

7. PASSENGER TERMINAL FACILITY REQUIREMENTS

This chapter address the methodology, assumptions, and general planning-level factors used to analyze facility requirements for key function areas of the passenger terminal building.

Requirements were analyzed based on a multitude of factors and compared to the PALs identified in *Chapter 4, Forecasts*, as identified in **Table 7-1**. The primary tool used to model various terminal space requirements was ACRP Report 25, Airport Passenger Terminal Planning and Design, Volume 2: Spreadsheet Models and User’s Guide (the Model). Additionally, guidelines published in the following publications were included:

- International Air Transport Association’s (IATA) Airport Development Reference Manual (ADRM, 10th Edition)
- FAA AC 150/5360-13A, Airport Terminal Planning
- FAA AC 150/5300-13A (Change 1), Airport Design

This review was conducted based on standard terminal design.

Table 7-1: Enplanement Planning Activity Levels

	Enplanements		
	Threshold	Implement (80%)	Planning (60%)
PAL 1	140,000	112,000	84,000
	160,000	128,000	96,000
	180,000	144,000	108,000
	200,000	160,000	120,000
	220,000	176,000	132,000
	240,000	192,000	144,000
	260,000	208,000	156,000
PAL 2	280,000	224,000	168,000
	300,000	240,000	180,000
	320,000	256,000	192,000
	340,000	272,000	204,000
	360,000	288,000	216,000
	380,000	304,000	228,000
PAL 3	400,000	320,000	240,000
	420,000	336,000	252,000
	440,000	352,000	264,000
	460,000	368,000	276,000
	480,000	384,000	288,000
PAL 4	500,000	400,000	300,000
	520,000	416,000	312,000
	540,000	432,000	324,000
	560,000	448,000	336,000
	580,000	464,000	348,000
	600,000	480,000	360,000

Source: McFarland Johnson analysis, 2021.

I. METHODOLOGY

The SGU passenger terminal, completed in 2011, serves as the main facility for the arrival and departure of commercial airline passengers. The terminal has two floors, however screened passengers have access to only the first floor, where all arrival and departure-related services are located. The areas of the first floor that are accessible to commercial airline passengers include an airline ticketing counter and check-in area, a garden lounge, restrooms, security screening, one secure passenger hold room with restrooms, four rental car counters, and a baggage claim area. The second floor consists of a conference room, multiple offices, an observation area, and restrooms.

The first floor has an area of 29,963 square feet, and the second floor has an area of 3,594 square feet, bringing the total area of the terminal to 33,557 square feet.

In order to gauge commercial passenger interests, practices, concerns, and desires for the passenger terminal, a survey was developed. Passengers in the terminal were given the option to complete the survey when connecting to Wi-Fi, or through posted flyers throughout the terminal. The survey focused on key aspects of the existing terminal building as well as the habits of passengers using the terminal in order to gain an understanding of what passengers themselves desire most in future development of the terminal. The survey included questions such as average party size, airline loyalty, method of check-in before flight, type of baggage carried, reason for travelling to/from SGU, and overall desires the passenger terminal. This survey is instrumental in the development of a future terminal that will serve both passenger and airline needs in an efficient and pleasant manner.

Terminal Functional Areas

Utilizing the Model and FAA industry standards guidance listed above, the following passenger processing functions were examined:

- Terminal Curb Length
- Passenger Check-In and Ticketing
- Outbound Baggage Screening and Make-Up
- Passenger Security Screening Checkpoint
- Passenger Holdrooms
- Concessions
- Inbound Baggage Handling and Baggage Claim
- Other Terminal Support Functions

To best inform potential future needs, the terminal building analysis was performed under each of the PALs. **Figure 7-1** details the location of each of the functional areas of the terminal.

Application of the ACRP Model

The ACRP Model is designed to determine terminal requirements by functional area based on historical and forecasted annual enplanements, departures, and gates. The Model uses these inputs (along with a variety of assumptions) to identify peak hour activity. From this point, the Model relies on peak hour activity levels to produce space requirements that can accommodate demand as it grows. In this way, the Model serves as “top down” analysis, starting with annual demand to estimate peak activity demand. Facility requirements at the Airport were determined using the four PALs. All outputs of this analysis reflect the standard spaces required and standard operating procedures regardless of the existing conditions/configuration so that an accurate assessment of future needs can be identified.

