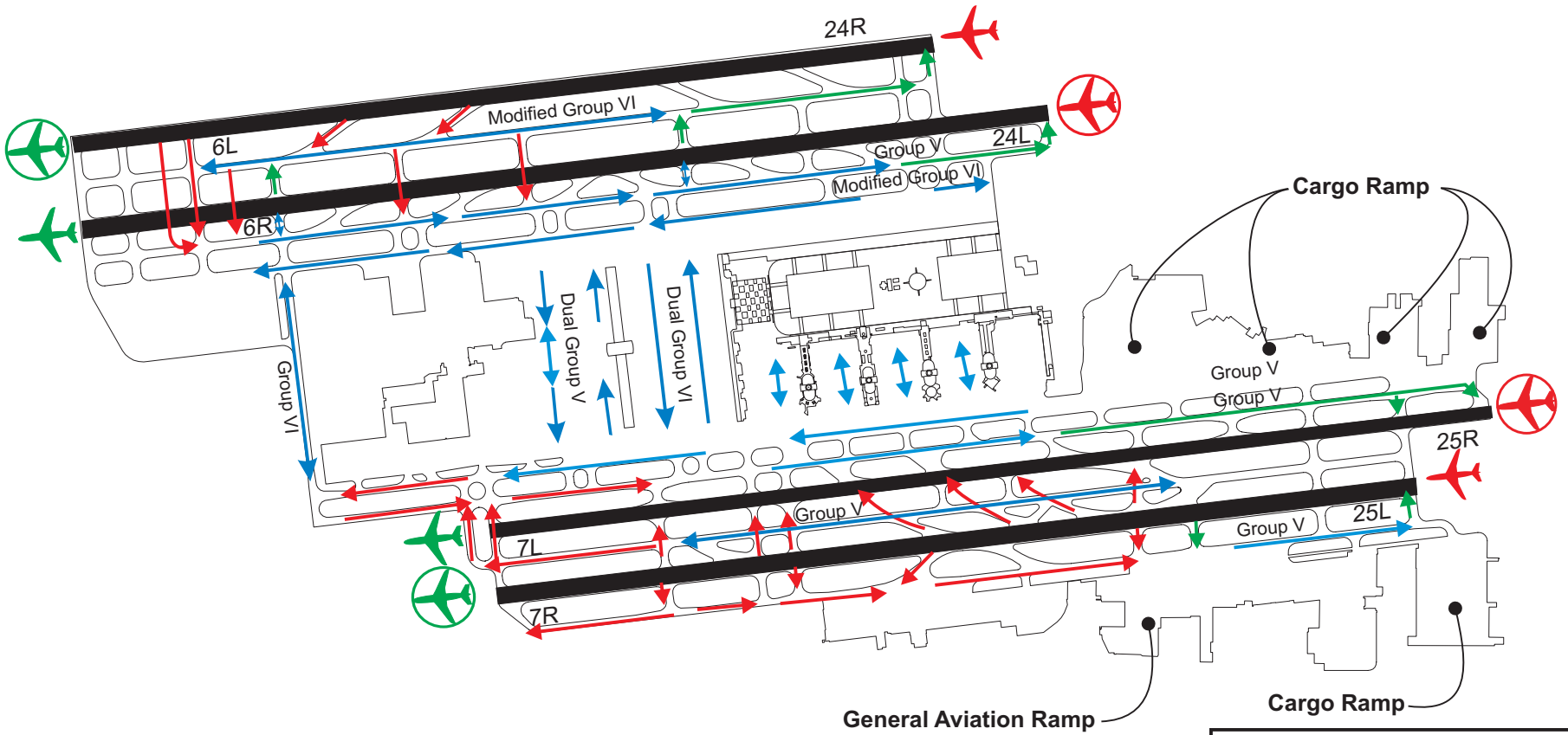
Figure
E-8



Los Angeles International Airport Master Plan	Generalized West Flow Primary Airspace Routes Alternative D	Figure E-9

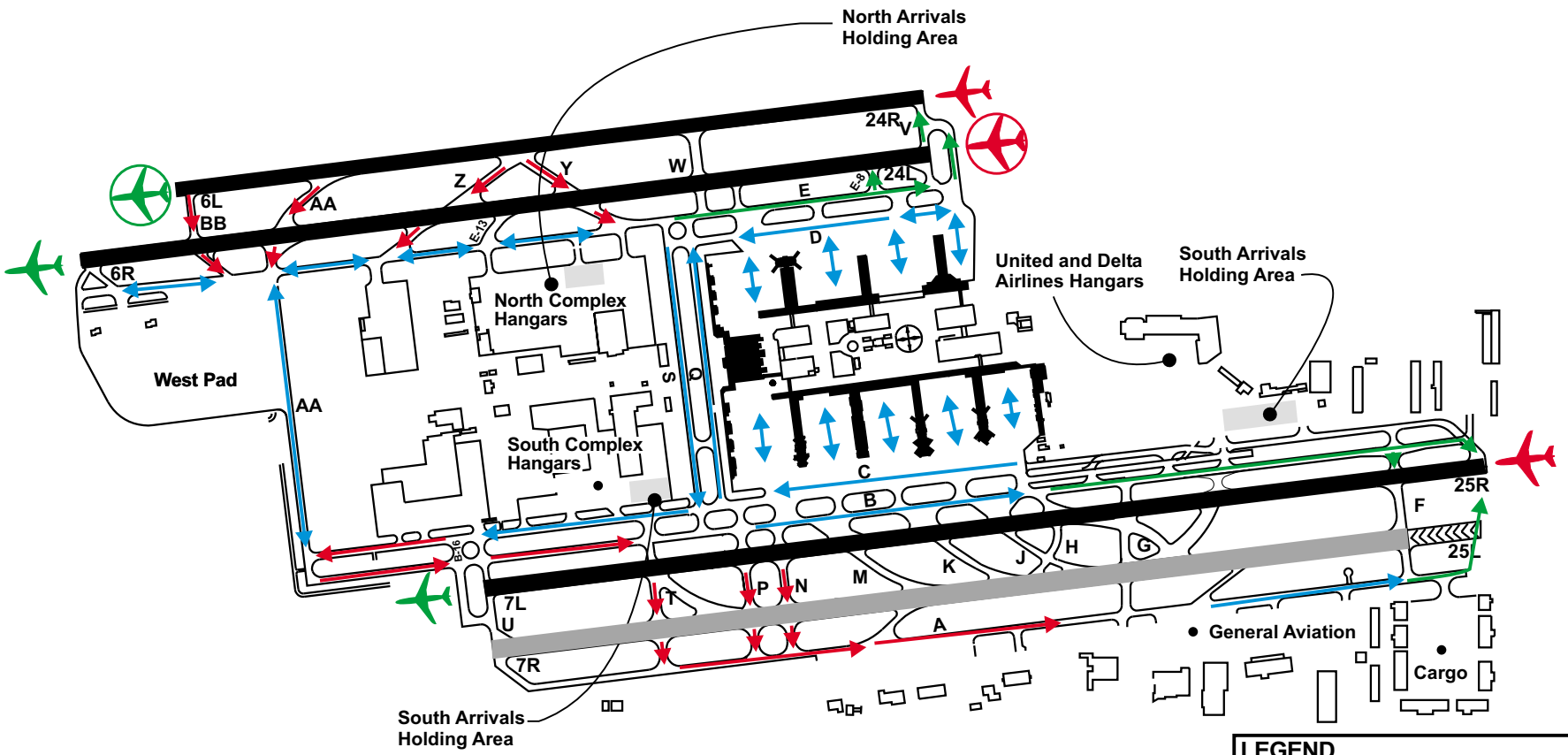


Los Angeles International Airport Master Plan	Generalized East Flow Primary Airspace Routes Alternative D	Figure E-10



