Yuma International Airport

Airport Master Plan

DRAFT Master Plan Update Change 1 (Last revision Aug 2011)

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Yuma International Airport

Master Plan Update

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Change 1 In Draft	August 2011	Modified Graphics for page size 8 ½ x 11. Updated ACIP project schedules and costs. Reformat for Kindle

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Yuma International Airport

Introduction

Yuma International Airport (the Airport) is located in the far southwest corner of the State of Arizona. The City of Yuma is 15 miles north of the United States (U.S.)-Mexican border and 4 miles east of the Arizona-California border, and serves as the County seat for Yuma County. The general vicinity of Yuma and the Airport is shown in Figure 1.

Figure 1 - Yuma, Arizona

As depicted in Figure 2 Yuma International Airport is one of Arizona's 11 commercial service airports recognized by the Federal Aviation Administration's (FAA) 2007-2011 National Plan of Integrated Airport Systems (NPIAS) report.[1]

Figure 2 - Commercial Service Airports in Arizona

The Colorado River, which runs along the border of Arizona and California, converges with the Gila River just north of Yuma. The Airport was incorporated into the city limits between 1970 and 1979,[2] at an elevation of 216 feet above mean sea level (MSL). The Airport is co-located with Marine Corps Air Station Yuma (MCAS Yuma), as shown in Figure 3. The Airport site is adjacent to 32nd Street, also known as Business Route 8, which is a major route into and out of Yuma. The Airport operates under a patent with the United States of America, Secretary of the

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1 Federal Aviation Administration, National Plan of Integrated Airport Systems (NPIAS) Report, *2007-2011 NPIAS Report*, http://www.faa.gov/airports_airtraffic/airports/planning_capacity/npias/reports/ (accessed March 25, 2008).

2 City of Yuma, Department of Community Development, *City of Yuma Annexation Map*, Revised August 2008, http://www.ci.yuma.az.us/Documents/COY_AnnexationMap.pdf (accessed March 2009).

Interior. For the purposes of the Airport Master Plan documentation, "Airport" will refer to the land owned by the Yuma County Airport Authority for the primary purpose of civil aviation activity. "MCAS Yuma" will refer to the remaining property of the military base and the airfield, which is owned, operated, and maintained by the United States Marine Corps (USMC).

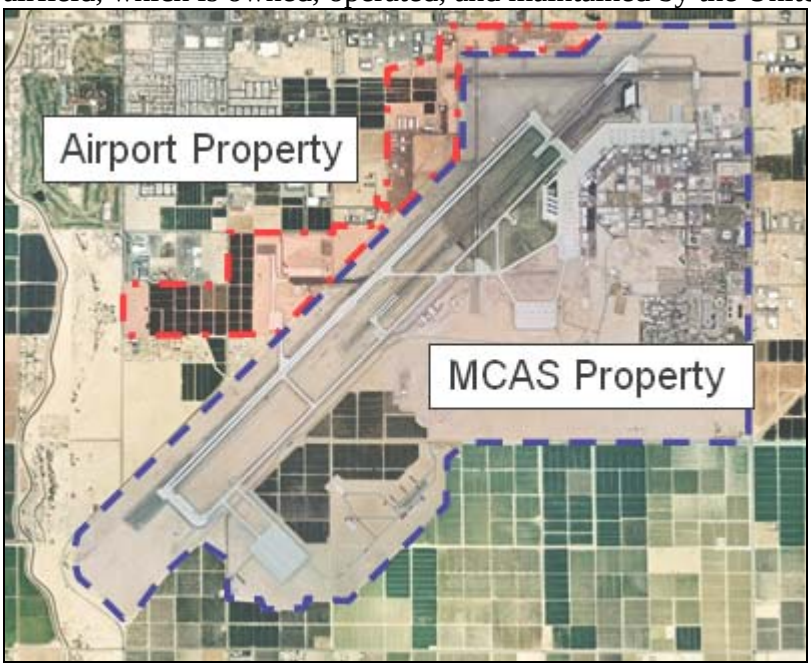

Figure 3- Yuma International Airport/MCAS Yuma

This document describes the analyses and assessments, conducted during the preparation of this Airport Master Plan, and provides the results of those efforts. The remainder of this chapter provides a discussion of the previous Master Plan Update, a brief history of the Airport, and a general discussion of the goals underlying the current Airport Master Plan. The following chapters of this report provide an inventory of Airport facilities, document the aviation demand forecasts, discuss the demand/capacity analyses and facility requirements, present the alternatives considered and the resulting Airport Development Plan (ADP), define an implementation plan and financing plan for the recommended ADP, and present an overview of potential environmental effects associated with the recommended ADP, as follows:

Chapter II – Airport Inventory
Chapter III – Aviation Demand Forecasts
Chapter IV – Demand/Capacity Analyses and Facility Requirements
Chapter V – Alternatives and Airport Development Plan
Chapter VI – Financial Plan
Chapter VII – Environmental Overview

1999 Master Plan Update

A Master Plan Update completed in 1999 examined and identified options for future Airport development.[3] Short-term improvements were programmed for completion between 1999 and 2003 at an estimated cost of $11.5 million. Intermediate-term projects were scheduled for completion between 2004 and 2009 at an estimated cost of $8.8 million. Many of the short- and

[3] Coffman Associates, *Airport Master Plan Final Technical Report for Yuma International Airport, Yuma, Arizona*, September 14, 1999.

intermediate-term projects, such as improvements to the passenger terminal, aircraft parking areas around the terminal, airfield lighting improvements, expansion of the cargo apron, and acquisition of nearly 100 acres of land to accommodate general aviation (GA) growth have been completed. Long-term projects (2010-2019) with an estimated total of over $23 million were identified to provide additional passenger, cargo, and GA facilities as demand warrants. The need for recommended improvements that have not been implemented were re-assessed as part of this Airport Master Plan.

History of Yuma International Airport

Yuma's history of flight dates to 1911 when Robert Fowler departed from Yuma in an effort to set a world's record for endurance and distance. He entered a Transcontinental Air competition sponsored by William Randolph Hearst. Originating in Los Angeles, he arrived in Yuma on October 25th. Over 2,000 spectators watched the aircraft circle and land. The next day he continued the cross-country endeavor and succeeded in setting a world's record.

In 1925, the Yuma Chamber of Commerce began work to secure an airport for Yuma. After two years of negotiations, 40 acres of land was secured from the federal government. The land was cleared, leveled, and the first hangar constructed. The 40 acres of land was officially designated as an active airport and named Fly Field after Colonel Ben Franklin Fly. In the beginning, Fly Field had limitations, including loose sand and a lack of facilities. In 1925, the Chamber's Aviation Committee decided another 160 acres was needed to create a first-class landing field in Yuma. Negotiations resulted in a public/private land trade, along with a commitment by the federal government to provide Fly Field a steel frame hangar capable of housing 12 airplanes. Congressman Douglas of Arizona introduced a bill asking for the lease of 640 acres of government land to Yuma County for 20 years at a cost of $1 per year, with the privilege of renewal for another 20 years at the same rate. President Calvin Coolidge signed the Yuma Aviation Bill on February 27, 1928.

Soon thereafter, the aviation committee started lining up activities for the airport. Yuma was selected to be a night stop for three transcontinental air races from New York to Los Angeles, and an international air race from Mexico to Los Angeles. The Chamber agreed to provide free gas and oil to the racers, at an estimated cost of $2,000. Yuma was also selected to be a stop-over for the first All American Tour of 25 Airplanes. In June of that year, the military announced that a United States Meteorological and Aerological station would be constructed at Fly Field at a cost of $30,000 and would be manned by four Army personnel, marking the first military presence at Yuma's airport.

In 1929, Yuma was selected as the first stop for the Women’s Transcontinental Air Race. Amelia Earhart experienced mechanical problems and landed in the soft sand, destroying the propeller. A new propeller and mechanics were flown in from Los Angeles to make repairs so she could continue the race. Fly Field experienced a downturn during the depression; but in the late 1930's it became clear that the U.S. faced a threat of conflict with the German Reich. The War Department needed facilities to train combat pilots and crews. Planning for the Yuma area, including a potential bombing range located between Yuma and Gila Bend, started in 1939 when a group of aeronautical experts toured the area. The Yuma County Board of Supervisors recommended Fly Field as a base for the Army Air Corps. Initially, Yuma County assumed the burden of airfield maintenance and limited the use exclusively to Army and Navy aircraft. Money for the expansion of Fly Field to accommodate military activity was available early in 1941. Three separate government agencies pooled a total of $781,000 to initiate construction. By mid-year another $635,000 became available for re-paving the north-south runway. Between

1941 and 1942 two paved runways, each measuring 4,200 feet long by 150 feet wide, were completed under the command of the 403rd Army Air Force Base Unit, Army Air Forces West Coast Training Center. In June 1942, the War Department authorized an additional three million dollars. The first class of cadets arrived in January 1943 when the field was used for advanced pilot and gunnery training.

In September 1946, flight activity had decreased and the field was declared surplus. As a result, the portion of the field used for civil flight activity was returned to the County. The Chamber of Commerce promoted Fly Field based on the earlier famous endurance flights that had flown through Yuma. This also highlighted the region's weather which was very conducive to flying, and a topic of particular importance to the military. The Airport became very active as a military facility during the Korean War, and was used extensively by the U.S. Air Force. In early 1951 the County Supervisors received a Department of Defense proposal to lease the airfield as a civilian-operated military training base with specific military and civil sides. The Yuma County Board of Supervisors gave the U.S. Air Force a right of entry and in 1956 the field was named Vincent Air Force Base.

At the same time, the United States of America issued a U.S. Government Patent from the Department of the Interior which conveyed specific airport land to Yuma County. The property, granted by the patent in 1956, is similar to the current property owned by Yuma County. In addition to the conveyance of land, the patent granted rights to unrestricted civil aviation use of the airfield's facilities, including all runways and taxiways, or as it is worded in the patent:

> There is also granted an easement for public airport purposes in and to the land area and facilities of the Yuma County Airport, granting to the County of Yuma, State of Arizona, its successors in functions or interest and assigns, the right to use for the landing, takeoff, and parking of civil aircraft, in common with aircraft; owned and controlled by the Government, the runways now located on the airport, those taxiways connecting the runways with the lands granted above, such runways as may be located on the airport as now constituted or as altered or expanded, and such future taxiways as are necessary for ingress and egress to the future runways…[4]

In 1959, control of the base was given to the United States Navy and then, nine days later, to the Marine Corps. The base was renamed Marine Corps Air Station Yuma on July 20, 1962. In 1965, the Yuma County Board of Supervisors created the Yuma County Airport Authority in accordance with the provisions of section 10-451, of the Arizona Revised Statutes, to take over the Airport and all associated activity. A Board of Directors was elected from the community to oversee the Airport Authority and all Airport functions. In 2007, the Board of Directors passed resolution 01-07 declaring that Yuma International Airport was an "Aviation Partner" with MCAS Yuma. That partnership continues today and allows for unrestricted civil aviation use of the airfield facilities, including all runways and taxiways. The patent also preserves the ability of Yuma County to collect and retain landing fees to provide for Airport operating expenses.[5] The boundaries of the Airport and MCAS Yuma are depicted in Figure 3.

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[4] United States of America, Department of the Interior, Douglas McKay, Secretary of the Interior, *Land Patent No. 1160556*, February 14, 1956.

[5] United States of America, Department of the Interior, Douglas McKay, Secretary of the Interior, *Land Patent No. 1160556*, February 14, 1956.

Airport Operations

The Airport, classified as a public use airport, served over 167,500 passengers in 2008. Two commercial passenger airlines, United Airlines through United Express, and US Airways through US Airways Express, operate at Yuma International Airport. United Airlines provides service to Los Angeles, and US Airways provides service to Phoenix. Four rental car companies operate at the Airport: Avis, Budget, Hertz, and Enterprise.

The Airport also has two fixed base operators (FBOs) that provide services to GA aircraft operators such as aircraft fueling, maintenance, storage, light aircraft maintenance, rental car arrangements, and catering services. The FBOs currently operating at the Airport are CareFlight Aviation Center, and Lux Air Jet Center. Additional aircraft storage hangars, including box hangars, T-hangars, and T-shades for rental, and a complimentary wash rack are available for use by based aircraft owners.

Airport Organization

The Yuma County Airport Authority (YCAA) operates and manages the Airport through a long-term lease with the County. The YCAA was established in 1964, and incorporated in 1965. YCAA's Board of Directors is composed of five Officers and nine Directors, who represent the business community and Airport interests. YCAA provides guidance and direction to Airport staff through six committees. As the Airport is co-located with MCAS Yuma, coordination and cooperation between the YCAA and the USMC is critical to the long-term success of the facility.

On June 12, 2007, the following mission statement was adopted by and for the YCAA.[6] "The Yuma County Airport Authority's mission is to provide a safe, efficient and customer focused airport to serve Greater Yuma."

The YCAA has defined key charters and strategies to ensure that the intent of the mission is met.[7] These strategies include:

Provide full service FBO by either partnering with existing businesses or attracting new businesses.

Expand aviation-related business, including but not limited to MCAS Yuma or GA.

Promote international airport status and seek scheduled international flights.

Develop air freight business through providers such as FedEx, UPS, etc.

Develop a strategic plan for growth through prudent use of financial resources while focusing on customer service. Stay abreast of community growth and needs by partnering with and/or leading with our community for economic development.

Develop cargo and/or freight business.

To further ensure implementation of these strategies, goals and objectives were developed through the Airport's Strategic Plan.[8] Specific performance measures are used to track the progress toward the achievement of each goal and objective toward ensuring that the mission of the YCAA is accomplished.

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6 Yuma County Airport Authority, Board of Directors, Monthly Board Meeting, *Official Minutes*, June 12, 2007.

7 Yuma County Airport Authority, Board of Directors, Board Retreat, *Official Minutes*, March 27, 2007.

8 Yuma International Airport, http://www.yumaairport.com/Yuma/Strategy.nsf/Goals?OpenView (accessed March 2008).

Goals and Objectives of This Airport Master Plan

The purpose of this Airport Master Plan is to provide a roadmap for the planned and logical future development of the Airport in accordance with YCAA's mission. The following goals and objectives were identified for this master planning effort and were discussed at the first Project Advisory Committee (PAC) meeting that was held on April 1, 2008.

Develop a plan to ensure a workable agreement between the YCAA and USMC. MCAS Yuma has an important role in the City's economy, and the collective resources offered by the Airport and MCAS should be managed collaboratively.

Develop a plan that identifies the best long-term facilities for civil aviation activity, including reasonably-priced GA facilities, economic development, and passenger amenities within the terminal building.

Enhance the relationship and partnership between the YCAA and USMC; considering global and specific issues such as airfield inspections and hours of operation for the Airport Traffic Control Tower.

Develop a plan to identify pavement conditions and necessary improvements.

Develop a plan that resolves vehicular parking limitations for GA aircraft operators.

Provide strategies for accommodating future terminal needs, including expansion of passenger holding areas and public parking needs during peak activity or heightened levels of threat to security.

The Airport Master Plan should:

be coordinated with related and regional development projects,

be able to be implemented without disrupting the efficient operation of the Airport,

be sensitive to the surrounding environments, and

ensure that the YCAA uses resources wisely.

I. Airport Inventory

The Airport is co-located with MCAS Yuma, and is operated under a patent that was established in 1956 by the United States of America to the County of Yuma, which provides for unrestricted civil aviation use. The YCAA is responsible for managing the civil aircraft operations at the Airport, including planning, development, administration, security, and maintenance of the commercial, FBO, GA, and air cargo facilities. Figure 4 presents the various land uses on Airport property.

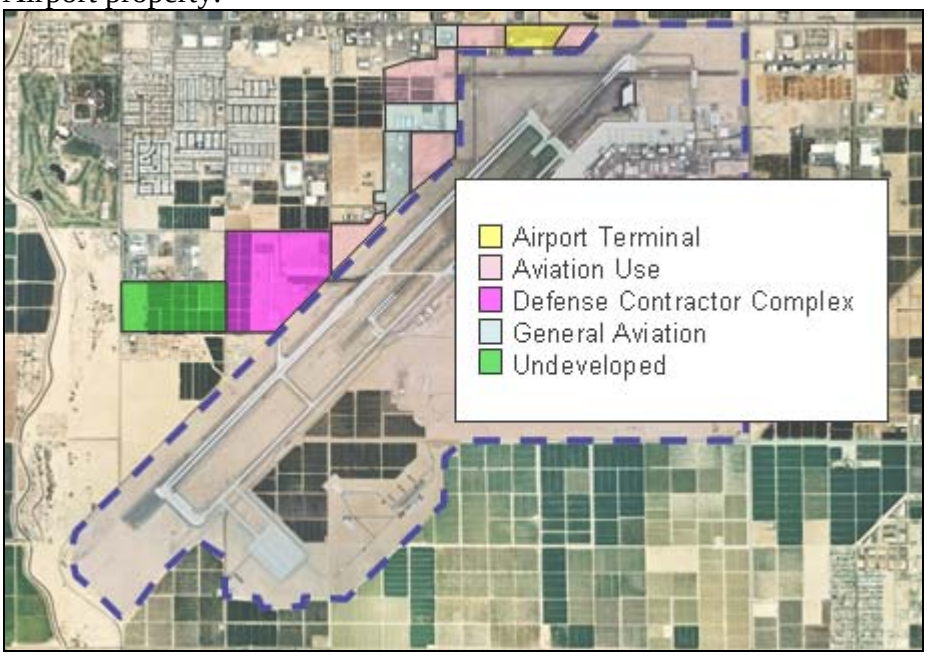

Figure 4 - Airport Land Use Overview

The existing facilities and other areas critical to the operation of the Airport are described in this chapter, with particular attention focused on the YCAA-owned facilities. The following are discussed in this chapter:

Airfield Facilities
Passenger Terminal Area
FBO and GA Facilities
Ancillary Facilities
Security Systems
Utility Infrastructure
Off-Airport Land Use and Zoning
Airspace Environment
Meteorological Conditions

Airfield Facilities

The U.S. Department of Transportation (DOT) *Airport/Facility Directory, Southwest U.S.*, effective February 14, 2008, lists the Airport Reference Point (ARP), or the midpoint of the airfield, as latitude N32°39.40' and longitude W114°36.36'. The Airport elevation, at the highest point on the airfield pavement, is 216 feet above MSL.

Airport Reference Code and Critical Aircraft

The FAA classifies airports by the size of aircraft that the airport is designed to accommodate. A coding system, referred to as an Airport Reference Code (ARC) is outlined in FAA Advisory Circular (AC) 150/5300-13, Change 14, *Airport Design*, dated November 1, 2008. The ARC is based on an aircraft's wingspan or tail height, and approach speed, and relates the operational and physical characteristics of the most demanding aircraft expected to operate at, or make substantial use of the airport, to airport design criteria (such as the size of runway safety areas and runway and taxiway/taxilane length, width, and separation distances). The most demanding aircraft is often referred to as the critical aircraft or the design aircraft and must account for at least 500 or more annual itinerant or scheduled commercial service operations (does not include local operations) at the airport. Itinerant operations are defined as all operations (takeoffs and landings) of aircraft going from one airport to another. Likewise, local operations are defined as operations of aircraft that remain within sight of the airport or within 20 nautical miles for the entire flight and are typically training operations.[9]

The ARC, consists of a letter designator (A through E) identifying the Aircraft Approach Category based on aircraft approach speeds followed by a Roman numeral (I through VI) identifying the Airplane Design Group (ADG) in terms of the aircraft wingspan or tail height, for example C-IV, representing Aircraft Approach Category C and ADG IV. The aircraft approach speed affects runway length and runway-related facilities, such as navigational aids, while aircraft wingspan primarily affects separation criteria between runways, taxiways, and taxilanes. **Table II-1** summarizes the aircraft classifications as presented in AC 150/5300-13 and lists typical aircraft by Aircraft Approach Category and ADG.

Aircraft Approach Categories A and B typically include small piston engine aircraft and a limited number of smaller business jets with approach speeds of less than 121 knots. Categories C, D, and E consist of the larger jet and propeller aircraft with approach speeds of 121 knots or greater, generally associated with commercial and/or military use. ADGs I and II primarily include small piston engine aircraft, light and midsize business jets, and a variety of single and twin-engine turboprop aircraft. ADGs III, IV, and V include a limited number of large business jet models that have entered the fleet over the last 5 to 7 years, as well as the majority of the commercial jet aircraft fleet, and military aircraft such as the KC-10, KC-135, C-17, and KC-135R. ADG VI includes very large jets, such as the new Airbus A380, the Antonov 124 Condor transport aircraft, and large military aircraft, such as the C-5 transport.

The projected fleet mix and number of operations are discussed in Chapter III, *Aviation Activity Forecasts*, of this document. The Airport Layout Plan (ALP) data table presents the critical aircraft and existing ARC as E-VI for Runway 3L-21R, and D-V for 3R-21L and, which are used predominately for military aircraft operations and as B-II for Runways 8-26 and 17-35, which are used predominately for civil aircraft operations. The existing ARC E-VI standards allow the full range of air carrier, cargo, and military aircraft, expected to operate at the Airport or at MCAS Yuma, to be accommodated.

Table II-1 FAA Aircraft Characteristics

Aircraft Approach Category		
Category	Approach Speed (knots)	Typical Aircraft by Aircraft Approach Category

[9] Federal Aviation Administration, *Pilot/Controller Glossary*, February 14, 2008, http://www.faa.gov/airports_airtraffic/air_traffic/publications/media/pcg.pdf (accessed April 30, 2008).

Yuma International Airport

A	< 91	C-172, Beech Bonanza, Cirrus SR-22, Diamond DA-42
B	91 - < 121	E120, Beech 1900C, King Air 200, Citations II, III and V, Falcon 2000
C	121 - < 141	Astra Galaxy, Challenger 604, CRJ, Global Express, Citations VI, VII, and X, A320, Boeing Business Jet, B-737-100/200/300/400/500/700/900ERW, B757, B767, B787-8, C-5
D	141 - < 166	Gulfstream II and IV, A310-300, A330-300, A340, B-737-800/900/900ER /900W/900ER, B-747, B-777-300, DC-10, MD 11, KC-10, KC-135, F-18
E	166 or greater	Military aircraft (F-16, F-22, T-38)

Airplane Design Group (ADG)

Design Group	Wingspan (feet)	Tail Height (feet)	Typical Aircraft by ADG
I	< 49	< 20	C-172, C-402, Beech 400A, Cirrus SR-22, Diamond DA-42, F-16, F-22
II	49 - < 79	20 - < 30	E120, Beech 1900C, King Air 200, CRJ-200, CRJ-700, Citations V and X, Falcon 2000, Gulfstream G350, G450
III	79 - < 118	30 - < 45	A318, A319, A320, A321, B-727, B-737, MD 80, DC-9, Gulfstream G550, G650
IV	118 - < 171	45- < 60	A300, A310, B-757, B-767, DC-8, MD 11, B-787-8, KC-10, KC-135
V	171 - < 214	60 - < 66	A330, A340, A350, B-747, B-777, B-787-8
VI	214 - < 262	66 - < 80	A380, Antonov 124 Condor, C-5

Source: Ricondo & Associates, Inc, April 2008, based on Federal Aviation Administration, FAA AC 150/5300-13, Change 14, *Airport Design*, November 1, 2008; Burns & McDonnell, *Aircraft Characteristics*, 9th edition; *Airport Reference Code and Approach Speeds for Boeing Airplanes*, August 2, 2007, http://www.boeing.com/commercial/airports/faqs/arcandapproachspeeds.pdf (accessed April 28, 2008).

Prepared by: Ricondo & Associates, Inc., March 2009.

Runway System

The runway system consists of four runways: parallel Runways 3L-21R and 3R-21L, which are used primarily by military aircraft operating at MCAS Yuma, and perpendicular intersecting Runways 8-26 and 17-35, which are used primarily by civil aircraft. Although civil aircraft typically operate on Runways 8-26 and 17-35, all four runways are available for civil use. The USMC is responsible for maintaining the runways, and the majority of the taxiways. Figure 5 depicts the runway and taxiway system, and the aircraft parking aprons, while **Table II-2** summarizes existing runway data.

1.1.1.1 Runway 3L-21R

Runway 3L-21R, the longest runway, is 13,300 feet long and 200 feet wide and is oriented northeast-southwest. The pavement is constructed of concrete and has a load bearing capacity of 103,000 pounds for aircraft with single-wheel landing gear, 200,000 pounds for aircraft with dual-wheel landing gear, and 400,000 pounds for aircraft with dual-tandem landing gear. The approach end of Runway 3L (the southwest end) has a 1,000-foot paved undershoot/overrun area. The approach end of Runway 21R has a 650-foot paved undershoot/overrun area. The safety area for Runway 3L-21R is 500 feet wide, and extends 1,000 feet beyond each end. Runway 3L-21R intersects Runway 17-35 approximately 2,100 feet from the approach end of Runway 21R.

Table II-2 Existing Runway Data

	Runways			
	3L-21R	3R-21L	8-26	17-35
Length (feet)	13,300	9,241	6,146	5,711
Width (feet)	200	150	150	150
Runway End Elevation (feet above MSL)	(3L) 194.6 (21R) 194.8	(3R) 190.1 (21L) 209.6	(8) 196.8 (26) 215.4	(17) 198.3 (35) 184.6
Effective Runway Gradient	0.1%	0.3%	0.3%	0.2%
Runway Surface Type	Concrete	Asphaltic Concrete	Asphaltic Concrete	Asphaltic Concrete
Runway Condition [1/]	Good	Good to Fair	Good to Satis.	Good to Fair
Load Bearing Capacity (pounds) Type of Aircraft Landing Gear				
Single Wheel	103,000	162,000	63,000	72,000
Dual Wheel	200,000	200,000	137,000	171,000
Dual Tandem	400,000	400,000	206,000	255,000
Aircraft Approach Category	E	D	B	B
Airplane Design Group	VI	V	II	II
Electronic Navigational Aids	(21R) ILS	None	None	None
Runway Lighting	(3L) HIRL, PAPI (21R) HIRL, PAPI, MALSR	HIRL, PAPI	HIRL	(17) HIRL, VASI (35) HIRL, REIL
Runway Markings	Precision	Non-precision	Visual	Non-precision
Runway Safety Areas				
Length Beyond Runway End (feet) [2/]	(3L) 1,000 (21R) 1,000	(3R) 1,000 (21L) 1,000	(8) 300 (26) 1,050	(17) 300 (35) 775
Width (feet)	500	500	150	150

Notes:

1/ As presented in *Airfield Pavement Condition Survey: Marine Corps Air Station Yuma, Arizona*, June 2005.

2/ Length indicated is at the approach end of the runway identified in ().

HIRL = High Intensity Runway Lights
ILS = Instrument Landing System
MALSR = Medium Intensity Approach Lighting System with Runway Alignment Indicator Lights
MSL = Mean Sea Level
PAPI = Precision Approach Path Indicators
REIL = Runway End Identifier Lights
VASI = Visual Approach Slope Indicator
Satis. = Satisfactory

Sources: U.S. Department of Transportation, *Airport/Facility Directory, Southwest U.S.*, Effective February 14, 2008; Yuma County Airport Authority, *Yuma International Airport Layout Plan*, March 2009.
Prepared by: Ricondo & Associates, Inc., March 2009.

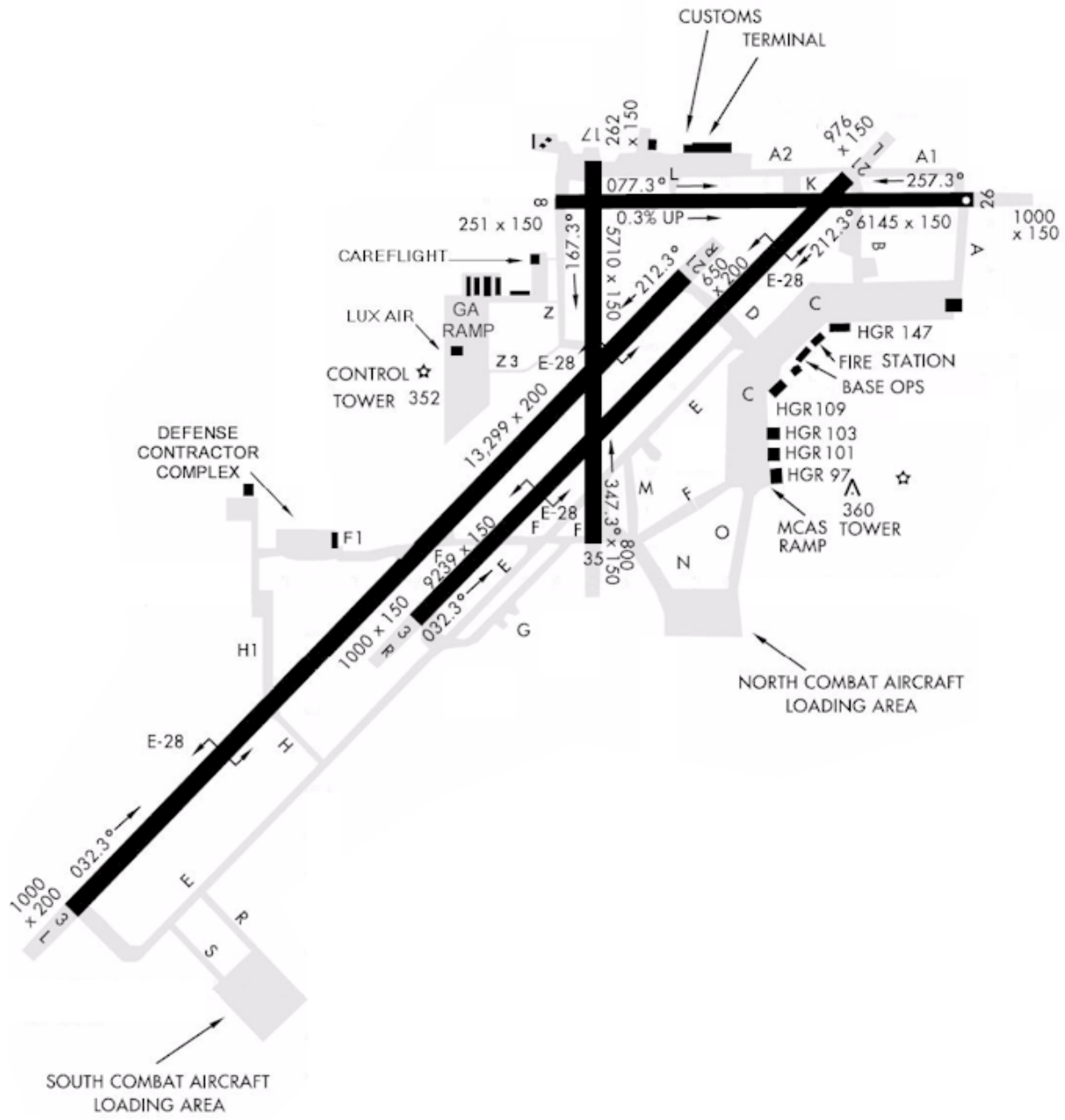

Figure 5 - Runways, Taxiways, and Aprons

1.1.1.2 Runway 3R-21L

Runway 3R-21L is parallel to and 700 feet southeast of Runway 3L-21R, measured runway centerline to runway centerline. Runway 3R-21L is 9,241 feet long and 150 feet wide. The pavement is constructed of asphaltic-concrete and has a load bearing capacity of 162,000 pounds for aircraft with single-wheel landing gear, 200,000 pounds for aircraft with dual-wheel landing gear, and 400,000 pounds for aircraft with dual-tandem landing gear. The approach end of Runway 3R (the southwest end) has a 1,000-foot paved undershoot/overrun area. The approach

end of Runway 21L has a 976-foot paved undershoot/overrun area. The safety area for Runway 3R-21L is 500 feet wide, and extends 1,000 feet beyond each end. Runway 3R-21L intersects Runway 17-35 approximately 4,000 feet from the approach end of Runway 3R and intersects Runway 8-26 approximately 500 feet from the approach end of Runway 21L.

1.1.1.3 Runway 8-26

Runway 8-26 is oriented east-west, is south of the passenger terminal apron, and is 6,146 feet long and 150 feet wide. The runway is used primarily for civil commercial operations, because of its close proximity to the passenger terminal. The pavement is constructed of asphaltic-concrete and has a load bearing capacity of 63,000 pounds for aircraft with single-wheel landing gear, 137,000 pounds for aircraft with dual-wheel landing gear, and 206,000 pounds for aircraft with dual-tandem landing gear. The approach end of Runway 8 (the west end) has a 251-foot paved undershoot/overrun area. The approach end of Runway 26 has a 1,050-foot paved undershoot/overrun area. The safety area for Runway 8-26 is 150 feet wide, and extends 300 feet beyond the approach end of Runway 8 and 1,050 feet beyond the approach end of Runway 26. Runway 8-26 intersects Runway 3R-21L approximately 2,200 feet from the approach end of Runway 26 and intersects Runway 17-35 approximately 500 feet from the approach end of Runway 8.

1.1.1.4 Runway 17-35

Runway 17-35 is oriented perpendicular to Runway 8-26 and is west and south of the passenger terminal apron. The runway is 5,711 feet long and 150 feet wide and is used primarily for civil operations. The pavement is constructed of asphaltic-concrete and has a load bearing capacity of 72,000 pounds for aircraft with single-wheel landing gear, 171,000 pounds for aircraft with dual-tandem landing gear, and 255,000 pounds for aircraft with dual-tandem landing gear. The approach end of Runway 17 (the north end) has a 262-foot paved undershoot/overrun area. The approach end of Runway 35 has an 800-foot paved undershoot/overrun area. The safety area for Runway 17-35 is 150 feet wide, and extends 300 feet beyond the approach end of Runway 17 and 775 feet beyond the approach end of Runway 35. Runway 17-35 intersects all three of the other runways as follows: Runway 8-26 approximately 700 feet from the approach end of Runway 17, Runway 3L-21R approximately 2,600 feet from the approach end of Runway 35, and Runway 3R-21L approximately 1,600 feet from the approach end of Runway 35.

Taxiway System

The taxiway system, including taxiways that are parallel to runways, runway exit/entrance taxiways, and connecting taxiways, are presented in Figure 5. On-site inspection of taxiways, owned and operated by YCAA, concluded that the pavement conditions appear to be adequate given the level of review. To fully access the strength, condition, and safety of the pavement an engineered pavement maintenance management system (PMMS) should be considered and will be further evaluated as part of the recommendations of this Master Plan.

1.1.1.5 Taxiways A, A1, and A2

Taxiways A, A1, and A2 together provide a full-length taxiway system for Runway 8-26. This taxiway system extends north from the MCAS Yuma apron to Runway 8-26 as Taxiway A. It then continues as Taxiway A1 north of Runway 8-26. Taxiway A, is 75 feet wide and Taxiway A1 is 50 feet wide. Taxiway A2 is 50 feet wide and extends from the approach end of Runway 21L to a point approximately 125 feet beyond the approach end of Runway 17. Taxiway A2 continues on the west side of Runway 17-35 and intersects with Taxiway Z. Taxiways A1 and

A2 are parallel to and separated 500 feet from Runway 8-26, measured runway centerline to taxiway centerline. Taxiways A, A1, and A2 are maintained by the USMC.

1.1.1.6 Taxiway B

Taxiway B is 75 feet wide and connects Runway 8-26 and the MCAS Yuma apron. Taxiway B extends from Taxiway C at the north edge of the MCAS Yuma apron to Runway 8-26, intersecting the runway at a point approximately 1,700 feet west of the approach end of Runway 26. Two run-up pads are adjacent to the taxiway. Taxiway B is maintained by the USMC.

1.1.1.7 Taxiway C

Taxiway C is 150 feet wide and is an apron taxiway located along the edge of the MCAS Yuma apron. Taxiway C is maintained by the USMC.

1.1.1.8 Taxiway D

Taxiway D is 150 feet wide and connects Runways 3L-21R and 3R-21L to the MCAS Yuma apron. Taxiway D extends from the northwest edge of the MCAS apron from Taxiway C, crossing Runway 3R-21L and then extends to the approach end of Runway 21R. Taxiway D is maintained by the USMC.

1.1.1.9 Taxiway E

Taxiway E is 75 feet wide and is parallel to and southeast of Runways 3L-21R and 3R-21L. Taxiway E extends from Taxiway D to the approach end of Runway 3L, providing a full-length parallel taxiway for Runway 3L-21R. Taxiway E is maintained by the USMC.

1.1.1.10 Taxiways F and F1

Taxiway F is 75 feet wide, is a runway exit/entrance taxiway, and connects with the MCAS Yuma apron. Taxiway F extends from Taxiway C in the southwest portion of the MCAS Yuma apron to the approach end of Runway 35, continues to and crosses Runway 3R-21L at a point approximately 1,800 feet northeast of the approach end of Runway 3R, and then extends to Runway 3L-21R, intersecting that runway at a point approximately 4,100 feet from the approach end of Runway 21R. Taxiway F is maintained by the USMC.

Taxiway F1 is 75 feet wide and is the continuation of Taxiway F on the west side of Runway 3L-21R. The taxiway provides a runway exit to the Defense Contractor Complex (DCC) from Runway 3L-21R, and together with Taxiway F provides access from the DCC to Runways 3R-21L and 17-35. Taxiway F1 intersects Taxiway H2 west of the DCC. The portion of Taxiway F1 west of the DCC is maintained by the YCAA. The USMC maintains the portion of Taxiway F1 east of the DCC, extending to Runway 3L-21R. Taxiway F1 is currently being rehabilitated, and will provide direct access to the 40th Street and West Visiting Aircraft Line aprons, and the DCC, from Runway 3L-21R.

1.1.1.11 Taxiway G

Taxiway G is 75 feet wide and extends from Taxiway F west of Runway 17-35 to the approach end of Runway 3R. Taxiway G serves as a bypass taxiway for Taxiway E and provides access to MCAS Yuma aircraft run-up aprons. Taxiway G is maintained by the USMC.

1.1.1.12 Taxiways H, H1, and H2

Taxiway H is 75 feet wide and extends from Taxiway E to Runway 3L-21R, intersecting the runway at a point approximately 4,350 feet northeast of the approach end of Runway 3L. Taxiway H is maintained by the USMC.

West of Runway 3L-21R, Taxiway H becomes Taxiway H1 and extends north to the West Visiting Aircraft Line. Taxiway H1 is maintained by the USMC, and used for civil aircraft operations through an easement to the YCAA.
Taxiway H2 is 75 feet wide and connects the 40th Street Apron and the West Visiting Aircraft Line to the south, and intersects Taxiway F1 west of the DCC. Taxiway H2 is maintained by the YCAA.

1.1.1.13 Taxiways K and L

Taxiways K and L are 50 feet wide and are runway exit/entrance taxiways connecting Runway 8-26 and Taxiway A2. Taxiways K and L are maintained by the USMC.

1.1.1.14 Taxiway M

Taxiway M is 75 feet wide and is a partial-length parallel taxiway to Runway 17-35, extending between Taxiways E and F east of the runway. Taxiway M is maintained by the USMC.

1.1.1.15 Taxiway N

Taxiway N is 75 feet wide and extends from the intersection of Taxiways M and F to the MCAS Yuma North Combat Aircraft Loading Area. Taxiway N is maintained by the USMC.

1.1.1.16 Taxiway O

Taxiway O is 75 feet wide and extends from the MCAS Yuma apron to the MCAS Yuma North Combat Aircraft Loading Area. Taxiway O is maintained by the USMC.

1.1.1.17 Taxiway R

Taxiway R is 75 feet wide and extends from Taxiway E to the MCAS Yuma South Combat Aircraft Loading Area. Taxiway R is maintained by the USMC.

1.1.1.18 Taxiway S

Taxiway S is 75 feet wide and extends from Taxiway E to the MCAS Yuma South Combat Aircraft Loading Area. Taxiway S is maintained by the USMC.

1.1.1.19 Taxiways Z, Z1, Z2, and Z3

Taxiway Z, Z1, Z2 and Z3 were formerly designated Taxiway I (India). Due to confusion between the letter I and the number 1, the letter designation for these taxiways has been changed to the letter Z to mitigate confusion and enhance safety.
Taxiway Z is 40 feet wide and is a partial-length parallel taxiway on the west side of Runway 17-35. Taxiway Z extends south from the Northwest GA Hangar Facility apron, intersects Taxiway A2, crosses the approach end of Runway 8, and then intersects Taxiways Z1, Z2, and Z3, all of which provide access to the GA ramps and FBOs. Taxiway Z is maintained by the YCAA.

Taxiway Z1 is 30 feet wide, intersects Taxiway Z, and provides access to the CareFlight Aviation Center apron. Taxiway Z2 is 40 feet wide and extends west from Taxiway Z along the north side of the Navy transceiver site, turns south and then terminates at the West GA Hangar Facility apron. Taxiway Z3 is 40 feet wide and is a runway exit/entrance taxiway that extends west from approximately the midpoint of Runway 17-35, intersects with Taxiway Z, continues west along the south side of the Navy transceiver site, and terminates at the Lux Air Jet Center apron. YCAA has an easement for the portion of Taxiway Z3 located on MCAS Yuma property. Taxiways Z1, Z2, and Z3 are maintained by the YCAA.

Ramp and Apron Areas

Aircraft parking aprons, also referred to as ramp areas, include space for aircraft parking and circulation for aircraft transitioning between the apron and other facilities. The apron areas are summarized in **Table II-3**, and are depicted on in Figure 5. Discussions for individual ramps areas leased by tenants are included in Section 2.4, FBO and GA Facilities of this document.

The passenger terminal aircraft parking apron is located on MCAS Yuma property south of the terminal building. Partially reconstructed in 1991, the concrete apron was expanded to the east to accommodate additional aircraft parking positions associated with development of the new terminal building. An easement has been granted to the YCAA for aircraft operations along the terminal apron. The terminal apron encompasses approximately 154,800 square feet.

Table II-3 Existing Aircraft Parking Aprons

Apron Name or Current Tenant	Location	Use	Apron Maintenance Responsibility	Apron Area (sf) [1/]	Pavement Type
Passenger Terminal	North of Runway 8-26 adjacent to the passenger terminal	Airlines	YCAA	154,800	Concrete
YCAA	West and southwest of the passenger terminal	Unassigned	YCAA	202,975	Asphalt
Northwest GA Hangar Facility	Northwest corner of Airport	GA Aircraft Storage	YCAA	81,800	Asphalt
CareFlight Aviation Center	Between Taxiways Z1 and Z2 and S. Fortuna Avenue	GA/FBO	YCAA	121,741	Asphalt
Fortuna Hangar	North of Navy transceiver	GA	YCAA	38,350	Asphalt
FedEx / Fortuna Hangar	North of Navy transceiver	Freight	YCAA	26,068	Asphalt
U.S. Border Patrol	North of Fortuna Hangar	Government	YCAA	104,348	Non-Paved
West GA Hangar Facility	Northwest of Navy transceiver	GA Aircraft Storage	YCAA	128,870	Asphalt
Lux Air Jet Center	Northwest of Navy transceiver	GA/FBO	YCAA	47,760	Asphalt
Lux Air Jet Center (formerly Bet-Ko Air)	West of Navy transceiver	GA/FBO	YCAA	316,080	Asphalt
Lux Air Jet Center	Southwest of Navy transceiver	GA/FBO	YCAA	518,795	Asphalt
Defense Contractor	Vicinity of Taxiway	Unassigne	YCAA	n/a	Asph/Co

Apron Name or Current Tenant Complex	Location F1	Used	Apron Maintenance Responsibility	Apron Area (sf) [1/]	Pavement Type nc
40th Street	North of Taxiway H2	Unassigned	YCAA	78,750	Concrete
West Visiting Aircraft Line	South of Taxiway H2	Large Aircraft Parking	YCAA	160,000	Concrete
MCAS Yuma	East airfield	Military	USMC	2,100,000	Concrete
MCAS Yuma Aircraft Run-up Apron	Adjacent to Taxiway G	Military	USMC	n/a	n/a
MCAS Yuma Aircraft Run-up Apron	Adjacent to Taxiway C	Military	USMC	n/a	n/a
MCAS Yuma Aircraft Run-up Apron	Adjacent to Taxiway B	Military	USMC	n/a	n/a
MCAS Yuma North Combat Aircraft Loading	Southwest of MCAS main apron	Military	USMC	700,000	Concrete
MCAS Yuma South Combat Aircraft Loading	Southwest of MCAS main apron	Military	USMC	1,100,000	Concrete

Note:
1/ Apron area quantities taken from lease documents and aerial photos. Does not include square footage associated with buildings or undeveloped land.
Sources: Ricondo & Associates, Inc., May 2008, based on Yuma County Airport Authority, 2008 (lease documents), and Geodetix, Inc., May 2008 (aerial photography).
Prepared by: Ricondo & Associates, Inc., March 2009.

Navigational Aids and Airfield Lighting

The MCAS Yuma/USMC is responsible for maintaining the navigational aids and airfield lighting at the Airport and MCAS Yuma. High intensity runway lights (HIRL) outline the runway edges and threshold lights identify all runway ends. The taxiways are equipped with medium intensity taxiway lights (MITL). Runway 21R is equipped with a medium-intensity approach lighting system with runway alignment indicator lights (MALSR) that provides a visual guide to the runway threshold. Runways 3L-21R and 3R-21L have precision approach path indicators (PAPI) that provide a visual indication of an aircraft's position on the glide path for the associated runway. The airfield has a single lighted wind tee located midfield, as well as windsocks located near the touchdown zones of the runway ends. The airfield is also equipped with a rotating beacon, located approximately 1,800 feet east of the southwest corner of MCAS Yuma apron that provides general identification of the airfield location to pilots at night and

during periods of reduced visibility. A summary of the approach aids and lighting systems is presented in **Table II-4**.

Table II-4 Navigational Aids and Airfield Lighting

Runway	Runway Markings	Runway Lighting	Approach Visibility Minimums Ceiling (ft) / Visibility	Approach Types	Navigational Aids
3L	Precision	HIRL, PAPI, OLS	100 / ½ mile	PAR/ASR, TACAN, HI-TACAN	TACAN,
21R	Precision	HIRL, PAPI, MALSR	100 / ½ mile	PAR/ASR, TACAN, HI-TACAN, ILS/LOC, RNAV (GPS) VOR/DME	ILS, LOC, TACAN, VOR/DME
3R	Non-precision	HIRL, PAPI, OLS	400 / 1 mile [1/]	PAR/ASR	
21L	Non-precision	HIRL, PAPI	400 / 1 mile [1/]	PAR/ASR	
8	Visual	HIRL	1,000 / 3 miles	Visual	
26	Visual	HIRL	1,000 / 3 miles	Visual	
17	Non-precision	HIRL, VASI	481 / 1 mile	TACAN, RNAV (GPS), VOR/DME	TACAN,VOR/DME
35	Non-precision	HIRL, REIL	1,000 / 3 miles	Visual	

Notes:

1/ For Approach Category A, B, and C aircraft.

ASR = Airport Surveillance Radar
GPS = Global Positioning System
HI-TACAN = High Tactical Air Navigation Aid
ILS = Instrument Landing System
LOC = Localizer
MALSR = Medium Intensity Approach Lighting System with Runway Alignment Indicator Lights
OLS = Optical Landing System
PAPI = Precision Approach Path Indicator
PAR = Precision Approach Radar
REIL = Runway End Identifier Lights
RNAV = Area Navigation
TACAN = Tactical Air Navigation Aid
VASI = Visual Approach Slope Indicator
VOR/DME = Very High Frequency Omnidirectional Range with Distance Measuring Equipment

Sources: U.S. Department of Transportation, *Airport/Facility Directory, Southwest U.S.*, Effective February 14, 2008; Federal Aviation Administration, *Digital Terminal Procedures*, Effective March 12, 2009,

http://naco.faa.gov/index.asp?xml=naco/online/d_tpp (accessed March 30, 2009); Yuma County Airport Authority, *Yuma International Airport, Airport Master Plan*, September 14, 1999.

Prepared by: Ricondo & Associates, Inc., March 2009.

Passenger Terminal Area

The existing passenger terminal building at the Airport is located south of 32nd Street just north of Runway 8-26. The original terminal was constructed in 1968 and expanded in 1980 and 1986 to encompass approximately 14,000 square feet. The original terminal building was demolished in 1999, and replaced by a new passenger terminal building adjacent to the original terminal site. The new terminal is rectangular, with its north face facing 32nd Street, and is shown in Figure 6**.**

Figure 6 - Terminal Building – North Face

The two-level terminal is approximately 49,000 square feet and includes the service areas listed in **Table II-5**. Passenger amenities such as concessions, vending machines, wireless Internet, an ATM, telephones, a conference room, and flight information display monitors are located on the terminal's lower level. The current main floor terminal layout plan is depicted in Figure 7.

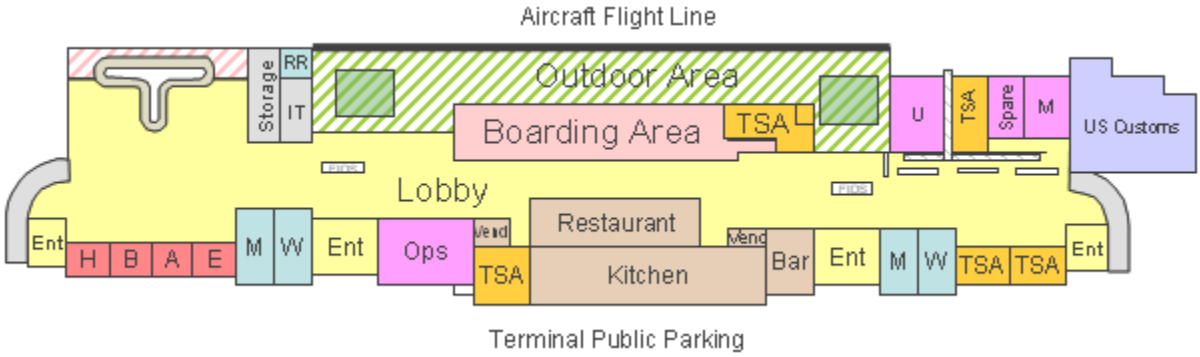

Figure 7 - Terminal Building – Existing Layout, Lower Level

The upper level, shown in Figure 8, includes the YCAA administrative offices, a conference room, a reserved military lounge and meeting space. A publically available Event Center is also located on the upper level.

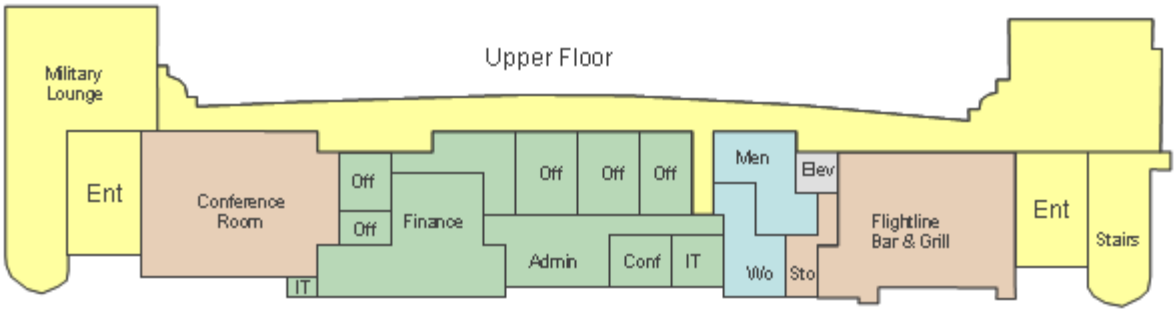

Figure 8 - Terminal Building – Existing Layout, Upper Level

Table II-5 Terminal Building Space Allocation

Lower Level		Area (Square Feet)
Public Circulation		13,635
Secure Passenger Waiting Area/Outdoor Atrium		5,920
Concessions		4,051
Airline and Ticket Counter Space		3,685
Boarding Area		2,250
U. S. Customs and Border Protection		2,030
Baggage Claim		1,920
Restrooms		1,750
Baggage Handling		1,110
Rental Car Counter and Offices		1,060
Airport Operations Office		1,023
TSA Screening and Offices		972
Mechanical/Airport Storage		760
	Total Lower Level	40,166
Upper Level		
YCAA Administrative Offices		2,850
Event Center		1,140
Restrooms		500
Public Circulation		3,235
Conference Room		1,050
	Total Upper Level	8,775
	Total Terminal	48,941

Note: TSA = Transportation Security Administration
Sources: Steven R. Fischer Architect, April 2008 (base map for square footage calculations); Ricondo & Associates, Inc., March 2009.
Prepared by: Ricondo & Associates, Inc., March 2009.

Airline and Ticket Counter Space

Airline ticket counters and offices are located in the western portion of the lower level of the terminal building. Two passenger airlines serve the Airport: United Airlines through United

Express, and US Airways through US Airways Express. Each airline occupies ticket counter space and has offices for administrative and operations functions. With the current level of operations, the ticket counters are sufficient to accommodate the needs of the airlines serving the Airport. A typical airline ticket counter is shown in Figure 9.

