

---

## CHAPTER 4 – FACILITY REQUIREMENTS

Facility requirements were developed for the airfield, passenger terminal complex, ground access, air cargo, and general aviation facilities based on assessments of existing capacity and future demand for major aviation-related facilities.

### 4.1 Planning Activity Levels

Planning activity levels (PALs) link facility requirements to activity “triggers” to account for future deviations between actual and forecast activity.

Recognizing uncertainties associated with long-range aviation demand forecasting, planning activity levels (PALs) were identified to represent future levels of activity at which key airside and landside improvements would be necessary. Because activity levels could deviate from the forecasts for a number of reasons, the use of PAL “triggers” allows for facilities planning that is tied to “realized” future activity levels as they occur, rather than arbitrary milestone years.

For this planning effort, PALs were chosen to coincide with the baseline growth forecast as it is the best estimate of future demand. PAL1 and PAL2 correspond to baseline aviation activity for 2020 and 2030, respectively. Notably, PAL2 corresponds to 2030, and therefore the constrained forecast demand level was used. Aviation activity associated with each PAL is summarized in **Table 4-1**.

### 4.2 Airfield Requirements

Airfield requirements included the existing airfield capacity, the runway length, and airfield geometrical constraints.

#### 4.2.1 Airfield Capacity

As indicated in the airfield inventory, the airfield’s annual service volume (ASV) is approximately 217,000 operations. Notably, the airfield has operated above its ASV in years past, including in 2007. **Table 4-2** depicts the number of operations forecast for PAL1 and PAL2 indicating the amount of delay expected at these levels, and the percentage above the ASV.

Table 4-1  
**PLANNING ACTIVITY LEVELS**  
San Diego International Airport

	<u>2007</u>	<u>PAL1 Unconstrained</u>	<u>PAL2 Constrained</u>
<b>ENPLANEMENTS</b>			
Domestic	9,040,280	10,854,600	13,839,100
International	132,686	297,600	369,400
<b>Total</b>	<b>9,172,966</b>	<b>11,351,200</b>	<b>14,106,800</b>
<b>CARGO TONNAGE</b>			
Freighter	141,653	183,300	222,000
Belly	13,036	4,900	3,600
<b>Total</b>	<b>154,689</b>	<b>188,200</b>	<b>225,600</b>
<b>AIRCRAFT OPERATIONS</b>			
Commercial passenger			
Domestic			
Air carrier	155,194	197,700	231,000
Commuter	40,433	16,300	16,500
International	3,317	5,700	6,900
Subtotal	198,943	219,700	254,400
Cargo	6,682	7,100	7,800
Civil	23,645	23,600	23,700
Military	216	200	200
<b>Total</b>	<b>229,486</b>	<b>250,600</b>	<b>286,100</b>

Source: Landrum and Brown, September 2008.

Table 4-2  
**AIRFIELD CAPACITY AND DELAY**  
 San Diego International Airport

	ASV	2007	PAL1	PAL2
Annual Operations	217,000	229,000	254,600	309,800
Ratio of Demand to ASV	-	1.05	1.17	1.43
Delay (a) (min/operation)	-	3	10	25

(a) Delay estimates based on demand delay curves shown on **Figure 2-6**.  
 Source: Jacobs Consultancy, September 2008.

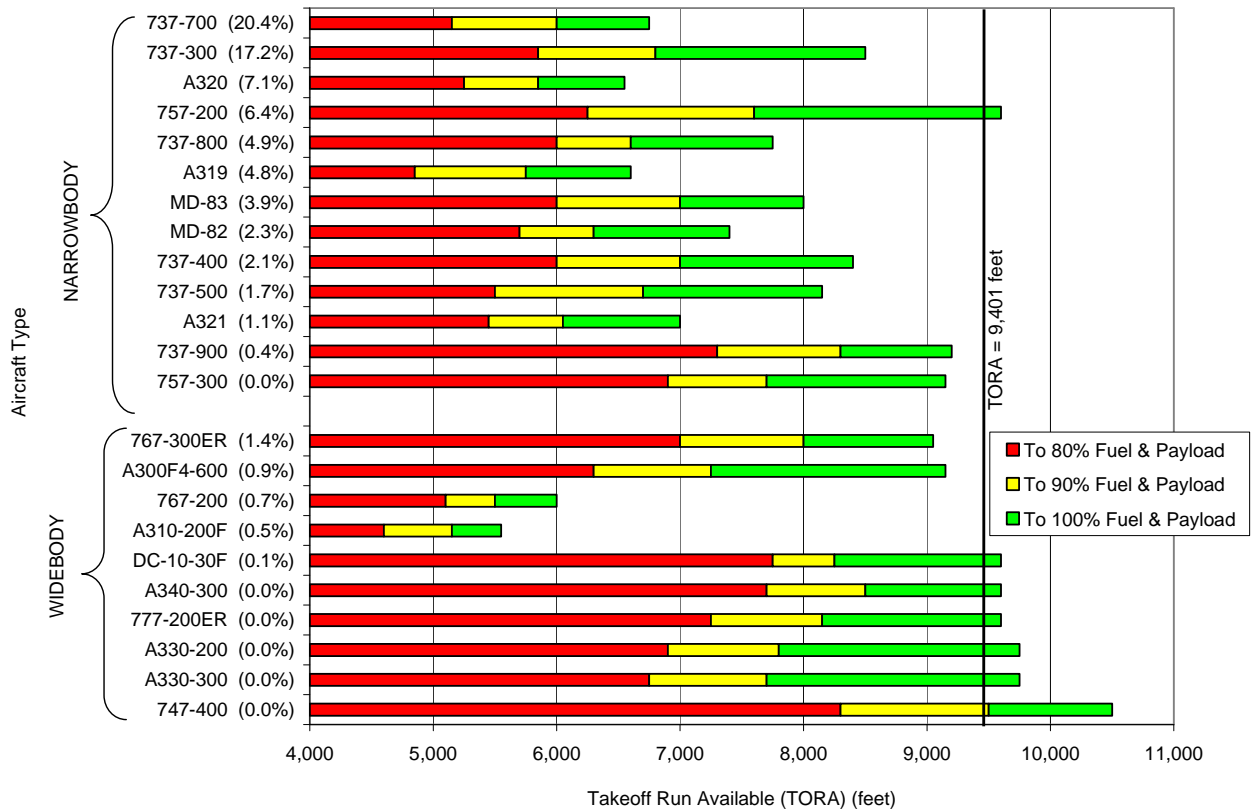
Airlines are expected to begin increasing average aircraft size per operation once delays begin averaging 10 minutes per operation.

At delays of 10 minutes per operation, growth in aircraft operations would begin to slow. At this level of delay, it is expected that airlines would begin to adjust to increasing delays by up-gauging aircraft, increasing load factors, and spreading any operational peaks in the day to the extent practical. These levels of demand and delay indicate that new runway capacity would be needed in the 2020 timeframe. With insufficient space available to construct a second runway, airfield operations will likely be constrained due to inadequate runway capacity. As discussed previously, the airfield is expected to be capable of handling approximately 286,000 annual aircraft operations.

#### 4.2.2 Runway Length Requirements

The assessment of required runway length focused on takeoff length requirements, which are longer than landing length requirements for the same aircraft. **Figure 4-1** depicts takeoff length requirements for many of the aircraft in the existing and projected aircraft fleet mix. As shown, the takeoff run available (TORA) is adequate for all aircraft depicted at 80 percent of their maximum takeoff weight (MTOW). It also shows that all aircraft depicted are accommodated at 90 percent of their MTOW with the single exception of the Boeing 747-400. Finally, most aircraft operating in the fleet today are accommodated at 100 percent of their MTOW. **Figure 4-1** shows that the existing runway length of 9,401 feet is adequate for most commercial service aircraft both currently operating and expected to operate at the Airport in the future.

**Figure 4-1. Runway Length Requirements.**



Source: Jacobs Consultancy Analysis, September 2008.

