SAN ANGELO REGIONAL AIRPORT

AIRPORT MASTER PLAN

CHAPTER 1 - INVENTORY

centurion PLANNING AND DESIGN

INTRODUCTION

An airport master plan is a comprehensive study of an airport that focuses on short-, medium-, and long-term development plans to meet future aviation demand. It focuses on facilities that serve passengers, air cargo, aircraft owners, pilots, and airport tenants providing guidance on how facilities should be updated to maintain a high level of service to the flying public into the future. The master planning process concludes with an Airport Layout Plan (ALP) which is a set of drawings depicting existing facilities and the planned future development plans for an airport. ALPs are regularly updated as airport improvements are undertaken. Federal Aviation Administration (FAA) Advisory Circular 150/5070-6B, *Airport Master Plans*, provides guidance for the preparation of Master Plan's and defines the general content.
The latest Airport Master Plan for San Angelo Regional Airport (Airport) was prepared in 1995. The ALP has been regularly maintained with the most recent update completed in 2012.

The Airport Master Plan is a joint effort on behalf of all involved in the use of the airport. It consists of six elements that translate into master plan chapters as follows.

Inventory

This element describes facilities and levels of activity currently existing at the Airport. The inventory is the foundation of subsequent plan elements.

Forecasts

Understanding future demand is a critical part in the decision-making process that occurs during the planning process and the execution of the ensuing capital improvement plan. The forecasts evaluate the volume of passengers and cargo, the number of based aircraft, and the movements of aircraft to describe how the use of the Airport will change over time. Aviation forecasts are pivotal in justifying plan outcomes and helping the City and FAA determine funding priority. For these reasons, the FAA must approve the aviation forecasts. This is one of only two Plan elements that the FAA formally approves.

Facility Requirements and Demand / Capacity Analysis

This element can be thought of as a gap analysis between the facilities that the Airport has (inventory) and the facilities it will need (based on the forecasts). This element will yield recommendations on which facilities need improvement, expansion, replacement, and removal and will provide an idea of the scale of facility changes needed to meet future demand.

Airport Alternatives

This element builds on the recommendations in the Facility Requirements and Demand / Capacity Analysis element and assesses a variety of alternatives to meet future needs. Alternatives are evaluated based on cost, environmental impact, construction feasibility, and operational integration with the existing airfield and facilities. A preferred alternative for each facility type is recommended based on the analysis and carried forward in the Plan.

Financial Feasibility Analysis and Facilities Implementation Plan

This element defines the timing of needed improvements and the how they will be paid for. A financial plan is prepared that addresses up front capital costs, ongoing operations and maintenance costs are identified, and the financial impact and feasibility evaluated. The outcome of this element is a phased, demand-based, capital improvement plan that will guide the City of San Angelo through the facility development process.

Airport Layout Plan

This element is the graphical depiction of the preferred improvements identified in the Master Plan. This document shows how the airfield will look once the improvements have occurred and illustrates the conceptual ultimate plan. This is the second part of the Plan that must be formally approved by the FAA. Only improvement projects depicted on an approved ALP are eligible for FAA funding. The ALP is required to be updated every 5 years unless major changes at the airport are made or planned.

Public Involvement is a critical part of the planning process that occurs constantly throughout the development of the Plan. The purpose of public involvement is to include airport stakeholders, city leadership, and other interested parties in the process of developing the Plan, thereby establishing "ownership" in the future of the Airport. The public involvement process allows questions and concerns to be addressed early in the plan process and is intended to make the Plan reflect the goals and objectives of all stakeholders.

The information contained in this document will give the City of San Angelo a practical strategy for the development of the Airport in consideration of financial, environmental and socioeconomic factors.

BACKGROUND

The City of San Angelo is in an agricultural/ranching region of west-central Texas. In 1860, the area was nothing more than a frontier town, located across the Concho River from Fort Concho. The founder, Bartholomew J. DeWitt, was the first to establish a trading post, which was called Santa Angela. It wasn't until 1883 that the name was changed to San Angelo. Some of the oldest buildings in downtown San Angelo were built in the early 1880's by an architect named Oscar Ruffini and several of these buildings are still in use today. The early growth of the city was very much reliant on Fort Concho. The steady flow of money paid to the soldiers brought traders and merchants from all across Texas and many stuck around to cater to the needs of the soldiers. It didn't take long for people to realize the abundance of water from the North, South and Middle Concho rivers created a viable source for cattle and sheep ranching. Agriculture, ranching and later the oil and gas industry became the most important factors in the city's economy. In fact, they did so well here that at one time San Angelo was the leading cattle market in Texas, the largest sheep market in the United States and the leading wool and mohair markets in the nation. The city became incorporated in 1903 and established a controlled educational system. By the 1940's the United States War Department chose San Angelo as the location of Goodfellow Airforce Base (located west of the city) and San Angelo Army Field (located south of the city). The facilities were built in response to the "program of preparedness", which

includes the construction of facilities dedicated to basic and advanced air training. Both facilities helped feed the economy bringing in more revenue and almost doubling the population of the community.

Airport Location

San Angelo is a city in, and the county seat of, Tom Green County, Texas. Located in the Concho Valley, it is approximately 66 miles north of U.S. Interstate 10, 75 miles south of U.S. Interstate 20, 110 miles southeast of Midland, and 200 miles northwest of Austin along U.S. Highway 87. The current estimated population of San Angelo is 100,450 residents covering 58.2 square miles.

