RYAN AIRFIELD
TUCSON AIRPORT AUTHORITY

Chapter 1

INVENTORY

Chapter One

Inventory

The initial step in the preparation of the airport master plan for Ryan Airfield (RYN) is the collection of information pertaining to the airport and the area it serves. The information summarized in this chapter will be used in subsequent analyses in this study. It includes:

- Physical inventories and descriptions of the facilities and services currently provided at the airport, including the regional airspace, air traffic control, and aircraft operating procedures.
- Background information pertaining to Pima County and the Tucson metropolitan area, including descriptions of the regional climate, surface transportation systems, Ryan Airfield's role in the regional, state, and national aviation systems, and development that has taken place recently at the airport.
- Population and other significant socioeconomic data which can provide an indication of future trends that could influence aviation activity at the airport.
- A review of existing local and regional plans and studies to determine their potential influence on the development and implementation of the airport master plan.

The information in this chapter was obtained from several sources, including on-site inspections, interviews with the Tucson Airport Authority (TAA) staff and airport tenants, airport records, related studies, the Arizona Department of Transportation (ADOT), the Federal Aviation Admini-

stration (FAA), and a number of internet sites. A complete listing of the data sources is provided at the end of this chapter.

AIRPORT SETTING

Ryan Airfield is located approximately ten miles southwest of the City of Tucson at the intersection of Ajo Highway (State Route 86) and West Valencia Road, as shown on **Exhibit 1A**. Ryan Airfield is situated on 1,754 acres at 2,417 feet above mean sea level (MSL) and serves as a general aviation reliever to Tucson International Airport. Tucson International Airport as well as Ryan Airfield are owned by the City of Tucson and operated by the TAA. Ryan Airfield is one of five public-use general aviation airport facilities in Pima County.

Pima County encompasses approximately 9,189 square miles of south central Arizona. Tucson, the state's second largest city at 543,959 residents, made up approximately 54 percent of the total County population of 1,014,023 in 2008. Tucson is also the county seat for Pima County. Pima County is home to the Tohono O'odham Nation Native American Reservation, as well as Saguaro National Park which showcases the Sonoran Desert and the plants and animals that inhabit the desert.

OWNERSHIP AND MANAGEMENT

Ryan Airfield is owned by the City of Tucson and is operated and maintained by the TAA. The Tucson Airport Authority is a non-profit organization that was created by state charter in 1948 to promote air transportation and commerce in the state, to maintain the Tucson International Airport and Ryan Airfield facilities, and to encourage economic growth in Tucson and southern Arizona. The TAA is made up of 115 community volunteers and a nine-person board which oversees policy decisions. The TAA also has a staff of approximately 330 employees who handle daily operations at Tucson International Airport and Ryan Airfield.

AIRPORT DEVELOPMENT HISTORY

Ryan Airfield was developed during World War II as the Federal government began to realize a need for a large number of trained pilots. The San Diego-based Ryan School of Aeronautics was one of several civilian flight schools contracted to train Army fliers. With the fear of coastal attack spurred by Pearl Harbor, inland training sites were preferred, and Arizona's clear weather was ideal.

From a June 15, 1942 groundbreaking, the open desert southwest of Tucson was transformed into an Army airfield in just three months. The Ryan School of Aeronautics came complete with paved runways, apron, hangars, barracks, mess hall, maintenance shop, classrooms, offices, a PX, and recreational facilities. A full four month course of flight instruction was compressed to nine weeks as Ryan graduated 6,000 pilots in two years of operation before the school was closed on September 5, 1944.

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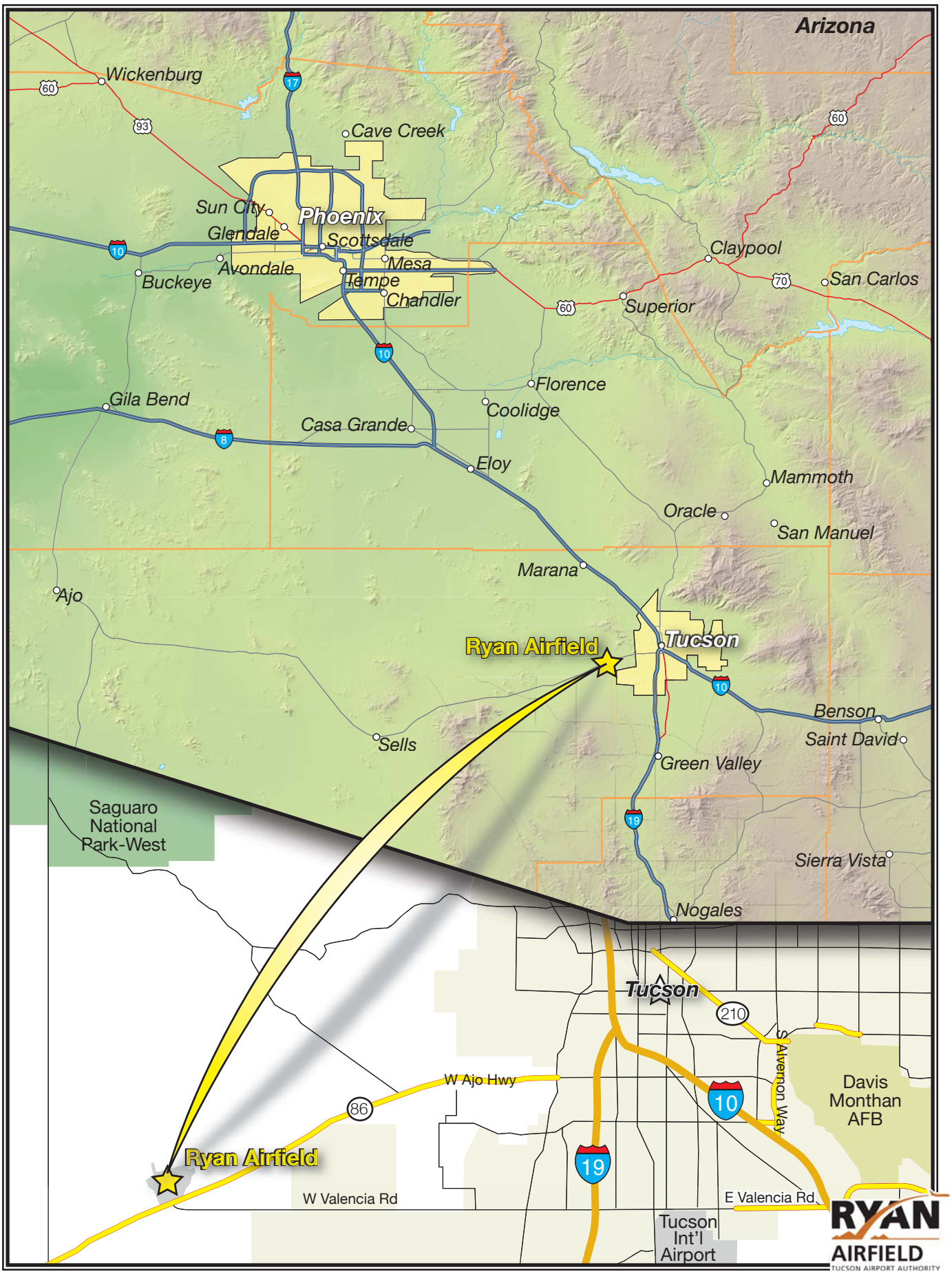

Exhibit 1A
LOCATION MAP

At the end of World War II, the United States government was left with numerous surplus airports which were transferred to state and local jurisdictions under the War Surplus Property Act of 1944. Ryan Airfield, including all improvements, was transferred to the state of Arizona on October 4, 1948.

On August 1, 1951, the State executed a 10-year lease agreement with the TAA for the 906-acre airport, ending a six-year period of dormancy. Within three weeks of operation, five buildings were leased to two tenants. The original agreement, however, proved to be a barrier to development because prospective tenants would not finance any improvements based upon the short term of the lease. In 1954, a new 99-year lease was executed. The State ultimately transferred ownership of the airport by quit claim deed to the City of Tucson on December 16, 1960. The lease with the TAA remained in effect.

Since that time, Ryan Airfield has experienced a significant expansion of general aviation facilities. This has included the extension of the primary runway from 4,000 feet to 5,500 feet in 1982-83; the construction of the maintenance facility in 1987, the installation of a permanent airport traffic control tower (ATCT) in 1993; the construction of a 4,900-foot-long parallel runway in 1993; the paving of the 4,000-foot crosswind runway in 1999; and the construction of an airport administration building in 2004.

The FAA has provided funding assistance to Ryan Airfield through the Airport Improvement Program (AIP). The AIP is funded through the Aviation Trust Fund, which was established in 1970 to provide funding for aviation capital investment programs (aviation development, facilities and equipment, and research and development). The Trust Fund also finances a portion of the operation of the FAA. It is funded by user fees, taxes on airline tickets, aviation fuel, and various aircraft parts.

Table 1A summarizes FAA AIP grants received by Ryan Airfield since 1997. The FAA has provided more than $5.2 million for airport improvements at Ryan Airfield over the past ten years.

TABLE 1A
AIP Grants Offered to TAA for Ryan Airfield Projects

Fiscal Year	AIP Grant Number	Project Description	Total Grant Funds
1997	3-04-0044-10	Land Acquisition	$1,000,000
2001	3-04-0044-11	Taxiway/Apron Reconstruction	$1,062,939
2002	3-04-0044-12	Taxiway B Lighting, Airfield Drainage	$859,697
2003	3-04-0044-13	GA Development Area Design	$150,000
2004	3-04-0044-14	GA Development Area Construction, Emergency Generator, Update Airport Wide Basin Study	$1,667,131
2005	3-04-0044-15	Airfield Security Fencing	$107,585
2007	3-04-0044-17	Ryan Tower Equipment & Cab Glass	$395,879
Total Grant Funds			**$5,243,231**

Source: TAA Records

From 1994 through 2008, ADOT has invested more than $12.1 million in improvements at Ryan Airfield. **Table 1B** summarizes these projects and their total expenditures over this period.

