AIRPORT MASTER PLAN

Working Paper No. 2

COCHISE COUNTY AIRPORT

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ARMSTRONG

Chapter Three
Facility Requirements

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3.1 INTRODUCTION

This chapter identifies the requirements for airfield and landside facilities to accommodate the forecast demand level at Cochise County Airport. In order to meet the demand levels, an assessment of the ability of existing airport facilities to meet current and future demand is needed. The facility requirements will be based on information derived from capacity and demand calculations, information from FAA advisory circulars and design standards, the sponsor's vision of the future of the airport, the condition and functionality of existing facilities, and other pertinent information.

Facility requirements have been developed for the various airport functional areas listed below:

- General aviation requirements
- Support facilities
- Ground access, circulation, and parking requirements
- Infrastructure and utilities
- Land use compatibility and control

The time frame for addressing development needs usually involves short-term (up to five years), medium-term (six to ten years), and long-term (eleven to twenty years) planning periods. Long-term planning primarily focuses on the ultimate role of the airport and is related to development. Medium-term planning focuses on a more detailed assessment of needs, while the short-term analysis focuses on immediate action items. Most important to consider is that a good plan is one that is based on actual demand at an airport rather than time-based predictions. Actual activity at the airport will vary over time and may be higher or lower than what the demand forecast predicts. Using the three planning milestones (short-term, medium-term, and long-term) the airport sponsor can make an informed decision regarding the timing of development based on the actual demand. This approach will result in a financially responsible and demand-based development of the Cochise County Airport.

3.2 DESIGN STANDARDS

Airport design standards provide basic guidelines for a safe, efficient, and economic airport system. The standards cover the wide range of size and performance characteristics of aircraft that are anticipated to use an airport. Various elements of airport infrastructure and their functions are also covered by these standards. Choosing the correct aircraft characteristics for which the airport will be designed needs to be done carefully so that future requirements for larger and more demanding aircraft are taken into consideration, while at the same time remaining mindful that designing for large aircraft that may never serve the airport is not economical.

As discussed previously in Chapter 1, Section 1.13, the Runway Design Code (RDC) is one component of the FAA's design standards. The RDC can be used to determine the necessary facility requirements. Examples of various aircraft meeting the design standards for a RDC of A-I and B-I are illustrated on **Table 3-1**, and examples of aircraft with a RDC of A-II and B-II are depicted in **Table 3-2.** For the purpose of this Chapter, examples of the remaining Airplane

Design Group (ADG) categories of C, D, and E aircraft and their corresponding approach categories (I, II, III, etc.) are not depicted due to their infrequent use of the Airport; the sample aircraft provided below are those that are likely to use the Airport on a regular basis.

TABLE 3-1 RDC OF A-I OR B-I (SAMPLE AIRCRAFT)

Aircraft	Approach Speed (knots)	Wingspan (feet)	Tail Height (feet)	Max T.O. Weight (pounds)
Beech Baron 58P	101	37.8	9.1	6,200
Beech Bonanza V35B	70	33.5	6.6	3,400
Cessna 150	55	33.3	8.0	1,670
Cessna 172	60	36.0	9.8	2,200
Cessna 182	64	36.0	9.2	2,950
Cessna 340	92	38.1	12.2	5,990
Cessna 414	94	44.1	11.5	6,750
Cessna Citation I	108	47.1	14.3	11,850
Gates Learjet 28/29	120	42.2	12.3	15,000
Mitsubishi MU-2	119	39.1	13.8	10,800
Piper Archer II	86	35.0	7.4	2,500
Piper Cheyenne	110	47.6	17.0	12,050
Rockwell Sabre 40	120	44.4	16.0	18,650
Raytheon Beechjet	105	43.5	13.9	16,100
Eclipse 500 Jet	90	37.9	13.5	5,920

Source: FAA AC 150/5300-13A, *Airport Design*

TABLE 3-2 RDC OF A-II OR B-II (SAMPLE AIRCRAFT)

Aircraft	Approach Speed (knots)	Wingspan (feet)	Tail Height (feet)	Max T.O. Weight (pounds)
Air Tractor 802F	105	58.0	11.2	16,000
Beech King Air C90-1	100	50.3	14.2	9,650
Beech King Air B100	111	45.9	15.3	11,799
Cessna 441	100	49.3	13.1	9,925
Cessna Citation II	108	51.6	15.0	13,300
Cessna Citation III	114	50.6	16.8	17,000
Dassault Falcon 50	113	61.9	22.9	37,480
Dassault Falcon 200	114	53.5	17.4	30,650
Dassault Falcon 900	100	63.4	24.8	45,500
DHC-6 Twin Otter	75	65.0	19.5	12,500
Grumman Gulfstream I	113	78.5	23.0	35,100
Pilatus PC-12	85	52.3	14.0	9,920

Source: FAA AC 150/5300-13A, *Airport Design*

As discussed in Chapter 1, the approved 1997 Master Plan for the Airport indicated that the existing RDC for Runway 3-21 is B-II, and the existing design aircraft is a light, turboprop (<12,500 pounds). An example of a light, turboprop aircraft weighing less than 12,500 pounds is the Beechcraft King Air F90 or B100. The RDC and design aircraft for Runway 14-32 (the crosswind runway) were not discussed in Chapter 1 due to the fact that Runway 14-32 has been closed and nonoperational for some time. However, based on a review of the Airport's existing and forecasted aircraft operations and discussions with airport management, it is recommended that the RDC for Runway 14-32 be established as B-I (small). An example of a B-I (small) design aircraft would be a light, twin-engine propeller aircraft weighing less than 12,500 pounds, such as the Piper Navajo.

Without adequate operations data for each runway, an exact design aircraft cannot be established. Based on existing and forecasted demand levels, these aircraft represent the most likely types of aircraft to use the facility in the planning period. Thus, it is recommended to maintain the existing RDC of B-II for Runway 3-21 for this Master Plan. Likewise, it is recommended that the RDC for Runway 14-32 be established as B-I (small). RDC design standards for both B-I (small) and B-II will be applied to the existing and ultimate development plans for the Cochise County Airport.