San Angelo Regional Airport is situated to the southwest of San Angelo, 8 miles from the downtown area via Texas Highway 584 and Knickerbocker Road as illustrated on **Exhibit 1A**. It is the only airport in the Concho Valley providing regularly scheduled passenger service. Owned and operated by the City of San Angelo, the airport resides on approximately 1,500 acres.

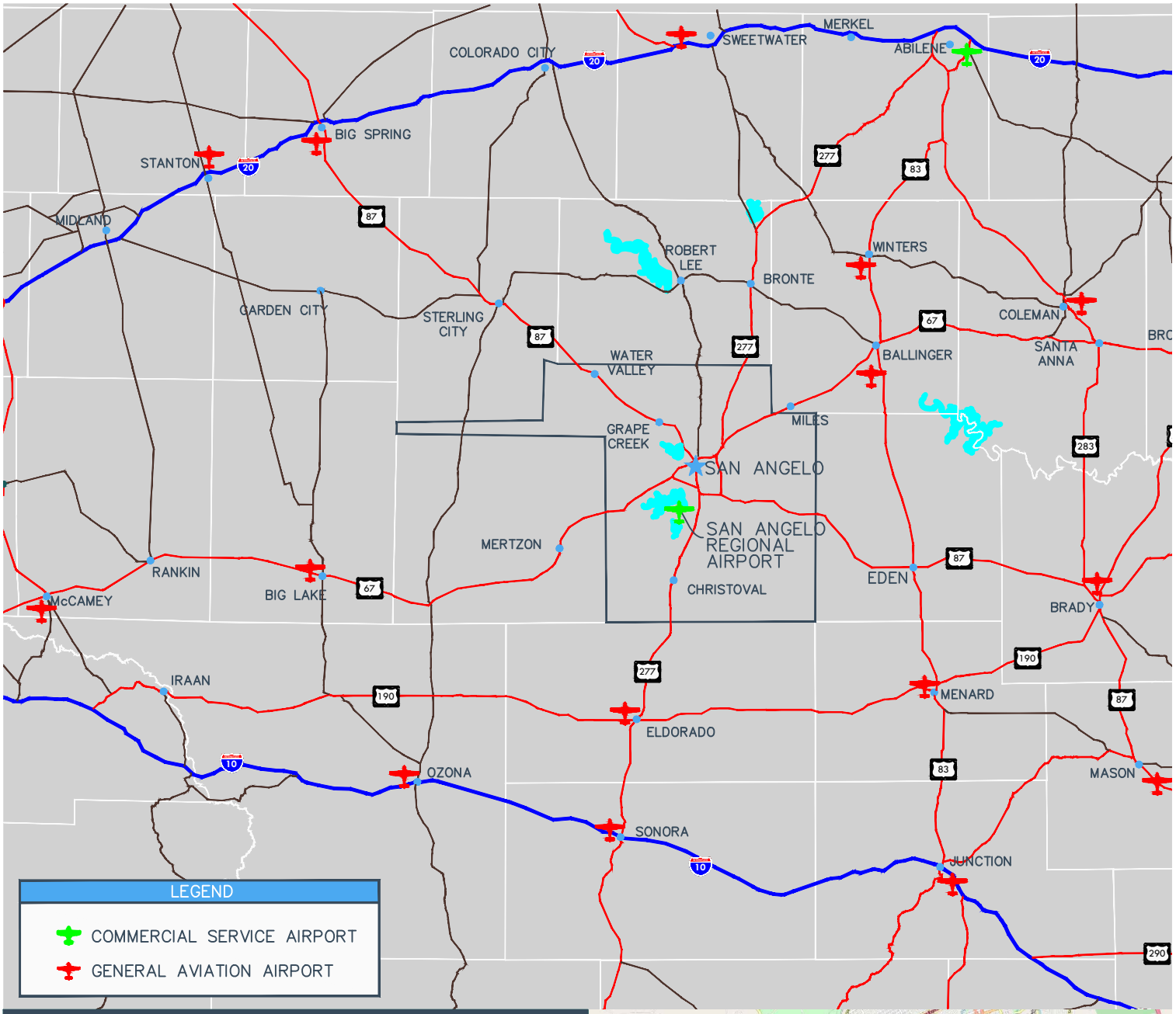
The airports official location is defined by the Airport Reference Point (ARP), or the geometric center of all usable runways. The ARP for San Angelo Regional Airport is N 31° 21' 27.90 latitude and W 100° 29' 46.70 longitude. Airport elevation, or field elevation, defines the highest point of the airports usable runways and is measured in height above Mean Sea Level (MSL). The elevation of San Angelo Regional Airport is 1,918.6 feet MSL.