Figure 9 - Ticket Counters

Security Screening and Boarding Area

The boarding area is centrally located on the south side of the lower level of the terminal building. Ticketed passengers clear TSA security screening before entering the secure boarding area. Two gates currently serve the commercial flights offered by the airlines serving the Airport. Because the terminal was constructed prior to September 11, 2001, security screening and boarding area space is limited. Originally, an outdoor area adjacent to the indoor boarding area space was constructed for use as a secure passenger waiting area/outdoor atrium. Because of its close proximity to the aircraft parking apron, this space cannot be used for its originally intended purpose. The boarding area and outdoor atrium are shown in Figure 10 and Figure 11.

Figure 10 - Boarding Area

Figure 11 - Boarding Area Atrium

Concessions/Sales and Restrooms

The main concessions area is centrally located on the lower level, across from the passenger boarding area, in the non-secure landside portion of the terminal. The concessions/sales space includes a cafeteria and bar. On the upper level of the terminal building, space previously used as a restaurant area has been converted to an event center. A vending machine is provided in the secure boarding area. Landside restrooms are located east and west of the restaurant. There are no restrooms in the secure boarding area. A portion of concessions area is shown in Figure 12.

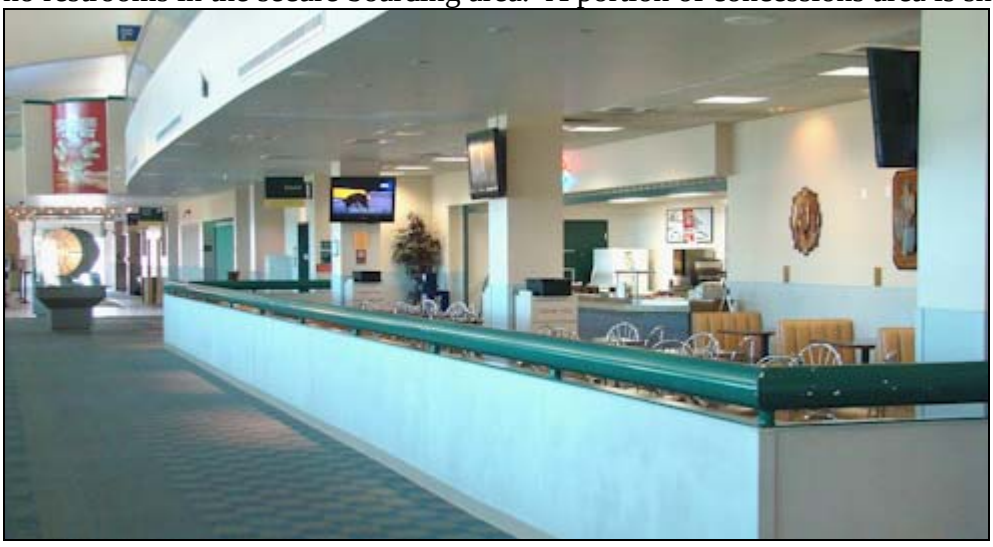

Figure 12 - Airport Restaurant

Baggage Claim

A single bag belt is provided, with an adjacent baggage handling area in the southeastern portion of the lower level. This device, currently used by two airlines, is shown in Figure 13.

Figure 13 - Baggage Claim Area

Rental Car Facilities

Counters and administrative office space are provided for the rental car companies across from the baggage claim area. The rental car companies currently operating at the Airport include Avis, Budget, Hertz and Enterprise. A portion of the rental car counter area is shown in Figure 14**.**

Figure 14 = Car Rental Counters

The rental car maintenance facility is located northeast of the terminal, in the former Airport maintenance building. The building is approximately 2,400 square feet, and accommodates maintenance, servicing and cleaning of rental vehicles, and is shown in Figure 15.

Figure 15 - Hertz Rental Car Service Facility

YCAA Administrative Offices

The YCAA administrative offices are located on the upper level of the terminal building. An office reception area, conference room and other administrative functions are accommodated in this area. Two stairways and an elevator provide access between the upper and lower levels. Additional public restrooms are also located on the upper level such as the reserved seating area for military personnel as shown in Figure 16.

Figure 16 - Upper Level Reserved Military Seating Area

Airport Operations Office

The Airport Operations office is located on the lower level of the terminal building, east of the concessions area. This provides office, communications, lockers, and storage space, in addition to a holding room.

Airport Access and Parking

Landside access to the passenger terminal area is provided via 32nd Street/Highway 80 and South Pacific Avenue from the north. The terminal loop roadway begins at the termination of South Pacific Avenue and passes in front of the terminal building and encircles the long- and short-term public parking areas.

Airport Roadways
Interstate 8 is the east-west corridor from Yuma toward San Diego to the west and toward Phoenix to the northeast. The Airport is located in the southern portion of the City of Yuma and is accessible via Highway 95 or Interstate 8 from the downtown area. The Airport is bordered by:
East 32nd Street / Highway 80 / County 11th Street to the north,
South Avenue 3 East to the east,
East County 14th Street South to the south, and
various roads, including South Fortuna Avenue, South 4th Avenue, South Avenue 1 East (South Arizona Avenue), and East 40th Street to the west.
The on-Airport terminal loop roadway, to the north of the passenger terminal, connects the terminal curbfront, various parking areas, and rental car facilities and serves as the link between the regional highway system and the terminal area.

Terminal Curbfront
When construction of the current terminal building was completed, the public parking, access, and curbfront areas were also improved. The terminal curbfront is single-level, with drop-off and pickup locations near the ticket counters and baggage claim areas, respectively. Under typical circumstances, there are no congestion concerns at the curbfront on on-Airport roadways.

Vehicle Parking
Various vehicle parking areas are provided near the terminal building. They are depicted in Figure 17 and summarized in **Table II-6.**

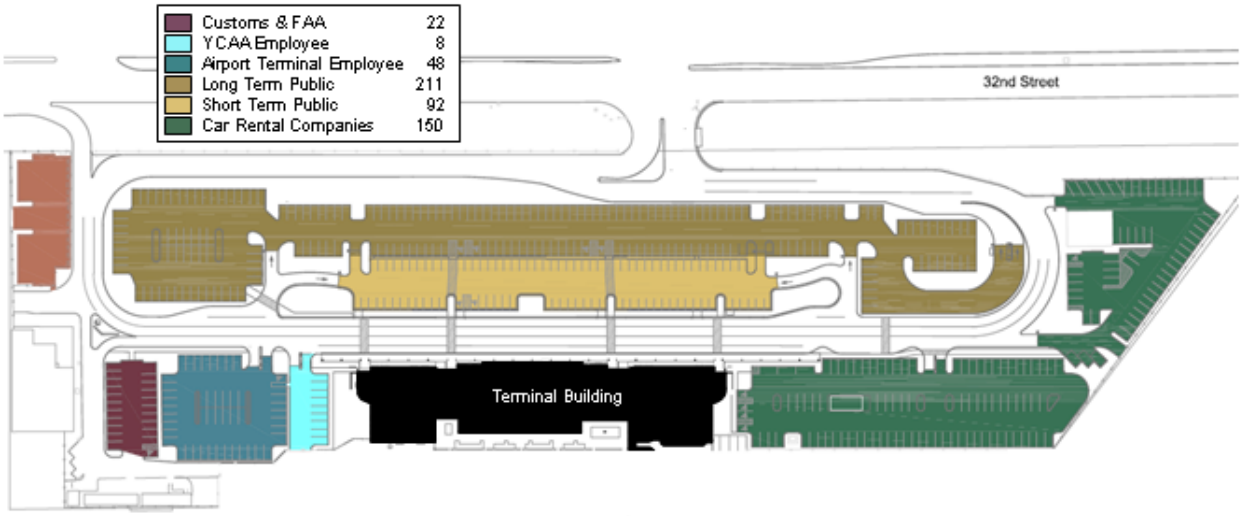

Figure 17 - Terminal Area – Vehicle Parking Facilities

Table II-6 Terminal Area Parking Allocation

Parking Area	Location	Number of Stalls
Customs & FAA	West of Non-YCAA parking lot	22
Employee (YCAA)	Adjacent to west side of terminal	8
Employee (Non-YCAA)	West of YCAA Employee parking lot	48

Employee (YCAA Airport Maintenance)	West of Long-Term parking	24
Rental Car	Ready lot - Adjacent to Passenger Terminal, 93 stalls Return lot and Maintenance Facility – Northeast of Passenger Terminal, 57 stalls	150
Non-Public Parking Total		**252**
Long-Term Public	North of Passenger Terminal and Short-Term Public parking	211
Short-Term Public	North of Passenger Terminal	92
Public Parking Total		**303**
Public and Non Public Parking Total		**555**

Source: Ricondo & Associates, Inc., February 2008, based on Yuma County Airport Authority, 2008 (as-built drawing and YCAA staff input), and Geodetix, Inc., May 2008 (aerial photography).
Prepared by: Ricondo & Associates, Inc., May 2008.

FBO and GA Facilities

Two FBOs and numerous other tenant facilities, as well as YCAA-owned facilities, are located within two GA areas at the Airport – one GA area is located in the northwest airfield, and the second is west of Runway 3L-21R and Taxiway Z in the west airfield area. The GA tenants at the Airport and their associated leaseholds are discussed below. The approximate areas presented were obtained from the leasehold documents provided by the YCAA. The overall GA facilities are presented in Figure 18.

Figure 18 – Main General Aviation Area

Lux Air Jet Center

Lux Air Jet Center, formerly Sun Western Flyers, provides FBO services including full-service 100LL and Jet-A fueling. Lux Air Jet Center currently leases facilities space adjacent to, and south of the West GA Hangar facility, as shown in Figure 19.

Figure 19 - West GA Area

The first area leased by Lux Air Jet Center is west of the Navy transceiver site, and east of the West GA Hangar Facility T-shades. This 55,760-square-foot site includes 47,760 square feet of apron and an 8,000-square-foot aircraft maintenance hangar. Landside access is provided via Burch Way.

The second area is the former Bet-Ko Air leasehold, which as been acquired by Lux Air Jet Center. It is located west of the Navy transceiver site and south of Lux Air's property described above. The leasehold consists of a total of 333,100 square feet, which includes: 316,080 square feet of apron, a hangar consisting of 2,460 square feet of office space and 6,560 square feet of hangar space on the north edge of the leasehold, and an 8,000-square foot hangar, along the south edge of the leasehold. Landside access is provided via Burch Way. This former Bet-Ko Air property, now leased by Lux Air Jet Center, is shown in Figure 20.

Figure 20 - Lux Air Jet Center

The third area is southwest of the Navy transceiver site. The 610,775-square foot site includes

518,795 square feet of apron, two temporary office trailers used by aircrews and for maintenance, and 91,980 square feet of unimproved land for the current development of Lux Air Jet Center's new FBO, which will include a Terminal (5,000 square feet), two hangars (8,000 square feet each), and 30 vehicle parking stalls. Landside access is provided via Burch Way. Figure 21shows a rendering of Lux Air's new FBO/Terminal currently under development. The facility will be considered an existing facility for the analyses in this Airport Master Plan. Lux Air Jet Center's combined leaseholds consist of a total of approximately 999,650 square feet, which includes approximately 882,650 square feet of existing apron, and approximately 46,000 square feet of hangars/buildings including both existing and those under development.

Figure 21 - New Lux Air Jet Center (Planned)

CareFlight Aviation Center

CareFlight Aviation Center, formerly Diamond Air Jet Center, provides FBO services and is located west of Taxiway Z1, as shown in Figure 19. CareFlight's 129,683-square foot leasehold includes 113,856 square feet of apron (including approximately 20 aircraft tie-down positions), 1,600 square feet of hangar space, 700 square feet of office area, 7,885 square feet of landside access and parking, including 7 vehicle parking stalls adjacent to the building, 5,450 square feet of unimproved land, and a 192-square foot storage building. CareFlight also provides self-serve 100LL and Jet-A fueling. Landside access is via Fortuna Avenue. Figure 22 shows the CareFlight Aviation Center.

Figure 22 CareFlight Aviation Center

YCAA-owned GA Facilities

YCAA provides GA facilities that include aircraft storage hangars and T-shades for aircraft based at the Airport. YCAA owns and maintains the Northwest GA Hangar Facility, the West GA Hangar Facility, and the Fortuna Hangar.

1.1.1.20 Northwest GA Hangar Facility

The Northwest GA Hangar Facility is located at the northwest corner of the Airport near the intersection of East 32nd Street and Fortuna Avenue, shown in Figure 23. Airside access is via Taxiway Z. The facilities include three hangars. Building One comprises five square box hangar units, approximately 2,400-square feet each, totaling approximately 12,000 square feet. Building Two comprises four nested T-hangars, approximately 900 square feet each, totaling approximately 3,600 square feet. Building Three comprises four nested T-hangars, approximately 1,600 square feet each, totaling approximately 6,400 square feet. The aircraft parking apron is approximately 81,800 square feet. Landside access is provided through Gate 3N from Fortuna Avenue. Approximately 64 vehicle stalls are provided for the Northwest GA Hangar Facility on the perimeter of the apron, and in the parking lot to the south of the apron. The Northwest GA Hangar Facility is owned and maintained by the YCAA.

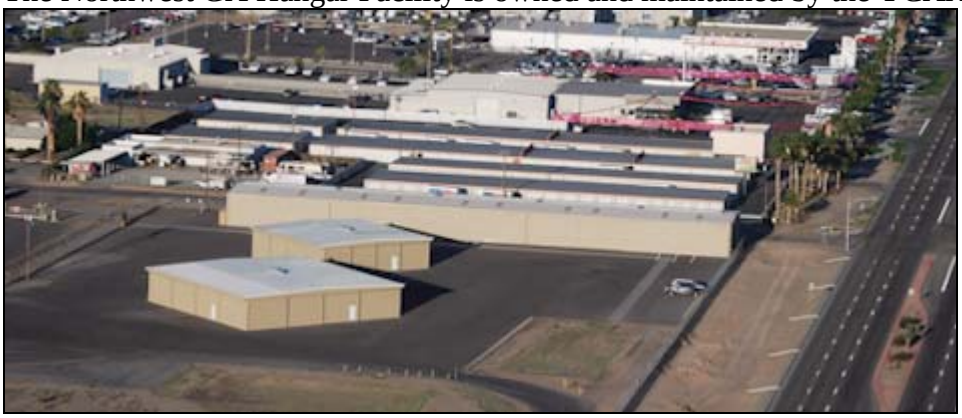

Figure 23 - Northwest GA Hangars

1.1.1.21 West GA Hangar Facility

The West GA Hangar Facility is located on the west side of the airfield, with airside access via Taxiway Z2, as shown on shown in Figure 19. The facility includes the following aircraft storage hangars: two sets of rectangular box hangars, two sets of T-hangars, and four rows of T-shades. Building A comprises four rectangular box hangar units, approximately 4,225 square feet each, totaling approximately 17,000 square feet. Building B comprises eight rectangular box hangar units, approximately 3,125 square feet each, totaling approximately 25,000 square feet. Building C comprises 11 nested T-hangars, approximately 1,400 square feet each, totaling approximately 16,800 square feet. Building D comprises 12 nested T-hangars, approximately 1,200 square feet, totaling approximately 15,600 square feet. The T-shades comprise four rows of 6 units (24 units total), approximately 1,000 square feet each, totaling approximately 24,000 square feet.

The West GA Hangar Facility apron is approximately 128,870 square feet. The West GA Hangar Facility also includes restrooms and an aircraft wash rack. Landside access is through Gate 7W from Burch Way. Approximately 46 vehicle parking stalls are provided for the West GA Hangar Facility, 21 stalls in the parking lot to the west of the T-hangars, and 25 stalls located

south of the T-shades. The West GA Hangar Facility is owned by the YCAA. T-shades are shown in Figure 24.

Figure 24 - West GA T-Shades

1.1.1.22 Fortuna Hangar

The Fortuna Hangar (formerly J-Mar) is a six-unit T-hangar facility located north of the Navy Transceiver Site, shown in Figure 19. Each unit is approximately 2,100 square feet, totaling 12,500 square feet. Approximately 20 parking stalls are located north of FedEx's hangar, on both sides of Fortuna Avenue. The Fortuna hangar is owned by the YCAA, and maintained by the Federal government.

FedEx leases 28,462 square feet on the east end of the Fortuna Hangar (as shown in Figure 25). The lease area includes a 2,394-square foot hangar and 26,068 square feet of apron.

Figure 25 - FedEx Operations from Fortuna Hangar Location

U.S. Customs and Border Protection

The U.S. Customs and Border Protection is responsible for the inspection of all passengers and aircraft entering the U.S. at the Airport and is available on a scheduled basis. They lease two

areas on the Airport. The first is located within the passenger terminal and occupies approximately 2,030 square feet, and is shown in Figure 26.

Figure 26 - U.S. Customs and Border Protection at Passenger Terminal

The second area is located within the GA area, located north of the Fortuna Hangar, with airside access via Taxiway Z2. The site encompasses 114,098 square feet, comprises a 9,750-square foot maintenance hangar and 104,348 square feet of unpaved apron, from which the U.S. Customs and Border Protection bases its local helicopter operations. Two temporary structures are also located on this site; a trailer and a shade tent. Landside access is through Gate 7W from Burch Way. The U.S. Customs and Border Protection's helicopter pads located in the GA area are shown in Figure 27.

Figure 27 - U.S. Customs and Border Protection Helicopter Operations

Ancillary Facilities

Airport support facilities that accommodate both aviation and non-aviation related services are discussed below, including:
Air Cargo
DCC
West Visiting Aircraft Line and 40th Street Apron
Airport Maintenance
Aviation Fuel
Aircraft Rescue and Fire Fighting (ARFF)
Military Facilities

Air Cargo

Currently no buildings at the Airport are dedicated solely to air cargo. As discussed in Section 2.3.3.3 of this document, FedEx leases space at the Fortuna Hangar facility. DHL and United Parcel Service (UPS) facilities are located off-Airport. Currently, these operators transfer freight directly from the aircraft to vehicles on the apron.

DCC

Airside access to the DCC area is via Taxiway F1 and landside access is from 40th Street and Arizona Avenue. The DCC area currently consists of various paved and concrete pads, a 10,000 square foot aircraft maintenance facility and a 15,000 SF Hangar. The DCC site is owned and maintained by the YCAA. The DCC area is depicted in Figure 28.

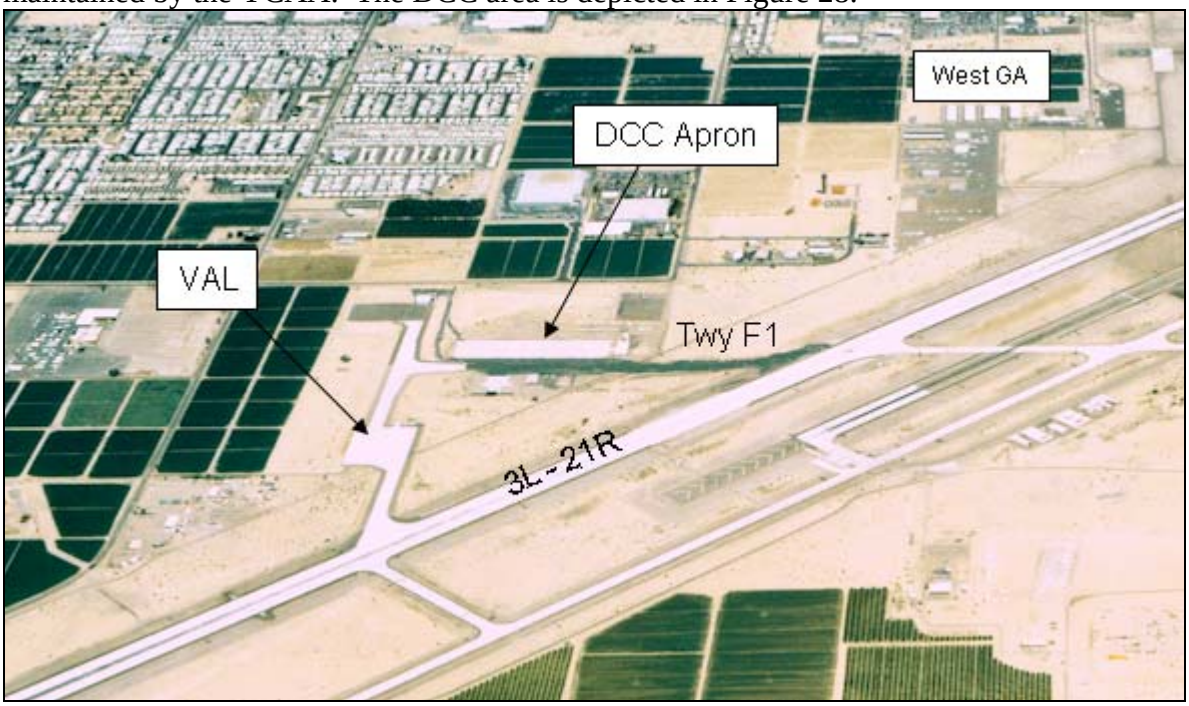

Figure 28 - DCC Area

West Visiting Aircraft Line and 40th Street Apron

There are currently two aircraft aprons west of the DCC. The West Visiting Aircraft Line is constructed of concrete, encompasses approximately 160,000 square feet, and is accessible via

4th Avenue or the Airport Loop. The 40th Street Apron is located northwest of the DCC and encompasses approximately 78,750 square feet. Landside access is via East 40th Street and Arizona Avenue. The West Visiting Aircraft Line and the 40th Street Apron are depicted in Figure 28. The West Visiting Aircraft Line is shown in Figure 29.

Figure 29 - Visting Aircraft Line (in DCC)

Source: Yuma County Airport Authority, August 2008.
Prepared by: Ricondo & Associates, Inc., August 2008.

Airport Maintenance Facility

The Airport maintenance facility is located west of the passenger terminal. The facility comprises approximately 190,475 square feet of apron space, and a hangar comprised of 3,000 square feet of storage/maintenance area, 1,200 square feet of shop space, and approximately 1,547 square feet of office space.

The FAA's Airways Facilities Office occupies the office space within the Airport maintenance facility, as well as a 220-square foot maintenance building located south of the hangar. Landside access is via 32nd Street (Business Route 8). The Airport maintenance building is shown in Figure 30.

Figure 30 - Airport Maintenance

Aviation Fuel

All civil aviation fuel storage and dispensing facilities at the Airport are privately owned and operated. The current fuel storage and years of tank installation are as follows: Lux Air Jet Center (former Bet-Ko Air) operates two 10,000 gallon 100 LL Avgas underground tanks, installed in 1988, and a 20,000 gallon Jet A underground tank, installed in 1991; CareFlight Aviation Center operates two above-ground tanks, one 12,000 gallon 100LL, and one 12,000

gallon Jet-A, both installed in 2002.[10] Fuel is dispensed through both self-serve pumps and mobile fuel delivery trucks. Figure 31 depicts CareFlight's two above ground tanks. A summary of the civil aviation fuel facilities at the Airport is presented in **Table II-7**.

Figure 31 - CareFlight Fuel Farm

Table II-7 Civil Aviation Fuel Facilities Summary

Provider	Storage Capacity (# of tanks, quantity in gals.) 100LL	Jet-A	Tank Location	Above or Below Ground Tanks	Full or Self-Serve
Lux Air Jet Center (former Bet-Ko Air)	(2) 10,000	(1) 20,000	Ramp	Under	Full
CareFlight Aviation Center	(1) 12,000	(1) 12,000	Ramp	Above	Full & Self-Serve

Sources: Yuma County Airport Authority, *Yuma International Airport, Airport Master Plan*, September 14, 1999; CareFlight Aviation Center, July 22, 2008 (tenant interview); Yuma County Airport Authority, November 2008 (YCAA staff input).
Prepared by: Ricondo & Associates, Inc., November 2008.

ARFF

ARFF services are provided by MCAS Yuma fire fighting personnel. The ARFF station is located in the east airfield, on the MCAS Yuma apron, and is shown in Figure 3. Airports with daily scheduled air carrier service are required to provide ARFF services. The index determination and equipment requirements are determined by the standards in Federal Aviation

[10] Yuma County Airport Authority, *Yuma International Airport,, Airport Master Plan*, September 14, 1999 (Lux Air data, includes facilities formerly operated by Yuma Jet Center and Sun Western Flyers); CareFlight, July 22, 2008 (tenant interview).

Regulations (FAR) Part 139, *Certification of Airports.* Figure 32 presents a photo of a representative A/S 32P-19A fire fighting truck, as operated at MCAS Yuma.

Figure 32 - Typical MCAS P-19 ARFF Vehicle

As stated in FAR Part 139.315, the ARFF index is determined by the length of the air carrier aircraft, and the number of average daily departures of air carrier aircraft. For the purpose of determining the ARFF index, the lengths of the air carrier aircraft are categorized into 5 groups, A through E. Index A includes aircraft less than 90 feet in length. Index B includes aircraft at least 90 feet but less than 126 feet in length. Index C includes aircraft at least 126 feet but less than 159 feet in length. Index D includes aircraft at least 159 feet but less than 200 feet in length. Index E includes aircraft at least 200 feet in length. Except as provided in FAR Part 139.319(c), if there are five or more average daily departures of air carrier aircraft in a single Index group serving the airport, the longest aircraft with an average of five or more daily departures determines the Index required for the Airport. When there are fewer than five average daily departures of the longest air carrier aircraft serving the airport, the Index required for the airport will be the next lower Index group than the Index group prescribed for the longest aircraft. The minimum designated index requirement shall be Index A.

Table II-8 presents the current average daily air carrier departures, as of July 2008, by aircraft make, aircraft length, and ARFF Index. The number of daily departures and the specific fleet mix varies within the calendar year, depending on peak travel seasons. Aircraft utilized by air carriers include, CRJ-200, Embraer 120, and DeHavilland Dash 8-300, which are all Index A aircraft. Based on the July 2008-scheduled air carrier aircraft operating at the Airport, the Airport is categorized as ARFF Index A.

Table II-8 Average Daily Air Carrier Departures

Type Aircraft	Average Number of Daily Departures [1/]	Aircraft Length	ARFF Index
CRJ – 200	2	87’ 10”	A
EMB 120	4	65’ 7”	A
DeHavilland Dash 8 - 300	5	84’ 3”	A
Total Departures	11		

Note:

1/ The number of daily departures and the specific fleet mix varies within the calendar year, depending on peak travel seasons. The number of departures presented is an estimated average of annual of operations.

Source: Ricondo & Associates, Inc., July 2008, based on Delta, *Canadair Regional Jet 100 (CRJ), Aircraft Specifications*, http://www.delta.com/planning_reservations/plan_flight/aircraft_ types_layout/crj-100/index.jsp (accessed July 15, 2008); SkyWest Airlines, *EMB120 Fact Sheet*, http://www.skywest.com/about/emb.php (accessed July 15, 2008); Bombardier, Inc., Q300 Specifications, http://www.bombardier.com/en/aerospace/products/commercial-aircraft/q-series (accessed July 15 2008); Federal Aviation Administration, FAA AC 150/5300-13, Change 14, *Airport Design*, November 1, 2008.

Prepared by: Ricondo & Associates, Inc., November 2008.

As stated in FAR Part 139.317, Index A airports require the following minimum ARFF equipment and agents: and firefighting equipment and agents: one vehicle carrying at least 500 pounds of sodium-based dry chemical, Halon 1211, or clean agent; or 450 pounds of potassium-based dry chemical and water with a commensurate quantity of AFFF to total 100 gallons for simultaneous dry chemical and AFFF application. Furthermore, ARFF vehicles that carry dry chemical, Halon 1211, or clean agent for compliance with the Index requirements, must meet one of the following minimum discharge rates for the equipment installed: dry chemical, Halon 1211, or clean agent through a hand line at 5 pounds per second; dry chemical, Halon 1211, or clean agent through a turret at 16 pounds per second. Other extinguishing agent substitutions authorized by the FAA Administrator may be made in amounts that provide equivalent firefighting capability. In addition to the quantity of water required, each vehicle required to carry AFFF must carry an appropriate amount of AFFF to mix with twice the water required to be carried by the vehicle.

Table II-9 presents a current inventory of MCAS Yuma ARFF equipment and quantities of agents capable of being carried by that equipment. The YCAA does not own, operate, maintain or provide manpower for this equipment. ARFF services are provided entirely by MCAS Yuma, which operates and provides ARFF services for their military operations, as well as civil operations at the Airport. The current MCAS Yuma ARFF equipment surpasses the requirements for the Airport's FAR Part 139, ARFF Index A, air carrier operations.

Table II-9 MCAS Yuma ARFF Vehicles and Capabilities

Type of Vehicle	Manufacturer	Model	Qty.	Water (gals)	AFFF Foam (gals)	Dry Chem (lbs)	Halon 1211 (lbs)	Roof Turret Discharge Rate	Handline Discharge Rate
Truck, Fire Fighting, ARFF and Structure	Oshkosh West Mark /	A/S 32P-19A	10	1,000	130	n/a	500	500 gpm	Water 60 gpm Halon 5 lbs/sec
Water Tanker	International	P-26	1	5,000	n/a	n/a	n/a	n/a	n/a

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Notes:
AFFF = Aqueous Film Forming Foam
ARFF = Aircraft Rescue and Fire Fighting
gals = gallons
gpm = gallon per minute
lbs = pounds
lbs/sec = pounds per second
n/a = not applicable
Source: MCAS Yuma, August 2008 (ARFF vehicle inventory list).
Prepared by: Ricondo & Associates, Inc., August 2008.

Military Facilities

The MCAS Yuma supports 80 percent of the Marine Corps' air to ground aviation training.[11] Four squadrons of Harriers are stationed at the facility. The base is owned by the USMC through the U.S. Government, and is approximately 5 square miles in size, including the "Airport" property owned by Yuma County. Through a patent, property was conveyed to Yuma County for civil aviation use, including general aviation and air carrier passenger operations. The Airport area (YCAA shared use leasehold) is depicted in Figure 33. The MCAS Yuma provides air traffic control and aircraft rescue and firefighting services for both military and civil aircraft that operate at the Airport.

Security Systems

The Airport maintains a modern security system, including video surveillance, controlled access through pedestrian and vehicular access points, and a sophisticated badging and background check and identification process. These systems are supported by the facilities located within the Airport Operations Offices in the passenger terminal building.

Utility Infrastructure

Yuma International Airport is served by the same public and municipal utilities that provide service to the City of Yuma. Sanitary sewer, water, and storm drainage services are provided by the City of Yuma. Electrical power is provided by Arizona Public Service (APS). Natural gas service is provided by Southwest Gas Corporation. Telephone communication lines are provided by Qwest Communications and cable television and Internet services in the passenger terminal are provided by Time Warner.

Off-Airport Land Use and Zoning

Off-Airport land uses in the vicinity of the Airport are predominantly residential, agricultural and commercial. The Airport lies within the city limits of the City of Yuma, and has planning areas within its immediate environs. The goal within the South Mesa Sub-Regional Planning Area[12] is to preserve and promote agricultural lands and activities, as well as low-density housing. Land

[11] Marine Corps Station Yuma, *Mission Statement*, http://192.156.9.102/info/mission.html (accessed March 2008).
[12] That portion of the Planning Area bounded by County 17th Street on the north, the BMGR and 4E on the east, Mexico border on the south and East Mesa Canal on the west, as presented in *Yuma County 2010 Comprehensive Plan*, *http://www.co.yuma.az.us/dds/ord/2010/Chapter%204D.pdf* (accessed March 2009).

use within the North Gila Valley[13] and Yuma Valley[14] Sub-Regional Planning Area is predominately agricultural.

Certain airport/airfield planning legislation applies to the preservation of military airports. Senate Bill 1525 Chapter 23 "Military Airports Preservation", ensures that cities and counties consider military airports when they undertake comprehensive general development planning studies. Senate Bill 1514 sets forth regulations for planning and zoning relative to military airport compatibility; and House Bill 2523 governs public airport disclosure. In coordination with these legislative bills, several mandates must be met in regard to land use and development in the vicinity of military airports. In the vicinity of the Airport/MCAS Yuma, rezoning proposals, development proposals, and special use permits must also be in compliance with the regulations provided in the legislation.

Specific requirements are to be addressed in coordination with Senate Bill 1525 , one of which is that a 30-day minimum notification period must be given to the military airport authorities for a hearing on construction of a new school adjacent to or in the vicinity of a military airport. Noise levels for properties around the airport must also be disclosed. Additionally, sound attenuation standards must be met for residential buildings that have been developed prior to 2001.

[13] That portion of the Planning Area bounded by the Colorado River, Martinez Lake, the U.S. Army Yuma Proving Ground and Gila Mountains on the west, north and east. The southern border is bounded by sections of the Gila Gravity Main Canal and Southern Pacific Railroad tracks west to County 7th Street extending to Fort Yuma and the California border, as presented in *Yuma County 2010 Comprehensive Plan, http://www.co.yuma.az.us/dds/ord/2010/Chapter%204D.pdf* (accessed March 2009).

[14] That portion of the Planning Area bounded by the JLUP and East Main Canal on the east, the Mexico border on the south and Colorado River on the west. as presented in *Yuma County 2010 Comprehensive Plan, http://www.co.yuma.az.us/dds/ord/2010/Chapter%204D.pdf* (accessed March 2009).

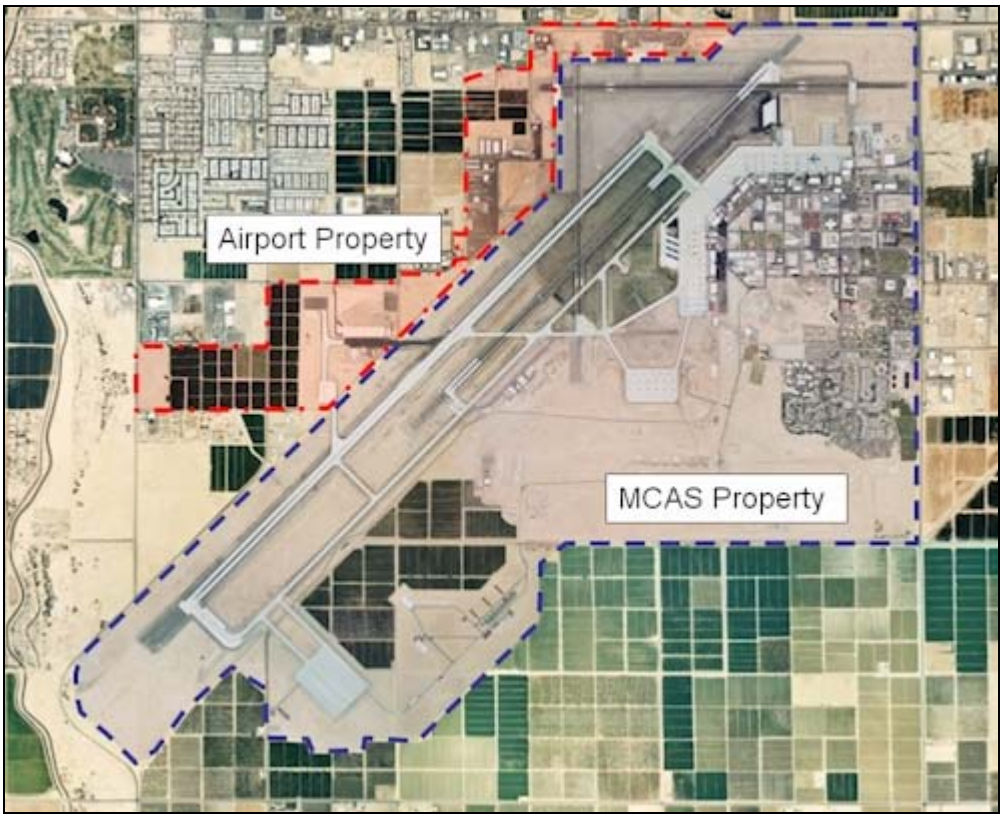

Figure 33 - Airport Property Boundaries

Airspace Environment

The airspace environment that affects aircraft operating at the Airport includes the airspace itself and air traffic control.

Airspace

The airspace surrounding the Airport is predominantly designed to accommodate military activity in the region. The Airport is located within Class D airspace, which is generally defined as airspace from the surface to 2,500 feet above the airport elevation surrounding the airport with an operational airport traffic control tower (ATCT). Each aircraft pilot must establish two-way radio communication with the ATCT controller providing air traffic services prior to entering the airspace and thereafter maintain those communications while in the airspace.[15] The ATCT is owned and operated by MCAS Yuma and generally operates weekdays from 7:00 a.m. to midnight, but changes frequently due to military operations. The ATCT does not observe daylight savings time. When the ATCT is closed, this airspace reverts to Class E airspace (un-controlled). Figure 34depicts the NYL[16] airspace.

[15] Federal Aviation Administration, *Pilot/Controller Glossary*, February 14, 2008, http://www.faa.gov/airports_airtraffic/air_traffic/publications/media/pcg.pdf (accessed April 30, 2008).

[16] FAA designation for the Yuma International Airport.

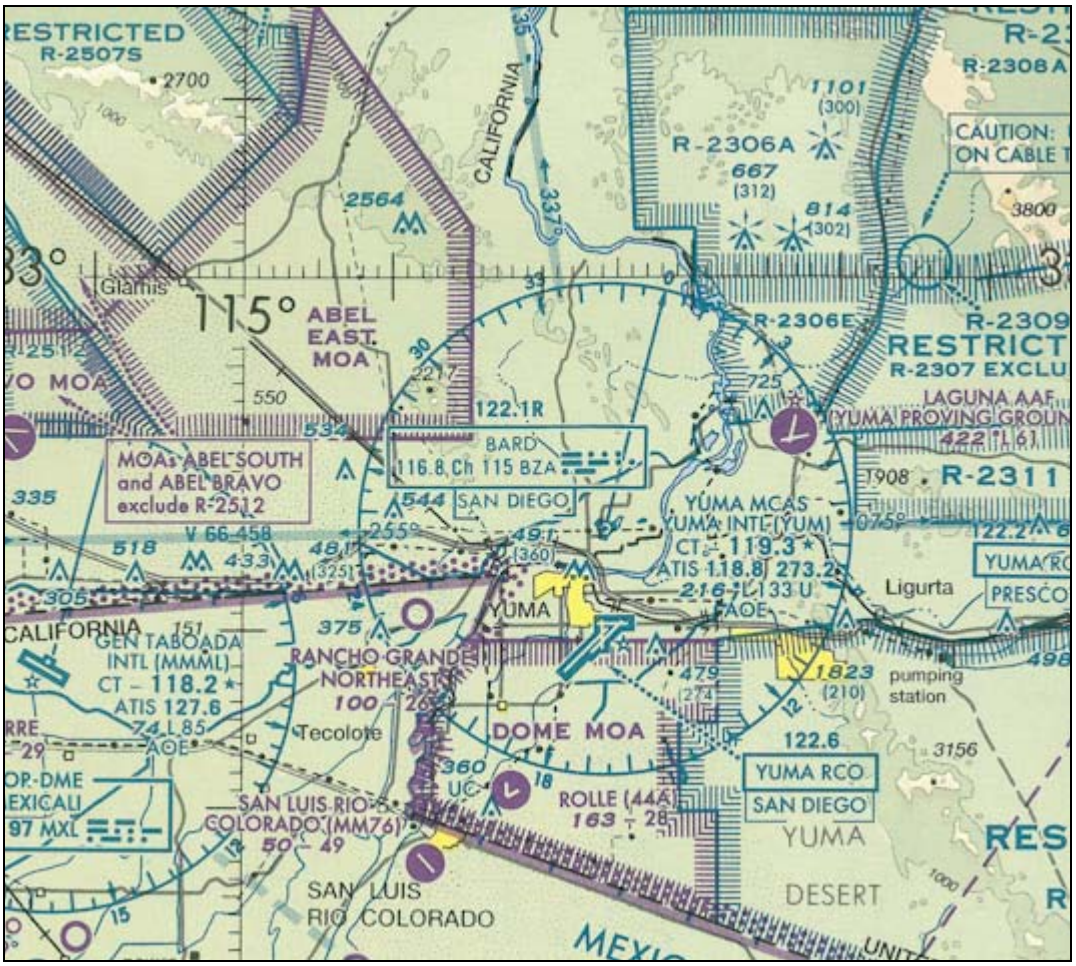

Figure 34 - Local Airspace Chart

The majority of the airfield itself is included within an area of special-use airspace designated as a Military Operations Area (MOA). The MOA, specifically known as the Dome MOA, begins south of Runway 8-26 and extends both west and south to the U.S.-Mexico border and east to where it abuts restricted airspace area R-2301W. Civil operations within an MOA are not prohibited; however pilots of private aircraft are cautioned to remain alert for military aircraft while operating in the MOA. Military operations within the Dome MOA are intermittent and the schedules for military activity may be obtained via a Notice to Airmen (NOTAM), where reserved blocks of time prohibit, restrict, or otherwise dictate civil aircraft operations. Military operations within the Dome MOA are conducted at altitudes above 6,000 feet above MSL. Numerous restricted areas for flight activity are in place around the Airport to protect and more closely monitor the flight activity in the area.

The Imperial National and Cibola Wildlife Refuges, as well as the Muggins and Trigo Mountains Wilderness Areas, are located in the vicinity of the Airport. While aircraft operations are not restricted over these areas, pilots are requested to maintain a minimum altitude of 2,000 feet above the surface. For aircraft en route to or departing from the area using VOR navigational facilities, a system of federal airways, referred to as Victor Airways, has been established by the FAA. Victor Airways are corridors of airspace 8 miles wide that extend upward from 1,200 feet above MSL to 18,000 feet above MSL and extend between VOR navigational facilities.

Airport Traffic Control Tower

Aircraft operating within the Class D airspace surrounding the Airport are controlled by USMC Air Traffic Control personnel, provided by the MCAS Yuma. The Control Tower Branch is responsible for aircraft operating both on the airfield, and within MCAS Yuma's Class D airspace. The site is a combined Center and Approach Control facility responsible for airspace outside of the Class D airspace. This is generally within a 60 nautical mile radius of the air station from the surface to 23,000 feet MSL and within designated Special Use Airspace up to 80,000 feet MSL.[17] The ATCT is located west of the West GA Hangar Facility, as depicted in Figure 19. The site includes: a maintenance building, approximately 8,000 square feet located to the northeast of the ATCT, an office building, approximately 4,750 square feet, located to the south of the ATCT, and vehicle parking. The ATCT is owned, operated and maintained by MCAS Yuma. Landside access is via East 39th Street and South Pico Way. The ATCT is shown on the following page.

Meteorological Conditions

The climate of Yuma is typical for the low desert region of southwestern Arizona. Average annual precipitation is approximately 3.20 inches, peaking in January, August, September, and December. The normal daily mean temperatures for Yuma range from an annual high of 93.7 degrees Fahrenheit in July to an annual low of 56.4 degrees Fahrenheit in December. July has the highest daily mean maximum temperature, averaging 106.6 degrees Fahrenheit. On average 52 days per year are considered cloudy, with 242 days on average perceived as clear, and 71 days on average noted as partly cloudy. In addition to the mild change in visibility, wind speeds are normally light, averaging 7.8 miles per hour.

[17] Marine Corps Air Station Yuma, Air Traffic Control Division, http://192.156.9.102/services/atc/default.htm (accessed March 31, 2008).

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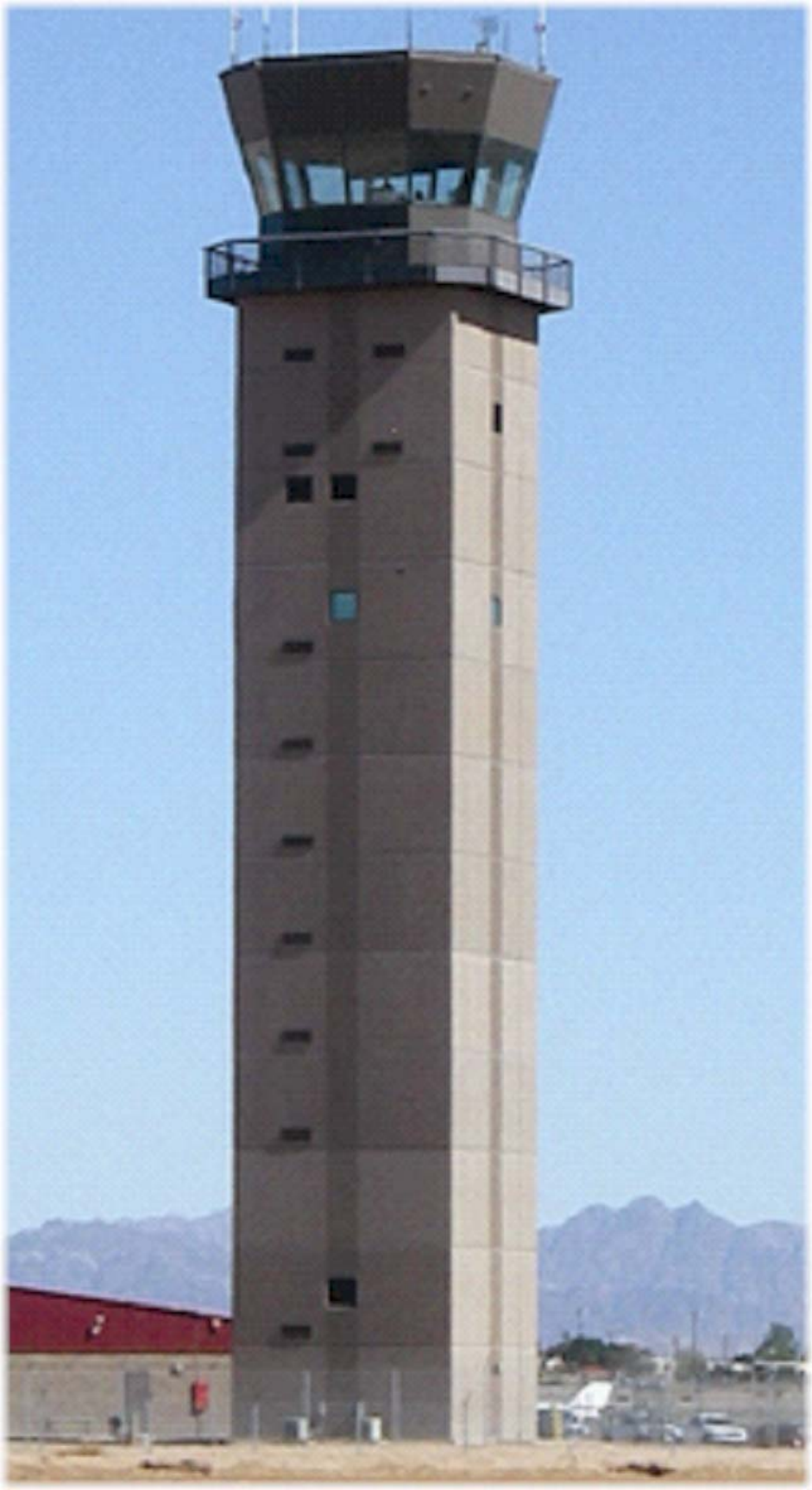

II. Aviation Activity Forecasts

Aviation activity forecasts are an important element of the Airport Master Plan in that they provide the basis for future planning considerations. The forecasts are essential for:
Determining the future role of the Airport in both the type of aircraft to be accommodated and the type of aviation demand to be served;
Evaluating the capacity of Airport facilities and their ability to accommodate the forecast aviation demand;
Identifying a reasonable range of activity to plan for over the Master Plan horizon; and
Estimating the extent to which airside and landside facilities should be provided at the Airport.
Forecasting aviation activity is both an analytical and subjective process. Many of the factors influencing aviation demand cannot be readily quantified. Consequently, actual activity realized in future years may differ from the forecasts presented herein as a result of unforeseen events or changes in the operational characteristics of the Airport or economic or political uncertainties in the region served by the Airport or the nation.
This chapter presents the assumptions and historical data underlying the forecasts; outlines the socioeconomic conditions within the Airport service region; and presents forecasts of aviation activity for the planning period through 2027. The following are discussed in the remainder of this chapter:
Historical Aviation Activity and Trends
Factors Affecting Aviation Activity
Enplaned Passenger Forecasts
Aircraft Operations and Fleet Mix Forecasts
Design-Day Activity
Planning Activity Levels

Historical Aviation Activity and Trends

Historical aviation activity at the Airport, and the key factors influencing this activity, are discussed in the following sections.

Airlines Serving the Airport

As of March 2009, the Airport was served by two passenger airlines providing nonstop scheduled service to Phoenix Sky Harbor International Airport (PHX) and Los Angeles International Airport (LAX)[18]. The service routes are depicted in Figure 35**,** and the markets served by the airlines are shown in **Table III-1**.

[18] Delta Air Lines initiated service in December 2007 at the Airport and discontinued service in August 2008.

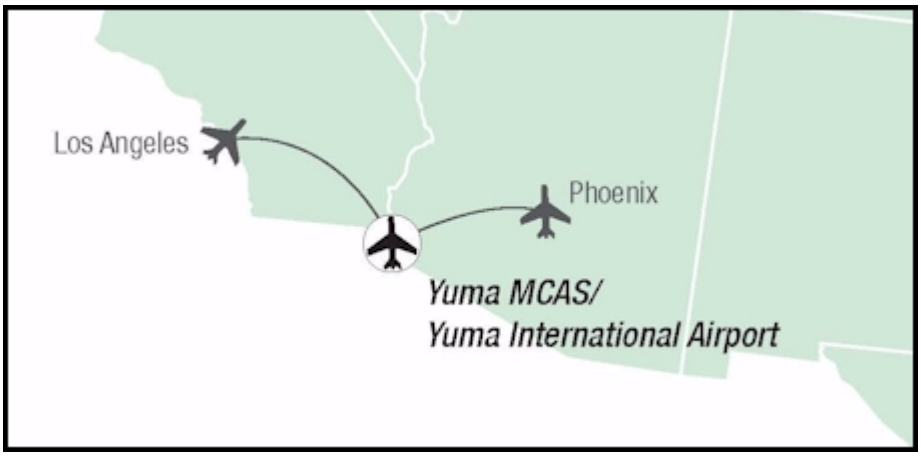

Figure 35 - Commercial Service Routes

Table III-1 Nonstop Markets

Market	Daily Nonstop Departures [1/]	Number of Airlines	Airline
Los Angeles	4	1	United Express (SkyWest)
Phoenix	5	1	U.S. Airways (Mesa Airlines)
Total Daily Departures	9	2	

Note:
1/ Departure numbers represent a typical weekday, and may not be representative of a weekend day or various peaking schedules throughout the year.
Source: Official Airline Guide (February 2007/2008, May 2007/2008, August 2007, November 2007).
Prepared by: Ricondo & Associates, Inc., March 2009.

Enplaned Passengers

The FAA classifies the Airport as a non-hub facility based on the percentage of national annual enplanements. In 2007 the Airport ranked as number 165 in total passengers enplaned and deplaned nationally, representing 0.011 percent of the market share according to the Airports Council International Traffic Data, *2007 Passenger Traffic*.

Table III-2 and Figure 36 present historical data on enplaned passengers at the Airport and the nation between 2002 and 2007.

Table III-2 Historical Enplaned Passengers (2002-2007)

	Airport		United States		
Year	Total Enplanements	Annual Growth	Domestic Enplanements	Annual Growth	Airport Share of U.S. Enplanements
2002	52,680	--	575,087,499	--	0.009%
2003	54,872	4.2%	587,829,547	2.2%	0.009%
2004	59,825	9.0%	628,493,362	6.9%	0.010%
2005	61,160	2.2%	669,427,839	6.5%	0.009%

2006	64,574	5.6%	668,418,019	-0.2%	0.010%
2007	73,487	13.8%	689,442,583	3.1%	0.011%
Compounded Annual Growth Rate 2002-2007		6.9%		3.7%	

Source: Ricondo & Associates, Inc., April 2008, based on Yuma County Airport Authority, 2008 (historical Airport activity), and Airports Council International, Data Center (2002-2002 U.S. annual domestic enplanements), http://www.airports.org (accessed April 2008).
Prepared by: Ricondo & Associates, Inc., April 2008.