3.3 AIRFIELD CAPACITY

The airfield capacity analysis is determined by using an airport's annual service volume (ASV). An airport's ASV has been defined by the FAA as "a reasonable estimate of an airport's annual capacity. It accounts for differences in runway use, aircraft mix, weather conditions, etc., that would be encountered over a year's time." Therefore, ASV is a function of the hourly capacity of the airfield and the annual, daily, and hourly demands placed upon it. According to FAA AC 150/5060-5, *Airport Capacity and Delay*, the ASV for a single runway configuration is approximately 230,000 operations. The ASV for a single runway configuration is being used for Cochise County Airport because Runway 3-21 is currently the only runway in operation (Runway 14-32 is closed and not currently in use on the airfield).

At Cochise County Airport the ASV is estimated to be 13,450 aircraft operations (landings and takeoffs) for present conditions. Compared to the projection of 16,678 operations by the year 2033, it is evident that airfield capacity is not a constraining factor to growth of the airport. Therefore, no additional runways are needed (from a capacity perspective) to accommodate the existing or forecasted activity. Table 3-4 summarizes the ASV relationship developed in this Section.

TABLE 3-4 ANNUAL SERVICE VOLUME SUMMARY

Year	Annual Operations	Annual Service Volume[1]	Annual Capacity Ratio
2013	13,450	230,000	5.8%
2023	15,064	230,000	6.5%
2033	16,678	230,000	7.2%

[1]FAA AC 150/5060-5, *Airport Capacity and Delay*

3.4 AIRSIDE FACILITY REQUIREMENTS

All airports are comprised of both airside and landside facilities as presented in Chapter 1. Airside facilities consist of those facilities that are related to aircraft arrival, departure, and ground movement, along with all associated navigational aids, airfield lighting, pavement markings, and signage.

3.4.1 RUNWAY LENGTH

There are many factors that may determine the runway length for an airport. FAA AC 150/5325-4B, *Runway Length Requirements for Airport Design*, provides guidance for determining runway length requirements. The information required to determine the recommended runway length(s) includes airfield elevation, mean maximum temperature of the hottest month, and the effective gradient for the runway. Also, the performance characteristics and operating weight of an aircraft impacts the amount of runway length needed. The following information for the Cochise County Airport was used for the analysis:

- Field elevation: 4,187 mean sea level (MSL)
- Mean maximum temperature of hottest month (July): 95° F
- Effective Runway 3-21 gradient: 1 foot
- Effective Runway 14-32 gradient: 3 feet
- Performance characteristics and operating weight of aircraft

The process to determine recommended runway lengths for a selected list of critical design aircraft begins with determining the weights of the critical aircraft that are expected to use the airport on a regular basis. For aircraft weighing 60,000 pounds or less, the runway length is determined by family groupings of aircraft having similar performance characteristics. The first family grouping is identified as small aircraft, which is defined by the FAA as aircraft weighing 12,500 pounds or less at Maximum Takeoff Weight (MTOW). The second family grouping is identified as large aircraft, which is defined by the FAA as aircraft exceeding 12,500 pounds but weighing less than 60,000 pounds. For aircraft weighing more than 60,000 pounds, the

required runway length is determined by aircraft-specific length requirements. **Table 3-5** depicts the aircraft weight categorization as recommended by the FAA.

TABLE 3-5 AIRPLANE WEIGHT CATEGORIZATION FOR RUNWAY LENGTH REQUIREMENTS

Airplane Weight Category Maximum MTOW			Design Approach
≤ 12,500 Pounds	Approach Speed < 30 knots		Family groupings of small airplanes
	Approach Speed ≥ 30 knots, but < 50 knots		Family groupings of small airplanes
	Approach Speed ≥ 50 knots	With < 10 Passengers	Family groupings of small airplanes
		With ≥ 10 Passengers	Family grouping of small airplanes
Over 12,500 pounds, but < 60,000 pounds			Family groupings of large airplanes
≥ 60,000 pounds or more, or Regional Jets[1]			Individual large airplane
Note[1]: All regional jets, regardless of their MTOW, are assigned to the 60,000 pounds or more weight category.			

Source: FAA AC 150/5325-4B, *Runway Length Requirements for Airport Design*

Recommended runway lengths are determined using charts in FAA AC 150/5325-4B, *Runway Length Requirements for Airport Design*, based on the seating capacity and the mean daily maximum temperature of the hottest month of the year at the airport. The small airplanes with the approach speed of greater than or equal to 50 knots with less than 10 passengers seats and a Maximum Takeoff Weight (MTOW) less than 12,500 pounds recommends a runway length of 5,480 feet in order to accommodate 95 percent of the fleet; the 95 percent of fleet category applies to airports that are primarily intended to serve medium size population communities with a diversity of usage and greater potential for increased aviation activities. Also included in this category are those airports that are primarily intended to serve low-activity locations, small population communities and remote recreational areas. The approach speed of greater than or equal to 50 knots with less than 10 passenger seats and a MTOW less than 12,500 pounds recommends a runway length of 5,790 feet in order to accommodate 100 percent of the aircraft fleet. The 100 percent of fleet category is a type of airport that is primarily intended to serve communities located on the fringe of a metropolitan area or a relatively large population remote from a metropolitan area. With an existing runway length of 6,095 feet, Runway 3-21 can accommodate 100 percent of the small airplanes.

Recommended runway lengths to serve large aircraft weighing over 12,500 pounds, but less than 60,000 pounds, are determined using a certain percentage of the useful load. The term useful load, as defined by the FAA, is the difference between the maximum allowable structural gross weight and the operating empty weight. A typical operating empty weight includes the airplane's empty weight, crew, baggage, other crew supplies, removable passenger service equipment, removable emergency equipment, engine oil and unusable fuel. According to the above referenced Advisory Circular, 75 percent of fleet at 60 and 90 percent useful load requires runway lengths of 6,440 feet and 8,610 feet respectively. The Advisory Circular indicates that 100 percent of the fleet at 60 and 90 percent useful load requires runway lengths of 9,420 feet and 10,840 feet respectively. To accommodate 75 percent of aircraft at 60 percent useful load weighing 60,000 pounds or less, a runway length of 6,440 feet is recommended.

Based on the analysis, the potential need to extend the runway in the planning period exists. However, if the types and frequencies of operations change significantly at the airport, the need to revisit the runway length analysis may be warranted. **Table 3-6** provides the recommended runway length information.