Useful load is defined as the aircraft maximum takeoff weight minus the aircraft empty weight. An aircraft’s useful load can be used to transport either fuel or payload (i.e., passengers, baggage, and cargo) and, within certain limits, useful load can be allocated between fuel and passengers.

It is important to note that aircraft typically do not operate at 100 percent of their MTOW. Airlines fuel aircraft for the distance to be traveled, and therefore typically do not carry fuel beyond that which is needed after accounting for an additional factor of safety. In addition, aircraft may not be carrying a full load of passengers or cargo in many instances. Therefore, the runway length provided by the current runway is considered adequate.

---

### **4.2.3 Airfield Geometrical Constraints**

In Chapter 2, the lack of a full-length parallel Taxiway C and its constraints on airfield operations were noted. Therefore, it is recommended that any new airfield alternative provide for a full-length parallel Taxiway C, if possible. A full-length parallel Taxiway C would, among other things, open the land envelope north of the runway to future development for terminal concourses.

In addition, Runway 27 RSA improvements should also be considered as a part of alternative development. Considerations could include the installation of EMAS, similar to that in place for Runway 09.

Finally, major airfield infrastructure should be designed around ADG V aircraft. Accordingly, alternatives should be considered that would accommodate ADG V aircraft on key airfield pavements, such as Taxiway B.

Future airfield facilities should be designed to support ADG V (i.e., Boeing 747 and 777) aircraft operations.

## **4.3 Passenger Terminal Requirements**

This section provides the methodology and calculated facility requirements for the passenger terminals for both PAL1 and PAL2.

### **4.3.1 Program Methodology**

Every airport has unique operating characteristics requiring consideration when projecting future terminal requirements. An equal-sized functional area may be undersized or oversized at one airport while it may operate efficiently at another. For Destination Lindbergh, terminal facility requirements were determined by analyzing existing terminal plans, conducting on-site observations, and reviewing data from comparable airports, industry standards, and planning guidelines. To establish reasonable baselines for comparisons, existing terminal facilities and levels of service were analyzed to determine planning ratios.

Terminal requirements are based on comparisons to planning factors developed from current terminal conditions and levels of service.

Baseline planning ratios calculated from existing demand levels and the existing facilities size were then compared to industry standards and other comparable airport planning ratios to determine if deficiencies or excesses exist. These deficiencies or excesses were then reconciled with on-site observations to determine if they are providing acceptable levels of service (LOS) for the passengers and tenants of the facility. Depending on the

---

Planning factors equate physical and/or spatial requirements to standard measures of aviation activity, such as passengers or aircraft operations.

Planning factors were developed for the following terminal functional areas:

- Airline functions
- Concessions areas
- Federal Inspection Service (FIS)
- Public areas—secure and non-secure
- Non-public areas

result of this analysis, the existing ratios may be used to project facility requirements, or they may be adjusted if the LOS standards are not met.

**Existing Terminal Areas and Planning Factors.** As discussed as part of baseline conditions in Chapter 2, there are several locations in the passenger terminals (although primarily T1 and T2 East) that do not perform at acceptable levels of service today, especially during peak periods. Generally, these locations are providing service to more passengers than they were designed to accommodate and resulting in congested conditions.

The most recent addition, T2 West, provides the highest LOS and planning ratios that meet current industry standards. For this study, the existing terminal ratios were determined by combining the facilities for all of the terminals to establish aggregate terminal ratios. Future planning ratios were determined by comparing the existing terminal ratios to industry planning ratios, which provide an acceptable LOS, generally described as LOS B by the International Air Transport Association (IATA). LOS B is described as providing a condition of stable flow with few delays and a high level of comfort. The existing terminal ratios were adjusted as required to ensure acceptable level of service standards for both the PAL1 and PAL2 requirements.

In **Table 4-3**, the functional components of the terminals are divided into the following categories: airline functions, concessions, federal inspection services (FIS), secure public area, non-secure public area, and non-public area. For each functional area, an existing ratio is shown based on the existing facilities and existing demand levels. If required, the planning factors were modified as appropriate to yield facilities that would function at an acceptable LOS. The planning factors to be used to generate facility requirements are shown.

**Airline functions.** Airline functions include those areas directly related to airline operations and passenger processing, such as ticketing, departure holdrooms, baggage services, airline operations, and airline clubrooms.

The current ticketing lobbies for the terminals provide a total of 765 linear feet of ticket counter frontage. The ticketing lobby depth in T1 and T2 East (the distance from the back wall to the

---

Requirements for ticketing lobbies are expressed in terms of square feet per originating passenger during the peak hour.

Requirements for baggage claim areas are expressed in terms of square feet per terminating passenger during the peak hour.

face of the ticket counter) does not meet the current standard of 11 feet. For T2 West and for all programmed requirements, 11 feet is designated as the standard. The T2 West ratio of 3.5 square feet per peak hour originating passenger was identified as the planning ratio for future facilities.

Similarly, the existing ticket counter queuing area is less than adequate due to T1 and T2 East substandard condition. To provide an acceptable LOS standard, a planning factor of 7.0 square feet per peak hour originating passenger was used for future requirements. Conversely, the current airline ticket office (ATO) area existing ratio is sufficient for an acceptable LOS, and therefore, the current 11.28 square feet per peak hour originating passenger was used as the planning factor. Airline clubrooms also employ the existing factor of 0.0014 square feet per annual enplaned passenger was used to determine future requirements.

The baggage claim area for the terminals is currently larger than required since the area provided in T2 West permits the addition of two claim devices. Therefore, the existing ratio of 21.85 square feet per peak hour terminating passenger has been reduced to 19.0 to reflect the IATA standard for LOS B. The existing nine claim devices provide an average of 130 linear feet per device. This ratio was maintained for the calculation of the requirement for future claim devices. The current 1.97 ratio for baggage service offices was also maintained to determine the need for future facilities. Finally, the existing planning factors for outbound and inbound baggage were also maintained.

The existing airline operations area ratio of 0.008 square foot per annual enplaned passenger is maintained for future requirements.

Table 4-3  
**EXISTING AND FUTURE PLANNING RATIOS FOR PASSENGER TERMINALS**  
 San Diego International Airport

Description	Demand level		Existing		Existing ratio		Planning ratio	Comments
			Length (lf)	Area (sf)	Ratio	Units		
<b>AIRLINE FUNCTIONS</b>								
Ticket counter area	2,527	PHOP	-	6,586	2.61	SF/PHOP	3.84	11' x LF of T/C
Ticket counter length	2,527	PHOP	765	-	0.30	LF/PHOP	0.35	Comparable Airports
Ticket counter queuing	2,527	PHOP	-	9,426	3.73	SF/PHOP	7.00	20' x LF T/C
Airline ticket office	2,527	PHOP	-	28,495	11.28	SF/PHOP	11.28	Existing ratio
Baggage claim area	2,336	PHTP	-	51,040	21.85	SF/PHTP	19.00	Comparable Airports
Baggage claim frontage	2,336	PHTP	1,177	-	0.50	LF/PHTP	0.60	Comparable Airports
Baggage claim devices	2,336	PHTP	9 ea	-	130.78	LF/Device	130	Existing ratio
Baggage service office	2,336	PHTP	-	4,597	1.97	SF/PHTP	1.97	Existing ratio
Outbound baggage	2,527	PHOP	-	50,010	19.79	SF/PHOP	19.79	Existing ratio
Inbound baggage	2,336	PHTP	-	27,278	11.68	SF/PHTP	11.68	Existing ratio
Airline operations	7,637,193	ANNPEP	-	61,035	0.008	SF/ANNPEP	0.008	Existing ratio
Clubrooms	7,637,193	ANNPEP	-	10,957	0.0014	SF/ANNPEP	0.0014	Existing ratio
<b>CONCESSIONS</b>								
Concessions (Includes Storage)	7,637,193	ANNPEP	-	68,914	0.0090	SF/ANNPEP	0.0120	Comparable Airports
<b>FEDERAL INSPECTION SERVICES</b>								
FIS (CIS, Claim, CBP, USDA)	125	PHTP-I	-	7,000	56.00	SF/ANNPEP	85	Existing Factor
<b>SECURE PUBLIC AREA</b>								
Passenger screening checkpoint	2,527	PHOP	18 ea	-	140	PHOP/Lane	160	Existing Factor
Passenger screening area	18	Lanes	-	10,203	567	SF/Lane	1,300	Comparable Airports
Concourse circulation	39	Gates	-	90,825	2,329	SF/Gate	3,000	Comparable Airports
<b>NON-SECURE PUBLIC AREA</b>								
Ticketing circulation	2,527	PHOP	-	16,526	6.54	SF/PHOP	10.50	30' x LF T/C
Baggage claim circulation	2,336	PHTP	-	7,380	3.16	SF/PHTP	5.00	Comparable Airports
General circulation	7,637,193	ANNPEP	-	52,940	0.007	SF/ANNPEP	0.015	Comparable Airports
<b>NON-PUBLIC AREA</b>								
TSA	2,527	PHOP	-	4,676	1.85	SF/PHOP	1.85	Existing ratio
SDCRAA	7,637,193	ANNPEP	-	7,163	0.0009	SF/ANNPEP	0.0009	Existing ratio
Mech./Elec./Maint./Storage			-	58,000	7%	% of T. Area	12%	Comparable Airports

