APPENDIX H
Los Angeles International Airport Airspace Overview

H.1 Introduction

This technical appendix describes visual flight rules transition routes, standard terminal arrivals, and departure procedures associated with Los Angeles International Airport.

H.2 Visual Flight Rules Transition Routes

The LAX Class B airspace includes VFR transition routes that general aviation aircraft use to avoid heavily congested IFR routes within the airspace. The names of these transition routes include the Coliseum Route, Hollywood Park Route, Mini Route, Shoreline Route, and the Los Angeles Special Flight Rules Area.

The Coliseum Route takes VFR aircraft northwest to southeast and vice-versa from Van Nuys to Miles Square Park at altitudes between 8,500 and 9,500 feet MSL east of LAX over the L.A. Coliseum. This route may not be available when LAX is in its east flow operation.

The Hollywood Park Route takes aircraft northwest to southeast and vice-versa from Van Nuys to the Queen Mary at altitudes between 7,000 and 10,000 feet MSL just east of LAX. This route may not be available when LAX is in east flow operation.

The Mini Route takes aircraft northwest to southeast and vice-versa from Santa Monica to the Hawthorne and Interstate 405 Freeway over LAX. ATC clearance from the LAX ATCT is required for this route.

The Shoreline Route takes aircraft northwest to southeast and vice-versa from Van Nuys to the Vincent Thomas Bridge at altitudes between 5,500 and 6,500 feet MSL just west of LAX over the VOR.

The Los Angeles Special Flight Rules Area is a route that takes aircraft from Santa Monica over LAX and south along the Interstate 405 Freeway and vice-versa. The maximum speed in this area for aircraft is 140 knots indicated airspeed (KIAS). Aircraft navigating southeasterly shall be in level flight at 3,500 feet MSL. Aircraft navigating northwesterly shall be in level flight at 4,500 feet MSL. In this area, communication with ATC is not required, however, there is an air-to-air frequency where aircraft communicate with each other their location, altitude, and direction of flight. The VFR transition routes are depicted on **Exhibit H-1**.

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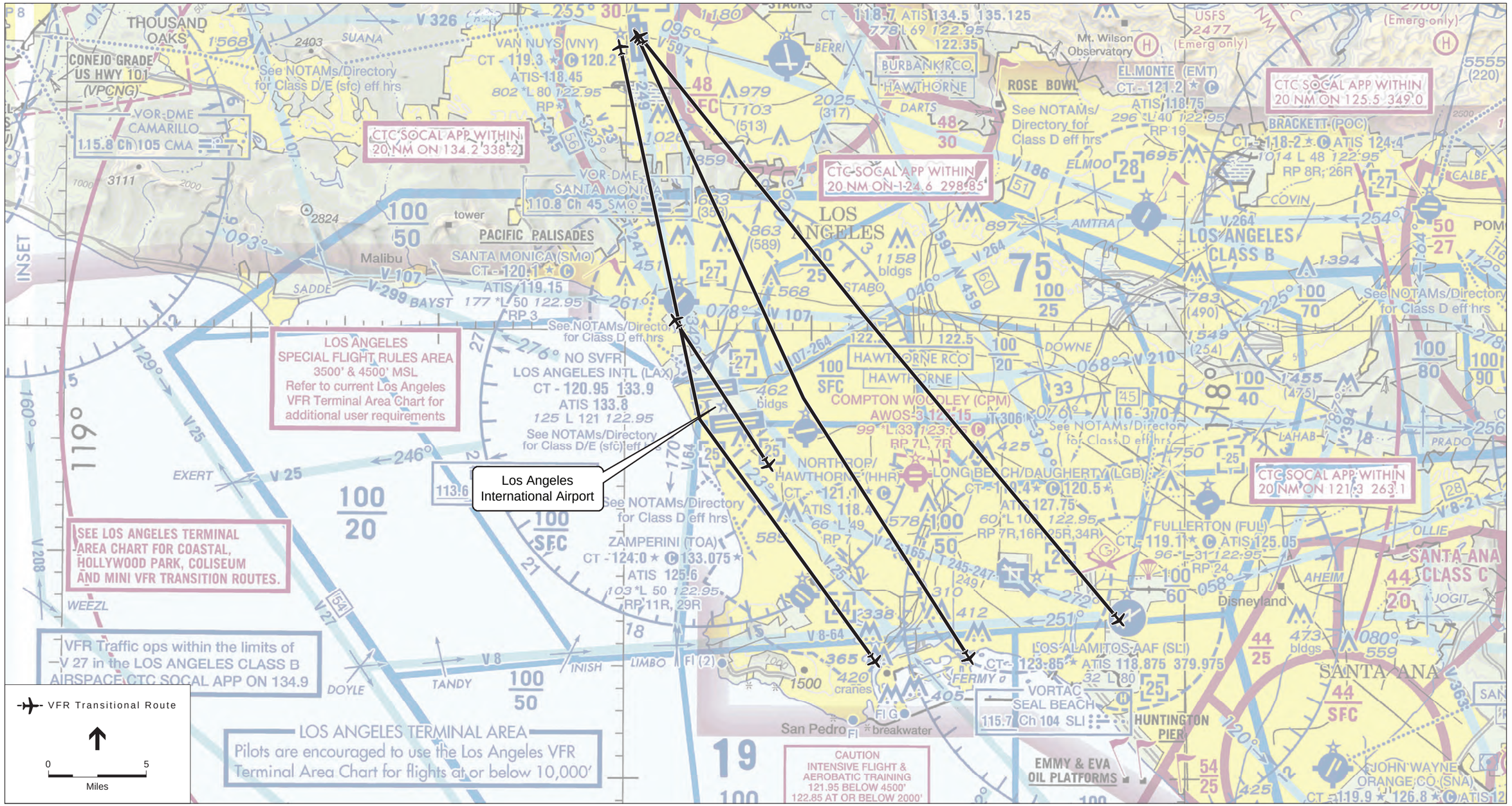