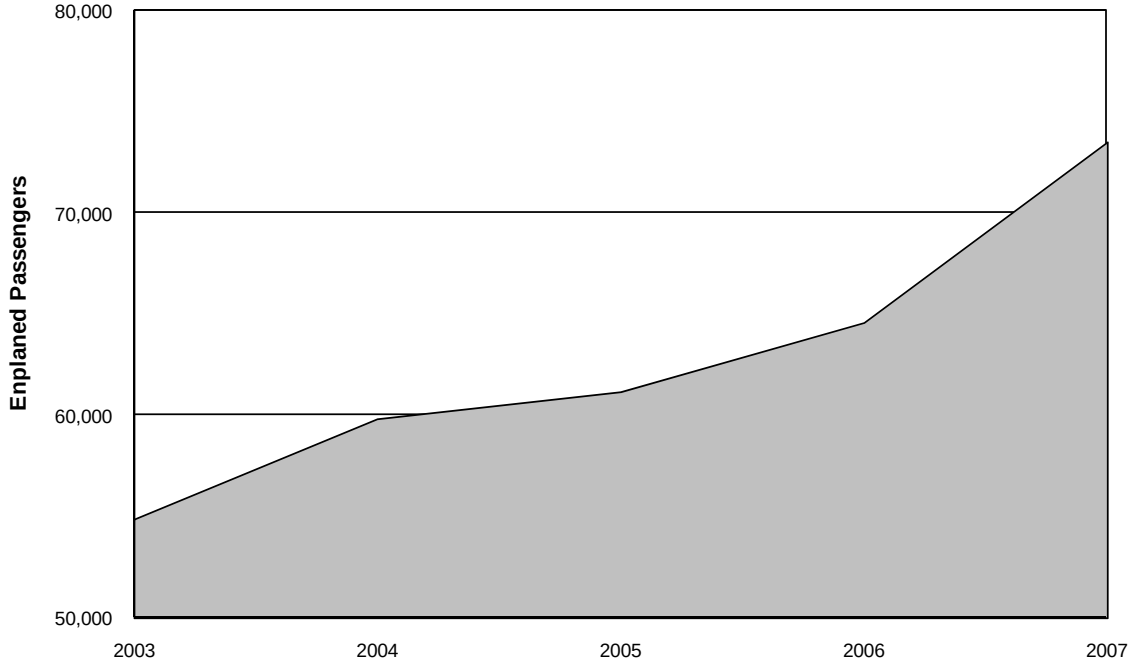

Figure 36 - Historical Enplaned Passengers

The number of annual enplaned passengers has increased every year over the period from 52,680 in 2002 to 73,487 in 2007, representing a compounded annual growth rate of 6.9 percent over the period. Over the same period, enplaned passengers at the national level increased at a compounded annual growth rate of 3.7 percent. **Table III-3** and Figure 37 present the enplanement data on a monthly basis.

Figure 38 shows a trend line for each year (2002-2007) of the number of monthly passenger enplanements, with established consistency in each year except 2002. In all other years, passenger enplanements were higher late in the fall season through early spring, attributable to seasonal residents and visitors.

Table III-3 Monthly Enplaned Passenger Comparison at the Airport (2002-Present)

Month	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**
January	5,918	4,889	5,393	5,876	5,076	6,339
February	4,448	5,397	6,529	6,256	5,574	7,012
March	4,162	5,705	6,843	6,650	6,410	7,246
April	3,330	4,627	5,474	5,946	5,852	6,405
May	3,608	4,181	4,335	4,773	5,203	5,742
June	3,567	3,489	4,052	4,249	4,929	5,513
July	3,767	3,363	3,862	3,976	4,370	5,076

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August	4,083	3,638	3,705	3,949	4,389	5,013
September	4,857	3,363	3,774	3,937	4,541	4,697
October	5,582	4,557	4,630	4,574	5,168	5,782
November	4,988	5,176	5,023	5,125	6,005	6,469
December	4,370	6,487	6,205	5,849	7,057	8,193
Annual Total	52,680	54,872	59,825	61,160	64,574	73,487

Source: Historical Airport Activity

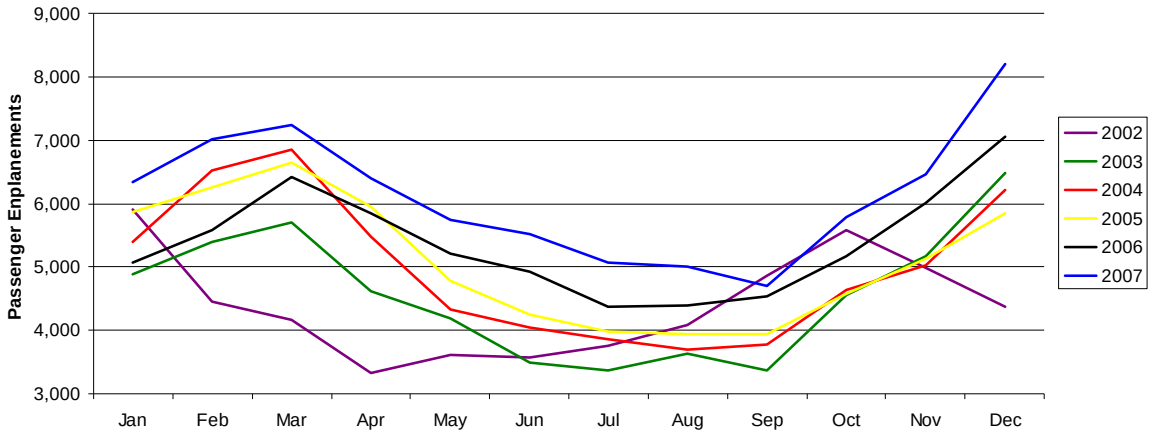

Figure 37 - Monthly Enplaned Passenger Comparison (2002-2007)

Aircraft Operations

Table III-4 and Figure 38 present the historical operations and activity levels at the Airport by category. Data as far back as 1998 were available and therefore included in this analysis through 2007. A discussion of operations by each category is provided in the following paragraphs.

Military: As shown by Table III-4 and Figure 39, the MCAS has had a significant presence at the Airport, with operations exceeding all other categories. Military operations increased rapidly in 2004 as a result of overseas deployments, but have declined each year since 2004.

GA: Between 1998 and 2002, GA activity at the Airport remained relatively constant, followed by a rapid increase in operations in 2003 and 2004. GA operations have declined each year since 2004.

Table III-4 Historical Aircraft Operations by Category (1998-2007)

Year	Air Carrier	GA	Military	Cargo	Airport Total
1998	10,096	24,357	77,115	1,202	112,770
1999	8,422	23,650	58,540	2,639	93,251
2000	9,602	24,544	56,605	2,792	93,543
2001	6,831	22,004	61,324	2,716	92,875
2002	5,898	26,857	59,237	2,733	94,725
2003	5,906	42,581	58,224	3,180	109,891
2004	5,592	65,621	86,564	3,179	160,956
2005	5,870	51,178	81,781	2,450	141,279
2006	6,548	50,108	78,147	2,351	137,154
2007	7,426	42,047	63,657	2,315	115,445
Compounded Annual Growth Rate					
1998-2002	-12.6%	2.5%	-6.4%	22.8%	-4.3%
2002-2007	4.7%	9.4%	1.4%	-3.3%	4.0%
1998-2007	-3.4%	6.3%	-2.1%	7.6%	0.3%

Source: Ricondo & Associates, Inc., April 2008, based on Yuma County Airport Authority, 2008 (historical Airport activity).
Prepared by: Ricondo & Associates, Inc., April 2008.

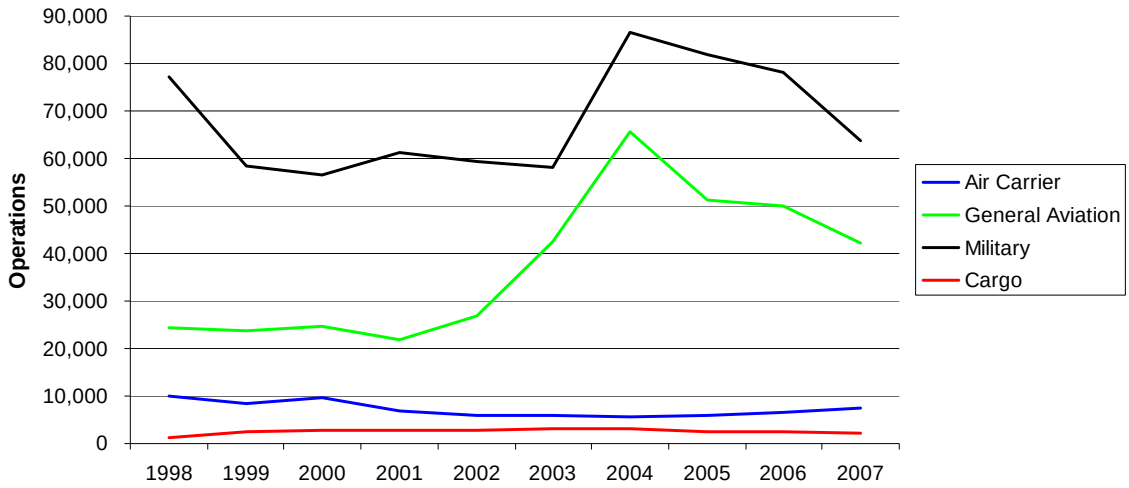

Figure 38 - Historical Aircraft Operations by Category (1998-2007)

Air Cargo: Aside from 1998-1999 when air cargo activity more than doubled, operations in this category have remained relatively stable in recent years. Operations increased at a slight to moderate rate from 1999 to 2003, followed by a period of decline through 2007.

Air Carrier: From 2000 to 2001, air carrier operations at the Airport decreased and then remained fairly stable for the next four years. Since 2006, the number of air carrier operations has increased moderately each year.

Figure 39 shows the 2007 aircraft operations split for the Airport. As shown in the chart, military operations represented more than half of the total operations at the Airport in 2007, while GA accounted for about 36 percent of total Airport operations. Air carrier operations and air cargo

operations made up the remaining 8 percent of total operations in 2007.

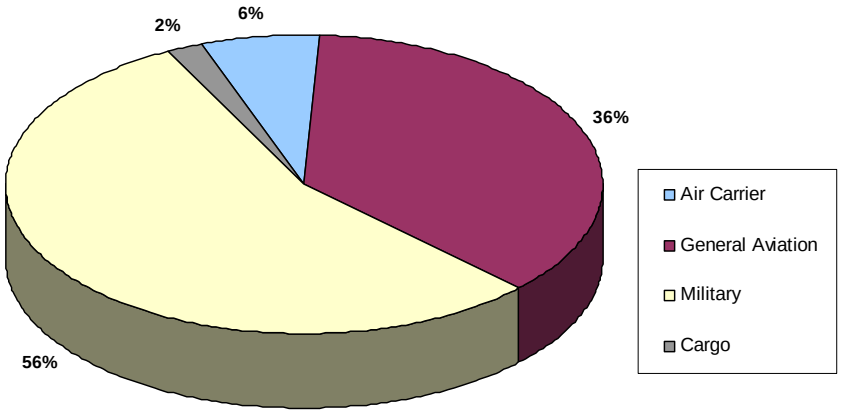

Figure 39 - 2007 Aircraft Operations by Category

Figure 40 shows the historical trend of total Airport operations from 1998 through 2007. As shown, total operations at the Airport increased significantly from 2002 to 2004, and have since decreased each year. As previously discussed, and shown in Table III-4 and Figure 38, the increase in activity from 2002 to 2004 and the subsequent decrease in operations are attributable to the fluctuations in the military and GA segments, which account for the majority of operations at the Airport.

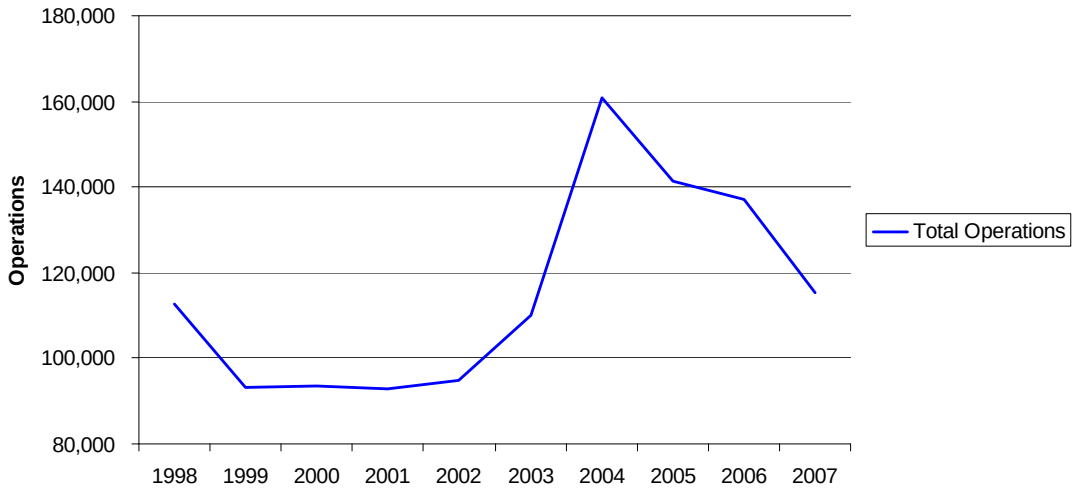

Figure 40 - Historical Aircraft Operations (1998-2007)

Factors Affecting Aviation Activity

Airport Service Region

The Airport's service region includes the area consisting primarily of Yuma County, with a larger secondary area extending into southeastern California and portions of Mexico. The primary service area is defined as the region immediately surrounding the Airport whose

population and economic activity generate the majority of the passenger activity. The air carrier airports surrounding this service region include those in San Diego (185 miles west), Phoenix (187 miles east/northeast), and Tucson (243 miles east).

Socioeconomic and Demographic Trends

The conditions of the economic and demographic base within the primary service area are important considerations in determining future aviation demand at an airport. Economic and demographic variables such as population, employment, and personal income are analyzed in determining the size and strength of the base. **Table III-5** presents a summary of historical and forecast growth of these factors in Yuma County compared to the State of Arizona and the U.S. as a whole.

Table III-5 Socioeconomic and Demographic Trends

Year	Yuma County[1/]	Arizona[1/]	United States[1/]
	Population		
2000-2007	2.4%	2.9%	1.0%
2007-2027	2.0%	2.3%	1.0%
	Employment		
2000-2007	3.8%	2.6%	1.2%
2007-2027	1.9%	2.6%	1.4%
	Per Capita Income		
2000-2007	3.5%	2.1%	2.0%
2007-2027	1.1%	1.4%	1.7%

Note:
1/ Percentages represent the compounded Annual Growth Rate
Sources: Ricondo & Associates, Inc., April 2008 (interpolated 2027 data); National Planning Association Data Service, Inc., 2008 (2007-2030 socioeconomic and demographic data).
Prepared by: Ricondo & Associates, Inc., April 2008.

As shown in Table III-5, the population in Yuma County has increased at a level fairly consistent with that of the State and outpacing the national average – a trend that is expected to continue into the future. Employment (total jobs) growth in Yuma County was strong between 2000 and 2007, increasing by a compounded annual growth rate of 3.8 percent; however, employment levels in Yuma County are forecast to grow at a lower rate (1.9 percent) over the period from 2007 to 2027. The table also shows that per capita income (PCI) in Yuma County has historically increased at a higher rate than the State and national averages, but in recent years the rate of growth in PCI in Yuma County slowed to more closely reflect State and national trends and is forecast to grow at a slower rate than that of the State and the U.S. over the period from 2007 to 2027.

Table III-6 presents the historical and projected residential population of Yuma County, the State of Arizona, and the U.S. as a whole.

Table III-6 Historical and Projected Resident Population

Area	Historical 2000	2007	Projected 2027	Compounded Annual Growth Rate 2000-2007	2007-2027
Yuma County	161,110	190,260	281,280	2.4%	2.0%
State of Arizona	5,165,250	6,290,090	9,963,600	2.9%	2.3%
United States	282,128,140	302,510,760	369,085,360	1.0%	1.0%

Source: Ricondo & Associates, Inc., April 2008, based on National Planning Association Data Services, Inc., 2008 (2007-2030 socioeconomic and demographic data).
Prepared by: Ricondo & Associates, Inc., April 2008.

As shown in Table III-6, the Yuma County population increased from 161,110 to 190,260 between 2000 and 2007, representing a compounded annual growth rate of 2.4 percent. During the same period, the population increased at the State and national levels by compounded annual growth rates of 2.9 percent and 2.3 percent, respectively. The data also show that Yuma County population is expected to increase to 281,280 by 2027, representing a compounded annual growth rate of 2.0 percent over the period from 2007 to 2027. Comparatively, population growth at the State and national levels is expected to occur at compounded annual growth rates of 2.3 percent and 1.0 percent, respectively, over the same period.

A comparative summary of the employment base at the County, State, and national levels is presented in **Table III-7**.

Table III-7 Historical and Projected Employment

Area	Historical 2000	2007	Projected 2027	Compounded Annual Growth Rate 2000-2007	2007-2027
Yuma	67,840	87,980	127,710	3.8%	1.9%
State of Arizona	2,825,840	3,385,570	5,627,490	2.6%	2.6%
United States	167,241,580	181,561,210	237,550,420	1.2%	1.4%

Source: Ricondo & Associates, Inc., April 2008, based on National Planning Association Data Services, Inc., 2008 (2007-2030 socioeconomic and demographic data).
Prepared by: Ricondo & Associates, Inc., April 2008.

As shown in Table III-7, between 2000 and 2007 the Yuma County employment base increased from 67,840 to 87,980, representing a compounded annual growth rate of 3.8 percent. During the same period, the State and national employment levels increased at compounded annual growth rates of 2.6 percent and 1.2 percent, respectively. Yuma County employment is projected to increase to 127,710 by 2027; a compounded annual growth rate of 1.9 percent over the period from 2007 to 2027 compared to the State and national rates of 2.6 percent and 1.4 percent, respectively, over the same period.

Table III-8 presents the historical and projected PCI in Yuma County. The data in the table show an increase from $15,747 in 2000 to $20,088 in 2007, representing a compounded annual growth rate of 3.5 percent. During the same period, PCI increased at a compounded annual growth rate of 2.1 percent at the State level and 2.0 percent at the national level. The table also shows that the Yuma County PCI is expected to increase to $25,118 by 2027, representing a compounded annual growth rate of 1.1 percent over the period from 2007 to 2027. During this

same period, PCI at the State and national levels is projected to increase at compounded annual growth rates of 1.4 percent and 1.7 percent, respectively.

Table III-8 Historical and Projected Per Capita Income

	Historical		Projected	Compounded Annual Growth Rate	
Area	2000	2007	2027	2000-2007	2007-2027
Yuma	$15,747	$20,088	$25,118	3.5%	1.1%
State of	$25,245	$29,156	$38,795	2.1%	1.4%
United States	$29,628	$33,944	$47,351	2.0%	1.7%

Source: Ricondo & Associates, Inc., April 2008, based on National Planning Association Data Services, Inc., 2008 (2007-2030 socioeconomic and demographic data).
Prepared by: Ricondo & Associates, Inc., April 2008.

Enplaned Passenger Forecasts

This section presents forecasts of enplaned passengers at the Airport, which were developed with consideration of a number of factors and methodologies, including local socioeconomic and demographic factors, the Airport's historical market share of U.S. enplaned passengers, and known industry trends.

Market Share Analysis

The market share methodology included an examination of the Airport's historical and forecast share of total U.S. enplaned passengers. The relationship between historical enplanements at the Airport and at the national level was used to derive the anticipated enplaned passenger forecast for the Airport. The U.S. forecast generally reflects the way in which industry traffic is expected to grow in the future and is based on factors such as national economic conditions, industry trends, and airline fuel and fare pricing. The national activity forecast (*FAA Aerospace Forecasts, Fiscal Years 2008-2025)* were used as the basis for the market share analysis.[19]
In the absence of significant local issues, the activity at an airport could reasonably be assumed to increase at a rate consistent with national growth. A market share analysis, which is a common methodology for master plans and facilities studies at commercial service airports, considers local factors that may influence growth. This analysis incorporated an increasing market share over the forecast period to correspondingly reflect the historical increase in recent years in the Airport's share of the national market.
Table III-9 displays historical and forecast enplaned passengers at the Airport using the increasing market share approach. As shown passenger enplanements at the Airport have grown historically at a higher rate of growth than at the national level, increasing at an average annual rate of 7.6 percent from 2003 to 2007. Using the market share methodology, this trend of strong growth is predicted to continue throughout the planning period, although at a lower rate (5.2 percent over the period from 2007 to 2027).

Table III-9 Enplaned Passenger Forecast – Market Share Methodology

Year	Airport	Annual Growth	United States	Annual Growth	Market Share
Historical					
2003	54,872	--	587,829,547	--	0.009%

[19] The most recent update to the *FAA Aerospace Forecasts* includes forecasts through 2025. For the purposes of this analysis, these data were extrapolated to 2027 using applicable growth rates.

2004	59,825	9.0%	628,493,362	6.9%	0.010%
2005	61,160	2.2%	669,427,839	6.5%	0.009%
2006	64,574	5.6%	668,418,019	-0.2%	0.010%
2007	73,487	13.8%	689,442,583	3.1%	0.011%
Forecast					
2008	76,517	4.1%	696,244,124	1.0%	0.011%
2009	81,582	6.6%	720,620,297	3.5%	0.011%
2010	86,944	6.6%	746,167,337	3.5%	0.012%
2011	91,907	5.7%	766,974,100	2.8%	0.012%
2012	97,207	5.8%	789,394,211	2.9%	0.012%
2013	102,751	5.7%	812,564,488	2.9%	0.013%
2014	108,301	5.4%	834,603,972	2.7%	0.013%
2015	114,314	5.6%	859,026,843	2.9%	0.013%
2016	120,342	5.3%	882,376,569	2.7%	0.014%
2017	126,808	5.4%	907,753,413	2.9%	0.014%
2018	133,490	5.3%	933,465,781	2.8%	0.014%
2019	140,253	5.1%	958,566,754	2.7%	0.015%
2020	147,237	5.0%	984,030,865	2.7%	0.015%
2021	154,298	4.8%	1,008,902,662	2.5%	0.015%
2022	161,713	4.8%	1,034,981,052	2.6%	0.016%
2023	169,423	4.8%	1,061,827,849	2.6%	0.016%
2024	177,420	4.7%	1,089,346,728	2.6%	0.016%
2025	185,826	4.7%	1,118,228,463	2.7%	0.017%
2026	194,456	4.6%	1,147,302,403	2.6%	0.017%
2027	203,409	4.6%	1,177,132,266	2.6%	0.017%

Source: Ricondo & Associates, Inc., April 2008, based on Yuma County Airport Authority, 2008 (historical Airport activity), and Federal Aviation Administration, Data and Research, Aviation Forecasts (historical and forecast activity, 2003-2025), http://www.faa.gov/data _research/aviation/aerospace_forecasts/2008-2025/ (accessed April 2008).

Prepared by: Ricondo & Associates, Inc., April 2008.

Regression Analysis

A regression analysis compares the relationships between the various socioeconomic characteristics of an airport's market area to the aviation activity. A mathematical regression analysis model was developed to correlate the historical relationship of these variables at the Airport, and to forecast this relationship using independent forecasts of the socioeconomic and demographic trends in the market area. A simple line trend was used to test the resulting enplanement forecasts.

The demand for airline service is typically driven by the demographic and economic conditions of an airport's market area. The socioeconomic variables used as the independent variables in this analysis include those that were discussed previously: population, employment, and PCI. Additionally, a linear trend analysis was used to evaluate the historical growth in enplaned passengers in order to produce a result that best captures the Airport's historical activity by a straight line, which is extended into the future to represent the forecast of enplaned passengers. The results of the various regression analyses are subsequently described.

Population Regression – Table III-10 displays the results of the population regression analysis. Using the Yuma County population as the basis for the regression, total enplaned passengers at the Airport are forecast to increase from 73,487 in 2007 to 159,163 in 2027, representing a compounded annual growth rate of 3.9 percent over the period.

Employment Regression – Table III-11 presents the results of the employment regression analysis. Using Yuma County employment as the basis for the regression, total enplaned passengers at the Airport are forecast to increase from 73,487 in 2007 to 127,026 in 2027, representing a compounded annual growth rate of 2.8 percent over the period.

Per Capita Income Regression – Table III-12 shows the results of the PCI regression analysis. Using Yuma County PCI as the basis for the regression, total enplaned passengers at the Airport are forecast to increase from 73,487 in 2007 to 104,814 in 2027, resulting in a compounded annual growth rate of 1.8 percent over the period.

Linear Trend Analysis – Table III-13 displays the results of the linear trend analysis. As shown in the table, total enplaned passengers at the Airport are forecast to increase from 73,487 in 2007 to approximately 155,100 in 2027, resulting in a compounded annual growth rate of 3.8 percent over the period.

The regression methodology generally resulted in high correlations between the independent variables and the dependent enplaned passenger variable. The coefficient of determination (r^2) is a statistical measure to show the relationship changes in the values of the independent variables with the changes in the values of the dependent variables. A perfect correlation of 1.0 would mean that each change in the value of the independent variable would translate into a change of equal scale in the dependent variable. Statistically, the closer the r^2 value is to a correlation of 1.0, the higher the confidence that movements in independent variables will be reflected in the dependent variable. The r^2 values of the three independent variables used in this analysis (population, employment, and PCI), as well as the linear trend analysis, were each above 0.95.

Table III-10 Enplaned Passenger Forecast – Population Regression Methodology

Year	Yuma County Population	Annual Growth	Passenger Enplanements	Annual Growth
Historical				
2003	173,498	--	54,872	--
2004	177,835	2.5%	59,825	9.0%
2005	182,281	2.5%	61,160	2.2%
2006	186,838	2.5%	64,574	5.6%
2007	190,260	1.8%	73,487	13.8%
Forecast				
2008	194,826	2.4%	75,115	2.2%
2009	199,502	2.4%	79,660	6.1%
2010	204,260	2.4%	84,286	5.8%
2011	208,141	1.9%	88,059	4.5%
2012	212,096	1.9%	91,904	4.4%
2013	216,125	1.9%	95,821	4.3%
2014	220,232	1.9%	99,813	4.2%
2015	224,416	1.9%	103,881	4.1%
2016	228,680	1.9%	108,027	4.0%
2017	233,025	1.9%	112,251	3.9%

2018	237,453	1.9%	116,555	3.8%
2019	241,964	1.9%	120,941	3.8%
2020	246,561	1.9%	125,411	3.7%
2021	251,246	1.9%	129,965	3.6%
2022	256,020	1.9%	134,606	3.6%
2023	260,884	1.9%	139,335	3.5%
2024	265,841	1.9%	144,154	3.5%
2025	270,892	1.9%	149,064	3.4%
2026	276,039	1.9%	154,068	3.4%
2027	281,280	1.9%	159,163	3.3%
Compounded Annual Growth Rate				
2003-2007		2.3%		7.6%
2007-2012		2.2%		4.6%
2012-2017		1.9%		4.1%
2017-2022		1.9%		3.7%
2022-2027		1.9%		3.4%
2007-2027		2.0%		3.9%

Source: Ricondo & Associates, Inc., April 2008, based on Yuma County Airport Authority (historical Airport activity), and National Planning Association Data Services, Inc., 2008 (Yuma County Population).

Prepared by: Ricondo & Associates, Inc., April 2008.

Table III-11 Enplaned Passenger Forecast – Employment Regression Methodology

Year	Yuma County Employment	Annual Growth	Passenger Enplanements	Annual Growth
Historical				
2003	75,324	--	54,872	--
2004	77,999	3.6%	59,825	9.0%
2005	80,767	3.5%	61,160	2.2%
2006	83,635	3.6%	64,574	5.6%
2007	87,980	5.2%	73,487	13.8%
Forecast				
2008	90,531	2.9%	75,738	3.1%
2009	93,157	2.9%	79,359	4.8%
2010	96,160	3.2%	83,502	5.2%
2011	97,602	1.5%	85,492	2.4%
2012	99,066	1.5%	87,512	2.4%
2013	100,552	1.5%	89,562	2.3%
2014	102,061	1.5%	91,642	2.3%
2015	103,592	1.5%	93,754	2.3%
2016	105,146	1.5%	95,898	2.3%
2017	106,723	1.5%	98,074	2.3%
2018	108,324	1.5%	100,282	2.3%
2019	109,948	1.5%	102,523	2.2%
2020	115,070	4.7%	109,589	6.9%
2021	116,796	1.5%	111,970	2.2%
2022	118,548	1.5%	114,387	2.2%
2023	120,326	1.5%	116,840	2.1%
2024	122,131	1.5%	119,330	2.1%
2025	123,963	1.5%	121,857	2.1%
2026	125,203	1.0%	123,567	1.4%
2027	127,710	2.0%	127,026	2.8%
Compounded Annual Growth Rate				
2003-2007		4.0%		7.6%
2007-2012		2.4%		3.6%
2012-2017		1.5%		2.3%
2017-2022		2.1%		3.1%
2022-2027		1.5%		2.1%
2007-2027		1.9%		2.8%

Source: Ricondo & Associates, Inc., April 2008, based on Yuma County Airport Authority (historical Airport activity), and National Planning Association Data Services, Inc., 2008 (Yuma County Employment).
Prepared by: Ricondo & Associates, Inc., April 2008.

Table III-12 Enplaned Passenger Forecast – Per Capita Income Regression Methodology

Year	Yuma County Per Capita Income	Annual Growth	Passenger Enplanements	Annual Growth
Historical				
2003	17,291	--	54,872	--
2004	17,896	3.5%	59,825	9.0%
2005	18,522	3.5%	61,160	2.2%
2006	18,967	2.4%	64,574	5.6%
2007	20,088	5.9%	73,487	13.8%
Forecast				
2008	20,570	2.4%	75,699	3.0%
2009	21,064	2.4%	78,859	4.2%
2010	21,609	2.6%	82,350	4.4%
2011	21,803	0.9%	83,595	1.5%
2012	22,000	0.9%	84,851	1.5%
2013	22,198	0.9%	86,118	1.5%
2014	22,397	0.9%	87,397	1.5%
2015	22,599	0.9%	88,688	1.5%
2016	22,802	0.9%	89,990	1.5%
2017	23,008	0.9%	91,304	1.5%
2018	23,215	0.9%	92,629	1.5%
2019	23,424	0.9%	93,967	1.4%
2020	23,962	2.3%	97,413	3.7%
2021	24,154	0.8%	98,640	1.3%
2022	24,323	0.7%	99,723	1.1%
2023	24,493	0.7%	100,813	1.1%
2024	24,664	0.7%	101,910	1.1%
2025	24,837	0.7%	103,016	1.1%
2026	25,011	0.7%	104,129	1.1%
2027	25,118	0.4%	104,814	0.7%
Compounded Annual Growth Rate				
2003-2007		3.8%		7.6%
2007-2012		1.8%		2.9%
2012-2017		0.9%		1.5%
2017-2022		1.1%		1.8%
2022-2027		0.6%		1.0%
2007-2027		1.1%		1.8%

Source: Ricondo & Associates, Inc., April 2008, based on Yuma County Airport Authority (historical Airport activity), and National Planning Association Data Services, Inc., 2008 (Yuma County Capita Income).
Prepared by: Ricondo & Associates, Inc., April 2008.

Table III-13 Passenger Forecast – Linear Trend Analysis Regression Methodology

Year	Airport	Annual Growth
Historical		
2003	54,872	--
2004	59,825	9.0%
2005	61,160	2.2%
2006	64,574	5.6%
2007	73,487	13.8%
Forecast		
2008	75,400	2.6%
2009	79,600	5.6%
2010	83,800	5.3%
2011	88,000	5.0%
2012	92,200	4.8%
2013	96,400	4.6%
2014	100,600	4.4%
2015	104,800	4.2%
2016	109,000	4.0%
2017	113,200	3.9%
2018	117,400	3.7%
2019	121,600	3.6%
2020	125,800	3.5%
2021	129,900	3.3%
2022	134,100	3.2%
2023	138,300	3.1%
2024	142,500	3.0%
2025	146,700	2.9%
2026	150,900	2.9%
2027	155,100	2.8%
Compounded Annual Growth Rate		
2003-2007		7.6%
2007-2012		4.6%
2012-2017		4.2%
2017-2022		3.4%
2022-2027		3.0%
2007-2027		3.8%

Source: Ricondo & Associates, Inc., April 2008, based on Yuma County Airport Authority (historical Airport activity) and National Planning Association Data Services, Inc., 2008 (Yuma County Per Capita Income).

Prepared by: Ricondo & Associates, Inc., April 2008.

Comparison of Regression Analysis Results

The key findings of each passenger forecast methodology are summarized below. The results are presented comparatively in **Table III-14** and Figure 41. The Airport's most recent FAA TAF forecast is a static 68,842 enplaned passengers through 2025. For comparative purposes this number was extended to 2027. Airport records indicate that the actual number of enplaned passengers in 2007 was 73,487, as shown in Table III-2.

Table III-14 Comparison of Regression Analysis Results

	Socioeconomic Regression Analysis						
Year	Market Share	Population	Employment	PCI	Trend Analysis	1999 Master Plan Update[1/]	FAA Terminal Area Forecast[2/]
Historical							
2003	54,872	54,872	54,872	54,872	54,872	N/A	53,669
2004	59,825	59,825	59,825	59,825	59,825	N/A	61,685
2005	61,160	61,160	61,160	61,160	61,160	112,000	62,641
2006	64,574	64,574	64,574	64,574	64,574	N/A	61,290
2007	73,487	73,487	73,487	73,487	73,487	N/A	68,842
Forecast							
2008	76,517	75,115	75,738	75,699	75,400	N/A	68,842
2009	81,582	79,660	79,359	78,859	79,600	N/A	68,842
2010	86,944	84,286	83,502	82,350	83,800	133,000	68,842
2011	91,907	88,059	85,492	83,595	88,000	N/A	68,842
2012	97,207	91,904	87,512	84,851	92,200	N/A	68,842
2013	102,751	95,821	89,562	86,118	96,400	N/A	68,842
2014	108,301	99,813	91,642	87,397	100,600	N/A	68,842
2015	114,314	103,881	93,754	88,688	104,800	154,000	68,842
2016	120,342	108,027	95,898	89,990	109,000	N/A	68,842
2017	126,808	112,251	98,074	91,304	113,200	N/A	68,842
2018	133,490	116,555	100,282	92,629	117,400	N/A	68,842
2019	140,253	120,941	102,523	93,967	121,600	N/A	68,842
2020	147,237	125,411	109,589	97,413	125,800	175,000	68,842
2021	154,298	129,965	111,970	98,640	129,900	N/A	68,842
2022	161,713	134,606	114,387	99,723	134,100	N/A	68,842
2023	169,423	139,335	116,840	100,813	138,300	N/A	68,842
2024	177,420	144,154	119,330	101,910	142,500	N/A	68,842
2025	185,826	149,064	121,857	103,016	146,700	N/A	68,842
2026	194,456	154,068	123,567	104,129	150,900	N/A	68,842
2027	203,409	159,163	127,026	104,814	155,100	N/A	68,842
Compounded Annual Growth Rate							
2003-2007	7.6%	7.6%	7.6%	7.6%	7.6%	N/A	6.4%
2007-2012	5.8%	4.6%	3.6%	2.9%	4.6%	3.5%[3/]	0.0%
2012-2017	5.5%	4.1%	2.3%	1.5%	4.2%	3.0%[3/]	0.0%
2017-2022	5.0%	3.7%	3.1%	1.8%	3.4%	2.6%[3/]	0.0%
2022-2027	4.7%	3.4%	2.1%	1.0%	3.0%	N/A	0.0%
2007-2027	5.2%	3.9%	2.8%	1.8%	3.8%	3.0%[3/]	0.0%

Notes:

1/ Base year for 1999 Master Plan Study was 2000, with data available only on a quinquennial basis.

2/ The FAA TAF is based on federal fiscal year and was calculated through 2025. The TAF was extended to 2027 for comparative purposes.

3/ Compounded annual growth rates for the 1999 Master Plan Update were available on a quinquennial basis for 2005-2020.

Source: Ricondo & Associates, Inc., April 2008, based on Yuma County Airport Authority, 2008 (historical market share and socioeconomic regression analysis data), Federal Aviation Administration, *FAA Terminal Area Forecast*, February, 2008, and Coffman Associates, *Yuma International Airport Master Plan Update*, 1999.

Prepared by: Ricondo & Associates, Inc., April 2008.

Figure 41 - Comparison of Regression Analysis Results

Source: Ricondo & Associates, Inc., April 2008, based on Yuma County Airport Authority, 2008 (historical market share and socioeconomic regression analysis data).
Prepared by: Ricondo & Associates, Inc., April 2008.

Figure 41 shows the results of each of the passenger enplanement forecasts comparatively. For the purposes of this Master Plan, the forecast derived from the linear trend analysis methodology is considered to be the preferred enplaned passenger forecast for the Airport. This statistically defensible methodology, which represents the approximate midpoint of the forecast range, produces reasonable results compared to the national forecast and is also consistent with the population regression analysis, another commonly-accepted approach.

Aircraft Operations and Fleet Mix Forecasts

Operations data for this analysis were obtained from the ATCT's daily activity log. Operations are categorized as air carrier, military, GA, and cargo, which are discussed in the following sections. The air carrier aircraft operations forecast was developed using the passenger enplanements trend analysis methodology previously described. Similarly, the cargo and military segments were also developed using the linear trend methodology; therefore, historical trends in GA operations at the Airport were the primary basis for the analysis. The methodology used to forecast GA activity at the Airport, including the associated fleet mix and peak-period demand activity levels, is described later in this chapter.

Air Carrier Aircraft Operations and Fleet Mix

The total air carrier category consists of both passenger air carrier (scheduled commercial passenger aircraft) operations and military air carrier operations. It is important to note that military air carrier operations are not double-counted in the military category presented in Section 3.4.2 of this chapter. The discussion and analysis of Airport passenger enplanements considers only passenger air carrier (i.e., commercial airline) statistics.

Table III-15 presents the historical and forecast passenger air carrier operations at the Airport, as well as the average number of passengers per departure. As shown in the table, passenger air carrier operations are forecast to increase from 3,460 operations in 2007 to over 5,400 operations

in 2027, representing a compounded annual growth rate of 2.3 percent. The number of passengers per departing flight is expected to increase from an average of approximately 43 passengers per departure in 2007 to approximately 57 passengers per departure in 2027, representing a compounded annual growth rate of 1.5 percent over the period.

Table III-15 Passenger Air Carrier Operations and Passenger Forecast

Year	Passenger Enplanements	Passenger Airline Operations	Passenger Airline Departures	Average Number of Passengers per Departure
Historical				
2003	54,872	2,958	1,479	37.1
2004	59,825	2,796	1,398	42.8
2005	61,160	2,935	1,468	41.7
2006	64,574	3,284	1,642	39.3
2007	73,487	3,460	1,730	42.5
Forecast				
2008	75,400	3,431	1,715	44.0
2009	79,600	3,536	1,768	45.0
2010	83,800	3,641	1,820	46.0
2011	88,000	3,746	1,873	47.0
2012	92,200	3,851	1,925	47.9
2013	96,400	3,955	1,978	48.7
2014	100,600	4,060	2,030	49.6
2015	104,800	4,165	2,083	50.3
2016	109,000	4,270	2,135	51.1
2017	113,200	4,375	2,188	51.7
2018	117,400	4,480	2,240	52.4
2019	121,600	4,585	2,292	53.0
2020	125,800	4,690	2,345	53.6
2021	129,900	4,795	2,397	54.2
2022	134,100	4,900	2,450	54.7
2023	138,300	5,005	2,502	55.3
2024	142,500	5,109	2,555	55.8
2025	146,700	5,214	2,607	56.3
2026	150,900	5,319	2,660	56.7
2027	155,100	5,424	2,712	57.2

Sources: Yuma County Airport Authority, April 2008 (2003-2007 data); Ricondo & Associates, Inc., April 2008 (2008-2027 data).
Prepared by: Ricondo & Associates, Inc., April 2008.

Military Operations

Military operations at the Airport are conducted primarily by the USMC, but also include transient military operations. Although the trend analysis regression methodology was used for this analysis, future military activity at the Airport will be influenced by U.S. Department of Defense (DOD) policy, which largely dictates the level of military activity at an airport.

As shown in **Table III-16**, the number of military operations is forecast to increase from 63,657 operations in 2007 to approximately 79,062 operations in 2027. This equates to a modest compounded annual growth rate of 1.1 percent over the period. Military operations were further analyzed according to those that are local operations and those that are transient. Local operations are those that stay within an airport traffic pattern or simulated instrument approaches, while all other operations are classified as itinerant.

It is important to note that the composition of the MCAS Yuma based aircraft fleet is expected to change somewhat with the arrival of the F-35 Lightning II Joint Strike Fighter (JSF). The first JSF squadron is expected to arrive at MCAS Yuma early in the planning horizon. While the immediate and long-term changes in the number of military operations are at this time unknown, discussions with MCAS Yuma representatives indicate that no significant changes in the number of annual military operations are anticipated, as the JSF operations would likely be a replacement to other military aircraft operations.

Table III-16 Military Operations Forecast

Year	Based Military	Growth	Transient Military	Growth	Total Military
Historical					
2002	51,543	1.4%	7,694	1.5%	59,237
2003	50,660	1.4%	7,564	1.5%	58,224
2004	75,317	1.4%	11,247	1.5%	86,564
2005	71,158	1.4%	10,623	1.5%	81,781
2006	67,996	1.4%	10,151	1.5%	78,147
2007	55,386	3.4%	8,271	3.4%	63,657
Forecast					
2008	64,743	3.4%	9,667	3.4%	74,409
2009	64,956	3.4%	9,698	3.4%	74,654
2010	65,169	3.4%	9,730	3.4%	74,899
2011	65,382	3.4%	9,762	3.4%	75,144
2012	65,595	0.3%	9,794	0.3%	75,389
2013	65,808	0.3%	9,826	0.3%	75,634
2014	66,021	0.3%	9,857	0.3%	75,879
2015	66,234	0.3%	9,889	0.3%	76,124
2020	67,300	0.3%	10,048	0.3%	77,348
2025	68,365	0.3%	10,207	0.3%	78,573
2026	68,579	0.3%	10,239	0.3%	78,818
2027	68,792	0.3%	10,271	0.3%	79,062

Sources: Yuma County Airport Authority, April 2008 (2002-2007 data); Ricondo & Associates, Inc., April 2008 (2008-2027 data).
Prepared by: Ricondo & Associates, Inc., April 2008.

GA Based Aircraft, Fleet Mix, and Operations

This section presents the forecast of the GA based aircraft, fleet mix, and operations. GA represents all facets of civil aviation except activity by certificated route carriers and air commuters. Therefore, GA at the Airport, which accounts for a substantial amount of the total operations, is inclusive of all private, not-for-hire aircraft and flight training activity.

Typically, the number of based aircraft at an airport is dependent on the local demand for aircraft storage facilities, the amenities provided at the airport, and the capacity of other airports in the service area with comparable facilities. The following three growth scenarios were used:

Population Growth methodology: based aircraft at the Airport were forecast to increase at a rate consistent with that of the Yuma County population;

Market Share methodology: based aircraft at the Airport were forecast to maintain a consistent share (percentage) of the national GA fleet, based on the numbers presented in the 2008 FAA TAF; and

National Trends methodology: based aircraft at the Airport were forecast to increase at a rate consistent with the forecast growth in the national fleet, as presented in the FAA TAF.

Table III-17 presents the results of each based aircraft forecast methodology. For comparative purposes, Table III-17 also shows the results of the previous Master Plan Update and the FAA TAF. These data are shown graphically in Figure 42.

Table III-17 and Figure 42 show a static number of based aircraft from 2002 until 2004, the loss of 18 based aircraft in 2005, and then a static number of based aircraft until 2007. It is important to note that although the data show a decrease, accurate based aircraft counts were not maintained until recent years. Discussions with YCAA personnel indicate that there have been approximately 176 based aircraft at the Airport since 2005. It should also be noted that the FAA TAF has not been updated to accurately reflect actual based aircraft at the Airport, and have been forecast to show no growth beyond 2005. As a result, these data show an anomalous increase in based aircraft in 2005, similar to the anomalous decrease that year shown by YCAA records. As a result of these facts, and based on discussions with Airport management in this regard, the National Trends methodology was selected as the preferred methodology, because of its consistency with reasonable expectations at the national level. Of the three methodologies evaluated, the National Trends methodology represents the lowest rate of growth in based aircraft. According to this methodology, based aircraft are expected to increase from 176 in 2007 to 227 in 2027, representing a compounded annual growth rate of 1.3 percent over the period.

Table III-17 Comparison of Based Aircraft Forecast Methodologies

Year	Population Growth	Growth Rate	Market Share	Growth Rate	National Trends	Growth Rate	1999 Master Plan [1/]	FAA Terminal Area Forecast[2/]
2002	194	0%	194	0%	194	0%		194
2003	194	0%	194	0%	194	0%		194
2004	194	0%	194	0%	194	0%		194
2005	176	-9%	176	-9%	176	-9%	140	221
2006	176	0%	176	0%	176	0%		221

2007	176	0%	176	0%	176	0%		221
2008	176	0%	176	0%	176	0%		221
2009	206	17%	207	18%	178	1%		221
2010	210	2%	210	1%	181	2%	155	221
2011	214	2%	212	1%	183	1%		221
2012	218	2%	216	2%	186	2%		221
2013	223	2%	219	1%	189	2%		221
2014	227	2%	222	1%	192	2%		221
2015	231	2%	225	1%	195	2%	170	221
2016	236	2%	228	1%	197	1%		221
2017	240	2%	231	1%	200	2%		221
2018	245	2%	235	2%	203	2%		221
2019	249	2%	238	1%	205	1%		221
2020	254	2%	242	2%	208	1%	185	221
2021	259	2%	245	1%	210	1%		221
2022	264	2%	249	2%	213	1%		221
2023	269	2%	252	1%	216	1%		221
2024	274	2%	256	2%	218	1%		221
2025	279	2%	260	2%	221	1%		221
2026	284	2%	264	2%	224	1%		221
2027	290	2%	268	2%	227	1%		221

Notes:
1/ Base year for 1999 Master Plan Study was 2000, with data available only on a quinquennial basis.
2/ The FAA TAF is based on the federal fiscal year (12-month period ending September 30) and was calculated through 2025. The TAF was extended to 2027 for comparative purposes.

Source: Ricondo & Associates, Inc., April 2008, based on Yuma County Airport Authority, 2008 (historical Airport activity), Federal Aviation Administration, *FAA Terminal Area Forecast*, February, 2008, and Coffman Associates, *Yuma International Airport Master Plan Update*, 1999 (2005 historical Airport activity).
Prepared by: Ricondo & Associates, Inc., April 2008.

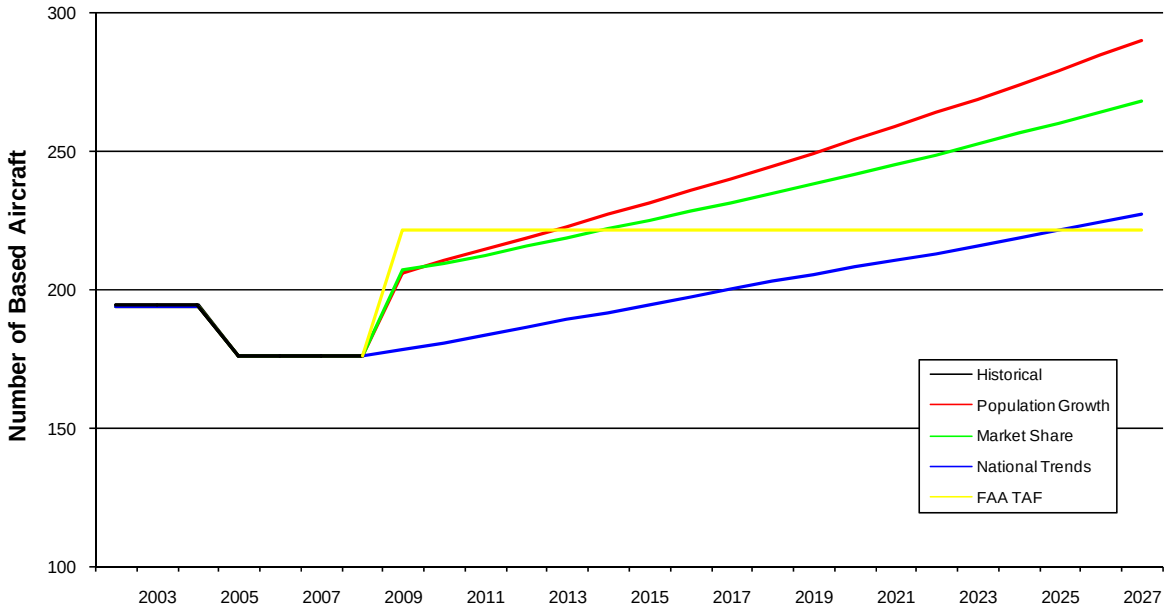

Figure 42 - Comparison of Based Aircraft Forecast Methodologies

Source: Ricondo & Associates, Inc., April 2008, based on Yuma County Airport Authority, 2008 (historical Airport activity), Federal Aviation Administration, *FAA Terminal Area Forecast*, February, 2008, and Coffman Associates, *Yuma International Airport Master Plan Update*, 1999 (2005 historical Airport activity).

Prepared by: Ricondo & Associates, Inc., April 2008.

The based aircraft forecast was further evaluated according to aircraft type. According to Airport management, the based aircraft fleet mix is expected to remain fairly homogeneous throughout the forecast period. Therefore, the current fleet mix, slightly tempered to reflect the anticipated changes in the GA fleet at the national level, was applied to the based aircraft forecast. **Table III-18** presents the GA based aircraft fleet mix forecast for the Airport.

As shown in Table III-18, the percentage of piston-engine aircraft in the based fleet at the Airport is expected to slightly decrease during the forecast period, with a corresponding increase in turbine aircraft and rotorcraft. These trends are consistent with those that are anticipated by the FAA to occur at the national level.

Table III-18 GA Based Aircraft Fleet Mix Projections

Year	Single-Engine Piston	%	Multi-Engine Piston	%	Turbine (Turboprop and Jet)	%	Rotorcraft	%	Total
2007	117	66.5 %	35	19.9 %	12	6.8%	12	6.8%	176
2008	117	66.5 %	35	19.9 %	12	6.8%	12	6.8%	176
2009	118	66.3 %	34	19.1 %	13	7.5%	12	7.0%	178
2010	120	66.4	34	19.0	14	7.5%	13	7.0%	181

		%		%					
		66.5		18.5					
2011	122	%	34	%	15	8.0%	13	7.0%	183
		66.5		18.5					
2012	124	%	34	%	15	8.0%	13	7.0%	186
		66.5		18.5					
2013	126	%	35	%	15	8.0%	13	7.0%	189
		66.5		18.5					
2014	127	%	35	%	15	8.0%	13	7.0%	192
		66.7		17.9					
2015	130	%	35	%	16	8.2%	14	7.2%	195
		66.7		18.1					
2016	131	%	36	%	16	8.1%	14	7.1%	197
		66.5		18.0					
2017	133	%	36	%	17	8.5%	14	7.0%	200
		66.0		18.0					
2018	134	%	36	%	17	8.5%	15	7.5%	203
		65.9		18.0					
2019	135	%	37	%	17	8.5%	15	7.5%	205
		66.0		18.0					
2020	137	%	37	%	18	8.5%	16	7.5%	208
		66.3		17.6					
2021	139	%	37	%	18	8.5%	16	7.5%	210
		66.1		18.0					
2022	141	%	38	%	18	8.5%	16	7.5%	213
		66.1		17.9					
2023	143	%	39	%	18	8.5%	16	7.5%	216
		66.0		18.0					
2024	144	%	39	%	19	8.5%	16	7.5%	218
		66.0		18.0					
2025	146	%	40	%	19	8.5%	17	7.5%	221
		66.0		18.0					
2026	148	%	40	%	19	8.5%	17	7.5%	224
		66.0		18.0					
2027	150	%	41	%	19	8.5%	17	7.5%	227

Sources: Yuma County Airport Authority, April 2008 (2007 data); Ricondo & Associates, Inc., April 2008 (2008-2027 data).
Prepared by: Ricondo & Associates, Inc., April 2008.

GA operations were developed using the operations per based aircraft (OPBA) methodology, a commonly accepted planning statistic. The OPBA is calculated by dividing the annual number of GA operations at an airport by the number of based GA aircraft in that same year. For this analysis, the historical average OPBA was used to forecast future operations. The OPBA statistic does not indicate which based aircraft will actually conduct a certain number of operations, but instead generally relates the total number of operations to the total number of based aircraft. **Table III-19** presents the GA operations forecast for the Airport using this methodology.

As shown in Table III-19, GA operations increased from 26,857 in 2002 to 65,621 in 2004, but have decreased each year since. Using the OPBA methodology, and validated by first quarter 2008 data provided by the Airport, GA operations are forecast to increase at a low to moderate level throughout the planning period, increasing from 42,047 in 2007 to approximately 57,200 in 2027, representing a compounded annual growth rate of 1.6 percent over the period.

Table III-19 GA Operations Forecast

Year	Based Aircraft	Operations Per Based Aircraft	GA Operations
Historical			
2002	194	138	26,857
2003	194	219	42,581
2004	194	338	65,621
2005	176	291	51,178
2006	176	285	50,108
2007	176	239	42,047
Forecast			
2008	176	252	44,352
2009	178	252	44,972
2010	181	252	45,578
2011	183	252	46,233
2012	186	252	46,928
2013	189	252	47,628
2014	192	252	48,311
2015	195	252	49,016
2016	197	252	49,729
2017	200	252	50,446
2018	203	252	51,084
2019	205	252	51,734
2020	208	252	52,375
2021	210	252	53,012
2022	213	252	53,663
2023	216	252	54,334
2024	218	252	55,025
2025	221	252	55,740
2026	224	252	56,473
2027	227	252	57,207
Compounded Annual Growth Rate			
2002-2007	-1.9%		9.4%
2007-2012	1.1%		2.2%
2012-2017	1.5%		1.5%
2017-2022	1.2%		1.2%
2022-2027	1.3%		1.3%
2007-2027	1.3%		1.6%

Yuma International Airport

Sources: Yuma County Airport Authority, April 2008 (2002-2007 data); Ricondo & Associates, Inc., April 2008 (2008-2027 data).
Prepared by: Ricondo & Associates, Inc., April 2008.