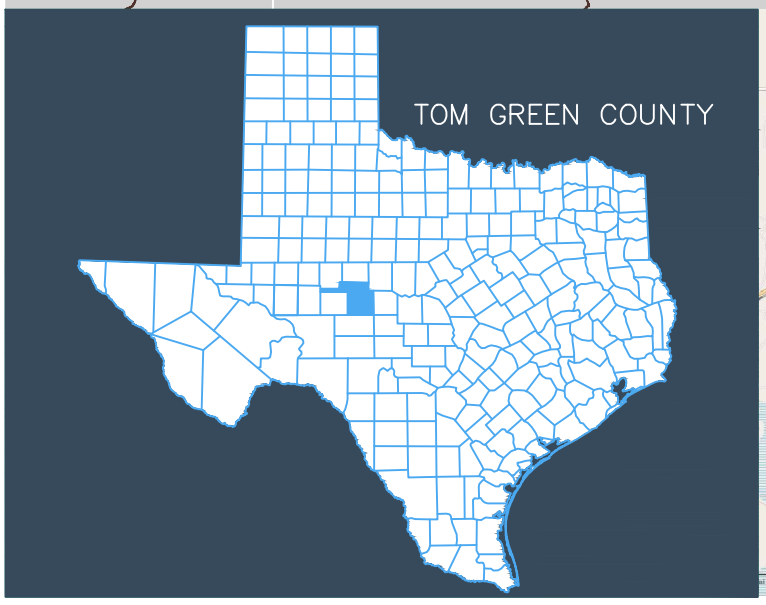
Primary Airport Information

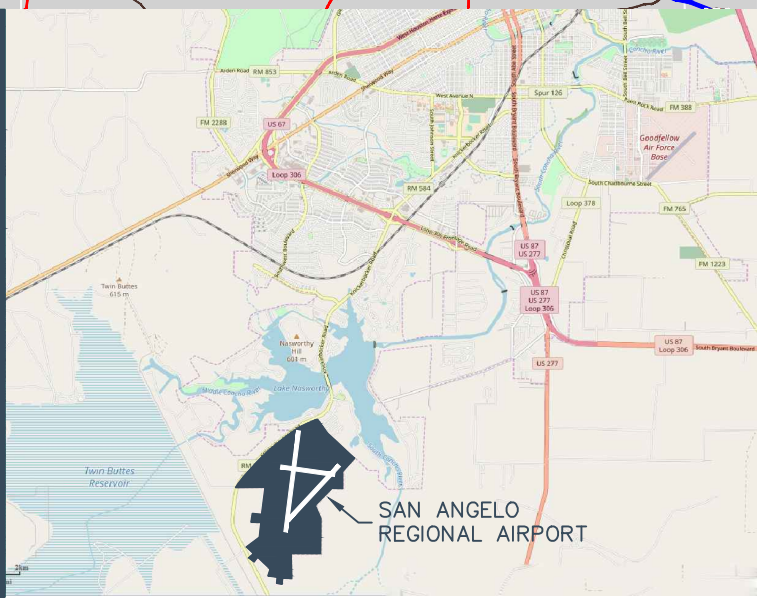
Table 1A provides a summary of important primary data elements for San Angelo Regional Airport.

TABLE 1A
San Angelo Regional Airport Data

San Angelo Primary Data Elements	
Airport Name	San Angelo Regional Airport
FAA Designation	SJT
Associated Town	San Angelo, TX
Airport Owner	City of San Angelo, TX
Airport Sponsor	City of San Angelo, TX
Airport Management	Full-time Airport Director
Date Established	1943
Commercial Air Service	American Eagle
Part 139 Classification	Class II
ARFF Index	B
Airport Acreage	1,503 Acres
Airport Reference Point	Latitude: 31°21'27.900"N
(ARP)	Longitude: 100°29'46.700"W
Airport Elevation	1,918.6 Mean Sea Level (MSL)
Area Mean Max. Temp.	90° F







SAN ANGELO REGIONAL AIRPORT

Exhibit 1A
AIRPORT LOCATION MAP

Airport History

Over 75 years ago, the city commission was considering the idea of establishing a city airport in or near San Angelo. An agreement was made to purchase approximately 670 acres of land located on Knickerbocker Road next to Lake Nasworthy. Shortly after work began, the first municipal airport runway was cleared and ready for construction. At this same time, the United States was preparing to enter World War II and an agreement was made for the Army Air Corps to construct the airport.

Activated in 1943, Carr Field was established to be the site of a new airfield training facility for the Army, later changing jurisdictions to the Army Corps of Engineers in 1946. After war efforts had ceased, a transfer agreement was arranged between the City of San Angelo and the War Assets Administration for the city to reclaim its original airport and government built/owned airport improvements. The airport was renamed in honor of Jack W. Mathis, a recipient of the Medal of Honor for his heroics in World War II. Today the airport is a public airport known as San Angelo Regional Airport – Mathis Field.

Airline Service at San Angelo Regional Airport. In 1948, Continental Airlines served the airport with passenger flights on a daily round trip from San Antonio to Denver and in 1949, Trans-Texas Airways offered daily round trips from Love Field in Dallas to El Paso. By 1961, Trans-Texas offered routes from San Angelo to Memphis with direct flights non-stop to Love Field. Continental also offered daily round trips from Houston to Los Angeles and a direct flight to Lubbock and Amarillo in 1963. One year later, Continental ceased all flights to San Angelo and no longer serviced the airport. Trans-Texas changed names to Texas International and in 1970 introduced jet service to San Angelo, eight years later offering service with four direct flights each day to Dallas/Fort Worth. In 1982, Texas International soon merged with Continental Airlines and again ceased all service to San Angelo.

Nearly five years after Texas International stopped servicing the airport, Rio Airways, an independent airline, began service into San Angelo with eight weekly non-stop flights to Dallas/Fort Worth. In 1985, Rio became connected with Delta Airlines continuing to service passengers to and from San Angelo. Two years later Atlantic Southeast Airlines, now known as Express Jet, replaced Rio Airways as Deltas Connection carrier.