SOURCE: Federal Aviation Administration, 2013; ESA Airports 2014
NOTE: Not for Navigational Use

Exhibit H-1
Visual Flight Rules Transitional Routes

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H.3 Standard Terminal Arrivals and Departure Procedures

The Los Angeles airspace is structured so that arriving aircraft can be safely and efficiently transitioned from the en route environment to the approach control environment and from the approach control environment to the airfield proper; these structures are known as Standard Terminal Arrivals (STARs). Likewise, the airspace is structured so that departing aircraft can transition from airfield to the terminal environment and ultimately to the en route environment; these structures are known as Departure Procedures (DPs). As discussed previously, aircraft flying in and out of LAX follow these precise routes depending on the operational flow of the Airport. STARs and DPs are a combination of lateral, vertical, and speed commands along a set of fixes (intersections) or waypoints that are typically pre-programmed into the aircraft's flight management system (FMS), and executed upon ATC clearance. As the FAA continues to revamp the national airspace system and its procedures within, as part of NextGen and the Metroplex system, newer RNAV (GPS) arrival and departure procedures are being created to provide benefits to both ATC and pilots by reducing communications, reducing flight time and distance, lowering fuel burn due to more efficient flight profiles, and increasing predictability.

When flying a STAR or DP, the pilot will follow waypoints or fixes that are either ground based or RNAV (GPS) based depending on aircraft capability. In conventional procedures, fixes are defined by the location of a navigational aid (e.g. VORTACs and VORs) or determined by reference to these navigational aids such as DME intersections. The advantage of the RNAV STARs and DPs are that waypoints are defined by longitude and latitude, and allow aircraft to fly a more direct course from point to point instead of from navigational aid to navigational aid. STARs and DPs may serve more than one airport in an area, and a single airport may have multiple STARS and DPs such as LAX. Each of the published lateral navigation procedures are referenced in the following sections. Standard Terminal Arrival Routes to LAX are depicted on **Exhibit H-2**. Departure Procedures at LAX are depicted on **Exhibit H-3**.