Cargo Operations
Cargo operations at the Airport consist of the air mail and air freight/air express activities conducted by the all-cargo operators who use the Airport. Air cargo operations at the Airport remained fairly constant between 2002 and 2007, with a slight decreasing trend after 2004. Using the trend analysis regression, operations are forecast to increase from 2,315 in 2007 to approximately 3,800 operations in 2027, representing a compounded annual growth rate of 2.5 percent over the period. These data are shown in Table III-20 in the following subsection.

Operations Summary
Figure 43 depicts the forecast increase in total Airport operations during the planning period, while **Table III-20** presents the operations forecast for each segment at the Airport.
As shown in Figure 43, total operations at the Airport are forecast to increase from 115,445 in 2007 to approximately 148,400 in 2027, representing a compounded annual growth rate of 1.3 percent over the period. Yearly operational data are presented on a segment-by-segment basis in Table III-15.

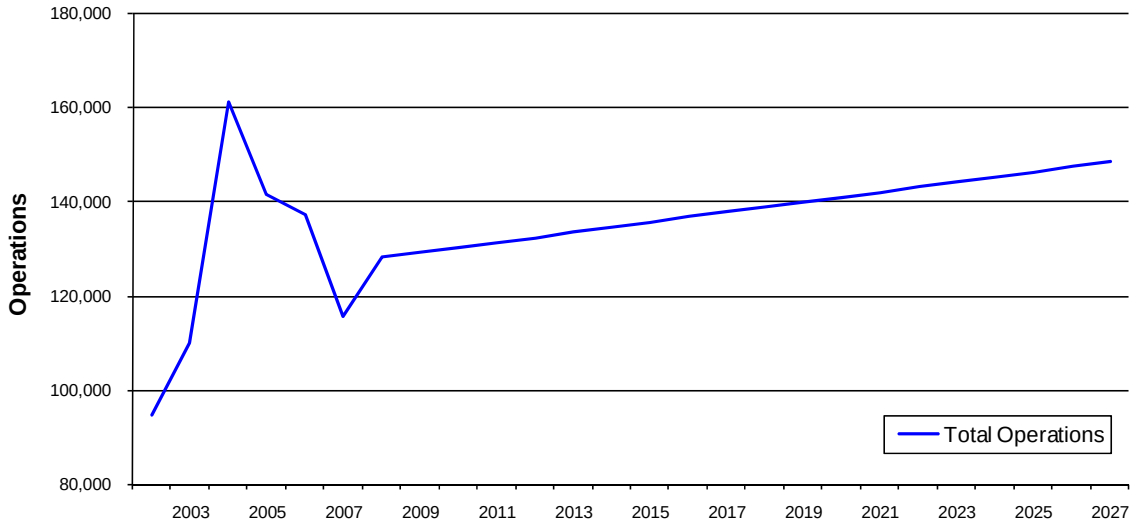

Figure 43 - Total Operations Forecast

Sources: Yuma County Airport Authority, April 2008 (2002-2007 data); Ricondo & Associates, Inc., April 2008 (2008-2027 data).
Prepared by: Ricondo & Associates, Inc., April 2008.

Table III-20 Total Operations Forecasts

Year	Passenger Air Carrier	Total Air Carrier [1/]	Cargo	General Aviation	Total Military	Airport Total [2/]
Historical						
2002	2,949	5,898	2,733	26,857	59,237	94,725
2003	2,958	5,906	3,180	42,581	58,224	109,891
2004	2,796	5,592	3,179	65,621	86,564	160,956
2005	2,935	5,870	2,450	51,178	81,781	141,279
2006	3,284	6,548	2,351	50,108	78,147	137,154

2007	3,460	7,426	2,315	42,047	63,657	115,445
Forecast						
2008	3,431	6,568	2,827	44,352	74,409	128,156
2009	3,536	6,663	2,876	44,972	74,654	129,165
2010	3,641	6,757	2,925	45,578	74,899	130,159
2011	3,746	6,852	2,974	46,233	75,144	131,203
2012	3,851	6,946	3,024	46,928	75,389	132,287
2013	3,955	7,041	3,073	47,628	75,634	133,375
2014	4,060	7,135	3,122	48,311	75,879	134,447
2015	4,165	7,230	3,171	49,016	76,124	135,541
2016	4,270	7,325	3,221	49,729	76,369	136,642
2017	4,375	7,419	3,270	50,446	76,613	137,749
2018	4,480	7,514	3,319	51,084	76,858	138,775
2019	4,585	7,608	3,368	51,734	77,103	139,814
2020	4,690	7,703	3,418	52,375	77,348	140,844
2021	4,795	7,797	3,467	53,012	77,593	141,869
2022	4,900	7,892	3,516	53,663	77,838	142,909
2023	5,005	7,986	3,565	54,334	78,083	143,969
2024	5,109	8,081	3,615	55,025	78,328	145,049
2025	5,214	8,175	3,664	55,740	78,573	146,152
2026	5,319	8,270	3,713	56,473	78,818	147,274
2027	5,424	8,365	3,762	57,207	79,062	148,397
Compounded Annual Growth Rate						
2002-2007	3.2%	4.7%	-3.3%	9.4%	1.4%	4.0%
2007-2012	2.2%	-1.3%	5.5%	2.2%	3.4%	2.8%
2012-2017	2.6%	1.3%	1.6%	1.5%	0.3%	0.8%
2017-2022	2.3%	1.2%	1.5%	1.2%	0.3%	0.7%
2022-2027	2.1%	1.2%	1.4%	1.3%	0.3%	0.8%
2007-2027	2.3%	0.6%	2.5%	1.6%	1.1%	1.3%

Notes:
1/ Total air carrier operations include both scheduled commercial passenger air carrier operations and military air carrier operations.
2/ Represents the sum of segments including total air carrier, cargo, GA, and total military activity.
Sources: Yuma County Airport Authority, April 2008 (2002-2007 data); Ricondo & Associates, Inc., April 2008 (2008-2027 data).
Prepared by: Ricondo & Associates, Inc., April 2008.

Design-Day Activity

In addition to forecasting annual activity levels at the Airport, it was necessary to forecast design level activity, defined in this study as activity that occurs during the average day in the peak month (peak month average day, or PMAD). PMAD are used to illustrate the demand for airport facilities based on specific use patterns. PMAD passenger enplanements reflect the number of enplaned passengers on a typical day during the peak month, while PMAD aircraft operations represent the average number of aircraft operations for each segment on a typical day during the peak month.

Table III-21 presents the demand level forecast for the Airport. As shown in the table**,** PMAD enplaned passengers are forecast to increase from an estimated 270 in 2008 to 555 in 2027. The

table also presents the forecast PMAD operations data. Total Airport operations on the average day in the peak month are expected to increase from 480 in 2008 to 555 in 2027.

Summary

The forecast Airport activity levels are presented in Table III-21. For the purpose of the analyses of this Airport Master Plan, references to specific years will be minimized in the subsequent chapters. Rather, Planning Activity Levels (PALs) will be emphasized. The purpose of the PALs is to guide Airport officials in determining when, according to activity levels instead of calendar years, Airport facilities will need to be expanded or upgraded. By referencing improvement decisions to activity levels and not specific dates, an airport operator can be flexible and responsive with regard to facility development needs. The PALs represent the preferred forecast levels of activity at the 5-, 10-, 15-, and 20-year planning horizons for PALs 1, 2, 3, and 4, respectively (estimated to occur 2012, 2017, 2022, and 2027). When utilizing these data for determining the timing of Airport improvements throughout the following chapters, the PALs are not correlated to a specific calendar year.

Table III-21 Demand Level Forecast

Forecast	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Passenger Enplanements										
Annual Enplanements 1/	75,400	79,600	83,800	88,000	92,200	96,400	100,600	104,800	109,000	113,200
Peak Month (11.1% of Annual)	8,369	8,836	9,302	9,768	10,234	10,700	11,167	11,633	12,099	12,565
Average Day (31 Days)	270	285	300	315	330	345	360	375	390	405
Aircraft Operations										
Passenger Air Carrier 1/										
Annual	3,431	3,536	3,641	3,746	3,851	3,955	4,060	4,165	4,270	4,375
Peak Month (11.1% of Annual)	381	392	404	416	427	439	451	462	474	486
Average Day (Peak Month/31 Days)	12	13	13	13	14	14	15	15	15	16
Total Air Carrier 2/										
Annual	6,568	6,663	6,757	6,852	6,946	7,041	7,135	7,230	7,325	7,419
Peak Month (14.5% of Annual)	952	966	980	994	1,007	1,021	1,035	1,048	1,062	1,076
Average Day (Peak Month/31Days)	31	31	32	32	32	33	33	34	34	35
Cargo 2/										
Annual	2,827	2,876	2,925	2,974	3,024	3,073	3,122	3,171	3,221	3,270
Peak Month (11.6 % of Annual)	328	334	339	345	351	356	362	368	374	379
Average Day (Peak Month/31 Days)	11	11	11	11	11	11	12	12	12	12
General Aviation 3/										
Annual	44,352	44,972	45,578	46,233	46,928	47,628	48,311	49,016	49,729	50,446
Peak Month (11.6 % of Annual)	5,145	5,217	5,287	5,363	5,444	5,525	5,604	5,686	5,769	5,852
Average Day (Peak Month/30 Days)	171	174	176	179	181	184	187	190	192	195
Total Military 4/										
Annual	74,409	74,654	74,899	75,144	75,389	75,634	75,879	76,124	76,369	76,613
Peak Month (11.4 % of Annual)	8,483	8,511	8,538	8,566	8,594	8,622	8,650	8,678	8,706	8,734
Average Day (Peak Month/31 Days)	274	275	275	276	277	278	279	280	281	282
Total Airport Operations 2										
Annual	128,156	129,165	130,159	131,203	132,287	133,375	134,447	135,541	136,642	137,749
Peak Month (11.6 % of Annual)	14,866	14,983	15,098	15,220	15,345	15,472	15,596	15,723	15,851	15,979
Average Day (Peak Month/31 Days)	480	483	487	491	495	499	503	507	511	515

Forecast	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027

Passenger Enplanements										
Annual Enplanements 1/	117,400	121,600	125,800	129,900	134,100	138,300	142,500	146,700	150,900	155,100
Peak Month (11.1% of Annual)	13,031	13,498	13,964	14,419	14,885	15,351	15,818	16,284	16,750	17,216
Average Day (31 Days)	420	435	450	465	480	495	510	525	540	555
Aircraft Operations										
Passenger Air Carrier 1/										
Annual	4,480	4,585	4,690	4,795	4,900	5,005	5,109	5,214	5,319	5,424
Peak Month (11.1% of Annual)	497	509	521	532	544	556	567	579	590	602
Average Day (Peak Month/31 Days)	16	16	17	17	18	18	18	19	19	19
Total Air Carrier 2/										
Annual	7,514	7,608	7,703	7,797	7,892	7,986	8,081	8,175	8,270	8,365
Peak Month (14.5% of Annual)	1,089	1,103	1,117	1,131	1,144	1,158	1,172	1,185	1,199	1,213
Average Day (Peak Month/31Days)	35	36	36	36	37	37	38	38	39	39
Cargo 2/										
Annual	3,319	3,368	3,418	3,467	3,516	3,565	3,615	3,664	3,713	3,762
Peak Month (11.6 % of Annual)	385	391	396	402	408	414	419	425	431	436
Average Day (Peak Month/31 Days)	12	13	13	13	13	13	14	14	14	14
General Aviation 3/										
Annual	51,084	51,734	52,375	53,012	53,663	54,334	55,025	55,740	56,473	57,207
Peak Month (11.6 % of Annual)	5,926	6,001	6,076	6,149	6,225	6,303	6,383	6,466	6,551	6,636
Average Day (Peak Month/30 Days)	198	200	203	205	207	210	213	216	218	221
Total Military 4/										
Annual	76,858	77,103	77,348	77,593	77,838	78,083	78,328	78,573	78,818	79,062
Peak Month (11.4 % of Annual)	8,762	8,790	8,818	8,846	8,874	8,901	8,929	8,957	8,985	9,013
Average Day (Peak Month/31 Days)	283	284	284	285	286	287	288	289	290	291
Total Airport Operations 2										
Annual	138,775	139,814	140,844	141,869	142,909	143,969	145,049	146,152	147,274	148,397
Peak Month (11.6 % of Annual)	16,098	16,218	16,338	16,457	16,577	16,700	16,826	16,954	17,084	17,214
Average Day (Peak Month/31 Days)	519	523	527	531	535	539	543	547	551	555

Notes:

1/ As presented in Table III-15.

2/ As presented in Table III-20.

3/ As presented in Table III-19.

4/ As presented in Table III-16.

Sources: Ricondo & Associates, Inc., April 2008.

Prepared by: Ricondo & Associates, Inc., April 2008.

III. Demand/Capacity Analyses and Facility Requirements

This chapter identifies Airport facility requirements through the 20-year planning period. A number of factors affect how efficiently a certain level of activity (demand) can be accommodated within a specific system or facility (capacity). Furthermore, acceptable levels of service or convenience vary by user, facility, or airport sponsor. The primary purpose of this chapter is to describe the relationship between demand and capacity in the context of the various facilities at the Airport and to provide general assessments of the ability of the existing facilities to meet future demand, as presented in the previous chapter. The following Airport facilities are assessed in this chapter:

Airfield Facilities
Passenger Terminal Area
FBO and GA Facilities
Ancillary Facilities

These assessments were translated into facility requirements at specific demand levels throughout the planning period. As discussed in Chapter III, *Aviation Activity Forecasts*, PALs were used to correlate the need for facility improvements with demand. For the purposes of this study, PAL 1 is associated with the short-term planning horizon (estimated to occur in 2012), PAL 2 (estimated to occur in 2017) and PAL 3 (estimated to occur in 2022) represent the mid-term planning horizon, and PAL 4 (estimated to occur in 2027) represents the long-term planning horizon. Development alternatives for meeting the facility requirements identified in this chapter are presented in Chapter V, *Alternatives and Airport Development Plan*.

This chapter of the Airport Master Plan is organized by functional airport systems, with each assessed separately. Ultimately, the facility requirements for each functional system will be combined in the ADP and refined to ensure that overall facility requirements can be met. The four functional systems identified in this study are described below.

Airfield Facilities includes the runway and taxiway system. The ability of the airfield system to accommodate the demand at the various PALs, in terms of runway capacity and design standards, was evaluated.

Passenger Terminal Area includes the terminal building, and associated facilities. Passenger demand defines the need for various facilities such as ticket counters, baggage claim devices, security screening stations, and holdrooms, among other building elements. Terminal gates and aircraft parking requirements were established according to peak hour demand and gate occupancy times for commercial passenger aircraft serving, and anticipated to serve, the Airport. This section also assessed ground access and parking facilities to include on-Airport ground transportation and circulation systems such as access roadways, terminal curbfront, and vehicular parking areas. The demand associated with these facilities is driven by passenger demand and the distribution of the various modes of transportation that serve the Airport and local roadway system.

FBO and GA Facilities includes facilities that accommodate corporate and private aircraft. These facilities typically include aircraft storage hangars, aircraft parking/tie-down aprons, vehicle parking and support facilities such as cargo facilities, fuel farms, and wash racks.

Ancillary Facilities include the aviation support facility, airport maintenance facility, aircraft rescue and fire fighting facilities, and utilities infrastructure.

The methodology used to determine facility requirements and capacity generally follows industry standards, and was adjusted if necessary to reflect actual or unique use characteristics at

the Airport. Planning experience at and knowledge of other airports was also used to determine requirements.

Airfield Facilities

AC 150/5300-13 was used to determine the Airport's Aircraft Reference Code (ARC). The ARC is a coding system that relates airport design criteria to the aircraft expected to operate at an airport. The code consists of two components. The first, a letter, is the aircraft approach category, which is defined by aircraft approach speed. Generally, approach speed relates to runway length and navigational aids. The second, a Roman numeral, is the Aircraft Design Group (ADG) determined by the aircraft's wingspan which relates to taxiways and taxilanes. **Table IV-1** presents a summary of the aircraft approach speed and ADG classifications.

Table IV-1 FAA Aircraft Classifications

Aircraft Approach Category

Category	Approach Speed (knots)	Typical Aircraft by Aircraft Approach Category
A	< 91	C-172, Beech Bonanza, Cirrus SR-22, Diamond DA-42
B	91 - < 121	E120, Beech 1900C, King Air 200, Citations II, III and V, Falcon 2000
C	121 - < 141	Astra Galaxy, Challenger 604, CRJ, Global Express, Citations VI, VII, and X, A320, Boeing Business Jet, B-737-100/200/300/400/500/700/900ERW, B757, B767, B787-8, C-5
D	141 - < 166	Gulfstream II and IV, A310-300, A330-300, A340, B-737-800/900/900ER /900W/900ER, B-747, B-777-300, DC-10, MD 11, KC-10, KC-135, F-18
E	166 or greater	Military aircraft (F-16, F-22, T-38)

Airplane Design Group (ADG)

Design Group	Wingspan (feet)	Tail Height (feet)	Typical Aircraft by ADG
I	< 49	< 20	C-172, C-402, Beech 400A, Cirrus SR-22, Diamond DA-42, F-16, F-22
II	49 - < 79	20 - < 30	E120, Beech 1900C, King Air 200, CRJ-200, CRJ-700, Citations V and X, Falcon 2000, Gulfstream G350, G450
III	79 - < 118	30 - < 45	A318, A319, A320, A321, B-727, B-737, MD 80, DC-9, Gulfstream G550, G650
IV	118 - < 171	45- < 60	A300, A310, B-757, B-767, DC-8, MD 11, B-787-8, KC-10, KC-135
V	171 - < 214	60 - < 66	A330, A340, A350, B-747, B-777, B-787-8
VI	214 - < 262	66 - < 80	A380, Antonov 124 Condor, C-5

Source: Ricondo & Associates, Inc, April 2008, based on Federal Aviation Administration, FAA AC 150/5300-13, Change 14, *Airport Design*, November 1, 2008; Burns & McDonnell, *Aircraft Characteristics*, 9th edition; *Airport Reference Code and Approach Speeds for Boeing Airplanes*, August 2, 2007, http://www.boeing.com/commercial/airports/faqs/arcandapproachspeeds.pdf (accessed April 28, 2008).

The ARC for Runway 3L-21R is E-VI, Runway 3R-21L is D-V, and Runways 17-35, and 8-26-use an ARC of B-II. Maintaining ARC E-VI standards through the 2027 planning period would accommodate the full range of air carrier, cargo, and military aircraft expected to serve the Airport.

Table IV-2 shows the FAA ARC design criteria for each runway. The standards depicted in the table will be incorporated into the airfield facility requirements in this Airport Master Plan.

Note that Taxiways west of Runway 3L-21R are not wide enough to accommodate operations of larger GA aircraft, such as Gulfstream corporate jets, specifically G-Vs that operate at the Airport. This is discussed further under Facilities Requirements in Section 4.1.2 of this document.

Table IV-2 FAA Airfield Design Standards for ARC E-VI, D-V, and B-II Aircraft

	E-VI	D-V	B-II

Yuma International Airport

Design Criteria	FAA Design Std.	Runway 3L-21R [1/]	FAA Design Std.	Runway 3R-21L	FAA Design Std.	Runway 8-26	Runway 17-35 [1/]
Runway Width (feet)	200	200	150	150	75	150	150
Shoulder Width (feet)	30	30	25	25	10	15	15
Runway Centerline to:							
Taxiway Centerline (feet)	400	1,200	400	500	240	475	475
Aircraft Parking Area (feet)	500	1,450	500	750	250	600	730
Runway Object Free Area (ROFA)							
Width (feet)	800	800	800	800	500	500	500
Length beyond Runway End (feet)	1,000	1,000	1,000	1,000	300	300	300
Runway Obstacle Free Zone (OFZ)							
Width	400	400	400	400	250	250	250
Length beyond Runway End	200	200	200	200	200	200	200
Runway Safety Area (RSA)							
Width (feet)	500	500	500	500	150	150	150
Length beyond Runway End (feet)	1,000	1,000	1,000	1,000	300	300 (8) [3/] 1,050 (26) [3/]	300 (17) [3/] 775 (35) [3/]
Taxiway Width (feet)	100	75 [2/] - 250	75	75	35	40-75	30-75 [4/]
Taxiway Centerline to:							
Parallel Taxiway/Taxilane Centerline (feet)	324	n/a	267	288	105	n/a	n/a
Fixed or Movable Objects (feet)	193	n/a	160	260	65.5	131	256
Taxiway Object Free Area Width (feet)	386	320	320	320	131	140	320

Notes:
1/ Dimensions that are highlighted in gray indicate a deficiency from FAA design standards.
2/ Includes taxiways serving Runway 3L-21R. Taxiways E, F, and H are 75 feet wide and do not meet FAA 100-foot taxiway width design standards for ADG VI. The location of taxiways is shown on Figure 5.
3/ Length indicated is at the approach end of the runway identified in ().

4/ Includes Taxiways Z, Z1, Z2, and Z3 serving the GA aprons. Taxiway Z1 is 30 feet wide and does not meet FAA 35-foot taxiway width design standards for ADG II. The location of taxiways is shown on Figure 5. Aircraft larger than ADG II also utilize the GA aprons and facilities and would benefit from the increased safety margin of ADG III taxiways, which are 50 feet wide.

n/a = not applicable
Source: Ricondo & Associates, Inc., March 2009, based on *Yuma International Airport Layout Plan*; Federal Aviation Administration, FAA AC150/5300-13, Change 14, *Airport Design*, November 1, 2008.
Prepared by: Ricondo & Associates, Inc., March 2009.

Annual Service Volume

The purpose of the airfield demand/capacity analysis is to assess the capability of the airfield to accommodate existing and forecast aircraft operations. Airfield capacity, sometimes referred to as throughput, is defined in AC 150/5060-5, Change 2, *Airport Capacity and Delay*, dated December 1, 1995, as the maximum number of aircraft operations that an airfield can accommodate during a specific period of time without incurring an unacceptable level of delay. Airfield capacity varies according to weather conditions, types of aircraft, airfield configuration, and ATCT procedures. The number and location of runway exits and the share of touch-and-go operations also influence airfield capacity. Aircraft delays increase exponentially as the number of aircraft operations (aircraft demand) nears or exceeds airfield capacity under specific operating conditions.

Annual Service Volume (ASV) is a tool used to estimate the timing of capacity improvements. As defined in AC 150/5060-5, ASV is a reasonable estimate of an airport's annual capacity. ASV generally accounts for the hourly, daily, and seasonal variations in aircraft demand associated with the airfield, and the occurrence of low visibility conditions during which air traffic control (ATC) procedures for the airport are modified to maintain operational safety. The ASV of a dual runway configuration with a centerline-to-centerline separation of 700 to 2,499 feet ranges from 260,000 to 355,000 annual operations, depending on the mix index. The mix index is expressed as C+3D, where C equals the percent of airplanes over 12,500 pounds but not over 300,000 pounds, and D equals the percent of airplanes over 300,000 pounds. The total annual operations on the airfield are forecast to be approximately 148,400 by the end of the planning period. As stated in the preceding paragraph, the FAA does not require detailed capacity analyses unless the forecast activity reaches 60 to 75 percent of airfield capacity. The forecast operations at the Airport do not meet this criterion for detailed analyses based on the dual runway configuration of 3L-21R and 3R-21L. It is important to note that the use of Runways 8-26 and 17-35 for civil operations marginally increases the capacity. The additional runways allow for operations to occur on those runways when conditions prohibit the use of Runways 3L-21R and 3R-21L, such as certain wind conditions or runway closures. The additional runways would increase the percentage of time that operations could feasibly occur on the overall airfield, but provide a marginal increase in throughput given the operational restrictions of intersecting runways. According to AC 150/5060-5, based on the runway configuration at the Airport, the forecast operations do not exceed the minimum ASV operations per year. Therefore, airfield capacity improvements are not needed through the 20-year planning

period on the basis of capacity alone. However, the safety considerations identified in paragraph 4.2.2 indicate a need for taxiway system upgrades and additions.

Airfield Requirements

Airfield requirements were developed for physical pavement and imaginary surfaces. These facilities are presented graphically on the ALP, a separate document that shows the detailed layout of the entire airfield. Dimensions for the runway and taxiway systems, separation distances between runways and taxiways, and safety areas and other imaginary surfaces are included on the ALP. The previous section addressed capacity of the airfield relative to anticipated future aircraft operations and the ability of the airfield to accommodate that activity. This section addresses the physical requirements for the following components:

Runway System
Taxiway System
Pavement Strength
Airfield Safety Areas
Navigational Aids

3.1.1.1 Runway System

As shown in Table IV-2, FAA design criteria for the civil use runways at the Airport specify a runway width of 75 feet for ARC B-II. Runway 8-26 and Runway 17-35 both exceed this requirement, each having an existing width of 150 feet. FAA design criteria for an ARC D-V runway require a width of 150 feet. Runway 3R-21L meets this requirement. FAA design criteria for an ARC E-VI runway require a width of 200 feet. Runway 3L-21R meets this requirement. Therefore, no modifications to runway widths are necessary to meet design criteria.

3.1.1.2 Taxiway System

Most of the taxiway system complies with FAA requirements. However, aircraft up to ADG III currently use taxiways in the northwest portion of the airfield, more specifically taxiways serving the GA facilities. This warrants the widening of taxiways serving those areas to 50 feet. This standard is not currently met by the northwest taxiway system and such improvements would increase operational safety.

Certain taxiways serving Runway 3L-21R should be widened to meet ADG VI standards. Currently Taxiways E, F, and H, accommodating ADG VI aircraft departing or arriving on Runway 3L-21R, do not meet the 100-foot width standard. The current Taxiway Object Free Area (TOFA) is 320 feet, 66 feet less than the 386-foot standard for ADG VI. A parallel taxiway northwest of Runway 3L-21R would enhance safety and efficiency while minimizing the risk of incursions.

MCAS Yuma owns most of the airfield, including Taxiways E, F, and H. These future improvements would be implemented at the discretion of MCAS Yuma.

3.1.1.3 Pavement Strength

Runway pavement strength can be expressed as single-wheel loading, dual-wheel loading, and dual tandem-wheel loading. The aircraft gear type and configurations dictate how the aircraft weight is distributed on the pavement and determine pavement response to loading. Examining the gear configuration, tire contact areas, and tire pressure in common use areas indicates that pavement strength is related to aircraft maximum take-off weight.

As shown in Table II-2 the stated load-bearing capacities of Runway 8-26 are 63,000 pounds single-wheel, 137,000 pounds dual-wheel, and 206,000 pounds dual tandem-wheel. The Naval

Facilities Engineering Command, Southwest Division, San Diego, California conducted the *Airfield Pavement Condition Survey, Marine Corps Air Station Yuma, Arizona* in June 2005. Pavement conditions were inspected and given a Pavement Condition Index (PCI) from zero to 100, where a PCI between 86 and 100 represents "Good", a PCI between 71 and 85 represents "Satisfactory", and a PCI between 56 and 70 represents a "Fair" rating. Runway 8-26 received a rating of "Good to Satisfactory." The load-bearing capacities of Runway 17-35 are 72,000 pounds single-wheel, 171,000 pounds dual-wheel, and 255,000 pounds dual tandem-wheel. In the MCAS survey, Runway 17-35 was rated as "Good to Fair." Runways 3L-21R and 3R-21L have heavier load-bearing capacities due to the larger aircraft using the military runways. The load-bearing capacities of Runway 3L-21R are 103,000 pounds single-wheel, 200,000 pounds dual-wheel, and 400,000 pounds dual tandem-wheel. Runway 3L-21R was rated as being in "Good" condition in the MCAS survey. Runway 3R-21L has load-bearing capacities of 162,000 pounds single-wheel, 200,000 pounds dual-wheel, and 400,000 pounds dual tandem-wheel, and was rated as being in "Good to Fair" condition in the MCAS survey. With forecasted regular scheduled air carrier service consisting primarily of regional jets (dual landing gear), pavement strength should be sufficient through PAL 4. It is recommended that a Pavement Maintenance and Management System be completed and updated on a regular basis to ensure that YCAA-owned pavements are evaluated and compliant with FAA Advisory Circulars. This system will provide an adequate assessment of the current pavement condition and timing for maintenance and possible rehabilitation of pavement areas.

3.1.1.4 Airfield Safety Areas

The FAA's design standards for the various airfield safety areas, and how they are met at the Airport, are presented in this section. However, MCAS Yuma owns the airfield, and modifications to the safety areas would be at their discretion. The following airfield safety areas were evaluated and compared against FAA-criteria for the Airport:

Runway Safety Area
Runway Object Free Area
Obstacle Free Zone
Runway OFZ
Inner-Approach OFZ
Inner-Transitional OFZ
Runway Protection Zone
FAR Part 77 Primary Approach and Transitional Surfaces

Runway Safety Area

Runway Safety Areas (RSAs) are rectangular areas centered on runway centerlines, which, under normal (dry) conditions, are capable of supporting aircraft without causing structural damage to an aircraft or injury to its occupants should an aircraft inadvertently leave the paved runway surface. To serve this function, the FAA requires RSAs to be (1) cleared and graded, (2) drained by grading or storm sewers to prevent water accumulation, and (3) free of objects, except those that need to be located in the RSA because of their function, such as approach lighting and other navigational aids.

Based on FAA design criteria, the RSAs for Runways 8-26 and 17-35 should be 150 feet wide and should extend 300 feet beyond the runway ends. The RSA standards are met for both runways. The RSAs for Runways 3L-21R and 3R-21L should be 500 feet wide and extend 1,000 feet beyond the runway. The RSA standards are met for both Runways 3L-21R and 3R-21L.

Therefore, there are no requirements for changes to meet RSA standards for existing or forecast conditions.

Runway Object Free Area

Runway Object Free Areas (ROFAs) are rectangular areas centered on runway centerlines that are required to be clear of objects protruding above the RSA edge elevation, with the exception of those objects that are essential to air navigation or aircraft ground maneuvering.

For runways serving Approach Category D and E aircraft, ROFAs must be 800 feet wide (i.e., 400 feet on either side of the runway centerline). ROFAs serving Approach Category D and E aircraft are required to extend 1,000 feet beyond the end of the runway or 1,000 feet beyond the end of the stopway if a stopway is provided. Extensions of ROFAs beyond this distance are encouraged, but not required, by the FAA.

For runways serving Approach Category B aircraft with not lower than 0.75-statute mile approach visibility minimums, ROFAs must be 500 feet wide (i.e., 250 feet on either side of the runway centerline). ROFAs serving Approach Category B aircraft are required to extend 300 feet beyond the end of the runway or 300 feet beyond the end of the stopway if a stopway is provided.

The ROFAs for all four runways, as shown on the ALP, meet FAA design criteria. Therefore, there are no requirements for changes to meet ROFA standards for existing or forecast conditions.

Obstacle Free Zone

The Obstacle Free Zone (OFZ) is a three-dimensional volume of airspace that is defined to protect for the safe transition of aircraft from ground to air and from air to ground. FAA OFZ clearance standards prohibit this airspace from being penetrated by taxiing or parked aircraft or other objects, with the exception of frangible navigational aids or fixed function objects. The ALP drawing set can be referred to for a detailed drawing of the OFZ, and whether penetrations to any of these imaginary surfaces exist. The descriptions of these imaginary surfaces are stated below.

Runway OFZ

The runway OFZ is defined by it width, length, and height. In general, the runway OFZ is typically 400 feet wide for runways serving large aircraft and 250 feet wide for nonprecision and visual approach runways serving smaller aircraft. Based on these factors, the OFZ for Runways 8-26 and 17-35 should be 250 feet wide. Runways 3L-21R and 3R-21L should have 400-foot-wide OFZs[20]. The length of the runway OFZs extend 200 feet beyond each end of the runway. The height of the runway OFZs varies based on the type of approach and the approach visibility minimums. In general, the runway OFZ height is 150 feet above airport elevation for visual runways. For runways serving large aircraft with lower than 0.75-statute mile approach visibility minimums, the runway OFZ height is based on the most demanding wingspan of the aircraft using the runway and the elevation of the runway threshold above sea level. As presented in Table IV-2, these requirements are met.

Inner-Approach OFZ

[20] Federal Aviation Administration, FAA AC 150/5300-13, Change 14, *Airport Design*, November 1, 2008.

The inner-approach OFZ is a volume of airspace centered on the approach area that applies only to precision instrument runways or those equipped with approach lighting. Table II-2 shows the lighting system of each runway at the Airport. As shown in the table, Runway 21R is the only one with MALSR lighting. The inner-approach OFZ begins 200 feet from the runway threshold and extends 200 feet beyond the last unit in the approach lighting system. It has the same width as the runway OFZ and rises at a slope of 50:1 away from the runway end.

Inner-Transitional OFZ

The inner-transitional OFZ is a defined volume of airspace along the sides of the runway and inner-approach OFZ. It applies only to runways with lower than 0.75-statute mile approach visibility minimums. Runway 21R has a 0.5-statute mile approach visibility minimum and is therefore the only runway end subject to inner-transitional OFZ object clearance restriction.

Runway Protection Zone

The Runway Protection Zone (RPZ) is a trapezoidal area centered on the extended runway centerline. The length and width of the RPZ are contingent on the size of the aircraft operating on the runway as well as the type of the approach (i.e., visual or instrument) and approach minima available. RPZs are designed to enhance the protection of people and property on the ground. To achieve this goal, the FAA encourages an airport operator to own the property within the RPZ. This area should be free of land uses that create glare and smoke. Also, the FAA recommends that airport operators keep the RPZs clear of incompatible land uses, specifically residences and places of public assembly. Incompatible land uses include churches, schools, office buildings, shopping centers, and fuel storage facilities. Automobile parking facilities, although discouraged, may be permitted within an RPZ with FAA approval. The ALP drawing set can be referred to for a detailed drawing of the RPZs for each runway.

FAR Part 77 Primary Approach and Transitional Surfaces

Approach threshold siting requirements are controlled by imaginary airspace surfaces that extend from the ends of the runway at specified angles and slopes. These surfaces are described in FAR Part 77 Subpart C, *Obstruction Standards*, which establishes standards for determining obstructions to air navigation. Part 77 applies to existing and proposed manmade objects, objects of natural growth, and terrain. It also regulates the use of navigable airspace and existing air navigation facilities, airports, federal airways, instrument approach and departure procedures, and approved off-airway routes. The FAR also specifies slopes for civil versus military-owned facilities. Thus, military guidelines are applied to FAR Part 77 primary approach and transitional surfaces. Details depicting these surfaces and any penetrations to them can be referenced in the ALP set. The standards apply to a planned facility or use, or a change in an existing facility or use. When a surface penetration exists, one or more of the following actions is required:
The object is removed or lowered to preclude penetration of applicable threshold siting surfaces.
The threshold is displaced to preclude object penetration of applicable threshold siting surfaces, with a resulting shorter landing distance.
Changes to approach minimums (visibility and ceiling height).
Night operations are prohibited.

3.1.1.5 Navigational Aids (NAVAIDS)

The NAVAID requirements for the Airport are based on recommendations contained in FAA Order 7031.2C, *Airway Planning Standard Number One – Terminal Air Navigation Facilities and Air Traffic Control Services, Change 12,* dated October 17, 1999, and AC 150/5300-13.

MCAS Yuma is responsible for maintaining the navigational aids and airfield lighting at the Airport. The distinction between precision and nonprecision NAVAIDS is that precision aids provide electronic descent and alignment guidance, while nonprecision aids provide only alignment information. An airport is equipped with either precision or nonprecision navigational aid capability in accordance with design standards based on safety considerations and operational needs. The type, mission, and volume of aeronautical activity associated with meteorological airspace and capacity data determine an airport's eligibility and need for various NAVAIDS. The existing runway instrumentation and lighting systems at the Airport are summarized in Table II-2. For purposes of this Airport Master Plan, required NAVAIDS are divided into three general categories: terminal area NAVAIDS, electronic approach NAVAIDS, and visual approach NAVAIDS. The NAVAIDS that are currently at the Airport are owned by MCAS Yuma. Future changes in NAVAIDS will be provided at the discretion of MCAS Yuma. The three categories of NAVAIDS are discussed in the following paragraphs.

Terminal Area NAVAIDS

Terminal Area NAVAIDS provide positive control to aircraft and expedite and maintain an orderly flow of air traffic within a specified area. Terminal area NAVAIDS provide separation between aircraft during landing and take-off as well as guidance that allows for sufficient aircraft maneuvering. Terminal area NAVAIDS currently located at the Airport include the ATCT. ATCT personnel are responsible for approach and departure control during ATCT hours of operation. En route control of aircraft to and from the Airport is provided by the Prescott Flight Service Station (FSS) located in Prescott, Arizona. The Prescott FSS provides air traffic control service to aircraft operating on Instrument Flight Rules (IFR) flight plans within controlled airspace during the en route phase of flight. The en route phase of flight is generally when aircraft are operating between departure and destination terminal areas.

Over the 20-year planning horizon, it is expected that the existing ATCT will be adequate to serve air traffic demand at the Airport. Currently, Yuma International Airport operates its approach and departure controls through the USMC ATCT. The personnel operating the USMC ATCT are provided by the MCAS Yuma, and the hours of operation are limited. To enhance safety, there is a need to extend the current ATCT operating hours from weekdays, to seven days a week, year-round. This requirement is due in part to the complexity of the airfield with intersecting runways and the mix of activity including GA, air carrier and occasional large or heavy aircraft operation when the ATCT is not operational.

Electronic Approach NAVAIDS

This category of NAVAIDS is used to assist pilots who use instrument approaches. An instrument approach is a series of predetermined maneuvers for the orderly transfer of an aircraft under instrument flight from the beginning of its initial approach to its landing, or to a point from which a landing may be made visually.

A precision approach is currently provided to Runway 21R. A Category I ILS provides guidance to the runway when visibility is 0.5-statute mile or greater and the ceiling is at least 200 feet above the Airport elevation. More precise Category II and III ILSs are not warranted at the Airport because of the infrequent weather conditions of less than 0.5-statute mile visibility and a

200-foot cloud ceiling[21]. Several NAVAIDS are provided as components on the existing ILS approach to Runway 21R, as listed in Table II-4.
Additionally, Distance Measuring Equipment (DME) and global positioning system (GPS) nonprecision approaches are provided to Runway 17. These approaches provide guidance to pilots approaching the runway when visibility is greater than one mile for Class A and B aircraft, 1.25–statute miles for Class C aircraft, and 1.5-statute miles for Class D aircraft.

Visual Approach NAVAIDS

Visual approach NAVAIDS provide aircraft guidance once the aircraft is within sight of the Airport. Visual approach NAVAIDS provided at the Airport include PAPIs and HIRLs. HIRLs are provided for all runways. PAPIs are provided for Runways 3L-21R and 3R-21L. Additional visual approach NAVAIDS are not required at the Airport based on forecast traffic levels throughout PAL 4.

Airfield Facilities Conclusions

The results of the airfield facilities analyses indicate that the existing runways at the Airport are adequate to accommodate demand through PAL 4, based on capacity alone. Taxiways west of Runway 3L-21R should be upgraded (widened) to accommodate safer taxi operations up to ADG III. Additionally, for safety, i.e. to prevent runway intrusions, and operational efficiency, a parallel taxiway to Runway 3L-21R is also necessary. The Airport's Pavement Management and Maintenance System provides guidelines for planning and scheduling of pavement maintenance, repairs, and rehabilitation.
The operational hours of the Air Traffic Control Tower should be extended to include weekends year-round. In assessing airfield requirements, it was determined that runway length, width, and safety areas are also sufficient to accommodate operations through PAL 4. To comply with ADG VI standards, MCAS Yuma should widen Taxiways E, F, and H.

Passenger Terminal Area

The assessment of the passenger terminal area included aircraft gates or parking positions available on the terminal ramp area, and facilities or amenities available within the terminal building. Additionally, requirements for ground access and parking facilities were included in the discussion of passenger terminal area requirements. As presented in Chapter III, *Aviation Activity Forecasts*, and as mentioned above in the introduction to this chapter, four PALs have been established to allow for the identification of requirements as a function of activity rather than as a function of specific years. PMAD activity throughout the planning period (i.e., through PAL 4) is presented in Table III-21. As shown in the table, the number of passenger air carrier operations increases on the PMAD to 19 (10 passenger air carrier departures) at PAL 4. Because the requirements for facilities within the passenger terminal are a function of the number of aircraft, passengers, and other Airport patrons that would be using the facilities within a given period of time, the requirements for the passenger terminal area, with the exception of parking, were established on the basis of anticipated peak hour activity on the PMAD rather than directly to the number of PMAD passengers or operations. To ensure that the requirements provided adequate flexibility, two peak hour demand scenarios were evaluated: a Baseline Scenario and a High Activity Scenario. The development of the two scenarios is described in Section 4.2.2

[21] Data obtained from NOAA National Climatic Data Center in Asheville, North Carolina included 79 Instrument Flight Rules (IFR) days over the last 7 years. Data obtained October 2008.

below. Although not related specifically to a PAL, both of the activity scenarios were based upon assumptions regarding aircraft fleet mix at PAL 4.

Aircraft Gates / Parking Positions

Aircraft gate and parking requirements at the terminal were established to evaluate the ability of the existing facility to accommodate both near-term and long-term demand. Although there are two parking positions currently utilized, the existing apron provides adequate space for four aircraft parking positions to serve commercial flights. The available positions were determined by the number of ADG II aircraft that can be accommodated on the apron with the ability to complete a taxi in and taxi out procedure. It should be noted that on a regular basis the terminal has three aircraft parked on the terminal apron and sometimes as many as four. A 50-seat regional jet was used in this example to illustrate typical aircraft movements on the terminal apron in Figure 44.

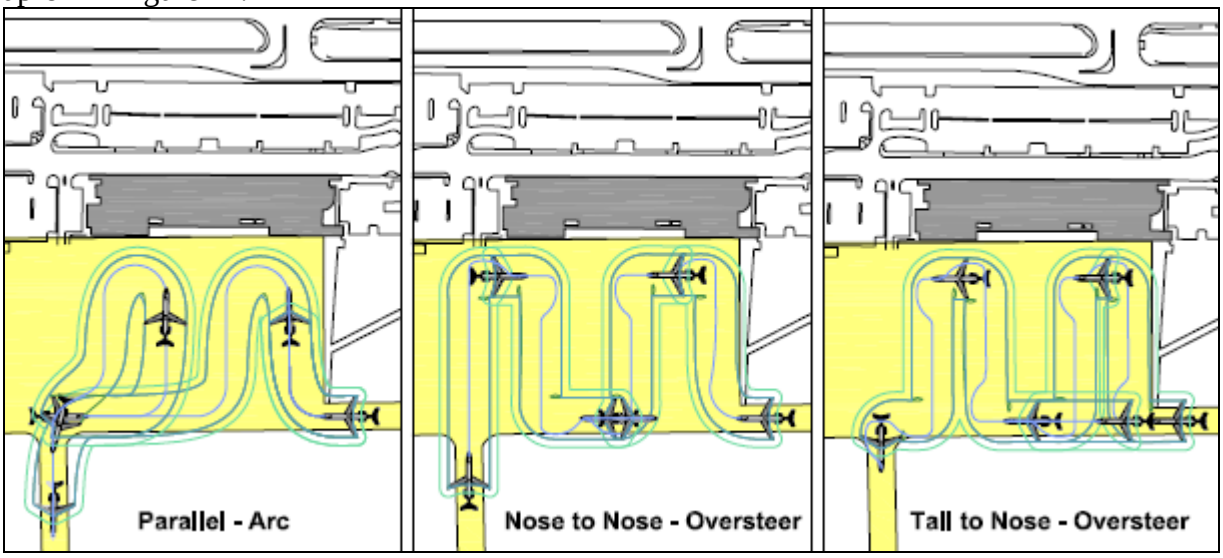

Figure 44 - Terminal Gates – Aircraft Movements

Passenger Terminal Building

Requirements for the major components of the terminal area were developed on the basis of aircraft operations and associated passenger demand during peak activity. Because the terminal facility is affected more by each additional operation during peak periods than by incremental aircraft capacity or load factor increases, two scenarios were analyzed. The Baseline Scenario indicated passenger demand growth for two concurrent aircraft departures during the peak period. The High Activity Scenario assumes an additional concurrent departure during the same peak period. Assumptions for aircraft equipment and passenger activity were based on the PMAD average enplanements per departure and historical and anticipated fleet mix at the Airport. **Table IV-3** presents the PMAD activity at each PAL. Overall growth in passenger enplanements increases 68 percent from PAL 1 to PAL 4. However, the average enplanements per departure is only expected to increase by 19 percent (from 47 passengers at PAL 1 to 56 passengers at PAL 4). Therefore, the terminal facility requirements were based on two concurrent operations of a 70-passenger aircraft with a 90 percent load factor in the Baseline

Scenario. A 50-passenger aircraft with a 90 percent load factor is included in the High Activity Scenario.

Table IV-3 Peak Month Average Day Activity

	PAL 1	PAL 2	PAL 3	PAL 4
PMAD Enplanements [1/]	330	405	480	555
PMAD Passenger Air Carrier Operations	14	16	18	19
PMAD Passenger Air Carrier Departures	7	8	9	10
PMAD Enplanements per Departure	47	51	53	56
Available Parking Positions on Apron	4	4	4	4

Note:
1/ The Peak Month Average Day (PMAD) enplanements information was obtained from Chapter III, *Aviation Activity Forecasts*, September 2008.
Source: Ricondo & Associates, Inc., Yuma International Airport, *Airport Master Plan, Aviation Activity Forecasts*, October 2008.
Prepared by: Ricondo & Associates, Inc. October 2008.

A 120-minute distribution profile that represents a typical arrival pattern to the terminal was developed. For planning purposes, a 30-minute difference in departure times was assumed during the peak for the two-operation Baseline Scenario and a 20-minute difference for the three-operation High Activity Scenario. This passenger activity profile generates a theoretical passenger and baggage demand for 10-minute and 60-minute increments. Each are used to generate facility requirements based on functional area processing times, queuing area requirements and level of service (LOS) standards.
A 120-minute distribution profile for departing passengers arriving at the terminal was developed based on two aircraft with 70 seats each, with a 90 percent load factor. The activity profile for departing passengers arriving at the terminal under the Baseline Scenario is illustrated in Figure 45**. Table IV-4** further illustrates the distribution of passengers arriving at the terminal in 10-minute increments. As indicated in the table and reflected in the chart, the peak hour activity is equal to 106 departing passengers. The peak 10-minute surge is equal to 20 passengers. For the purpose of this study, the peak hour activity level for deplanements is also assumed to be 106 passengers to account for simultaneous aircraft arrivals at the Airport.

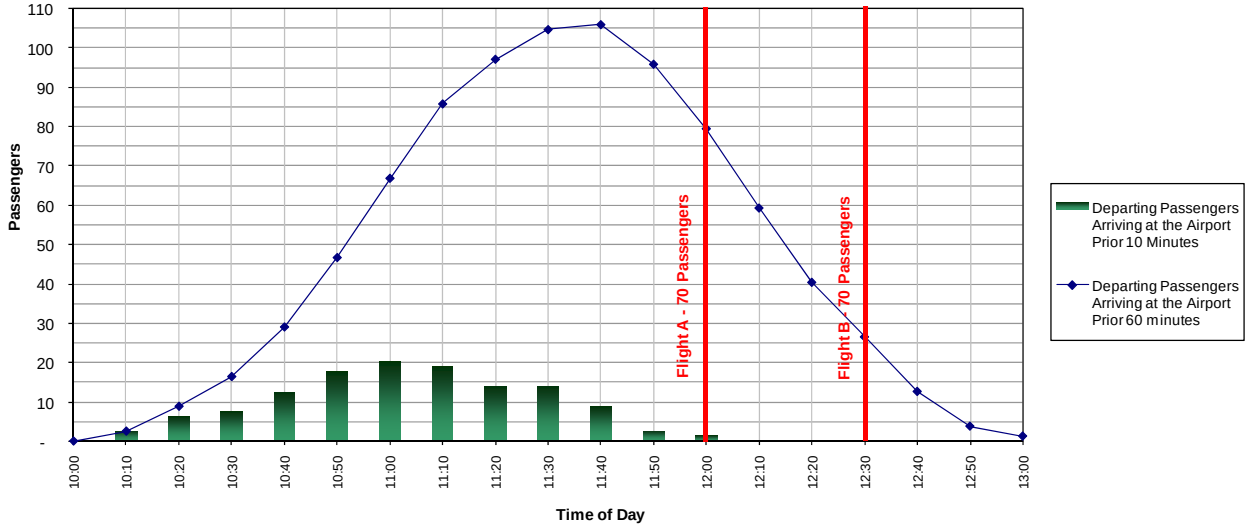

Figure 45 - Baseline Scenario: 120-Minute Arrival Profile for Departing Passengers

Source: Ricondo & Associates, Inc., October 2008.
Prepared by: Ricondo & Associates, Inc., October 2008.

Table IV-4 Baseline Scenario: 120-Minute Arrival Profile for Departing Passengers

Time	Departing Passengers Arriving at the Airport during Prior 10 minutes		Total Departing Passengers Arriving at the Airport	
	Flight A [1/]	Flight B [1/]	Prior 10 minutes	Prior 60 minutes
10:00				
10:10	3		3	3
10:20	6		6	9
10:30	8		8	16
10:40	10	3	13	29
10:50	11	6	18	47
11:00	13	8	20	67
11:10	9	10	19	86
11:20	3	11	14	97
11:30	1	13	14	105
11:40		9	9	106
11:50		3	3	96
12:00		1	1	79
12:10				59
12:20				40
12:30				26
12:40				13
12:50				4
13:00				1
Maximum over 120-minute period			20	106

Note:
1/ Assumes a 90 percent load factor of a 70-seat aircraft.

Source: Ricondo & Associates, Inc., October 2008.
Prepared by: Ricondo & Associates, Inc., October 2008.

The High Activity Scenario reflected a potential higher peak activity level than the Baseline Scenario to accommodate an additional operation during peak periods. It should be noted that this scenario reflects a highly concentrated activity rate for the terminal-related operations. As stated earlier, only 10 total passenger air carrier departures would occur on the PMAD. Therefore, under the High Activity Scenario, approximately 30 percent of all PMAD passenger air carrier aircraft departures would occur during a single peak hour, for instance during an early morning departures peak. Under the High Activity Scenario, it was assumed that the aircraft departure times would be staggered by 20 minutes and would occur within a one hour time frame. A 120-minute distribution profile for departing passengers arriving at the terminal was developed based on 2 aircraft with an average of 70 seats each, and 1 additional aircraft with 50 seats. For the purpose of this analysis, all three flights were assumed to operate at a 90 percent load factor. In this scenario, approximately 24 percent of the PMAD enplaned passengers would depart during the peak hour. The High Activity Scenario profile for departing passengers arriving at the terminal is illustrated in Figure 46**. Table IV-5** further illustrates the distribution of passengers arriving at the terminal in 10-minute increments. As indicated in the table and the chart, the peak hour activity is equal to 133 departing passengers. Passenger arrival profiles for the baggage claim and landside curb are typically more condensed than a departing passenger profile. However, for the purpose of this study, the peak hour activity level for deplanements is also assumed to be 133 passengers to account for simultaneous aircraft arrivals to the Airport.

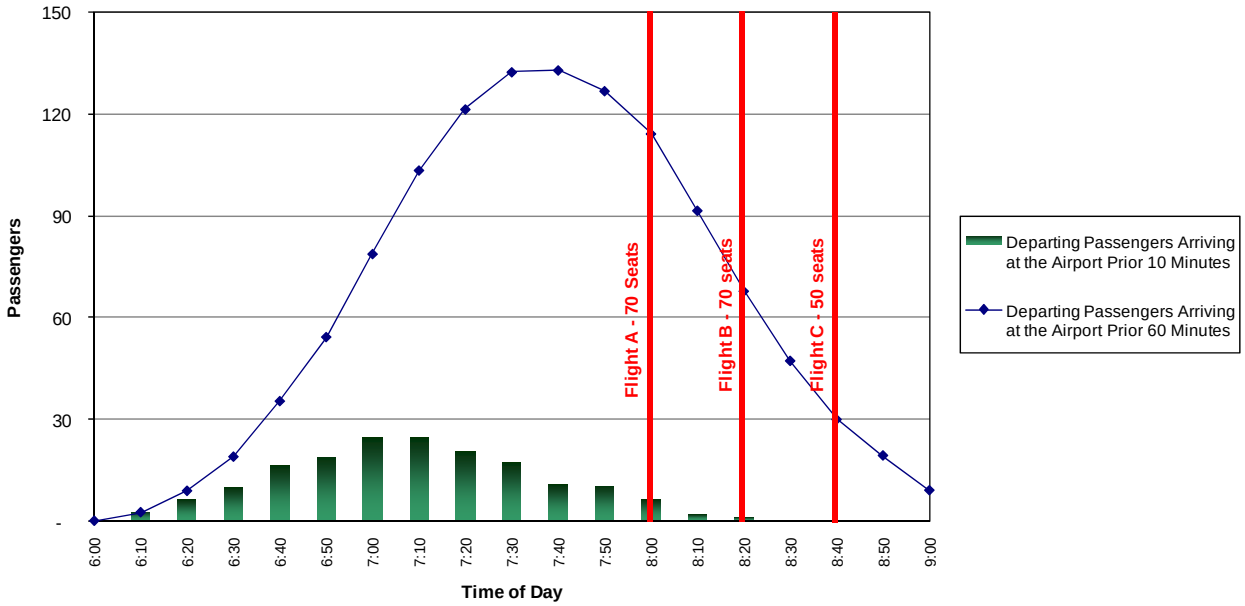

Figure 46 - High Activity Scenario: 120-Minute Arrival Profile for Departing Passengers

Source: Ricondo & Associates, Inc., October 2008.
Prepared by: Ricondo & Associates, Inc., October 2008.