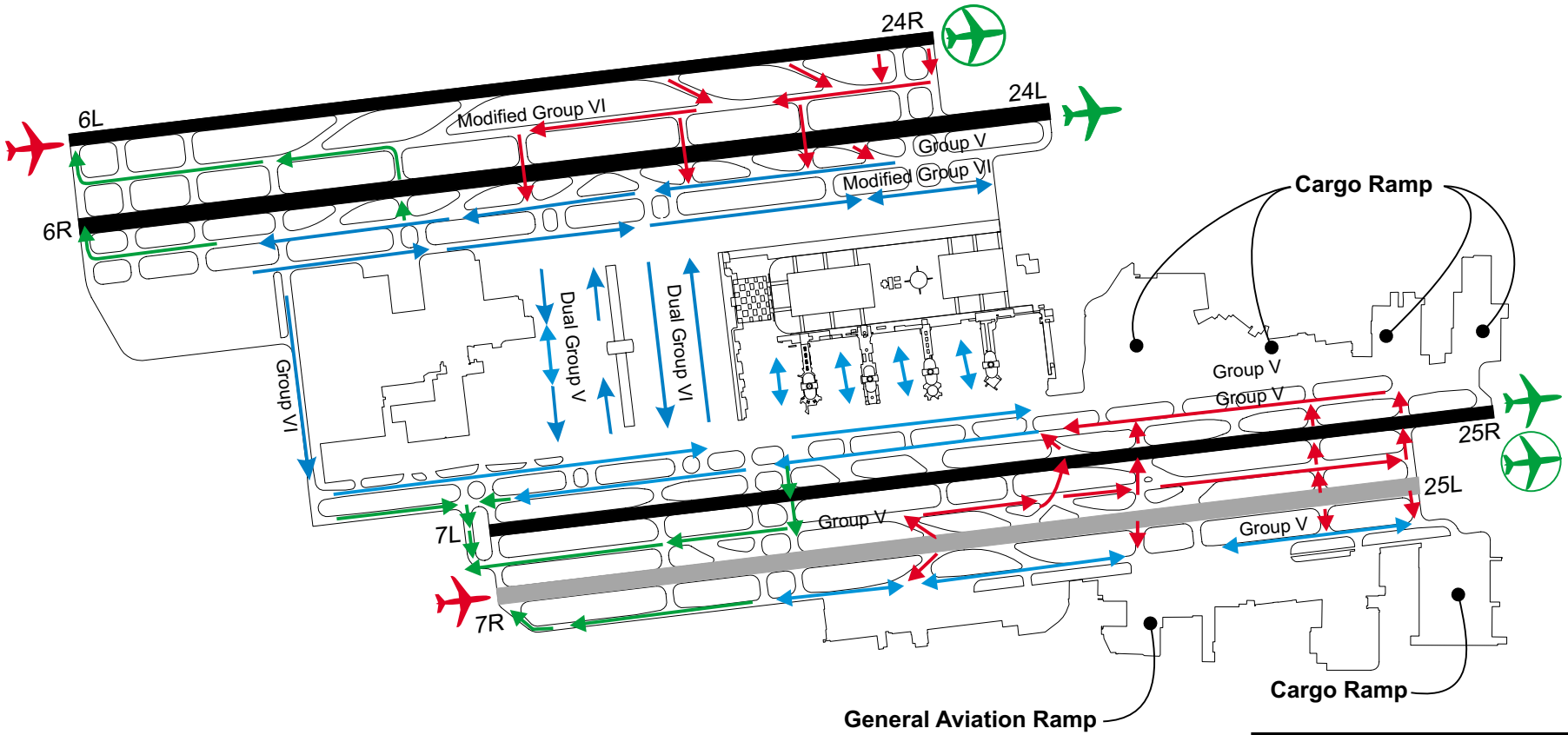
Prepared by: Landrum & Brown
Draft: April 2004

Los Angeles International Airport Master Plan	2015 Alternative D West Flow Primary Airfield Taxi Routes	Figure E-11



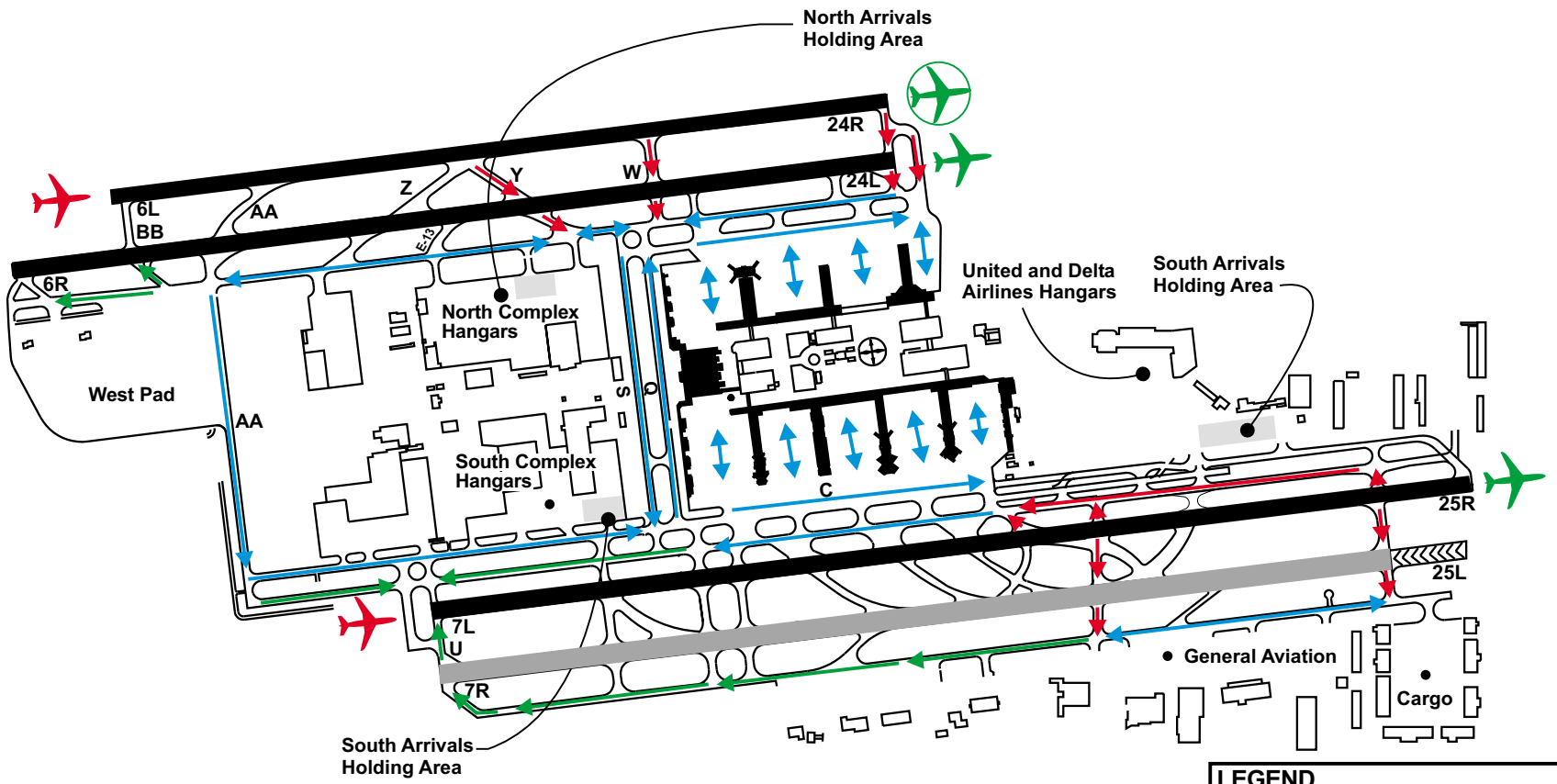
Source: LAX Air Traffic Control Tower, On-site observations
Prepared by: Landrum & Brown
Draft: 12/30/02

Los Angeles International Airport Master Plan	**2005 Alternative D West Flow Primary Airfield Taxi Routes**	**Figure E-12**



Prepared by: Landrum & Brown
Draft: 07/30/02

Los Angeles International Airport Master Plan	2015 Alternative D East Flow Primary Airfield Taxi Routes	Figure E-13



Source: LAX Air Traffic Control Tower, On-site observations
Prepared by: Landrum & Brown
Draft: 12/30/02

Los Angeles International Airport Master Plan	**2005 Alternative D East Flow Primary Airfield Taxi Routes**	**Figure E-14**

Shown in these figures are also the Airplane Design Group standards met by the various taxiways and taxilanes to help identify taxi routings for Group VI or NLA type aircraft. Dual taxiways and taxilanes identified as meeting less than Group VI or NLA standards also imply the availability of a single Group VI taxiway/taxilane with aircraft flow restrictions.

In 2005, cargo and general aviation operations would use Runway 25R as an alternative to the closed Runway 25L. Arrival operations going to the South or Imperial Cargo Complexes would exit south on Taxiway N, P, T or U to reach the ramp area. Cargo and general aviation departures were assumed to queue south of Runway 25R.

E.1.4.3.2 Gate Assignments

As discussed in Section 1.3 of this appendix, each flight in the Alternative D 2005 and 2015 design day schedules was assigned to a "scheduled" gate. During the simulation, flights were permitted to use alternative gates if, at the actual time of arrival at the gate, the scheduled gate was occupied by another flight. Gate reassignments performed during the simulations were conducted according to the user allocation, gate layout, and gate size assumptions.

E.1.5 AIRSIDE PERFORMANCE

This section presents the results of the airside performance analysis for Alternative D for 2005 and 2015 conditions. Runway use, delay and throughput results are described for each of the simulated configurations.

E.1.5.1 RUNWAY USE

Arrivals and departures were allocated to the runways based on the direction of the flight, which is determined by the outer fix assigned to that flight and the applicable runway use restrictions. **Figures E-15** and **E-16** illustrate how the runways are being used by the different aircraft categories in 2015 and 2005 respectively.

In 2005, the majority of heavy aircraft were assigned to arrive on Runway 25R to allow for a higher arrival throughput rate on Runway 24L and for more departures to take off on Runway 25R than would be possible if the fleet mix on the runways was not segregated. Krauz, and Paradise traffic was split between the complexes and Ontario was assigned to the north complex to help off load Runway 25R which serves as a mixed operation runway. Each of the three operating

runways was used for arrivals and departures in the VFR visual west flow configuration.