H.3.1 Standard Terminal Arrivals

A STAR is an ATC IFR arrival route established to simplify aircraft clearance delivery and assist in the aircraft's transition between the en route and approach portions of the flight. The San Diego TRACON and LAX ATC use 17 STARs to route aircraft into the Los Angeles area. Currently there are three RNAV (GPS) arrival procedures and 14 conventional arrival procedures as shown in **Table H-1**. The names of the RNAV (GPS) arrival procedures are the BUFIE THREE, KEACH ONE, and the SYMON ONE arrivals. The names of the conventional arrival procedures include the BASET THREE, DOWNE FOUR, KIMMO THREE, LEENA FOUR, MOORPARK THREE, OCEAN TWO, OLDEE ONE, REDEYE TWO, REEDR THREE, RIIVR TWO, SADDE SIX, SEAVU TWO, SHIVE ONE, and the VISTA TWO arrivals.

TABLE H-1
STANDARD TERMINAL ARRIVAL ROUTES, LOS ANGELES INTERNATIONAL AIRPORT

Procedure Name	Procedure Type	Arrival Direction
BASET THREE	Conventional	East/Northeast
DOWNE FOUR	Conventional	East/Northeast
KIMMO THREE	Conventional	North/Northwest
LEENA FOUR	Conventional	North/Northwest
MOORPARK THREE	Conventional	North/Northwest
OCEAN TWO	Conventional	South/Southwest/Southeast
OLDEE ONE	Conventional	South/Southwest/Southeast
REDEYE TWO	Conventional	East/Northeast
REEDR THREE	Conventional	East/Northeast
RIIVR TWO	Conventional	East/Northeast
SADDE SIX	Conventional	North/Northwest
SEAVU TWO	Conventional	East/Northeast
SHIVE ONE	Conventional	South/Southwest/Southeast
VISTA TWO	Conventional	South/Southwest/Southeast
BUFIE THREE	RNAV	South/Southwest/Southeast
KEACH ONE	RNAV	North/Northwest
SYMON ONE	RNAV	North/Northwest

NOTE: RNAV = Area Navigation
SOURCE: AirNav.com, August 2014.

North/Northwest

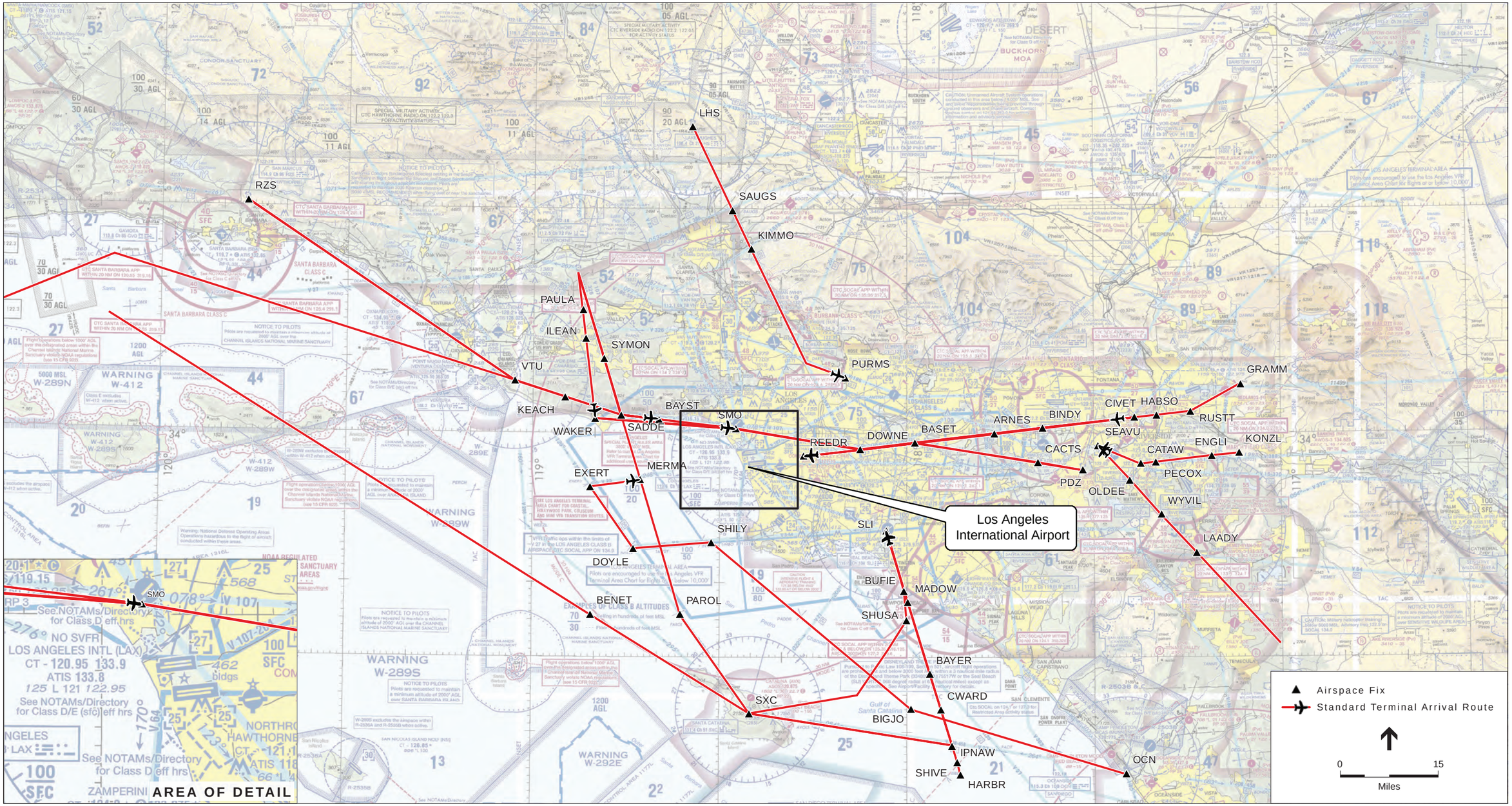
Aircraft entering the LAX airspace from the north/northwest are generally assigned the KEACH ONE RNAV arrival, the KIMMO THREE arrival, the LEENA FOUR arrival, the MOORPARK THREE arrival, the SADDE SIX arrival, or the SYMON ONE RNAV arrival.