Table IV-5 High Activity Scenario: 120-Minute Arrival Profile for Departing Passengers

	Departing Passengers Arriving at the Airport during Prior 10 minutes			Total Departing Passengers Arriving at the Airport	
Time	Flight A [1/]	Flight B [1/]	Flight C [2/]	Prior 10 minutes	Prior 60 minutes
6:00				0	0
6:10	3			3	3
6:20	6			6	9
6:30	8	3		10	19
6:40	10	6		16	35
6:50	11	8		19	54
7:00	13	10	2	24	79
7:10	9	11	5	25	103
7:20	3	13	5	21	121
7:30	1	9	7	17	132
7:40		3	8	11	133
7:50		1	9	10	127
8:00			6	6	114
8:10			2	2	91
8:20			1	1	68
8:30					47
8:40					30
8:50					19
9:00					9
Maximum over120-minute period				25	133

Notes:
1/ Assumes a 90 percent load factor of a 70-seat aircraft.
2/ Assumes a 90 percent load factor of a 50-seat aircraft.
Source: Ricondo & Associates, Inc., October 2008.
Prepared by: Ricondo & Associates, Inc., October 2008.

Future terminal building requirements were established for both landside and airside facilities as follows. The landside facilities include the departure lobby, airline ticket offices, concessions, rental car facilities, baggage claim, administrative offices, and outbound baggage area. The airside facilities include the boarding area and passenger security screening. **Table IV-6** presents a summary of the requirements for the landside facilities and

Table IV-6 Summary of Terminal Requirements, Landside Facilities

Terminal Component	Planning Factor	2008	Baseline 1/	High Activity 2/
Airline Ticket Counters and Departure Lobby				
PMAD Peak Hour Enplaning Passenger			106	133
Airline Ticket Counter Positions 3/	20 passengers per hour per position	6	6	7
Linear Frontage Counter Required (linear feet) 3/	4.5 linear feet per position	71	27	31.5
Area Required, Departure Lobby (square feet) 3/	20 feet deep x linear feet of ticket counter	700	540	630
Airline Ticket Offices				
Area Required (square feet) 3/	20 feet deep x linear feet of ticket counter	1,545	540	630
Outbound Baggage Handling and Screening				
Manual Devices Required (linear pier conveyor) 5/	1 device per 200 peak hour enplanements	1	1	1
Average Bags Per Passenger 5/	1.2 bags per passenger		127	160
Primary EDS Required 5/	1 EDS = 400 bags per hour	1	1	1
Area Required (square feet) 5/	3,500 square feet per EDS	3,500	3,500	3,500
Baggage Claim Unit and Arrival Lobby				
PMAD Peak Hour Deplaning Passengers			106	133
Frontage Required (linear feet) 3/	1.25 linear feet per passenger	132	132	166
Baggage Claim Units Required 4/		1	1	1
Area Required, Arrival Lobby (square feet) 3/	3,900 square feet per baggage claim unit	4,250	3,900	3,900
Concessions				
PMAD Peak Hour Enplaning Passengers			106	133
Area Required (square feet) 3/	20 square feet per passenger	4,515	2,120	2,660
Administrative Offices				
Area Required (square feet) 5/	250 square feet per employee	3,235	4,250	4,250

Notes:

1/ The PMAD Baseline Scenario was generated by analyzing a 120-minute arrival profile

for departing passengers, assuming concurrent operations with a departure time separation of 30 minutes.
2/ The PMAD High Activity Scenario was generated by analyzing a 120-minute arrival profile for departing passengers, assuming concurrent operations with a departure time separation of 20 minutes. Numbers in bold indicate the need for additional facilities.
3/ Planning Factors derived AC 150/5360-13, Change 1, *Planning and Design Guidelines for Airport Terminal Facilities*, January 19, 1994.
4/ Although an additional baggage claim unit is not required, the existing unit would have to be replaced to provide additional frontage to accommodate the additional High Growth Demand Scenario requirement.
5/ Planning factor derived from ratios used for other passenger terminal studies.

Sources: Yuma County Airport Authority, October 2008 (Existing Conditions); Ricondo & Associates, Inc., October 2008 (Baseline Scenario and High Activity Scenario).
Prepared by: Ricondo & Associates, Inc., February 2009.

3.1.1.6 Landside Facilities

Airline Ticket Counters and Departure Lobby

The facility requirements for airline ticket counters and the departure lobby were based on accommodating peak period enplaning passengers, and planning assumptions from AC 150/5360-13, Change 1, *Planning and Design Guidelines for Airport Terminal Facilities*, dated January 19, 1994. Requirements were established for peak hour activity of 106 passengers in the Baseline Scenario and 133 passengers in the High Activity Scenario. The number of airline ticket counter positions required was calculated assuming the potential for shared use of the ticket counter space by various airlines and an average processing rate of 20 passengers per hour for each check-in position. Dividing the planning period demand of 106 PMAD peak hour departing passengers by 20 passengers per hour and rounding up to the nearest integer results in a requirement of 6 airline ticket counter positions and 27 feet of linear frontage under the Baseline Scenario. The actual number of positions may vary based on tenant agreements and the use of additional self-service positions. Under the High Activity Scenario (133 PMAD peak hour departing passengers), 7 airline ticket counter positions and 31.5 feet of linear frontage would be required using the same methodology. Reconfiguration from 6 to 7 ticket counter positions would be needed in the High Activity Scenario. Although only 6 ticket counter positions are currently provided at the Airport, the total existing linear footage would accommodate anticipated demand through PAL 4.
The available depth in the departure lobby was assessed by considering 8 feet of circulation and transaction width, 4 feet of queuing/stanchion width, and 10 feet of public corridor circulation width. Currently, there is 20 feet of depth from the check-in counter to the closest barrier, although additional, albeit obstructed, depth is available directly adjacent to the area. Therefore, it was concluded that the existing depth of the departure lobby is sufficient through PAL 4, but could become moderately congested during peak periods.

Airline Ticket Offices

Recent changes in the business model of the airline industry have reduced cash and storage requirements and therefore reduced the area needed behind ticket counters for airline activities. The airline ticket office requirement is dependent upon airline preference. Currently there are

1,545 square feet of existing office area. Unless otherwise required by an individual tenant, the airline office space is sufficient through PAL 4.

Outbound Baggage Handling and Screening

The outbound baggage handling and screening area is where baggage is sorted and loaded into containers or carts for subsequent delivery to aircraft. Facility requirements for this area are based on equipment (aircraft) size and frequency. Due to the type and consistency of peak period operations, no additional area is required. A manual system is used for outbound baggage screening at the Airport. According to the AC 150/5360-13, this system is sufficient for up to 200 peak hour enplanements. The Baseline Scenario includes 106 peak hour enplanements and the High Activity Scenario includes 133 peak hour enplanements. The outbound baggage system is assumed to be sufficient according to these standards.

Baggage Claim Unit and Arrival Lobby

The current baggage claim unit is a flat-bed plate device used for direct feed loading. The required number of baggage claim units was based on accommodating the peak hour arriving passengers. The linear footage required was calculated by multiplying the number of peak hour arriving passengers by a planning factor of 1.25 linear feet of baggage claim device per arriving passenger. Using this metric the linear frontage of the bag claim unit should be 132.5 feet under the Baseline Scenario. This concludes that the existing baggage claim unit is sufficient for the Baseline Scenario. However, the High Activity Scenario warrants the expansion of the baggage claim unit to 166 feet. This would require a larger baggage claim unit to replace the existing unit.

In addition, the arrivals lobby provides public circulation space for access to baggage claim facilities and for egress from the baggage claim area to the deplaning curb and ground transportation. It also provides space for passenger amenities and rental car counters. It was determined that approximately 3,900 square feet would accommodate the baggage claim unit, passengers waiting to claim bags, and circulation of passengers and greeters. The area required was calculated by adding a 12-foot buffer around the baggage claim unit for passengers to a 20-foot corridor for public circulation. Currently, the area provided for baggage claim is 4,250 square feet, which is sufficient based on this estimate of requirements. However, due to the configuration of the terminal, Airport management has suggested that additional baggage claim area is needed to improve the LOS and more adequately support the arriving passengers, meeters and greeters.

Concessions/Sales and Rental Car Offices/Counters

The concessions space requirement was developed based on current activity and passenger behavior at the Airport, with consideration given to the distribution of concessions between non-secure and secure areas of the terminal. Currently, 5,175 square feet of concessions space is provided within the terminal, including rental car counters and support space. The space for food and beverage concessions is 4,515 square feet. Although the overall space is adequate, there may be a need for concessions in the secure areas in the future to improve the LOS for departing passengers. At many airports, the total concession space allocation is typically balanced such that 70 percent is in the non-secure area and 30 percent is on the secure airside. Due to the nature of operations at the Airport (i.e. passengers proceed into the secure area only at designated times prior to departures), current provisions of vending machines may be adequate, but considerations should be given in the future to increase the LOS or convenience to the passengers.

Administrative Offices

Airport management office space requirements within the terminal building vary depending on the number of staff members and the extent to which airport authority offices are located in the terminal building itself. The administrative offices are currently located on the second floor of the terminal building and encompass 3,235 square feet. According to Airport management, there were 17 YCAA employees that occupied office space within the terminal building as of March 2008. Using a generally accepted planning factor of 250 square feet per employee for administrative office space, the 4,250 square foot requirement for 17 employees is not currently met. Furthermore, with no vacant space for additional employees, it was validated by Airport staff that additional administrative space will be necessary by PAL 1.

3.1.1.7 Airside Facilities

Table IV-7 presents a summary of the requirements for the airside facilities. A discussion of the planning standards used in the analysis and the associated requirements follows.

Passenger Security Screening

Passenger security screening requirements are based on accommodating the PMAD peak hour enplaning passengers. As previously described the two activity scenarios were used in the terminal analysis, with 106 peak hour departing passengers under the Baseline Scenario and 133 peak hour departing passengers under the High Activity Scenario. Observed rates throughout the industry are approximately 165-180 passengers per lane per hour. The TSA continues to improve the efficiency of the security screening process. Currently, there is one screening lane available at the security area, which is sufficient to accommodate peak period activity. However, repairs or closures for maintenance would reduce the capacity of the checkpoint significantly as all security checks would have to be conducted manually. The YCAA should coordinate with the Department of Homeland Security (DHS)/TSA for additional screening equipment and personnel as necessary.

Table IV-7 Summary of Terminal Requirements, Airside Facilities

Facilities	Planning Factor	Existing Conditions (2008)	Baseline Scenario [1/]	High Activity Scenario [2/]
Passenger Security Screening				
PMAD Peak Hour Enplaning Passengers			106	133
Screening Lanes Required [3/]	165 – 180 passengers per hour per lane	1	1	1
Boarding Area				
PMAD Peak Hour Enplaning Passengers			106	133
Area Required (square feet) [4/]	20 square feet per passenger	2,250	2,120	**2,660**

Notes:

1/ The PMAD Baseline Scenario was generated by analyzing a 120-minute arrival profile for departing passengers, assuming concurrent operations with a departure time separation of 30

minutes.
2/ The PMAD High Activity Scenario was generated by analyzing a 120-minute arrival profile for departing passengers, assuming concurrent operations with a departure time separation of 20 minutes. Numbers in bold indicate the need for additional facilities.
3/ Planning factor derived from benchmarking of numerous passenger terminal studies that have been completed at airports since 2006.
4/ Planning factors derived AC 150/5360-13, Change 1, *Planning and Design Guidelines for Airport Terminal Facilities*, January 19, 1994.

Sources: Yuma County Airport Authority, October 2008 (Existing Conditions); Ricondo & Associates, Inc., October 2008 (Baseline Scenario and High Activity Scenario).

Boarding Area

The total existing space available in the boarding area is 2,250 square feet. AC 150/5360-13 indicates that the requirement for boarding areas is based on providing 15 to 20 square feet of space per passenger. Given the space constraints of the existing boarding area and limited options for seating and circulation, a conservative factor of 20 square feet per passenger was used to optimize the terminal area through the planning horizon. Under the Baseline Scenario, the area required would be approximately 2,120 square feet. This indicates that the existing boarding area would be sufficient. However, it has been observed by Airport staff that the current seating capacity for approximately 80 passengers is occasionally exhausted and results in a decreased LOS. Consideration should be given to additional seating or other configurations to optimize the existing space. Furthermore, under the High Activity Scenario, additional space would be required to sufficiently meet boarding area requirements of 2,660 square feet.
It should be noted that there are no concessions (except vending machines) beyond security, as mentioned in the previous section of this chapter. It is assumed that vending machines would be sufficient for concessions, but consideration may be given to improving those services in the future. There are currently no restroom facilities in the secure area of the terminal as well. Although it is not required, restroom facilities should be provided in the secure area to improve passenger comfort.

3.1.1.8 Disaster Response Equipment and Capabilities

Not specific to facility requirements, but an important component for the overall management and efficiency of the Airport, the YCAA is prepared to respond to emergency situations as necessary. Staffing, manpower and necessary equipment are available to ensure that safe and expeditious response minimizes the extent and duration of emergency situations. The YCAA is continuously planning and improving capabilities in this area and remains updated on current events and technology to fulfill this obligation to the Airport users.

Ground Access

Ground Access facilities include airport roadways and the terminal curbfront. Each is reviewed separately in the following sections due to characteristics unique to each assessment.
Growth in vehicle demand is driven by the growth in the activity of Airport users, including commercial passengers and general aviation. For the purposes of this assessment, the rate of commercial passenger growth was used to define anticipated growth in vehicular activity, because it makes up the primary component of activity for the facilities under the Airport's jurisdiction. Recognizing that MCAS Yuma utilizes different roadway access points on other

sides of the facility, analysis of those roadways systems were not included as part of this Airport Master Plan.

3.1.1.9 Airport Roadways

Access to the Airport is available via Highway 5 or Interstate 8 (I-8). I-8 is the major east/west corridor in Yuma, with the San Diego metropolitan area to the west and the Phoenix metropolitan area to the northeast. Arterial and local roadways that border the Airport include:
East 32nd Street/County Highway 11 Street East to the north;
South Avenue 3 East to the east;
East County 14th Street South to the south; and
Various roads to the west including South Fortuna Avenue, South 4th Avenue, South Avenue 1 East (South Arizona Avenue), and East 40th Street.

Access to the passenger terminal building is available from the north via East 32nd Street and South Pacific Avenue. South Pacific Avenue terminates at 32nd Street but continues into the Airport as the terminal loop roadway, thereby serving as the link between the regional roadway system and the Airport terminal area. To estimate the number of vehicles per lane per hour using South Pacific Avenue, PMAD peak hour enplanements and deplanements were estimated to determine the maximum number of passengers using the roadways. The High Activity Scenario peak hour enplanements were estimated to reach 133 (see Section 4.2.2). The amount of vehicular traffic generated by this activity is dictated by the mode split utilized by passengers to access the Airport, and the average number of passengers per vehicle. Additionally, background traffic associated with Airport operations, employees and other non-passenger activity provides an additional modest component that should be considered. For the purposes of this analysis, the following assumptions were made.

100 percent of passengers access the Airport in private vehicles
An average of one passenger per vehicle (excluding well-wishers and greeters)
Non-passenger vehicular traffic equals 10 percent of passenger vehicular traffic
Inbound peak traffic is equal to outbound peak traffic.

According to AC 150/5360-13, a capacity of 700 to 800 vehicles per lane per hour should be provided for at-grade interrupted flow conditions, such as those occurring on South Pacific Avenue. Although a traffic study was not conducted as part of this Airport Master Plan, it was assumed that South Pacific Avenue (two lanes at its narrowest), has a capacity of 800 vehicles per lane per hour, for a total capacity of 1,600 vehicles per hour. Under the High Activity Scenario, the peak hour activity or demand on South Pacific Avenue was estimated to be 266 vehicles (133 inbound and 133 outbound). This number represents the highest anticipated peak hour activity level through PAL 4. **Table IV-8** provides a comparison of vehicular demand under the Baseline Scenario and High Activity Scenario with Airport roadway capacity. As shown, with a roadway capacity of 1600 vehicles, and a demand not anticipated to exceed 266 vehicles, sufficient roadway capacity exists.

Table IV-8 Peak Hour Roadway Demand and Capacity

Scenario	Total Passengers [2/]	Access Road Vehicles (1 pax per vehicle)	Max Vehicles accommodated per hour [3/]
Baseline Scenario [1/]	212	212	1600
High Activity Scenario [1/]	266	266	1600

Notes:
1/ The PMAD Baseline Scenario was generated by analyzing a 120-minute arrival profile for departing passengers, assuming concurrent operations with a departure time separation of 30 minutes. The PMAD High Activity Scenario was generated by analyzing a 120-minute arrival profile for departing passengers, assuming concurrent operations with a departure time separation of 20 minutes.
2/ Total passengers (peak hour enplanements plus peak hour deplanements) was calculated by multiplying the Baseline Scenario and High Activity Scenario peak hour enplanements by 2.
3/ Roadway capacity assumed to be equal to FAA AC 150/5360-13 recommended capacity of 800 vehicles per lane per hour for at-grade interrupted flow conditions.

PMAD = Peak Month Average Day
Source: Ricondo & Associates, Inc., October 2008, except as noted.
According to Authority staff, the City will be reducing the roadway into the Airport to a single lane by 2010, due to utility constraints and lane configuration changes. Even with only one lane, the High Activity Scenario demand estimate of 266 peak hour vehicles per lane is less than the assumed existing capacity of 700 to 800 vehicles.

3.1.1.10 Terminal Curbfront

The current terminal curbfront is single-level with drop-off and pick-up locations near the check-in and baggage claim areas. In the immediate vicinity of the terminal, there are 3 through lanes, in addition to a parking lane along the curbfront. For the purposes of assessing curbfront capacity, the following assumptions were made:
The curbfront length is approximately 425 feet.
An average private vehicle parking position is 25 feet (AC 150/5360-13).
Dwell times for private vehicles are typically between 1 and 4 minutes (AC 150/5360-13). For purposes of this analysis, 4 minutes per vehicle was assumed as a worst case. Traffic control and enforcement of reduced dwell times could decrease this factor and subsequently increase curbfront capacity.
An average of one passenger per vehicle (excluding well-wishers and greeters) was assumed.
Based on these assumptions, the current curbfront can adequately accommodate approximately 225 passengers per hour. The terminal curbfront capacity is shown in **Table IV-9**.

Table IV-9 Terminal Curbfront Capacity

Current Curbfront Length (feet)	Vehicle Slot Length (feet) [1/]	Maximum Vehicles at Curbfront [2/]	Maximum dwell time (minutes) [1/]	Maximum Vehicles accommodated per hour
425	25	17	4	225

Notes:
1/ Planning factors derived AC 150/5360-13, Change 1, *Planning and Design Guidelines for Airport Terminal Facilities*, January 19, 1994.
2/ Derived by dividing current curbfront length by vehicle slot length.
Source: Ricondo & Associates, Inc., October 2008, except as noted.
Prepared by: Ricondo & Associates, Inc., October 2008.
Peak hour curbfront demand was estimated under the Baseline Scenario and High Growth Scenario and is shown in **Table IV-10**. A conservative 4-minute dwell time was applied to the peak hour enplanement and deplanements equating the maximum number of minutes needed at the curbfront to accommodate the passengers. This number was then divided by the number of

positions available (17), to get the maximum time required to accommodate the total number of vehicles. The analysis concluded that under the Baseline Scenario, the entire anticipated demand of 212 vehicles could be accommodated along the terminal curbfront. The High Growth Scenario calculation identified that 266 vehicles would need to utilize the curb during the peak hour. With an hourly maximum capacity of 225 vehicles at a 4-minute dwell time, congestion could result. However, this approach was very conservative and based on an assumption that every passenger would utilize the curb for 4 minutes. To the extent necessary, under extreme demand levels, curbfront capacity could effectively be increased by enforcing traffic control to minimize dwell times of vehicles on the curbfront.

Table IV-10 Terminal Curbfront Demand/Capacity Analysis

	Total Vehicles per Hour [2/]	Maximum Vehicles accommodated per hour [3/]	Time needed to address maximum peak hour demand (minutes)
Baseline Scenario [1/]	212	225	50
High Growth Scenario [1/]	266	225	63

Notes:
1/ The PMAD Baseline Scenario was generated by analyzing a 120-minute arrival profile for departing passengers, assuming concurrent operations with a departure time separation of 30 minutes. The PMAD High Activity Scenario was generated by analyzing a 120-minute arrival profile for departing passengers, assuming concurrent operations with a departure time separation of 20 minutes.
2/ Calculated as PMAD enplanements multiplied by 2 (sum of enplanements and deplanements). Assumes one passenger per vehicle.
3/ As presented in Table IV-9.

PMAD = Peak Month Average Day
Source: Ricondo & Associates, Inc., October 2008.
Prepared by: Ricondo & Associates, Inc., October 2008.

Vehicle Parking

Parking facilities at the Airport accommodate public, employee, and rental car parking. Future public parking demand was calculated using the PMAD enplaned passenger forecasts, while future employee parking demand was estimated based on forecast annual aircraft operations and rental car needs were based on annual originating passengers.

3.1.1.11 Public Parking

Both short-term and long-term public parking is provided at the Airport and is operated by the YCAA. Currently there are 92 short-term parking spaces and 211 long-term parking spaces available for public use. Both short-term and long-term parking is located directly across South Pacific Avenue from the terminal building. Generally, the parking capacity is sufficient, with demand normally at approximately 50 percent during typical conditions (i.e. parking lot is typically half-full during non-peaking holiday seasons), and near capacity during December holidays, according to Airport staff. Future parking demand was estimated by analyzing forecast passenger levels in light of existing parking characteristics. According to AC 150/5360-13, a general assumption is that 70 to 85 percent of the total parking lot users remain at an airport for

less than three hours, which is considered short-term. The remaining balance would be considered long-term users, at a general assumption of 15 to 30 percent. Because short-term spaces turn more vehicles per day, the ratio of space requirements is typically reversed, whereas short-term space requirements account for approximately 20 to 30 percent of the total parking requirements, and long-term parking comprises the remaining 70 to 80 percent. This general assumption is validated in the existing split at the Airport, where 92 short-term parking spaces represent 30 percent of the total Airport public parking and 211 long-term parking spaces represent the remaining 70 percent of total Airport public parking.

In order to develop the requirements for parking at each PAL, a methodology provided in AC 150/5360-13 was applied. According to this methodology, between 1,000 and 3,300 on-Airport parking spaces (including both short-term and long-term) are required for every one million annual originating passengers. Given the activity at the Airport, the metric of 2,000 parking spaces per every one million passengers was selected for this assessment. Using this methodology, it was determined that there is sufficient public parking available through PAL 3. However, by PAL 4, there will be a very slight additional requirement of one space for short-term parking and six spaces for long-term parking. This would not be considered a significant shortfall, but implies the growing demand should be closely monitored throughout the PAL 3 and PAL 4 planning periods. The results of this analysis are presented in **Table IV-11**.

Table IV-11 Short-Term Public Parking Demand and Capacity

Year	Annual Enplaned Passengers [1/]	Short-Term Parking Spaces Required [2/]	Additional Short-Term Parking Spaces Requirements [3/]	Long-Term Parking Spaces Required [2/]	Additional Long-Term Parking Stalls Requirements [3/]
PAL 1	92,200	55	--	129	--
PAL 2	113,200	68	--	158	--
PAL 3	134,100	80	--	188	--
PAL 4	155,100	93	1	217	6

Notes:
1/ The annual enplaned passengers data was obtained from Chapter III, *Aviation Activity Forecasts*, September 2008.
2/ The number of parking spaces required is based on FAA AC 150/5360-13, as 2,000 parking spaces per one million originating passengers, with short-term spaces being 30 percent of the total. Requirement is based on existing 92 short-term spaces, as counted by Ricondo & Associates, Inc., based on parking layouts provided by Yuma County Airport Authority, October 2008.
3/ Results with a "- -" indicate that existing parking space requirements are adequate.
Source: Ricondo & Associates, Inc., October 2008, except as noted.
Prepared by: Ricondo & Associates, Inc., October 2008.

Not reflected in the methodology is the additional need for parking during the holidays or the potential effects of heightened security threats. It has been observed that during the holidays, parking demand can exceed current capacity. In addition, parking could become constrained during periods of high security threat levels. During such periods, it is possible that a separation of 300 feet between the face of the terminal building and public parking areas may be required, if deemed necessary by the local TSA Federal Security Director (FSD). Figure 47 shows that the area established by the 300-foot guideline would encompass most of the existing public parking and rental car spaces at the Airport.

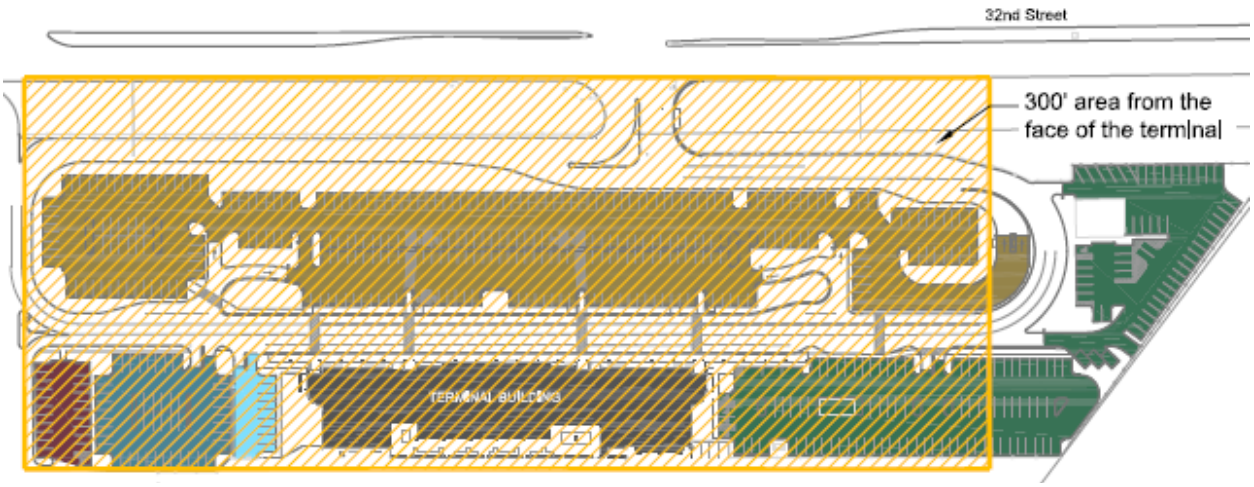

Figure 47 - 300-Foot Vehicle Parking Guidelines

3.1.1.12 Employee Parking

Employee parking is accommodated on the east and west sides of the terminal building. Nine parking spaces are provided for Airport Terminal employees on the west side of the terminal and 40 spaces in a shared parking lot near the Hertz vehicle maintenance facility. There are 22 spaces dedicated to U.S. Customs and FAA employees located north of their respective facilities. According to AC 150/5360-13, it should be assumed that approximately 90 percent of Airport employees travel to work in private automobiles and require parking. Near term plans by YCAA to relocate employee parking for Airport maintenance indicate that future requirements are met.

3.1.1.13 Rental Car Facilities and Parking

The requirement for the storage and maintenance of rental cars includes a parking area and a service center area maintained by each of the rental car companies operating at the Airport. The required space allocation for rental car operations was assessed for each PAL. According to Airport staff, rental car activity is moderate to high, and occasionally the demand for rental cars exceeds the number of available cars. The existing rental car facilities provide parking in two locations. The return lot includes 49 parking spaces on the east side of the terminal. The ready lot has 93 parking spaces adjacent to the baggage claim area immediately east of the terminal building. In total, 142 parking stalls are provided for rental car parking.

According to AC 150/5360-13, one rental car spaces is needed for every 750 originating annual passengers. **Table IV-12** indicates that the by PAL 2, additional rental car spaces will be needed. There will be a need for approximately 8 additional spaces by PAL 2, 37 additional spaces by PAL 3, and 65 additional spaces by PAL 4. Currently, 65 percent of rental car spaces are ready spaces, and the remaining 35 percent are return spaces. The analyses of future ready and return spaces were calculated by utilizing the same proportion of ready spaces (65 percent) to return spaces (35 percent) as the existing operation.

Table IV-12 Rental Car Parking Demand and Capacity

Year	Annual Enplaned	Ready/Return Parking Space	Additional Ready Spaces	Additional Return Spaces	Combined Ready Return

Yuma International Airport

	Passengers [1/]	Requirements [2/]	Required (65%) [3/]	Required (35%)[3/]	Spaces Required [3/]
PAL 1	92,200	123	--	--	--
PAL 2	113,200	151	5	3	8
PAL 3	134,100	179	24	13	37
PAL 4	155,100	207	42	23	65

Notes:
1/ The annual enplaned passengers data was obtained from Chapter III, *Aviation Activity Forecasts*, September 2008.
2/ Future requirement for rental car parking spaces is based on FAA AC 150/5360-13, with 1 parking space required for every 750 originating annual passengers.
3/ Results with a "- -" indicate that existing rental car space requirements are adequate.
Source: Ricondo & Associates, Inc., October 2008, except as noted.
Prepared by: Ricondo & Associates, Inc. October 2008.

Passenger Terminal Area Conclusions

Table IV-13 summarizes the passenger terminal area requirements, including ground access and parking, at the Airport through the planning horizon compared to the existing facilities. The facility requirements for the terminal area resulted in findings that significant improvements are necessary to meet the future anticipated demand at the Airport, including expansion of the boarding and baggage claim area, as well as administrative and rental car space. Some facilities are necessary to provide increased level of service to the traveling public, such as restrooms in the secure passenger boarding area, as well as consideration for space for concessions. The roadways and terminal curbfront are sufficient through the planning horizon, however there is a need to plan for additional space for public parking and rental car parking accommodations.

Table IV-13 Terminal Requirements, High Activity Scenario/PAL 4

	Existing (2008)	Requirement [1/]	Additional Requirement [2/]
Aircraft Gates / Parking Positions			
Parking Positions	4	3	--
Airline Ticket Counter			
Airline Ticket Counter Positions	6	7	1
Linear Frontage Counter Required	71	31.5	--
Departure Lobby			
Area Required (square feet)	700	630	--
Airline Ticket Offices			
Area Required (square feet)	1,545	630	--
Outbound Baggage Handling and Screening			
Manual Devices Required	1	1	--
Area Required (square feet)	3,500	3,500	--
Baggage Claim Unit and Arrival Lobby			
Baggage Claim Unit (linear feet)	132	166	34
Baggage Claim Area (square feet) [3/]	4,250	3,900	--

Concessions			
Area Required (square feet)	4,515	2,660	--
Administrative Offices			
Area Required (square feet)	3,235	4,250	1,015
Passenger Security Screening			
Screening Lanes	1	1	--
Area Required (square feet)	945	945	--
Boarding Area			
Area Required (square feet)	2,250	2,660	410
Airport Roadways			
Lanes Required	2	2	--
Terminal Curbfront			
Length Required (linear feet)	425	425	--
Vehicle Parking			
Short-Term Parking	92	93	1
Long-Term Parking	211	217	6
Employee Parking	88	88	--
Rental Car Facilities and Parking	142	207	65

Notes:
1/ Requirements listed in this summary are based on either the High Activity Scenario as described in Section 4.2.2 or on traffic levels associated with PAL 4.
2/ Results with a "- -" indicate that existing requirement is adequate.
3/ Although the baggage claim area analysis concluded that the requirement is met for future demand, expansion of the baggage claim unit to 166 feet justifies the need for expansion of the baggage claim area.
Source: Ricondo & Associates, Inc., October 2008.
Prepared by: Ricondo & Associates, Inc., October 2008.

FBO and GA Facilities

FBOs are service centers that provide aviation-related services such as aircraft fuel, oil, parking, hangar storage, maintenance, aircraft charter or rental, and flight training. FBOs may also provide nonaviation services such as rental/courtesy cars, lounges, and assistance with hotel reservations and other local accommodations. They may be privately owned and operated, or operated by the airport sponsor.

The demand/capacity assessment of GA facilities addressed aircraft parking apron areas, aircraft storage hangars, and vehicle parking areas. These facilities serve GA aircraft (fixed wing and helicopter) based at the Airport, and itinerant or transient aircraft that may require temporary storage and/or flight support services. The GA and FBO requirements in this analysis were based on guidance provided in AC 150/5300-13 and AC 150/5390-2B, *Heliport Design*, dated September 30, 2004. Due to the operational characteristics, space requirements, and demand levels of the different GA components, each was evaluated separately.

There are two primary GA areas at the Airport: one located in the northwest corner of the airfield, and one west of Taxiway Z. Two FBOs provide GA services in these areas. The FBOs

are CareFlight Aviation Center, and Lux Air Jet Center (formerly Sun Western Flyers). The YCAA also provides aircraft storage and shade hangars for GA aircraft.
The GA apron and hangars located west of and adjacent to the main passenger terminal were recently vacated by Lux Air Jet Center. These facilities are now occupied by Airport maintenance, and the FAA Airways Facility Office. Lux Air Jet Center is developing a new FBO/GA facility on their leasehold that is located in the west airfield, east of the ATCT. Therefore, the former Lux Air Jet Center area west of the passenger terminal was not included in the demand/capacity assessment for GA facilities. For planning purposes, the aggregate demand for GA and FBO facilities will be compared to the aggregate capacity to determine overall GA facility requirements.
A wide range of GA aircraft types and sizes is accommodated and is anticipated to continue to be accommodated at the Airport. The fleet mix includes: single- and multi-engine piston aircraft (ADG I), such as Cessna 172 and 414, Beechcraft C99; and Cirrus SR-22; turboprop and small jet aircraft (ADG II), such as Beech King Air, Embraer 110, Canadair CL-600, and Citations; and helicopters such as Bell 206, Schweizer 300, Robinson R-22 and R-44. The fleet mix is expected to remain relatively constant throughout the planning period, as presented in Table III-18, therefore for planning purposes, the average percentages of 85 percent ADG I, 8 percent ADG II aircraft and 7 percent helicopters were used. Historical fleet mix data was not available for itinerant aircraft, therefore it was assumed that the itinerant GA aircraft fleet mix is similar to the based aircraft fleet mix.
Data were not available for the ratio of itinerant to based aircraft operations; therefore it was assumed that it is similar to the ratio of itinerant to local operations as presented in the FAA TAF.[22] This approach represents the most conservative estimation of the demand for itinerant aircraft parking and hangar space.

GA Hangar Requirements
Most GA aircraft owners and operators prefer to store their aircraft in a hangar to protect them from Arizona's sun and high temperatures that the Airport experiences. For the purposes of this study, the following assumptions, based on Airport and tenant interviews and surveys, were used:
Sixty percent of based GA aircraft will be stored in hangars and 40 percent will be stored on the apron at tie-down positions.
Ten percent of itinerant GA aircraft will be stored in hangars and 90 percent will be stored on the apron at tie-down positions.
Of those aircraft that are stored in hangars, 60 percent will be stored in T-hangars or box hangars, 30 percent in T-shades, and 10 percent in community hangars with other aircraft.
The capacity of community hangars depends on the placement of aircraft. A greater capacity can be obtained by nesting or stacking the aircraft. However, aircraft owners typically prefer a more conservative method that provides a greater amount of space around their aircraft and provides easier access for moving their aircraft into and out of the hangar.

3.1.1.14 Community Aircraft Storage Hangar Area Required Per GA Aircraft
For this assessment, a conservative method was used to calculate the required hangar area by adding 5 feet (ADG I) or 10 feet (ADG II) to both the aircraft wingspan and length, then

[22] Federal Aviation Administration, APO Terminal Area Forecast Detail Report, http://aspm.faa.gov/wtaf/detail.asp?line=SELECT+*+FROM+WTAF+WHERE+SYSYEAR%3E^1990+AND+SYSYEAR%3C^2025+AND+(LOC_ID^~NYL~) (accessed August 25, 2008).

multiplying the extended wingspan by the extended length. This methodology was applied only to community hangars. T-hangar, box hangar, and T-shade requirements were assessed by the number of units, and average area per unit of existing facilities.

Table IV-14 summarizes the average required GA community hangar area per aircraft. These averages were derived from listings of aircraft characteristics presented in AC 150/5300-13 and AC 150/5390-2B. A weighted average was then calculated based on the average fleet mix of 85 percent single- and multi-engine piston aircraft, 8 percent turbine aircraft (turboprops and small jets), and 7 percent helicopters. A weighted average of 2,600 square feet per aircraft was calculated for the GA aircraft community storage hangar.

Table IV-14 Average Storage Hangar Area Required per GA Aircraft

ADG	Average Length (ft)	Average Wingspan/ Width (ft)	Clearance on all sides of Aircraft (s.f.) [1/]	Average Hangar Area Required (s.f.) [2/]	Average Fleet Mix	Weighted Average Parking Area by ADG (s.f.) [3/]
I	36	40	5	2,300	85%	2,000
II	55	60	10	6,000	8%	500
Helicopter [4/]	47	8	10	1,876	7%	100
Weighted Average						2,600

Notes:

1/ Provides operational safety area around aircraft.

2/ Includes aircraft area plus clearances on all four sides of the aircraft (five feet on all sides for ADG I, and 10 feet on all sides for ADG II and Helicopters).

3/ Calculated by multiplying the fleet mix percentages and their associated area requirement and then summing the three ADG requirements. All numbers rounded to the nearest 100.

4/ Includes GA helicopters and UH-60 Blackhawks that regularly park on GA aprons, blades folded.

Source: Ricondo & Associates, Inc., October 2008, based on Federal Aviation Administration, FAA AC 150/5300-13, Change 14, *Airport Design*, November 1, 2008; Federal Aviation Administration, FAA AC 150/5390-2B, *Heliport Design*, September 30, 2004.

3.1.1.15 GA Aircraft Storage Hangar Demand

Table IV-15 presents the future demand for GA aircraft storage hangars based on the assumption that 60 percent of based aircraft, and 10 percent of itinerant aircraft are to be stored in hangars.

Table IV-15 GA Aircraft Storage Hangar Demand

	Based Aircraft (#) [1/]	Based Aircraft Stored in Hangars (#) [2/]	Itinerant Aircraft (#) [3/]	Itinerant Aircraft Stored in Hangars (#) [4/]	Total Aircraft Stored in Hangars (#)
PAL 1	186	112	39	4	116
PAL 2	200	120	42	4	124
PAL 3	213	128	45	5	133
PAL 4	227	136	49	5	141

Notes:

Table includes demand for T-hangar, box hangars, T-shades, and community hangars.

1/ Derived from Table III-19.

2/ Assumed 60 percent of based aircraft stored in hangars. All numbers rounded up to next whole integer.

3/ Itinerant aircraft operations assumed to similar to the FAA TAF ratio of itinerant to local operations (i.e. 45/55 percent split). Number of itinerant aircraft was calculated by taking 45 percent of the annual GA operations presented in Table III-21, and rounded to the nearest 100. Annual itinerant operations are then multiplied by 11.6 percent, to determine peak month itinerant operations. The peak month itinerant operations are then divided by 31 to determine

peak month average day itinerant operations, which are then divided by 2 (assuming one take-off and one landing are two operations per aircraft).
4/ Assumed 10 percent of itinerant aircraft stored in hangars (assumed to be in community hangars). All numbers rounded up to next whole integer.
Source: Ricondo & Associates, Inc., October 2008.
Prepared by: Ricondo & Associates, Inc., October 2008.

The present hangars at the Airport include T-hangars, box hangars, T-shades, and community hangars. Due to the unique size and space requirements of these options, each type of hangar was evaluated separately in this analysis, with the results presented in **Table IV-16**.

Table IV-16 GA Aircraft Storage Hangar Demand by Hangar Type

	Aircraft Stored in Hangars [1/]			Demand by Type of Hangar		
				60%	30%	10%
	Based (#)	Itinerant (#)	Total (#)	T and Box Hangars (#) [2/]	T-Shades (#) [3/]	Community (#) [4/]
PAL 1	112	4	116	70	35	11
PAL 2	120	4	124	74	37	12
PAL 3	128	5	133	80	40	13
PAL 4	136	5	141	85	42	14

Notes:
1/ As presented in Table IV-15.
2/ Assumed 60 percent of GA aircraft stored in hangars are in T and box hangars. All numbers rounded up to next whole integer. Total number of hangars required may not equal due to rounding.
3/ Assumed 30 percent of GA aircraft stored in hangars are in T-shades. All numbers rounded up to next whole integer.
4/ Assumed 10 percent of GA aircraft stored in hangars are in community hangars. All numbers rounded up to next whole integer.
Source: Ricondo & Associates, Inc., October 2008.
Prepared by: Ricondo & Associates, Inc., October 2008.

3.1.1.16 Summary of GA Aircraft Storage Hangar Requirements

Based on the preceding analysis, the existing aircraft storage hangar capacity does not meet the demand beginning in PAL 1. Additional aircraft storage hangars are required at each PAL to meet the forecast demand. The following is a summary of the required additional GA aircraft storage capacity during the planning period:
A deficit of T-hangar and box hangar capacity ranging from 19,000 square feet in PAL 1 to 47,500 square feet in PAL 4 is expected.
A deficit of T-shades ranging from 11,000 square feet in PAL 1 to 18,000 square feet in PAL 4 is expected.
A deficit of community hangars ranging from 5,200 square feet in PAL 1 to 13,000 square feet in PAL 4 is expected.
A total deficit of all aircraft storage hangars and T-shades ranging from 35,200 square feet in PAL 1 to 78,500 square feet in PAL 4 is expected.
A summary of GA aircraft storage hangar requirements by hangar type is shown in **Table IV-17**.
The need for development of new GA hangar facilities may be influenced by the number of available hangars, or other aircraft storage options at Rolle Airfield, located 10 nautical miles southwest of the Airport. This consideration will be discussed in a later chapter.
Table IV-17 Summary of GA Aircraft Storage Hangar Requirements by Hangar Type

Yuma International Airport

	T- and Box Hangars				T-Shades			
		Existing	Additional Requirement [3/]			Existing	Additional Requirement [5/]	
	Required (#) [1/]	Capacity (#) [2/]	(#)	(s.f.)	Required (#) [1/]	Capacity (#) [4/]	(#)	(s.f.)
PAL 1	70	60	10	19,000	35	24	11	11,000
PAL 2	74	60	14	26,600	37	24	13	13,000
PAL 3	80	60	20	38,000	40	24	16	16,000
PAL 4	85	60	25	47,500	42	24	18	18,000

	Community Hangars				All Aircraft Storage Hangars	
		Existing	Additional Requirement [7/]			
	Required (#) [1/]	Capacity (#) [6/]	(#)	(s.f.)	Total Required Hangar Area (s.f.) [8/]	Additional Hangar Area Requirement (s.f.) [9/]
PAL 1	11	9	2	5,200	196,600	35,200
PAL 2	12	9	3	7,800	208,800	47,400
PAL 3	13	9	4	10,400	225,800	64,400
PAL 4	14	9	5	13,000	239,900	78,500

Notes:

1/ As presented in Table IV-16.

2/ Includes T- and box Hangars in Northwest GA Hangar facility, West GA Hangar facility, and 6 T-Hangars in Fortuna Hangar. Does not include Lux Air Jet Center (formerly Sun Western Flyers) facility west of passenger terminal that is to be vacated in the short term. Based on YCAA lease documents and hangar specifications.

3/ The additional T- and box hangar requirements (number of units) were calculated by subtracting existing facilities from required facilities. The additional T- and box hangar requirements (square feet) were calculated by multiplying the number of required units by 1,900 square feet (average area per T and box hangar of existing facilities, based on YCAA hangar specifications).

4/ Includes T-Shades located in West GA Hangar Facility. Based on YCAA hangar specifications.

5/ The additional T-shade requirements (number of units) were calculated by subtracting existing facilities from required facilities. The additional T-shade requirements (square feet) were calculated by multiplying the number of required units by 1,000 square feet (average area per T-shade of existing facilities, based on YCAA hangar specifications).

6/ As determined by discussions with FBOs (Lux Air Jet Center and CareFlight Aviation Center). Includes 16,000 square feet of community hangars to be developed by Lux Air, and 6,480 square feet of existing community hangar space at Lux Air (formerly Bet-Ko). CareFlight Aviation Center does not have any community hangar space. Total existing community hangar square footage of 22,480 square feet divided by weighted average of 2,600 square feet per aircraft equals community storage capacity for 9 aircraft. Based on YCAA hangar specifications.

7/ The additional community hangar requirements (number of units) were calculated by

subtracting existing facilities from required facilities The additional community hangar requirements (square feet) were calculated by multiplying the number of required aircraft parking positions by 2,600 square feet per aircraft as presented in Table IV-14.
8/ Required aircraft hangar total is equal to the sum of the required number of each type of hangar units multiplied by their respective area per hangar type (T-hangars and box hangars – 1,900 square feet, T-shades – 1,000 square feet, and community hangars – 2,600 square feet).
9/ The additional hangar area requirements for all aircraft storage hangars (square feet) are equal to the sum of the T- and box hangar, T-shade, and community hangar additional requirements (square feet) presented in this table.
Source: Ricondo & Associates, Inc., October 2008, except as noted.
Prepared by: Ricondo & Associates, Inc., October 2008.

GA Apron Requirements
A GA apron is intended to accommodate the parking of based and itinerant aircraft. Itinerant aircraft usually park for relatively short periods (less than 24 hours) and require more area, while based aircraft typically park for longer periods of time and may be parked more densely. Parking configurations and associated spatial requirements for itinerant and based aircraft can vary greatly and were therefore assessed separately in this Airport Master Plan. The results of these analyses were then combined for an overall GA apron requirement and compared to the existing 996,491 square feet of GA aprons available to accommodate based and itinerant aircraft parking. YCAA facilities include aircraft storage hangars and T-shades; there are no existing YCAA aircraft parking aprons. Therefore YCAA GA facilities were not included in the analysis for apron requirements. Figure 48 shows the available GA aircraft apron parking space available.

Figure 48 - Existing GA Aprons

3.1.1.17 Apron Area Required Per Itinerant Aircraft
When planning apron area requirements for itinerant GA aircraft, provisions must be made for the aircraft parking area, as well as the taxilanes leading into, and in some parking configurations, from, the parking positions and circulation area. It was assumed that itinerant GA aircraft parking will consist of single rows, wing-to-wing, pull-through and/or back-in parking, depending on the row location in reference to the pavement edge. Back-in parking for larger aircraft may require the use of ground equipment. In addition to the area required to park the aircraft, the full taxilane and Object Free Area (OFA) in front of the parked aircraft and a

clearance on all four sides of the aircraft (ADG I: 5 feet, ADG II: 10 feet) were included in the apron area requirement.

Table IV-18 summarizes the average parking apron area requirement per GA itinerant aircraft. These averages were derived from listings of aircraft characteristics in AC 150/5300-13 and AC 150/5390-2B. A weighted average was calculated based on the forecast GA fleet mix of 85 percent single- and multi-engine piston aircraft, 8 percent turboprop and small jets, and 7 percent helicopters. As shown in the table, this analysis resulted in a weighted average of 6,700 square feet per aircraft for the GA itinerant apron.

Table IV-18 GA Itinerant Aircraft Parking Apron Area Requirements

Airplane Design Group (ADG) [1/]	Average Length (ft)	Average Wingspan/ Width (ft)	Clearance on all sides of Aircraft (s.f.) [2/]	Average Req. Parking Area (s.f.) [3/]	Fleet Mix	Weighted Average Parking Area by ADG(s.f.) [4/]
I	36	40	5	6,250	85%	5,300
II	55	60	10	14,050	8%	1,100
Helicopter [5/]	47	47	12	4,891	7%	300
Weighted Average					100.0%	6,700

Notes:

1/ Itinerant GA aircraft forecast to utilize the Airport are single- and multi-engine piston, turbine (turboprops, small jets), and helicopters.

2/ Provides operational safety area around aircraft.

3/ Parking for fixed-wing aircraft assumes wing-to-wing parking, in single rows. Required parking area includes full width of taxilane and object free area in front of aircraft parking to accommodate back-in parking (calculated as wingspan plus clearance multiplied by OFA width of 79 feet for ADG I, and 115 feet for ADG II). This taxilane and OFA clearance is added to aircraft area (calculated as length plus clearances multiplied by wingspan plus clearances on all four sides of the aircraft (5 feet for ADG I, and10 feet for ADG II). Parking for Helicopter provides 12-foot clearances on all four sides of the helicopter, and assumes hover taxi operations.

4/ Calculated by multiplying the fleet mix percentages and their associated area requirement, and totaling the ADG specific requirements. All numbers rounded to the nearest 100.

5/ Includes GA helicopters and UH-60 Blackhawks that regularly park on GA aprons. Average length and width each equal to two times tail rotor arc. Clearance equal to one-third rotor diameter and assumes hover taxi operations.

Source: Ricondo & Associates, Inc., October 2008, based on Federal Aviation Administration, FAA AC 150/5300-13, Change 14, *Airport Design*, November 19, 2008*;* Federal Aviation Administration, FAA AC 150/5390-2B, *Heliport Design*, September 30, 2004.

Prepared by: Ricondo & Associates, Inc., Novembe 2008.

3.1.1.18 Apron Area Required Per Based Aircraft

As with the itinerant parking apron, in planning for based GA aircraft apron area requirements, provisions must be made for the aircraft parking area as well as the taxilanes leading into, and in some parking configurations from the parking positions and circulation area. It was assumed that based GA aircraft parking will consist of double rows of back-in parking with aircraft in each row parked wing-to-wing, and where the aircraft in the two rows face the opposite direction and are parked tail-to-tail. This parking configuration accommodates a moderate density of aircraft within a given area. In addition to the area required to park the aircraft, one-half the

width of the taxilane and OFA in front of the parked aircraft and a clearance on all four sides of the aircraft (ADG I: 5 feet, ADG II: 10 feet, helicopters: 12 feet) were included in the parking apron requirement for all based GA aircraft. Helicopter parking area requirements assumed hover taxi operations and turn-around or taxi-through parking positions. **Table IV-19** summarizes the average parking area requirements per based GA aircraft. A weighted average derived from characteristics contained in AC 150/5300-13 was calculated based on the forecast fleet mix of 85 percent single- and multi-engine piston aircraft, 8 percent turboprop and small jets, and 7 percent helicopters. As shown in the table, this analysis resulted in a weighted average of 4,700 square feet per aircraft for the GA based aircraft apron.

Table IV-19 GA Based Aircraft Parking Apron Area Requirement

Airplane Design Group (ADG) [1/]	Average Length (ft)	Average Wingspan (ft)	Clearance on all sides of Aircraft (s.f.) [2/]	Average Req.Parking Area (s.f.) [3/]	Fleet Mix	Weighted Average Parking Area by ADG (s.f.) [4/]
I	36	40	5	4,275	85%	3,600
II	55	60	10	10,025	8%	800
Helicopter [5/]	47	47	12	4,891	7%	300
Weighted Average					100.0%	4,700

Notes:

1/ GA aircraft forecast to utilize the Airport are single- and multi-engine piston, turbine (turboprops, small jets), and helicopters.

2/ Provides operational safety area around aircraft.

3/ Parking for fixed-wing aircraft assumes double rows of, back-in parking. Required parking area includes one-half the width of taxilane and object free area in front of the parked aircraft (calculated as wingspan plus clearance multiplied by one-half of the OFA width of 79 feet for ADG I and 115 feet for ADG II). This taxilane and OFA clearance is added to aircraft area (calculated as length plus clearance multiplied by wingspan plus clearances on all four sides of the aircraft; 5 feet for ADG I, and 10 feet for ADG II). Parking for Helicopter provides 12-foot clearances on all four sides of the helicopter, and assumes hover taxi operations.

4/ Calculated by multiplying the fleet mix percentages and their associated area requirement and totaling the ADG specific requirements. All numbers rounded to the nearest 100.