The runway use in 2015 is similar to Alternative C. As shown, Civet and Filmore traffic is split between the complexes due to the high number of flights originating from these fixes. All four runways were used for arrivals and departures in the VFR visual west flow configuration.

In general, arrivals from any fix would be able to reach any of the available approaches as needed, in order to balance demand and minimize delay. Departure traffic to the Thermal outer fix was primarily assigned to the south runways. As needed, Thermal departures were diverted to Dagget and assigned to the north or south runways to balance departure demand and minimize delay. Departures to Exert outer fix were assigned primarily to the north runways but were diverted to the south runways, as needed to minimize delay.

E.1.5.2 AIRCRAFT DELAY AND TAXI TIME

The average annual all weather delay for Alternative D and the final iteration alternatives is summarized in **Table E-3** and illustrated in **Figure E-17** for 2015.

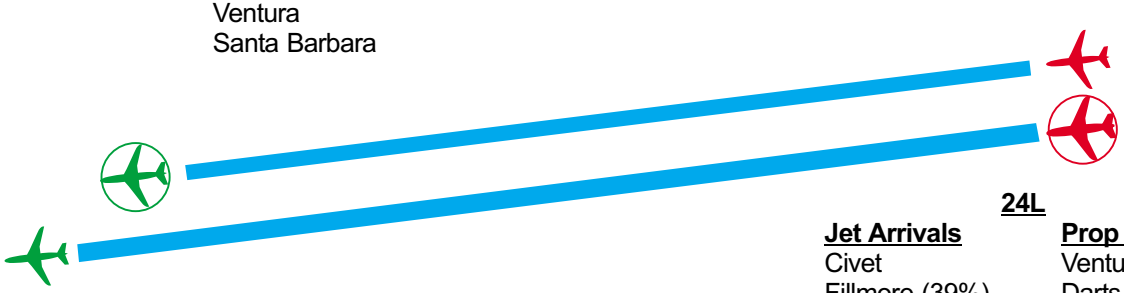
Table E-3

2015 ALL WEATHER AVERAGE DELAY AND FLIGHT CANCELLATIONS

Alternative	Average Delay	Cancelled Flights
No Action/No Project	13.34	29
Alternative A	9.86	45
Alternative B	10.88	26
Alternative C	13.82	46
Alternative D	11.56	28

Note: Delay is expressed in minutes per operation

As in the final iteration analysis, flow control and flight cancellations were modeled in cases that result in excessive arrival airspace delays. In these cases the flight schedules were submitted through a flow control process before running the airside simulations in the SIMMOD model. Flights were cancelled, as needed, in order to process all arrivals prior to midnight. Alternative D in 2015 would require flight cancellations during non-visual configurations.



24R

Jet Departures
Gorman (73%)

Prop Departures
Gorman
Ventura
Santa Barbara

24R

Jet Arrivals
Civet (39%)
Krauz
Fillmore (32%)
Ventura
Santa Catalina

Prop Arrivals
Krauz
Ventura
Darts (62%)
Santa Ana

24L

Jet Arrivals
Civet
Fillmore (39%)
Ventura (50%)

Prop Arrivals
Ventura
Darts

24L

Jet Departures
Gorman
Exert (96%)
Thermal
Dagget (100%)

Jet Departures
Gorman (62%)
Ventura (61%)
Santa Barbara (88%)

25R

Jet Arrivals
Civet
Krauz
Fillmore

Prop Arrivals
Krauz
Paradise
Ventura
Darts

25R

Jet Departures
Oceanside (76%)
Thermal (88%)

Prop Departures
Oceanside (91%)
Santa Ana (81%)
Paradise (52%)
Ontario (100%)

25L

Jet Departures
Exert
Oceanside
Thermal

Prop Departures
Burbank
Gorman
Ventura
Oceanside
Santa Ana
Paradise (44%)

25L

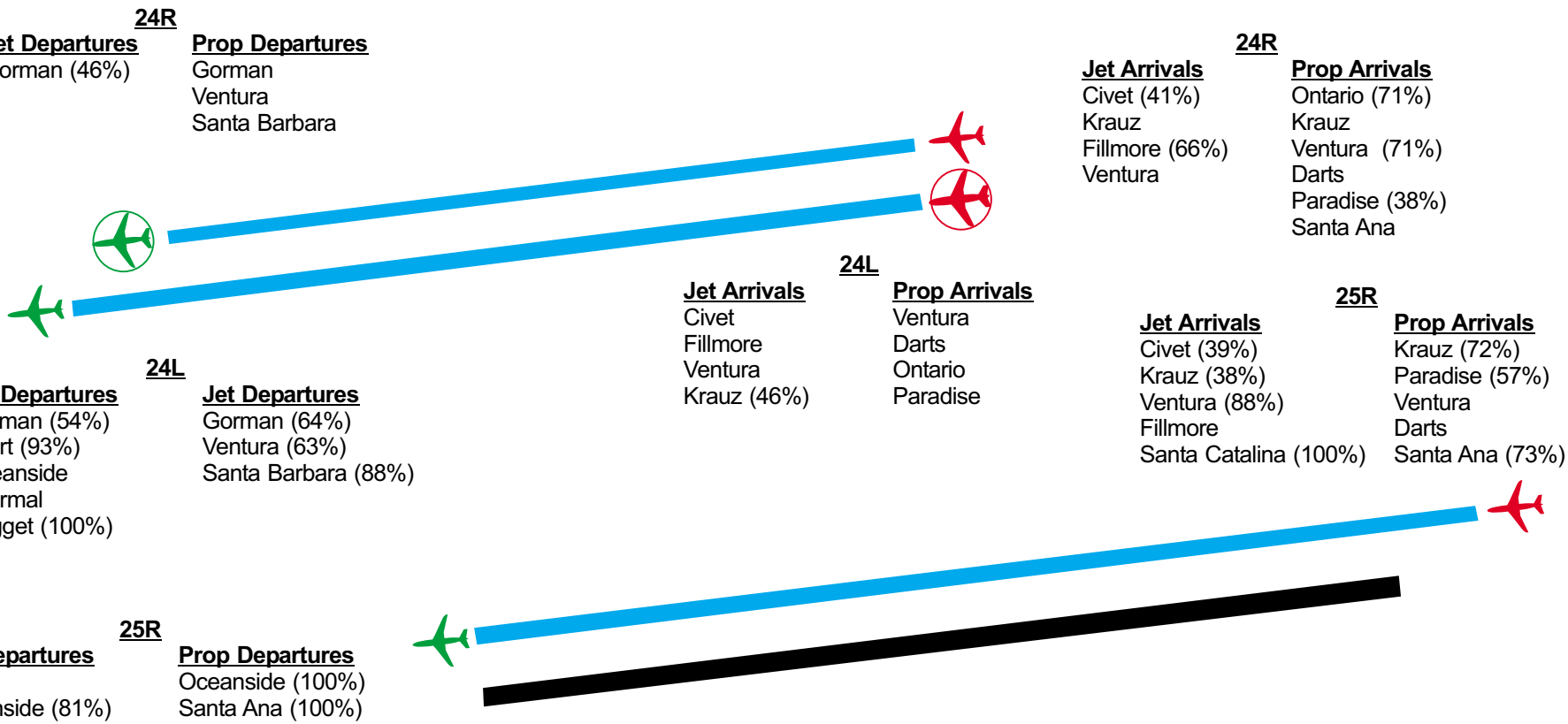
Jet Arrivals
Civet (33%)
Krauz (79%)
Fillmore
Santa Catalina (79%)
Ventura (50%)