SF = square feet; LF = linear feet

PHOP = peak hour origination passengers; PHTP= peak hour terminating passengers; PHTP -I = peak hour terminating international passengers; PHP = peak hour passengers; ANNPEP = annual enplaning passengers

Source: HNTB analysis, September 2008.

---

SDIA has fewer concession areas per annual passenger than the national average or industry standards.

**Concessions.** The sizing of concession space is influenced by a variety of specific factors. For this study, a standard square footage per enplaned passenger derived from the characteristics of other large origin-destination markets similar to San Diego was used. In general, SDIA is significantly below the industry standard for acceptable levels of service with regard to concession space. As such, the existing ratio of 0.009 square foot per annual enplaned passenger was increased to 0.012 to reflect industry standards for acceptable levels of service.

**Federal Inspection Services (FIS).** The facilities provided for the federal inspection of arriving international passengers include: Customs and Immigration Services (CIS), baggage claim, Customs and Border Patrol (CBP), and United States Department of Agriculture (USDA). Currently, the FIS facilities at SDIA process 125 passengers in the peak hour. The allocation of 7,000 square feet for the FIS facility is less than that provided at comparable airports for this number of passengers. Accordingly, future requirements have been derived using 85 square feet per peak hour international terminating passenger. This ratio provides requirements for FIS facilities sized similarly to comparable airports.

**Secure public area.** Secure public areas include the security checkpoints, secure circulation, and concourse circulation. Currently, the 18 security checkpoint lanes at SDIA process approximately 140 passengers per hour based on peak hour demand. The security checkpoint throughput requirement was increased to 160 passengers per hour for the future requirements to provide acceptable levels of service. In addition, the security area is insufficient by TSA standards. The future requirements will reflect a larger allocation of space at 1,300 square feet per security lane.

Currently, concourse circulation is inadequate at both T1 and T2 East, and the current factor of 2,329 square feet per gate has been increased to 3,000 square feet per gate to reflect the need for improved passenger circulation.

**Non-secure public area.** The non-secure public areas include the ticketing lobby, the baggage claim lobby, and general circulation which include entrance vestibules, fire stairs, escalators, and elevators. The United Services Organization

---

(USO) is also included in the non-secure public area. The existing planning factors for circulation in the ticketing lobby, baggage claim and general circulation were increased to provide future facilities that would provide LOS standards similar to those experienced in T2 West. The USO is assumed to remain the same size throughout the forecast years.

**Non-public area.** Non-public areas include private office space for the Authority, the TSA and building support spaces such as mechanical rooms, loading docks, maintenance, and storage. For both the TSA and the Authority offices, the existing factors were used to determine future requirements. Currently, mechanical, electrical, maintenance and storage facilities comprise about seven percent of the total terminal area. Typically, these areas are programmed at 12 percent of the terminal area; accordingly, future facilities will be programmed at 12 percent of total terminal area to provide adequate space for mechanical, electrical, maintenance, and storage.

#### **4.3.2 Requirements**

Generally, existing terminal facilities operate below desirable levels of service at the existing passenger demand levels. Additional terminal space is needed to meet current demand.

**Table 4-4** provides an analysis of the excesses and deficiencies of the current overall terminal facilities using the planning ratios. Most existing passenger processing facilities are deficient, as shown. As shown, the SDIA terminals are approximately 165,500 square feet deficient in area. As shown in **Table 4-4**, the terminal functional areas with the greatest deficiencies include: ticket counter queue, concessions, passenger screening, and circulation for the ticketing, baggage claim, and concourses.

Table 4-4  
**PASSENGER TERMINAL EXCESSES AND DEFICIENCIES**  
 San Diego International Airport

Description	Existing		Planning ratio		Required area	Excess / (deficiency)
	Length (lf)	Area (sf)				
<b>AIRLINE FUNCTIONS</b>						
Ticket counter area	-	6,586	3.84	SF/PHOP	9,704	(3,118)
Ticket counter length	765	-	0.35	LF/PHOP	884	(119)
Ticket counter queuing	-	9,426	7.00	SF/PHOP	17,689	(8,263)
Airline ticket office	-	28,495	11.28	SF/PHOP	28,495	0
Baggage claim area	-	51,040	19.00	SF/PHTP	44,384	6,656
Baggage claim frontage	1,177	-	0.60	LF/PHTP	1,402	(225)
Baggage claim devices	9 ea	-	130	LF/Device	156	(25)
Baggage service office	-	4,597	1.97	SF/PHTP	4,597	0
Outbound baggage	-	50,010	19.79	SF/PHOP	50,010	0
Inbound baggage	-	27,278	11.68	SF/PHTP	27,278	0
Airline operations	-	61,035	0.01	SF/ANNEP	61,035	0
Departure holdrooms	-	102,788	2,190	SF/gate	89,700	13,088
Clubrooms	-	10,957	0.0014	SF/ANNEP	10,957	0
<b>CONCESSIONS</b>						
Concessions (Includes Storage)	-	68,914	0.0120	SF/ANNEP	91,646	(22,732)
<b>FEDERAL INSPECTION SERVICES</b>						
FIS (CIS, Claim, CBP, USDA)	-	7,000	85	SF/ANNEP	10,000	(3,000)
<b>SECURE PUBLIC AREA</b>						
Passenger screening checkpoint	18	-	160	PHOP/Lane	18	0
Passenger screening area	-	10,203	1,300	SF/Lane	23,465	(13,262)
Concourse circulation	-	90,825	3,000	SF/Gate	117,000	(26,175)
<b>NON-SECURE PUBLIC AREA</b>						
Ticketing circulation	-	16,526	10.50	SF/PHOP	26,534	(10,008)
Baggage claim circulation	-	7,380	5.00	SF/PHTP	11,680	(4,300)
General circulation	-	52,940	0.015	SF/ANNEP	114,558	(61,618)
USO	-	6,520			6,520	0
<b>NON-PUBLIC AREA</b>						
TSA	-	4,676	1.85	SF/PHOP	4,676	0
SDCRAA	-	7,163	0.0009	SF/ANNEP	7,163	0
Mech./Elec./Maint./Storage	-	58,000	12%	% of T. Area	90,851	(32,851)
<b>TOTAL AREA</b>		<b>682,539</b>			<b>847,941</b>	<b>(165,582)</b>

SF = square feet; LF = linear feet; PHOP = peak hour origination passengers; PHTP= peak hour terminating passengers; PHTP -I = peak hour terminating international passengers; PHP = peak hour passengers; ANNEP = annual enplaning passengers

Source: HNTB analysis, September 2008.