5/ Includes GA helicopters and UH-60 Blackhawks that regularly park on GA aprons. Average length and width each equal to two times tail rotor arc. Clearance equal to one-third rotor diameter and assumes hover taxi operations

Source: Ricondo & Associates, Inc., October 2008, based on Federal Aviation Administration, FAA AC 150/5300-13, Change 14, *Airport Design*, November 1, 2008; Federal Aviation Administration, FAA AC 150/5390-2B, *Heliport Design*, September 30, 2004.

Prepared by: Ricondo & Associates, Inc., November 2008.

3.1.1.19 Itinerant Aircraft Parking Apron Demand

For planning purposes, the number of annual itinerant operations are assumed to be similar to the FAA TAF ratio of itinerant to local operations (i.e. 45/55 percent split). Demand was calculated by taking 45 percent of annual GA operations (rounded to nearest 100), then multiplying by 11.6 percent to represent the peak month itinerant operations. This number is then divided by 31 to represent the peak month average day itinerant operations. The daily operations are then divided by two, assuming that an aircraft will perform one take-off and one landing. This number represents the number of itinerant aircraft that may operate at the Airport on the peak month

average day. It is further assumed that 50 percent of those aircraft would be on the ground at any given time throughout a peak month average day. For purposes of this analysis, this resulting number is defined as the itinerant aircraft parking demand.

Itinerant aircraft parking aprons should provide sufficient temporary apron parking positions to accommodate aircraft waiting to transition into or out of hangars. Therefore for planning purposes, 100 percent of the itinerant aircraft parking demand will be used, even though 10 percent of itinerant aircraft are assumed to be stored in a hangar. Itinerant aircraft parking apron demands are presented in **Table IV-20.**

Table IV-20 Itinerant Aircraft Parking Apron Demand

	Annual GA Operations 1/	Annual Itinerant Operations 2/	Peak Month Itinerant Operations 3/	Peak Month Average Day Itinerant Operations 4/	Average Day Itinerant Aircraft (# of aircraft) 5/	Itinerant Aircraft Parking (# of stalls) 6/
PAL 1	46,900	21,100	2,400	77	39	20
PAL 2	50,400	22,700	2,600	84	42	21
PAL 3	53,700	24,200	2,800	90	45	23
PAL 4	57,200	25,700	3,000	97	49	25

Notes:
1/ As presented in Table III-19. Numbers rounded to nearest 100 from numbers presented in forecast.
2/ Annual itinerant operations assumed to be similar to the FAA TAF ratio of itinerant to local operations (i.e. 45/55 percent split). Number rounded to nearest 100.
3/ Peak month itinerant operations equal 11.6 percent of annual itinerant operations based on Table III-21. Number rounded to nearest 100.
4/ Calculated by dividing peak month itinerant operations by 31.
5/ Calculated by dividing peak month average day operations by two (assuming one take-off and one landing are two operations per aircraft).
6/ Calculated by dividing average day itinerant aircraft by two (assuming that 50 percent of the aircraft may be on the ground at any given time throughout a PMAD).

Source: Ricondo & Associates, Inc., October 2008, based on Federal Aviation Administration, FAA AC 150/5300-13, Change 14, *Airport Design*, Novermber 1, 2008.
Prepared by: Ricondo & Associates, Inc., November 2008.

3.1.1.20 Based Aircraft Parking Apron Demand

As previously stated, most owners and operators of based GA aircraft prefer hangars or T-shades to protect their aircraft from inclement weather conditions. Therefore, it was assumed that 40 percent of based aircraft will be stored at tie-down positions on the apron and 60 percent will be stored in hangars. **Table IV-21** presents the demands for based aircraft stored on the apron, and the number stored in hangars, based on the above ratios.

Table IV-21 Based Aircraft Hangar and Parking Apron Demand

	Based Aircraft (#) [1/]	60% of Based Aircraft Stored in Hangar (#)[2/]	40% of Based Aircraft Stored on Apron (#) [2/]
PAL 1	186	112	74
PAL 2	200	120	80
PAL 3	213	128	85
PAL 4	227	136	91

Notes:
1/ As presented in Table III-19.
2/ Numbers rounded to the closest whole integer.

Source: Ricondo & Associates, Inc., October 2008.
Prepared by: Ricondo & Associates, Inc., October 2008.

3.1.1.21 GA Aircraft Apron Requirements

Table IV-22 presents a summary of the GA aircraft parking apron requirements throughout the planning period. As shown in the table, existing capacity exceeds demand through PAL 4 with a surplus ranging from approximately 403,000 square feet in PAL 1 to approximately 264,000 square feet in PAL 4.

Table IV-22 Summary of GA Aircraft Parking Apron Requirements

	Based Aircraft Stored on Apron (# of aircraft) [1/]	Itinerant Aircraft Positions on Apron (# of positions) [2/]	Apron Required (s.f.) [3/]	Circulation Area Required (s.f.) [4/]	Total Apron Required (s.f.) [5/]	Existing Apron (s.f.) [6/]	Surplus GA Apron (s.f.) [7/]
PAL 1	74	20	474,400	118,600	593,000	996,491	(403,000)
PAL 2	80	21	508,700	127,175	635,875	996,491	(361,000)
PAL 3	85	23	545,100	136,275	681,375	996,491	(315,000)
PAL 4	91	25	586,100	146,525	732,625	996,491	(264,000)

Notes:
1/ As presented in Table IV-21.
2/ As presented in Table IV-20.
3/ Number of based aircraft times 4,700 square feet per aircraft, plus number of itinerant aircraft time 6,700 square feet per aircraft.
4/ Circulation area equals 25 percent of required apron area, based on layouts of GA aprons at comparable airports.
5/ Total apron required equals the sum of the required apron and circulation areas.
6/ Existing apron includes only aprons leased by FBOs (CareFlight Aviation Center, 113,856 s.f.) (Lux Air Jet Center, 882,835 s.f.). Does not include Lux Air Jet Center facility

west of the passenger terminal which is to be vacated in the near term. Based on YCAA lease documents.
7/ Calculated by subtracting required apron area from existing apron area. Amounts indicated in parentheses are surplus to the requirements. Rounded to the nearest 1,000.
Source: Ricondo & Associates, Inc., October 2008, except as noted.
Prepared by: Ricondo & Associates, Inc., October 2008.

GA Vehicle Parking

Current vehicle parking to support GA facilities consists of 137 parking stalls. In addition, Lux Air Jet Center will provide 30 parking stalls in the near future in conjunction with the development of their new FBO, for a total of 167 parking stalls. Vehicle parking demand considers FBO employees, customers, aircraft owners, and their guests.

To determine GA vehicle parking requirements, a planning metric of one vehicle parking stall per 1,000 square feet of aircraft storage hangar space was applied, based on comparable airports. Additionally, it was assumed that each vehicle parking stall would consist of 300 square feet, accounting for a stall dimension of nine feet wide by 20 feet deep, with half of a 26-foot-wide drive aisle for vehicle circulation. The areas that have the highest need for additional parking include three areas: CareFlight Aviation Center, the area north of the FedEx apron (on both sides of Fortuna Avenue), and south of the T-shades. The results of the GA vehicle parking analysis are presented in **Table IV-23**.

Table IV-23 GA Vehicle Parking Requirements

	Total Required Hangar Area (s.f.) [1/]	Required Vehicle Parking (# of stalls) [2/]	Existing Vehicle Parking (# of stalls) [3/]	Additional Vehicle Parking Required (# of stalls) [4/]	Additional Vehicle Parking Requirement (s.f.) [5/]
PAL 1	196,600	197	167	30	9,000
PAL 2	208,800	209	167	42	12,600
PAL 3	225,800	226	167	59	17,700
PAL 4	239,000	239	167	72	21,600

Notes:
1/ Sum of aircraft storage hangar requirements presented in Table IV-17.
2/ One vehicle parking stall per 1,000 square feet of aircraft storage hangar. All numbers rounded to the nearest whole integer.
3/ Includes stalls counted from aerial photograph taken by Geodetix, Inc., May 2008 for the following facilities: Northwest GA Hangar Facility (28 stalls); lot south of Northwest GA Hangar Facility (36 stalls); adjacent to CareFlight Aviation Center (7 stalls); north of FedEx apron on both sides of Fortuna Ave. (20 stalls); west of West GA Hangar Facility's T- and box hangars (21 stalls); south of T-shades (25 stalls); and parking for new Lux Air Jet Center (30 stalls).
4/ Calculated by subtracting existing vehicle parking area from required vehicle parking area.
5/ Calculated by multiplying number of required vehicle parking stalls by 300 square feet per stall, which assumes a stall dimension of 9 feet wide by 20 feet deep, plus half of a 26-foot drive aisle for vehicle parking and circulation.
Source: Ricondo & Associates, Inc., October 2008, except as noted.
Prepared by: Ricondo & Associates, Inc., October 2008.

FBO and GA Facilities Conclusions
Based on anticipated operations and growth in GA activity, additional hangars (t-hangars, box and community) as well as T-shades are required, totaling approximately 78,000 square feet by the end of the planning horizon. Additional vehicle parking in the vicinity of the GA facilities is also needed.

Ancillary Facilities

The demand and capacity for current air support facilities accommodated at the Airport that provide both aviation-related and non-aviation related services are presented below for the following components:
DCC
Airport Maintenance Facility
ARFF
Utilities Infrastructure

DCC
Based on FAA guidelines, there would not specifically be a demand for additional ramp or apron area in the DCC. However, the unique circumstances at the Airport indicate that additional ramp

areas in the DCC area will be necessary for future development and growth. This has been addressed in greater detail in the Chapter V, *Alternatives and Airport Development Plan* of this document.

Airport Maintenance Facility
YCAA maintains equipment and employs staff to maintain the terminal building, grounds, landscaping, and other responsibilities such as electrical, plumbing, and heating, ventilation and air condition (HVAC) as necessary. The Airport maintenance facility operates from a facility previously occupied by an FBO west of the passenger terminal area. It is substantially larger than the previous Airport maintenance facility, well located for its purpose and appropriate for staffing and storage of equipment. The size of the overall property and the passenger terminal building maintained by YCAA are not anticipated to grow substantially. Based on that assumption and the forecast operations and anticipated fleet mix at the Airport, the location and size of the existing maintenance facility will be sufficient through the planning horizon.

ARFF
Each airport with daily scheduled air carrier service is required to provide ARFF services. The equipment required is determined by the standards in FAR Part 139, *Certification of Airport*. These standards are related to the length of the air carrier aircraft (expressed as ARFF indices, as indicated below) and the number of average daily departures by the most demanding index of aircraft operating at an airport. For a more detailed description of the ARFF guidelines, refer to Section 2.4.6 of this document. Air carrier aircraft are indexed as follows:
Index A: Aircraft less than 90 feet long
Index B: Aircraft at least 90 feet long, but less than 126 feet long
Index C: Aircraft at least 126 feet long, but less than 159 feet long.
Index D: Aircraft at least 159 feet long, but less than 200 feet long
Index E: Aircraft at least 200 feet long
The indices provide a general assumption regarding the number of passengers that could be involved in an aircraft incident, resulting in the number of response vehicles and amount of fire fighting agents that would be necessary. The index of aircraft with an average of five or more daily departures at an airport is the index required for that airport. Yuma International Airport is currently designated as Index A. This is not expected to change during the planning period. The existing ARFF station is located in the east airfield, on the MCAS Yuma apron. The ARFF services are provided by the MCAS Yuma personnel and meet FAR Part 139 Index D requirements, exceeding those requirements necessary for air carrier operations conducted by commercial airline tenants that require FAR Part 139 Index A standards.

Utilities Infrastructure
The Airport is served by the same public and municipal utility providers as the City of Yuma, with the City providing sanitary sewer, water, and storm drainage services; Arizona Public Service providing electrical power; and Southwest Gas Corporation providing natural gas. The provision of these services is not anticipated to change during the planning period. Substantial growth and development, as it would occur incrementally, would address utilities and infrastructure requirements as necessary.

Ancillary Facilities Conclusions
Additional ramp space in the DCC area is anticipated. The Airport maintenance facility meets the needs of the existing and future demand anticipated through PAL 4, given the recent

relocation to a larger, more appropriate facility. ARFF equipment exceeds the requirements for the Airport's commercial aircraft activity anticipated through PAL 4, and utilities will be considered with individual development projects as demand warrants.

Summary

The demand/capacity analyses were completed according to various industry standards, and took into consideration the unique circumstances of the Airport and applied accordingly. When demand varies by planning activity level, the facility requirements are identified accordingly. The following is a summary of additional facility requirements to the Airport's existing facilities:

Airfield Facilities

Construct a full-length parallel taxiway northwest of Runway 3L-21R

Widen taxiways to GA facilities northwest of Runway 3L-21R to accommodate ADG III aircraft activity

Widen deficient areas of Taxiway E, F and H to accommodate ADG VI aircraft activity

Increase Taxiway E TOFA from 320 feet to 386 feet

Passenger Terminal Area

Provide additional passenger waiting area in the boarding areas

Provide additional space in the boarding area for passenger seating, circulation, and restrooms

Upgrade the baggage claim unit and provide additional area in the arrival lobby

Provide additional short- and long-term parking

Provide additional rental car facility parking

Provide additional administrative office space

FBO and GA Facilities – Hangars and Ramp

Develop additional T and box hangars ranging from approximately 10 units or 19,000 square feet in PAL 1 to approximately 25 units or 47,500 square feet in PAL 4

Develop additional T-shades, ranging from approximately 11 units or 11,000 square feet in PAL 1, to approximately 18 units or 18,000 square feet in PAL 4

Develop additional community hangars capacity, ranging from capacity for approximately 2 aircraft or 5,200 square feet in PAL 1, to capacity for 5 approximately aircraft or 13,000 square feet in PAL 4

Develop a total additional aircraft storage hangar capacity, ranging from 35,200 square feet in PAL 1 to 78,500 square feet in PAL 4

FBO and GA Facilities – Vehicle Parking

Provide additional GA vehicle parking, ranging from approximately 30 parking stalls or 9,000 square feet in PAL 1, to approximately 72 parking stalls or 21,600 square feet in PAL 4

Ancillary Facilities

Develop additional ramp space in the DCC


Short Term Parking
Lot E
Long Term Parking
Lot D
Long Term Parking
Lot C
Long Term Parking
Lot B
Long Term Parking
Lot A

IV. Alternatives and Airport Development Plan

A primary focus of a typical master plan is to identify and evaluate airport development alternatives that satisfy future aviation-related demand, are responsive to the needs of the communities served by the airport, and provide for effective management of land uses. More specific to Yuma International Airport, specific goals and objectives were identified at the first PAC meeting that was held on April 1, 2008. Documented in Chapter I of this document, these goals and objectives are restated below:

Develop a plan to ensure a workable agreement between the YCAA and USMC. MCAS Yuma has an important role in the City's economy, and the collective resources offered by the Airport and MCAS should be managed collaboratively.

Develop a plan that identifies the best long-term facilities for civil aviation activity, including passenger amenities within the terminal building, reasonably-priced general aviation facilities, and economic development opportunities.

Enhance the relationship and partnership between the YCAA and USMC; considering global and specific issues such as airfield inspections and hours of operation for the ATCT.

Enhance the plan to identify pavement conditions and necessary improvements.

Develop a plan that resolves vehicular parking limitations for GA aircraft operators.

Provide strategies for accommodating future terminal needs, including expansion of passenger holding areas and public parking needs during peak activity or heightened levels of threat to security.

The Airport Master Plan should:

be coordinated with related and regional development projects,

be able to be implemented without disrupting the efficient operation of the Airport,

be sensitive to the surrounding environments, and

ensure that the YCAA uses resources wisely.

To work toward satisfying these goals, coordination with Airport management, presentations to the PAC members, including representatives from MCAS Yuma, Arizona DOT, and other City of Yuma departments, was completed throughout the planning process. In particular, coordination with MCAS Yuma personnel occurred with regard to the ALP, airfield improvements, hours of operation for the ATCT, and attendance at the MCAS Yuma master planning airfield charette on November 17, 2008.

The resulting effort of this collaboration was that numerous development concepts were identified, evaluated, and refined. In some cases, there were multiple choices on how to resolve an issue or to plan for anticipated demand; these were termed as alternatives. In other cases, only one possibility exists for such resolution, which was termed as an optional improvement that was then considered for inclusion in the resulting airport development plan. Development alternatives and optional improvements were considered for four functional areas (airfield facilities, passenger terminal area, FBO and GA facilities, and ancillary facilities). The alternatives or optional improvements were based on the facility requirements presented in Chapter IV of this document, and the associated forecast demand. The facility requirements identify the quantity and size of various facility components that are necessary to serve demand levels projected throughout that planning horizon. The facility requirements also help identify the appropriate phasing and timing of future development. In some cases, certain improvements or recommendations are not based on a specific planning metric or level of demand, and are discussed accordingly. An example of this would be the addition of restrooms for improved

level of service to the passenger, or the extension of hours of operations for the ATCT for increased safety.

While each functional area was considered separately, it was also important to consider the interaction between the various functional areas, as the resolution of issues in one functional area may affect other functional areas. At the end of this chapter, the preferred development alternatives and selected optional development for each functional area has been integrated into a single ADP, which will serve as the basis for the future ALP. Development options were based on the facility requirements associated with forecast demand and other recognized operational or regulatory needs. The airfield was evaluated first because of its critical importance to overall airport operations and the effect that airfield improvements could have on other airport facilities. Alternative development scenarios were presented to Airport management and staff for review and input, and were then presented to the PAC.

The remainder of this chapter discusses the methodologies used to identify and evaluate alternatives within each of the four functional areas and the process that led to the selection of the preferred ADP. The methodologies used in identifying and evaluating alternatives and options followed FAA planning guidelines as outlined in AC 150/5070-6B, Change 1, *Airport Master Plans*, dated May 1, 2007, and industry standards, and were supplemented by staff experience, MCAS Yuma input, and additional information that depicts the operational and physical conditions at the Airport for an accurate estimate of future facility requirements.

Airfield Facilities

The airfield development options evaluated are described in this section.

Description of Airfield Development Options

As presented in Chapter IV of this document, the airfield demand/capacity analyses and facility requirements determined that the capacity of the existing airfield would be adequate to meet demand through PAL 4. However, three primary and separate airfield issues were identified that need to be resolved. These include: 1) the need for an ADG VI taxiway parallel to and west of Runway 3L-21R to improve the safety and efficiency of aircraft taxiing; 2) the widening of taxiways that serve the GA facilities to meet ADG III standards; and 3) the widening of Taxiway L to meet ADG III standards and extended to connect with the planned taxiway parallel to Runway 3L-21R.

A full-length taxiway parallel to and west of Runway 3L-21R would minimize runway crossings for aircraft taxiing from the YCAA-portion of the Airport to other runway ends; and would provide a more direct taxi route from Runway 8-26 to the southwestern portions of the airfield (i.e. West Visiting Aircraft Line and the DCC). The widening of the Taxiway Z complex would enhance operations in the area, because larger corporate aircraft (ADG III) use the general aviation facilities in that area and experience difficulty taxiing and maneuvering on the taxiways at their current widths. The lengthening and widening of Taxiway L to ADG III standards improves operational efficiency of the airfield by providing more direct taxi routes for aircraft accessing the terminal ramp area from runways other than Runway 8-26. Following is a description of each optional airfield improvement. They are not alternatives to each other, but represent individual improvements that could address the identified airfield issues.

4.1.1.1 Airfield Development –Taxiway Parallel to Runway 3L-21R

Figure 49 provides an illustration of this optional airfield improvement, which includes the addition of a full-length ADG VI taxiway parallel to Runway 3L-21R. According to ADG VI

standards, the recommended width for the new taxiway is 100 feet. In addition, the separation distance from the Runway 3L-21R centerline to the planned taxiway centerline would be 500 feet. This may preclude the use of high-speed exit taxiways. The demolition of pavement from the intersection of the planned taxiway and Taxiway Z3 to Runway 3L-21R is also recommended under this optional improvement. This taxiway is recommended to improve the safety and efficiency of aircraft taxiing to most of the YCAA-owned facilities on the west side of the airfield. It provides a continuous taxi route that would minimize potential runway incursions and decrease runway crossings.

Due to funding restrictions Taxiway Y would be constructed in four separate sections in different fiscal years as illustrated. Each section is in priority order.

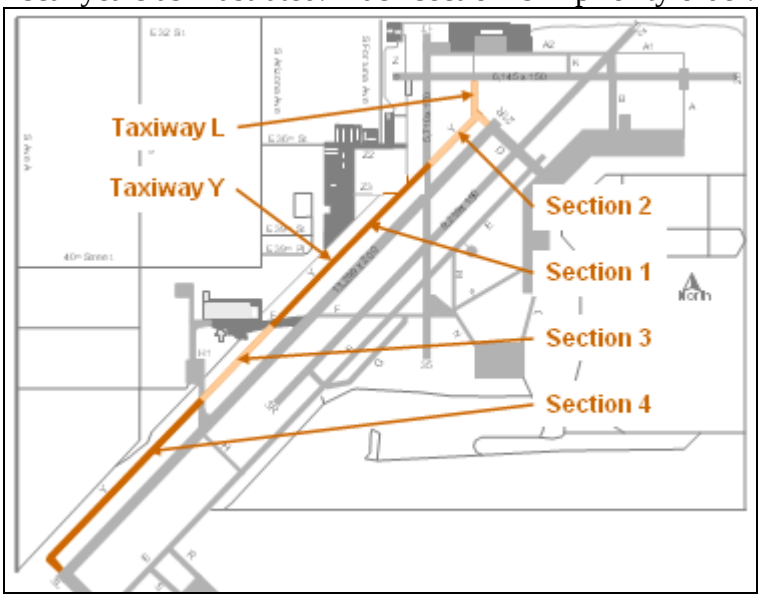

Figure 49 - Airfield Development, Parallel Taxiway to Runway 3L-21R

4.1.1.2 Airfield Development – Taxiway L Extension

Part of constructing Section 2 of the Parallel Taxiway should include extending Taxiway L south from Runway 8/26 to connect with the parallel to Runway 3L-21R. In conjunction with this extension, Taxiway L would be widened to 50 feet to meet ADG III standards. These improvements would improve the safety and efficiency of aircraft taxiing as well as to accommodate ADG III aircraft in the terminal area. The widening of the taxiway would provide an increased margin of safety for aircraft taxiing to and from the terminal ramp area, and the extension would improve airfield efficiency by providing a more direct taxi route to the terminal from runways other than Runway 8-26.

4.1.1.3 Airfield Development –Taxiway Widening

Figure 50 provides an illustration of this optional airfield improvement, which includes the widening of taxiways adjacent to the GA facilities to accommodate ADG III aircraft. ADG III design standards require taxiways to be 50 feet wide. Additional pavement would be required at the intersection of the proposed parallel taxiway and Taxiways Z and Z3 to create a perpendicular taxiway providing access to the GA facilities. It is also recommended that Taxiway Z1 be moved south of the CareFlight hangar. These improvements would enhance the

safety and maneuverability of aircraft taxiing in this vicinity, as larger aircraft using this area have experienced difficulty taxiing to and from the GA area with the current taxiway widths.

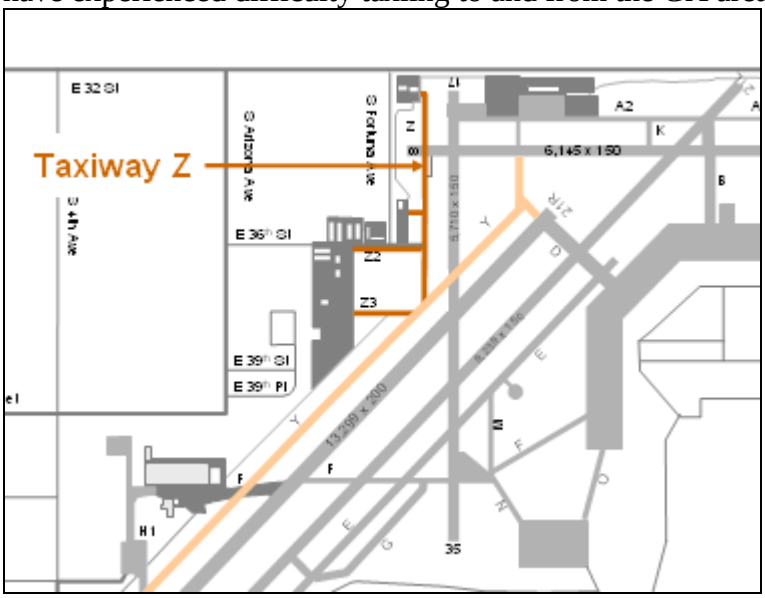

Figure 50 - Airfield Development, Taxiway Widening

Preferred Airfield Development

Implementation of the optional airfield improvements presented in Section 5.1.1 of this document would enhance the safety and efficiency of aircraft movements; bring more areas of the airfield into compliance with ADG III standards; and improve access to the passenger terminal and to GA areas on the west side of the airfield. Although not a facility development, it is recommended that YCAA staff continue coordination with the MCAS Yuma on extending the hours of operation for the ATCT, and implement a Pavement Maintenance and Management System.

Passenger Terminal Area

Passenger terminal area development alternatives and optional improvements are described in this section, along with the process used to select the preferred terminal area alternative. To provide more cohesive passenger terminal area development alternatives, ground access and parking were included in this section.

Description of Terminal Area Development Options

The terminal area development options described in this section were based on associated with requirements based on the High Activity Scenario. This scenario would require additional terminal area facilities including: boarding area; passenger circulation space; and additional public parking space. Airport staff indicated that a separate corridor for deplaning passengers would improve passenger flow from aircraft into the passenger terminal by separating the deplaning passengers from the passengers that are waiting in the boarding area. Passenger demand under the High Activity Scenario would also require expansion of the rental car parking facilities. The YCAA has also indicated the need for restrooms beyond security screening in the boarding area, an expanded baggage claim waiting area, and additional administration office space. Expansion of the baggage claim waiting area could also require relocation of the rental car offices.

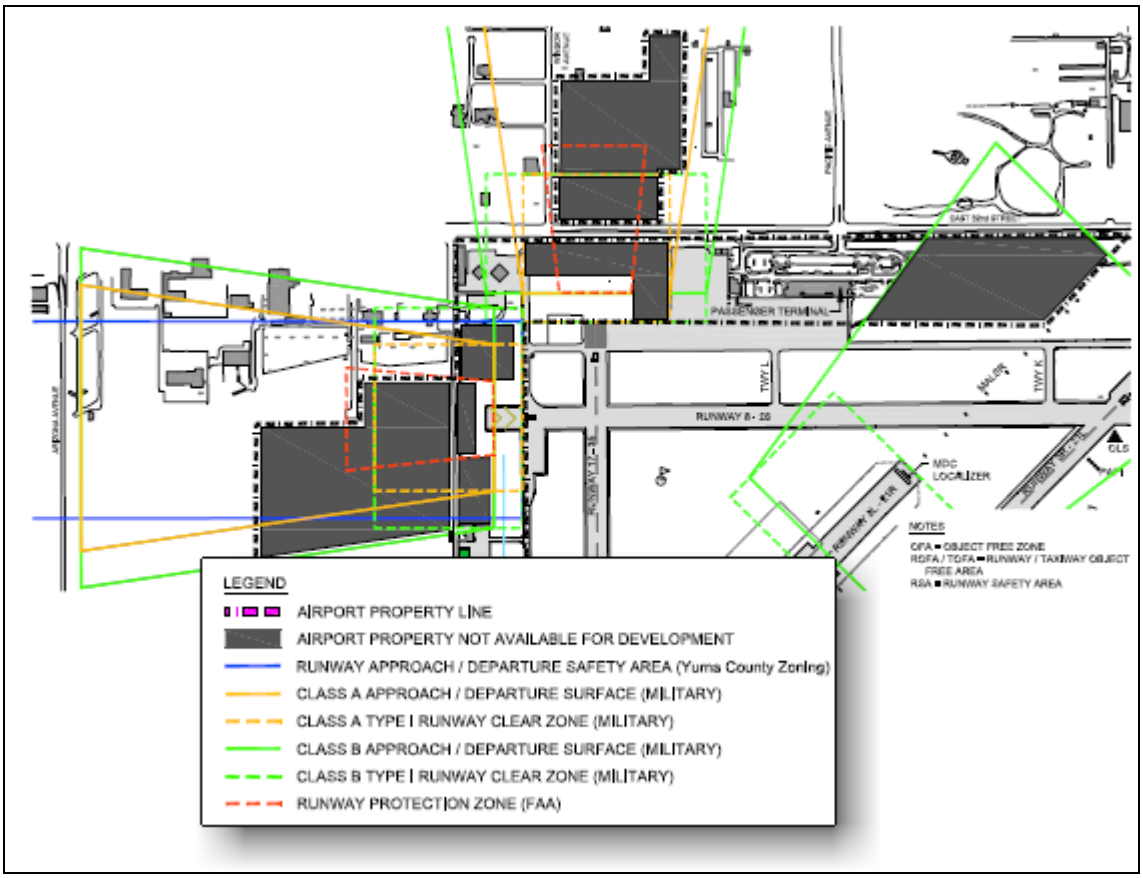

Figure 51 - Development Restrictions (West Side)

The potential need for additional public parking to accommodate future demand, as well as to relocate parking away from the passenger building for security reasons have also been identified. The requirement for additional rental car ready and return spaces has also been identified. Because the terminal building and existing and potential ground access and parking facilities are located in such close proximity to four runway ends, there are a number of restrictions on development that are imposed upon YCAA. They include runway protection zones and building restriction lines imposed by the FAA, various imaginary surfaces imposed by FAA and military airspace restrictions, and development restrictions imposed by Yuma County. Figure 51 distinguishes between and depicts the various restrictions and to identify areas where development would not be allowed.

The following development alternatives and potential improvements were identified to address one or more of the passenger terminal area issues.

4.1.1.4 Terminal Area Development – Boarding Area Expansion, Alternative 1

Figure 52 provides an illustration of this terminal development alternative, under which the existing atrium south of the existing boarding area would be enclosed. Enclosure of the atrium (adding 4,745 square feet to the existing 2,250 square feet) would provide approximately 7,000 square feet in the boarding area. The addition of an 815-square-foot restroom area west of the boarding area would provide restrooms for enplaning passengers after they have cleared security screening. A 10-foot-wide corridor would be provided to the east of the boarding area to improve circulation for deplaning passengers proceeding to the baggage claim area.

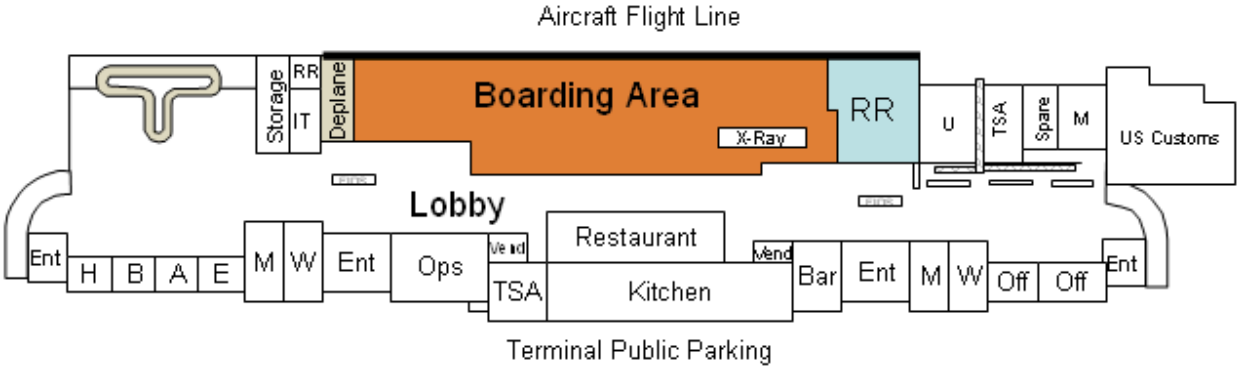

Figure 52 - Terminal Area Development, Boarding Area Expansion, Alternative 1

4.1.1.5 Terminal Area Development – Boarding Area Expansion, Alternative 2

Figure 53 provides an illustration of this terminal development alternative, which also includes enclosure of the existing atrium. This alternative would add approximately 4,370 square feet for a total of approximately 6,600 square feet in the boarding area. Security screening would be relocated and oriented in the north/south direction to provide passengers with 20 feet of queuing space prior to the screening equipment, resulting in an increase of approximately 650 square feet in the space available for passenger screening. Restrooms would be provided to the east of the boarding area to accommodate enplaning passengers after they have cleared security screening. A 10-foot-wide corridor would be provided to the east of the boarding area to improve circulation for deplaning passengers proceeding to the baggage claim area.

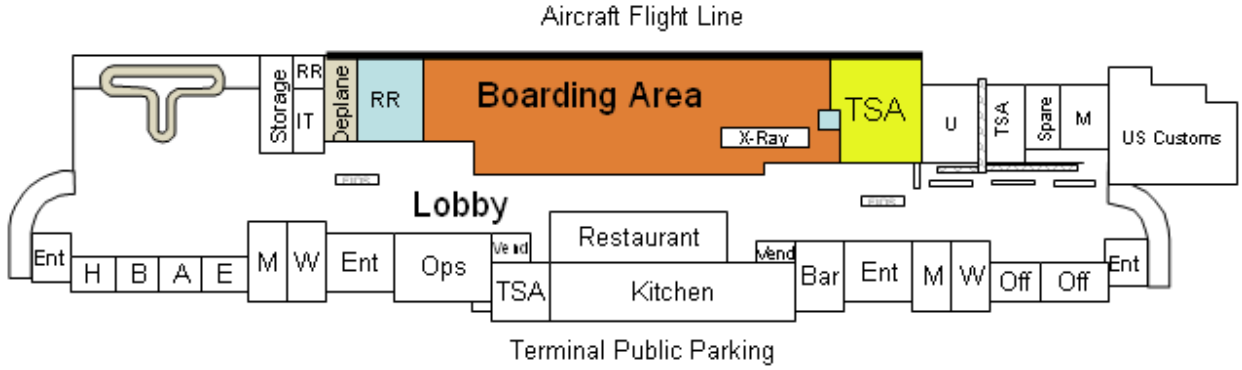

Figure 53 - Terminal Area Development, Boarding Area Expansion, Alternative 2

4.1.1.6 Terminal Area Development – Boarding Area Expansion, Alternative 3

Figure 54 provides an illustration of this terminal development alternative, which includes partial enclosure of the existing atrium to add approximately 2,700 square feet and providing a total of 5,000 square feet in the boarding area. Under this alternative, restrooms would also be provided to the east of the boarding area to accommodate enplaning passengers once they have cleared security screening. The location and size of the screening area would remain unchanged. A 10-foot-wide corridor would be provided to the east of the boarding area to improve circulation for deplaning passengers proceeding to the baggage claim area.

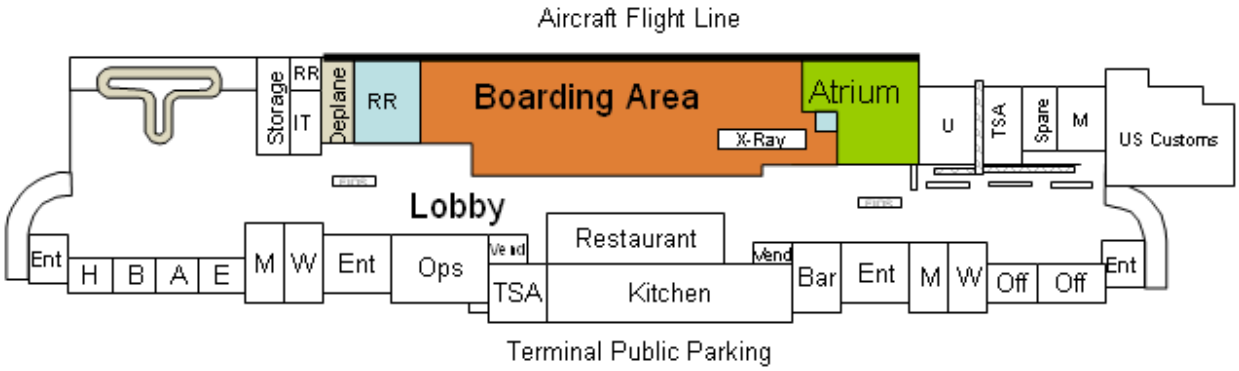

Figure 54 - Terminal Area Development, Boarding Area Expansion, Alternative 3

4.1.1.7 Terminal Area Development – Baggage Claim Expansion, Alternative 1

Figure 55 provides an illustration of this terminal development alternative. The baggage claim area would be expanded by approximately 720 square feet by relocating the adjacent mechanical room to the west, resulting in a total baggage claim area of approximately 5,000 square feet. This alternative would accommodate a new baggage claim unit 85 feet in length and 45 feet in width, with a linear frontage of 150 feet. This linear frontage would accommodate the Baseline Scenario requirement of 132 linear feet but would not accommodate the High Activity Scenario requirement of 166 linear feet throughout the planning period. This alternative would also require relocation of a restroom that is primarily used by airside employees, as well as expansion of the baggage handling area.

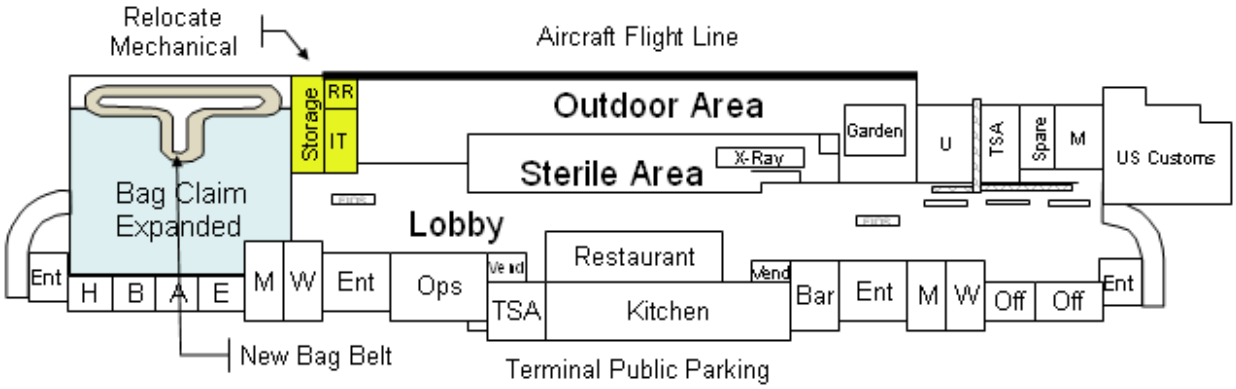

Figure 55 - Terminal Area Development, Baggage Claim Expansion, Alternative 1

4.1.1.8 Terminal Area Development – Baggage Claim Expansion, Alternative 2

Figure 56 provides an illustration of this terminal development alternative. The baggage claim area would be expanded by approximately 1,090 square feet, by relocating the adjacent rental car offices to an area that would be provided by a terminal expansion to the east, resulting in a total baggage claim area of approximately 5,300 square feet. This alternative would also allow for a 300-square-foot bag service office. In addition, a new "U" shaped baggage claim unit 50 feet in length and 45 feet in width could be accommodated. The "U" shaped unit would also have a

linear frontage of 190 feet, which would accommodate the required 166 linear feet under the High Activity Scenario throughout the planning period.

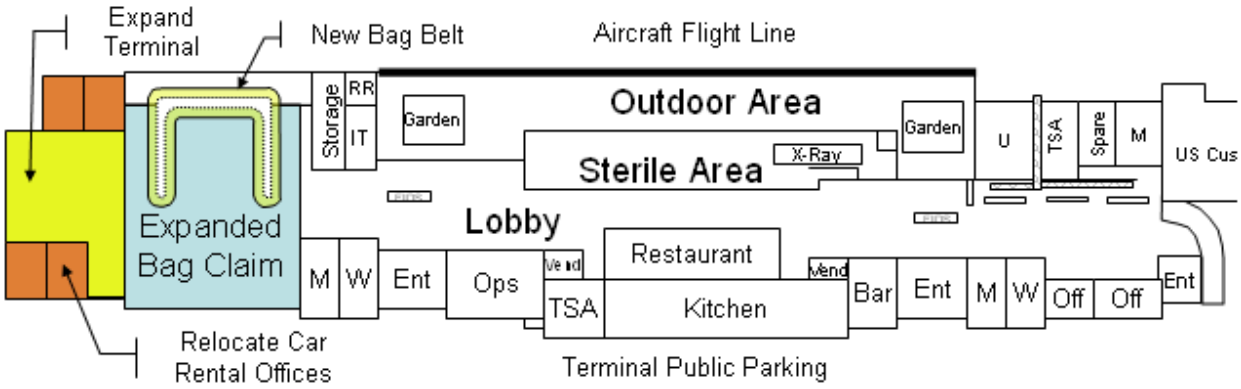

Figure 56 - Terminal Area Development, Baggage Claim Expansion, Alternative 2

4.1.1.9 Terminal Area Development – Rental Car Facilities Expansion

Figure 57 provides an illustration of this optional terminal area improvement to accommodate rental car demand. The existing rental car ready and return parking facilities would be expanded and a single-level deck would be constructed over the existing rental car ready and return parking area to provide a two-level parking garage. Rental car offices would be relocated to an expanded area outside of the existing passenger terminal building. The lower parking level would accommodate 150 rental car ready spaces and the upper level would accommodate 80 rental car return spaces. The rental car facilities would therefore accommodate demand at the High Activity Scenario throughout the planning period.

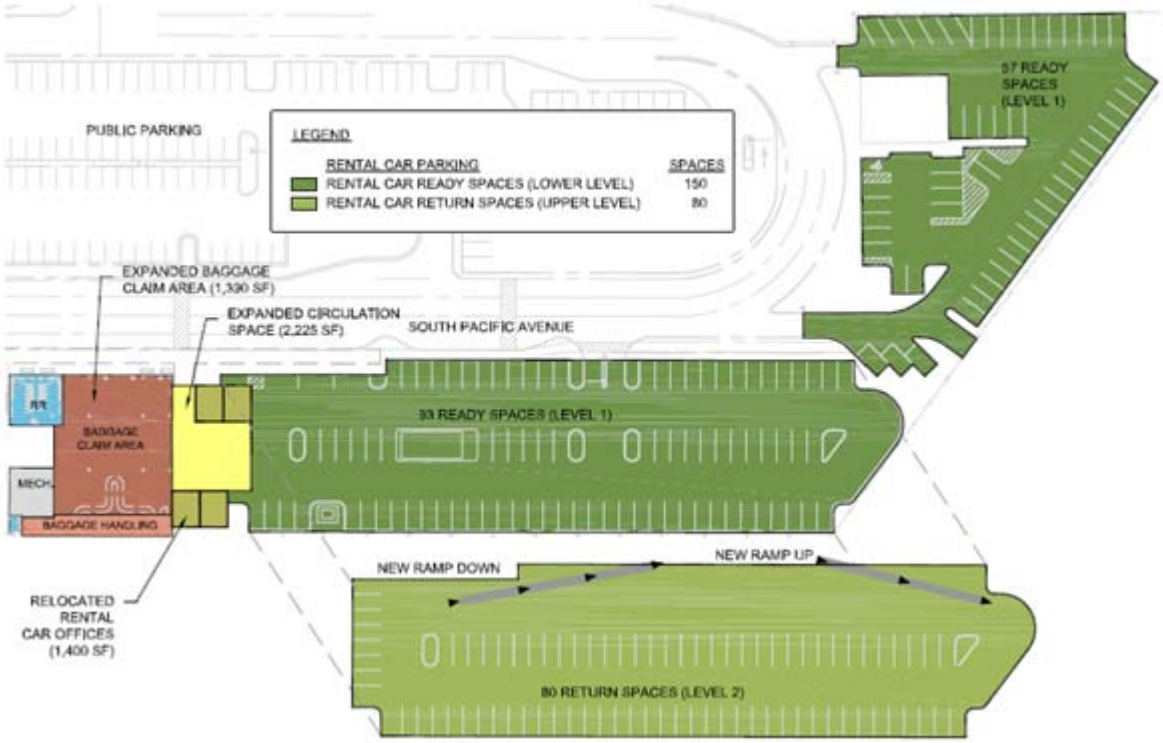

Figure 57 - Terminal Area Development, Rental Car Facilities Expansion

4.1.1.10 Terminal Area Development – Administration Space Expansion

Figure 58 provides an illustration of this optional terminal area improvement. Airport administration space would be added on the upper and lower levels of the existing YCAA-occupied building, west of the terminal complex, which was recently renovated from a previous FBO office to administration and office space. Currently, only the lower level of this facility is being used, and the second level could be renovated to provide appropriate administration space for YCAA functions. A total of 3,580 square feet would be provided for administrative uses, in this secondary facility. This option would provide the space needed to accommodate more than 20 employees, according to Airport staff. Combined with the existing administrative office area in the terminal, nearly 5,900 square feet would be available, exceeding the space requirement of 5,000 square feet.

Figure 58 - Terminal Area Development, Administration Space Expansion

4.1.1.11 Terminal Area Development – Public Parking Alternatives

Chapter IV of this document identified a need, based on forecast demand to increase public parking. Not specifically tied to annualized enplanements was the identified need to accommodate peak level activity on a seasonal basis, and the deficiency that could exist if heightened security measures would prohibit the use of the majority of the public parking available under existing conditions. Refer to Figure 47, titled "300-Foot Vehicle Parking Guidelines" for restrictions this imposes.

Figure 59 provides an illustration of the terminal area development, public parking alternatives. Three areas were identified as potential locations for expansion of public parking: (1) west of the passenger terminal; (2) north of 32nd Street; and (3) west of Fortuna Avenue. Alternative 1 would provide 3.3 acres for potential parking development, and Alternatives 2 and 3 would provide 8.3 acres and 10.3 acres, respectively. Alternatives 2 and 3 would require the use of a separate revenue control system and shuttle service for passengers, whereas Alternative 1, which is in proximity to the terminal building, would allow passengers to walk to the terminal building.

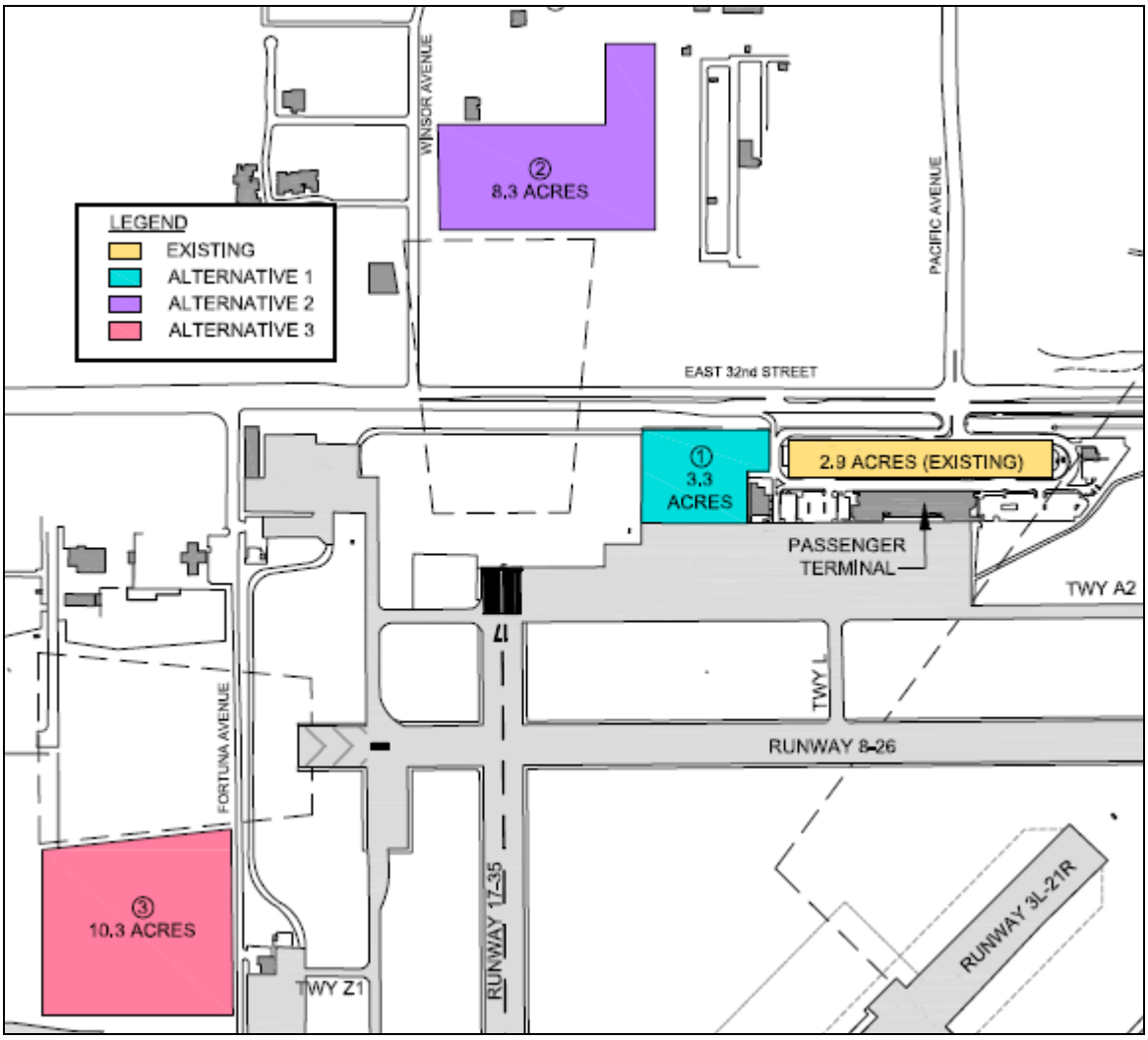

Figure 59 - Terminal Area Development, Public Parking Alternatives

Evaluation of Terminal Area Development Options

The terminal development optional improvements and alternatives were assessed individually and presented to the YCAA staff and PAC. All of the optional improvements and alternatives meet the needs for anticipated demand, but present various means of accomplishing YCAA's goals of expanding passenger boarding areas, baggage claim, rental car facilities, Airport administration offices, and public parking.

The preference of enclosing the entire atrium area over a partial enclosure is more practical, as the current atrium area is unusable by the public, as it was originally intended, due to security restrictions. Because security restrictions are not anticipated to be lessened in any way, leaving any portion of the atrium area results in unusable space. Expansion of the passenger security screening area was also preferred, as it would improve the passenger level of service, particularly during peak hour activity. The passenger level of service for security is currently affected by the limited number of screening devices and by queuing space for passengers awaiting security clearance.

The evaluation of the baggage claim expansion alternatives resulted in that the selection of the alternative that best met the High Activity Scenario, without affecting the existing mechanical room within the passenger terminal building. In addition, the inclusion of the rental car expansion optional improvement would improve the passenger level of service and allow for space within the terminal building to provide for a baggage service office – an amenity not currently provided in the existing terminal configuration.

The addition of the administrative space optional improvement would allow for long-term use of the YCAA's existing space within the second level of the passenger terminal second level as well as cohesive expansion within the newly renovated office space west of the terminal building.

Finally, the evaluation of the public parking areas resulted in the selection of Alternative 1, as this alternative would meet requirements through the planning period and the proximity of parking in this area to the terminal building is preferred over the remote alternatives that would require shuttling of passengers. To summarize, the following terminal area developments are recommended for incorporation into the ADP:

Boarding Area Expansion, Alternative 2 (Figure 53)
Baggage Claim Expansion, Alternative 2 (Figure 56)
Rental Car Facilities Expansion (Figure 57)
Administration Space Expansion (Figure 58)
Public Parking Expansion, Alternative 1 Figure 59)

These options and alternatives were integrated, and compiled into the preferred alternative for terminal area development, as illustrated in Figure 60.