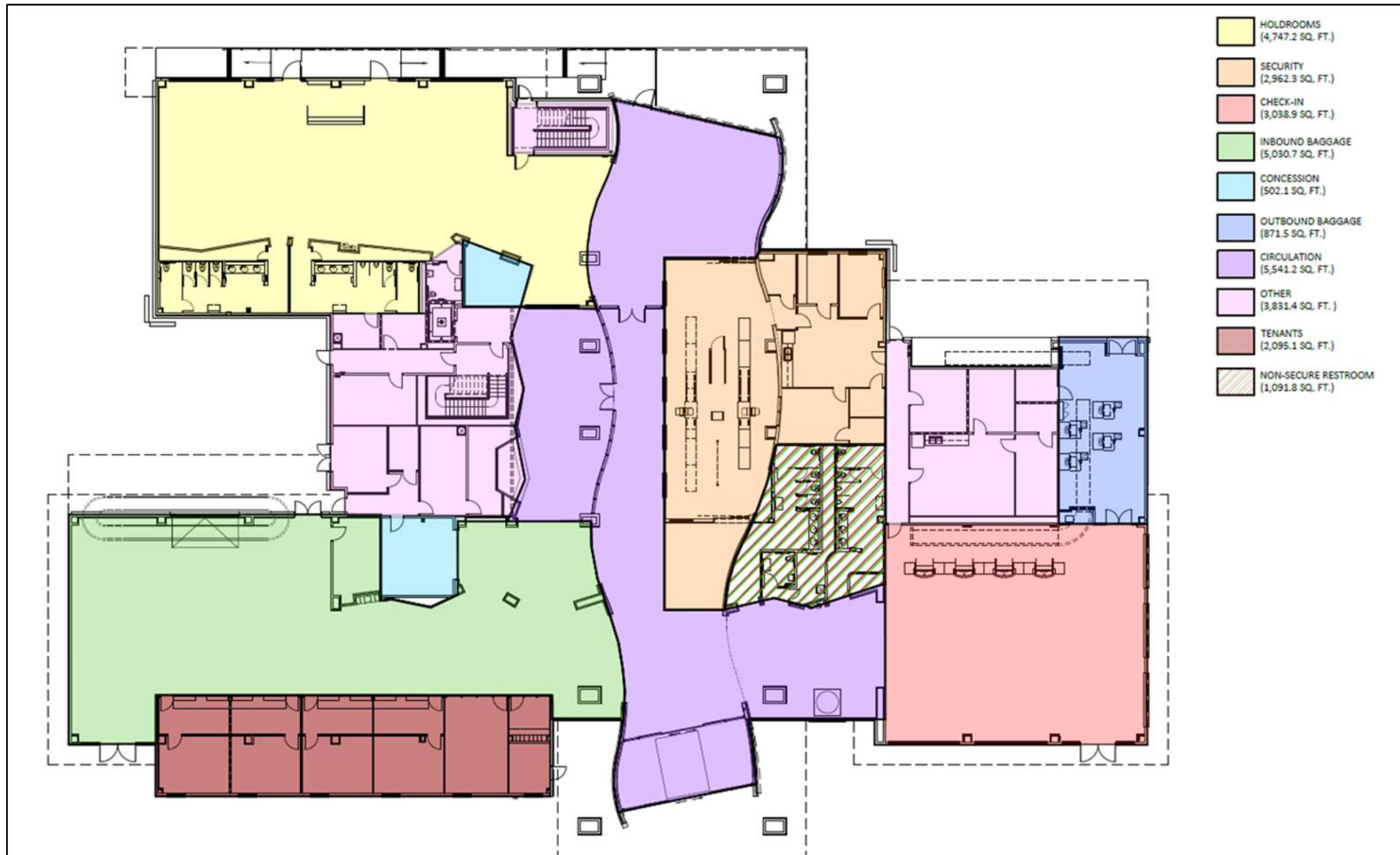
II. TERMINAL BUILDING ELEMENTS

This section includes a breakdown of the existing elements as well as the assumptions utilized for the assessment of the existing passenger terminal building. Each element of the terminal building has its own function for processing passengers, and as such, facility requirements will be based on each of the existing elements. As noted in **Figure 7-1** above, the existing elements of the terminal building include:

- Passenger Check-in/Ticketing
- Outbound Baggage Make-Up and Screening
- Passenger Security Screening Checkpoint
- Secure Holdrooms
- Inbound Baggage Handling and Baggage Claim
- Concessions
- Other Terminal Support Facilities

Each of the existing elements of the terminal building will have their own assumptions and calculations to determine the requirements for development through the end of the planning period in 2040.