The terminal facility required to meet PAL2 demand is approximately 1.7 million square feet, 0.9 million square feet larger than today's terminal building area combined.

A summary of the terminal facility requirements for each of the functional areas for both PAL1 and PAL2 is provided in **Table 4-5**. The total terminal area required for PAL1 is approximately 1.4 million square feet. This is approximately 618,000 square feet larger than the existing terminal facilities. The total terminal facility required for PAL2 is approximately 1.7 million square feet. This area is approximately 933,000 square feet larger than the existing terminal facilities.

Table 4-5  
**TERMINAL FACILITY REQUIREMENTS**  
 San Diego International Airport

Description	Planning factors		PAL1			PAL2		
			Demand levels		Area (sf)	Demand levels		Area (sf)
<b>AIRLINE FUNCTIONS</b>								
Ticket Counter Area	3.84	SF/PHOP	3,340	PHOP	12,826	4,150	PHOP	15,936
Ticket Counter Queuing	7.00	SF/PHOP	3,340	PHOP	23,380	4,150	PHOP	29,050
Airline Ticket Office	11.28	SF/PHOP	3,340	PHOP	37,675	4,150	PHOP	46,812
Baggage Claim Area	19.00	SF/PHTP	3,172	PHTP	60,268	3,938	PHTP	74,822
Baggage Service Office	1.97	SF/PHTP	3,172	PHTP	6,249	3,938	PHTP	7,758
Outbound Baggage	19.79	SF/PHOP	3,340	PHOP	66,099	4,150	PHOP	82,129
EDS In-Line Screening Area	9.90	SF/PHOP	3,340	PHOP	33,049	4,150	PHOP	41,064
Inbound Baggage	11.68	SF/PHTP	3,172	PHTP	37,049	3,938	PHTP	45,996
Airline Operations	0.008	SF/ANNEP	11,351,200	ANNEP	90,810	14,106,800	ANNEP	112,854
Departures Lounge			53	Gates	122,350	61	Gates	143,700
Wide Body	3,500	SF/gate	10	Gates	35,000	13	Gates	45,500
B757-200	2,250	SF/gate	5	Gates	11,250	5	Gates	11,250
Narrow Body	2,050	SF/gate	32	Gates	65,600	39	Gates	79,950
Regional	1,750	SF/gate	6	Gates	10,500	4	Gates	7,000
Turboprop	950	SF/gate	-	Gates	-	-	Gates	-
Clubrooms	0.0014	SF/ANNEP	11,351,200	ANNEP	15,892	14,106,800	ANNEP	19,750
Subtotal airline functions					505,646			619,870
CONCESSIONS	0.012	SF/ANNEP	1,351,200	ANNEP	136,214	14,106,800	ANNEP	169,282
FEDERAL INSPECTION SERVICES	85	SF/PHTP-I	380	PHTP-I	30,400	531	PHTP-I	42,480
<b>SECURE PUBLIC AREA</b>								
Passenger Screening Area	1,300	SF/lane	18	lanes	23,904	22	lanes	27,969
Concourse Circulation	3,000	SF/gate	53	gates	159,000	61	gates	183,000
Restrooms	3.00	SF/PHP	6,105	PHP	18,315	7,579	PHP	22,737
Other	0.0010	SF/ANNEP	11,351,200	ANNEP	11,351	14,106,800	ANNEP	14,107
Subtotal Secure Public Area					212,570			247,813
<b>NON-SECURE PUBLIC AREA</b>								
Circulation-ticketing	10.50	SF/PHOP	3,340	PHOP	35,070	4,150	PHOP	43,575
Circulation-baggage claim	5.00	SF/PHTP	3,172	PHTP	15,860	3,398	PHTP	19,690
Circulation-general	1.50%	of total SF	11,351,200	ANNEP	170,268	14,106,800	ANNEP	211,602
USO					6,521			6,521
Restrooms	2.00	SF/PHP	6,105	PHP	12,210	7,579	PHP	15,158
Other	0.001	SF/ANNEP	11,351,200	ANNEP	11,351	14,106,800	ANNEP	14,107
Subtotal non-secure public area					251,280			310,653
<b>NON-PUBLIC AREA</b>								
TSA	1.85	SF/PHOP	3,340	PHOP	6,179	4,150	PHOP	7,768
SDCRAA	0.0009	SF/ANNEP	11,351,200	ANNEP	10,216	14,106,800	ANNEP	12,696
Circulation	4%	of total SF			46,100			56,419
Maintenance/storage	2%	of total SF			23,050			28,209
Mechanical/electrical	10%	of total SF			115,251			141,047
Other	6%	of total SF			69,150			84,628
Subtotal non-public area					269,946			330,677
<b>TOTAL FUNCTION AREA</b>					<b>1,406,057</b>			<b>1,720,774</b>

Notes: SF = square feet; PHOP = peak hour originating passengers; PHTP = peak hour terminating passengers; PHTP-I = peak hour terminating international passengers; PHP = peak hour passengers; ANNEP = annual enplaning passengers.

Source: HNTB analysis, September 2008.

### 4.3.3 Area Comparison

Table 4-6 provides a comparison between the existing terminal facilities and PAL1 and PAL2 forecast program requirements.

Table 4-6  
**EXISTING AND FUTURE TERMINAL AREA COMPARISON**  
San Diego International Airport

Existing area (square feet)	Required area (square feet)			
	PAL1	Percent Increase	PAL2	Percent Increase
787,425	1,406,057	79%	1,720,774	119%
Additional area required	618,632		933,349	

Source: HNTB analysis, September 2008.

### 4.3.4 Gate Requirements

This section presents the methodology used to determine future aircraft gate requirements for commercial passenger airlines operating at SDIA for both PAL1 and PAL2:

- PAL1: equivalent to unconstrained demand in year 2020;
- PAL2: equivalent to 2030 demand in the constrained scenario.

To estimate gate requirements for PAL1 and PAL2 at SDIA, aggregate domestic and international enplanements and operations were allocated to airline and aircraft groups.

**Domestic Traffic.** The segmentation of domestic enplanements was based on the following assumptions regarding the airlines' future air service:

- Southwest will continue to be the dominant carrier at SDIA.
- Legacy carriers will grow at a slower pace than their low-cost carrier (LCC) counterparts.
- LCCs such as AirTran and jetBlue will experience the fastest growth rates due to their focus in northeast and southeast regions which are expected to experience the strongest growth over the forecast period.

- 
- American, Continental, and Delta currently focus their traffic on the east coast and their main hubs. As they are well established in these regions, it was assumed that these airlines will experience relatively slower growth over the forecast period.
  - Hawaiian and Alaska tend to focus more on the Pacific region. As a result, these two airlines are expected to grow at a rate of 1.9 to 2.0 percent annually through PAL2.

**Table 4-7** provides a summary of domestic enplanements by airline. While legacy carriers accounted for 54.5 percent of the total domestic enplanements in 2008, this trend will be reversed by PAL2 with LCCs projected to account for 54.8 percent of domestic enplanements.

The corresponding domestic operations by airline are presented in **Table 4-8**. Domestic operations by legacy carriers are expected to increase from about 109,000 operations to just over 113,000 operations by PAL2, averaging growth of just 0.2 percent per year. Legacy carriers typically have more diverse fleets than LCCs and as a result are expected to have more flexibility to up-gauge aircraft at SDIA and as a result experience significantly slower growth in operations than passenger traffic. Growth in LCC domestic operations is expected to more closely mirror forecast passenger growth rates due to their operating more limited narrow-body jet fleets.