Prop Arrivals
Paradise (91%)
Santa Ana (79%)
Krauz (83%)
Ventura (45%)
Darts

Mixed **Arrivals**
Departures **Occasional Use**
Not Used

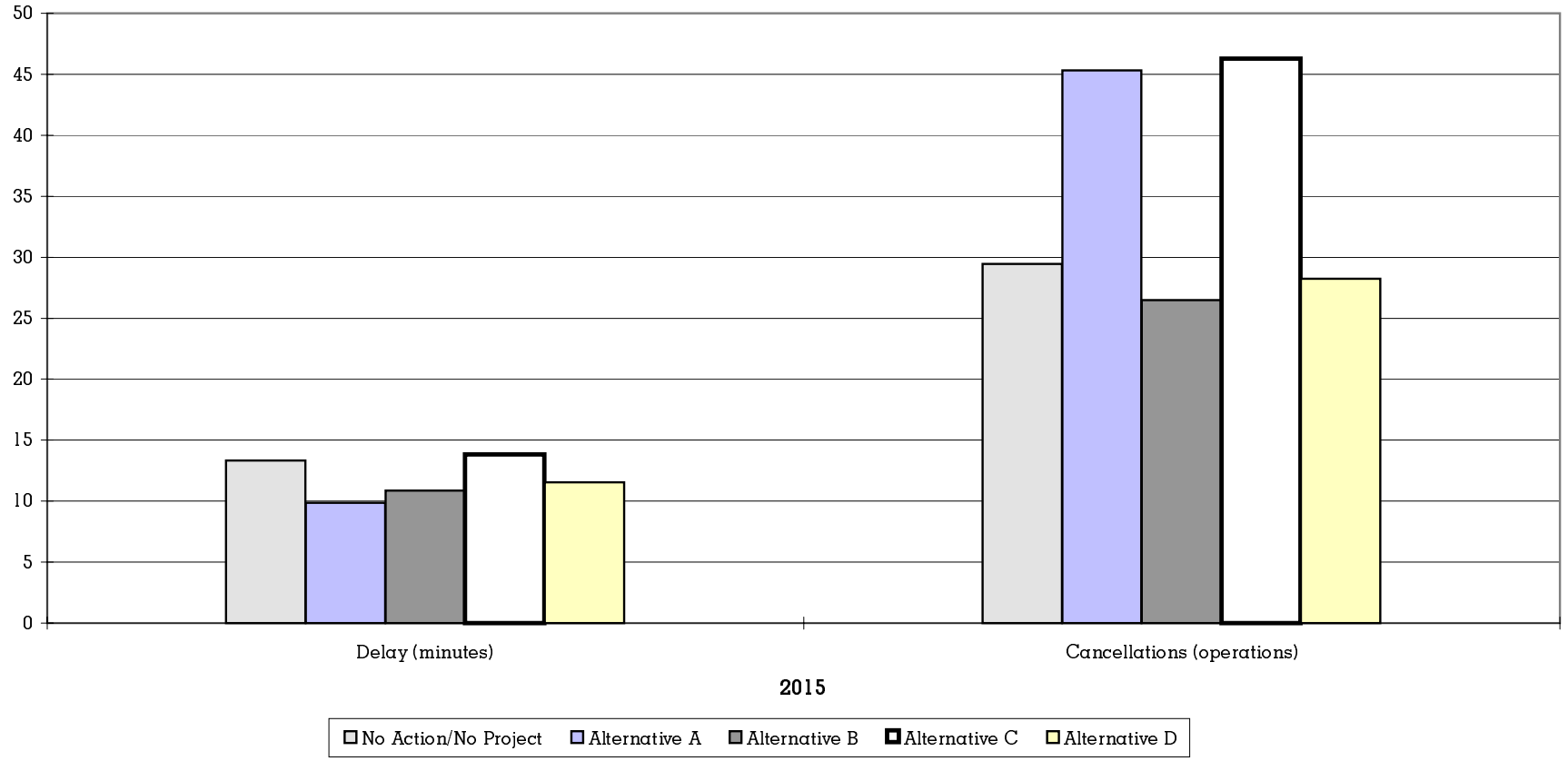
Prepared by: Landrum & Brown
Draft: 12/30/02

Los Angeles International Airport Master Plan	Runway Use 2015 Alternative D	Figure E-15



Prepared by: Landrum & Brown
Draft: 12/30/02

Los Angeles International Airport Master Plan	Runway Use 2005 Alternative D	Figure E-16



Note: Based on 2015 performance with cancellations.
Source: SIMMOD simulation output
Prepared by: Landrum & Brown
Draft: 05/18/00

Alternative	Delay (minutes)	Cancellations (Operations)
No Action/No Project	13.34	29
Alternative A	9.86	45
Alternative B	10.88	26
Alternative C	13.82	46
Alternative D	11.56	28

Los Angeles International Airport Master Plan

2015 Annual All Weather Average Delays and Cancellations

Figure E-17

Because the activity profiles are derived based on the capacity of the alternative, every alternative has all weather average delays within the pre-defined 10 to 15 minute range in 2015. Alternative D would have slightly lower delay and slightly fewer cancellations than the No Action/No Project Alternative due to the airfield improvements associated with Alternative D. Delays with Alternative D would be lower than Alternative C because Alternative C would have a heavier fleet mix than Alternative D.

In 2005, with only three runways available, airfield capacity would be reduced and activity would be lower than if four runways were open. Even with the reduced activity, delays would still be higher under the three runway case in 2005, as compared to a four runway case. As a result, flow control would be necessary in VFR visual conditions, in addition to the lower capacity VFR ILS west flow, IFR west flow, and east flow conditions. It is assumed that the flow delay in VFR visual conditions would be tolerated by the airlines because it would be a temporary condition due to the runway closure. In addition to flow control, a departure gate hold procedure would be needed in the 2005 visual configuration to control the high taxi out delays and long departure queues that otherwise would interfere with the flow of inbound aircraft.

Tables E-4 and E-5 provide detailed delay and taxi time results by runway operating configuration for Alternative D in 2015 and 2005 respectively. Tables for the final iteration alternatives can be found in Appendix J of the Draft LAX Master Plan.

1.5.3 PEAK HOUR THROUGHPUT AND DELAY

Table E-6 presents the peak arrival, departure and total operations throughput by runway operating configuration for 2005 and 2015. Peak throughputs are computed as the average of the peak three consecutive hours and serve as a measure of sustainable hourly capacity. **Table E-7** illustrates the all weather average peak hour throughput for all the 2015 Master Plan alternatives.

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Table E-4
Los Angeles International Airport Master Plan

AVERAGE DELAY AND UNIMPEDED TAXI TIME
2015 ALTERNATIVE D
(With Cancellations)

Average Delay (Minutes per Operation)

			Arrivals					Departures					Average			
Configuration		Annual Use	Cancellations	Flow	Airspace	Ground	Total	Cancellations	Gatehold	Airspace	Ground	Total	Airspace	Total Ground	Taxi Only	Total
VFR Visual West Flow		69.70%	0	0.00	4.38	2.49	6.87	0	0.00	0.15	7.34	7.49	2.26	4.92	4.92	7.18
VFR ILS West Flow		15.49%	41	26.33	11.57	1.41	39.31	30	0.00	0.13	4.74	4.87	5.81	16.16	3.09	21.97
VFR East Flow	1/	5.71%	41	26.33	11.57	1.41	39.31	30	0.00	0.13	4.74	4.87	5.81	16.16	3.09	21.97
Average VFR		**90.90%**	9	5.96	6.01	2.24	14.21	6	0.00	0.15	6.74	6.89	**3.07**	**7.47**	**4.50**	**10.54**
IFR West Flow		9.10%	71	26.32	7.59	1.63	35.54	74	0.00	0.13	9.00	9.13	3.86	18.47	5.32	22.32
Average All Weather		**100.00%**	**15**	**7.80**	**6.13**	**2.17**	**16.11**	**13**	**0.00**	**0.14**	**6.90**	**7.04**	**3.13**	**8.43**	**4.54**	**11.56**

Average Unimpeded Taxi Time (Minutes per Operation)

	Annual Use	Arrivals	Departures	Average
VFR Visual West Flow	69.70%	7.62	11.20	9.41
VFR ILS West Flow	15.49%	7.66	11.10	9.39
VFR East Flow	5.71%	8.51	12.86	10.70
Average VFR	**90.90%**	7.68	**11.28**	**9.48**
IFR West Flow	9.10%	7.47	11.37	9.42
Average All Weather	**100.00%**	**7.61**	**11.23**	**9.43**

Average Delay and Unimpeded Taxi Time (Minutes per Operation)

	Annual Use	Arrivals	Departures	Average
VFR Visual West Flow	69.70%	14.49	18.69	16.59
VFR ILS West Flow	15.49%	46.97	15.97	31.36
VFR East Flow	5.71%	47.82	17.73	32.67
Average VFR	**90.90%**	**21.89**	**18.17**	**20.02**
IFR West Flow	9.10%	43.01	20.50	31.74
Average All Weather	**100.00%**	**23.72**	**18.27**	**20.99**

Note: 1/ East Flow performance is assumed to be equivalent to ILS West Flow.
Source: SIMMOD Simulation Ouput

Table E-5
Los Angeles International Airport Master Plan

AVERAGE DELAY AND UNIMPEDED TAXI TIME
2005 ALTERNATIVE D
(With Cancellations)

Average Delay (Minutes per Operation)

			Arrivals					Departures					Average			
Configuration		Annual Use	Cancellations	Flow	Airspace	Ground	Total	Cancellations	Gatehold	Airspace	Ground	Total	Airspace	Total Ground	Taxi Only	Total
VFR Visual West Flow		69.70%	0	26.98	4.48	2.79	34.25	0	2.48	0.16	11.92	14.56	2.32	22.09	7.36	24.41
VFR ILS West Flow		15.49%	55	26.52	9.66	1.80	37.98	54	0.00	0.18	7.48	7.66	4.92	17.89	4.64	22.81
VFR East Flow	1/	5.71%	55	26.52	9.66	1.80	37.98	54	0.00	0.18	7.48	7.66	4.92	17.89	4.64	22.81
Average VFR		**90.90%**	12	26.85	5.63	2.57	35.05	11	1.92	0.16	10.91	13.00	**2.90**	**21.12**	**6.74**	**24.02**
IFR West Flow		9.10%	111	27.65	5.75	3.14	36.54	110	0.00	0.10	13.30	13.40	2.92	22.04	8.22	24.96
Average All Weather		**100.00%**	**22**	**26.67**	**5.62**	**2.59**	**34.88**	**21**	**1.73**	**0.16**	**11.00**	**12.89**	**2.89**	**21.00**	**6.80**	**23.88**