Continental Airlines returned to San Angelo roughly 40 years after stopping services in 1964. The service, flown by Colgan Air, flew nonstop to Houston but eventually this route was discontinued in 2008 when Continental merged with United Airlines.

In 1995, Delta Connection and American Eagle began competing for the Dallas/Fort Worth route and four years later in 1999 American Eagle claimed their title as the only commercial servicer operating non-stop to Dallas/Fort Worth. Currently, American Eagle, operating on behalf of American Airlines, makes four non-stop flights to Dallas/Fort Worth daily.

Airport Improvements. Numerous improvements have been made to San Angelo Regional Airport over the past two decades, these improvements are described in **Table 1B**.

Airport Management

San Angelo Regional Airport is owned by the City of San Angelo and operated by an Airport Director and his or her staff. The Airport Director reports directly to one of two Assistant City Managers. The City operates under a City Manager/City Council form of government. City Council is comprised of the elected Mayor and six Council members.

An Airport Advisory Board, composed of seven members appointed by the City Council, serves as an advisory board for the mayor and the council to monitor the development and operations of the airport.

Airport Role

All airports have functional roles and contribute at varying levels in meeting transportation and economic needs on a national, regional, state and local level. Identifying and understanding the various roles of an airport is an essential part of the airport planning process, ensuring recommended facilities and services are appropriate for fulfilling respective roles.

TABLE 1B
Historical Airport Improvement Program Grants Funded by the FAA (1999-2017)

Year	Grant Funded	Amount
2017	Rehabilitate Taxiway	$ 3,229,017
2017	Acquire ARFF Vehicle, PCI Study	$ 603,175
2016	PCI Study, Rehabilitate Taxiway, Wildlife Hazard Assessment	$ 348,910
2012	Improve Terminal Building	$ 4,000,000
2011	Improve Terminal Building	$ 1,034,814
2010	Improve Terminal Building, Rehabilitate Runway 3-21	$ 1,390,565
2010	Rehabilitate Runway 9-27 and Taxiway, Wildlife Hazard Assessment	$ 2,173,604
2009	Rehabilitate Taxiway	$ 3,074,621
2008	Rehabilitate Apron, Rehabilitate Taxiway, Remove Obstructions	$ 741,606
2008	Rehabilitate Apron	$ 3,000,000
2008	Improve Terminal Building, Remove Obstructions	$ 258,394
2007	Rehabilitate Apron, Rehabilitate Runway Lighting, Rehabilitate Taxiway Lighting	$ 4,233,810
2006	Rehabilitate Apron, Rehabilitate Runway 18-36	$ 4,700,000
2005	Improve Terminal Building, Rehabilitate Apron, Rehabilitate Runway 18-36	$ 2,500,000
2004	Acquire Land for Approaches, Install Runway 3-21 Lighting, Modify Terminal Building, Rehabilitate Runway 3-21	$ 3,525,000

TABLE 1B (cont.)
Historical Airport Improvement Program Grants Funded by the FAA (1999-2017)

Year	Grant Funded	Amount
2003	Rehabilitate Runway 9-27, Rehabilitate Taxiway, Improve Terminal Building, Acquire ARFF Vehicle	$ 1,000,000
2002	Security Enhancements	$ 50,102
2002	Improve Terminal Building	$ 1,490,787
2002	Acquire ARFF Vehicle	$ 562,500
2001	Modify Terminal Building, Rehabilitate Runway 3-21	$ 1,000,000
2000	Acquire Pavement Sweeper	$ 90,000
2000	Construct ARFF Building, Conduct Airport Master Plan Update	$ 177,038
2000	Construct ARFF Station	$ 1,271,596
1999	Construct Lighting Vault	$ 529,984

National Role

The National Plan of Integrated Airport Systems (NPIAS), a 5-year plan, is continually updated and published biennially by the FAA. The plan lists those airports considered to be in the national interest and therefore eligible for financial assistance for airport planning and development under the Airport and Airway Improvement Act of 1982. Over 3,300 airports are included within the NPIAS. Airports are grouped by statute into two major categories: primary and nonprimary. Primary airports are defined in the FAA's authorizing statute as public airports receiving scheduled air carrier service with 10,000 or more enplaned passengers per year. According to the September 2018, *National Plan of Integrated Airport Systems Plan 2019-2023*, there are currently 380 primary airports within the NPIAS.

Non-primary airports primarily support general aviation aircraft. The non-primary category includes nonprimary commercial service airports (public airports receiving scheduled passenger service and between 2,500 and 9,999 enplaned passengers per year), general aviation airports, and reliever airports. There are 2,941 nonprimary airports.

San Angelo Regional Airport is classified as a primary commercial service airport in the NPIAS. This classification does not restrict or prevent its use by general aviation or military aircraft; rather, it is intended to reflect the airport's capacity to provide the highest level of public services and accommodations for some of the largest, most sophisticated aircraft in the commercial and general aviation fleet. This classification is also used as a funding category for the distribution of federal aid.

Primary airports are further grouped into four categories: large hub, medium hub, small hub, and non-hub. The percentage of revenue-producing passengers in each area (referred to as a "hub") is determined by dividing the number of annual passenger enplanements at the airport into the number

of annual enplanements nationwide. This percentage then falls within a predetermined hub classification: large, medium, small, or non-hub.