TABLE 1B
State Grants Offered to TAA for Ryan Airfield Projects

Fiscal Year	ADOT Grant Number	Project Description	Total Grant Funds
1994	N557	Land Acquisition/Relocation	$49,090
1994	N517	Pave Crosswind Runway, Land Acquisition, Taxiway Reconstruction	$450,910
1995	N617	Land Acquisition	$500,000
1996	N719	Land Acquisition	$965,000
1997	N851	Pave Crosswind Runway, Fire Protection, Storm Water Improvements, Service Road	$911,000
1998	N857	Master Plan Update	$150,000
1998	N873	Overlay Runway 6R/24L, Realign Twy B2	$131,150
1998	E9030	Pave Crosswind Runway	$994,000
1999	E0124	Overlay Rwy 6R/24L, Realign Twy B2	$1,077,000
2000	E0170	Install Twy D Apron Ramp Parking	$110,000
2000	E1124	AWOS, Land Acquisition, Fencing	$936,000
2001	E2S21	Land Acquisition	$555,300
2001	E1147	Taxiway/Apron Reconstruction	$52,178
2002	E3S19	Apron Construction	$550,000
2003	E3F40	Taxiway B Lighting, Airfield Drainage	$42,201
2004	E4F10	GA Development Area Design	$7,363
2004	E5F47	GA Development Area Construction, Emergency Generator	$41,247
2004	E5F48	Update Airport Wide Basin Study	$2,625
2005	E5S07	GA Development Area Utilities	$246,000
2005	E5S08	Install MIRL Rwy 6R/24L	$848,788
2006	E6S27	Taxiway & Entrance Road Improvements	$855,000
2006	E6S39	Master Plan Update	$315,000
2006	AMPM 06	AMPM	$79,936
2006	E6F53	Airfield Security Fencing	$2,831
2007	E7S72	GA Development Area Utilities, Fire Protection	$716,603
2007	E7S73	Lighting Detection AWOS, Electrical Vault	$169,466
2008	Pending	Ryan Tower Equipment	$10,418
2008	E8S30	Lighting Improvements	$1,350,442
Total State Grant Funds			**$12,119,548**

Source: TAA Records

THE AIRPORT'S SYSTEM ROLE

Airport planning exists on many levels: local, regional, and national. Each level has a different emphasis and purpose. This master plan is the primary local airport planning document.

At the regional level, Ryan Airfield is included in the Pima Association of Governments' (PAG) *2002 Regional Aviation System Plan* (RASP). The RASP provides an overview for airport planning in the region, reflecting the overall plans for each airport in the

region and assessing proposed project costs and the proper phasing of each project. Ryan Airfield is one of six public-use airports included in the RASP. The RASP classifies public-use airports as either Level I or Level II. Level I airports are those that are essential to meeting the region's transportation and economic needs, whereas Level II airports are thought of as support facilities. Ryan Airfield is classified as a Level I airport in the PAG RASP.

At the state level, Ryan Airfield is included in the Arizona *State Airports System Plan* (SASP). The purpose of the SASP is to ensure that the State has an adequate and efficient system of airports to serve its aviation needs. The SASP defines the specific role of each airport in the State's aviation system and establishes funding needs. In 2009, ADOT updated the SASP to reflect current conditions. Through the State's continuous aviation system planning process, the SASP is updated every five years. The 2000 SASP update concluded with the State Aviation Needs Study (SANS). The SANS provides policy guidelines that promote and maintain a safe aviation system in the State, assess the State's airports' capital improvement needs, and identifies resources and strategies to implement the plan. Ryan Airfield is one of 112 airports included in the 2000 SANS, which includes all airports and heliports in Arizona that are open to the public, including American Indian and recreational airports. The SANS classifies Ryan Airfield as a reliever airport.

At the national level, Ryan Airfield is designated within the FAA's *National Plan of Integrated Airport Systems* (NPIAS). Inclusion within the NPIAS allows the airport to be eligible for Federal Airport Improvement Program (AIP) funding. Ryan Airfield is classified as a reliever airport in the NPIAS. A total of 3,489 airports across the country are included in the NPIAS. This number includes existing and proposed airports. Ryan Airfield is one of 59 airports in the State of Arizona that are included in the NPIAS and one of seven airports in Arizona classified as a reliever airport.

AIRPORT FACILITIES

Airport facilities can be functionally classified into two broad categories: airside and landside. The airside category includes those facilities directly associated with aircraft operations. The landside category includes those facilities necessary to provide a safe transition from surface to air transportation and support aircraft servicing, storage, maintenance, and operational safety.

AIRSIDE FACILITIES

Airside facilities include runways, taxiways, airfield lighting, and navigational aids. Airside facilities are identified on **Exhibit 1B**. **Table 1C** summarizes airside facility data.

TABLE 1C
Airside Facility Data
Ryan Airfield

	Runway 6R-24L		Runway 6L-24R		Runway 15-33	
Length (ft.)	5,500		4,900		4,000	
Width (ft.)	75		75		75	
Surface Material	Asphalt		Asphalt		Asphalt	
Load Bearing Strength (pounds)						
Single Wheel Loading (SWL)	12,500		12,500		12,500	
Dual Wheel Loading (DWL)	30,000		30,000		N/A	
Instrument Approach Procedures	ILS/DME/GPS		None		None	
Runway Edge Lighting	MIRL		None		None	
Pavement Markings	Precision (6R) Basic (24L)		Basic		Basic	
Taxiway Edge Lighting	None		None		None	
Approach Aids	**6R**	**24L**	**6L**	**24R**	**15**	**33**
Global Positioning System	Yes	No	No	No	No	No
Visual Approach Slope Indicators	No	Yes	No	No	No	No
Runway End Identifier Lights	Yes	No	No	No	No	No
Runway High/Low Point Elevation (ft.)	2,403/2,398		2,396/2,393		2,417/2,385	
Fixed Wing Aircraft Traffic Pattern	Left		Left		Left	
Weather or Navigational Aids	AWOS-III; Segmented Circle Lighted Wind Cone; Rotating Beacon; NDB; GPS					

Source: *FAA Airport/Facility Directory*, Southwest U.S., October 25, 2007 Edition
AWOS – Automated Weather Observing System
DME – Distance Measuring Equipment
GPS – Global Positioning System
ILS – Instrument Landing System
MIRL – Medium Intensity Runway Lighting
NDB – Non-Directional Beacon

Runway

Ryan Airfield is served by a three-runway system including parallel Runways 6R-24L and 6L-24R and crosswind runway 15-33. Runways 6R-24L and 6L-24R are both asphalt and oriented in a northeast to south-west manner with 6R-24L measuring 5,500 feet in length and 75 feet wide, and 6L-24R measuring 4,900 feet in length and 75 feet wide. The load bearing strength for both parallel runways are equal at 12,500 pounds single wheel loading (SWL) and 30,000 pounds dual wheel loading (DWL). SWL refers to the design of certain aircraft landing gears having a single wheel on each main landing gear, while DWL refers to landing gears having dual wheels on each main landing gear. The parallel runways both slope upward from the southwest to the northeast. The Runway 24L end elevation is 3.3 feet higher than the Runway 6R end, equating to a runway gradient (difference in runway elevations divided by the length of the runway) of 0.07 percent. The Runway 24R end elevation is 4.6 feet higher

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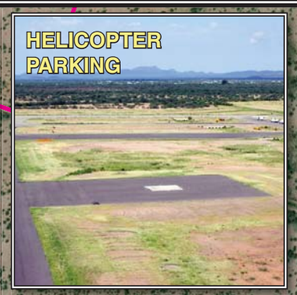
SCALE IN FEET

NORTH

LEGEND
Airport Property Line



D3
DETENTION BASIN
35'
450'
RUNWAY 6L/24R 4,900' x 75'
A1
AWOS/ILS GLIDE SLOPE ANTENNA
TAXIWAY A
A2
A4
35'
240'
700'
A5
VASI-4
REIL
RUNWAY 6R/24L 5,500' x 75'
40'
B2
B3
300'
B4
B5
B6
LOCALIZER ANTENNA
TAXIWAY B
50'
S. CONTINENTAL ROAD
240'
35'
D2
HELICOPTER PARKING
SEGMENTED CIRCLE/ WINDCONE
RUNWAY 15/33 4,000' x 75'
TAXIWAY E
TAXIWAY D
ATCT / AIRPORT BEACON
PIMA COUNTY SOLID WASTE TRANSFER STATION
AVIATOR LANE
AIRFIELD DRIVE
DIKE
D1
NON-DIRECTIONAL BEACON
REMOTE TRANSMITTER/RECEIVER
WELL SITE (TUCSON WATER)
CONNECTOR ROAD
AJO HIGHWAY (STATE ROUTE 86)

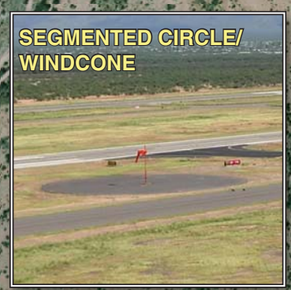


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Exhibit 1B
AIRFIELD FACILITIES

than the Runway 6L end, equating to a runway gradient of 0.08 percent.

The crosswind runway (Runway 15-33) is oriented in a northwest southeast manner and has a length of 4,000 feet and a width of 75 feet. This runway is also asphalt with a load bearing strength of 12,500 pounds SWL. Runway 15-33 slopes downward from south to the north. The Runway 33 end elevation is 32 feet higher than the Runway 15 end, resulting in an effective runway gradient of 0.8 percent.

Taxiways

The existing taxiway system at Ryan Airfield is shown on **Exhibit 1B**. Each runway has an associated parallel taxiway and entrance/exit (connector) taxiways. The parallel taxiways include Taxiways A, B, and D serving Runways 6L-24R, 6R-24L, and 15-33 respectively. Taxiway E is a 35 foot wide partial parallel taxiway serving the southwest end of Runway 15-33. The 35-foot wide Taxiway A has three connector taxiways with the same width. Taxiway B is 50 feet wide and has five connector taxiways with the same width. Taxiway D is 40 feet wide southwest of the intersection with the Runway 6R end. Northeast of this intersection Taxiway D is 35 feet wide. Taxiway D has three connector taxiways each 35 feet wide.

Pavement Condition

As a condition of receiving federal funds for the development of the airport, the Federal Aviation Administration requires the airport sponsor receiving and/or requesting federal funds for pavement improvement projects implement a pavement maintenance management program.

Part of the pavement maintenance management program is to develop a Pavement Condition Index (PCI) rating. The rating is based on the guidelines contained in FAA Advisory Circular 150/5380-6, *Guidelines and Procedures for Maintenance of Airport Pavements*.

The PCI procedure was developed to collect data that would provide engineers and managers with a numerical value indicating overall pavement conditions and that would reflect both pavement structural integrity and operational surface condition. A PCI survey is performed by measuring the amount and severity of certain distresses (defects) observed within a pavement sample unit.

In March 2006, a pavement inspection was conducted at Ryan Airfield by the Arizona Department of Transportation. The parallel runways 6R-24L and 6L-24R were found to have PCI ratings of 84 and 77 respectively. Both runways were found to have longitudinal and transverse cracking of low to high severity. Runway 15-33 had a PCI rating of 86 with low to moderate longitudinal and transverse cracking and patching. The south parking apron adjacent the terminal building has a PCI rating of 74 and 79 (two sections). The north apron between Taxiway D and B2 had a PCI rating of 100. The apron used by the

International Airline Training Academy had a PCI rating of 37 with low to high severity cracking, patching, and weathering.

Airfield Lighting

Airfield lighting systems extend an airport's usefulness into periods of darkness and/or poor visibility. A variety of lighting systems are installed at the airport for this purpose. These lighting systems, categorized by function, are summarized as follows.

Identification Lighting: The location of an airport at night is universally identified by a rotating beacon. A rotating beacon projects two beams of light, one white and one green, 180 degrees apart. The rotating beacon at Ryan Airfield is located atop the airport traffic control tower (ATCT) as shown on **Exhibit 1B**.