KEACH ONE RNAV – Aircraft are routed from the west/northwest to the Ventura VOR located approximately 33 nm northwest of LAX, and then to the Santa Monica VOR located 5 nm north of LAX. From this point, aircraft are radar vectored to the final approach phase. This arrival is for turbojet aircraft only.

KIMMO THREE – Aircraft are routed from the north to the KIMMO fix, located approximately 28 nm north of LAX, south to the PURMS fix located approximately 16 nm northeast of LAX. From this point, aircraft are radar vectored to the final approach phase. This arrival is for non-turbojet aircraft only.

LEENA FOUR – This arrival is unconventional in that it routes aircraft from the northwest and southwest to the Santa Catalina VOR located on Santa Catalina Island south of the Airport, then west to the IPNAW intersection located 47 nm southeast of LAX, and then to the Seal Beach VOR located 20 nm southeast of the Airport. From this point, aircraft are radar vectored to the final approach phase.

MOORPARK THREE – Aircraft are routed from the north and northwest to the Fillmore VOR located 33 nm northwest of LAX, and then to the WAKER intersection located 22 nm northwest of LAX. From this point, aircraft are radar vectored to the final approach phase.



SOURCE: Federal Aviation Administration, 2013; ESA Airports, 2014
NOTE: Not for Navigational Use