San Angelo Regional Airport is classified as a non-hub primary airport as it enplanes less than 0.05 percent of all U.S. commercial passenger enplanements, but more than 10,000 annual enplanements. In 2018 there are 247 non-hub primary airports in the United States that together account for three percent of all enplanements. Annual enplaned passenger data for San Angelo Regional Airport is contained in **Table 1C**.

An airport must have an Airport Operating Certificate (AOC) if it is serving air carrier aircraft with more than nine seats or serving unscheduled air carrier aircraft with more than 30 passenger seats. 14 CFR Part 139 (Part 139) describes the requirements for obtaining and maintaining an AOC. This includes meeting various Federal Aviation Regulations (FARs).

TABLE 1C
Historical Airline Enplaned Passengers (1999-2017)

Year	Passengers
1999	39,411
2000	47,544
2001	45,307
2002	39,844
2003	48,299
2004	59,430
2005	65,705
2006	68,236
2007	71,008
2008	64,865
2009	60,353
2010	56,021
2011	54,995
2012	56,301
2013	62,296
2014	65,973
2015	63,842
2016	60,277
2017	59,206

Airports are classified in the following categories based on the type of air carrier operations served:

- Class I Airport – an airport certificated to serve scheduled operations of large air carrier aircraft that can also serve unscheduled passenger operations of large air carrier aircraft and/or scheduled operations of small air carrier aircraft.

- Class II Airport – an airport certificated to serve scheduled operations of small air carrier aircraft and the unscheduled passenger operations of large air carrier aircraft. A Class II airport cannot serve scheduled large air carrier aircraft.
- Class III Airport – an airport certificated to serve scheduled operations of small air carrier aircraft. A Class III airport cannot serve scheduled or unscheduled large air carrier aircraft.
- Class IV Airport – an airport certificated to serve unscheduled passenger operations of large air carrier aircraft. A Class IV airport cannot serve scheduled large or small air carrier aircraft.

Part 139 (which implemented provisions of the Airport and Airway Development Act of 1970, as amended on Nov. 27, 1971) set standards for: the marking and lighting of areas used for operations; firefighting and rescue equipment and services; the handling and storing of hazardous materials; the identification of obstructions; and safety inspection and reporting procedures. It also required airport operators to have an FAA-approved Airport Certification Manual (ACM).

The ACM defines the procedures to be followed in the routine operation of the airport and for response to emergency situations. The ACM is a working document that is updated annually. It reflects the current condition and operation of the airport and establishes responsibility, authority, and procedures.

There are required sections for the ACM, covering administrative detail and procedural detail. Each section independently addresses the: who (primary/secondary), what, how, and when as it relates to each element. The administrative sections of the ACM cover such elements as the organizational chart, operational responsibilities, maps, descriptions, weather sensors, access, and cargo. The procedural elements cover such items as paved and unpaved areas, safety areas, lighting and marking, communications and navigational aids, airport rescue and firefighting, handling of hazardous material, utility protection, public protection, self-inspection program, ground vehicle control, obstruction removal, wildlife management, and construction supervision.

San Angelo Regional Airport has an AOC that is classified as a Class II airport and maintains a current, approved ACM.

Airport Activity

San Angelo Regional Airport is used by a wide range of airport users. According to the airport's 5010 Master Record (5010)[1], 176 aircraft are based at the airport. This number includes:

- 98 single-engine aircraft
- 16 multi-engine aircraft
- 45 jet aircraft
- 7 helicopters
- 10 military

[1] https://www.gcr1.com/5010web/airport.cfm?Site=SJT

It must be noted that the number of based jet aircraft fluctuates. Currently, Envoy Air, a subsidiary of American Airlines, leases apron space north of the terminal building to store regional jet aircraft. As these aircraft are placed back into service, or additional aircraft are taken out of service, the based jet aircraft number will change. The most recent count of the regional jet aircraft was 7. In addition to these aircraft 15 business jets are based at the Airport.

San Angelo Regional Airport is unique in that U.S. Customs and Border Protection bases 4 Unmanned Aircraft Systems (UAS) in the northernmost hangar at the airport. These aircraft are considered single-engine aircraft and operate regularly through a Memorandum of Agreement (MOA) with the airport traffic control tower (ATCT).

The 5010 reported 84,130 total operations during calendar year 2017. These operations are categorized as follows:

- 2,080 air carrier
- 4,458 air taxi
- 12,951 local general aviation
- 22,199 itinerant general aviation
- 42,442 military

Air carrier operations are classified as those that occur in aircraft with more than 60 passenger seats. At San Angelo Regional Airport the air carrier operations are undertaken primarily by charter operations to destinations such as Laughlin, Nevada. Air taxi operations occur in aircraft with fewer than 60 seats and include those regularly scheduled operations by American Airlines to Dallas Fort Worth International Airport. Service is currently provided through four daily arrivals and four daily departures with 40-seat Embraer Regional Jet aircraft.

AIRPORT FACILITIES

To accommodate airport users, San Angelo Regional Airport includes three paved runways and associated taxiways, a passenger terminal complex, an ATCT, aircraft hangars, aircraft parking aprons, and numerous support facilities. Airside facilities typically include those that are required for the physical movement of aircraft and Landside facilities include those that support the use of the airport. The following sections provide details regarding these facilities.

Airside Facilities

Exhibit 1B, depicts the location of the airside facilities, described in **Table 1D**. Below are descriptions of the primary facilities.