Pavement Edge Lighting: Pavement edge lighting utilizes light fixtures placed near the edge of the pavement to define the lateral limits of the pavement. This lighting is essential for safe operations during night and/or times of low visibility in order to maintain safe and efficient access to and from the runway and aircraft parking areas. Runway 6R-24L is equipped with medium intensity runway lighting (MIRL). Runways 6L-24R and 15-33 are not currently equipped with a lighting system. Most of the taxiway system is equipped with taxiway retro reflective edge markers, which resemble taxiway lighting. These reflective markers serve the same purpose as taxiway lights, but are illuminated by the landing lights of the aircraft. Medium intensity taxiway lighting (MITL) is installed along entrance/exit taxiways B2, B3, B4, B5, and B6.

Pilot-Controlled Lighting: Airfield lighting systems can be controlled through a pilot-controlled lighting system (PCL). A PCL allows pilots to turn on or increase the intensity of the airfield lighting systems from the aircraft with the use of the aircraft's radio transmitter. The Runway 6R-24L MIRL is connected to the PCL system at Ryan Airfield.

Visual Approach Lighting: A visual approach slope indicator (VASI-4) is available for Runway 24. The VASIs provide approach path guidance with a series of light units. The four-unit VASIs give the pilot an indication of whether their approach is above, below, or on-path through a pattern of red and white light visible from the light units.

Airfield Signs: Airfield identification signs assist pilots in identifying their location on the airfield and directing them to their desired location. Current airfield signage includes lighted and unlighted signs installed at all taxiway and runway intersections.

Runway Threshold Lighting: Runway threshold lights identify the runway end. Runway threshold lights have specially designed lights that are green on one side and red on the other. The green side is oriented towards the landing aircraft. Runway 6R is equipped with runway threshold lighting.

Runway End Identification Lighting: Runway end identifier lights (REILs) provide rapid and positive identification of the approach end of a runway. REILs are typically used on runways without more sophisticated approach lighting systems. The REIL system consists of two synchronized flashing lights located laterally on each side of the runway facing the approaching aircraft. REILs are installed at the end of Runway 6R and are only operational during daylight hours.

Pavement Markings

Pavement markings aid in the movement of aircraft along airport surfaces and identify closed or hazardous areas on the airport. Ryan Airfield provides and maintains marking systems in accordance with Part 139.311(a) and Advisory Circular 150/5340-1, *Standards for Airport Marking*.

Runway 6R has precision instrument runway (PIR) markings that identify the runway centerline, threshold, designation, touchdown point, and aircraft holding positions. Runways 24L, 6L-24R, and 15-33 are equipped with basic runway markings, which identify the runway centerline, designation, and aircraft holding positions. Runway 6L-24R is also equipped with aiming points 1,000 feet from the 6L threshold and 850 feet from the 24R threshold. Runway 24L is marked with an aiming point 1,000 feet from the threshold.

Taxiway and apron taxilane centerline markings are provided to assist aircraft using these airport surfaces. Centerline markings assist pilots in maintaining proper clearance from pavement edges and objects near the taxilane/taxiway edges. Pavement markings also identify aircraft parking positions.

Weather Reporting

Ryan Airfield is equipped with an Automated Weather Observing System (AWOS). The AWOS-III provides automated aviation weather observations 24 hours per day. The system updates weather observations every minute, continuously reporting significant weather changes as they occur. The AWOS reports cloud ceiling, visibility, temperature, dew point, wind direction, wind speed, altimeter setting (barometric pressure), thunderstorm activity, and density altitude (airfield elevation corrected for temperature). The AWOS is located adjacent to the ILS glide slope antenna.

Ryan Airfield is equipped with lighted wind cone and a segmented circle. The wind cone provides wind direction and speed information to pilots, while the segmented circle provides aircraft traffic pattern information. This equipment is located northeast of the airport traffic control tower between Taxiway B and Runway 6R-24L. Four additional unlit wind cones are located at the ends of Runways 6R/6L, 15, 33, and 24L.

Area Airspace and Air Traffic Control

The *Federal Aviation Administration (FAA) Act of 1958* established the FAA as the responsible agency for the control and use of navigable airspace within the United States. The FAA has established the National Airspace System (NAS) to protect persons and property on the ground and to establish a safe and efficient airspace environment for civil, commercial, and military aviation. The NAS covers the common network of U.S. airspace, including air navigation facilities; airports and landing areas; aeronautical charts; associated rules, regulations, and procedures; technical information; and personnel and material. The system also includes components shared jointly with the military.

Airspace Structure

Airspace within the United States is broadly classified as either "controlled" or "uncontrolled." The difference between controlled and uncontrolled airspace relates primarily to requirements for pilot qualifications, ground-to-air communications, navigation and air traffic services, and weather conditions. Six classes of airspace have been designated in the United States, as shown on **Exhibit 1C**. Airspace designated as Class A, B, C, D, or E is considered controlled airspace. Aircraft operating within controlled airspace are subject to varying requirements for positive air traffic control. Airspace in the vicinity of Ryan Airfield is depicted on **Exhibit 1D**.

Class A Airspace: Class A airspace includes all airspace from 18,000 feet mean sea level (MSL) to flight level (FL) 600 (approximately 60,000 feet MSL). This airspace is designated in Federal Aviation Regulation (F.A.R.) Part 71.193 for positive control of aircraft. The Positive Control Area (PCA) allows flights governed only under instrument flight rule (IFR) operations. The aircraft must have special radio and navigation equipment, and the pilot must obtain clearance from an air traffic control (ATC) facility to enter Class A airspace. In addition, the pilot must possess an instrument rating.

Class B Airspace: Class B airspace has been designated around some of the country's major airports to separate arriving and departing aircraft. Class B airspace is designed to regulate the flow of uncontrolled traffic above, around, and below the arrival and departure airspace required for high-performance, passenger-carrying aircraft at major airports. This airspace is the most restrictive controlled airspace routinely encountered by pilots operating under visual flight rules (VFR) in an uncontrolled environment. The nearest Class B airspace to Ryan Airfield is located at Phoenix Sky Harbor International Airport.

Class C Airspace: The FAA has established Class C airspace at 120 airports around the country as a means of regulating air traffic in these areas. Class C airspace is designed to regulate the flow of uncontrolled traffic above, around, and below the arrival and departure airspace required for high-performance, passenger-carrying

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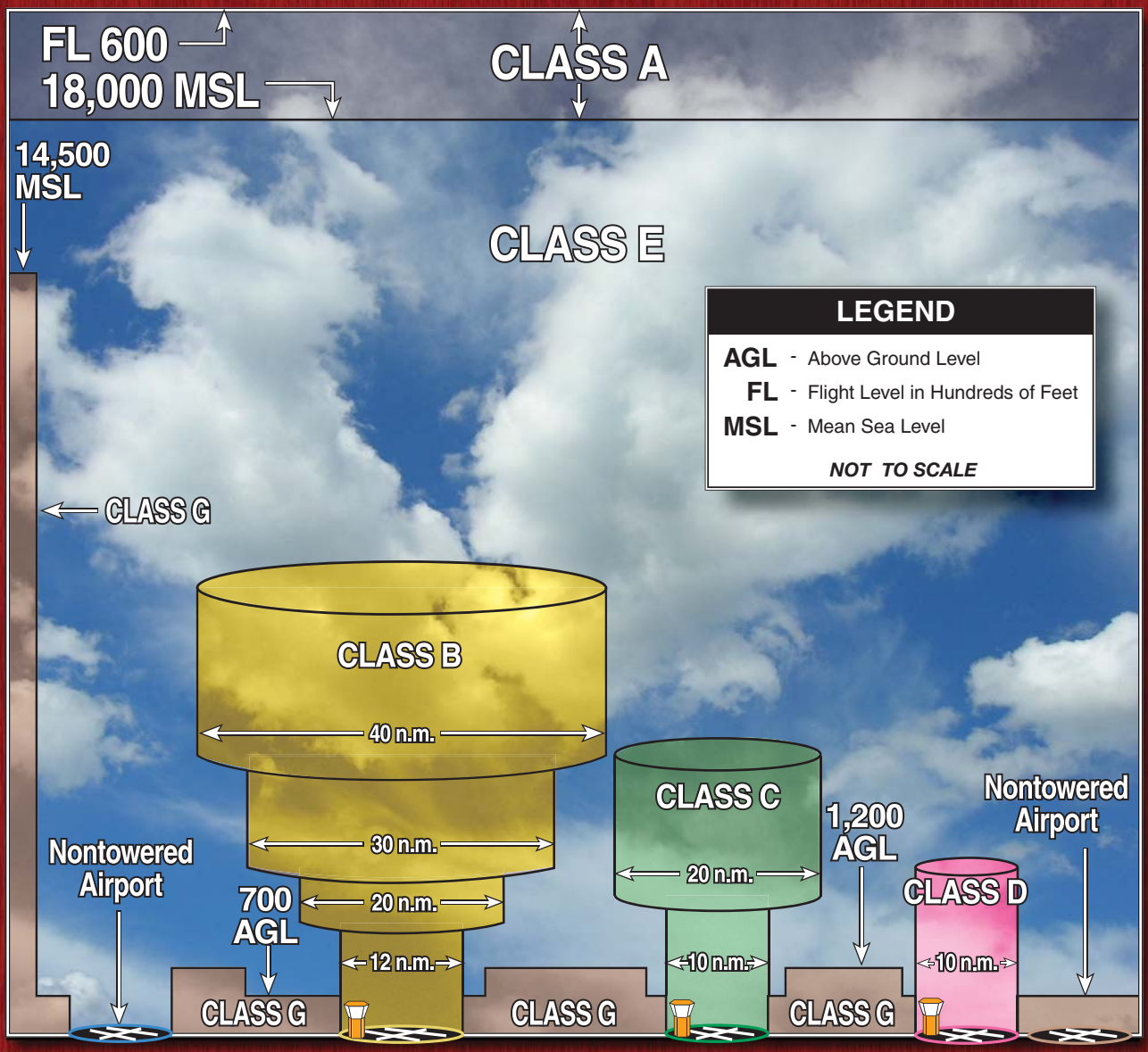

CLASSIFICATION	DEFINITION
CLASS A	Generally airspace above 18,000 feet MSL up to and including FL 600.
CLASS B	Generally multi-layered airspace from the surface up to 10,000 feet MSL surrounding the nation's busiest airports.
CLASS C	Generally airspace from the surface to 4,000 feet AGL surrounding towered airports with service by radar approach control.
CLASS D	Generally airspace from the surface to 2,500 feet AGL surrounding towered airports.
CLASS E	Generally controlled airspace that is not Class A, Class B, Class C, or Class D.
CLASS G	Generally uncontrolled airspace that is not Class A, Class B, Class C, Class D, or Class E.

Source: "Airspace Reclassification and Charting Changes for VFR Products," National Oceanic and Atmospheric Administration, National Ocean Service. Chart adapted by Coffman Associates from AOPA Pilot, January 1993.