TABLE 3-6 RECOMMENDED RUNWAY 3-21 LENGTH

Description	Runway Length (ft)
Existing Runway 3-21 Length	6,095
Recommended to accommodate:	
Small Aircraft (<12,500 lbs.,< 10 passenger)	
75 percent of these small airplanes	4,170
95 percent of these small airplanes	5,480
100 percent of these small airplanes	5,790
Large Aircraft (<60,000 lbs.)	
75 percent of these planes at 60 percent useful load	**6,440 (recommended)**
75 percent of these planes at 90 percent useful load	8,610
100 percent of these planes at 60 percent useful load	9,420
100 percent of these planes at 90 percent useful load	10,840
Aircraft More than 60,000 lbs.	6,480 (approx.)

Source: FAA AC 150/5325-4B, *Runway Length Requirements for Airport Design*

Takeoff Distance Requirements: When determining runway length requirements for an airport, it is necessary to consider the types of aircraft (aircraft design group and critical aircraft) that will be using the airport and their respective takeoff distance requirements. Examples of takeoff distance requirements for several aircraft likely to use Cochise County Airport are illustrated in **Figure 3-1**. Examples of takeoff distance requirements for the crosswind runway are not provided as Runway 3-21 (the primary runway) is viewed as the most important runway that will drive growth at the airport.

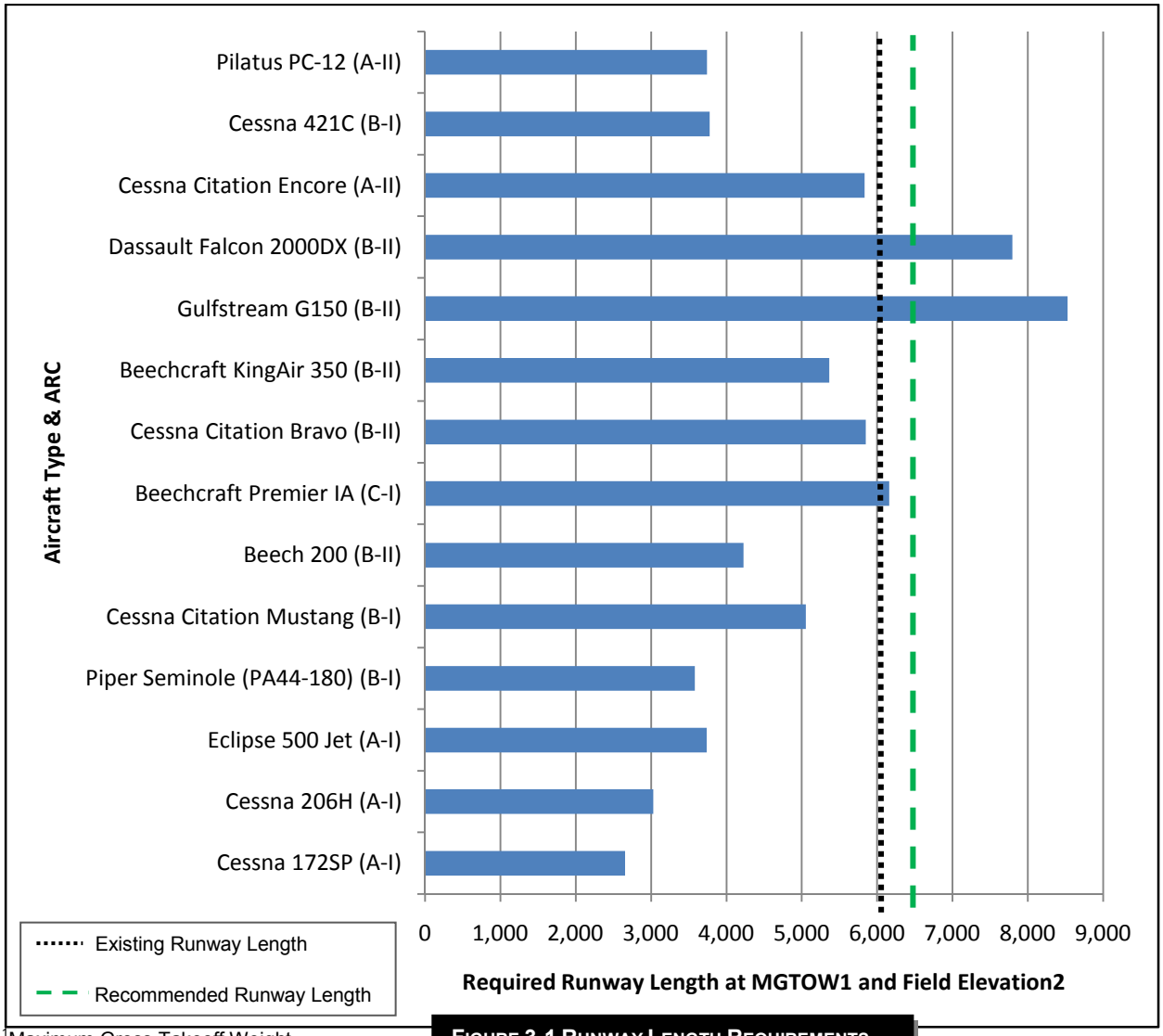

FIGURE 3-1 RUNWAY LENGTH REQUIREMENTS

[1]Maximum Gross Takeoff Weight
[2]4,187 feet MSL
Source: ACI

The Alternatives chapter will present various concepts for achieving the recommended runway length while taking into consideration any site constraints and potential environmental impacts.

3.4.2 RUNWAY ORIENTATION

The FAA recommends that a runway's orientation provide at least 95 percent crosswind coverage for A-I, B-I, A-II, and B-II aircraft according to the FAA Advisory Circular 150/5300-13A, *Airport Design*. Based on the wind data presented in **Table 1-12** in Chapter 1, the existing primary runway, Runway 3-21, only provides 89.2 percent wind coverage for A-I and B-I aircraft (10.5 knots) and 93.7 percent wind coverage for A-II and B-II aircraft (13 knots).

At one point Runway 14-32 was the designated crosswind runway on the airfield. However, Runway 14-32 has been closed for some time due to the deteriorating condition of the pavement. According to the wind data presented in **Table 1-12** in Chapter 1, when in operation, Runway 14-32 provides 94.3 percent wind coverage for A-I and B-I aircraft (10.5 knots) and 97.1 percent wind coverage for A-II and B-II aircraft (13 knots). Furthermore, if one were to assume the existing runway configuration for the airfield also included Runway 14-32, the combined wind coverage would be 98.5 percent at 10.5 knots, and 99.7 percent at 13 knots.