Table 4-7  
**DOMESTIC ENPLANEMENTS BY AIRLINE**  
 San Diego International Airport

Carrier	Enplanements			AAGR		% of Total		
	2008	PAL1	PAL2	08- PAL1	08- PAL2	2008	PAL1	PAL2
<b>LCC</b>								
AirTran	118,204	174,693	235,531	3.3%	3.2%	1.3%	1.6%	1.7%
Allegiant	12,918	15,827	19,940	1.7%	2.0%	0.1%	0.1%	0.1%
Frontier	234,818	287,464	344,222	1.7%	1.8%	2.6%	2.6%	2.5%
JetBlue	254,196	338,994	449,411	2.4%	2.6%	2.8%	3.1%	3.2%
Southwest	3,357,524	4,450,960	6,254,654	2.4%	2.9%	36.8%	40.3%	45.2%
Sun								
Country	41,631	51,092	62,958	1.7%	1.9%	0.5%	0.5%	0.5%
Virgin								
America	<u>139,825</u>	<u>171,590</u>	<u>211,434</u>	<u>1.7%</u>	<u>1.9%</u>	<u>1.5%</u>	<u>1.6%</u>	<u>1.5%</u>
<b>Subtotal</b>	<b>4,159,118</b>	<b>5,490,620</b>	<b>7,578,150</b>	<b>2.3%</b>	<b>2.8%</b>	<b>45.5%</b>	<b>49.7%</b>	<b>54.8%</b>
<b>Legacy</b>								
Alaska	437,629	526,039	667,039	1.5%	1.9%	4.8%	4.8%	4.8%
Aloha	15,642	-	-	n.c.	n.c.	0.2%	0.0%	0.0%
American	975,831	1,160,492	1,249,732	1.5%	1.1%	10.7%	10.5%	9.0%
Continental	512,358	557,093	604,319	0.7%	0.8%	5.6%	5.0%	4.4%
Delta	742,000	870,757	945,808	1.3%	1.1%	8.1%	7.9%	6.8%
ExpressJet	161,205	-	-	n.c.	n.c.	1.8%	0.0%	0.0%
Hawaiian	133,535	162,389	207,104	1.6%	2.0%	1.5%	1.5%	1.5%
Midwest	34,105	34,400	38,808	0.1%	0.6%	0.4%	0.3%	0.3%
Northwest	288,750	325,372	363,611	1.0%	1.1%	3.2%	2.9%	2.6%
United	1,059,475	1,212,815	1,371,151	1.1%	1.2%	11.6%	11.0%	9.9%
US								
Airways	<u>616,251</u>	<u>713,723</u>	<u>813,378</u>	<u>1.2%</u>	<u>1.3%</u>	<u>6.7%</u>	<u>6.5%</u>	<u>5.9%</u>
<b>Subtotal</b>	<b>4,976,782</b>	<b>5,563,080</b>	<b>6,260,950</b>	<b>0.9%</b>	<b>1.0%</b>	<b>54.5%</b>	<b>50.3%</b>	<b>45.2%</b>
<b>Total</b>	<b>9,135,900</b>	<b>11,053,700</b>	<b>13,839,100</b>	<b>1.6%</b>	<b>1.9%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>

Note: n.c. = not calculated.

Source: Landrum & Brown analysis.

Table 4-8  
**DOMESTIC COMMERCIAL PASSENGER AIRCRAFT OPERATIONS BY AIRLINE**  
 San Diego International Airport

Carrier	Operations			AAGR		% of Total		
	2008	PAL1	PAL2	08- PAL1	08- PAL2	2008	PAL1	PAL2
<b>LCC</b>								
AirTran	2,148	3,175	4,280	3.3%	3.2%	1.1%	1.5%	1.7%
Allegiant	174	202	255	1.3%	1.8%	0.1%	0.1%	0.1%
Frontier	4,236	5,341	5,729	2.0%	1.4%	2.1%	2.5%	2.3%
JetBlue	4,648	5,650	7,490	1.6%	2.2%	2.3%	2.6%	3.0%
Southwest	75,036	89,593	112,252	1.5%	1.8%	37.7%	41.9%	45.4%
Sun Country	718	822	972	1.1%	1.4%	0.4%	0.4%	0.4%
Virgin America	<u>3,024</u>	<u>3,138</u>	<u>3,179</u>	<u>0.3%</u>	<u>0.2%</u>	<u>1.5%</u>	<u>1.5%</u>	<u>1.3%</u>
<b>Subtotal</b>	<b>89,984</b>	<b>107,921</b>	<b>134,159</b>	<b>1.5%</b>	<b>1.8%</b>	<b>45.2%</b>	<b>50.4%</b>	<b>54.2%</b>
<b>Legacy</b>								
Alaska	8,354	8,687	10,211	0.3%	0.9%	4.2%	4.1%	4.1%
Aloha	352	-	-	n.c.	n.c.	0.2%	0.0%	0.0%
American	27,582	26,562	24,877	-0.3%	-0.5%	13.9%	12.4%	10.1%
Continental	7,356	7,916	8,437	0.6%	0.6%	3.7%	3.7%	3.4%
Delta	10,822	14,543	17,181	2.5%	2.1%	5.4%	6.8%	6.9%
ExpressJet	9,598	-	-	n.c.	n.c.	4.8%	0.0%	0.0%
Hawaiian	1,222	1,430	1,783	1.3%	1.7%	0.6%	0.7%	0.7%
Midwest	956	929	1,053	-0.2%	0.4%	0.5%	0.4%	0.4%
Northwest	4,232	4,938	5,521	1.3%	1.2%	2.1%	2.3%	2.2%
United	27,550	29,288	31,226	0.5%	0.6%	13.9%	13.7%	12.6%
US Airways	<u>10,852</u>	<u>11,785</u>	<u>13,020</u>	<u>0.7%</u>	<u>0.8%</u>	<u>5.5%</u>	<u>5.5%</u>	<u>5.3%</u>
<b>Subtotal</b>	<b>108,876</b>	<b>106,079</b>	<b>113,309</b>	<b>-0.2%</b>	<b>0.2%</b>	<b>54.8%</b>	<b>49.6%</b>	<b>45.8%</b>
<b>Total</b>	<b>198,860</b>	<b>214,000</b>	<b>247,468</b>	<b>0.6%</b>	<b>1.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>

Source: Landrum & Brown analysis.

**International Traffic.** Similar to domestic enplanements, international enplanements were distributed among the airlines that provide or are expected to provide international service at SDIA. **Table 4-9** presents international enplanements by airline for PAL1 and PAL2.

As Mexico is expected to be one of the fastest growing international destinations from SDIA, Aeromexico and Alaska are expected to experience 5.1 and 4.8 percent growth per annum, respectively, through PAL2. Enplanements to Europe,

which started with Zoom Airlines in 2008, are expected to grow 7.3 percent annually over the forecast period. Airlines with service to Canada will experience more moderate growth. Finally, airline(s) serving the Pacific region (service anticipated to begin by 2015) will constitute 12.1 percent of the international enplanements in PAL2.

Table 4-9  
**INTERNATIONAL ENPLANEMENTS BY AIRLINE**  
 San Diego International Airport

Carrier	Enplanements			CAGR		Share of total		
	2008	PAL1	PAL2	08-PAL1	08-PAL2	2008	PAL1	PAL2
Aeromexico	32,290	75,296	95,937	7.3%	5.1%	25.2%	25.3%	26.0%
Air Canada	45,434	69,908	77,375	3.7%	2.4%	35.4%	23.5%	20.9%
Alaska	33,444	62,488	92,939	5.3%	4.8%	26.1%	21.0%	25.2%
US Airways	7,069	9,412	10,531	2.4%	1.8%	5.5%	3.2%	2.9%
Europe	10,063	41,496	47,745	12.5%	7.3%	7.8%	13.9%	12.9%
Pacific	-	39,000	44,873	n.c.	n.c.	0.0%	13.1%	12.1%
<b>Total</b>	<b>128,300</b>	<b>297,600</b>	<b>369,400</b>	<b>7.3%</b>	<b>4.9%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>

CAGR = compound annual growth rate; n.c. = not calculated.  
 Source: Landrum & Brown analysis.