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Exhibit 1C
AIRSPACE CLASSIFICATION

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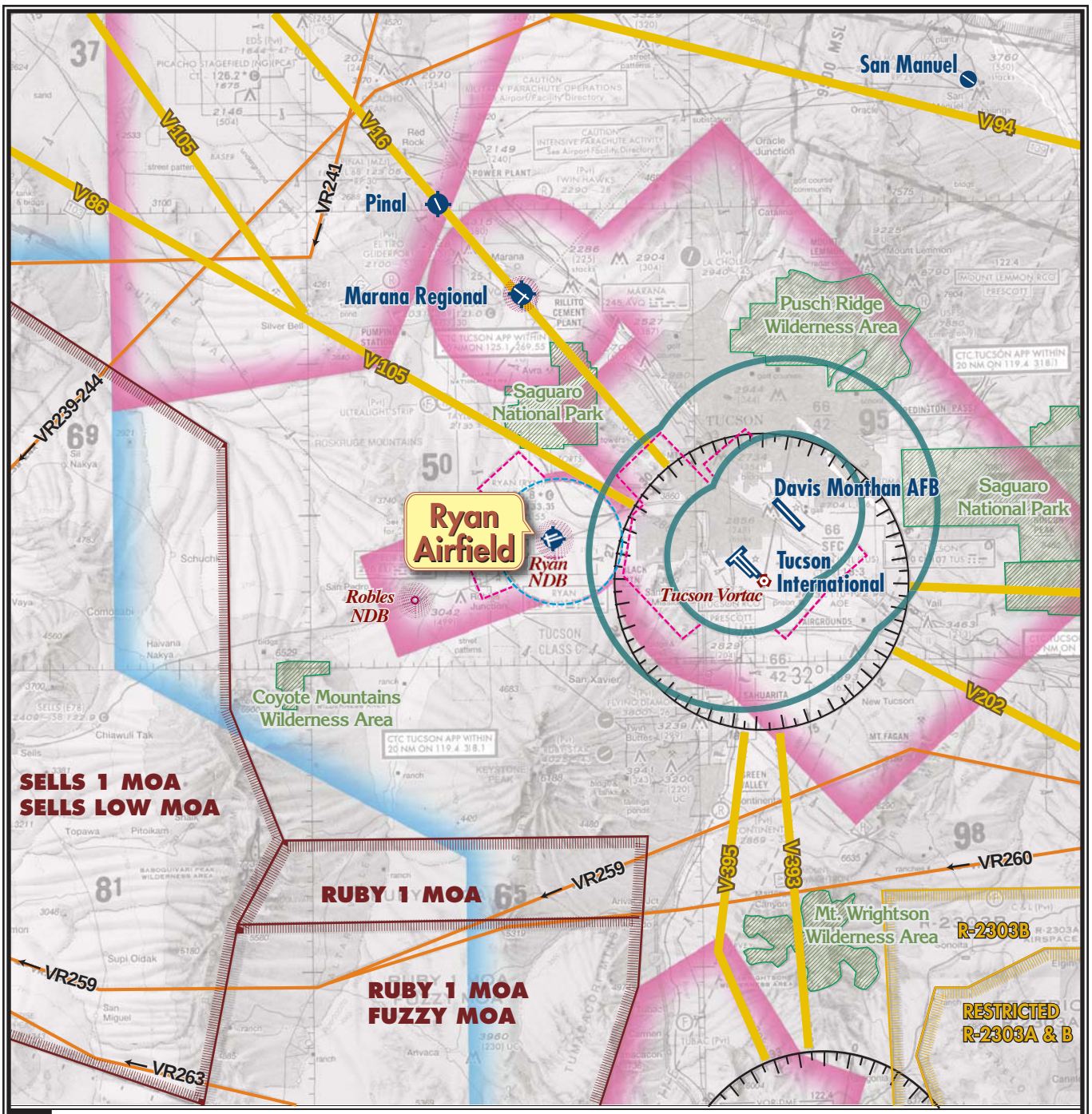

LEGEND

- Airport with hard-surfaced runways 1,500' to 8,069' in length
- Airports with hard-surfaced runways greater than 8,069' or some multiple runways less than 8,069'
- Non-Directional Radiobeacon (NDB)
- VORTAC
- Compass Rose
- Victor Airways
- Class C Airspace (Mode C)
- Class D Airspace
- Class E Airspace
- Class E Airspace with floor 700 ft. above surface
- Class E Airspace with floor 1200 ft. or greater above surface that abuts Class G Airspace
- Military Training Routes
- MOA - Military Operations Area
- Prohibited, Restriced, Warning and Alert Areas

NORTH

NOT TO SCALE

Source: South Pheonix Sectional Charts, US Department of Commerce, National Oceanic and Atmospheric Administration 08/02/07

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Exhibit 1D
VICINITY AIRSPACE

aircraft at major airports. In order to fly inside Class C airspace, the aircraft must have a two-way radio, an encoding transponder, and have established communication with ATC. Aircraft may fly below the floor of the Class C airspace or above the Class C airspace ceiling without establishing communication with ATC. Tucson International Airport and Davis Monthan Air Force Base are both located within Class C airspace.

Exhibit 1D shows the Tucson International Airport and Davis Monthan Air Force Base Class C airspace. The Class C airspace consists of controlled airspace extending upward from the surface to 6,600 feet above ground level (AGL), within which all aircraft are subject to the operating rules and pilot equipment requirements specified in FAR Part 91. The Class C airspace for both airports converge to form an oval shape. The airspace for each airport is made up of two cylinders, an inner and outer, which are centered on each airport. The inner cylinder of each airport has a radius of five nautical miles and extends from the surface of the airport up to 6,600 feet AGL. The outer cylinders have a radius of ten nautical miles that extend from 4,200 AGL to 6,600 feet AGL.

Class D Airspace: Class D airspace is controlled airspace surrounding airports with an ATCT. The Class D airspace typically constitutes a cylinder with a horizontal radius of four or five nautical miles (NM) from the airport, extending from the surface up to a designated vertical limit, typically set at approximately 2,500 feet above the airport elevation. If an airport has an instrument approach or departure, the Class D airspace sometimes extends along the approach or departure path.

Ryan Airfield has its own Class D airspace. It extends for approximately four nautical miles around the airport, from the surface to 4,199 feet MSL. The Ryan Airfield Class D airspace is effective only during the ATCT operational hours, which is from 6:00 a.m. to 8:00 p.m., daily. At all other times, the airport is in Class E airspace.

Class E Airspace: Class E airspace consists of controlled airspace designed to contain IFR operations near an airport and while aircraft are transitioning between the airport and enroute environments. Unless otherwise specified, Class E airspace terminates at the base of the overlying airspace. Only aircraft operating under IFR are required to be in contact with air traffic control when operating in Class E airspace. While aircraft conducting visual flights in Class E airspace are not required to be in radio communications with air traffic control facilities, visual flight can only be conducted if minimum visibility and cloud ceilings exist.

Ryan Airfield is in Class E airspace when the ATCT is closed between 8:00 p.m. and 6:00 a.m. This area of controlled airspace has a floor of 700 feet AGL and extends to Class A airspace. This transition area is intended to provide protection for aircraft transitioning from enroute flights to the airport for landing.

Class G Airspace: Airspace not designated as Class A, B, C, D, or E is

considered uncontrolled, or Class G, airspace. Air traffic control does not have the authority or responsibility to exercise control over air traffic within this airspace. Class G airspace lies between the surface and the overlaying Class E airspace (700 to 1,200 feet AGL). Class G airspace extends below the floor of the Class E airspace transition area in the Ryan Airfield area.

While aircraft may technically operate within Class G airspace without any contact with ATC, it is unlikely that many aircraft will operate this low to the ground. Furthermore, federal regulations specify minimum altitudes for flight. F.A.R. Part 91.119*, Minimum Safe Altitudes*, generally states that except when necessary for takeoff or landing, pilots must not operate an aircraft over any congested area of a city, town, or settlement, or over any open air assembly of persons, at an altitude of less than 1,000 feet above the highest obstacle within a horizontal radius of 2,000 feet of the aircraft. Over less congested areas, pilots must maintain an altitude of 500 feet above the surface, except over open water or sparsely populated areas. In those cases, the aircraft may not be operated closer than 500 feet to any person, vessel, vehicle, or structure. Finally, this section states that helicopters may be operated at less than the minimums prescribed above if the operation is conducted without hazard to persons or property on the surface. In addition, each person operating a helicopter shall comply with any routes or altitudes specifically prescribed for helicopters by the FAA.

Special Use Airspace

Special use airspace is defined as airspace where activities must be confined because of their nature or where limitations are imposed on aircraft not taking part in those activities. These areas are depicted on **Exhibit 1D** by brown and yellow-hatched lines, as well as with the use of green shading.

Military Operating Areas: Military Operations Areas (MOAs) are depicted in **Exhibit 1D** with the brown-hatched lines. The MOAs in the vicinity of Ryan Airfield are all controlled by the Albuquerque Air Route Traffic Control Center (ARTCC) and include the Ruby 1 MOA, Fuzzy MOA, Sells 1 MOA, and the Sells Low MOA, all of which are located southwest of the airfield. The Ruby 1 MOA is used at 10,000 feet MSL from 6:00 a.m. to 7:00 p.m., Monday through Friday. The Fuzzy MOA is used from 100 feet AGL up to 9,999 feet MSL from 7:00 a.m. to 7:00 p.m. daily. The Sells 1 MOA is used at 10,000 feet MSL from 6:00 a.m. to 7:00 p.m., Monday through Friday. The Sells Low MOA is used from 3,000 feet AGL up to 9,999 feet MSL Monday through Friday from 6:00 a.m. to 7:00 p.m.

Military Training Routes: Military training routes near Ryan Airfield are identified with the letters VR and a four digit number, or with IR and a three digit number. The arrows on the route show the direction of travel. Military aircraft travel on these routes below 10,000 feet MSL and at speeds in excess of 250 knots.

Wilderness Areas: As depicted on **Exhibit 1D**, a number of wilderness areas are located in the Tucson area. These wilderness areas include Saguaro National Park (five nautical miles [nm] north), Coyote Mountains Wilderness Area (16 nm southwest), Pusch Ridge Wilderness Area (16 nm northeast), and the Mt. Wrightson Wilderness Area (27 nm southeast). Aircraft are requested to maintain a minimum altitude of 2,000 feet above the surface of designated National Park areas, which includes wilderness areas and designated breeding grounds. FAA Advisory Circular 91-36C defines the "surface" as the highest terrain within 2,000 feet laterally of the route of flight or the uppermost rim of a canyon or valley.

Victor Airways: For aircraft arriving or departing the regional area using very high frequency omnidirectional range (VOR) facilities, a system of Federal Airways, referred to as Victor Airways, has been established. Victor Airways are corridors of airspace eight miles wide that extend upward from 1,200 feet AGL to 18,000 feet MSL and extend between VOR navigational facilities. Victor Airways are shown with solid yellow lines on **Exhibit 1D**.

Restricted Areas: Restricted areas are depicted on **Exhibit 1D** with yellow-hatched lines. There are two restricted areas to the southeast of Ryan Airfield. Restricted airspace is off-limits for public use unless granted permission from the controlling agency. These restricted areas are bomb and gunnery ranges used by the military for training purposes. Restricted area R-2303A includes altitudes from the surface to 15,000 feet MSL and is operational Monday through Friday from 7:00 a.m. to 5:00 p.m. Restricted area R-2303B includes altitudes from 8,000 feet to 30,000 feet MSL and is operational Monday through Friday from 7:00 a.m. to 5:00 p.m. The controlling agency for these restricted areas is the Albuquerque ARTCC.