The FBO, along with various users of the airport, are in favor of having Runway 14-32 reopened. Therefore, adequate justification and support exist to recommend that Runway 14-32 be reconstructed and reopened as the designated crosswind runway on the airfield.

The FAA AC 150/5325-4B, *Runway Length Requirements for Airport Design*, recommends the same guidelines be followed to determine the recommended runway length for crosswind runways. For airplanes with lesser crosswind capabilities, it is recommended that a crosswind runway to accommodate 100 percent of small aircraft be provided. To accommodate 100 percent of small aircraft weighing less than 12,500 pounds, a runway length of 5,790 feet is recommended. **Table 3-7** provides the recommended runway length information.

TABLE 3-7 RECOMMENDED (CROSSWIND) RUNWAY 14-32 LENGTH

Description	Runway Length (ft)
Existing Runway 14-32 Length	6,100 (closed)
Recommended to accommodate:	
Small Aircraft (<12,500 lbs.,< 10 passenger)	
75 percent of these small airplanes	4,170
95 percent of these small airplanes	5,480
100 percent of these small airplanes	**5,790 (recommended)**
Large Aircraft (<60,000 lbs.)	
75 percent of these planes at 60 percent useful load	6,460
75 percent of these planes at 90 percent useful load	8,630
100 percent of these planes at 60 percent useful load	9,440
100 percent of these planes at 90 percent useful load	10,860
Aircraft more than 60,000 lbs.	6,480 (approx.)

Source: FAA AC 150/5325-4B, *Runway Length Requirements for Airport Design*

The Alternatives chapter will present various concepts for achieving the recommended crosswind runway length taking into consideration any site constraints and potential environmental impacts.

3.4.3 RUNWAY WIDTH

The required runway width is a function of airplane approach category, airplane design group, and the approach minimums for the design aircraft expected to use the runway on a regular basis.

The existing runway pavement width of 75 feet for Runway 3-21 meets the existing and future FAA design standards and should be maintained for the planning period. According to the 1997

Master Plan, the existing runway pavement width for Runway 14-32 is 150 feet. Based on the proposed RDC of B-I (small) discussed in Section 3.2, Runway 14-32 should be reconstructed to a width of 60 feet.

3.4.4 RUNWAY PAVEMENT STRENGTH

According to FAA guidance on pavement strength, what aircraft types and the critical aircraft expected to use the airport during the planning period are used to determine the required pavement strength, or weight bearing capacity, of airfield surfaces. The required pavement design strength is an estimate based on average levels of activity and is expressed in terms of aircraft landing gear type and configurations. Pavement design strength is not the maximum allowable weight; limited operations by heavier aircraft other than the critical aircraft may be permissible. It is important to note that frequent operations by heavier aircraft will shorten the lifespan of the pavement.

The existing runway pavement strength is:

- Runway 3-21 - 50,000 pounds gross weight single-wheel landing gear and 75,000 pounds gross weight dual-wheel landing gear.
- Runway 14-32 - Unknown

Based upon the existing and planned RDC, and the aircraft most likely to use the airport on a regular basis (illustrated in Tables 3-1 and 3-2), the pavement strength rating for Runway 3-21 appears adequate. Many B-II aircraft likely to use Runway 3-21 have a maximum takeoff weight of 12,500 pounds or less. Thus, for planning purposes, the existing pavement strength for Runway 3-21 should be maintained for the planning period. The pavement strength for 14-32 should be constructed to support 12,500 pounds gross weight single-wheel landing gear in order to accommodate the majority of light, single- and twin-engine propeller aircraft found within the B-I and A-I RDC categories.

3.4.5 TAXIWAY AND TAXILANE REQUIREMENTS

By definition, a taxiway is a defined path established for the taxiing of aircraft from one part of an airport to another. A taxilane is a taxiway designated for low speed and precise taxiing. Taxilanes are usually, but not always, located outside the movement area, providing access from taxiways to aircraft parking positions, hangars, and terminal areas.

FAA AC 150/5300-13A, Airport Design, provide planners with guidance on recommended taxiway and taxilane layouts to avoid runway incursions and to enhance the overall safety at the airport. According to the FAA, a runway incursion is “any occurrence at an airport involving the incorrect presence of an aircraft, vehicle, or person on the protected area of a surface designated for the landing and takeoff of aircraft.”

According to Airport Design, “good airport design practices keep taxiway intersections simple by reducing the number of taxiways intersecting at a single location and allows for proper placement of airfield markings, signage and lighting.” Existing taxiway geometry should be

improved whenever feasible with emphasis on “hot spots,” and to the extent practical, the removal of existing pavement to correct confusing layouts should be permissible.

As discussed previously in Chapter 1, Section 1.13, to arrive at the best TDG, the undercarriage dimensions of the aircraft are used. The TDG design standards are based on the overall Main Gear Width (MGW) and the Cockpit to Main Gear (CMG) distance. Taxiway/taxilane width and fillet standards, and in some instances, runway to taxiway and taxiway/taxilane separation requirements, are determined by the TDG. The FAA advises that it is appropriate for a series of taxiways on an airport to be built to a different TDG standards based on anticipated use.

The northern portion of Taxiway A that is currently in use is 35 feet wide, categorizing it in TDG 2. Although it was designed under the previous FAA AC 150/5300-13 (Change 17), Airport Design, the existing standard still applies under the new FAA AC 150/5300-13A, Airport Design. Based on the design aircraft and RDCs for Runways 3-21 and the proposed Runway 14-32, it is recommended that all future taxiways and taxilanes should meet TDG 2 design standards for the Cochise County Airport (with the exception of where aircraft access the existing T-hangar area.) The extension of Taxiway A from approximately mid-field to the Runway 3 end is currently under design and is expected to be constructed in 2014. This new taxiway will be designed to meet FAA design standards for TDG 2. No other construction is planned to take place in 2014.

As discussed in Section 1.17.2, there are areas in the vicinity of the existing terminal building and the existing T-hangars that do not meet TDG 2 standards. In this area only, it is recommended that TDG 1 standards be applied because only small aircraft (RDC A-I) operate in this area.

The Alternatives chapter will consider various taxiway and taxilane layout configurations to improve access to and from the aprons, hangars, and the terminal/FBO building.