Figure 7-1: Passenger Terminal Functional Areas



Source: McFarland Johnson analysis, 2021.

Passenger Check-in/Ticketing

Passenger check-in/ticketing includes the functions of full-service staffed airline counter positions, self-service kiosks, active check-in area, passenger queue area, airline ticket office areas, circulation area, and public restrooms accessible from the ticketing lobby. Assumptions for these areas include the following:

- 60% of peak hour passengers could be expected in the peak 30-minute period
- 30% of passengers use the full-service staffed airline counters
- 40% of passengers use self-service kiosks
- 30% of passengers use mobile check-in services
- Average passenger processing time at the counter or kiosk is four minutes

Industry trends favor an increase in self-service (mobile and kiosk) check-in practices. While there is presently no self-tagging/checked baggage drop at the Airport, this is a provision that should be planned for in the future. Staffed check-in positions in the traditional form are likely to be minimal by the end of the planning period and replaced with more kiosks or mobile services. However, contingency for additional staffed check-in counters may be necessary in the short-term as activity increases in advance of the application of new technology.

Outbound Baggage Make-Up and Screening

Outbound baggage screening and make-up functions include operations by TSA to screen checked baggage, as well as airline staff to collect and disperse bags to carts for the appropriate aircraft prior to departure. The ACRP Model assumes that this practice will be done with EDS baggage screening technology.

Assumptions for these areas include the following:

- 65 percent of passengers will check a bag
- Average of one bag per passenger
- TSA surge factor of 50 percent for peak processing
- 20 percent alarm rate for additional screening (level 2 on-screen resolution (OSR)), 95 percent clear rate, 5 percent requiring level 3, explosives trace detection (ETD)
- Level 1 EDS screening rate of 220 bags per hour, with an alarm rate of 20 percent
- Level 2 OSR processing ration was set at 60 bags per hour
- Level 3 ETD screening, the TSA suggests 24 bags per hour per operator

Baggage screening space requirements contained in the Model were utilized here, and are as follows:

- Level 1 Area: 500 SF per EDS unit
- Level 2 Area: 40 SF per OSR station
- Level 3 Area: 100 SF per ETD station

An additional 35 percent of space is added for circulation area and 15 percent to allow for future equipment changes and any required reconfiguration or renovations.

Passenger Security Screening Checkpoint

This section discusses the assumptions utilized to analyze the future demand for security screening of departing passengers. The assumed processing rate for the analysis is 120 persons per hour for a single lane screening module and 175 persons per hour for a two-lane screening module configuration. The constrained configuration of the Airport means 120 peak hour passengers is an optimistic case.

Although TSA recommends 2,800 SF of space for a two-lane (two bag screening with a shared walk through) screening module, HYA currently accommodates one lane (one bag screening with one walk through) within roughly 1,300 SF. The single lane has an approximate throughput of 120 peak hour passengers while a two-lane checkpoint can process approximately 175 peak hour passengers.

Based on these throughputs a two-lane checkpoint would likely be required if multiple forecast scenarios occur. The percentage of assumed non-passenger traffic, such as employees and crew, represents ten percent of the throughput, which was added to the design peak hour passenger screening demand and is based on recent experience at other airports. As with other functional areas, allowances were also included for future equipment changes (ten percent) or reconfigurations and TSA support space (12 percent).

Secure Holdrooms

Holdroom space typically accounts for seating a certain percentage of passengers, with the remaining passengers either not in the holdroom area or standing. The analysis assumed 15 SF per seated passenger and 10 SF per standing passenger. The Model also includes some flexibility to account for amenities (e.g., children's play area, workstations, charging stations, mother's rooms, and in some cases, service animal relief areas etc.), and high utilization and holdroom sharing, when the holdroom is utilized for passengers waiting for more than one flight or is shared between gates. Other assumptions include:

- 80 percent of passengers are seated
- 20 percent of passengers are standing

- No sharing of holdroom space with adjacent gates (there is only one hold room under
- existing conditions)

Allowances for amenities, circulation, and restrooms are assumed to be 5 percent, 35 percent, and 15 percent, respectively.