Runways

Runways are named using a number between 01 and 36. This represents the runway's general magnetic compass orientation and each runway end is named accordingly. For example, Runway 18 has a magnetic heading of 180 degrees.

SAN ANGELO REGIONAL AIRPORT

Exhibit 1B
AIRSIDE FACILITIES

The opposite end of Runway 18 is 36, which has a magnetic heading of 360 degrees. These numbers represent the direction the aircraft is approaching or departing the runway and are 180 degrees apart. Runway headings are important as they are used by pilots to identify which runway aligns with the prevailing winds as, ideally, pilot's takeoff and land with the nose of the aircraft facing the wind to maximize lift. As previously described, San Angelo Regional Airport currently maintains three runways, providing 6 runway surfaces.

Runway 18-36 is 8,049 feet long and 150 feet wide. Oriented in a north/south direction, the runway is equipped with Medium Intensity Runway Lights (MIRL) and Precision Approach Path Indicators (PAPI) on both ends of the runway. The runway is constructed of asphalt and has a gross weight bearing capacity of 100,000 pounds for a dual-wheel configuration. The surface is grooved to aid in drainage for improved traction.

To meet Runway Safety Area (RSA) requirements, the landing threshold for Runway 18 is displaced 889 feet allowing for 7,160 feet for landing. The full 8,049 feet of runway is available for departures. Runway 36 has 7,160 feet available for landings and departures.

Runway 3-21 is 5,939 feet long and 150 feet wide. Oriented in a northeast/southwest direction, the runway is equipped with High Intensity Runway Lights (HIRL) and a four-box Visual Approach Slope Indicators (VASI). As the airport's only precision approach capable runway, Runway 3 has an Omnidirectional Approach Light System (ODALS) and Runway 21 has a Medium Intensity Approach Lighting System with Runway Alignment Indicator Lights (MALSR). The runway is constructed of asphalt and has a gross weight bearing capacity of 100,000 pounds for a dual-wheel configuration. The surface is grooved to aid in drainage for improved traction.

Runway 9-27, the airport's general aviation utility runway, is 4,402 feet long and 75 feet wide. Oriented in an east/west direction, the runway is equipped with MIRL and is used as a runway for general aviation, but also used for aircraft taxiing by all aircraft types. The runway is constructed of asphalt and has a gross weight bearing capacity of 100,000 pounds for a dual-wheel configuration

TABLE 1D
Summary of Airfield Facilities

	Runway 18-36	Runway 3-21	Runway 9-27
Runway Length (Feet)	8,049*	5,939	4,402
Runway Width (Feet)	150	150	75
Runway Surface	Asphalt	Asphalt	Asphalt
Surface Treatment	Grooved	Grooved	None
Runway Load Bearing Strength (Pounds)			
Single Wheel Loading	70,000	70,000	70,000
Dual Wheel Loading	100,000	100,000	100,000
Pavement Classification Number (PCN)	67	115	39
Runway Lighting	MIRL	HIRL	MIRL
Approach Aids			
Approach Slope Indicators	PAPI-4L	VASI- 4L (21)	None
Approach Lighting Systems	None	MALSR (21) ODAL (3)	None
Pavement Markings			
Runway	Non-Precision	Precision	Visual
Taxiway, Taxilanes, Apron	Centerline	Centerline	Centerline
Taxiway Lighting	MIRL	MIRL	MIRL
Instrument Approach Aids		ILS or LOC (3) HI-ILS (3) RNAV (GPS) (3 ,18, 21) HI-VOR/DME or TACAN (3 ,21) VOR/DME or TACAN (3) VOR (21) NDB (3)	
Weather Reporting		ASOS 325-949-6686 ATIS (128.45 Mhz)	

* To avoid obstruction and meet safety area requirements, published declared distances for Runway 18-36 are as follows:

Take Off Run Available (TORA)	8,049 (18) 7,160 (36)
Take Off Distance Available (TODA)	8,049 (18) 7,160 (36)
Accelerate Stop Distance Available (ASDA)	8,049 (18) 7,160 (36)
Landing Distance Available (LDA)	7,160 (18) 7,160 (36)

Runway Classification and Future Plans

In 2017 the FAA determined that only two runways at San Angelo Regional Airport are eligible for Airport Improvement Plan (AIP) funding assistance. The 2016 Pavement Assessment and Pavement Management Plan allowed the City of San Angelo to prepare a Pavement Prioritization Plan that evaluated the three runways at the airport. This study resulted in the classification of Runway 18-36 as the airport's "primary" runway, Runway 3-21 as the airport's "crosswind" runway, and Runway 9-27 as the airport's "additional" runway, therefore, not eligible for AIP funding assistance. During the December 12, 2017 City Council meeting it was determined that additional City funds would not be allocated for the preservation of Runway 9-27 and the runway will be closed once it reaches the end of its useful life.

Taxiways

Taxiways allow access between the runways and landside areas and are named using letters in the phonetic alphabet, for example, Taxiway Alpha (A) or Bravo (B). There are three main types of taxiways: full parallel, partial parallel, and stub or connector taxiways. Each type is named after its relative location to a runway, i.e., a full parallel taxiway runs the entire length of a runway from end to end.

The existing taxiway system at the San Angelo Regional Airport, depicted on **Exhibit 1B** and summarized in **Table 1E**, consists of several types of taxiways that provide access throughout the airfield. All taxiways at the airport are constructed of asphalt.