Exhibit H-2
LAX Standard Terminal Arrival Routes

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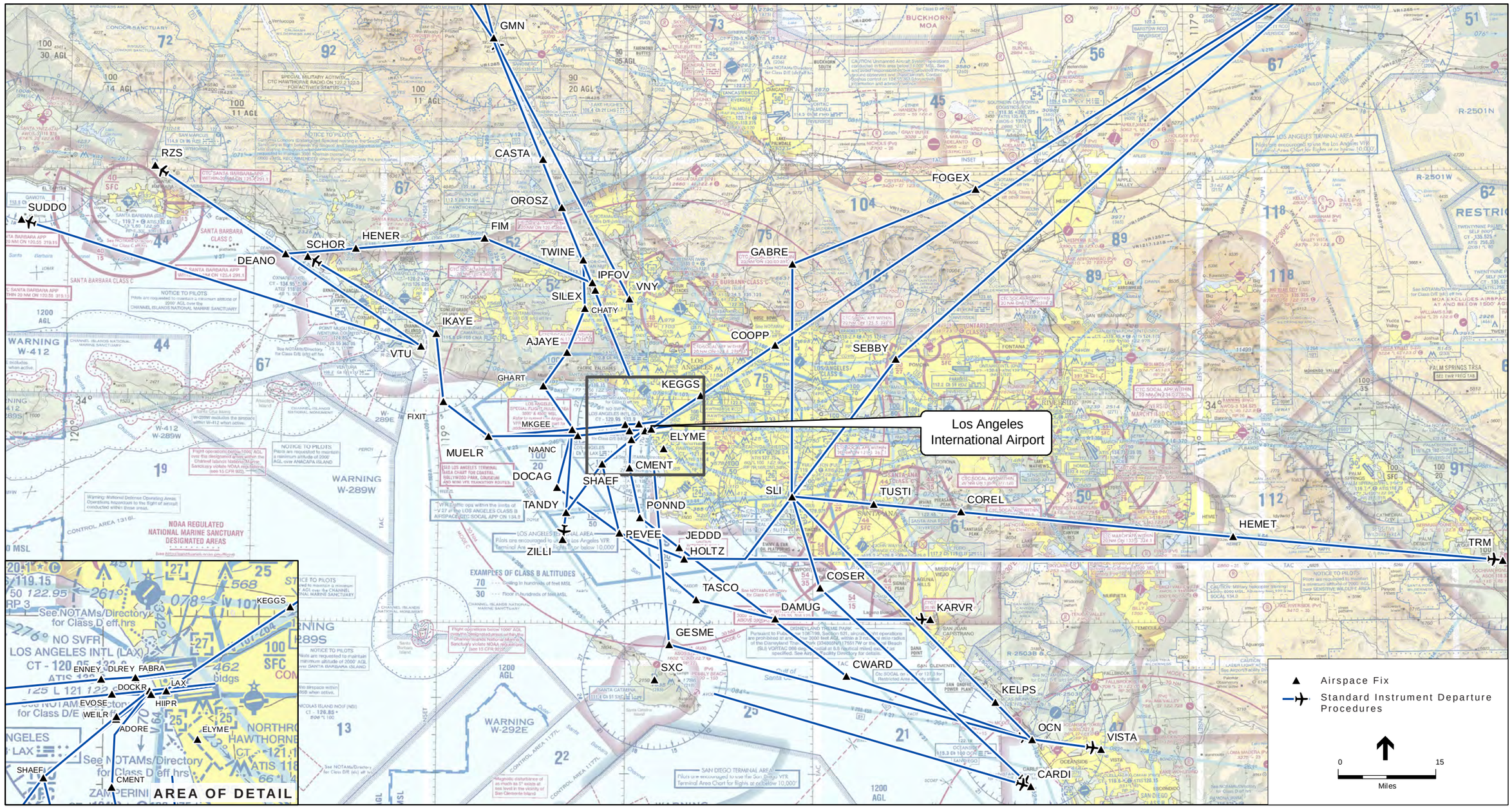

SOURCE: Federal Aviation Administration, 2013; ESA Airports, 2014
NOTE: Not for Navigational Use

Exhibit H-3
LAX Departure Procedures

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SADDE SIX – Aircraft are routed to the SADDE intersection located 18 nm northwest of LAX, and then to the Santa Monica VOR. From this point, aircraft are radar vectored to the final approach phase.

SYMON ONE RNAV – Aircraft are routed from the north to the Fillmore VOR located 33 nm northwest of LAX and then to the SADDE waypoint located 18 nm northwest of LAX. From this point, aircraft direct to the Santa Monica VOR where they are radar vectored to the final approach phase. This arrival is for turbojet aircraft only.

East/Northeast

Aircraft entering the LAX airspace from the east/northeast are generally assigned the BASET THREE arrival, the DOWNE FOUR arrival, the REDEYE TWO arrival, the REEDR THREE arrival, the RIIVR TWO arrival, or the SEAVU TWO arrival.