Inbound Baggage Handling and Baggage Claim

Inbound baggage handling includes the unloading of baggage from aircraft and transferring them to the baggage claim unit for circulation to the baggage claim hall. The Model calculates baggage claim requirements assuming that a certain percentage of passengers will deplane in a peak 30-minute period. As previously noted, it is also assumed that 65 percent of passengers will check one bag. Much of the assumptions and analysis in the model assumes some sort of baggage claim device other than a chute, which is currently used at the Airport. The resulting baggage claim requirements are reflective of a more standardized claim device, which would become necessary with increased activity. Additionally, the following assumptions are made:

- An additional 10 percent is applied to the number of passengers checking bags to account for meters and greeters
- 1.3 LF of claim is required for each person in the claim lobby
- Baggage claim area is increased by 15 percent to provide for baggage services office
- Baggage claim area is increased by 15 percent to provide for meet and greet area
- Baggage claim area is increased by 20 percent to provide for circulation space
- Baggage claim area is increased by 10 percent to provide for restroom facilities

To account for inbound baggage handling area the following assumptions are made:

- Take off belts require 850 SF of space each
- Baggage train circulation requires 1,275 SF of per take off belt
- 255 SF per take off belt is provided to account for conveyor belts equipment and other miscellaneous equipment

Some of these areas supporting the inbound baggage delivery do not necessarily need to be within the building envelope as the offloading of baggage on the backside of the baggage carousel does not need to occur indoors based on the climate conditions.

Concessions

Terminal concessions include both non-secure and secure area retail establishments to service departing and arriving passengers. This

assessment is generalized due to the low activity and limited existing concessions at the airport. The Model makes the following assumptions to calculate spatial requirements:

- Food and beverage-based concessions require seven SF per peak hour passenger
- Retail based concessions requires 3.5 SF per peak hour passenger
- Service based concessions require 0.5 SF per peak hour passenger
- A multiplier of 20-30 percent is used to account for support space for food, beverage, and retail concessions
- Internal circulation area allowance of 15 percent is also included for terminal building concession areas

While the primary concession at the Airport is currently vending, the output of this analysis is reflective of a significant additional need for concessions in the terminal. As demand grows beyond existing levels the nature of the concessions are expected to evolve into the more traditional food and beverage type which would consist of prepared foods cold storage and likely a kitchen and supporting utilities. Even under the higher demand scenarios it is likely that the concession will support food and beverage needs to both the secure and non-secure terminal elements.

Other Terminal Support Facilities

The final consideration of passenger terminal functional areas includes allowances for the various support areas.

A provision of five percent of the total departure/arrival areas is provided for the following:

- Airline operations
- Ground handling services
- Airport operations and maintenance
- Facilities support and services

A provision of ten percent of the total departure/arrival areas is provided for the following:

- Building structure
- Vertical circulation
- Mechanical/electrical/utility
- Allowance for other tenants/configurations

III. SUMMARY OF TERMINAL FACILITY REQUIREMENTS

The results of the terminal facility requirements model are summarized by PAL in **Table 7-3**. The results are based on the assumptions and methods of calculation as detailed above using the ACRP model.

According to the analysis, the existing terminal is approximately 50% undersized for existing demand levels of commercial service passenger traffic. Through the planning period, as soon as funding is available, a terminal expansion should be planned for a minimum of PAL 2, with consideration for expansion to meet the space requirements of PAL 3 and 4, which may reflect passenger terminal traffic levels by 2040. The existing elements that immediately require expansion include outbound baggage screening and makeup, the passenger security screening checkpoint, holdroom space, baggage claim, and perhaps most drastically, concessions. The existing concessions area at the terminal consists only of vending machines, and expanded concessions was one of the main requests of passengers through the passenger survey.

A terminal expansion should be planned as soon as possible to bring the size requirements within the range of PAL 2 at least. This represents at least a doubling of the existing total space of the terminal.