Taxiway Alpha is a connector taxiway connecting the northwestern aircraft ramp with landside facilities at the north, but also functions as a partial parallel taxiway to Runway 18-36. Taxiway Alpha intersects Taxiway Bravo and continues on to the Runway 18 end.

Taxiway Bravo is the airfield's only full-length parallel taxiway. It extends between the south end of Runway 18-36 and Taxiway Alpha at the north end of the runway. Taxiway Bravo is separated from Runway 18-36 by 538.5 feet. Taxiways Alpha and Bravo run parallel and are separated by 343 feet.

Taxiway Charlie and Echo are exit taxiways linking Runway 18-36 with parallel Taxiway Bravo. Recent improvements to Taxiways Charlie and Echo have resulted in the taxiways meeting current FAA standards as defined in Advisory Circular (AC) 150/5300-13A, *Airport Design*, providing 90-degree exit taxiways.

Taxiways Delta and Foxtrot provide access from Taxiway Bravo to Runway 3-21. Taxiway Delta first crosses 18-36 and continues east to connect with Runway 3-21, as depicted on **Exhibit 1E**.

TABLE 1E
Taxiway System

Taxiway	Type	Width	Description
A (Alpha)	Connector/Partial Parallel	75′	Provides access from Runway 18 end to Apron
B (Bravo)	Full Length Parallel	75′	Full length parallel taxiway for Runway 18-36
C (Charlie)	Connector	75′	Connects Runway 18-36 to Taxiway Bravo
D (Delta)	Connector	50′	Provides access from center of Runway 3-21 to Apron
E (Echo)	Connector	75′	Connects Runway 18-36 to Taxiway Bravo
F (Foxtrot)	Connector	75′	Connects Runway 18-36 to Taxiway Bravo
H (Hotel)	Partial Parallel	75′	Connects Runway 21 end to Runway 9-27

Taxiway Hotel is a partial parallel taxiway serving the northeastern end of Runway 3-21. It is separated from the runway by 400 feet and extends from Runway 9-27 to the Runway 21 threshold.

Taxilanes

A taxilane is designed for low speed and precise taxiing. They are usually, but not always, located outside the movement area[2], providing access from taxiways (usually an apron taxiway) to aircraft parking positions and other terminal areas. There is currently one marked taxilane at the airport which provides access from Taxiway Bravo to the Fed-Ex cargo area.

Pavement Condition

In the fall of 2016, a Pavement Management Plan (PMP) was prepared for San Angelo Regional Airport. FAA Advisory Circular 150/5380-7B defines a PMP as "a consistent, objective, and systematic procedure for establishing facility policies, setting priorities and schedules, allocating resources, and budgeting for pavement maintenance and rehabilitation. It can also quantify information and provide specific recommendations for actions required to maintain a pavement network at an acceptable level of service while minimizing the cost of maintenance and rehabilitation. A PMP not only evaluates the present condition of a pavement, but also predicts its future condition using pavement condition indicators. By projecting the rate of deterioration, a life- cycle cost analysis can be made for various alternatives to determine the optimal time to apply the best maintenance and rehabilitation alternative and avoid higher maintenance and rehabilitation costs in the future."

This plan is an important part of this master plan inventory process as it provides details regarding the pavement maintenance and rehabilitation projects that should be included within the airport's Capital

[2] Aircraft movement areas are defined as runways, taxiways, and other areas of an airport that are used for taxiing, takeoff, and landing of aircraft.

Improvement Program (CIP). **Exhibit 1C** depicts the current pavement conditions at the airport as well as the anticipated condition in years 2024 and 2029.

Visual and Navigation Aids

Airport navigational and visual aids are important features that provide airport references to pilots, especially during low visibility or nighttime operations. Both aids assist pilots in safe and efficient movement of aircraft during landing, takeoff and taxiing maneuvers.

Pavement Markings aid in the movement of aircraft along airport surfaces and identify closed or hazardous areas on an airport. Runway markings are present for visual identification of a paved runway during all weather conditions. These markings indicate airfield information and paths for pilots to follow while navigating the runways, taxiways or aprons.