3.4.6 AIRCRAFT APRON

An aircraft apron is typically located in the non-movement area of an airport near or adjacent to the terminal area. The function of an apron is to accommodate aircraft during loading and unloading of passengers and/or cargo. Activities such as fueling, maintenance, and short to long-term parking take place on an apron. The layout and size of an apron depends on aircraft and ground vehicle circulation needs and specific aircraft clearance requirements. There are several types of aircraft aprons:

- **Terminal / itinerant aircraft apron** – These aprons are adjacent to the terminal where passengers board and deplane from the aircraft. The apron also accommodates multiple activities such as fueling, maintenance, limited aircraft service, etc. Itinerant aprons handle itinerant aircraft activities which are usually only on the airport for a few days. The apron will also accommodate some larger itinerant aircraft. At general aviation airports, this type of apron can also provide some tie-down locations for both itinerant and based aircraft.

- **Tie-down apron** – Aircraft requiring a place to tie-down for both short-term and long-term parking (based and itinerant aircraft).

- **Other services apron** – Apron areas that will accommodate aircraft servicing, fueling, and the loading/unloading of cargo.

- **Hangar aprons** – This is an area on which aircraft move into and out of a storage hangar.

FAA AC 150/5300-13A, *Airport Design*, provides design criteria to assist in apron layout and capacity. For the purpose of calculating the necessary apron size, the following planning criterion was used:

- 800 square yards of apron per aircraft for single-engine and multi-engine aircraft
- 1,500 square yards per aircraft for turboprops and business jets
- 5,000 square yards per aircraft for larger firefighting aircraft
- 20% of single-engine (forecasted) based aircraft will require apron parking
- 10% of multi-engine (forecasted) based aircraft will require apron parking
- Itinerant aircraft apron requirements are based on the design hour operations

Based on the above criterion, additional aircraft apron may be required for the planning period. Depending on the County's desire to reserve a dedicated area on the apron for firefighting aircraft activity, additional apron may be needed in the short term. The County should monitor the utilization of the apron and based on the above criterion, make adjustments in the apron size as needed. However, it is recommended that reconstruction and pavement maintenance projects take place on the existing apron as needed. The Alternatives chapter will consider various aircraft parking apron layouts to maximize the use of the existing apron and determine where additional apron pavement can be constructed. **Table 3-8** depicts the aircraft apron requirements.

TABLE 3-8 AIRCRAFT APRON REQUIREMENTS

Aircraft Apron Requirements	Year				
	Available in 2013	2018	2023	2028	2033
Existing Parking Positions (including shaded parking)	26	-	-	-	-
Parking Positions For SE/ME Aircraft	-	5	6	6	6
Parking Positions For Turboprops and Business Jets	-	2	3	3	3
Parking For Fire Fighting Aircraft	-	1	1	1	1
Based Aircraft Apron Area (sy)[1]	-	12,000	14,300	14,300	14,300
Itinerant Aircraft Apron Area (sy)[1]	-	6,450	6,688	7,166	7,405
Total Aircraft Apron Area (sy)[1]	13,390	18,450	20,988	21,466	21,705

Note. Apron development will depend on actual demand
[1]Apron requirements based on 800 square yards x the design hour operations
Source: ACI

3.4.7 INSTRUMENT AIDS TO NAVIGATION

Non-precision Global Positioning System (GPS) approaches do not require ground-based facilities on or near the airport for navigation. The GPS receiver uses satellites for navigation. Therefore, it involves little or no cost for the airport sponsor. GPS was developed by the United States Department of Defense for military use and is now available for civilian use. GPS approaches are rapidly being commissioned at airports across the United States, having approach minimums of as low as 350-foot ceilings and 1-mile visibility are typical for this type of approach. An instrument approach increases the utility of the airport by providing for the capability to operate in inclement weather conditions. This is especially important for air ambulance, physician transport and business flights. It is also useful for conducting training and maintaining instrument currency.

The Airport has two published non-precision, GPS instrument approach procedures serving Runway 3-21. These approaches should be maintained in the future as they provide all-weather capabilities for the airport.

3.4.8 AIRFIELD LIGHTING, SIGNAGE, MARKING AND VISUAL AIDS TO NAVIGATION

Based on findings from the airport inventory as discussed in Chapter 1, several recommendations for improvements to the airfield lighting, markings, signage, and visual aids to navigation are recommended for Cochise County Airport. These recommendations include the following:

Rotating beacon – The existing beacon appears to be in good condition; however, the steel tower it is located upon is dated and is reaching the end of its useful lifecycle. It is recommended that the beacon tower be replaced with a new tip-down tower. This will eliminate the need to climb the tower or use a bucket-truck to replace parts or conduct maintenance. The Alternatives chapter will discuss recommended locations for the new tower and airport beacon.

Segmented circle – The existing segmented circle is constructed of old automobile tires that have been painted white, and therefore does not meet design standards. A new segmented circle should be installed in accordance with FAA Advisory Circular 150/5340-5D, *Segmented Circles Airport Marker System*.

Runway 3-21 medium intensity runway lights (MIRL) – For the most part, the MIRLs appear to be in good condition. It was observed that two units are missing, and should be replaced.

Runway 14-32 medium intensity runway lights (MIRL) – When Runway 14-32 is reconstructed, it is recommended MIRLs be installed for improved safety on the airfield. It is recommended that all incandescent lighting be replaced with more energy efficient light emitting diode (LED) lighting; this is recommended for all future runway and taxiway lighting.

Runway 3-21 hold sign (lighted) panels – The runway hold panels (one located on Taxiway A-1 and one on Taxiway A-2) are faded and should be replaced.

Precision Approach Path Indicators (PAPI) – This approach lighting system assists pilots by providing visual glide scope guidance during non-precision approaches. These systems have an

effective visual range of three miles during the day and up to 20 miles at night. It is recommended that a four-box PAPI system be installed for both Runways 3 and 21.

Runway end identification lights (REIL) – These lights are (basically) strobe lights located near the runway threshold on both sides of the runway. The lights provide rapid identification of the runway threshold. The FAA recommends that a REIL system be installed at runway ends that do not have, or are not planning to have, an approach lighting system (ALS). It is recommended that a REIL system be installed on both ends of Runways 3-21 and 14-32. LED models are recommended for both REIL systems.