Table 7-3: Summary of Passenger Terminal Facility Requirements

Terminal Functional Area	Existing Provision	PAL 1	PAL 2	PAL 3	PAL 4
Check-In /Ticketing	3,585	1,173	2,072	2,241	3,126
Outbound Baggage Screening & Makeup	872	3,115	3,115	4,357	4,357
Passenger Security Screening Checkpoint	2,962	6,259	8,735	9,125	11,449
Secure Holdrooms	4,747	7,146	10,406	12,724	15,076
Baggage Claim and Inbound Baggage Handling	5,577	8,126	8,573	9,316	10,070
Concessions	502	4,168	5,256	5,256	6,609
Circulation	5,541	4,081	5,602	7,370	8,723
Tenants	2,095	3,013	4,058	4,642	5,544
Other Functions	3,831	15,063	20,289	23,211	27,722
Total Passenger Terminal Requirement	29,712	52,144	68,106	78,242	92,676
Passenger Terminal Requirement Range	N/A	50,000-60,000	65,000-75,000	75,000-85,000	90,000-100,000

Source: McFarland Johnson analysis, 2021.

IV. TERMINAL LANDSIDE ELEMENTS

In order to access the passenger terminal, passengers may park in the adjacent parking lot or be dropped off/picked up at the terminal curb. Employees that work in the terminal building may also use the adjacent parking lot to access the terminal. Through the planning period, as commercial service traffic is expected to increase, it is crucial to expand terminal parking and curb to accommodate the additional passengers and employees that will be using the terminal.

- Automobile Parking (Passengers and Employees)
- Terminal Curb

Automobile Parking

An automobile parking lot for commercial service passengers and employees is located across from the passenger terminal building. The lot contains approximately 1,000 parking spaces, including 18 handicap spaces. Through the planning period, as passenger enplanements rise, additional parking spaces will be needed to accommodate the demand.

An analysis of required parking spaces was completed using the PALs to determine when, and how many, additional spaces will be required. Using assumptions based on passenger survey data taken during the time of this study, a demand estimate was created. The assumptions are listed below:

- Average party size: 2.5 passengers
- 45% of enplanements using terminal parking lot
- 10% arriving by rental car
- 20% pick-up/drop-off in parking lot
- 20% pick-up/drop-off at curb
- 5% TNC/hotel shuttle/other
- 25% of a daily average of enplaned passengers are employees who use the terminal parking lot

The number of cars per enplanement was calculated with the assumption that 45% of annual enplaned passengers will park their car at the terminal parking lot, with an average of 2.5 passengers per car. This average daily demand is multiplied by five to reflect an average duration of five days parked at the airport. This represents the average daily parking demand, peak periods such as holidays and school vacation weeks may be slightly higher.

20% of enplaned passengers do not leave their car at the parking lot for a period of five days, so a single-day average was determined using the same method. 20% of annual enplanements park their car for a

single day at the parking lot, with an average of 2.5 passengers per car, over a single day in the year.

At any given time throughout the year, it is assumed that 25% of the daily average of enplaned passengers are employees who also use the terminal parking lot.

The total demand of the parking lot for a single day at the Airport is given by adding the demand of the five-day average parked cars, single-day average parked cars, and single-day employee parked cars. Given the parking lot has an existing 1,000 available spaces, TABLE XX shows when additional parking spaces will need to be constructed in order to keep up with the growing demand.

Recommendation: At each PAL, it will be necessary to construct an additional 500 parking spaces to accommodate demand at the Airport. Although the demand model does not indicate that 500 parking spaces will be needed at each PAL, it is important to provide additional spaces prior to the demand reaching the point where it created operational and customer experience disruptions.

Since the data and analysis includes all parking types, the construction of a dedicated employee lot outside of the revenue control system would delay the need for a passenger auto parking expansion by removing those users from, the lot.