Airspace Control

The FAA is responsible for the control of aircraft within the Class A, Class C, Class D, and Class E airspace described above. The Albuquerque ARTCC controls aircraft operating in Class A airspace. The Albuquerque ARTCC located in Albuquerque, New Mexico, controls IFR aircraft entering or leaving the Ryan Airfield area. The area of jurisdiction for the Albuquerque center includes most of the states of New Mexico and Arizona, and portions of Texas, Colorado, and Oklahoma.

The Ryan Airfield ATCT controls aircraft approaches and departures from Ryan Airfield airspace. The Ryan ATCT located at the northeast corner of the north parking apron is a contract tower operated by SERCO from 6:00 a.m. to 8:00 p.m. daily. The tower cab is 65 feet high, with offices and a break area below. Controllers gain access to the facility via a staircase from the ground leading to the lower offices and break area. The airport's rotating beacon is located on top of the ATCT cab.

Navigational Aids

Navigational aids are electronic devices that transmit radio frequencies which pilots of properly equipped aircraft translate into point-to-point guidance and position information. The types of electronic navigational aids available for aircraft flying to or from Ryan Airfield include the VOR, the nondirectional beacon (NDB), global positioning system (GPS), and Loran-C.

The VOR provides azimuth readings to pilots of properly equipped aircraft by transmitting a radio signal at every degree to provide 360 individual navigational courses. Frequently, distance measuring equipment (DME) is combined with a VOR facility to provide distance as well as direction information to the pilot. Military tactical air navigation aids (TACANs) and civil VORs are commonly combined to form a VORTAC. A VORTAC provides distance and direction information to civil and military pilots.

The Tucson VOR/DME, located at Tucson International Airport, is approximately 13.5 nautical miles east of the Ryan Airfield area. This facility is identified on **Exhibit 1D**.

The nondirectional beacon (NDB) transmits nondirectional radio signals, whereby the pilot of a properly equipped aircraft can determine the bearing to or from the NDB facility and then "home" or track to or from the station. Ryan Airfield is equipped with NDB equipment on the airfield. The Robles NDB is located approximately 12 miles southwest of Ryan Airfield and provides an initial approach fix to the airport.

Loran-C is a ground-based enroute navigational aid which utilizes a system of transmitters located in various locations across the continental United States. Loran-C allows pilots to navigate without using a specific facility. With a properly equipped aircraft, pilots can navigate to any airport in the United States using Loran-C.

GPS was initially developed by the United States Department of Defense for military navigation around the world. However, GPS is now used extensively for a wide variety of civilian uses, including civil aircraft navigation.

GPS uses satellites placed in orbit around the globe to transmit electronic signals, which pilots of properly equipped aircraft use to determine altitude, speed, and navigational information. This provides more freedom in flight planning and allows for more direct routing to the final destination.

Instrument Approach Procedures

Instrument approach procedures are a series of predetermined maneuvers established by the FAA, using electronic navigational aids that assist pilots in locating and landing at an airport, especially during instrument flight conditions. Ryan Airfield has a published precision and non-precision instrument approach. Precision instrument approaches provide course and vertical guidance, while non-

precision instrument approaches provide only course guidance.

The capability of an instrument is defined by the visibility and cloud ceiling minimums associated with the approach. Visibility minimums define the horizontal distance the pilot must be able to see in order to complete the approach. Cloud ceilings define the lowest level a cloud layer (defined in feet above the ground) can be situated for the pilot to complete the approach. If the observed visibility or cloud ceilings are below the minimums prescribed for the approach, the pilot cannot complete the instrument approach. **Table 1D** summarizes instrument approach minima for Ryan Airfield.

TABLE 1D
Instrument Approach Data

	WEATHER MINIMUMS BY AIRCRAFT TYPE							
	Category A		Category B		Category C		Category D	
	CH	VIS	CH	VIS	CH	VIS	CH	VIS
ILS or LOC RWY 6R								
S-ILS	250	1.0	250	1.0	250	1.0	250	1.0
S-LOC	500	1.0	500	1.0	500	1.25	500	1.5
Circling	500	1.0	500	1.0	500	1.5	580	2.0
NDB/DME or GPS RWY 6R								
Straight-In	900	1.25	900	1.25	900	2.75	900	3.0
Circling	900	1.25	900	1.25	900	2.75	900	3.0

Aircraft categories are based on the approach speed of aircraft, which is determined by 1.3 times the stall speed in landing configuration. The approach categories are as follows:

Category A 0-90 knots (Cessna 172)
Category B 91-120 knots (Beechcraft KingAir)
Category C 121-140 knots (Canadair Challenger)
Category D 141-165 knots (Gulfstream IV)

Abbreviations:
CH: Cloud Height (in feet above ground level)
DME: Distance Measuring Equipment
GPS: Global Positioning System
ILS: Instrument Landing System
LOC: Localizer
NDB: Nondirectional Beacon
VIS: Visibility (in statute miles)

Source: U.S. Terminal Procedures Southwest Volume 4 of 4, March 12, 2009

Visual Flight Procedures

The majority of flights into and out of Ryan Airfield are conducted under visual flight rules (VFR). Under VFR flight, the pilot is responsible for collision avoidance. Typically, the pilot will make radio calls announcing his/her intentions and the position of the aircraft relative to the airport. In most situations, under VFR and basic radar services, the pilot is responsible for navigation and choosing the arrival and departure flight paths to and from the airport. The results of individual pilot navigation for sequencing and collision avoidance are that aircraft do not fly a precise flight path to and from the airport. Therefore, aircraft can be found flying over a

wide area around the airport for sequencing and safety reasons.

While aircraft can be expected to operate over most areas of the airport, the density of aircraft operations is higher near the airport. This is the result of aircraft following the established traffic patterns for the airport. The traffic pattern is the traffic flow that is prescribed for aircraft landing or taking off from an airport. The components of a typical traffic pattern are upwind leg, crosswind leg, downwind leg, base leg, and final approach.

a. Upwind Leg - A flight path parallel to the landing runway in the direction of landing.

b. Crosswind Leg - A flight path at right angles to the landing runway off its upwind end.

c. Downwind Leg - A flight path parallel to the landing runway in the direction opposite to landing. The downwind leg normally extends between the crosswind leg and the base leg.

d. Base Leg - A flight path at right angles to the landing runway off its approach end. The base leg normally extends from the downwind leg to the intersection of the extended runway centerline.

e. Final Approach - A flight path in the direction of landing along the extended runway centerline. The final approach normally extends from the base leg to the runway.

Essentially, the traffic pattern defines the side of the runway on which aircraft will operate. At Ryan Airfield, all runways have established left-hand traffic pattern resulting in aircraft making left turns from base leg to final for landing.

While the traffic pattern defines the direction of turns that an aircraft will follow on landing or departure, it does not define how far from the runway an aircraft will operate. The distance laterally from the runway centerline an aircraft operates or the distance from the end of the runway is at the discretion of the pilot, based on the operating characteristics of the aircraft, number of aircraft in the traffic pattern, and meteorological conditions. The actual ground location of each leg of the traffic pattern varies from operation to operation for the reasons of safety, navigation, and sequencing, as described above. The distance that the downwind leg is located laterally from the runway will vary based mostly on the speed of the aircraft. Slower aircraft can operate closer to the runway as their turn radius is smaller.

The established traffic pattern altitude (TPA) for aircraft operating in the traffic pattern is 800 feet above the ground (or 3,217 feet MSL) when on the downwind leg. The traffic pattern altitude is established so that aircraft have a predictable descent profile on base leg to final for landing.

Area Airports

A review of public-use airports within the vicinity of Ryan Airfield has been made to identify and distinguish the type of air service provided in the area

surrounding the airport. Information pertaining to each airport was obtained from FAA records.

Tucson International Airport is located approximately 12 miles east of Ryan Airfield. Tucson International Airport is owned by the City of Tucson and operated by the TAA. There are three runways available for use: Runway 11L-29R is 10,996 feet long and 150 feet wide; Runway 11R-29L is 8,408 feet long and 75 feet wide; and Runway 3-21 is 7,000 feet long and 150 feet wide. The ATCT at Tucson International Airport is operated continuously. There is one published ILS instrument approach, eight RNAV instrument approaches (6 GPS, 2 RNP), one LOC/DME instrument approach, and two VOR instrument approaches into Tucson International Airport. Tucson International Airport has approximately 400 based aircraft, and 270,348 operations were conducted in 2006. A full range of commercial service as well as general aviation services are available at the airport.

Davis Monthan Air Force Base is located approximately 15 nautical miles east of Ryan Airfield. Davis Monthan AFB is a military base with a single runway. Runway 12-30 has a length of 13,643 feet and a width of 200 feet. The base has its own military ATCT.

Marana Regional Airport is located approximately 16 nautical miles north of Ryan Airfield and is owned and operated by the Town of Marana. The airport is equipped with a dual runway system. The primary runway, Runway 12-30, has a length of 6,901 feet and a width of 100 feet. Marana Regional Airport has five published non-precision instrument approaches. A full range of general aviation services are available at the airport. The airport has approximately 295 based aircraft and annual operations are estimated at more than 100,000. The airport does not currently have a tower, but has begun the approval process to establish a federal contract tower similar to that at Ryan Airfield.

La Cholla Airpark is located approximately 20 nautical miles northeast of Ryan Airfield and is privately owned and operated by La Cholla Airpark Inc. The airport is equipped with a single asphalt runway, which measures 4,500 feet long and 44 feet wide. La Cholla Airpark has limited general aviation services available, including 100LL Avgas. There are a total of 93 based aircraft, and annual operations are estimated at 4,000.

Pinal Airpark is located approximately 23 nautical miles northwest of Ryan Airfield. It is owned by Pinal County and leased to Evergreen Air Center, Inc. A single runway 6,849 feet long by 150 feet wide is available for use. Pinal Airpark does not have an operating ATCT. There are approximately 58 based aircraft at Pinal Airpark. A full range of general aviation services are available at Pinal Airpark. A major function on this airport is the storage of commercial service aircraft.

San Manuel Airport is located approximately 40 nautical miles northeast of Ryan Airfield. San Manuel Airport is on property owned by Mag-

ma Copper Co. and leased to Pinal County. There is a single runway available for use, Runway 11-29, which measures 4,200 feet in length and 75 feet in width. There is no operating ATCT and there are no published instrument approaches into San Manuel Airport. There are approximately 27 based aircraft at San Manuel Airport. General aviation services at San Manuel Airport are limited.

Sells Airport, located 39 miles southwest of Ryan Airfield, has a single asphalt runway that measures 5,830 feet long and 60 feet wide. Sells Airport is owned and operated by the Tohono O'odham Indian Nation. There are no general aviation services provided at the airport. There are currently no based aircraft, and annual operations are estimated at 1,210.