Taxiway edge lights and signage – To enhance safety and increase the reliability of the airport during nighttime operations, all taxiways should have medium intensity taxiway edge lights (MITL) and lighted airfield signage installed. As previously mentioned in Chapter 1, the remainder of Taxiway A from the midpoint of Runway 3-21 to the end of Runway 3 is anticipated to be reconstructed in July 2014. During this time, new medium intensity taxiway lights (MITL) will be installed, along with any required lighted signage. Furthermore, the existing taxiway reflectors located along Taxiway A are anticipated to be replaced with MITL sometime in 2015. LED models of MITL are recommended.

Taxiway, taxilane, and apron pavement markings – The taxiway, taxilane and apron pavement markings, including the open tie-down spaces, should be repainted.

3.4.9 WEATHER AIDS

Presently, the Airport does not have any on-airport weather aids, such as an Automated Weather Observing System (AWOS) or Automated Surface Observing System (ASOS). Based on conversations with the FBO and various airport users, there is support for an AWOS. Thus, an AWOS is recommended to be installed at the airport. The Alternatives chapter will discuss the various locations where a system can be located.

3.5 LANDSIDE FACILITY REQUIREMENTS

As presented in Chapter 2, the capacity, condition, and functionality of the various airport facilities were examined in relation to the anticipated aviation demand in order to identify future facility needs. Landside facilities are an important aspect of any airport as they handle aircraft and passengers while on the ground at the airport. Landside facilities serve as the processing interface between two modes of transportation - air and ground. Likewise, landside facilities also offer travelers the first impression of the airport and the local community.

3.5.1 TERMINAL BUILDING

The terminal building at general aviation airports typically offers various amenities to passengers, local and transient pilots, and airport management. Terminal buildings (often called pilot lounges at general aviation airports) most often house public restrooms, public telephones, a pilot's lounge area and information regarding airport services. The existing terminal building at the Cochise County Airport is utilized by the Airport's Fixed Base Operator (FBO) and transient

or local aircraft operators. It is recommended that an airport's terminal building be able to satisfy the forecasted peak hour general aviation pilot and passenger demand.

The accepted methodology used to project terminal building facility needs for general aviation airports is based on the number of airport users anticipated to use the facility during the design hour. The design hour is typically defined as the peak hour of an average day of the peak month. The design hour measures the number of passengers departing or arriving on aircraft in an elapsed hour of a typical busy (design) day. Estimating design hour passengers is typically a three-step process:

- Determine the peak month
- Determine the design day to be used
- Estimate the amount of daily activity (operations) that occurs in the design hour

The number of peak hour passengers and pilots was derived by assuming 3.4 passengers and pilots per design hour operation. The terminal function size is based on providing 150 square feet per peak design hour. This process is applied to both the existing (base year) conditions as well as activity in future years. **Table 3-9** depicts the terminal building requirements.

TABLE 3-9 GENERAL AVIATION TERMINAL BUILDING REQUIREMENTS

Year	Design Hour Operations	Peak Hour Pilots and Passengers	Terminal Function Size (sf)
2013	7	24	3,600
2018	8	27	4,000
2023	8	28	4,200
2028	9	31	4,650
2033	9	32	4,800

Source: ACI

As described in Chapter 1, the existing terminal building is approximately 2,250 square feet. As shown in **Table 3-9**, the existing terminal building may not be adequately sized for the forecasted activity. The FBO has also expressed some concern about the building's overall condition. Therefore, the County should consider either renovating or building a new terminal building in the planning period.

After the terminal building is renovated, and/or relocated, a recycling program should be put in place to reduce the solid waste that will be generated. The program should also be suggested as a requirement for each tenant. The County should also make sure that the dumpsters for the terminal building are adequately sized and coordinated with tenant activities to keep the overall number of dumpsters to a minimum, thereby reducing the waste haulers maneuvers and emissions on airport property.

The Alternatives chapter will consider various terminal concepts and present additional recommendations.

3.5.2 HANGAR FACILITIES

Prefabricated conventional and T-hangar units are available from a variety of manufacturers throughout the nation. Storage space for based aircraft was determined using guidelines suggested in manufacturer's literature. Typical aircraft sizes were also reviewed in light of the evolution of business aircraft sizes.

Conventional hangar standards:

- 1,200 square feet for single-engine aircraft
- 1,400 square feet for multi-engine aircraft
- 1,800 square feet for turboprop or turbojet aircraft

T-hangar standards:

- 1,400 square feet for single- and multi-engine aircraft

The above hangar criterion was applied to the based aircraft forecasts to determine the actual hangar area requirements for each hangar type. **Table 3-10** depicts the assumptions that were made regarding the type of hangar needed for each type of aircraft.

TABLE 3-10 BREAKDOWN OF AIRCRAFT STORAGE TYPES

Percent of aircraft type	Type of Storage
100% of turbojet	Conventional hangar
55% of multi-engine	Conventional hangar
35% of multi-engine	T-hangar
10% of multi-engine	Parking apron
20% of single-engine	Conventional hangar
60% of single-engine	T-hangar
20% of single-engine	Parking apron

Source: ACI

Using the above criterion, combined with consideration of the potential fleet mix, **Table 3-11** depicts the demand requirements for hangar space at Cochise County Airport. It should be noted that these requirements are not rigid, meaning that shifting of the space requirements between conventional and T-hangars is something that the County will need to consider as operations fluctuate and the need to satisfy user's specific requirements are identified.

TABLE 3-11 AIRCRAFT HANGAR REQUIREMENTS

	Year				
	2013	2018	2023	2028	2033
Based Aircraft	25	27	28	30	31
Total Aircraft to be Hangared (approximately 70%)	18	19	20	21	22
T-hangared Aircraft (approximation)	10	11	12	12	13
Conventional Hangared Aircraft (approximation)	8	8	8	9	9
Hangar Size Requirements					
T-hangars (sf)[1]	16,225	15,400	16,800	16,800	18,200
Conventional Hangars (sf)[1]	13,600	12,000	12,000	14,000	14,000
Total Hangar Storage (sf)	29,825	27,400	28,800	30,800	32,200

Note. Hangar development will depend on actual demand
[1]An average of 1,500 square feet was used to approximate the required space
Source: ACI

The airport is likely to need additional T-hangars and conventional hangars in the planning period. Based on the data illustrated in **Table 3-11**, the expected growth of based aircraft will likely drive the need for additional hangars, but as previously mentioned, the shifting of the space requirements between conventional and T-hangars is something that is driven by the specific needs of the users.

The Alternatives chapter will consider various hangar configurations to maximize the use of the existing hangars, and also determine the best course of action regarding any remaining hangars.