Average Unimpeded Taxi Time (Minutes per Operation)

		Arrivals	Departures	Average
VFR Visual West Flow	69.70%	7.85	10.15	9.00
VFR ILS West Flow	15.49%	7.72	10.23	8.98
VFR East Flow	5.71%	8.39	12.41	10.40
Average VFR	**90.90%**	7.85	**10.29**	**9.07**
IFR West Flow	9.10%	7.25	9.98	8.62
Average All Weather	**100.00%**	**7.73**	**10.17**	**8.95**

Average Delay and Unimpeded Taxi Time (Minutes per Operation)

		Arrivals	Departures	Average
VFR Visual West Flow	69.70%	42.10	24.71	33.41
VFR ILS West Flow	15.49%	45.70	17.89	31.79
VFR East Flow	5.71%	46.37	20.07	33.21
Average VFR	**90.90%**	**42.90**	**23.29**	**33.09**
IFR West Flow	9.10%	43.79	23.38	33.58
Average All Weather	**100.00%**	**42.61**	**23.06**	**32.83**

Note: 1/ East Flow performance is assumed to be equivalent to ILS West Flow.
Source: SIMMOD Simulation Output

Table E-6

PEAK HOUR THROUGHPUT ALTERNATIVE D
(Peak 3 Hour Average)

2015 Alternative D

Configuration	Annual Use	Peak Arrival Operations	Peak Departure Operations	Peak Total Operations
VFR VisualWest Flow	69.70%	75	76	144
VFR ILS West Flow	15.49%	66	73	135
VFR East Flow	5.71%	66	73	135
Average VFR	**90.90%**	**73**	**76**	**142**
IFR West Flow	9.10%	64	69	131
All Weather Average	**100.00%**	**72**	**75**	**141**

2005 Alternative D

Configuration	Annual Use	Peak Arrival Operations	Peak Departure Operations	Peak Total Operations
VFR VisualWest Flow	69.70%	69	69	132
VFR ILS West Flow	15.49%	63	69	129
VFR East Flow	5.71%	63	69	129
Average VFR	**90.90%**	**67**	**69**	**131**
IFR West Flow	9.10%	65	68	118
All Weather Average	**100.00%**	**67**	**69**	**130**

Notes:
1 Peak hour throughput for arrivals, departures, and total operations may not correspond to the same hour.
2 East flow performance is assumed to be equivalent to ILS west flow.
Source: SIMMOD simulation output

Table E-7

2015 ALL WEATHER AVERAGE PEAK HOUR THROUGHPUT

	Peak Hour Operations		
Alternative	Arrivals	Departure	Total
No Action/No Project	73	75	140
Alternative A	92	85	172
Alternative B	91	86	172
Alternative C	73	71	138
Alternative D	72	75	141

Note: Peak hour throughput for arrivals, departures, and total operations may not correspond to the same hour.

Alternative D yields an all weather average throughput of 141 operations, similar to the other four-runway alternatives, Alternative C (138) and the No Action/No Project Alternative (140).

Peak hour throughput and delay data by runway for Alternative D is provided in **Tables E-8** and **E-9**. The figures represent the highest average delay and throughput observed in a single hour for each runway. Peak hour performance for the various runways may not correspond to the same hour. In 2015, peak hour operations on the primary arrival and departure runways range from 30 to 40 arrivals or departures depending primarily on fleet mix.

In order to serve the maximum number of passengers possible in 2005 (with the closure of Runway 25L), higher delay than in a four-runway alternative would be tolerated and greater demand is placed on the three runways. The higher demand results in a higher throughput than that of the four-runway alternatives.

Table E-8
Los Angeles International Airport Master Plan

RUNWAY AVERAGE DELAY AND PEAK HOUR THROUGHPUT
2015 ALTERNATIVE D

	Throughput				Delay (Minutes per Operation)			
	Arrivals		Departures		Arrivals 2/		Departures	
	Daily Total	Peak Throughput Hour 1/	Daily Total	Peak Throughput Hour 1/	Daily Average	Peak Delay Hour 1/	Daily Average	Peak Delay Hour 1/
VFR Visual West Flow								
24R ———	334	29	113	16	6.81	15.24	7.11	8.71
24L ———	140	10	456	32	6.35	6.61	7.01	10.84
25R ———	143	13	463	31	5.30	4.60	6.97	14.04
25L ———	520	37	110	11	7.47	5.73	12.07	30.37
VFR ILS West Flow								
24R ———	473	33	20	6	12.43	3.56	9.16	14.13
24L ———	58	14	545	39	25.03	32.60	4.71	6.01
25R ———	62	14	437	36	17.54	27.57	4.12	5.83
25L ———	503	36	110	12	11.55	8.82	7.84	5.51
VFR East Flow 3/								
6L ———	473	33	20	6	12.43	3.56	9.16	14.13
6R ———	58	14	545	39	25.03	32.60	4.71	6.01
7L ———	62	14	437	36	17.54	27.57	4.12	5.83
7R ———	503	36	110	12	11.55	8.82	7.84	5.51
IFR West Flow								
24R ———	458	31	--	--	8.44	8.67	--	--
24L ———	56	15	514	36	16.65	27.79	7.45	9.51
25R ———	62	14	469	36	15.63	25.34	11.43	12.08
25L ———	491	35	84	13.00	8.30	7.34	6.52	14.54

Notes: 1/ Peak hour delay and throughput are the highest delay and throughput obtained in a single hour. The peak hour values shown may not correspond to the same hour.
2/ Arrival delay by runway does not count arrival flow control delay incurred on the ground at the origin airport.
3/ East Flow performance is assumed to be equivalent to ILS West Flow.
Source: SIMMOD simulation output

Table E-9
Los Angeles International Airport Master Plan

RUNWAY AVERAGE DELAY AND PEAK HOUR THROUGHPUT
2005 ALTERNATIVE D

	Throughput				Delay (Minutes per Operation)			
	Arrivals		Departures		Arrivals 2/		Departures	
	Daily Total	Peak Throughput Hour 1/	Daily Total	Peak Throughput Hour 1/	Daily Average	Peak Delay Hour 1/	Daily Average	Peak Delay Hour 1/
VFR Visual West Flow								
24R ———	497	39	62	11	7.07	11.62	18.91	30.58
24L ———	174	22	556	40	7.53	8.89	11.43	7.73
25R ———	417	26	471	35	7.40	11.84	11.92	8.78
25L ———	--	--	--	--	--	--	--	--
VFR ILS West Flow								
24R ———	511	37	50	9	10.89	15.64	18.18	4.90
24L ———	58	26	576	41	17.87	27.03	6.91	4.46
25R ———	465	28	409	35	11.28	11.73	7.46	4.35
25L ———	--	--	--	--	--	--	--	--
VFR East Flow 3/								
6L ———	511	37	50	9	10.89	15.64	18.18	4.90
6R ———	58	26	576	41	17.87	27.03	6.91	4.46
7L ———	465	28	409	35	11.28	11.73	7.46	4.35
7R ———	--	--	--	--	--	--	--	--
IFR West Flow								
24R ———	482	35	--	--	8.64	6.82	--	--
24L ———	71	27	598	44	18.67	23.53	13.32	10.27
25R ———	425	27	381	37	7.55	4.26	13.51	12.76
25L ———	--	--	--	--	--	--	--	--

Notes: 1/ Peak hour delay and throughput are the highest delay and throughput obtained in a single hour. The peak hour values shown may not correspond to the same hour.
2/ Arrival delay by runway does not count arrival flow control delay incurred on the ground at the origin airport.
3/ East Flow performance is assumed to be equivalent to ILS West Flow.
Source: SIMMOD simulation output

E.2 ALTERNATIVE D ADDITIONAL INTERIM YEAR AIRSIDE ANALYSIS

The Draft EIS/EIR required the analysis of additional interim years for Alternative D and was later integrated into the Final EIS/EIR. The year 2008 was determined to be the peak traffic year for construction and airport traffic, thereby requiring design day flight schedules with gate assignments for the traffic modeling (but not airside simulations). The year 2013 was defined as the peak emissions year for air quality analyses in the Draft EIS/EIR and was later integrated into the Final EIS/EIR. The facilities available and the resulting activity levels in 2013 would be similar to 2015. Therefore, airside performance was estimated for 2013 based on the 2015 analysis in order to provide data for the air quality modeling. Detailed simulations were therefore not necessary for 2013.

The following sections discuss the 2008 and 2013 Alternative D analysis. For a detailed discussion of the interim year activity refer to Appendix F.

E.2.1 2008 ALTERNATIVE D

By 2008, the construction in the south airfield would be completed and a parallel taxiway between the south runways would be open. The north airfield facilities would remain unchanged from the existing airfield.

No new terminal facilities would be available in 2008 with Alternative D. The NLA would be required to park at the remote gates in the west pad area. Alternative D in 2008 would retain the existing cargo and general aviation facilities.

A design day flight schedule was developed for Alternative D in 2008. The methodology and assumptions used to derive the design day schedule are discussed in Appendix D. A detailed profile of hourly aircraft operations for Alternative D in 2008 can be found in Appendix F. Alternative D would have the ability to serve 73.3 MAP and 781,000 annual operations in 2008.