Eric Marcus Municipal Airport, located 88 miles west of Ryan Airfield in the City of Ajo, Arizona, has a single asphalt runway available for public use. The runway has a length of 3,800 feet and a width of 60 feet. The airport is owned and operated by Pima County. Limited general aviation services are available at the airport. There are currently five based aircraft, and annual operations are estimated at 300.

LANDSIDE FACILITIES

Landside facilities are the ground-based facilities that support the aircraft and pilot/passenger handling functions. These facilities typically include aircraft storage/maintenance hangars, aircraft parking aprons, and support facilities such as fuel storage, automobile parking, and roadway access. Landside facilities are identified on **Exhibit 1E**.

Administration Building

The administration building was built in 2004 and is located on the southeast side of the airport, north of the intersection of West Ajo Highway (Highway 86) and West Valencia Road. The administration building encompasses approximately 2,500 square feet and includes administrative offices, a pilot's lounge and briefing room, a conference room, supply closets, and restrooms. An adjacent parking lot provides a total of 13 parking spaces, including a handicapped parking space.

Aircraft Hangar Facilities

There are currently 251 individual aircraft storage units at Ryan Airfield totaling 434,830 square feet. This hangar space is made up of 30 T-hangar units and 157 conventional hangar units of varying size and shape. There are also two 18,900 square-foot shade hangar facilities on the airport with a total of 64 aircraft storage spaces. All hangar facilities are located south of Runway 6R-24L and east of Runway 15-33. There is currently a hangar waiting list as each hangar unit is currently occupied.

07MP02-1E-4/2/09

AREA A

HELICOPTER PARKING

NORTH APRON

AREA B

AREA C

AREA D

TAXIWAY D

TAXIWAY B2

AVIATOR LANE

FLIGHT SCHOOL APRON

SOUTH APRON

AIRFIELD DRIVE

CONNECTOR ROAD

NORTH

0 300 600

SCALE IN FEET

AREA A

1. Flight School (vacant)
2. Tyconic, Inc.
3. Vista West Hangars
4. Winsor Aviation
5. Jim's Aircraft
6. Southwest Avionics
7. Kelly's Aviation
8. National Pilot Academy
9. Alpha Air
10. Air Center West
11. Windwalker Flight Instruction
12. Tucson Upholstery

AREA B

11. Todd's Restaurant
12. TAA Administration Building
13. Self Fueling System
14. Mobile Aire Hangars
15. Corsair Condos
16. E & R AERO
17. Hangar Facility
18. Aircraft Washrack
19. Airport Traffic Control Tower

AREA C

20. Cherokee Cabanas
21. Airlift Service
22. B & M Aircraft
23. Air Ventures Plaza
24. Aircrafters

AREA D

25. TAA Maintenance Facilities
26. ARDCO

Exhibit 1E
LANDSIDE FACILITIES

Fixed Base Operator (FBO)

Ryan Airfield does not currently have a full service FBO, but provides similar services through a combination of the Airport Authority and specialty operators on the airport. General aviation services that the TAA provides include 100LL Avgas fuel, aircraft ramp or tiedown parking, flight planning equipment, vending machines, and restrooms. The TAA maintains office space, a conference room, and a pilot's lounge in the airport administration building.

Apron and Aircraft Parking

There are five separate aircraft parking aprons at Ryan Airfield encompassing approximately 70,499 square yards and providing 160 total aircraft tiedown spaces.

The TAA controls two of the three aircraft parking aprons. The first is located adjacent to the administration building and the restaurant and is called the south apron. The south apron encompasses approximately 24,000 square yards and has 50 aircraft tiedown spots used mainly for short-term and overnight aircraft parking. The self-service fuel island operated by the TAA is located on the south end of the south apron east of the administration building. The north apron, the closest apron to the airfield, is located between Taxiways D and B2. The north apron encompasses approximately 28,900 square yards and has 51 aircraft tiedown spots not including a helicopter parking pad north of the central part of the apron. The north apron is used primarily as long-term parking. The ATCT is located at the northeast corner, and an aircraft wash rack is located on the south side of this apron.

The third aircraft parking apron, which is located east of the Runway 33 end was formerly used by the airport's flight training school. This apron encompasses approximately 10,500 square yards and has 20 aircraft tiedown spaces. The flight training facilities are located at the southeast corner of the apron. An additional five aircraft tiedown positions are available north of the flight school's hangar facilities on 1,044 square yards of apron area.

A 6,055 square yard apron area north of the Vista West hangars includes 16 tiedown positions and 15 nose shades for locally based aircraft.

Fueling Facilities

Fuel storage at Ryan Airfield consists of underground fuel storage tanks and fueling trucks. Two 12,000 gallon FiberSteel underground 100LL Avgas fuel storage tanks owned by the TAA are located adjacent the administration building. These storage tanks were installed in 1989 and are in excellent condition. The fuel in these storage tanks is dispensed by a self-service fuel island that allows customers to pay at the pump and fuel their own aircraft. The TAA also owns one 100LL Avgas fuel truck with a capacity of 1,000 gallons, two Jet A fuel trucks with a combined capacity of 5,500 gallons, and two 2,000-gallon tanks used to store diesel fuel and unleaded gasoline. The diesel and un-

leaded gasoline storage tanks were installed adjacent to the maintenance facilities in 1999 and are used for fueling fleet vehicles. The TAA has plans to construct a fuel farm consisting of one 12,000-gallon storage tank for Jet A fuel. This fuel farm would be located adjacent the maintenance facilities.

Maintenance/ARFF Facilities

Maintenance at Ryan Airfield is performed by the TAA. The maintenance facilities are located on the east side of the airport and are made up of a 2,400 square-foot maintenance shop, an 1,800 square-foot shade parking structure, a 1,200 square-foot storage room, a pesticide shed, a paved vehicle movement area, and fuel storage facilities. The maintenance area is accessible through a security gate entrance off of Airfield Road and a service road stemming from Taxiway B4.

Ryan Airfield is not an F.A.R. Part 139 certificated airport; therefore, it is not required to have aircraft rescue and firefighting (ARFF) equipment onsite. However, the TAA maintains an ARFF vehicle at the airport which has the capability of applying aqueous foam and dry chemical flame retardants. This ARFF equipment is stored in the maintenance facilities. A listing of maintenance and ARFF equipment is included in **Table 1E**.

Utilities

The availability of utilities at the airport is an important factor in determining the development potential of the airport property. Of primary concern in the inventory investigation is the availability of water, sanitary sewer, electricity, telecommunications, and natural gas. Some, if not all, of these utilities will be necessary for any future development. Water is provided by the City of Tucson via a 12-inch main water line which runs along Ajo Highway and on-site water mains for domestic and fire protection. Sanitary sewer service is provided by individual septic tank systems, and a TAA maintained "community" septic tank system. Electrical power is supplied to the airport by two sources: Tri Co. Electric Company serving the west side of the airport and Tucson Electric Power serving the east side. Telecommunication services are provided by Qwest. Natural gas is provided by Southwest Gas.

Security Fencing and Gates

The airport perimeter is equipped with six-foot chain-link fencing with three strands of barbed wire. Hangars and operating areas in the terminal area are separated from public areas by chain-link security fencing. Automated access gates are located in several locations throughout the terminal area, all of which are padlocked or remote security controlled.

TABLE 1E
TAA Maintenance and ARFF Equipment
Ryan Airfield

ASSET NUMBER	YEAR	TYPE	DESCRIPTION
227	1970	Dump Truck	International 2 1/2 ton 2wd
268	1977	Jet A Refueler	International 2,500-gallon capacity
85	1978	Crack Sealer	Crafco Ez-pour 200-gallon capacity
210	1990	GPU	28vdc, 10kw, military surplus
289	1991	Jet A Refueler	3,000-gallon capacity
170	1993	Sweeper	International-Elgin
226	1994	Welder/Generator	Miller 8kw
231	1996	Forklift	Ingersol Rand 8,000 lbs. off-road 2wd
230	1999	Trailer	Carson 3,500 lbs. single-axle
252	1999	Pressure Washer	Landa 3,000 psi.
89	2000	Avgas Refueler	Isuzu/Bosserman - 1,000-gallon capacity
323	2002	Utility Tractor	John Deere 72 4wd, 90 hp
324	2002	Mower Deck	John Deere 15' width
--	2004	Riding Mower	John Deere
369	2005	Fuel Bowser	200-gallon capacity
--	2005	Pesticide Sprayer	Single axle trailer, 200-gallon capacity
365	2006	Service Truck	Ford F-250 crew cab, 4wd, long bed, winch
373	2006	ARFF	Ford F-550 4wd - aqueous foam/dry chemical
383	2006	Service Truck	Ford F-250 extended cab, 4wd, long bed
395	2006	Skid-Steer	John Deere 317
126	UNKNOWN	Crack Router	Crafco
--	UNKNOWN	Spill Response Trailer	Military surplus, single axle

Source: TAA Records

Specialty Operators/ Other Tenants

Several businesses are located on the airport providing a wide variety of aviation and non-aviation related services. The following is a brief description of each of the businesses currently located on airport property. Each business is identified on **Exhibit 1E**.

Air Center West, located in area A of the terminal area on **Exhibit 1E**, leases hangar space, aircraft tiedowns, shadeports, and office space at Ryan Airfield. Their facility includes a pilot's lounge and office space.

AirCrafters, located in area C of the terminal area, provides heavy maintenance for light aircraft.

Airlift Service, located in area C of the terminal area, provides maintenance for light aircraft.

Air Ventures Plaza, located in area C of the terminal area, develops, leases, and sells hangar space.

Alpha Air, located in area A of the terminal area, is a flight school and flying club, which also sells basic pilot supplies.

ARDCO, located in area D of the terminal area, contracts with the U.S. Forest Service for aerial firefighting services.

B&M Aircraft, located in area C of the terminal area, provides heavy maintenance on light aircraft.

Cherokee Cabanas, located in area C of the terminal area, develops, rents, and sells hangar space on the airport.

Corsair Condos, located in area B of the terminal area, provides executive hangar space for rent.

E & R AERO, located in area B of the terminal area, provides maintenance for light aircraft.

Jim's Aircraft, located in area A of the terminal area, provides maintenance on light aircraft, aircraft part sales, and hangar and tiedown rentals.

Kelly's Aviation, located in area A of the terminal area, provides flight instruction and aircraft rental services.

Mobile Aire, located in area B of the terminal area, provides aircraft parking, tiedowns, and hangar rentals.

National Pilot Academy, located in area A of the terminal area, provides flight training services.

Southwest Avionics, located in area A of the terminal area, sells avionics equipment.

Todd's Restaurant, located in area B of the terminal area, is a 2,400 square-foot facility located adjacent to the airport administration building, providing restaurant services. The restaurant has a parking lot which provides 30 automobile parking spaces.

Tucson Upholstery, located in area A of the terminal area, provides full service upholstery services.

Tyconic, Inc., located in area A of the terminal area, provides flight training, aircraft rental, light maintenance on light aircraft, and limited pilot supplies.

VistaWest Hangars, located in area A of the terminal area, provides aircraft storage services.

Windwalker Flight Instruction, located in area A of the terminal area, provides flight instruction services.

Winsor Aviation, located in area A of the terminal area, provides flight instruction services and pilot supplies.