3.5.3 AVIATION FUEL FACILITIES

As discussed in Chapter 1, there are currently two fuel storage tanks on the Airport that are owned by the County and are operated by the airport FBO. Each fuel tank has a capacity of 10,000 gallons; 100LL AvGas and Jet A are available. A self-service system with a credit card reader is not currently available, but is recommended. Self-service fueling capabilities are becoming more of an expectation by pilots using small GA airports.

Additional fuel storage capacity should be planned when the airport is unable maintain an adequate supply and reserve. For general aviation airports such as Cochise County Airport, typically a 14 day supply is common. As the need for additional fuel storage becomes necessary, additional tanks should be added in 10,000 or 12,000 gallon increments. These increments will be the most economical to install.

As the need for additional fuel storage becomes necessary, additional tanks should be added in 10,000 or 12,000 gallon increments. These increments will be the most economical to install.

3.5.4 AIRPORT ACCESS AND VEHICLE PARKING

Cochise County Airport is located approximately 4 miles southwest of the City of Willcox, and can be accessed by heading north on Taylor Road from Interstate 10. The main airport access

road is Vista Avenue. The two lane access road enters the airport which leads to the gravel vehicle parking lot, adjacent to the airport terminal/FBO building. The parking area can accommodate approximately 20 vehicles. It is recommended that an airport's vehicle parking be able to satisfy the forecasted peak hour general aviation pilot and passenger demand. Using planning methods commonly accepted for calculating parking space requirements, **Table 3-12** depicts the vehicle parking space requirements for the 20-year planning period.

TABLE 3-12 VEHICLE PARKING REQUIREMENTS

Year	Parking Space Requirements	Parking Lot Requirements[1] (sy)
2018	27	945
2023	28	980
2028	30	1,050
2033	31	1,085

Note. Parking space requirements = forecasted based aircraft
[1]Each parking space = 35 square yards
Source: ACI

Based on the vehicle parking requirements, the existing parking area should be adequate for the planning period. If the County experiences periods where additional parking is warranted, there is sufficient area near the terminal building to expand the parking area as necessary.

3.5.5 FENCING

The airport has a five-strand barbed wire live stock fence around the perimeter. The fencing appears to be in good condition. The primary purpose of airport fencing is to restrict inadvertent entry to the airport by unauthorized people and wildlife. Recommendations for Cochise County Airport include upgrading the perimeter fencing to eight-foot high wildlife fencing. Also, chain-link fencing and electrified, mechanical gates are also recommended in the vicinity of the terminal area to separate the public area from the aircraft operations area. Typically, chain-link fencing at airports consists of eight-foot high chain-link fence with three strands of barbed wire.

3.5.6 SECURITY

There are several programs designed to increase general aviation airport security. For example, the Aircraft Owners and Pilots Association (AOPA) Airport Watch program created an around the clock telephone hotline answered by federal authorities for pilots to report suspicious activity at GA airports. Also, the Transportation Security Administration's (TSA) *Security Guidelines for General Aviation Airports* provides a set of federally-endorsed recommendations to enhance security for municipalities, owners, operators, sponsors and other entities charged with oversight of general aviation airports. The TSA's guidance provides nationwide consistency with regard to security at general aviation facilities, as well as a rational method for determining when and where these enhancements may be appropriate based upon the operational profile of differing airports. The guidelines offer an extensive list of options, ideas, suggestions and proven best practices for the airport operator, sponsor, tenant and/or user to choose from when considering security enhancements. The TSA's guidelines are updated and modified as new

security enhancements are developed and as input from the general aviation community is received. It is recommended that the Airport sponsor review the latest version of the TSA's *Security Guidelines for General Aviation Airports* in order to assess the security needs, if any, at Cochise County Airport.

3.5.7 AIRCRAFT RESCUE AND FIRE FIGHTING (ARFF) EQUIPMENT & STORAGE BUILDING

Airport Rescue and Fire Fighting (ARFF) equipment is not required at airports that do not have scheduled passenger service with 10 or more passenger seats. Local municipal or volunteer fire departments typically provide fire protection to general aviation airports in their district. Mutual aid agreements may also be provided and developed with nearby fire departments to assist in emergency situations. In any case, procedures should be in place to ensure emergency response in case of an accident or emergency at the airport. Although statistically very safe, the most likely emergency situations at general aviation airports are an aircraft accident, fuel or aircraft fire, or a hazardous material (fuel) spill. The level of protection recommended in FAA AC 150/5210-6D, *Aircraft Fire and Rescue Facilities and Extinguisher Agents*, for small general aviation airports is 190 gallons of aqueous film forming foam (AFFF) supplemented with 300 pounds of dry chemical. Proximity suits should be utilized for fire fighter protection. Aviation rated fire extinguishers should be immediately available in the vicinity of the aircraft apron and fueling facilities. It is recommended that the Willcox Rural Fire Department maintain compliance with the recommendations contained in FAA AC 150/5210.6D, *Aircraft Fire and Rescue Facilities and Extinguishing Agent*, if they are currently noncompliant.

3.6 INFRASTRUCTURE NEEDS

The existing electric, water, and telecommunication utilities are considered adequate for the existing facility. Upgrades and improvements to the existing utilities are recommended, as needed, in order to accommodate recommended development. The need for additional utilities, or modifications to existing utilities, will be evaluated in more detail in the Alternatives chapter.

3.7 LAND USE COMPATIBILITY AND CONTROL

As previously discussed in Chapter 1, Section 1.14, 14 CFR Part 77 establishes several imaginary surfaces that are used as a guide to provide a safe and unobstructed operating environment for aviation. In addition to ensuring that penetrations to these imaginary surfaces are avoided or appropriately marked and lighted, the FAA recommends that the airport sponsor make reasonable efforts to prevent incompatible land uses, such as residential encroachment, from developing in the immediate area of the airport.