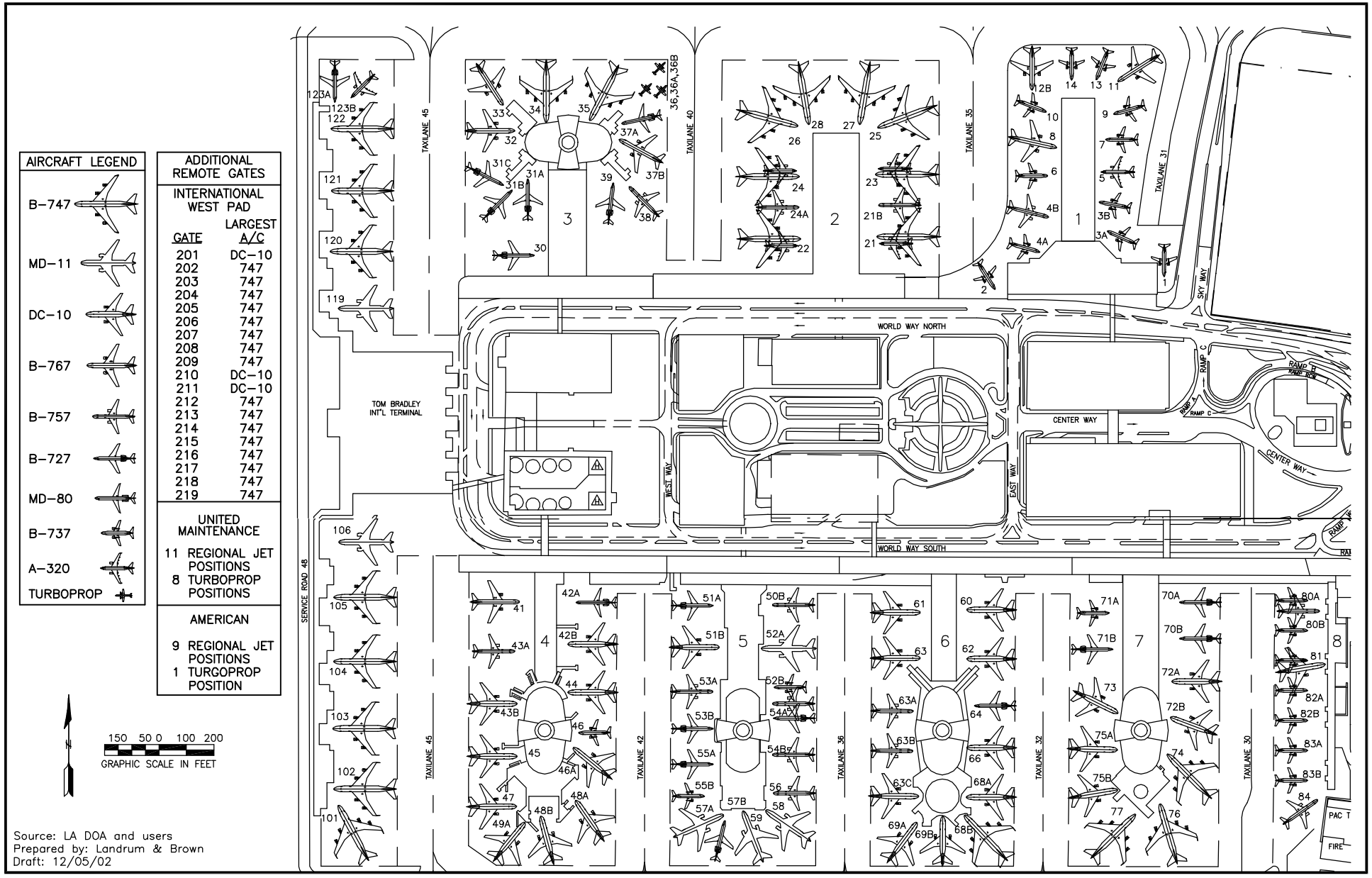
As discussed in Section 1.3 of this appendix, flights in the design day schedules were classified into general airline groups for the purpose of assigning the aircraft to the gates and allocating passengers to the terminal area. The resulting layout, gate size, and airline allocation for Alternative D in 2008 are shown in **Figure E-18**.

All flights in the 2008 design day schedule were assigned to a gate to determine future terminal loadings (see Section 1.3 of this appendix). The results of the Alternative D 2008 gate assignments are illustrated in **Figure E-19**. The number of passengers on each flight was determined using the load factor and aircraft size assumptions presented in Chapter V of the Draft LAX Master Plan.

E.2.2 2013 ALTERNATIVE D

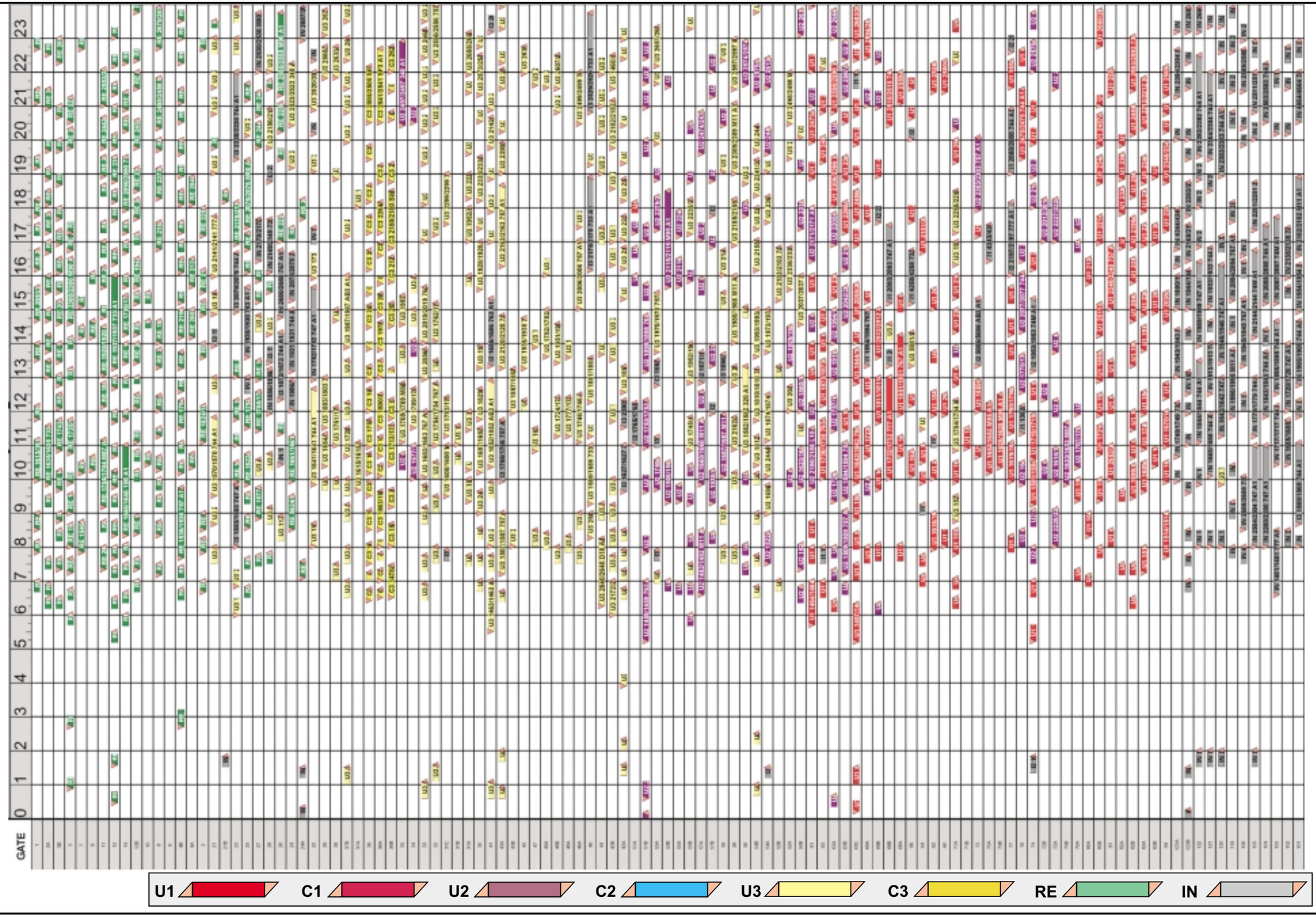
The year 2013 was identified as the peak emissions year for air quality analyses in the Draft EIS/EIR and airside simulation data was required and was later integrated into the Final EIS/EIR. The facilities in 2013 would be similar to the ultimate 2015 facilities. Four runways would be available in both 2013 and 2015. The available gate facilities would be identical with the exception of the north linear concourse, which would be under construction. As discussed in Appendix D, because the capacity of the 2013 facilities would be similar to the 2015 facilities, it was assumed that the 2015 activity was representative of the 2013 interim year.

In 2013, construction would be underway on the north airfield. All four runways would remain open. The south piers on the existing CTA would remain in tact, although the number and size of aircraft that could park around each of the terminals would be changed. TBIT would be expanded to accommodate aircraft on the west side of the terminal and a new West Satellite Concourse would be constructed west of TBIT.