Table 7-4: Automobile Parking Lot Requirements

	Enpl.	Cars	5-Day Avg.	ST Demand	Employee	Total Demand	Surplus/Shortage
PAL 1	140,000	25,200	345	31	96	472	528
	160,000	28,800	395	35	110	539	461
	180,000	32,400	444	39	123	607	393
	200,000	36,000	493	44	137	674	326
	220,000	39,600	542	48	151	741	259
	240,000	43,200	592	53	164	809	191
PAL 2	260,000	46,800	641	57	178	876	124
	280,000	50,400	690	61	192	944	56
	300,000	54,000	740	66	205	1011	-11
	320,000	57,600	789	70	219	1078	-78
	340,000	61,200	838	75	233	1146	-146
	360,000	64,800	888	79	247	1213	-213
PAL 3	380,000	68,400	937	83	260	1281	-281
	400,000	72,000	986	88	274	1348	-348
	420,000	75,600	1036	92	288	1415	-415
	440,000	79,200	1085	96	301	1483	-483
	460,000	82,800	1134	101	315	1550	-550
	480,000	86,400	1184	105	329	1618	-618
PAL 4	500,000	90,000	1233	110	342	1685	-685
	520,000	93,600	1282	114	356	1752	-752
	540,000	97,200	1332	118	370	1820	-820
	560,000	100,800	1381	123	384	1887	-887
	580,000	104,400	1430	127	397	1955	-955
	600,000	108,000	1479	132	411	2022	-1022

Source: McFarland Johnson analysis, 2021.

Vehicle Demand at Terminal Curb

Vehicle demand is measured based on the range of vehicle types used by passengers as ground transport to an airport for departing flights. These include everything from private automobiles typically carrying one to three passengers to tour buses carrying large groups of passengers. While some hotel shuttles and buses may drop off and pick up passengers, they are infrequent in nature and also not overly common at other similar sized airports, therefore the focus is placed on the use and operation of personal vehicles and/or those that share the size and characteristics of such.

The estimated passenger breakdown by landside mode is as follows:

- Parking lots: 45 percent
- Pick-up/drop-off at parking lot: 20 percent
- Pick-up/drop-off at curb: 20 percent
- TNCs/hotel shuttle/other: 5 percent
- Rental cars: 10 percent

In addition to this breakdown, the analysis also assumes an average party size of 2.5 people for parked vehicles and those involved in personal pick-ups and drop offs. Rental cars, taxis and TNCs (Uber, Lyft, etc.) all assume one passenger per transaction.

The existing terminal curb is approximately 450 feet in length. Of the total length, the northern portion is more associated with departing traffic and the southern portion more associated with arriving traffic with the center portion used by both. Arriving passengers will likely be picked up at a point that is close to the passenger terminal exit, while departing passengers will be dropped off at a point that is close to the passenger terminal entrance. To account for this, the analysis considers approximately 250 LF (linear feet) are associated with passenger pick-up/drop-off. Although the curb is 450 LF, it is unreasonable for all 450 LF to be considered suitable for an entire function (i.e., the northern position of the curb being used for arrivals).

Table 7-5 details the terminal curb requirements based on PALs and the number of annual passenger enplanements. It is assumed that the number of cars using the terminal curb per day is 20% of the average daily number of enplaned passengers, and the peak hour of cars using the curb is 25% of the cars per day. The peak 10-minute curb length is assumed to be 25% of the peak hour of cars using the curb, multiplied by an average of 25 feet per car.

The peak 10-minute curb length can be used to determine a surplus/deficit of curb length by using the existing total curb length of 450 LF as well as the realistic pick-up/drop-off length of 250 LF.

Table 7-5: Terminal Curb Requirements

	Enplanements	Curb PH	Length	Surplus/Deficit	Realistic
PAL 1	140,000	19	120	330	130
	160,000	22	137	313	113
	180,000	25	154	296	96
	200,000	27	171	279	79
	220,000	30	188	262	62
	240,000	33	205	245	45
	260,000	36	223	227	27
PAL 2	280,000	38	240	210	10
	300,000	41	257	193	-7
	320,000	44	274	176	-24
	340,000	47	291	159	-41
	360,000	49	308	142	-58
	380,000	52	325	125	-75
	400,000	55	342	108	-92
PAL 3	420,000	58	360	90	-110
	440,000	60	377	73	-127
	460,000	63	394	56	-144
	480,000	66	411	39	-161
	500,000	68	428	22	-178
PAL 4	520,000	71	445	5	-195
	540,000	74	462	-12	-212
	560,000	77	479	-29	-229
	580,000	79	497	-47	-247
	600,000	82	514	-64	-264

Note: Values in Linear Feet (LF).

Source: McFarland Johnson analysis, 2021.

Recommendation: At PAL 3, it is recommended to expand the total curb length between 250 and 300 LF or add an equivalent sized island to separate pick-up/drop-off passengers and TNCs/other forms of transportation.