Private development proposals should also be reviewed to ensure compatibility in the vicinity of the airport. Land use compatibility considerations include safety, height hazards, and noise exposure. Although extremely rare, most aircraft accidents occur within 5,000 feet of a runway. Therefore, the ability of the pilot to bring the aircraft down in a manner that minimizes the severity of an accident is dependent upon the type of land uses within the vicinity of the airport. Land uses are reviewed in four zones surrounding the airport; the Runway Protection Zone (RPZ), the Approach Zone, Airport Influence Zone and the Traffic Pattern Zone. The RPZ is a trapezoidal area extending 1,200 feet beyond the ends of the runway and is typically included within the airport property boundary. Residential and other uses that result in congregations of

people are restricted from the RPZ. The approach zone generally falls within the CFR 14 Part 77 Approach Surface area. Within the approach zone, public land uses, such as schools, libraries, hospitals and churches should be avoided. Any new residential developments should include avigation easements and disclosure agreements. The Traffic Pattern Zone is generally the area within one mile of the airport. Within the Traffic Pattern Zone, avigation easements should be considered for residential and public uses and disclosure statements should be required. The Airport Influence Zone is the area where aircraft are transitioning to or from enroute altitude or airport over-flight altitude to or from the standard traffic pattern altitude.

In addition, according to FAA Advisory Circular 150/5200-33B, *Hazardous Wildlife Attractants On or Near Airports,* landfills and/or transfer stations are incompatible land uses with airports. Therefore, according to the FAA, these types of facilities should be located at least 5,000 feet from any point on a runway that serves piston type aircraft and 10,000 feet from any point on a runway that serves turbine powered aircraft. Furthermore, the FAA recommends that any facility which may attract wildlife (especially birds), such as sewage treatment ponds and wastewater treatment plants, should also be located this same distance from any point on the runway. Based on a review of the surrounding land uses, it does not appear that any of them would create a wildlife attractant, but the County should remain diligent to ensure future land uses remain compatible as it relates to wildlife attractants.

However, although not a designated land use, there is an area on airport property that has the potential to attract wildlife such as birds. This is the storm water detention area located approximately 1,500 feet southeast from the Runway 3 threshold. The detention area is approximately 2 acres in size.

3.7.1 AIRPORT PROPERTY

The existing airport property encompasses approximately 960 acres according to Cochise County property records. The existing Runway Protection Zone (RPZ) for Runway 3 is controlled by the County in fee simple. When reconstructed and reopened, the RPZs for Runway 14-32 will also be controlled by the County in fee simple. The majority of the RPZ for Runway 21 is controlled by the County, except for approximately 2.46 acres in the outer portion of the Runway 21 RPZ. It is recommended that the County acquire this land if feasible.

It is not anticipated that any additional land will be required for the future development of the airport, although the Alternatives chapter of this Master Plan will identify any needed land and/or avigation easements.

3.7.2 AIRPORT ZONING

Airport zoning ordinances should include height restrictions and land use compatibility regulations. Development around airports can pose certain hazards to air navigation if appropriate steps are not taken to ensure that existing, as well as future, buildings and other types of structures do not penetrate 14 CFR Part 77 imaginary surfaces.

The FAA therefore recommends that airport sponsors implement height restrictions in the vicinity of the airport to protect all 14 CFR Part 77 imaginary surfaces. The existing airport is

zoned accordingly for airport use and is considered to be adequate for the planning period. There are currently no incompatible land uses in the vicinity of the airport. The surrounding land uses and zoning are compatible with airport operations.

3.8 SUMMARY OF FACILITY REQUIREMENTS

The facility requirements for the Cochise County Airport are summarized in **Table 3-13**. The recommendations are based on the types and volume of aircraft currently using, and expected to use, the airport in the short and long-term time frames. These recommended facilities will enable the airport to continue to serve its users in a safe and efficient manner.

In the next chapter, Alternatives, the various airside and landside improvements will be presented and evaluated, which will in turn lead to the preferred development alternative. Ultimately, an Airport Layout Plan (ALP) will be created to visually depict and communicate the County's vision of the Airport.

TABLE 3-13 FACILITY REQUIREMENTS SUMMARY

Item	Base Year (2013)	Short Term	Medium Term	Long Term
Runways				
3-21				
Runway Design Code (RDC)	B-II	Same as existing		
Length (ft)	6,095	Recommend lengthening to 6,440		
Width (ft)	75	Same as existing		
Pavement Strength (lbs)	50,000 S, 75,000 D, 135,000 DT	Same as existing		
Lighting	MIRL	Same as existing		
Markings	Non-precision	Same as existing		
14-32				
Runway Design Code (RDC)	--	Recommend B-I (small)		
Length (ft)	6,100 (Closed)	Reconstruct to 5,790		
Width (ft)	150 (Closed)	Reconstruct to 60		
Pavement Strength (lbs.)	Unknown	12,500 S		
Lighting	No	Install MIRL		
Markings	No	Visual		
Taxiways				
Taxiways (Existing and Planned)				
Taxiway Design Group (TDG)	TDG - 2	Same as existing		
Width (ft)	35	Same as existing		
Lighting	MITL	Same as existing		
Markings	Centerline	Repaint	Maintain	
Taxilanes (near T-hangars)				
Taxiway Design Group (TDG)	Non-standard	Recommend TDG - 1		
Width (ft)	Varies	Recommend 25		
Lighting	No	Install MITL	Maintain	
Markings	Centerline	Repaint	Maintain	
Navigational and Weather Aids				
AWOS	No	Install	Maintain	
Beacon	Yes	Replace	Maintain	
Approaches	Yes GPS Runway 3-21	Same as existing		
Visual Aids				
REIL	No	Install on Runway 3-21 & Runway 14-32	Maintain	
PAPI	No	Install on Runway 3-21	Maintain	
Segmented circle	Yes	Replace	Maintain	
Terminal[1]				
General Aviation (sf)	2,250	4,000	4,650	4,800
Hangars[1]				
T-hangars (sf)	16,225	15,400	16,800	18,200
Conventional (sf)	13,600	12,000	14,000	14,000
Total	29,825	27,400	30,800	32,200
Aprons[1]				
Tie-down/transient (sy)	13,390	18,450	21,466	21,705
Vehicle Parking (spaces)				
GA Itinerant and Based Users	18	25	28	29

Table 3-13 Facility Requirements Summary Continued				
Public	2	2	2	2
Total	20	27	30	31
Fuel Facility				
Jet A (gal)	10,000	Same as existing		
AVGAS (100LL) (gal)	10,000	Same as existing		
Total (gal)	20,000	Same as existing		
Fencing				
Perimeter	Yes	Replace/Install	Maintain	
Note. S = Single-wheel landing gear, D = Dual-wheel landing gear, DT = Dual-tandem landing gear				

[1] Terminal space, hangar, and apron development will depend on actual demand.
Source: ACI