Source: LA DOA and users
Prepared by: Landrum & Brown
Draft: 12/05/02

Los Angeles International Airport Master Plan	2008 Alternative D Gate Layout and Utilization	Figure E-18

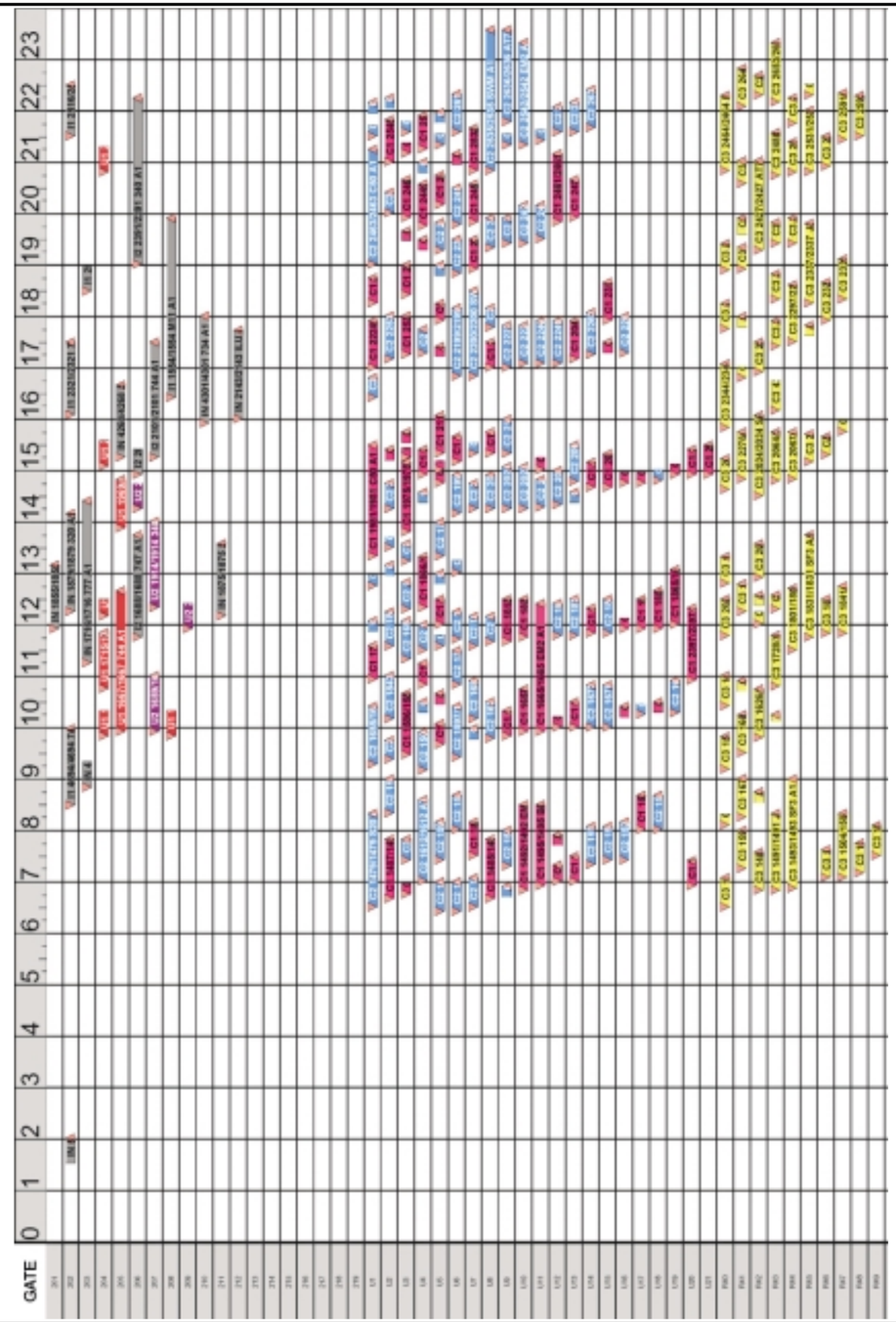


Prepared by: Landrum & Brown
Draft: 12/30 02

Los Angeles International Airport Master Plan

Design Day Gate Assignment
2008 Alternative D - Central Terminal Area

E-19
(1 of 2)



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Prepared by: Landrum & Brown
Draft: 12/30 02

Los Angeles International Airport Master Plan

Design Day Gate Assignment
2008 Alternative D - Remote Gates

E-19
(2 of 2)

The north piers of the CTA would be removed and a portion of the new north linear concourse would be complete for Alternative D in 2013. The remainder of the concourse would be under construction to complete nine additional gates by 2015. During the construction there would not be sufficient gates available at the terminal to serve demand and remote gates would be needed. The international foreign flag activity that would operate on the north linear concourse in 2015 was assumed to operate from the west pad in 2013. The use of the west remote pad gates would maximize the level of activity that could be served by the LAX facilities while the final gates are constructed. **Figure E-20** demonstrates the layout gate size and airline allocation for Alternative D in 2013.

All flights in the 2013 design day schedule were assigned to a gate to determine future terminal loadings consistent with the assumptions for 2005 and 2015 described in Section 1.3 of this appendix. The results of the Alternative D in 2013 gate assignments are illustrated in **Figure E-21**.

The number of passengers on each flight was determined using the load factor and aircraft size assumptions presented in Chapter V of the Draft LAX Master Plan. Detailed profiles of hourly passengers by terminal and by airline for Alternative D are contained in Appendix F.

Airside performance was estimated for 2013 based on the 2013 gate locations and the 2015 airside performance results. Because both 2013 and 2015 have four runways and similar activity levels, the 2015 delays and hourly runway capacity were assumed to be representative of 2013 for the purpose of estimating air quality impacts. The 2015 taxi times were adjusted to account for the differences in gate locations in 2013. The difference in the required taxi distance between the remote west pad positions and the north linear concourse was calculated and air quality reports were modified accordingly to represent 2013 conditions. The 2013 airside simulation reports used for the air quality analysis are presented in Appendix G.