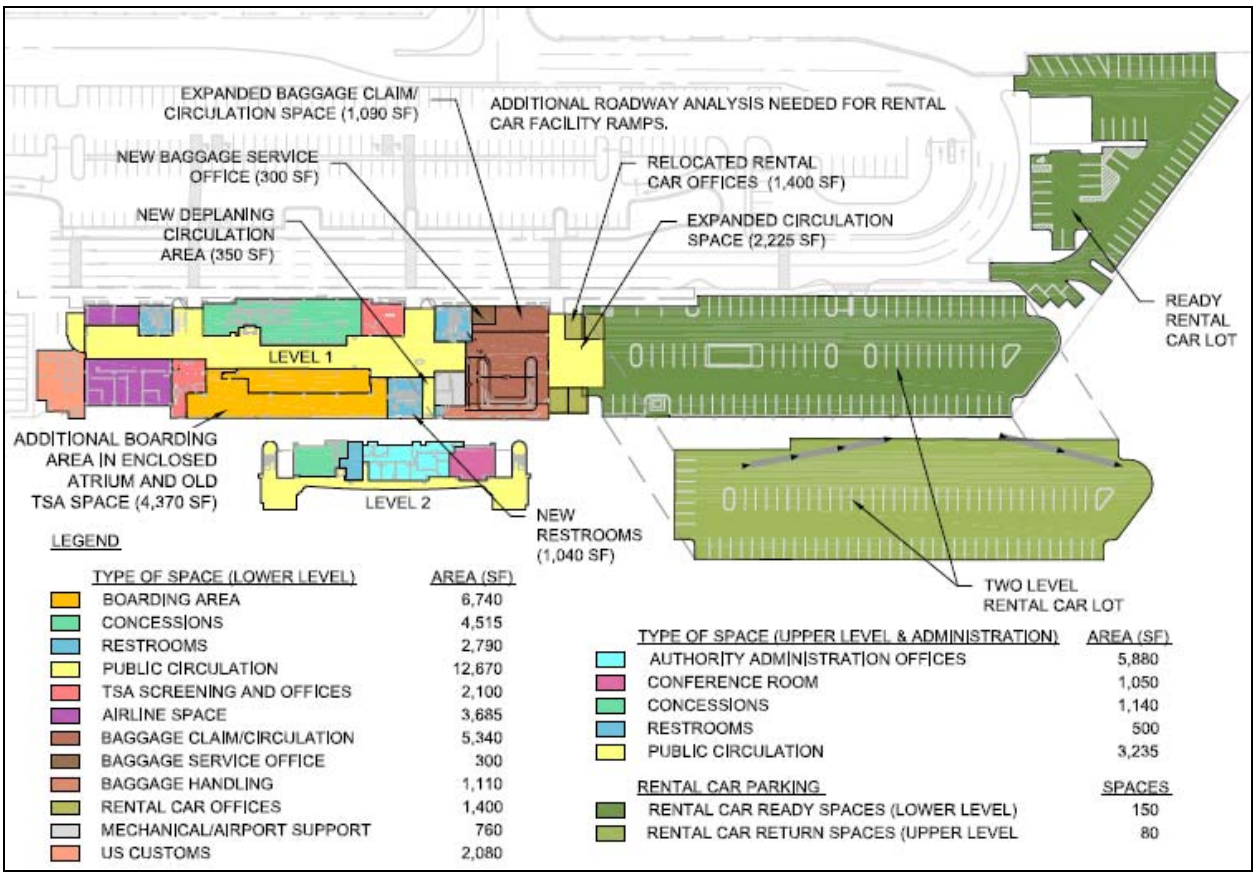

Figure 60 - Terminal Area Development, Preferred Alternative

FBO and GA Facilities

The development options associated with the FBO and GA facilities at the Airport are described below, along with the process by which the preferred FBO and GA development option was selected.

Description of FBO and GA Facilities Development Options

Based on the facility requirements identified a need for additional hangars (T-, box, and community) as well as T-shades. Vehicle parking areas will also need to be increased in the vicinity of the general aviation facilities. The development alternatives discussed below address FBO and GA facilities that would provide adequate aircraft storage hangars with convenient airside access for aircraft, as well as vehicular landside access and parking through the planning horizon.

4.1.1.12 FBO and GA Facilities Development –GA Facilities Expansion, Alternative 1

Figure 61 provides an illustration of this FBO and GA facilities development alternative. Development would occur in the vicinity of the current West GA Hangar Facility. This alternative would accommodate forecast demand for aircraft storage hangars and vehicular parking through PAL 4. The Fortuna hangar would be replaced with a comparably sized facility providing aligned hangars This would provide area for development of a variety of hangar sizes for a wide range of GA aircraft. Current vehicle parking facilities are insufficient to meet PAL 4 demand. Also, existing parking lots are not located in areas where demand is the highest. Therefore, Alternative 1 would provide new and/or expanded parking facilities for three general areas: (1) new hangar development, (2) CareFlight, and (3) the unimproved parking area to the south of the existing T-shade hangars. To provide access to the expanded West GA Hangar Facility, a two-lane roadway would be constructed along the north edge of the hangar development from Burch Way to Fortuna Avenue.

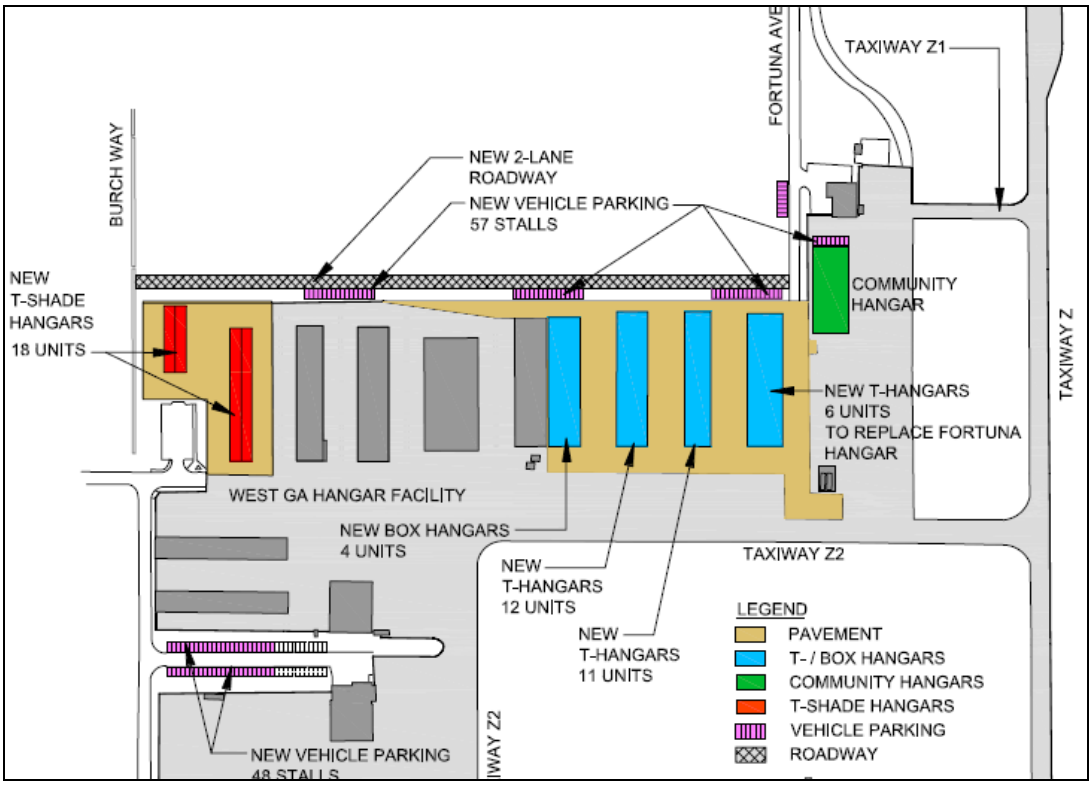

Figure 61 - FBO and GA Facilities Development, GA Facilities Expansion, Alternative 1

4.1.1.13 FBO and GA Facilities Development, GA Facilities Expansion, Alternative 2

Figure 62 provides an illustration of this FBO and GA development alternative. Development under Alternative 2 is somewhat similar to Alternative 1, with the exception that the Fortuna hangar would remain under this alternative and the new box hangars and T-hangars north of the Fortuna hangar would be oriented east-west rather than north-south. The location and alignment of the Fortuna hangar in relation to the hangars to the west could decrease the efficient use of the area for hangar development. Additional vehicular parking, similar to that included in Alternative 1 would be provided under this alternative. This alternative would accommodate forecast demand for aircraft storage hangars and vehicle parking through PAL 4.

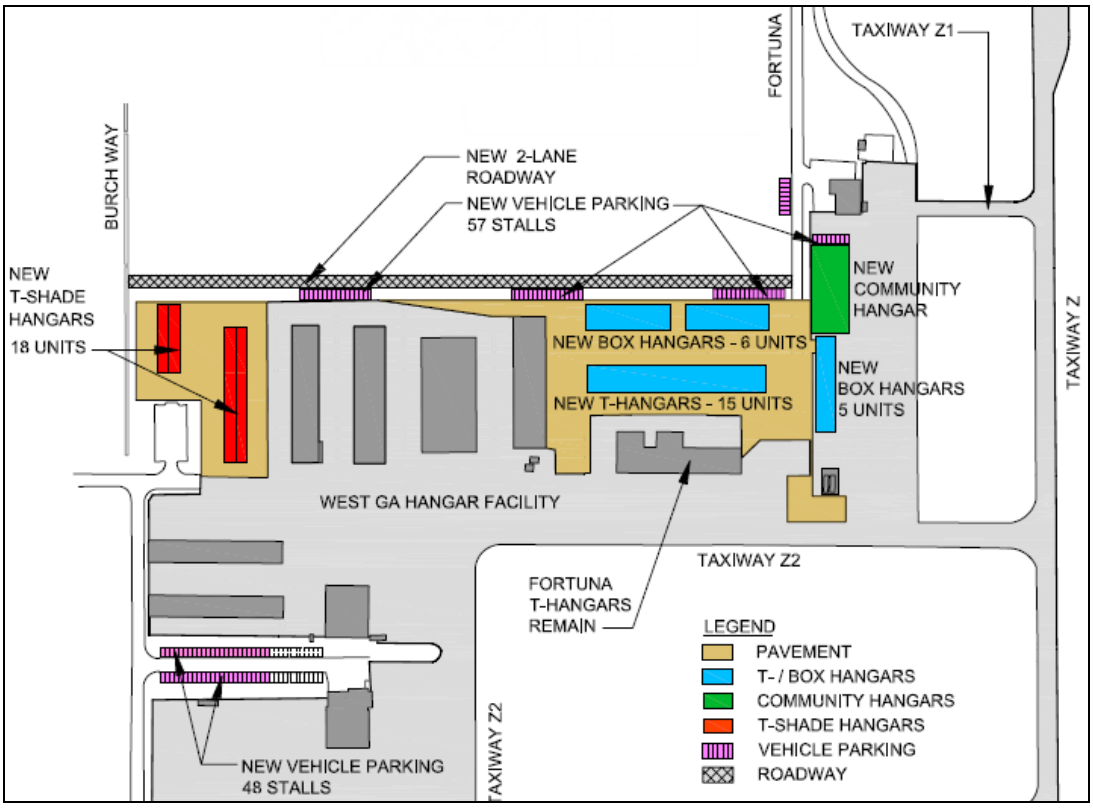

Figure 62 - FBO and GA Facilities Development, GA Facilities Expansion, Alternative 2

4.1.1.14 FBO and GA Facilities Development, GA Facilities Expansion, Alternative 3

Figure 63 provides an illustration of this FBO and GA development alternative. Development under Alternative 3 is somewhat similar to Alternative 1, with the exception of the area north of the Fortuna hangar. The Fortuna hangar would remain under this alternative and the area to the north would be developed as an aircraft parking apron. Additional vehicular parking, similar to that included in Alternative 1 would be provided under this alternative. This alternative was developed with input from YCAA staff and the PAC to provide additional aircraft parking apron for CareFlight. Based on the demand/capacity analysis presented in Chapter IV of this document, this alternative meets: forecast demand for vehicle parking, T-shade hangars; exceeds the demand for aircraft parking apron; and does not meet forecast demand for aircraft storage hangars (T-, box, and community hangars) through PAL 4.

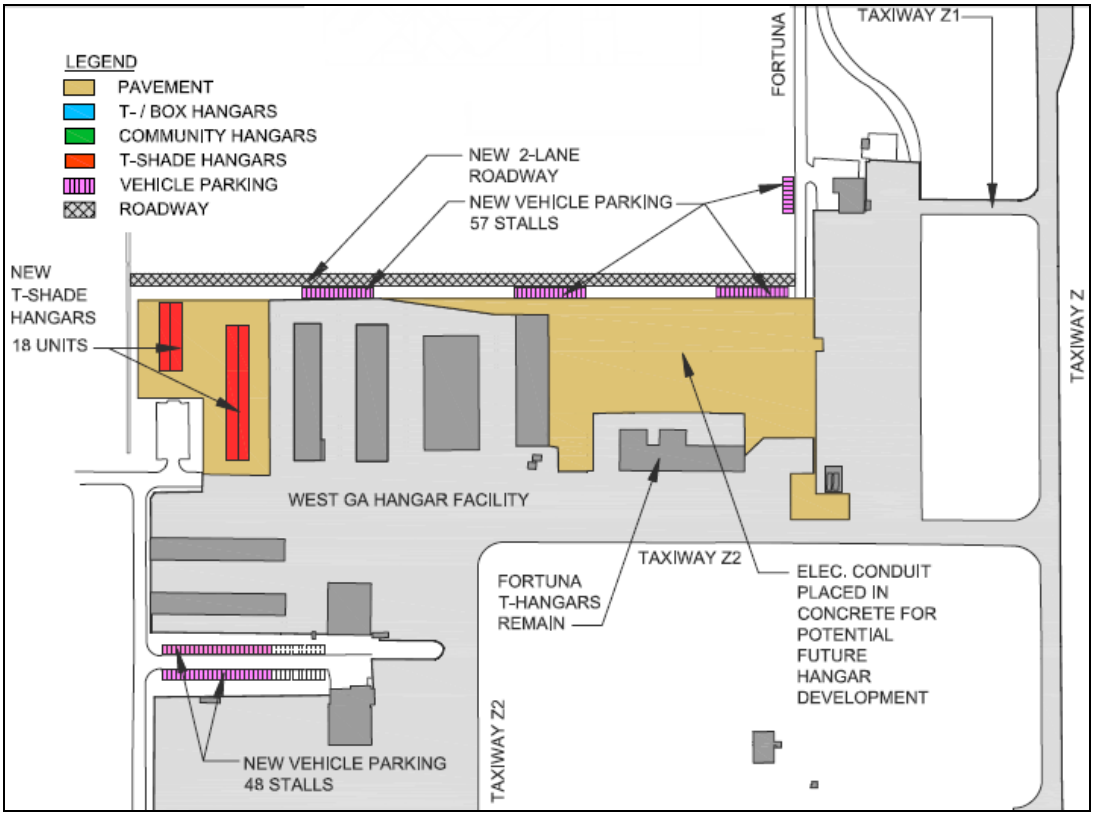

Figure 63 - FBO and GA Facilities Development, GA Facilities Expansion, Alternative 3

4.1.1.15 FBO and GA Facilities Development, Alternative 4

Figure 64 provides an illustration of this FBO and GA development alternative, which would accommodate short-term (PAL 1) demand at Yuma International Airport and midterm to long-term demand (PALs 2, 3, and 4) at Rolle Field. The expansion at Yuma International Airport is identical to Alternative 3, with additional GA hangar and apron development at Rolle Field. The Fortuna hangar would remain intact unless another use for this area is determined to be more suitable for another use. Hangar demand for smaller, recreational GA aircraft operators would be met at Rolle Field where new improvements to accommodate GA aircraft would be undertaken, including a runway extension, parallel taxiway construction, and the addition of aircraft storage hangars and apron, vehicle parking area, and park/recreational area. A conceptual layout of the additional facilities is provided in Figure 64, but would be need to be further refined through detailed analyses if this alternative is selected for implementation. Moving the smaller recreational GA aircraft traffic to Rolle Field would separate the mix of small GA aircraft and large, fast military aircraft, as well as from higher performance commercial and corporate civil aircraft.

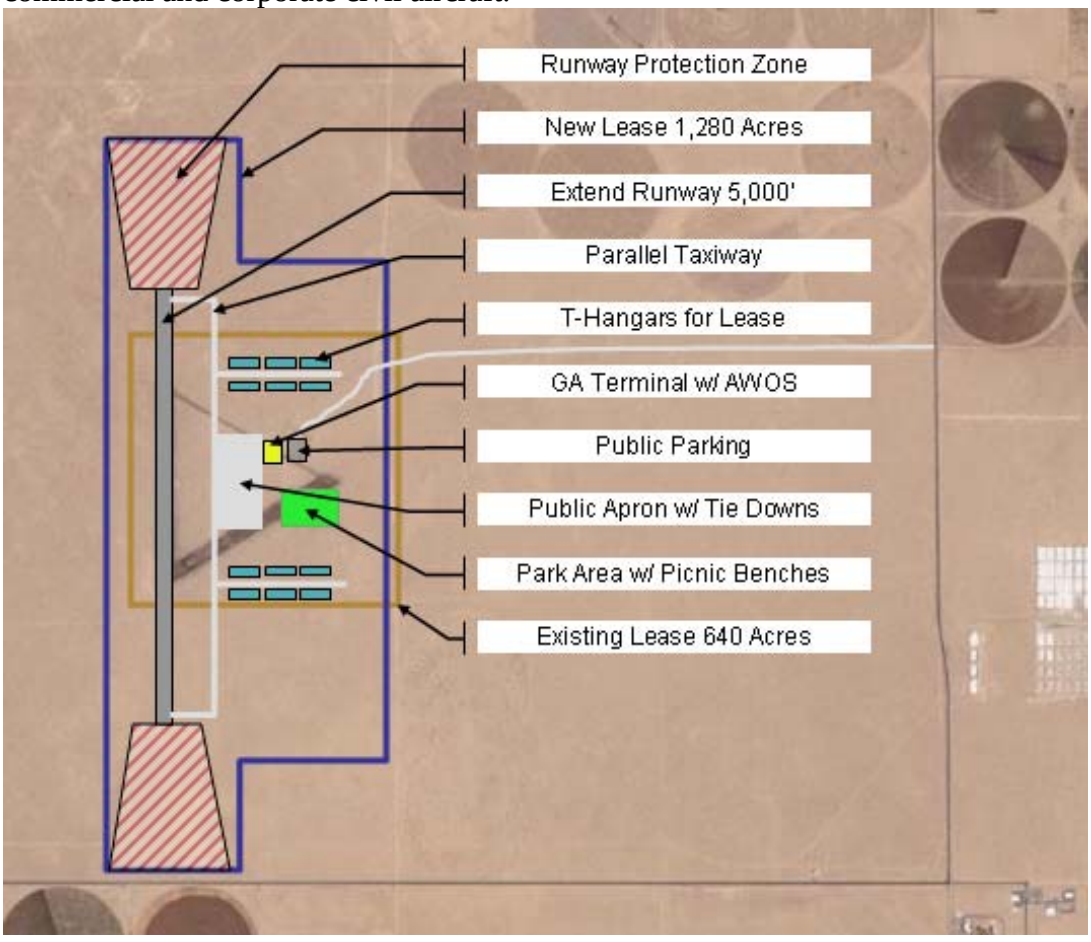

Figure 64 - FBO and GA Facilities Development, with Rolle Field Development, Alternative 4

Evaluation of FBO and GA Facilities Development Options

All of the alternatives meet the forecast demand for FBO and GA facilities and the YCAA's goal of accommodating additional vehicular parking for the tenants, with the exception of Alternative 3. The evaluation of the FBO and GA facilities resulted in a preferred alternative, Alternative 4, which represents a hybrid combination of the other alternatives. Because development at the Airport would occur as demand warrants, it would be preferred to expand the existing facilities at the current location in the short term, by constructing additional vehicular parking and T-shade hangars as needed, while planning for mid-, and long-term development needs at Rolle Field. Alternative 4, the preferred alternative, would be incorporated into the ADP.

Ancillary Facilities

The development concepts associated with the ancillary facilities at the Airport are described below, along with the process by which the preferred facilities development concept was selected.

Description of the Defense Contractor Complex

The Defense Contractor Complex (DCC) development concepts discussed below are located in the vicinity of the DCC, 40th Street Apron, and the West Visiting Aircraft Line, and are intended to depict a variety of concepts for the area, which should be preserved for incremental development of facilities to support the aviation-related activity at the Airport. Potential users of this area are the generally larger participants in the aeronautical industry such as aircraft manufacturers, aircraft refitters, and contractors associated with Department of Defense operations at MCAS Yuma and the Yuma Proving Ground. Related activities could be those involved in the introduction of the Joint Strike Fighter to MCAS Yuma. It is the intent of YCAA to plan accordingly to reserve adequate space for appropriate aviation-related operations. The following options present conceptual examples of how development could occur in this area, with the intent of maximizing the use of the land available to YCAA and subsequent revenue flow.

Defense Contractor Complex, Concept 1

Figure 65 provides an illustration of the DCC concept. The areas to the west of the 40th Street Apron, and the West Visiting Aircraft Line, and north of Taxiway F1 are available for incremental development as demand warrants. This concept includes the construction of new aircraft parking apron to the west of Taxiway H. Over time this would include development to the west, across 4th Avenue, and extending to Avenue A, with a surface parking lot at the western end to accommodate the vehicular parking needs for such a facility at full build-out. Development under this concept would require the City of Yuma to abandon a portion of 4th Avenue. Reserving this overall area would ensure that the Airport would adequately serve all future support and government-related facilities development.

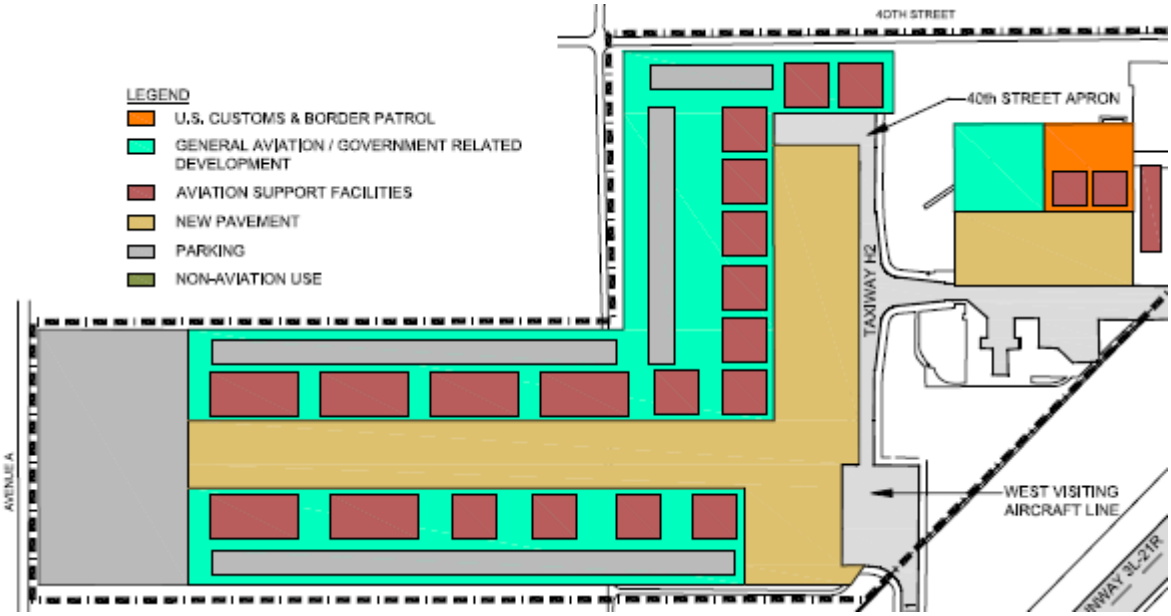

Figure 65 - Defense Contractor Complex, Concept 1

4.1.1.16 Defense Contractor Complex, Concept 2

This concept is similar to Concept 1, with the exception that some portion of land adjacent to Avenue A, on the western end, identified in Figure 65 as vehicle parking would be used for non-aviation development. This could include such activities as the expansion of the US Border Patrol regional headquarters which adjoins the northern boundary, constructing a solar panel facility in this location, or other operations. The facility requirements do not dictate the need for expansion of aviation development to the extent presented in Concept 1; therefore, the potential for non-aviation activities could be considered. Developing this area early rather than later could generate revenue to support other aviation related activities on the airport.

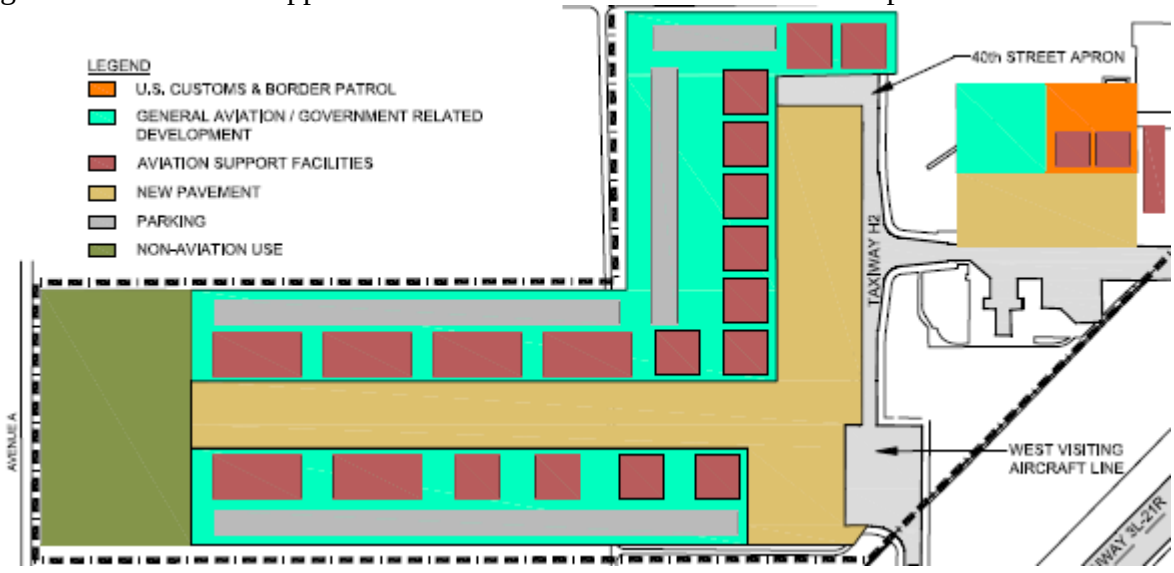

Figure 66 - Defense Contractor Complex, Concept 2

4.1.1.17 Defense Contractor Complex, Concept 3

Figure 67 provides an illustration of a further alternative for the 80 acres of land to the west of 4th Avenue. Depending on the level of growth of DCC aeronautical activities, and the potential public resistance to the closure of 4th Avenue, the entire area could be dedicated to non-aeronautical activities. This conceptual option could be implemented incrementally if interest in this revenue-generating, non-aviation activity does not impede the provision of aviation-related development.

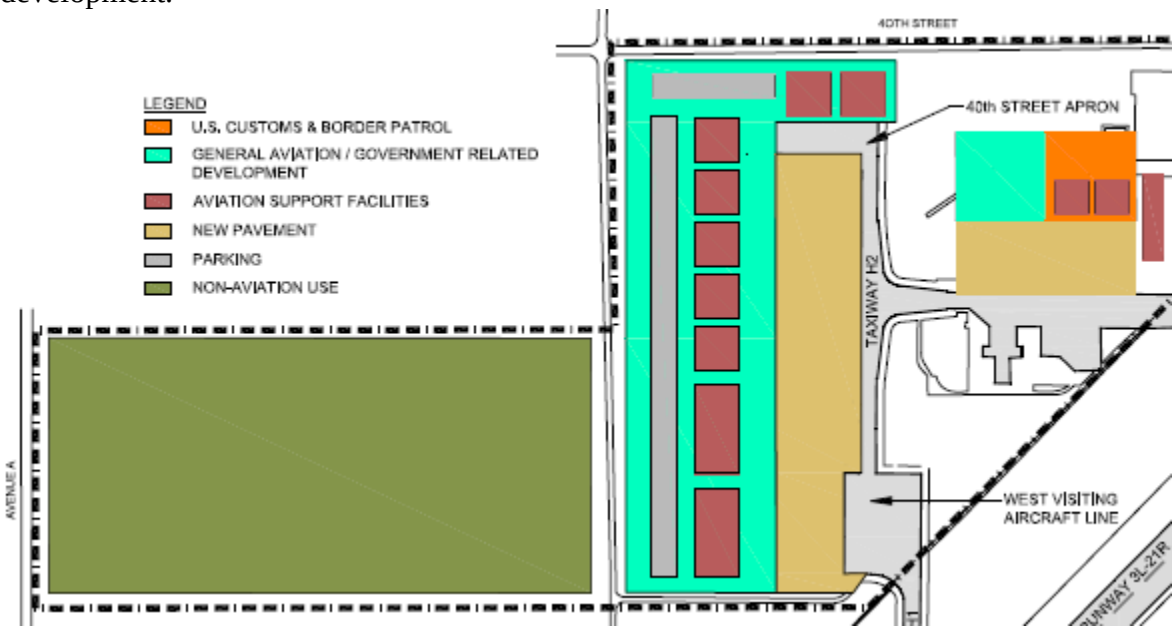

Figure 67 - Defense Contractor Complex, Concept 3

Evaluation of DCC Development Concepts

The ancillary facilities, specifically the aviation-related facilities as described in this section, were considered for incorporation into the ADP. All of the conceptual options would address the potential need or growth of aviation-related facilities. YCAA has the flexibility to expand these facilities as the opportunities are presented, particularly if a third party developer expresses interest in a revenue-generating development. Although it is not possible to select a preferred concept at this time, it is recommended that the entire area be reserved for future growth, and developed incrementally as demand dictates.

Potential Closure of Runway 17-35

In addition to the development options and alternatives presented in this chapter and consistent with the development options considered in the MCAS Airfield Master Plan, the effects of the potential closure of Runway 17-35 have also been considered. This potential closure is evaluated in the MCAS Airfield Master Plan in response to congestion in the area of the Runway 35 threshold caused by slower civil general aviation aircraft takeoff and landing speeds. Currently, Runway 17-35 intersects both of the parallel runways, thereby delaying aircraft takeoffs, approaches, and landings on Runway 3-21 while civil general aviation aircraft complete the flight path to Runway 17-35. Additionally, the current runway configuration creates RPZ and Accident Potential Zone (APZ) restrictions off the Runway 35 end, limiting development

opportunities adjacent to the military flight line.[23] The possibility of this development option is uncertain. If it were to be implemented, Runway 17-35 would not be closed for many years, and only when an alternative solution is in place to accommodate potential displaced GA traffic.

Figure 68 depicts the airfield layout with the potential closure of Runway 17-35 and the preferred airfield development optional improvements discussed previously in this chapter. Additionally, the illustration shows the reconfiguration of Taxiway Z connectivity to the planned parallel taxiway. Although the possibility exists for the pavement to be converted to a taxiway, that decision would be made in collaboration with, but primarily by, the USMC and, therefore, is uncertain at this time. Preliminary recommendations would be to remove the pavement and continue to use the Taxiway Z complex. The proximity of Taxiway Z to the FBO and GA facilities is preferred over the greater separation that would exist if Runway 17-35 were converted to a taxiway. Additionally, it is assumed that the operating and maintenance costs incurred by the Airport to maintain the converted Runway 17-35 pavement as a taxiway would be higher than the costs associated with maintaining a newly constructed Taxiway Z. Additionally, the location of Taxiway Z to the FBO and GA facilities is appropriate, and the additional area that would be provided by the increased separation of ramp and taxiway is not an identified requirement.

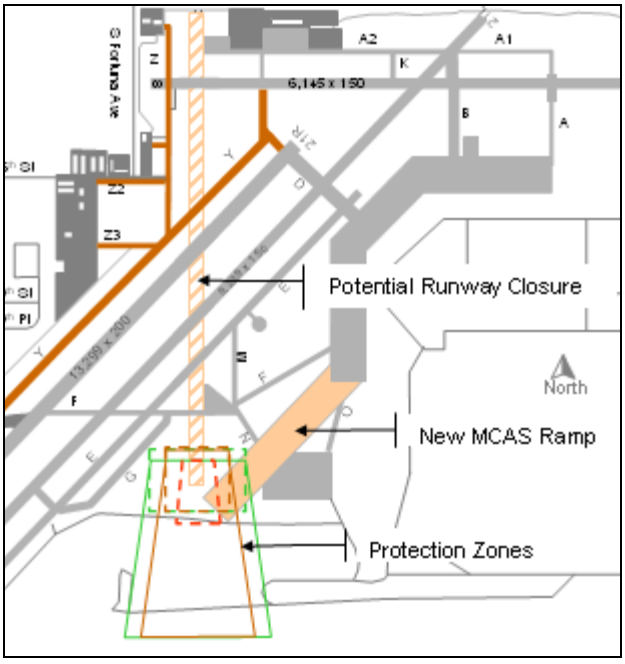

Figure 68 - Airfield Development, Potential Closure of Runway 17-35

Airport Development Plan

The preferred development options and alternatives presented in this chapter were combined to create an overall ADP, which sets forth the conceptual layout of the future Airport to address the concerns identified in Chapter IV of this document. The ADP also includes consideration of two options with regard to Runway 17-35: (1) maintenance of existing conditions and (2) the

[23] Parsons, *Marine Corps Air Station Yuma, Airfield Master Plan*, Draft Appendix C, "Plan Alternatives", November 2008.

potential closure of the runway, as discussed in the previous section. To summarize, the following components are included in the overall ADP:

Airfield Facilities Development

- Construction of a full-length taxiway parallel to Runway 3L-21R
- Widening of taxiways to ADG III standards of the west side of the airfield
- Extension of Taxiway L from the terminal ramp to meet the planned parallel taxiway
- Extension of operating hours for the ATCT
- Enhancement of the Pavement Maintenance and Management System

Passenger Terminal Area Development

- Expansion of the passenger boarding area, including enclosure of the entire atrium area
- Realignment of the security screening area
- Construction of restrooms in the secure passenger boarding area
- Allowance for a corridor for deplaning passenger circulation
- Expansion of the baggage claim area and installation of a new “U” shaped baggage claim unit
- Expansion of the terminal for rental car counters and improved passenger circulation area on the east end of the terminal building to support the expanded baggage claim area
- Expansion of the rental car parking area with two levels to separate ready and return vehicles
- Expansion of the administration areas by renovation of existing facilities

FBO and GA Facilities Development

- Construction of additional aircraft ramp to the west of Fortuna Avenue
- Construction of additional vehicular parking for existing GA tenants in conjunction with a roadway providing access to these areas
- Identification of Rolle Field as a "Reliever Airport" by the FAA and its consequent inclusion in the NPIAS.
- Construction of a parallel taxiway with an apron and extension of the runway at Rolle Field
- Expansion of GA facilities at Rolle Field to relieve the GA burden on the Yuma aerodrome and accommodate long-term GA demand
- Construction of additional T-shade hangars, T-hangars, and box hangars

Defense Contractor Complex

- Preservation of land to support development of aviation-related facilities

Implementation of the components of the ADP would improve the efficiency of taxi routes, access to the terminal ramp, and enhance safety of aircraft operations on the airfield; it would improve passenger flow and the use of space within the terminal building; and it would continue to support the overall mission of the Airport and MCAS Yuma but focusing on development of appropriate aviation-related operations. Improved customer service would result from the construction of additional amenities, such as restrooms in the passenger boarding area and less congestion throughout the terminal and baggage claim areas. None of the recommendations included in the ADP would require the acquisition of additional property, although one of the aviation support facility concepts would require the partial closure of 4th Avenue. The YCAA has accommodated all development needs to date within the existing Airport boundaries and the

ADP improvements would remain within those boundaries. The components of this plan were completed in conjunction with input from the Airport Master Plan PAC and representatives from MCAS Yuma.

The improvements on the ADP would be phased as demand warrants, in accordance with the previously established PALs. For the purpose of cost estimating, the overall ADP phasing is considered and incorporated into the Financial Plan chapter of this Airport Master Plan. Generally, the airfield development optional improvements would be implemented as soon as funding becomes available, since these improvements are not based on demand. The terminal area development options would be phased according to demand, as the requirements are based on the High Activity Scenario for the Airport. The majority of FBO and GA development would occur by PAL 1, with the planning for facility expansion at Rolle Field to be initiated in the short term (PAL 1), so that facilities could be constructed and in place when demand is realized by PAL 3 or PAL 4. The ancillary facilities development would occur as demand warrants, likely to be by PAL 1 or PAL 2.

V. Financial Plan

This chapter outlines the programmed improvements scheduled at the Airport and Rolle Field over the 20-year planning period and analyzes the financial feasibility of developing the projects in the Capital Improvement Program (CIP). The actual implementation schedule for the improvements identified in the Master Plan will be defined by development triggers and demand growth rather than specific years. To illustrate this financial analysis, however, a specific implementation schedule was assumed to demonstrate the financial plan's viability. The actual financing strategies will be determined as implementation approaches.

The proposed financial plan was developed after evaluating the financial structure of the Airport and identifying potential sources of revenue to fund capital improvement projects. These funding sources were then matched with projects based on eligibility guidelines over an estimated phasing schedule to determine the financial implications of undertaking the capital improvements. The implementation plan presented here describes the staging of proposed improvements, based upon need, prerequisite projects, and anticipated funding.

This implementation plan, then, is intended to provide general financial guidance to the YCAA and Airport staff in making policy decisions regarding the recommended development of the Airport and Rolle Field over next 20 years.

The budget and projected financial results are presented for the planning period, budget Fiscal Year ending September 30 (FY) 2009 through FY 2027.

This chapter comprises these sections:

Financial Structure of the Airport
Program Phasing and Cost Estimating
Airport Capital Improvement Program
Operation and Maintenance (O&M) Expenses and Capital Outlays
Airport Revenues
Cash Flow
Cost per Enplaned Passenger
Summary

Financial Structure of the Airport

The accounting policies of YCAA conform to generally accepted accounting principles as applied to governmental units. These standards, which are set by the Governmental Accounting Standards Board, call for activities of governmental units to be accounted for and organized into "funds". Each fund is considered a separate accounting entity using a complete set of self-balancing accounts. The activities of each fund are recorded using these accounts, representing the fund's assets, liabilities, fund equity, revenues, expenditures, or expenses.

YCAA receives no external funding and must rely on revenues generated through Airport activities. Due to the nature of YCAA's reliance on fees generated through its activities to cover the related costs, its activities are accounted for using a single Enterprise Fund. This fund called the "Operations Fund" not only records the day to day transactions but also accounts for the receipt and expenditure of restricted revenue sources, such as capital improvements grants, and passenger facility charges.

Corporate by-laws stipulate that YCAA undergo an annual independent audit process. These financial audits which are performed by an independent CPA firm are available to the public upon request.

YCAA has an Airline Use Agreement and Lease (Agreement) with each of the airlines that operate at the Airport. These Agreements outline the terminal rentals and landing fees paid by the airlines and defines the building areas occupied by each.
As of March 2009, the Airport was served by United Airlines through United Express and US Airways through US Airways Express, offering daily nonstop scheduled service to Los Angeles International Airport (LAX) and Phoenix Sky Harbor International Airport (PHX), respectively. YCAA's Agreement with Mesa was executed on April 1, 2004, and the Agreement with SkyWest, was executed on July 1, 2004. Both Agreements expired on March 31, 2009. Renewal of the Agreement is currently being negotiated with airlines. The current terminal rental rate is $55.56 per square foot per year and the current landing fee rate is $1.25 per thousand pounds of landed weight. The terminal rental rate and landing fee rate are adjusted annually by YCAA based on the cost of providing facilities and services to the airlines.

Program Phasing and Cost Estimating

An initial development schedule for the proposed improvements was prepared based upon facility requirements, which were determined through the estimates of operational forecasts. Since actual activity levels realized at the Airport may vary over time, the staging of these proposed improvement projects needs to remain sensitive to these variations and be reviewed periodically for changes.
Some projects may take precedence over others, depending on agency-assigned priority levels and the changing importance of other relevant development projects. A list of prioritized improvements was established, therefore, based upon the urgency of need, ease of implementation, logic of project sequencing, and Airport staff input. The objective was to establish an efficient order for project development and implementation that satisfied the anticipated demand for facility improvements and distributed projects as reasonably as possible throughout the planning horizon. The proposed development schedule upon which the financial analysis is based is summarized in Figure 69 below. The schedule indicated assumes maximum grant funding is available every year. Any shortfall in available funds will include adjustments in the proposed schedule.
Cost estimates were developed for each project by a local engineering firm that works regularly with Yuma pricing and construction. The projected costs were based on the preliminary layouts developed as part of the alternatives analysis and later refined and presented in the ALP. Estimated quantities of major items, such as pavement, fill material, or building structural areas were used along with localized unit cost values to determine construction costs and miscellaneous "soft costs," such as administrative, engineering, testing, and insurance services. Due to the preliminary nature of each project's definition, a contingency amount of 30 percent of the estimated construction cost was added to account for unknown items. The total project costs are expressed in 2009 dollars. Escalated dollars should factor in annual inflation of 3 percent throughout the planning years.

ID	Task Name	Cost
1	**Yuma International Airport CIP**	**$59,000,000.(**
2	**Airfield Development**	**$19,000,000.(**
3	Taxiway Y Section 1	$5,000,000.(
4	Taxiway Z Widening	$3,000,000.(
5	Taxiway Y Section 2 w/ Twy L ext	$3,000,000.(
6	Taxiway Y Section 3	$3,000,000.(
7	Taxiway Y Section 4	$5,000,000.(
8	**Pavement Management**	**$7,500,000.(**
9	Terminal Apron Rehab	$3,500,000.(
10	NW GA Hangar Apron Rehab	$2,000,000.(
11	West GA Apron Rehab	$2,000,000.(
12	**Terminal Area Development**	**$11,000,000.(**
13	Boarding Area Expansion	$3,000,000.(
14	Baggage Claim Expansion	$2,000,000.(
15	Rental Car Parking Expansion	$4,000,000.(
16	Public Parking Expansion	$1,000,000.(
17	Administrative Space Expansion	$1,000,000.(
18	**FBO and GA Facilities Development**	**$14,000,000.(**
19	Fortuna Ramp Expansion	$2,500,000.(
20	T-Shades Expansion	$1,500,000.(
21	Rolle Field Rwy Rehab	$2,000,000.(
22	Rolle Field Paralle Taxiway	$2,000,000.(
23	Rolle Field Apron & Taxilanes	$2,000,000.(
24	Rolle Field Hangar Development	$2,000,000.(
25	Rolle Field Runway Extension	$2,000,000.(
26	**Defense Constractor Complex**	**$7,500,000.(**
27	Apron Expansion Section 2	$2,500,000.(
28	Apron Expansion Section 3-7	$5,000,000.(

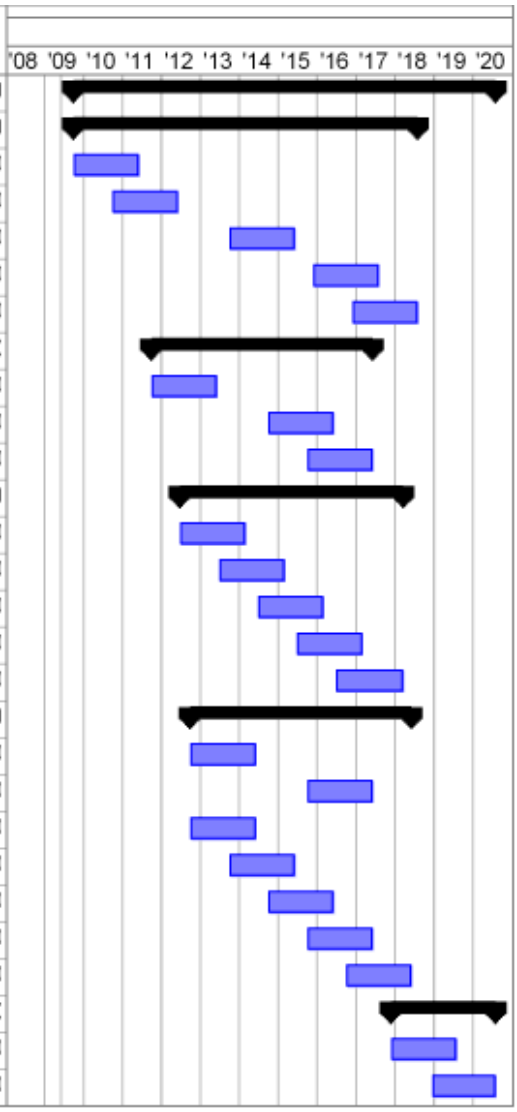

Figure 69 - Assumed Development Schedule

Airport Capital Improvement Program

Based on the facility requirements, operational analysis, and alternatives developed in previous chapters of this report, an Airport Capital Improvement Program (ACIP), phasing plan, and development schedule (Figure 69) have been recommended for the 20-year planning horizon. Although this Airport Master Plan charts a course for planned development, it must be emphasized that the planning and development of an airport comprise a continuous process. The rehabilitation and maintenance of existing facilities and development of new ones must be predicated on sustained demand and a positive return on investment, which justifies the costs of improvements. Therefore, periodic re-evaluation of the ACIP schedule will be necessary to accommodate variations from the aviation forecasts and adjust for other unforeseen factors. It is also highly possible that improvements not identified in this study may be required to facilitate safe and efficient Airport operations. All future improvement projects, those identified in this report or others, shall be compatible with the development strategies proposed in the Airport Layout Plan. If for whatever reason, a significant variance from those plans is may be deemed

necessary by YCAA, a compatibility review should be conducted along with possible strategic plan updates.

Table VI-1 shows the Airport's current Airport Capital Improvement Program (ACIP) projects and their estimated costs. The total program cost for the 20-year planning period is estimated to be approximately $60.0 million. Before construction of a project begins, however, detailed cost estimates should be developed as part of preliminary design and the financial feasibility (including funding eligibility) of the project re-examined. The 20-year ACIP's costs are provided in 2009 dollars.

Along with the development schedule and project cost summaries, the ACIP presents the improvements required during the period, but it does not assume how financially feasible it will be for YCAA to undertake these projects. A subsequent subpart of this section, therefore, will address in general terms the financial feasibility of this development program.

These projections, however, should be used for planning purposes only and do not imply that funding will be available; nor does it imply that YCAA is committed to each of the projects in the ACIP or in the year shown. Each project cost reflects the planning and design efforts necessary for project implementation, along with the probable construction costs. It is assumed that project construction would take place in either that same year or the ensuing year to design activities.

YCAA intends to finance the recommended ACIP through a combination of FAA Airport Improvement Program (AIP) grants (entitlements and discretionary), Arizona Department of Transportation (ADOT) grants, PFC revenues, rental car customer facility charge (CFC) revenues, and Airport funds.

Table VI-1 ACIP Scheduled Project Costs (2009 Dollars)

FY	Project	Total Cost	Entitlements	Discretionary	Local/PFC	State
2009	Taxiway Y Section 1	$5,000,000	$1,000,000	$3,750,000	$125,000	$125,000
2010	Taxiway Z Widening	$3,000,000	$1,000,000	$1,850,000	$75,000	$75,000
2011	Terminal Apron Rehab	$3,500,000	$1,000,000	$2,325,000	$87,500	$87,500
2012	Fortuna Ramp Expansion	$2,500,000	$1,000,000	$1,375,000	$62,500	$62,500
2012	Rolle Field Rwy Rehab	$2,000,000		$1,900,000	$50,000	$50,000
2013	Taxiway Y Section 2 w/ Twy L ext	$3,000,000	$1,000,000	$1,850,000	$75,000	$75,000
2013	Boarding Area Expansion	$3,000,000			$300,000	$2,700,000
2013	Rolle Field Paralle Taxiway	$2,000,000		$1,900,000	$50,000	$50,000
2014	NW GA Hangar Apron Rehab	$2,000,000	$1,000,000	$900,000	$50,000	$50,000
2014	Baggage Claim Expansion	$2,000,000			$200,000	$1,800,000
2014	Rolle Field Apron & Taxilanes	$2,000,000		$1,900,000	$50,000	$50,000
2015	Taxiway Y Section 3	$3,000,000	$1,000,000	$1,850,000	$75,000	$75,000
2015	West GA Apron Rehab	$2,000,000	$1,000,000	$900,000	$50,000	$50,000
2015	Public Parking Expansion	$1,000,000			$1,000,000	
2015	T-Shades Expansion	$1,500,000			$150,000	$1,350,000
2015	Rolle Field Hangar Development	$2,000,000			$200,000	$1,800,000
2016	Taxiway Y Section 4	$5,000,000	$1,000,000	$3,750,000	$125,000	$125,000
2016	Administrative Space Expansion	$1,000,000			$100,000	$900,000
2016	Rolle Field Runway Extension	$2,000,000		$1,900,000	$50,000	$50,000
2017	Apron Expansion Section 2	$2,500,000	$1,000,000	$1,375,000	$62,500	$62,500
2018	Rental Car Parking Expansion	$4,000,000			$4,000,000	
2018	Apron Expansion Section 3-7	$5,000,000	$1,000,000	$3,750,000	$125,000	$125,000
	Total	$59,000,000	$11,000,000	$31,275,000	$7,062,500	$9,662,500

Probable Development Costs

The total project costs estimated for each airport improvement or development project reflects a preliminary opinion of the probable implementation cost. In addition to the estimated construction costs, anticipated fees for design, inspection, permitting, surveying, testing and administration have also been included in the overall cost estimate where possible. In instances where two or more of these projects can be funded and scheduled for implementation simultaneously, overall project costs may be reduced by eliminating duplicated or similar items. Such cost reductions are not reflected in this analysis.

With the exception of projects based at Rolle Field, detailed environmental analyses, such as an Environmental Impact Study, are not anticipated to be required before implementing the projects; however, in several cases where development is over undisturbed land, an environmental review or screening, such as an Environmental Assessment or Categorical Exclusion, will most likely need to be conducted. These costs are included in the project contingencies. Few of the projects may require certain mitigation measures to offset impacts to environmentally sensitive areas.

The recommended development projects and their estimated total project costs are itemized in Table VI-1 and summarized here in these four major categories:

Airfield Development – The largest undertaking in the ACIP is the proposed parallel taxiway to Runway 3L-21R with an estimated cost of about $19 million in 2009 dollars. The total cost of

Airfield Development projects is projected to cost approximately $34 million in 2009 dollars or $30 million in escalated dollars.

Terminal Area Development – Key Terminal Area Development projects include the expansion of rental car facilities and passenger boarding areas. Estimated total costs of the Terminal Area Development projects are approximately $11 million in 2009 dollars or $14.3 million in escalated dollars.

FBO and GA Facilities Development – Projects in this category include GA facility expansion and hangar/apron construction at both Yuma International Airport and Rolle Field. The projected costs of the FBO and GA Facilities Development projects are approximately $14 million in 2009 dollars or $18.2 million in escalated dollars.

Defense Contractor Complex – The initial projected cost of Ancillary Facilities Development is approximately $7.2 million in 2009 dollars, or $9.7 million in escalated dollars. The full build out cost will be higher but is dependent on the various alternatives pursued.

Anticipated Funding Sources

Each recommended project in the ACIP was analyzed to determine eligibility for federal AIP funding, as well as potential funding from these sources:

State grant funding

Passenger facility charge revenues

Customer facility charge revenues

In addition, certain projects such as general aviation hangar and apron development at the Airport and at Rolle Field are assumed to be funded by private sources. The remaining share of estimated project costs are not anticipated to be funded from the preceding sources, but are assumed to be funded through uncommitted YCAA funds.

5.1.1.1 Federal Funding

One of the main sources of funding for airport improvements is the federal AIP. The AIP was initially authorized by the Airport and Airway Improvement Act of 1982 to assist airport sponsors in funding planning, development, and noise compatibility projects at public-use airports nationwide to accommodate projected civil aviation growth. To be eligible for funding assistance under this 1982 act, an airport must be included in the NPIAS. As stated in Chapter 1, *Introduction*, the Airport is one of 11 commercial service airports in Arizona, as reported in the FAA 2007-2011 NPIAS report.

The AIP is funded through the Aviation Trust Fund, which was established by the Airport and Airway Revenue Act of 1970. Revenues for the Aviation Trust Fund are derived through the levying of taxes and fees on aviation fuel and lubricants, airline tickets, international departing passengers, aircraft freight, and other components of the aviation industry. Funds deposited into the Aviation Trust Fund are distributed to eligible airports throughout the United States and its territories through grants administrated by the FAA under appropriations limits established by the United States Congress. The FAA allocates funds to the nation's airports based on eligibility criteria tied to a priority system to rank each request and determine which projects will be funded during any given federal fiscal year (also ending September 30). The priority system used by the FAA is based on different criteria for different types of projects. Generally, projects that improve the safety of aircraft operations and those that increase capacity in the national air transportation system have higher priority. Projects are also ranked based on the size of the airport and the number of aircraft and aircraft operations at the facility.

The YCAA expects to use a combination of AIP discretionary and entitlement grants to fund approximately $42.3 million of AIP-eligible projects – or 72 percent of the ACIP.

5.1.1.2 State Grants

The State of Arizona, through the Arizona Department of Transportation's Aeronautics Division, has also funded airport improvement projects. The State's program parallels the federal AIP program in terms of eligible grant items and has traditionally funded up to 50 percent of the local share of all eligible items contained in FAA airport project grants. This program was recently suspended due to budgetary concerns. However, for the purposes of this analysis, the program is assumed to be reinstated and available to fund a share of eligible project costs over the projection period. As shown in Table VI-1, about $9.7 million in State funds are assumed over the 20-year planning horizon.

Should the program not be reinstated, YCAA will need to identify additional funding sources for the portion of projects currently assumed to be funded with future state grants.

5.1.1.3 Customer Facility Charge Revenues

As is common practice at many airports, this analysis assumes that YCAA implements a rental car customer facility charge (CFC) beginning in FY 2010 to fund rental car projects at the Airport, namely the ACIP's proposed Rental Car Expansion project. The CFC would be paid by rental car customers, typically on a per-transaction day basis, collected by rental car companies, and then remitted to the Airport on a monthly basis. These fees are usually listed as a separate item on the customer's invoice for the rental car. The CFC rate can be established by YCAA based on its anticipated funding needs. CFC rates typically range from $1.00 to $5.00 per rental car transaction day.