BASET THREE – Aircraft are routed from the east to the BASET intersection located 22 nm east of the Airport, and then are routed west to the REEDR intersection located 8 nm east of LAX where aircraft are then radar vectored to the final approach phase.

DOWNE FOUR – Aircraft are routed from the east to the CIVET intersection located 52 nm east of the Airport, and then routed west to the WAKER intersection located 22 nm northwest of LAX. From this point, aircraft are radar vectored to the final approach phase. This arrival is utilized for noise abatement between 12:00 a.m. and 6:30 a.m. local time.

REDEYE TWO – Like the BASET and DOWNE arrivals, aircraft are routed from the east to the BASET intersection, then to the DOWNE intersection, and then to the northwest to the WAKER intersection. From this point, aircraft are radar vectored to the final approach phase. This arrival is utilized for noise abatement between 12:00 a.m. and 6:30 a.m. local time.

REEDR THREE – Aircraft are routed from the east to the CIVET intersection, and then to the REEDR intersection located 8 nm east of the LAX VOR. Aircraft then fly a 220° heading and are radar vectored to the final approach phase.

RIIVR TWO – Aircraft are routed from the northeast to the GRAMM intersection located 66 nm east of LAX. From GRAMM, aircraft are routed to the RUSTT intersection located 59 nm east of LAX, and then to the RIIVR intersection located 49 nm east of LAX. From this point, aircraft are radar vectored to the final approach phase.

SEAVU TWO – Aircraft are routed from the Twentynine Palms VOR located 132 nm east of the airport to the SEAVU intersection 46 nm east of the Airport. From this point, aircraft are radar vectored to the final approach phase.

South/Southwest/Southeast

Aircraft entering the LAX airspace from the south/southwest/southeast are generally assigned the BUFIE THREE RNAV arrival, the OCEAN TWO arrival, the OLDEE ONE arrival, the SHIVE ONE arrival, or the VISTA TWO arrival.

BUFIE THREE RNAV – Aircraft are routed from the Santa Catalina VOR to the FITOW waypoint located approximately 34 nm south of LAX, and then north to the Seal Beach VOR located 20 nm southeast of LAX. From this point aircraft fly a 330° heading and are radar vectored to the final approach phase. This arrival is for turbojet aircraft only.

OCEAN TWO – Aircraft are routed from the Julian VOR located approximately 103 nm southeast of LAX to the northwest to the MERMA intersection located 14 nm west of the LAX VOR. From this point, aircraft are radar vectored to the final approach phase.

OLDEE ONE – Aircraft are routed from the Julian VOR to the SEAVU intersection located 46 nm east of the Airport. From this point, aircraft are radar vectored to the final approach phase.

SHIVE ONE – Aircraft are routed from the HARBR intersection located 50 nm southeast of the Airport to the Seal Beach VOR. From this point, aircraft are radar vectored to the final approach phase.

VISTA TWO – Aircraft are routed from the Julian VOR to the SHIVE intersection located 49 nm southeast of LAX. From there aircraft make a north turn toward the Seal Beach VOR where they are radar vectored to the final approach phase.

H.3.2 Departure Procedures

Aircraft departing LAX are often assigned a specific DP before departure as shown in **Table H-2**. A DP is a published IFR procedure that provides a standard route from the runway to the appropriate en route structure. In some cases, a DP may have an associated transition, which is a published procedure that connects the end of the DP to one of several en route structures. DPs are designed to separate departing aircraft from arriving aircraft, provide for efficient interception of an outbound course, avoid noise-sensitive areas near an airport, simplify the issuance of departure clearances, and reduce radio communication.

Similar to the published standard terminal arrival procedures (i.e., STARs), departure procedures at LAX include a mix of RNAV and conventional procedures. Currently there are eight RNAV departures, and 12 conventional departures for a total of 20. The names of the RNAV departures are: CASTA FOUR, FIXIT TWO, HOLTZ NINE, JEDDD ONE, KARVR THREE, MUELR ONE, OSHNN FOUR, and the ZILLI ONE departures. The names of the conventional DPs include: CATALINA FIVE, CHATY TWO, GABRE EIGHT, GORMAN FOUR, IMPER ONE, LAXX SEVEN, LOOP SEVEN, PERCH NINE, SAN DIEGO SIX, SEAL BEACH FIVE, SEBBY EIGHT, and the VENTURA FIVE departures.