The international fleet in 2008 was comprised of mainly narrow-body aircraft (89 percent). Over the forecast period, the airlines will tend to replace older aircraft such as B734s and MD80s with newer B737s, B738s, B739s and E90s. Airlines serving Europe and the Pacific region are expected to use wide-body aircraft such as B763s, B787s, and A350s. As a result, aircraft gauge is expected to grow from 124.0 in 2008 to 144.4 in PAL1 and PAL2.

**Table 4-10** provides a summary of the international aircraft operations for each airline.

Table 4-10  
**INTERNATIONAL PASSENGER AIRCRAFT OPERATIONS BY AIRLINE**  
 San Diego International Airport

Carrier	Operations			CAGR		Share of total		
	2008	PAL1	PAL2	08- PAL1	08- PAL2	2008	PAL1	PAL2
Aeromexico	742	1,608	1,978	6.7%	4.6%	26.5%	28.2%	28.7%
Air Canada	1,024	1,746	1,916	4.5%	2.9%	36.5%	30.6%	27.8%
Alaska	732	1,240	1,737	4.5%	4.0%	26.1%	21.8%	25.2%
US Airways	192	274	306	3.0%	2.1%	6.8%	4.8%	4.4%
Europe	114	416	479	11.4%	6.7%	4.1%	7.3%	6.9%
Pacific	-	416	479	n.c.	n.c.	0.0%	7.3%	6.9%
<b>Total</b>	<b>2,804</b>	<b>5,700</b>	<b>6,894</b>	<b>6.1%</b>	<b>4.2%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>

CAGR = compound annual growth rate; n.c. = not calculated.  
 Source: Landrum & Brown analysis.

**Terminal Gate Requirements.** Domestic and international gate requirements were developed for each carrier for PAL1 and PAL2 using a methodology based on the number of turns per gate. The number of turns per gate for each airline was assessed for 2008 to determine the efficiency with which each airline is currently using its gates. A future turns per gate assumption was derived for each airline for PAL1 and PAL2 to develop gate requirements for each planning level.

On average airlines operated 6.6 turns per gate at SDIA in 2008. This is expected to increase to 6.9 turns per gate by PAL1 and to 7.1 turns per gate by PAL2.

International aircraft typically need to be on the ground longer than domestic flights so the utilization of the domestic gates is higher than international gates. The international gates are currently being used for less than one turn per day on average. By PAL2, the number of turns per gate on the international gates is expected to increase to 2.3.

Southwest typically has higher gate utilization than legacy carriers and this holds true at SDIA. Southwest averaged 10.7 domestic turns per gate in 2008. Given Southwest's already high level of gate use, turns per gate were held constant through PAL2.

---

Gate utilization in the Commuter Terminal was higher than the average in 2008. American Eagle averaged 11 domestic turns per gate while United Express averaged 8 turns per gate. American Eagle's high gate utilization is not considered sustainable and is expected to decrease to 8.5 turns per gate by PAL2. United Express' gate utilization is expected to drop slightly in PAL1 and then return to 8 turns per gate in PAL2. The decreases in gate utilization for the commuter carriers is a function of reduced activity in the future.

Air Canada, Delta, Hawaiian, and Sun Country are expected to achieve slightly higher gate utilization by PAL2. Most of the other carriers are expected to maintain their current gate utilization through PAL2.

Based on these assumptions, a total of 61 narrow-body equivalent gates (NBEG) will be required by PAL2, as shown in **Table 4-11**.

#### 4.4 Ground Transportation Requirements

This section presents the ground transportation requirements for PAL1 and PAL2. The ground transportation facilities analyzed include the terminal curbside, public parking, employee parking and rental car.

##### **4.4.1 Program Methodology**

Requirements for ground transportation functions are based on a peak day in the average month.

Ground transportation requirements were developed for a peak month average day and do not account for peak holiday travel, such as Thanksgiving and Christmas.

Current vehicle mode share and occupancies, shown in **Table 4-12** were derived from survey data and calibrated against available traffic counts and transaction records. For the purpose of developing general ground transportation facility requirements, it was assumed that future mode share and vehicle occupancy would remain similar in the future.

Table 4-11  
**TERMINAL GATE REQUIREMENTS**  
San Diego International Airport

Airline	PMAWD Operations			PMAWD Enplanements			Turns per Gate (c)		Gate Requirements			
	2008	PAL1	PAL2	2008	PAL1	PAL2	PAL1	PAL2	2008	PAL1	PAL2	PAL2 NBEG (b)
<b>Domestic</b>												
Air Canada	4	4	6	170	170	256	2.0	3.0	0.4	0.5	1.0	1.0
AirTran	10	12	14	555	666	777	5.0	5.0	0.7	2.0	2.0	2.0
Alaska	24	26	28	1,238	1,548	1,730	4.0	4.0	3.0	4.0	4.0	4.0
Allegiant	2	2	2	149	156	156	1.0	1.0	0.1	0.2	0.2	0.2
Aloha	2	-	-	89	-	-	-	-	0.2	-	-	-
American	34	36	40	2,012	2,387	2,824	3.4	3.4	5.0	5.0	5.0	6.0
American Eagle	44	42	34	678	932	736	10.5	8.5	2.0	2.0	2.0	2.0
Continental	20	24	24	1,376	1,699	1,745	5.0	5.0	2.0	3.0	3.0	3.0
Delta <sup>1/</sup>	32	48	58	2,149	2,920	3,888	6.9	6.9	2.4	4.0	5.0	6.0
ExpressJet	26	-	-	449	-	-	-	-	1.0	-	-	-
Frontier	12	14	16	644	753	951	6.0	6.0	1.0	2.0	2.0	2.0
Hawaiian	4	4	6	438	454	681	2.0	3.0	0.3	0.4	0.4	0.4
jetBlue	16	20	24	876	1,200	1,440	4.0	4.0	2.0	3.0	3.0	3.0
Midwest	4	2	4	145	72	145	1.0	2.0	0.3	0.2	0.2	0.2
Northwest (a)	14	-	-	941	-	-	-	-	0.9	-	-	-
Southwest	214	258	318	9,580	13,124	17,391	10.7	10.7	10.0	12.0	15.0	15.0
Sun Country	2	2	4	117	125	256	1.0	2.0	0.2	0.2	0.2	0.2
United	44	52	56	2,515	3,005	3,382	4.8	4.8	4.6	5.5	6.0	6.0
United Express	32	30	32	405	439	464	7.5	8.0	2.0	2.0	2.0	2.0
US Airways	28	32	36	1,566	1,892	2,254	7.0	7.0	2.0	3.0	3.0	3.0
Virgin America	10	10	10	461	542	674	5.0	5.0	1.0	1.0	1.0	1.0
<b>Subtotal</b>	<b>578</b>	<b>618</b>	<b>712</b>	<b>26,551</b>	<b>32,086</b>	<b>39,750</b>	<b>6.9</b>	<b>7.1</b>	<b>41.0</b>	<b>50.0</b>	<b>55.0</b>	<b>57.0</b>
<b>International</b>												
Aeromexico	2	4	4	87	203	209	2.0	2.0	1.0	1.0	1.0	1.0
Alaska	2	4	4	91	200	209	2.0	2.0	1.0	1.0	1.0	1.0
Europe	-	2	2	-	200	200	1.0	1.0	-	0.5	0.3	0.7
Pacific	-	2	2	-	188	188	1.0	1.0	-	0.5	0.3	0.7
US Airways	-	-	2	-	-	69	-	1.0	1.0	-	0.3	0.7
<b>Subtotal</b>	<b>4</b>	<b>12</b>	<b>14</b>	<b>178</b>	<b>790</b>	<b>874</b>	<b>2.0</b>	<b>2.3</b>	<b>3.0</b>	<b>3.0</b>	<b>3.0</b>	<b>4.0</b>
<b>Total</b>	<b>582</b>	<b>630</b>	<b>726</b>	<b>26,729</b>	<b>32,876</b>	<b>40,624</b>	<b>6.6</b>	<b>6.8</b>	<b>44.0</b>	<b>53.0</b>	<b>58.0</b>	<b>61.0</b>

Note: PMAWD international operations and enplanements are higher than in the derivative forecasts.