This analysis assumes the following with respect to CFC revenues:

CFC rate of $5.00 per rental car transaction day

Rental car transactions are projected assuming a ratio of 0.2 rental car transaction days per enplaning passenger

Rental car transactions days are estimated by applying an assumed average rental duration of 3.0 days to the projection of rental car transactions

Annual funding requirements associated with the Rental Car Expansion Project, perhaps as early as FY 2016 and FY 2017, exceeds the CFC capacity in those years. Thus, it is anticipated that YCAA may issue CFC-backed bonds to fund a portion of the project costs and that a portion of annual CFC collections will be used to pay the outstanding debt service on any CFC-backed bonds. For the purposes of this analysis, it is assumed that CFC collections for the period FY 2010 through FY 2016 are used on a pay-as-you-go basis to fund Rental Car Expansion project costs totaling approximately $608,000 in FY 2015 and approximately $1.4 million in FY 2016, a portion of project costs in that year. The remaining portion of FY 2016 project costs (approximately $1.3 million) and total FY 2017 project costs (approximately $1.4 million) are assumed to be funded from the proceeds of CFC-backed bonds.

Funding assumptions incorporated into the calculation of annual debt service resulting from the issuance of the bonds include the following:

30-year term

2 years capitalized interest

6.0 percent interest rate

Establishment of a Debt Service Reserve Account equivalent to the maximum annual debt service
Level annual debt service
If YCAA charges a $5.00 per transaction day CFC beginning in FY 2010, approximately $4.8 million will be available to fund the Rental Car Expansion project expenditures. Total costs of this project are estimated at $6.1 million. The shortfall in Rental Car Expansion costs, approximately $1.3 million, is assumed to be funded through private funding sources which could include, but would not be limited to, rental car operators, third-party developers, and additional YCAA funding.

5.1.1.4 Passenger Facility Charges/Airport Funds

In accordance with the Aviation Safety and Capacity Expansion Act of 1990, as amended by the Aviation Investment and Reform Act for the 21st Century (AIR-21), a $4.50 PFC is imposed at the Airport. PFC revenues may be used to fund the local share of eligible Airport project costs. PFC eligibility for projects generally follows the same guidelines for determining AIP grant eligibility, such as placing high priorities on improving safety and increasing capacity. .
Based on past trends and current proposed legislation, it is likely that the maximum PFC collection level will increase during the projection period of this financial analysis. As of March 2009, AIP reauthorization is currently being reviewed in Congress and although not certain, a bill allowing for an increase of the PFC collection limit is widely expected. Although an increase to the PFC collection level could occur, for the purposes of this analysis, it is assumed that the gross PFC level will remain at $4.50 per eligible enplaning passenger through FY 2027. Combined, PFC revenues and local funds are anticipated to fund approximately $1.4 million in total project costs. About $1.3 million of the Master Plan projects are expected to be funded from PFC revenues. After accounting for PFC revenues that have been committed through prior PFC applications, PFC capacity at the $4.50 per enplaned passenger level is projected to be sufficient to fund a portion of the annual cost of projects identified as PFC-eligible in the years in which the project costs are expected to be incurred. Thus, it is anticipated that the PFC-eligible project costs will be funded on a pay-as-you-go basis.
Remaining project costs (after consideration of federal and State funding sources, PFC revenues, CFC revenues, and private sources) must be funded from YCAA revenues or accumulated cash balances.

5.1.1.5 Private Funding Sources

For this analysis, it is assumed that tenant-financed or third-party financed projects would not be constructed until demand warrants and unit-user revenues (rental revenues) make it feasible to finance facility construction. Rental car expansion and hangar/apron construction projects at the Airport and hangar/apron construction projects at Rolle Field, totaling approximately $16.0 million, are assumed to be funded through private sources, such as individual tenants or third-party developers.

O&M Expenses and Capital Outlays

Operating expenses and capital outlays are escalated based on historical trends, anticipated inflation, and potential incremental impacts related to future capital projects, if applicable. The operating expenses and capital outlays by type are projected to increase at the following compounded annual growth rates:

Salaries and wages – 3.0 percent

Employee benefits – 5.0 percent
Overtime and holiday – 5.0 percent
All other personnel expenses – 3.0 percent
Utilities and water – 5.0 percent
All other operating expenses – 3.0 percent
Capital outlays – 0.0 percent

Total expenses, excluding capital outlays, are projected to increase from about $1.9 million budgeted in FY 2009 to $3.7 million in FY 2027, a compounded annual growth rate of 3.4 percent. **Table VI-2** illustrates 2009 to 2015.

Airport Revenues

Airport revenues are escalated based on historical trends, anticipated inflation, lease terms, and incremental revenue impacts resulting from future capital projects, if applicable. Projected revenues from future development at the property have been included in total operating revenues. Existing leases at the Airport were evaluated to determine future lease revenue potential. Certain leases contained provisions for rate increases after a specific number of years and others allowed for annual rate increases. If the term of existing leases and potential extensions expired during the projection period, it was assumed that similar leases would be undertaken thereafter.

The revenue projections, as presented in **Table VI-3**, are based on the following assumptions and compounded annual growth rates:

Key Aeronautical Revenues:

Terminal Rent – Airlines and Others – Growth in airline and other terminal rentals is projected based on an assumed 3.0 percent per year increase in the terminal rental rate, which reflects anticipated inflation. Incremental increases to rented space as a result of boarding area and baggage claim projects are also assumed.

Rent FBOs – Projected to increase from $252,861 budgeted in FY 2009 to $486,295 in FY 2027 based on the terms of existing FBO leases and assumed inflation. Projected growth in FBO rentals represents an approximate compounded annual growth rate of 3.7 percent between FY 2009 and FY 2027.

Rent – Commercial Hangars and General Aviation – Rental revenues, which comprise commercial hangar, general aviation, and land rents, are projected to increase at 3.0 percent per year, from $368,046 in FY 2009 to $626,574 in FY 2027.

Fuel Flowage – Revenues from fuel flowage are projected to increase from $120,000 budgeted in FY 2009 to $256,035 in FY 2027, a compounded annual growth rate of 4.3 percent over the period.

Air Cargo Landings – Revenue growth is projected based forecasts of cargo operations developed in the Master Plan. Air cargo landing revenues are projected to grow at a compounded annual growth rate of 2.5 percent between FY 2009 ($15,000) and FY 2027 ($23,395).

Landing Fees – Projected growth in landing fee revenue corresponds to the forecasted growth in total airport operations. Landing fee revenue is projected to increase from $160,708 budgeted in FY 2009 to $202,772 in FY 2027, a compounded annual growth rate of approximately 1.3 percent.

Key Non-Aeronautical Revenues

Rental Car Agencies – Terminal Space Rent – Growth in rental car terminal rental revenue is projected based on an assumed 3.0 percent per year increase in the terminal rental rate, which reflects anticipated inflation. Incremental increases to rented space as a result of rental car expansion project are also assumed.

Rental Car Agencies – Concessions – Projected growth in rental car concession revenues reflects the impacts of projected growth in Airport passengers as well as assumed inflationary impacts. Concession revenues are projected to increase from $539,919 in FY 2009 to $1,277,284 in FY 2027.

Parking Lot – Parking lot revenues are projected to increase from $106,112 in FY 2009 to $251,029 in FY 2027, representing a compounded annual growth rate of 4.9 percent.

Interest Income – Projected to remain level at $35,000 through the projection period.

Total revenues and interest income are projected to increase from approximately $2.4 million budgeted in FY 2009 to $5.1 million in FY 2027, a compounded annual growth rate of 4.0 percent.

Cash Flow

To determine the financial feasibility of the ACIP, operating expenses and revenues conservatively projected for the 20-year planning horizon are incorporated to an overall cash flow analysis. The annual cash flow calculations assumed the project costs would be expended over the planning horizon based on the development schedule identified previously. **Table VI-4** presents Cash Flow for FY 2008 through FY 2015.

Cost per Enplaned Passenger

Airline revenues (comprised of Terminal Rents – Airline and Landing Fees as shown in Table VI-3) are divided by the number of enplaned passengers to yield the cost per enplaned passenger for the airlines in total. The number of enplaned passengers is forecast to increase at a compounded annual growth rate of 3.6 percent from FY 2009 through FY 2027. Based on the projections depicted in Table VI-3, the airline cost per enplaned passenger is projected to decreases from $6.85 in FY 2009 to $9.25 in FY 2027.

Summary

Based on analyses of forecast activity at the Airport, projected revenues and expenses, and the ACIP for FY 2009 through FY 2027, YCAA appears to have the adequate resources and the YCAA has adequate growth capacity to meet future demand. YCAA has access to various sources of funding—a mix of FAA funding, State funding, PFC revenues, CFC revenues, private funds, and Airport funds—to be able to meet the anticipated funding requirements of the ACIP. The capital projects recommended in the Master Plan appear to be financially feasible and YCAA can reasonably expect to implement these projects.

Table VI-2 Five Year Expense Projection

	Budget FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015
Personnel Expense							

Salary and Wages	$713,274	$734,672	$756,712	$779,414	$802,796	$826,880	$851,686
Employee Benefits	266,261	279,574	293,553	308,230	323,642	339,824	356,815
Overtime and Holiday	11,528	12,104	12,710	13,345	14,012	14,713	15,449
Travel and Training	40,000	41,200	42,436	43,709	45,020	46,371	47,762
Dues and Memberships	8,000	8,240	8,487	8,742	9,004	9,274	9,552
Uniforms	6,000	6,180	6,365	6,556	6,753	6,956	7,164
Employee Screening	500	515	530	546	563	580	597
Total Personnel Expense	$1,045,563	$1,082,486	$1,120,794	$1,160,543	$1,201,791	$1,244,597	$1,289,026
Operating Expense							
Communications	$16,000	$16,480	$16,974	$17,484	$18,008	$18,548	$19,105
Utilities and Water	235,000	246,750	259,088	272,042	285,644	299,926	314,922
Office Supplies and Postage	35,000	36,050	37,132	38,245	39,393	40,575	41,792
Payroll Processing	3,800	3,914	4,031	4,152	4,277	4,405	4,537
IP/Website/Backup	20,973	21,602	22,250	22,918	23,605	24,313	25,043
Attorney Fees	60,000	61,800	63,654	65,564	67,531	69,556	71,643
Audit Fees	17,200	17,716	18,247	18,795	19,359	19,940	20,538
Advertising and Marketing	135,000	139,050	143,222	147,518	151,944	156,502	161,197
Insurance	95,965	98,844	101,809	104,864	108,009	111,250	114,587
Contract Services	60,000	61,800	63,654	65,564	67,531	69,556	71,643
Board Expenses	2,000	2,060	2,122	2,185	2,251	2,319	2,388
FTZ/DCC	10,000	10,300	10,609	10,927	11,255	11,593	11,941
Repairs and Maintenance	100,000	103,000	106,090	109,273	112,551	115,927	119,405
Fuel	13,500	13,905	14,322	14,752	15,194	15,650	16,120
Janitorial Supplies	20,000	20,600	21,218	21,855	22,510	23,185	23,881
Equipment Rental	2,000	2,060	2,122	2,185	2,251	2,319	2,388
Small Tools	1,500	1,545	1,591	1,639	1,688	1,739	1,791
Environmental	15,000	15,450	15,914	16,391	16,883	17,389	17,911
Special Projects	30,000	30,900	31,827	32,782	33,765	34,778	35,822
SCASD Grant Match	15,000	15,450	15,914	16,391	16,883	17,389	17,911
Contingency	10,000	10,300	10,609	10,927	11,255	11,593	11,941
Total Operating Expense	$897,938	$929,576	$962,398	$996,452	$1,031,787	$1,068,453	$1,106,505
Total Expenses	$1,943,501	$2,012,062	$2,083,192	$2,156,995	$2,233,577	$2,313,050	$2,395,531
Capital Outlay							
Capital Outlay	$142,478	$142,478	$142,478	$142,478	$142,478	$142,478	$142,478
Total Expenses & Capital Outlay	$2,085,979	$2,154,540	$2,225,670	$2,299,473	$2,376,055	$2,455,528	$2,538,009

Sources: Yuma County Airport Authority, September 2008 (Budget FY 2009); and Ricondo & Associates, Inc., March 2009 (Projected).
Prepared by: Ricondo & Associates, Inc., March 2009.

Table VI-3 Five Year Revenue Projection

	Budget FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015
Aeronautical Revenues							
Terminal Rent - Airlines	$384,171	$395,696	$407,567	$419,794	$432,388	$445,360	$550,918
Terminal Rent - Others	55,657	57,327	59,047	60,818	62,642	64,522	66,457
Rent - FBOs	252,861	262,217	271,919	281,980	292,413	303,232	314,452
Rent - Commercial Hangars	69,626	71,715	73,866	76,082	78,365	80,716	83,137
Rent - General Aviation	298,420	307,373	316,594	326,092	335,874	345,951	356,329
Fuel Flowage	120,000	125,160	130,542	136,155	142,010	148,116	154,485
Air Cargo Landings	15,000	15,375	15,759	16,153	16,557	16,971	17,395
Landing Fees	160,708	162,797	164,914	167,057	169,229	171,429	173,658
Miscellaneous Operating Permits	5,600	5,768	5,941	6,119	6,303	6,492	6,687
Total Aeronautical Revenues	$1,362,043	$1,403,427	$1,446,148	$1,490,251	$1,535,782	$1,582,788	$1,723,519
Non-Aeronautical Revenues							
Rental Car Agencies - Terminal Space Rent	$67,972	$70,011	$72,111	$74,275	$76,503	$78,798	$81,162
Rental Car Agencies - Concessions	539,919	566,375	594,127	623,240	653,778	685,814	719,418
Rent - Land	18,139	18,683	19,244	19,821	20,416	21,028	21,659
Parking Lot	106,112	111,311	116,766	122,487	128,489	134,785	141,390
Foreign Trade Zone	15,000	15,450	15,914	16,391	16,883	17,389	17,911
Advertising	20,000	20,600	21,218	21,855	22,510	23,185	23,881
TSA Reimbursement	150,925	155,453	160,116	164,920	169,867	174,963	180,212
SCASD Grant	100,000	103,000	106,090	109,273	112,551	115,927	119,405
Sundry	8,500	8,755	9,018	9,288	9,567	9,854	10,149
Total Non-Aeronautical Revenues	$1,026,567	$1,069,639	$1,114,604	$1,161,549	$1,210,564	$1,261,744	$1,315,188
Other Revenues							
Interest Income	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000
Total Revenues & Interest Income	$2,423,610	$2,508,066	$2,595,752	$2,686,800	$2,781,346	$2,879,533	$3,073,707

Sources: Yuma County Airport Authority, September 2008 (Budget FY 2009); and Ricondo & Associates, Inc., March 2009 (Projected).
Prepared by: Ricondo & Associates, Inc., March 2009.

Table VI-4 Five Year Cash Flow Projection

	Budget FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015
Revenues							
Aeronautical Revenues	$1,362,043	$1,403,427	$1,446,148	$1,490,251	$1,535,782	$1,582,788	$1,723,519
Non-Aeronautical Revenues	1,026,567	1,069,639	1,114,604	1,161,549	1,210,564	1,261,744	1,315,188
Other Revenues - Interest Income	35,000	35,000	35,000	35,000	35,000	35,000	35,000
Total Revenues	$2,423,610	$2,508,066	$2,595,752	$2,686,800	$2,781,346	$2,879,533	$3,073,707
Expenditures							
Total Expenses	$1,943,501	$2,012,062	$2,083,192	$2,156,995	$2,233,577	$2,313,050	$2,395,531
Capital Outlay	142,478	142,478	142,478	142,478	142,478	142,478	142,478
Debt Service	237,632	281,707	281,707	281,707	281,707	281,707	281,707
CIP Expenditures	0	0	0	9,005	81,047	0	0
Total Expenditures	$2,323,611	$2,436,247	$2,507,378	$2,590,186	$2,738,810	$2,737,236	$2,819,717
Net Remaining Revenues							
Net Remaining Revenues	$99,999	$71,819	$88,374	$96,614	$42,536	$142,297	$253,990
Summary							
Total Revenues	$2,423,610	$2,508,066	$2,595,752	$2,686,800	$2,781,346	$2,879,533	$3,073,707
Total Expenditures	2,323,611	2,436,247	2,507,378	2,590,186	2,738,810	2,737,236	2,819,717
Net Remaining Revenues	$99,999	$71,819	$88,374	$96,614	$42,536	$142,297	$253,990
Cumulative Balance		$171,818	$260,192	$356,806	$399,342	$541,639	$795,629

Sources: Yuma County Airport Authority, September 2008 (Budget FY 2009); and Ricondo & Associates, Inc., March 2009 (Projected).
Prepared by: Ricondo & Associates, Inc., March 2009.

VI. Environmental Overview

The goal of an Airport Master Plan is to provide guidelines for future airport development that is financially, technically, and environmentally feasible. The National Environmental Policy Act of 1969 (NEPA) affects airport planning by requiring that potential environmental impacts of proposed airport development be considered throughout the entire planning process. Environmental feasibility is as important as financial and technical feasibility in determining how an airport will be developed. FAA Order 5050.4B, *National Environmental Policy Act (NEPA) Implementing Instructions for Airport Actions*, provides guidance on evaluating environmental impacts when implementing actions at public-use airports.

Three categories of environmental analysis and review relevant to airport development are outlined in NEPA. Projects proposed for implementation by an airport operator and subject to NEPA review are assessed based on their potential to cause significant environmental impacts. The three categories of environmental review are:

Categorical Exclusions – Projects that are categorically excluded have been found to have no potential for significant environmental impacts under normal circumstances.

Actions Normally Requiring an EA – Projects normally requiring an EA are those that have been found, through experience, to sometimes have significant environmental impacts.

Actions Normally Requiring an EIS – Major actions that will significantly affect the environment must be assessed in an EIS. In addition, if an EA determines that a project will have significant impacts, the FAA will prepare an EIS to further investigate the project's potential environmental impacts.

The major product of the master planning process is the ALP, which shows the existing and ultimate planned development through the planning horizon. Federal aviation regulations require that an airport operator submit environmental review documentation of the planned development for FAA review and approval if the airport operator plans to apply for federal grants to fund development depicted on the ALP. Certain types of development, as previously noted, are categorically excluded from additional NEPA review. Due to the limited shelf life of NEPA documents, nearly all ALPs are conditionally approved by the FAA prior to the receipt of environmental approval. The formal NEPA review process is typically undertaken at a later date to ensure that current conditions within the timeframe that the project is to be undertaken are reflected.

This section of the Airport Master Plan was prepared to aid decision-makers by providing a general overview of the potential environmental impacts of the projects recommended for development. An environmental overview differs from an EA or an EIS in its purpose and depth of analysis. This overview provides a discussion of the environmental resource categories identified in FAA Order 1050.1E, *Environmental Impacts: Policies and Procedures*, Change 1, dated April 20, 2006, and FAA Order 5050.4B. It should be noted that this section only identifies those potential environmental issues related to the recommended projects that would need to be evaluated, in accordance with NEPA, prior to project implementation; alternatives or potential impacts were not evaluated.

Known existing conditions are documented herein, and, in general terms, the potential impacts that may result from implementation of the full build-out of the ADP are identified. Interim stages of development will likely result in different impacts; however, interim development stages are not assessed in this environmental overview. The YCAA has applied for FAA approval of a Categorical Exclusion for the taxiway parallel to Runway 3L-21R (Taxiway Y)

included in the ADP. The YCAA is also in the process of requesting Categorical Exclusions for the widening of Taxiway Z and the rehabilitation of the GA aircraft parking aprons.
The proposed ADP projects, with the exception of those at Rolle Field, are sited within the existing Airport boundary. Potential projects associated with Rolle Field are not considered in this environmental overview. The following is a description of the potential environmental impacts of the proposed ADP projects in each of the environmental resource categories identified in FAA Orders 1050.1E and 5050.4B.

Aircraft Noise

Aircraft noise originates from both the engines and the airframe of an aircraft, but the engines are by far the most significant source of aircraft noise. Although noise from propeller-driven aircraft (mostly commuter and general aviation aircraft) can be annoying, the primary source of disturbing noise from the Airport is jet aircraft. Because none of the proposed ADP projects are airfield capacity projects, a detailed noise analysis was not completed as part of the Master Plan Update. The Department of Defense is currently in the process of preparing an EIS to evaluate the impacts of basing the Joint Strike Fighter aircraft at MCAS Yuma. As part of that EIS, a detailed noise analysis for MCAS Yuma and the Airport will be completed.
The projects in the ADP would provide more efficiency and safety for aircraft operations, and access to runways and various aircraft aprons. Ground noise would increase in some areas of the airfield as a result of the increase in aircraft taxiing time associated with use of the new parallel taxiway and development of additional areas for GA, FBO, and DCC. This increase in ground noise is not expected to be significant; however, each project will need to be evaluated to verify that it would not affect noise sensitive land uses in the area. No significant increase in the overall aircraft noise levels at the Airport is expected to occur as a result of implementation of any of the ADP projects.

Compatible Land Use

Federal agencies have adopted guidelines for compatible land uses and environmental sound levels in airport areas. Land use is normally determined by zoning codes, such as residential, industrial, or commercial. Based on extensive research on the effects of noise on people, noise levels that are incompatible with residential land uses may be compatible with industrial or commercial land uses, such as stores or factories. The FAA has identified land use compatibility guidelines relating types of land uses to aircraft noise levels. FAR Part 150, *Airport Noise Compatibility Planning*, sets forth compatibility guidelines for residential, public, commercial, manufacturing, and recreational land uses. Land adjacent to the Airport boundary is categorized as Airport Area Specific Plan commercial, industrial, business park, or recreational/open space land use.[24] The City of Yuma has also identified and adopted a Runway Approach Departure Safety Area/Airport Industrial Overlay District (RADSA/AIOD) for the approaches to Runway 8-26. The Department of Defense has identified Clear Zones and Accident Potential Zones (APZ) as part of its Air Installation Compatible Use Zone (AICUZ) Study for MCAS Yuma.[25]

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[24] City of Yuma and Yuma County, *Joint Land Use Plan, Land Use Element Amendment, City of Yuma General Plan, Yuma County Comprehensive Plan*, http://www.co.yuma.az.us/DDS/PDF/JLUP.pdf (accessed February 10, 2009).

[25] Parsons for Naval Facilities Engineering Command Southwest, *Draft Airfield Master Plan, Marine Corps Air Station Yuma*, November 2008.

No development proposed as part of the ADP would occur adjacent to any existing residential or noise sensitive areas. All proposed ADP projects would occur within the current Airport property, and no changes to the airfield would significantly affect the areas exposed to aircraft noise off Airport property. Portions of the proposed taxiway parallel to Runway 3L-21R would traverse the APZ for the runway; however, taxiway development is considered compatible with an APZ. Therefore, implementation of the ADP projects would be consistent with planned land uses and is not anticipated to affect compatible land use.

Social Impacts

Aviation development affects not only the natural environment, but also the human environment. Therefore, consideration of social impacts is required to determine the potential effects of airport development on the human environment. The types of impacts considered in this overview that could result from Airport development include:

Disproportionately high and adverse human health or environmental effects on minority and low-income populations

Disproportionate health and safety risks to children

Relocation of residences and/or businesses

Disruption of communities

Alterations in traffic patterns that may permanently or temporarily restrict traditional community access

Substantial loss in community tax base

All proposed ADP projects would be implemented on existing Airport property and would not require the relocation of residences or businesses, or cause community disruption. Because no residential areas are located adjacent to the areas where projects are proposed, no disproportionate effects are anticipated on minority and low-income populations or to health and safety risks for children. Development of GA, FBO, and DCC would increase vehicular traffic on some local roads; the extent of the effects of this increased traffic would depend upon the type of development that occurs. Full implementation of the proposed Defense Contractor Complex may require the closure of 4th Avenue. Should implementation of this project require this road closure, the affects of the roadway closure would have to be assessed, including the accessibility of emergency vehicles and potential changes in vehicle traffic patterns. The proposed roadway would improve accessibility to the GA facilities, as a more direct route to vehicle parking areas, but should have minimal effect on existing traffic patterns. Each ADP project would need to be evaluated to verify that no significant social impacts would result from implementation.

Induced Socioeconomic Impacts

Sometimes called secondary or indirect impacts, induced socioeconomic impacts are directly proportional to the scope of the project. This category typically involves shifts in population, public service demands, or the business and/or economic climate.

It is anticipated that the Airport Master Plan recommendations would positively contribute to the overall business and economic climate of the area. Expansion and development of Airport facilities, such as the DCC, would promote tenant growth, which would create additional jobs, providing a benefit to the surrounding community.

Public service demands are anticipated to increase to support the operation of new Airport facilities; however, it is expected that local utility infrastructure and public services are sufficient to accommodate the anticipated public service demands of the new facilities.

In addition to the substantial benefit that the Airport provides to the community in terms of air service and induced socioeconomic impacts, there are also induced socioeconomic impacts created by the relationship between the Airport and MCAS Yuma. With full implementation of the proposed DCC, demand for aviation functions, such as avionics or maintenance in support of MCAS Yuma aircraft operations would be possible. Development of the proposed GA and DCC would be accomplished in collaboration with MCAS Yuma personnel to ensure that the Airport's development does not conflict with the mission of MCAS Yuma, and to determine ways that the proposed development could help support the mission and needs of MCAS Yuma.

Air Quality

Procedures to analyze and evaluate air quality impacts at airports are described in the FAA report *Air Quality Procedures for Civilian Airports and Air Force Bases*[26] and the U.S. Environmental Protection Agency (EPA) report, *An Air Pollution Impact Methodology for Airports: Phase I.* [27] The federal Clean Air Act, as amended, requires each state to identify general geographic areas where the National Ambient Air Quality Standards (NAAQS) are not met for six criteria pollutants.[28] The EPA has designated such areas as nonattainment areas. A state with a nonattainment area must prepare a State Implementation Plan (SIP) that details the programs and requirements that the state will implement to meet the NAAQS by the deadlines specified in the Clean Air Act Amendments of 1990 (CAAA) and subsequent rules promulgated by the EPA. The CAAA require federal agencies to ensure that their actions conform to the appropriate SIP. Conformity is defined as demonstrating that a project or action conforms to the SIP's purpose of eliminating or reducing the severity and number of violations of the NAAQS and achieving expeditious attainment of such standards. Actions or projects that are funded or approved by the FAA are subject to the General Conformity regulations of the CAAA (40 CFR Part 93, Subpart B).

Generally, to comply with the General Conformity regulations, two criteria must be met: (1) it must be shown that total direct and indirect pollutant emissions[29] resulting from a project in a nonattainment area are included in a SIP budget or are below *de minimis*[30] emissions levels established for the nonattainment area, and (2) it must be demonstrated that pollutant emissions from the project would not be regionally significant (i.e., the project would not contribute 10 percent or more of the region's total emissions for a criteria pollutant). If it is determined through an emissions inventory that the direct and indirect pollutant emissions from a project would be below *de minimis* levels and not "regionally significant", no further air quality analysis is required and the project is presumed to conform with the applicable SIP. If a project's emissions would equal or exceed the annual *de minimis* levels, a conformity determination/NAAQS assessment is required, including requisite pollutant dispersion analyses.

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[26] Federal Aviation Administration, *Air Quality Procedures for Civilian Airports and Air Force Bases*, Report No. FAA-AEE-97-03, Washington, D.C., April 1997.

[27] U.S. Environmental Protection Agency, *An Air Pollution Impact Methodology for Airports: Phase I*, EPA Report No. APTD-1470, National Technical Information Service, Springfield, Virginia, 1973.

[28] The criteria pollutants include ozone (O_3), carbon monoxide (CO), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), particulate matter less than 10 microns in diameter (PM_{10}), particulate matter (fine particles) less than 2.5 microns in diameter ($PM_{2.5}$), and lead (Pb).

[29] Total direct and indirect emissions are the sum of the emissions increases and decreases associated with a proposed project, or the "net" change in emissions anticipated to occur as a result of the proposed project [40 CFR Part 93.152].

[30] Emissions are so small as to be negligible or insignificant. If a project/action has *de minimis* emissions, a conformity determination/NAAQS assessment pursuant to the CAAA is not required (40 CFR Part 93.153c).

An operational emissions inventory is conducted to assess air quality impacts caused by changes in airport activity. A substantial change in the number, type, or operating patterns of aircraft; ground support equipment; point sources (including boilers and fuel tanks); and passenger vehicles caused by an airport improvement project warrants an operational emissions inventory analysis. If, through the operational emissions inventory process, it is determined that project-related emissions (direct and indirect) would not exceed applicable *de minimis* thresholds, no further air quality analysis would be required. If project-related emissions are found to equal or exceed the *de minimis* thresholds, an NAAQS assessment may be required. The Emissions and Dispersion Modeling System (EDMS) has been approved by the FAA and the EPA for conducting operational emissions inventories for airports.

Many projects at airports and air bases are too small to require a detailed NAAQS assessment, and only a few projects located in nonattainment areas are broad enough in scope to require the full complement of air quality analyses (i.e., an emissions inventory and dispersion analysis). However, in the past decade, the number of airport operators that have been required to conduct NAAQS assessments has increased substantially, particularly in communities with poor air quality.

As of February 2009, the Airport is located in the Yuma Metropolitan Air Pollution District[31], and is in nonattainment for PM_{10}[32]. Compliance with the *Yuma PM_{10} Non-attainment Area State Implementation Plan* and all applicable State and federal clean air regulations is required. Implementation of the ADP projects is not expected to increase aircraft operations; some minor changes in aircraft movements on the airfield due to the proposed taxiways will occur, but these should not result in any significant air quality impacts. It is also expected that air quality impacts associated with automobile activity would not significantly decrease as a result of increased traffic associated with the development of GA, FBO, and DCC. Concentrations of air pollutant emissions at the Airport are not considered to be significant because there are no barriers to prevent emissions dispersion. However, for construction of the proposed parallel taxiway, a construction emissions inventory would probably be required to quantify the temporary emissions caused by construction and/or demolition activities. This inventory would include emissions related to fill activities, earth compaction, and taxiway construction. Typical sources of construction-related emissions include non-road equipment (backhoe, drilling rigs, mixers, etc.), on-road equipment (dump trucks, concrete trucks, etc.), and construction employee vehicle traffic.

Methodologies for conducting construction emissions inventories and the emission factors for construction equipment are described in EPA publications, including *Compilation of Air Pollutant Emissions Factors, AP-42, Volume II: Mobile Sources, Fifth Edition.*[33] The established protocol for conducting a construction emissions inventory is to compare the direct and indirect emissions associated with the project to *de minimis* thresholds for the applicable nonattainment area.[34] Construction-related emissions for most airport projects are below *de*

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31 Yuma County, *2010 Comprehensive Plan*, Chapter 7, "Environmental Element," http://www.co.yuma.az.us/dds/ord/2010/TC.htm (accessed February 11, 2009).

32 U.S. Environmental Protection Agency, *Currently Designated Nonattainment Areas for All Criteria Pollutants*, http://www.epa.gov/oar/oaqps/greenbk/ancl.html#ARIZONA (accessed February 11, 2009).

33 U.S. Environmental Protection Agency, *Compilation of Air Pollutant Emission Factors, AP-42, Fifth Edition, Volume II: Mobile Sources*, Washington, D.C., January 1995.

34 Under the General Conformity regulations, emissions associated with construction activities must be calculated and added to operational emissions, if appropriate, and the total compared to the annual *de minimis* thresholds for criteria pollutants.

minimis thresholds; however, emissions caused by on-road construction vehicle trips have been the subject of NAAQS assessments, in particular, hot-spot analyses. A hot-spot analysis predicts the expected emissions at a particular location, typically a congested intersection or a location where a concentration of pollutant emissions is anticipated to result from projected activity at that location. If the hot-spot analysis indicates that no exceedances of the NAAQS are anticipated, it is presumed that surrounding areas and activities would also not exceed the NAAQS.

Water Quality

Airport activities can affect water quality, primarily as a result of storm water runoff that carries pollutants from paved surfaces. Pollutants typically found in airport runoff include spilled oil and fuel, loose debris, and accidentally discharged chemicals. Water pollution can be intensified during the winter in certain climates when deicing/anti-icing compounds are used to clear ice and snow from runways, taxiways, aprons, and aircraft. Contaminated runoff generated in this manner is classified as "non-point" source pollution.

The Federal Water Pollution Control Act, as amended by the Clean Water Act, provides the federal government with the authority to establish water quality standards, control discharges into surface and subsurface waters, develop waste treatment management plans, and issue permits for dredge and fill material. Since enactment of these laws, the significance of adverse water quality impacts resulting from non-point sources of pollution has been increasingly recognized. The 1987 Water Quality Act amended the Clean Water Act to specifically address non-point source pollution. In addition, since these acts became effective, a variety of state and local regulations have been promulgated to address stormwater runoff and non-point source pollution. The regulations are directed toward controlling the quantity and quality of stormwater runoff from existing industrial facilities. Through changes to the National Pollutant Discharge Elimination System (NPDES), the EPA has specifically included airports as "industrial facilities" and, in particular, considers deicing activities at airports to be a "priority concern."

Recognizing the value of controlled drainage and clean water, the following potential impact categories were examined pursuant to the recommended projects at the Airport: water resources, stormwater runoff, and erosion and siltation.

The existing water resources in the Airport vicinity include ground water wells[35] and the Colorado River, via a canal system. Berms protect the canals' banks, so contamination from runoff is not a concern.[36] Groundwater wells would need to be protected in compliance with local and State regulations, if any are located in the vicinity of the proposed ADP projects. Appropriate best management practices (such as chemical storage techniques, spill prevention methods, and good housekeeping) would also need to be implemented to adhere to applicable water quality criteria.

Stormwater runoff is generated by gradient-induced drainage of paved and impervious surfaces. Activities such as aircraft washing, fueling, and minor maintenance on paved surfaces can result in contaminants in stormwater runoff. If not treated, contaminated stormwater will eventually be deposited into nearby tributaries or groundwater reserves. The ADP projects will increase the amount of impervious surfaces on the Airport, which will result in an increased rate of

[35] Arizona Department of Water Resources, *ADWR-GWSI Database*, http://www.sahra.arizona.edu/wells/ (accessed February 11, 2009).

[36] Department of Health and Human Services, Public Health Assessment, *Marine Corps Air Station Yuma, Yuma, Arizona*, http://www.atsdr.cdc.gov/HAC/pha/yuma/ymc_p1.html (accessed February 11, 2009).

stormwater runoff. Some ADP projects may require the construction of detention facilities to prevent increased rates and volumes of stormwater runoff from affecting off-Airport property. To mitigate stormwater runoff impacts to water resources, compliance with the Yuma County Stormwater Management Plan, the Airport's NPDES operating permit, and State and federal regulations is required.

Erosion and siltation also play important roles in water quality. Implementation of the ADP projects will require soil disturbance, which can lead to soil erosion and siltation of surface water features if appropriate mitigation is not incorporated into the construction program. During construction, special consideration should be given to minimizing the disruption of ground cover and the exposure of unstabilized soil to adverse weather conditions. To minimize these impacts, construction activities need to comply with the federal specifications identified in AC 150/5370-10C, *Standards for Specifying Construction of Airports,* dated September 29, 2007, and Order 1050.10C, *Prevention, Control and Abatement of Environmental Pollution at FAA Facilities,* dated September 13, 2004. In addition, if any of the projects would disturb one acre or more, an NPDES construction permit would be required. Measures would need to be taken to control erosion and siltation from the construction sites through the use of best management practices, which could include temporary ponds, filter barriers, and soil stabilizers. Planting permanent vegetation can also reduce erosion.

Department of Transportation Act, Section 4(f) Lands

Section 4(f) of the Department of Transportation Act of 1966 specifies that transportation projects cannot take land from public parks, historic sites, or wildlife refuges without first determining that there is no reasonable and prudent alternative. Takings can include the physical acquisition of lands or significant noise or air pollutant impacts to such lands so as to make the lands unsuitable for their desired use.

All proposed ADP projects are sited within the Airport boundary. Two public parks and two public golf courses are located within approximately 1.5 to 2.0 miles of the Airport.[37] Because the proposed ADP projects would not increase the number of aircraft operations or change existing arrival and departure patterns, aircraft noise exposure at these parks would not increase. Historic resources are discussed in the following section; potential effects to these resources would need to be evaluated, if any are present in the area. However, no impacts to Section 4(f) lands are anticipated as a result of implementation of the ADP projects.

Historic, Architectural, Archaeological, and Cultural Resources

Historic, architectural, archaeological, and cultural resources are examined in this portion of the analysis pursuant to two federal acts:

- The National Historic Preservation Act of 1966, as amended, establishes the Advisory Council on Historic Preservation to advise the President and the Congress on historic preservation matters, to recommend measures to coordinate federal historic preservation activities, and to comment on federal actions affecting properties included in or eligible for inclusion in the National Register of Historic Places.
- The Archaeological and Historic Preservation Act of 1974 provides for the survey, recovery, and preservation of significant scientific, prehistoric, historical, archaeological, or paleontological data when such data may be destroyed or irreparably lost due to a federal, federally funded, or federally licensed project.

[37] Measured from the midpoint of Runway 3L-21R to the midpoint of the parks/golf courses.

All proposed ADP projects would be implemented within the existing Airport boundary, but literature searches and possibly surveys would need to be conducted, along with coordination with the Arizona State Historical Preservation Office to ensure that no impacts to historic, architectural, archaeological, and cultural resources would occur as a result of implementation of the ADP projects.

Biotic Resources

The Airport environs consist of areas of urban development, undeveloped disturbed land, and undeveloped vacant land. According to the Yuma County *2010 Comprehensive Plan*, the County is within the Sonoran Desert physiographic province, which is home to a variety of unique Colorado River and Arizona uplands plant communities. Continued development is diminishing the native Sonoran desert plants and wetland species, and increasing the number of invasive weed species.[38]

Some of the areas where the ADP projects are proposed include undeveloped vacant land with desert plant communities. It is not known whether these are native or non-native plant communities; an assessment of these areas will be required to determine whether sensitive biotic communities would be affected. Coordination with the Arizona Game and Fish Department (AZGFD) and the U.S. Fish and Wildlife Service (USFWS) should occur prior to land disturbance activities to ensure that sensitive biotic communities are not affected and that adequate measures are taken to minimize the potential for propagation of invasive or noxious weeds.

Endangered and Threatened Species of Flora and Fauna

The term "endangered species" means any member of the animal kingdom (mammal, fish, or bird), or plant kingdom (seeds, roots, etc.) that is in danger of extinction throughout all or significant portion of its range. "Threatened species" refers to those members of the animal or plant kingdom that are likely to become endangered within the foreseeable future. "Candidate species" refers to a plant or animal species for which the USFWS or National Oceanic and Atmospheric Administration, National Marine Fisheries Service has on file sufficient information on related biological vulnerability and threats to support a proposal to list the species as endangered or threatened. "Species proposed for delisting" refers to animal or plant species that are being considered for removal from the list of endangered and threatened wildlife and plants. "Species protected by conservation easement" refers to those species that are protected by permanent restrictions on the use or development of land through a legal agreement voluntarily entered into by a property owner and a qualified conservation organization, such as a land trust or government agency.

The USFWS is the primary agency responsible for determining which species are threatened or endangered with extinction and providing for their continued survival. Prior to project initiation, the USFWS should be contacted for information on threatened and endangered species to ensure that the proposed ADP would not affect federally listed species. As of April 8, 2008, the USFWS had identified five endangered species, one threatened species, one candidate species, one species proposed for delisting, and one species protected by conservation easement within

[38] Yuma County, *2010 Comprehensive Plan*, http://www.co.yuma.az.us/dds/ord/2010/TC.htm (accessed February 11, 2009).

Yuma County.[39] The AZGFD maintains a Natural Heritage database that contains information on species of concern. The AZGFD should also be contacted to determine whether any of the species occur or whether habitat for those species could occur within the project areas and therefore if any of the proposed ADP projects would affect special status species within Arizona.

Wetlands

Wetlands are areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands have value as wildlife habitat and for water retention, and some wetlands provide groundwater recharge.

The EPA and the U.S. Army Corps of Engineers jointly hold federal jurisdiction over wetlands. Executive Order 11990, *Protection of Wetlands*, directs federal agencies to minimize the destruction, loss, or degradation of wetlands on federal property or on projects with federal funding. New construction within wetlands is discouraged unless no practical alternative exists and all measures to minimize harm have been implemented. If no practical alternative can be found that does not affect wetlands, then a permit will need to be acquired under Section 404 of the Clean Water Act before the project can be built. Section 404 of the Clean Water Act, as amended, regulates the discharge of dredged or fill materials into waters of the United States, including wetlands. The Army Corps of Engineers administers the permitting program authorizing actions regulated by Section 10 and/or Section 404 of the Clean Water Act.

All proposed ADP projects would be located within the existing Airport boundary; there is no anticipated wetlands impact. Prior to ADP initiation, it should be verified that no wetlands exist within or adjacent to the proposed project areas.

Floodplains

Executive Order 11988, *Floodplain Management*, requires federal agencies to avoid or minimize activities that directly or indirectly result in developing floodplain areas. No Airport property is located in any designated 100-year floodplain,[40] therefore, no floodplain impact would occur as a result of the proposed ADP projects.

Coastal Zone Management Program

The Airport is not within any area covered under a Coastal Zone Management Plan and, therefore, ADP projects would not affect any coastal zone management program.

Coastal Barriers

Coastal barriers are narrow islands or margins along the coast with active dunes (or structures built to replace them). These barriers are managed to prevent beach erosion. The Airport is not on a coastal barrier. Therefore, implementation of the ADP projects would not affect coastal barriers.

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[39] Arizona Ecological Services, U.S. Fish and Wildlife Service, Yuma County List, http://www.fws.gov/southwest/es/arizona/Documents/CountyLists/Yuma.pdf (accessed February 13, 2009).

[40] Federal Emergency Management Agency, *FEMA Issued Flood Maps*, Item Numbers 04027C1840E and 04027C1520E, effective August 28, 2008, http://msc.fema.gov/webapp/wcs/stores/servlet/CategoryDisplay (accessed February 10, 2009).

Wild and Scenic Rivers

Wild and scenic rivers are designated by the U.S. Department of the Interior to protect the most beautiful and unspoiled rivers in the nation in accordance with the Wild and Scenic Rivers Act. The Wild and Scenic Rivers Act describes those river areas eligible to be included in and protected under the Act as free flowing and possessing "outstandingly remarkable scenic, recreational, geological, fish and wildlife, historic, cultural, and other similar values." The U.S. Department of the Interior maintains a Nationwide River Inventory (NRI) of wild and scenic rivers, as well as other rivers or sections of rivers that have outstanding remarkable values. The Verde River is Arizona's only designated wild and scenic river, and it is located approximately 50 miles south of Flagstaff.[41] The NRI also identifies a 31-mile segment of the Colorado River located in Yuma County as having scenic, recreation, wildlife, and other values. This segment of the Colorado River is located between the Cibola Lake gaging station[42] and Martinez Lake (Fishers Landing), traversing Cibola and Imperial national wildlife refuges and Picacho State Recreation Area.[43] The Airport is located approximately 25 miles south (downstream) of this segment of the Colorado River; thus, implementation of the ADP projects is not anticipated to affect wild and scenic rivers.

Farmland

Preservation of prime farmland is a priority goal for the U.S. Department of Agriculture, and the sponsors of projects with federal support are required to assess the projects' effects on prime farmland. The ADP projects would be implemented completely within the Airport property boundary; implementation of the ADP projects would not affect farmland.

Energy Supply, Natural Resources, and Sustainable Design

The Airport is not an energy-producing location, nor does Yuma County produce any commercial mineral products.[44] One concept for the DCC may include the installation of solar power generation facilities on a portion of the development area, which may or may not be utilized for Airport energy requirements. The effects of Airport development on energy and natural resources are generally related to the amount of energy required for stationary facilities (i.e., terminal building cooling or heating equipment, electrical lighting for building interiors and the airfield, and approach or radar control systems) and the movement of aircraft and ground vehicles. The primary concern related to energy supply and natural resources would be if future growth, improvements, and expansion of the Airport would result in a shortage of energy supply or place a strain on existing energy suppliers needed to operate the Airport at the highest level of efficiency. Implementation of the ADP projects is not anticipated to significantly increase the need for energy or other natural resources. It is anticipated that the energy and natural resource

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41 U.S. Fish and Wildlife Service, National Wild and Scenic Rivers *Designated Wild & Scenic Rivers*, http://www.rivers.gov/wildriverslist.html (accessed February 16, 2009).

42 Gaging stations are facilities used to automatically monitor streams, wells, lakes, rivers, etc. Instruments at these stations collect information such as water height, discharge, water chemistry, and temperature. http://geology.com/articles/gaging-station.shtml (accessed March 3, 2009).

43 U.S. Department of the Interior, National Park Service, *Nationwide Rivers Inventory*, http://www.nps.gov/ncrc/programs/rtca/nri/states/az.html (accessed February 16, 2009).

44 State of Arizona, Department of Mines and Mineral Resources, *Arizona Mining Update – 2007*, Circular 129, June 2008, http://www.admmr.state.az.us/Info/mining_update2007.pdf (accessed February 16, 2009).

providers in the area would be able to meet the future demand associated with development of the ADP projects at the Airport.

Light Emissions and Visual Effects

Lighting required for the airfield and the terminal, obstruction markings, navigational aids, and the automobile parking areas is the chief contributor to light emissions from an airport. Airport-related light emissions are considered to have a noticeable adverse impact if light is directed toward residential areas. A light emissions analysis is necessary when a proposed project introduces new airport lighting facilities that may affect residential or other sensitive land uses. However, such introduction typically occurs only under unusual circumstances (e.g., when high-intensity strobe lights shine directly into residential areas).

Light emissions typically would be caused by a proposed action during two separate time periods, construction and operation. Although not anticipated, some airfield construction activity associated with the ADP projects may occur at night, for which lights would be localized and shielded to reduce interference with ongoing flight activity. The Rio Colorado Estates residential neighborhood is located approximately ½-mile from the area proposed for the DCC and the GA facility improvements. The proposed projects would be operated in accordance with all State and local ordinances regarding light emissions in the same manner as current Airport operations. All proposed ADP projects are sited within the Airport boundary, and no existing residential areas are adjacent to Airport property. Therefore, implementation of the ADP projects is not expected to result in increased light emissions at the Airport.

Hazardous Materials, Pollution Prevention, and Solid Waste

Two distinct elements of hazardous materials and solid waste impacts relate to airport development: the proximity of hazardous waste and waste disposal sites to an airport and additional hazardous and solid waste generated by the proposed projects. These impacts are discussed below.

Proximity of Hazardous and Solid Waste Sites

AC 150/5200-34A, *Construction or Establishment of Landfills near Public Airport,* dated January 26, 2006, provides guidelines concerning the establishment, elimination, or monitoring of landfills, open dumps, waste disposal sites, or similar facilities on or in the vicinity of airports. These types of facilities, used to process, bury, store, or otherwise dispose of waste, trash, and refuse, can attract rodents and birds. As the potential for bird strikes erodes the safety of an airport environment, waste storage facilities are undesirable and potentially hazardous to aviation. An additional hazard is created if the site ignites and produces smoke.

While random bird strikes in flight are always possible, it is also possible to define conditions within fairly narrow limits where the risk increases. Those high-risk conditions exist in the aircraft approach and departure patterns and landing areas on and in the vicinity of airports. AC 150/5200-34A recommends that landfills be located a minimum of 10,000 feet from an airport that serves turbine-powered aircraft. However, the FAA also recommends that landfills be located at least 5 miles from the nearest Air Operations Area of an active airport to protect the approach, departure, and circling airspace.

Commercial, industrial, or large loads of solid waste are accepted at three locations within Yuma County: South Yuma County Landfill, Copper Mountain Landfill, and Allied Waste Transfer Station. The closest landfill to the Airport is the South Yuma County Landfill, approximately

7 miles south of the Airport.[45] Thus, none of the projects proposed at the Airport would conflict with recommendations contained in AC 150/5200-34A.

The closest hazardous waste site on the U.S. EPA's National Priority List (NPL) is a site on MCAS Yuma, EPA ID 0971590062,[46] which is adjacent to the runways on the north portion of the airfield. The widening of Taxiway Z would occur in areas where groundwater has been contaminated by chlorinated hydrocarbons. Land disturbance in these areas would need to be coordinated with the EPA, the Department of Defense, and possibly the Arizona Department of Environmental Quality to ensure that the widening of Taxiway Z would not affect remediation or containment of the chlorinated hydrocarbons in this area.

Currently, seven hazardous waste sites in Yuma County are listed in the Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) database, but not on the NPL, the closest of which is AGSPRAY INC., EPA ID AZ0000125286 [47], located approximately 4 miles from the Airport.[48] None of these sites would be affected by the ADP projects.

Generation of Hazardous and Solid Waste

Solid waste typically increases as the result of terminal development rather than airfield development. Projects that relate only to airfield development (runways, taxiways, etc.) do not typically result in any direct impact on solid waste collection, control, or disposal other than that associated with demolition and clearing of land and the construction itself.

Preliminary review indicates that the proposed ADP projects would not significantly change the methods used for solid waste disposal at the Airport. It is expected that the additional waste to be generated through implementation of the ADP projects would be readily accommodated by the Airport's sanitary sewer/refuse disposal system.

If any of the areas where the proposed ADP projects are sited have been previously developed, a Phase 1 Environmental Site Assessment should be conducted prior to initiating construction.

Construction

Construction impacts associated with airport development can result from a number of different sources, including noise, dust, air emissions, and erosion. The projects proposed in the ADP would all result in some form of construction that would include disturbance of paved and unpaved areas, as well as construction of various facilities and paved surfaces. Each of these potential construction impact categories is discussed below.

Noise – Construction activity necessary to fully implement the ADP projects would create temporary noise around the Airport environs. Pavement construction, terminal, roadway and facility additions would all be sources of construction noise. Heavy construction equipment generates noise; however, it is expected that this noise would occur only during daylight hours. Construction activity would be coordinated with appropriate agencies to ensure that noise effects

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45 Measured from the closest point of the Airport property boundary to the closest point of the Landfill property boundary, as stated in FAA AC 150/5200-34A.

46 U.S. Environmental Protection Agency, Superfund Program, *National Priorities List*, http://cfpub.epa.gov/supercpad/cursites/csitinfo.cfm?id=0900885 (accessed February 16, 2009).

47 U.S. Environmental Protection Agency, Superfund Program, *National Priorities List*, http://cfpub.epa.gov/supercpad/cursites/srchrslt.cfm?start=1&CFID=1800745&CFTOKEN=22387235&jsessionid=2030595418c22b7a73007b3753312d3e1919TR4a3020302e302830 (accessed February 16, 2009).

48 Measured from the midpoint of Runway 3L-21R to the midpoint of the landfill.

are minimized. Noise is an expected byproduct of construction and would not produce any permanent, ongoing impacts.

Dust - Potential impacts of dust during construction include: reduced visibility, unsightly coatings on buildings and vehicles, and discomfort for dust-sensitive individuals. Full implementation of the ADP projects including pavement construction, terminal, roadway, and facility additions would be sources of dust emissions. Methods for dust control would need to be implemented to minimize dust generation and transport. It is expected that no substantial dust impacts to neighborhood residences would occur because of their distance from the ADP project sites.

Air Emissions - Long-term air pollutant emissions from construction activity would be negligible. Construction activity produces emissions from vehicles, equipment, and other sources. Pavement construction, terminal, roadway, and facility additions would be temporary sources of air emissions. A temporary increase in emissions would occur because of the additional number of construction vehicle internal combustion engines in use at the Airport. While these activities would produce a temporary increase in emissions, they are typical of large construction projects and would not result in any lasting negative impacts.

Erosion - Some erosion and subsequent sedimentation in the vicinity of the ADP project sites would likely occur because of the amount of earthwork involved. Erosion control measures required by the State of Arizona would be incorporated into project plans and specifications. As is the case with dust impacts, the volume of work, duration of operations, and time of exposure determine the amount of potential erosion. An erosion control plan would be formulated and required as part of the NPDES permit that would need to be obtained before construction begins. Construction impacts would also be mitigated by incorporating the provisions of AC 150/5370-10C, *Standards for Specifying Construction of Airports,* dated September 29, 2007. The proposed development of the ADP projects at the Airport will require stormwater runoff plans, spill prevention control and containment plans, and erosion/sedimentation plans to minimize any potential impact to water resources. During construction, temporary pollution of either surface or subsurface waters can occur. These transient impacts can be minimized through the design and operation of a quality siltation and erosion control plan. This plan must be included with the application for a stormwater runoff NPDES permit and it must be approved prior to construction. Through prudent engineering, construction practices, and adherence to applicable federal, state, and local requirements, effects associated with construction of the proposed ADP projects can be minimized. Therefore, construction activities related to the ADP projects are not expected to be a concern.

Yuma International Airport

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Yuma International Airport

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