TABLE H-2
DEPARTURE PROCEDURES, LOS ANGELES INTERNATIONAL AIRPORT

Procedure Name	Procedure Type	Departure Direction
CATLINA FIVE	Conventional	South/East
CHATY TWO	Conventional	North/West
GABRE EIGHT	Conventional	North/West
GORMAN FOUR	Conventional	North/West
IMPER ONE	Conventional	South/East
LAXX SEVEN	Conventional	South/East
LOOP SEVEN	Conventional	North/West
PERCH NINE	Conventional	North/West
SAN DIEGO SIX	Conventional	South/East
SEAL BEACH FIVE	Conventional	South/East
SEBBY EIGHT	Conventional	North/West
VENTURA FIVE	Conventional	North/West
CASTA FOUR	RNAV	North/West
FIXIT TWO	RNAV	North/West
HOLTZ NINE	RNAV	South/East
JEDDD ONE	RNAV	South/East
KARVR THREE	RNAV	South/East
MUELR ONE	RNAV	North/West
OSHNN FOUR	RNAV	North/West
ZILLI ONE	RNAV	South/East

NOTE: RNAV = Area Navigation.
SOURCE: AirNav.com, August 2014.

North/West

Aircraft departing LAX airspace to the north and west are generally assigned the CASTA FOUR RNAV departure, the FIXIT TWO RNAV departure, the CHATY TWO departure, the GABRE EIGHT departure, the GORMAN FOUR departure, the LOOP SEVEN departure, MUELR ONE RNAV departure, the OSHNN FOUR RNAV departure, the PERCH NINE departure, the SEBBY EIGHT departure, or the VENTURE FIVE departure.

CASTA FOUR RNAV – This departure is for turbojet aircraft only, and used when aircraft depart LAX on westerly headings and are routed north/northwest to the CASTA waypoint located 38 nm north of LAX, and then as filed.

FIXIT TWO RNAV – This departure is for turbojet aircraft only, and used when aircraft depart LAX on westerly headings and are routed west to the FIXIT waypoint located 28 nm west of LAX, and then as filed.

CHATY TWO – This is a radar vector departure for non-turbojet aircraft departing LAX on easterly headings, 040° when departing the northern runways, and 070° heading when departing

on the south runways. The aircraft are then radar vectored to the LAX 323° radial to the CHATY intersection located 20 nm north of LAX. Aircraft are then routed as filed.

GABRE EIGHT – This is a radar vector departure for aircraft departing LAX to the east on an assigned heading of 070°. Aircraft departing from the north runways fly the 070° heading to the LAX VOR three DME and turn to a 055° heading. Departures are then radar vectored onto the 345° radial off of the Seal Beach VOR to GABRE intersection, and then as filed.

GORMAN FOUR – This is a radar vector departure for aircraft departing LAX both to the east and the west for this departure, depending on the runways in use, on a heading of 070° to the east, or 250° to the west. Aircraft departing from the north runways to the east fly to the LAX VOR three DME and turn to a 055° heading. Aircraft are then radar vectored to radials off of the LAX VOR or the Santa Monica VOR to the Gorman VOR located 56 nm north of LAX, and then as filed.

LOOP SEVEN – This is a radar vector departure for aircraft departing LAX westerly on a 250° heading remaining within 15 nm of the LAX VOR. Aircraft departing from the south runways fly west on the 250° heading to the Santa Monica VOR 160° radial, and then fly a 235° heading. Aircraft are then radar vectored back to the LAX VOR, and continue northeast to the Daggett VOR located 110 nm from the LAX VOR, and then as filed.

MUELR ONE RNAV – This departure is for turbojet aircraft only for aircraft departing LAX on a westerly heading and are routed west to the MUELR waypoint located 22 nm west of LAX, and then northwest as filed.