(a) Delta includes Northwest after 2008.

(b) NBEG = Narrow-body equivalent gates

(c) Gate needs are based on turns per gate as presented. Gate requirements are based on rounding of partial gates for key carriers.

Source: Landrum & Brown analysis.

Table 4-12  
**MODAL SHARE AND VEHICLE OCCUPANCY**  
 San Diego International Airport

Mode	Mode share (a)	Vehicle occupancy (air passengers per vehicle) (a)
<b>PRIVATE VEHICLE</b>		
Curbside	25.5%	1.2
Short-Term Parking	17.0%	1.3
Long-Term Parking	2.5%	1.3
Remote Parking	10.0%	1.3
<b>RENTAL CAR</b>	<b>19.1%</b>	<b>1.4</b>
<b>COMMERCIAL VEHICLE</b>		
Taxi	7.3%	1.5
Limousine	1.3%	1.5
Shared-ride Shuttle	9.5%	4
Hotel/Motel Courtesy Shuttle	5.8%	2.6
Rental Car Courtesy Shuttle (b)	--	1.5
Remote Parking Courtesy Shuttle (c)	--	1.8
Public Transit	1.0%	5
Charter/Other Bus	1.0%	15
<b>TOTAL</b>	<b>100.0%</b>	

(a) Mode share and vehicle occupancy based on HNTB calibration.

(b) Uses the same mode share percentage as remote parking.

(c) Uses the same mode share percentage as rental car.

Source: HNTB Analysis, 2008 SDIA Master Plan.

#### **4.4.2 Requirements**

Curbside, public parking, employee parking and rental car requirements are summarized in **Table 4-13**. In general, the Airport is significantly deficient in public parking spaces needed to meet current demand. Specifically, the current demand for daily and hourly parking is over 6,000 spaces, whereas only 3,166 are provided.

The rental car facilities located off of North Harbor Drive do not present a customer experience equivalent with the passenger terminal, and a consolidated rental car facility is recommended.

Table 4-13  
**GROUND TRANSPORTATION REQUIREMENTS**  
 San Diego International Airport

	Current Facilities	Current Requirements	PAL1	PAL2
<b>CURBSIDE (feet)</b>				
Private vehicle enplaning	1,670	1,530	1,630	1,840
Private vehicle deplaning	1,590	1,460	1,650	1,745
Commercial vehicle (multiple)	3,370	3,090	3,370	3,785
Commercial vehicle (single)	N/A	N/A	1,800	2,065
<b>TOTAL CURBSIDE – SINGLE (a)</b>	<b>6,630</b>	<b>N/A</b>	<b>5,080</b>	<b>5,650</b>
<b>TOTAL CURBSIDE – MULTIPLE</b>	<b>N/A</b>	<b>6,080</b>	<b>6,650</b>	<b>7,370</b>
<b>PUBLIC PARKING (spaces)</b>				
Hourly	N/A	1,270	1,705	2,245
Daily	N/A	4,740	6,705	8,290
Subtotal hourly/daily parking	3,166	6,010	8,410	10,535
Remote	9,287	5,610	7,940	9,815
<b>TOTAL PUBLIC PARKING</b>	<b>12,447</b>	<b>11,623</b>	<b>16,350</b>	<b>20,350</b>
<b>EMPLOYEE PARKING (spaces)</b>	<b>1,595</b>	<b>1,450</b>	<b>2,000</b>	<b>2,500</b>
<b>RENTAL CAR</b>				
Ready/return spaces (ea)	N/A	2,550	2,775	3,525
Storage spaces (ea)	N/A	1,000	1,110	1,400
Support facilities	N/A	8.0	9.0	11.5
Customer service	N/A	0.9	1.0	1.4
Landscaping and circulation	N/A	4.7	5.2	6.7
Subtotal rental car (b)	27.0 acres	38.2	42.0	53.4
	(on site only)			

N/A = not applicable

(a) Curbside requirements differ depending on the terminal configuration. With a single terminal, some efficiencies are gained, and therefore, the curbside requirement is less for a single terminal alternative versus a multiple terminal layout.

(b) Existing space does not include Pacific Highway facilities; requirements assume all facilities are on site.

Source: HNTB analysis, 2008 SDIA Master Plan.

#### 4.4.3 Terminal Curbside

Curb length requirements for each vehicle mode were estimated by vehicle type. The analysis was conducted for peak hour operations during a peak month average day at the Airport. To account for the random pattern of vehicle arrivals during the peak hour a surge factor of 1.1 was applied. Peak hour vehicle

---

volumes were estimated using the mode share and vehicle occupancies shown in **Table 4-12**.

The curb length requirement for each mode was then estimated by multiplying the required number of stalls by the average vehicle parking length, and by the number of stops the mode is expected to make along the curb.

Approximately five percent of parking and rental car traffic was assumed to use the curbs based on past air passenger surveys at SDIA. Approximately 30 percent of deplaning private vehicles were assumed to re-circulate based on the mode share calibration.

It was also assumed that during the peak hour, a LOS C would be acceptable for operations on the private vehicle curbside. At LOS C, approximately 30 percent of the vehicles would double-park when loading or unloading passengers, either within a 20 foot striped curb lane or in the first travel lane if the curb lane is 12-feet or less. No double parking was assumed on the commercial vehicle curbside.

**Table 4-13** summarizes the projected curbside requirements for PAL1 and PAL2. As shown, the PAL1 curbside requirement for a multiple terminal configuration is 6,650 feet; and the PAL2 requirement is 7,370 feet. For a single consolidated terminal layout, the curbside requirements are lessened: for PAL1 5,080 feet and PAL2 at 5,650 feet.

#### **4.4.4 Public Parking**

Parking stall requirements for hourly, daily and remote parking were estimated by applying average parking durations from parking transactions data. Parking durations as reported by Lindbergh Parking Incorporated (LPi) and Authority staff are as follows:

- Hourly Parking – 1.24 hours
- Daily Parking – 1.76 days
- Remote Parking – 2.5 days

Hourly parking demand is based on peak hour demand, and daily, and remote parking demand is based on a peak day. As mentioned, the peak day represents an average day in the peak month and does not account for holiday demand. The parking requirements include parking reserves of 15 percent for short-

Nearly 80 percent of total parking transactions at SDIA occur at the short-term parking facilities.

term and 10 percent for long-term and remote parking. In addition, a surge factor to account for the random pattern of vehicle arrivals throughout the peak hour was applied.

Hourly and daily parking demand represents the demand for terminal area parking facilities that permit walking to the terminals while remote parking requires a shuttle to the terminals.

The estimated parking transaction ratio was assumed to remain constant during the peak month of airport activity. SDIA parking transaction data indicated the following distribution: 78 percent short-term terminal parking, 12 percent long-term terminal parking, and 10 percent remote parking.

Parking requirements were estimated by type of parking (i.e., close-in versus remote) based on the projected parking transactions and the average parking durations for each type. The requirements represent all public parking demand including the demand currently accommodated by private operators. **Table 4-13** shows the estimated parking requirements for hourly, daily, and remote facilities.

As mentioned, the current demand far exceeds the existing provision of daily/hourly parking. Today, only 3,166 spaces are provided, whereas there is demand for over 6,000. Further, hourly/daily parking demand is expected to continue to grow reaching 16,350 spaces at PAL1, and 20,350 in PAL2.