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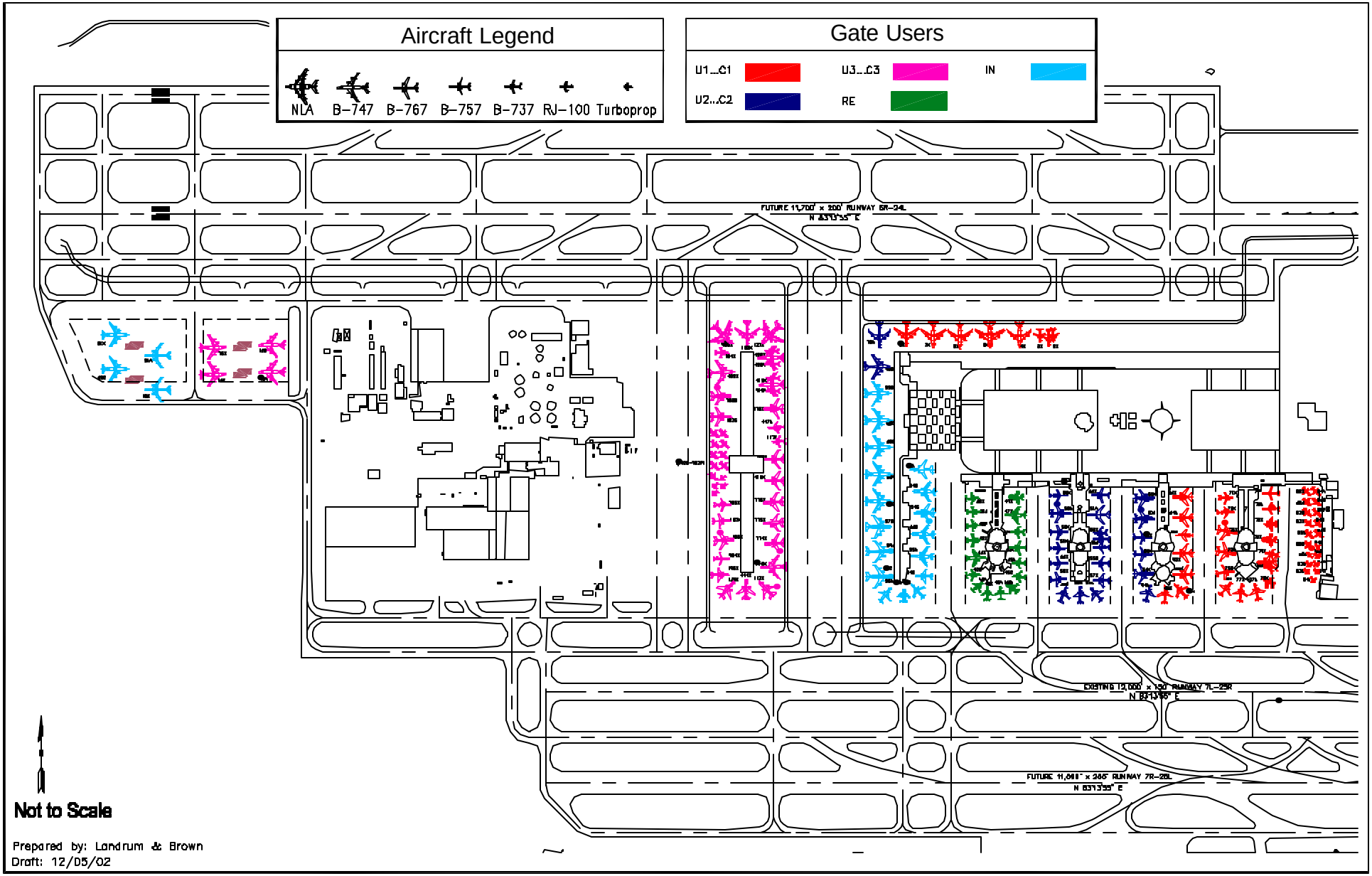
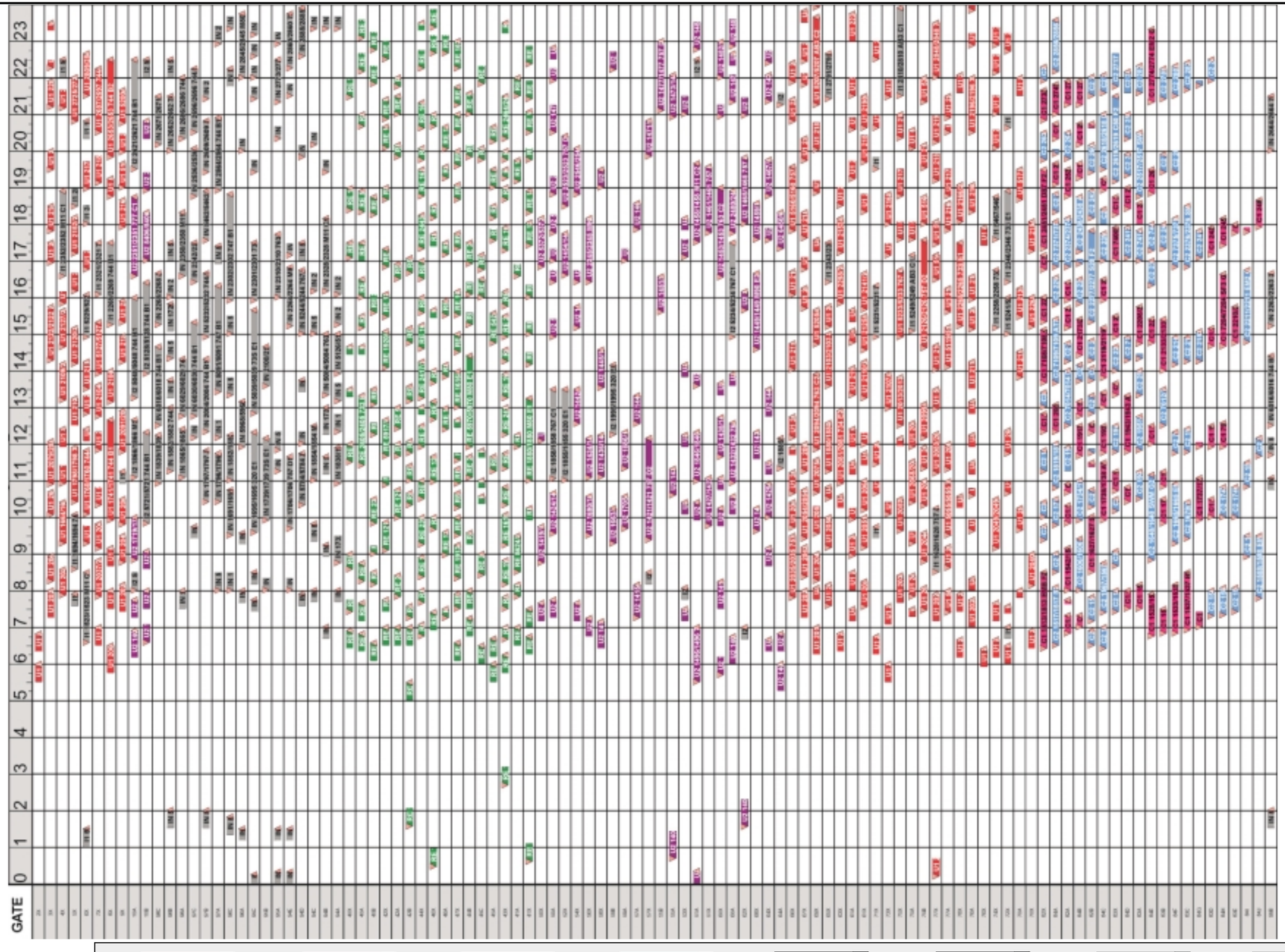


Los Angeles International Airport
Master Plan

2013 Alternative D
Gate Layout and Utilization

Figure
E-20

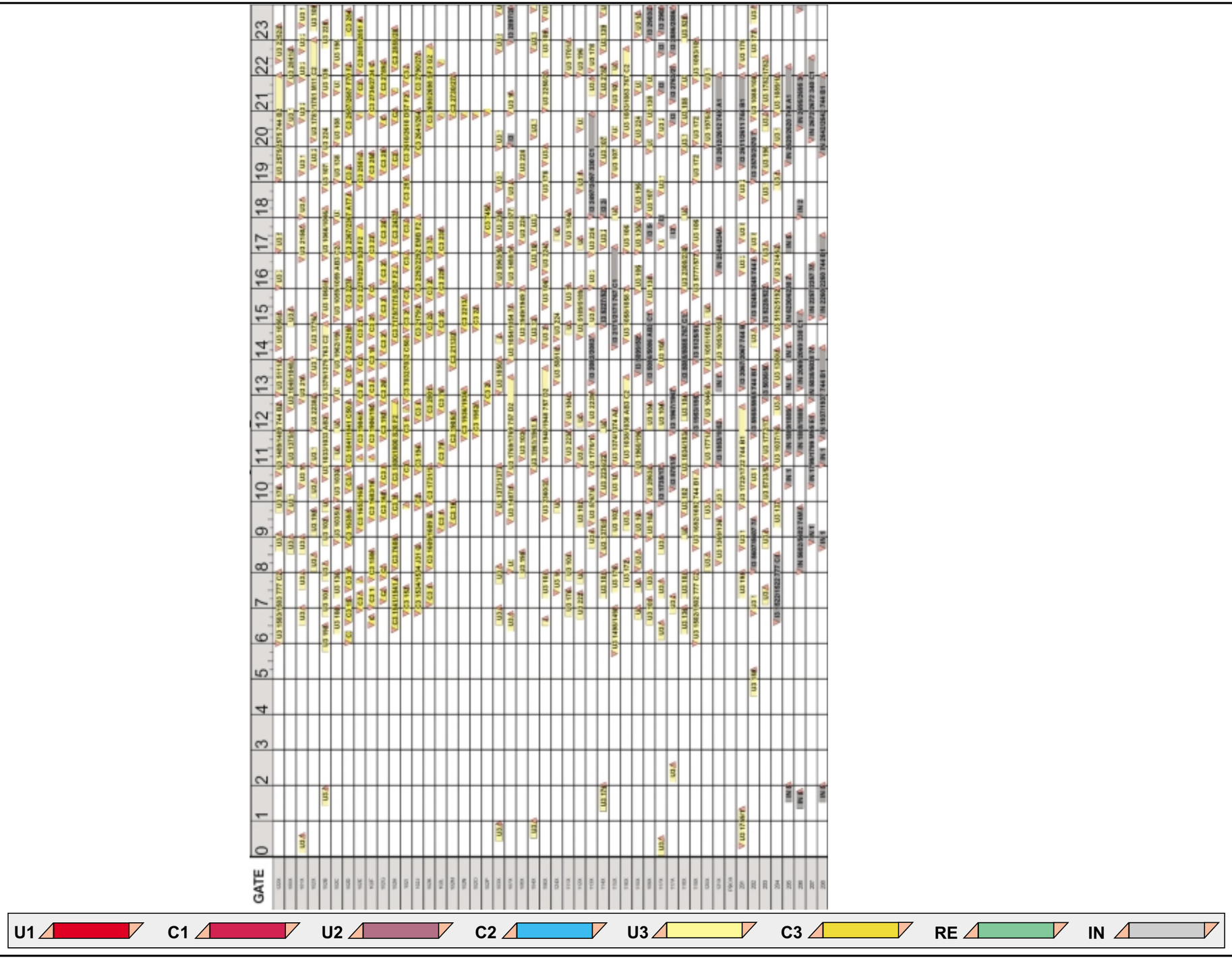


Prepared by: Landrum & Brown
Draft: 12/30/02

Los Angeles International Airport Master Plan

Design Day Gate Assignment
2013 Alternative D - East Terminal Area

Figure
E-21
(1 of 2)



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Draft: 12/30/02

Los Angeles International Airport Master Plan

Design Day Gate Assignment
2013 Alternative D - West Terminal Area

Figure
E-21
(2 of 2)