OSHNN FOUR RNAV – This departure is for aircraft departing LAX to the west and that are unable to fly the LOOP SEVEN DP. Aircraft are routed south to the OSHNN waypoint located 22 nm south of LAX. Aircraft then fly north to the Daggett VOR and then as filed. This departure is typically used for aircraft departing LAX between 9:00 p.m. and 7:00 a.m. local time.

PERCH NINE – This is a radar vector departure for aircraft departing LAX both to the east and the west for this departure, depending on runways in use, on a heading of 070° to the east or 250° to the west. They are then radar vectored to the DINTY or FICKY intersections located 211 nm and 208 nm respectively, and then as filed.

SEBBY EIGHT – This is a radar vector departure for aircraft unable to fly the LOOP SEVEN DP. Aircraft depart LAX to the west on a 250° heading and then radar vectored to the 022° radial off of the Seal Beach VOR to the SEBBY intersection located 34 nm northeast of LAX, and then to the Daggett VOR as filed. This departure is typically used for aircraft departing LAX and are unable to fly the LOOP SEVEN DP between 9:00 p.m. and 7:00 a.m. local time.

VENTURA FIVE – This is a radar vector departure for aircraft departing LAX both to the east and the west for this departure, depending on runways in use, on a heading of 070° to the east or 250° to the west. Aircraft are then radar vectored to the Ventura VOR located 34 nm northwest of

LAX and then as filed out to the DINTY intersection. This departure is typically used for aircraft departing LAX between 9:00 p.m. and 7:00 a.m. local time.

South/East

Aircraft departing LAX airspace to the south and east are generally assigned the CATALINA FIVE departure, the HOLTZ NINE RNAV departure, the IMPER ONE departure, the JEDDD ONE RNAV departure, the KARVR THREE RNAV departure, the LAXX SEVEN departure, SAN DIEGO SIX departure, the SEAL BEACH FIVE departure, or the ZILLI ONE RNAV departure.

CATALINA FIVE – This is a radar vector departure for aircraft departing LAX to the east on a 070° heading. Aircraft are radar vectored south to the Santa Catalina VOR located 34 nm south of LAX, and then as filed.

HOLTZ NINE RNAV – Aircraft depart LAX to the west and are routed south to the HOLTZ waypoint located 18 nm south of the Airport, and then east as filed.

IMPER ONE – Aircraft depart LAX both to the east and the west for this departure, depending on runways in use, on a heading of 070° to the east or 250° to the west. Aircraft are then radar vectored to the Seal Beach VOR for easterly departures, or to the 160° radial off of the LAX VOR, and then fly the departure southeast to the Imperial VOR located 160 nm southeast of LAX, and then as filed.

JEDDD ONE RNAV – This departure is for turboprop aircraft only departing LAX Runways 25L and 25R to the west. Aircraft are routed south to the JEDDD waypoint located 19 nm south of LAX, and then fly southeast as filed.

KARVR THREE RNAV – Aircraft depart LAX to the west and are routed south to the KARVR waypoint located 45 nm southeast of LAX, and then fly south, and then southeast as filed.

LAXX SEVEN – This is a radar vector departure for turbojet aircraft only departing LAX both to the east and the west for this departure, depending on runways in use, on heading of 070° to the east, and 250° to the west respectively. Aircraft are then radar vectored to the Seal Beach VOR and then east, or southeast as filed.

SAN DIEGO SIX – This is a radar vector departure for non-turbojet aircraft unable to fly the LAXX SIX DP only. Aircraft depart LAX both to the east and the west for this departure, depending on runways in use, on a heading of 070° to the east or 250° to the west. They are then radar vectored to the Seal Beach VOR for easterly departures, and the Santa Catalina 091° radial for westerly departures to the CARDI intersection located 69 nm southeast of LAX, and then southeast as filed.

SEAL BEACH FIVE – This is a radar vector departure for turbojet aircraft unable to fly the LAXX SIX DP only. Aircraft depart LAX both to the east and the west for this departure,

depending on runways in use, on a heading of 070° to the east or 250° to the west. They are then radar vectored to the Seal Beach VOR, and then as filed.

ZILLI ONE RNAV – Aircraft depart LAX to the west for this procedure and are routed to the ZILLI waypoint located approximately 22 nm southwest of LAX, and then southwest as filed.