ACCESS & CIRCULATION

The airport is located approximately ten miles southwest of the City of Tucson at the intersection of Ajo Highway (State Route 86) and West Valencia Road. Ajo Highway is a two-lane paved roadway that extends from Interstate 19 in Tucson to Ajo.

Interstate 19, which runs north to south, extends from Tucson 66 statute miles to Nogales at the Mexican border. Interstate 10, which runs east to west, traverses Tucson and extends 116 statute miles to Phoenix in the

northwest, and 318 statute miles to El Paso, Texas to the east.

Access to the airport is provided by Airfield Drive at the intersection of Ajo Highway and West Valencia Road. Airfield Road is a paved two-lane road which provides access to several on-airport specialty operators and hangar facilities. South Aviator Lane is a divided two-lane paved road that provides access from Ajo Highway to the ATCT, as well as several other specialty operators and hangar facilities. South Aviator Lane and Airfield Drive are connected by a paved roadway that runs parallel to Ajo Highway. Each of these roadways is identified on **Exhibit 1E**.

A total of 199 automobile parking spaces are provided along both Aviator Lane (146 parking spaces) and Airfield Drive (53 parking spaces) for public use. An additional 10 parking spaces are provided adjacent to the gate entrance to the north apron.

SOCIOECONOMIC PROFILE

The socioeconomic profile provides a general look at the socioeconomic makeup of the community that utilizes Ryan Airfield. It also provides an understanding of the dynamics for growth and the potential changes that may affect aviation demand. Aviation demand forecasts are often directly related to the population base, economic strength of the region, and the ability of the region to sustain a strong economic base over an extended period of time. Current demographic and economic information was collected from the Pima Association of Governments (PAG), Arizona Department of Economic Security, and the United States Department of Commerce.

POPULATION

Population is a basic demographic element to consider when planning for future needs of the airport. The State of Arizona has been one of the fastest growing states in the country. **Table 1F** shows the total population growth since 1960 for the State of Arizona, Pima County, and the City of Tucson. The State, County, and City experienced its greatest amount of growth between 1970 and 1980. Recently, Arizona has grown at a faster annual average rate (3.3 percent) since 2000 than Pima County and the City of Tucson (2.3 and 1.4 percent respectively).

TABLE 1F
Tucson Area Population Trends

Year	State of Arizona	Avg. Annual % Change	Pima County	Avg. Annual% Change	City of Tucson	Avg. Annual % Change
1960	1,302,161	--	265,660	--	212,892	--
1970	1,770,900	3.1%	351,666	2.8%	262,933	2.1%
1980	2,718,215	4.4%	531,433	4.2%	330,537	2.3%
1990	3,665,228	3.0%	666,880	2.3%	405,390	2.1%
2000	5,130,632	3.4%	843,746	2.4%	486,699	1.8%
2008	6,629,455	3.3%	1,014,023	2.3%	543,959	1.4%

Sources: U.S. Census Bureau (1960-2000)
Arizona Department of Commerce (2008)

EMPLOYMENT

Employment opportunities affect migration to the area and population growth. As shown in **Table 1G**, the Tucson metropolitan statistical area (MSA) unemployment rate has been consistently below state and national levels over the last seven years. This indicates a strong job market and a healthy local economy which promotes population growth.

TABLE 1G
Historical Unemployment Rate
United States, State of Arizona, Tucson Metropolitan Statistical Area

Year	United States	State of Arizona	Tucson MSA
2000	4.0%	4.0%	3.7%
2001	4.7%	4.7%	4.3%
2002	5.8%	6.0%	5.7%
2003	6.0%	5.7%	5.3%
2004	5.5%	4.9%	4.6%
2005	5.1%	4.6%	4.4%
2006	4.6%	4.1%	4.0%
2007	4.6%	3.7%	3.6%

Source: Arizona Department of Economic Security

Table 1H summarizes total employment by sector for Pima County from 1970 to 2008. As shown in the table, total employment in the county has experienced steady growth over this timeframe with an average annual growth rate of 3.4 percent. The sectors that experienced the greatest growth were the "Services" sector (5.2 percent), "Finance, Ins. & Real Estate" sector (4.4 percent), and "Transportation, Communication, and Utility" sector (3.4 percent).

TABLE 1H
Pima County Employment by Sector

Sector	1970	1980	1990	1995	2000	2008	Annual % Growth
Farm Employment	1,090	930	1,040	1,070	990	1,155	0.2%
Agricultural Services, Other	970	1,880	3,330	4,260	4,940	294	-3.1%
Mining	6,970	6,920	2,740	2,790	2,480	2,320	-2.9%
Construction	11,060	16,710	18,830	24,300	27,710	36,069	3.2%
Manufacturing	9,300	22,080	28,260	29,870	34,930	30,589	3.2%
Trans., Comm., Util.	5,870	8,960	10,120	15,220	14,580	21,245	3.4%
Wholesale Trade	3,510	6,130	8,840	11,360	12,620	11,702	3.2%
Retail Trade	25,340	40,840	60,490	68,210	73,940	57,334	2.2%
Finance, Ins. & Real Estate	10,950	21,000	24,780	26,850	36,220	55,655	4.4%
Services	32,450	59,960	103,820	126,550	155,830	219,970	5.2%
Government	36,750	49,340	59,450	74,130	80,130	85,431	2.2%
Total	144,260	234,750	321,700	384,610	444,370	521,764	3.4%

Source: Woods & Poole CEDDS 2007

PER CAPITA PERSONAL INCOME

Per capita personal income (PCPI) for the United States, the State of Arizona, and the Tucson MSA is summarized in **Table 1J**. PCPI is determined by dividing total income by population. For PCPI to grow significantly, income growth must outpace population growth. As shown in the table, PCPI average annual growth in the Tucson MSA (1.2 percent) has been outpaced by PCPI growth in the state (1.3 percent) and the country (1.5 percent) since 1970. Historic PCPI levels for the Tucson MSA have also been consistently lower than the state and national levels.

TABLE 1J
Historical Per Capita Personal Income (2004 $)
United States, State of Arizona, Tucson MSA

Year	United States	Arizona	Tucson MSA
1970	$19,810	$18,505	$18,539
1980	$23,038	$21,384	$20,559
1990	$28,150	$24,577	$23,128
1995	$28,603	$24,702	$23,891
2000	$32,737	$28,144	$26,517
2005	$33,341	$29,035	$27,923
Avg. Annual Growth Rate	1.5%	1.3%	1.2%

Source: United States Department of Commerce, Bureau of Economic Analysis

CLIMATE

Weather plays an important role in the operational capabilities of an airport. Temperature is an important factor in determining runway length required for aircraft operations. The percentage of time that visibility is impaired due to cloud coverage is a major factor in determining the use of instrument approach aids.

Temperatures typically range from 68 to 99 degrees Fahrenheit (F) during the summer months. The hottest month is typically July with an average high of 99.6 degrees. July is the wettest month averaging 2.29 inches of precipitation. January is the coldest month with average minimum temperatures around 38 degrees. There are only 82 cloudy days a year in Tucson, with the majority occurring during the winter months. **Table 1K** summarizes typical temperature and precipitation data for the region.

TABLE 1K
Temperature and Precipitation Data
Tucson, Arizona

	Temperature (Fahrenheit)			
	Mean Maximum	Mean Minimum	Precipitation (Inches)	Cloudy Days
January	64.8	38.7	0.87	10
February	68.2	41.0	0.72	9
March	73.2	44.9	0.71	9
April	81.5	50.9	0.31	6
May	90.4	58.7	0.18	4
June	99.6	68.1	0.24	3
July	99.3	73.9	2.29	9
August	97.0	72.4	2.28	7
September	94.2	67.8	1.35	4
October	84.7	57.0	0.91	5
November	73.1	45.4	0.59	6
December	65.3	39.0	0.94	10
Annual	82.6	54.8	11.37	82

Source: Western Regional Climate Center

ENVIRONMENTAL INVENTORY

Available information about the existing environmental conditions at Ryan Airfield has been derived from the 1990 Environmental Assessment, internet resources, agency maps, and existing literature. The intent of this task is to inventory potential environmental sensitivities that might affect future improvements at the airport.

Air Quality

The U.S. Environmental Protection Agency (EPA) has adopted air quality standards that specify the maximum permissible short-term and long-term concentrations of various air contaminants. The National Ambient Air Quality Standards (NAAQS) consist of primary and secondary standards for six criteria pollutants which include: Ozone (O_3), Carbon Monoxide (CO), Sulfur Dioxide (SO_2), Nitrogen Oxide (NO), Particulate matter (PM_{10} and $PM_{2.5}$), and Lead (Pb). Various levels of review apply within both NEPA and permitting requirements. Potentially significant air quality impacts, associated with an FAA project or action, would be demonstrated by the project or action exceeding one or more of the NAAQS for any of the time periods analyzed.

The airport is located in Pima County, which is in attainment for Carbon Monoxide (CO), Particulate Matter (PM10), and Sulfur Dioxide (SO2).

Fish, Wildlife, and Plants

The Fish and Wildlife Service (FWS) and the National Marine Fisheries Service (NMFS) are charged with overseeing the requirements contained within Section 7 of the *Endangered Species Act*. This Act was put into place to protect animal or plant species whose populations are threatened

by human activities. Along with the FAA, the FWS and the NMFS review projects to determine if a significant impact to these protected species will result with implementation of a proposed project. Significant impacts occur when the proposed action could jeopardize the continued existence of a protected species or would result in the destruction or adverse modification of federally designated critical habitat in the area.

In a similar manner, states are allowed to prepare statewide wildlife conservation plans through authorizations contained within the *Sikes Act*. Airport improvement projects should be checked for consistency with the State or Department of Defense (DOD) Wildlife Conservation Plans where such plans exist. The Arizona Department of Game and Fish oversees State Natural Heritage Programs in Arizona.

Vegetation on the airport is mostly characterized by a sparse Mesquite-Creosote bush. The airport lies in the Avra Valley and is adjacent to the east forks of Brawley Wash, the main drainage way of the valley. A major branch of the wash runs from southwest to northwest past the extreme northeastern corner of the airport. This area consists of riparian habitat to the north and east of the airport containing dense stands of mesquite forests and provides high density nesting habitat for migratory birds and functions as a movement corridor for a variety of wildlife.

Table 1L depicts federally listed species in Pima County. In addition, the Arizona Game and Fish Department has numerous species listed as wildlife species of concern. A search of the Arizona Heritage Data Management System on-line environmental review tool indicates that the Pima Pineapple Cactus, a federally listed species, has a recorded occurrence within three miles of the airport. It was also indicated that one or more native plants listed on the Arizona Native Plant Law and Antiquities Act have been documented within the vicinity of the airport.

Previous surveys conducted for airport development projects failed to locate any significant or sensitive habitat or threatened or endangered species.

Floodplains

Floodplains are defined in *Executive Order 11988, Floodplain Management*, as "the lowland and relatively flat areas adjoining inland and coastal waters…including at a minimum, that area subject to a one percent or greater chance of flooding in any given year" (i.e., that area would be inundated by a 100-year flood). Federal agencies, including the FAA, are directed to "reduce the risk of loss, to minimize the impact of floods on human safety, health, and welfare, and to restore and preserve the natural and beneficial values served by floodplains." The airport is located within 100-year floodplains associated with Brawley Wash and its tributaries.