#### **4.4.5 Employee Parking**

Employee parking requirements were estimated based on the ratio of existing employee parking supply to the annual passenger activity level at SDIA, adjusted for observed parking occupancies. There are currently 1,595 employee parking spaces at SDIA and when parking lot surveys were conducted in 2004 there were approximately 96 employee parking spaces per million annual passengers (MAP) with average peak hour occupancies of 65 percent. It was determined that a 40 percent reserve of parking spaces be maintained in the employee lots to accommodate employees working on shifts. For example, second shift employees must arrive at work before first shift employees have completed their shift requiring an overlap in parking spaces. Employee parking demand is expected to grow

---

in proportion to total airport passengers and reach 2,000 spaces in PAL1 and 2,500 spaces in PAL2 as shown on **Table 4-13**.

#### **4.4.6 Rental Car**

Rental car requirements assume that a consolidated rental car facility meeting 100 percent of projected demand will be constructed.

Rental car acreage requirements were estimated using acreage ratios observed at SDIA and other airports in the western United States as well as surveys of SDIA rental car operators conducted in 1997 and 2007. These requirements were refined as part of a rental car programming effort prepared for the Authority by Demattei Won Architecture. The existing rental car facilities located south of North Harbor Drive occupy approximately 27.5 acres and are comprised of 3 companies: Hertz, Avis and National. Additional companies are located along Pacific Highway. Future acreage requirements were estimated for a consolidated rental car facility that accommodated 100 percent of rental car demand including both North Harbor Drive and Pacific Highway facilities.

The following assumptions and ratios were used to estimate rental car stall requirements:

##### Ready/return spaces

- Assumes flex spaces accommodating both ready and return functions
- 335 square feet per space

##### Storage spaces

- 40 percent of ready/return spaces
- 210 square feet per space

##### Support facilities (quick turnaround)

- Fueling
- Car wash
- Vehicle stacking space

##### Customer service lobby

- Rental car counters and lobby area
- Building support
- Employee office space and building support

##### Landscaping and circulation

- 10 percent landscaping buffer per design standards
- 5 percent of total site for circulation

---

**Table 4-13** summarizes rental car stall and area requirements. The total area required for rental car operations was estimated to be 42.0 acres in PAL1 and 53.4 acres in PAL2. Rental car support functions including quick-turn-around (fueling, washing, et cetera) and customer service counters were estimated to require 10.0 acres.

#### **4.4.7 Intermodal Context and Opportunities**

I-5 and the Coaster/Amtrak and trolley rail corridors run along the north side of the Airport providing an opportunity for connectivity to airport terminal and gate facilities. In addition, an Intermodal Transit Center (ITC) in the vicinity of the Airport could serve as a larger regional transportation hub providing interconnectivity between regional transit lines including trolley, Coaster, Amtrak, local buses, and proposed bus rapid transit. The facility could also be designed to accommodate a potential High Speed Rail station and serve as the San Diego terminus for both High Speed Rail and Amtrak service. This facility could also provide parking and rental car facilities that cannot be accommodated at the Santa Fe Depot due to site constraints downtown.

As an airport rail station, the ITC could provide a combination of air passenger facilities including: ticketing, baggage claim and passenger security. The ITC and air passenger amenities would be located on or adjacent to airport property near the north property line. Passengers would travel to the terminal concourses either by moving walkways if terminal concourses are provided north of the runway or with a people mover to terminal concourses south of the runway. As a larger regional transportation hub the ITC could provide: rail platforms with easy connections between modes; a rail station with ticket facilities and passenger waiting areas; and a bus plaza serving regional and local bus lines.

In addition, the *2030 Regional Transportation Plan* calls for all three trolley routes (blue, green and orange) to operate in the corridor between Old Town and Santa Fe Depot by 2030. The associated improvements to the corridor would allow a connection to the ITC from all trolley routes in the County providing passengers with a “one-seat ride” to the ITC.

---

## 4.5 Support Facilities Requirements

The following sections present the facility requirements for air cargo and general aviation facilities.

### **4.5.1 Air Cargo Requirements**

The inventory task established that there currently is 69,750 square feet of office and building space designated for air cargo operations. The future facility requirements were calculated based on a range of building utilization rates, from 0.75 to 1.25 square feet per ton of cargo handled. Industry planning standards typically assume a building utilization rate of 1.5 square feet per ton of cargo, but the ratio for SDIA was adjusted downward as a result of the historically higher building utilization rate at the Airport. It was also assumed that efficiency will increase over the planning period due to the increased use of mechanization technology.

The aircraft parking requirements were derived based on projections of number of aircraft operations on the peak month average week day. Apron requirements were calculated based on the parking position requirements, assuming that an air carrier aircraft (e.g., Boeing 757) requires 40,000 square feet of apron and a feeder aircraft (e.g., Cessna Caravan) requires 15,000 square feet of apron.

The results of the analysis are presented in **Table 4-14**.

Table 4-14  
**CARGO FACILITY REQUIREMENTS**  
 San Diego International Airport

	Current facilities	Existing requirements	PAL1	PAL2
<i>Air cargo demand (a)</i>				
Cargo tonnage	154,689	-	188,200	225,600
Cargo operations	6,682	-	7,070	7,840
<i>Requirements</i>				
Warehouse (sf) (b)	69,750	116,020 - 193,360	141,150 - 235,250	169,200 - 282,000
Apron (sf)	270,000	-	1,055,000	1,230,000
<i>Aircraft parking positions</i>				
Air carrier	-	-	23	27
Feeder	-	-	9	10
Total	-	-	32	37

(a) Cargo demand was calculated based on a constrained growth forecast scenario.

(b) Warehouse requirements were based on a range of building utilization rates, from 0.75 to 1.25 square feet per ton of cargo handled.

Source: Jacobs Consultancy and C&S Engineers analysis.

Based on this analysis, the available warehouse space is below the square footage needed to meet current and future requirements. As a result of the current lack of available building space dedicated to aircraft cargo, cargo operators FedEx, UPS, and the United States Postal Service sort and load containers off airport property.

The available apron space dedicated to air cargo would also have to increase to meet future demand, from 270,000 square feet to approximately 1.05 million square feet at PAL1 and 1.23 million square feet at PAL2.

#### **4.5.2 General Aviation Requirements**

The general aviation (GA) area currently consists of approximately 10 acres of apron space, including a 23,538 square foot terminal building, a 40,200 square foot hangar facility, and a fuel farm that encompasses 0.4 acres of the GA apron area. In addition, the cargo airline ABX currently leases a portion of the apron area for cargo-related operations.

The GA requirements are based on the constrained aviation forecast, which assumes that general aviation activity will not

grow at SDIA over the planning period. Since current facilities meet the needs generated by GA activity, there is no anticipated need for additional facilities. Therefore, no additional space is programmed for GA. However, the GA facility improvements will likely be necessary over the planning period, and facilities may be reconfigured or relocated as prudent.

#### 4.6 Summary of Requirements

A summary of the facility requirements for PAL1 and PAL2 for each of the key airport functions is shown in **Table 4-15**.

Table 4-15  
**SUMMARY OF EXISTING FACILITIES AND FUTURE REQUIREMENTS**  
San Diego International Airport

Function	Facility	Current Facilities	Planning Activity Level	
			PAL1	PAL2
Airfield	Airfield design criteria	ADG V	ADG V	ADG V
	Runway length (ft)	9,401	9,401	9,401
Commercial aviation	Passenger terminal building (sf)	787,425	1,406,057	1,720,774
	Aircraft gates	44	53	61
	Terminal curbside frontage	6,530	6,650	7,370
	Vehicle parking			
	Public parking (spaces)	12,447	16,350	20,350
	Employee parking (spaces)	1,595	2,000	2,500
	Rental car (ac)	27	42.0	53.4
Air cargo	Cargo warehouse (sf)	69,750	141,150 - 235,250	169,200 - 282,000
	Aircraft parking apron (sf)	270,000	1,055,000	1,230,000
General aviation	FBO terminal building (sf)	23,538	23,538	23,538
	Apron (sf)	435,600	435,600	435,600
	Hangar space (sf)	40,200	40,200	40,200

FBO = fixed based operator  
 ILS = instrument landing system  
 sf = square feet; ac = acre

Source: Jacobs Consultancy Team, 2008.