TABLE 1L
Threatened or Endangered Species in Pima County, Arizona

Species	Federal Status
California brown pelican	Endangered
Chiricahua leopard frog	Threatened
Desert pupfish	Endangered
Gila chub	Endangered
Gila topminnow	Endangered
Huachua water umbel	Endangered
Jaguar	Endangered
Kearney blue star	Endangered
Lesser long-nosed bat	Endangered
Masked bobwhite	Endangered
Mexican spotted owl	Threatened
Nichol Turk's head cactus	Endangered
Ocelot	Endangered
Pima pineapple cactus	Endangered
Sonoran pronghorn	Endangered
Southwestern willow flycatcher	Endangered
Acuna cactus	Candidate
Sonoyta mud turtle	Candidate
Yellow-billed cuckoo	Candidate

Source: FWS online listed species database, November 2007

Wetlands/Waters of the U.S.

The U.S. Army Corps of Engineers regulates the discharge of dredged and/or fill material into waters of the United States, including adjacent wetlands, under Section 404 of the *Clean Water Act*. Wetlands are defined in *Executive Order 11990, Protection of Wetlands*, as "those areas that are inundated by surface or groundwater with a frequency sufficient to support and under normal circumstances does or would support a prevalence of vegetation or aquatic life that requires saturated or seasonably saturated soil conditions for growth and reproduction." Categories of wetlands include swamps, marshes, bogs, sloughs, potholes, wet meadows, river overflows, mud flats, natural ponds, estuarine areas, tidal overflows, and shallow lakes and ponds with emergent vegetation. Wetlands exhibit three characteristics: hydrology, hydrophytes (plants able to tolerate various degrees of flooding or frequent saturation), and poorly drained soils.

The east forks of Brawley Wash are located north and east of the airport. As seen on the United States Geological Survey (USGS) map, waters associated with the Brawley Wash are located east and west of the airport. It is not known if these waters are considered jurisdictional.

Historical, Architectural, and Cultural Resources

Determination of a project's impact to historical and cultural resources is made in compliance with the *National Historic Preservation Act* (NHPA) *of 1966*, as amended for federal undertakings. Two state acts also require consideration of cultural resources. The NHPA requires that an initial review be made of an undertaking's *Area of Potential Effect* (APE) to determine if any properties in, or eligible for inclusion in, the National Register of Historic Places are present in the area.

Coordination undertaken with the State Historic Preservation Officer (SHPO) during the 1990 EA indicated that the airport is located in an area where significant cultural resources might be located. Previous surveys undertaken for airport development projects did not reveal any cultural resources.

Department of Transportation Act: Section 4(f)

Section 4(f) properties include publicly owned land from a public park, recreational area, or wildlife and waterfowl refuge of national, state, or local significance; or any land from a historic site of national, state, or local significance. There are no Section 4(f) resources located on airport property. Previous coordination with the Pima County Parks and Recreation Department expressed concern regarding Vahalla Regional Park located approximately 2.5 miles southeast of the airport. The Arizona State Parks Department has previously expressed concern regarding air traffic over the San Xavier Del Bac Mission, which is located on the National Register of Historic Places. The mission is located eight miles southeast of the airport.

LAND USE

Existing Land Use and Zoning

The existing land use for the area surrounding Ryan Airfield is depicted on **Exhibit 1F**. As indicated on the exhibit, the areas in the immediate vicinity of the airport are largely undeveloped. Land cover in these areas consists of open rangeland with scrub vegetation. Development is limited north of the airport. There is a small industrial development located south of Snyder Hill Road and a water treatment facility north of the airport. Additionally, there are scattered single-family and mobile home residences in this area. To the west of the airport, there are several low-density single-family and mobile homes residence. East of the airport, there are two commercial properties, including a gun shooting range and an automobile salvage yard. The area directly south of the airport is undeveloped rangeland. Southeast of the airport, along Valencia Road, there are multiple single-family residential developments with existing residences, houses under construction, and available lots. The density of these developments is greater than the existing single-family developments north and west of the airport.

Although much of the area near Ryan Airfield is undeveloped, the potential for development remains. An examination of the Pima County zoning designations, although not permanent, can provide some insight into how the land could be developed. A parcel's zoning classification determines the type of development that may occur on the property as outlined in the county's zoning ordinance. According to the Pima County Assessor's office, the areas immediately surrounding the airport are zoned as Rural Homestead (RH). This classification allows residential uses and commercial and industrial development appropriate and necessary to serve the needs of rural areas. The land north of the airport is zoned as General Industrial (CI-2) which allows a variety of industrial and manufacturing land uses and airport facilities. There are also several smaller parcels zoned for a variety of residential and supporting commercial land uses located throughout the airport area. These parcels are zoned as Mixed Dwelling (CR-4), General Residential (GR-1), Transition (TR), and Local Business (CB-1). A detailed listing of the allowable uses within each of these zones can be found in Chapter 18 of the Pima County Code.

In addition to the primary zoning classifications, Pima County has established an airport overlay zone for Ryan Airfield that consists of a height overlay and a land use overlay. The height overlay establishes a maximum allowable height for structures near the airport. The intent of this zone is to protect the airspace in the arrival and departure corridors at the airport from potential obstructions. The land use overlay zone permits a variety of non-residential uses that are considered compatible with airport operations and establishes a minimum density of one dwelling unit per acre for residential land uses.

For further analysis of land use and zoning please refer to Appendix C.

SUMMARY

The information discussed on the previous pages provides a foundation upon which the remaining elements of the planning process will be constructed. Information on current airport facilities and utilization will serve as a basis, with additional analysis and data collection, for the development of forecasts of aviation activity and facility requirement determinations. The inventory of existing conditions is the first step in the process of determining those factors which will meet projected aviation demand in the community and the region.

DOCUMENT SOURCES

A variety of sources were used in the inventory of existing facilities. The following listing presents a partial list of reference documents. The list does not reflect some information collected by airport staff or through interviews with airport personnel.

AirNAV Airport information, website: http://www.airnav.com

Airport/Facility Directory, Southwest U.S., U.S. Department of Transportation, Federal Aviation Administration,

07MP02-1F-6/12/08

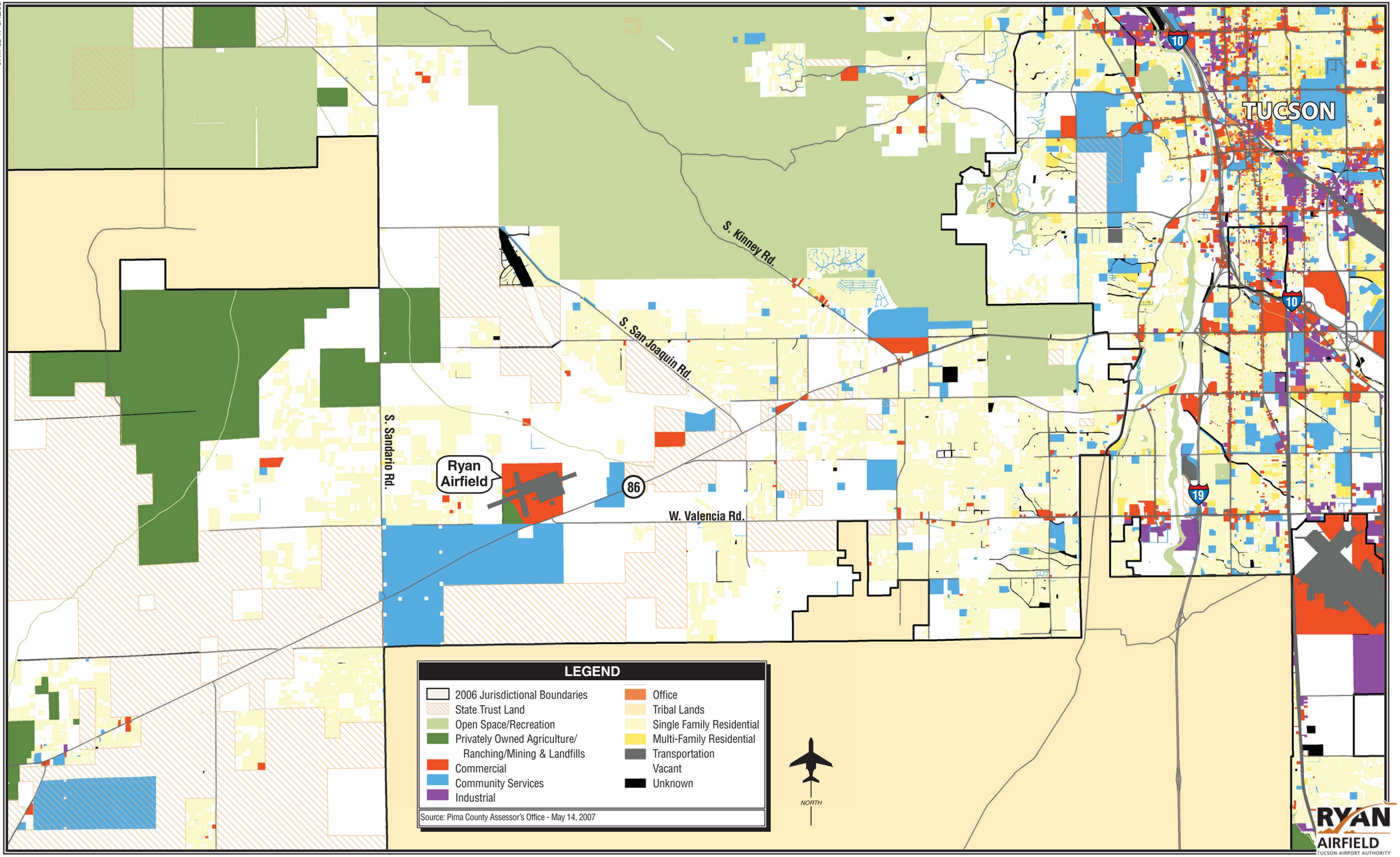

Exhibit 1F
2006 LAND USE MAP

National Aeronautical Charting Office, October 25, 2007 Edition

Arizona Department of Commerce, 2008

Arizona Department of Transportation; 2007

FAA 5010 Form, Airport Master Record; 2007

National Plan of Integrated Airport Systems (NPIAS), U.S. Department of Transportation, Federal Aviation Administration, 2007-2011

Pima Association of Governments (PAG); 2007

Ryan Airfield *Airport Master Plan*; 1999

Ryan Airfield *Master Plan & F.A.R. Part 150 Noise Compatibility Plan, Environmental Assessment*; 1990

Tucson Airport Authority (TAA)

U.S. Department of Commerce, Bureau of Economic Analysis; 2007

U.S. Terminal Procedures, Volume 4 of 4, Department of Transportation, Federal Aviation Administration, March 12, 2009 Edition.

Western Regional Climate Center; 2007

Woods & Poole Economics, *The Complete Economic and Demographic Data Source*; 2007