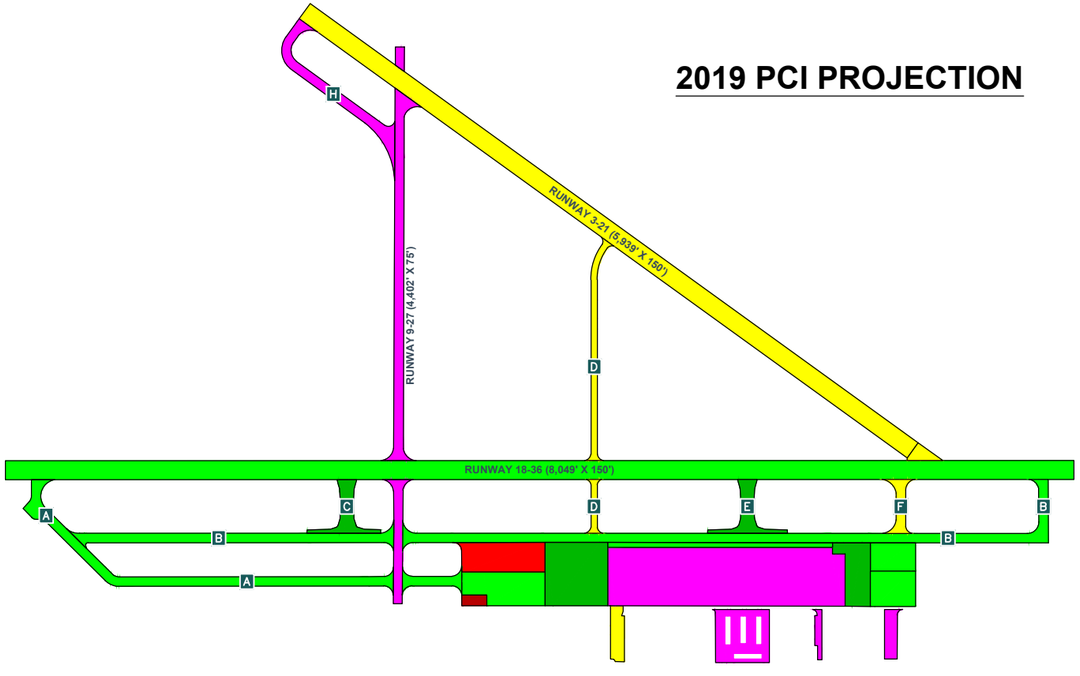
San Angelo Regional Airport uses three types of runway markings (precision, non-precision and visual). Runway 3-21 is a precision runway, meaning a runway end having an instrument approach procedure that provides course and vertical path guidance. This runway consists of surface markings including numerals, centerline, pavement edge, aiming point, threshold, touchdown zone and blast pad markings.

Runway 18-36 is a non-precision runway, or a runway end having an instrument approach procedure that provides course guidance without vertical path guidance. This runway consists of surface markings including numerals, centerline, pavement edge, aiming point, threshold, blast pad and displaced threshold markings.

Runway 9-27 is a visual runway, a runway without an existing planned straight-in instrument approach procedure. This runway consists of surface markings such as numerals, centerline, pavement edge and aiming point. All three runways are equipped with aircraft hold position markings, these prevent aircraft and vehicles from entering critical areas associated with a runway. Taxiway markings including centerlines, enhanced centerlines, lead-on or lead-off lines, holding position and surface painted signs are provided to assist aircraft in movement from the apron to the runway or vice versa.

- The taxiway centerline assists pilots in maintaining proper distances from pavement edges and other objects.
- The enhanced centerline is made up of two 150-foot parallel lines of yellow dashes used to alert pilots that are approaching a runway hold position.
- A hold position marking is designed to be the location of which an aircraft or vehicle is to stop and hold so that the ATCT can control taxiing operations through or onto a runway. This marking is parallel to the corresponding runway, it consists of a set of two continuous lines, two dashed lines and three spaces extending across the width of taxiway.
- Taxiway lead-on or lead-off lines are used in conjunction with a holding position of a taxiway crossing the runway. In this case the taxiway centerline curves onto the runway and extends parallel to the runway centerline for a distance of 200 feet, these lines are offset from the runway centerline by 3 feet.

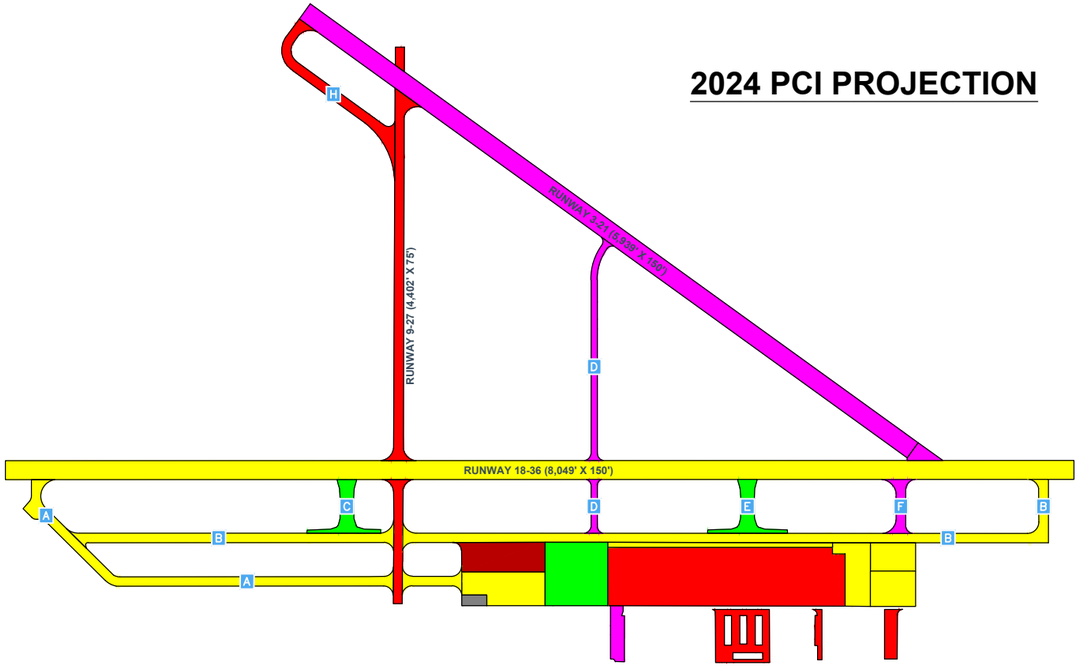
2019 PCI PROJECTION



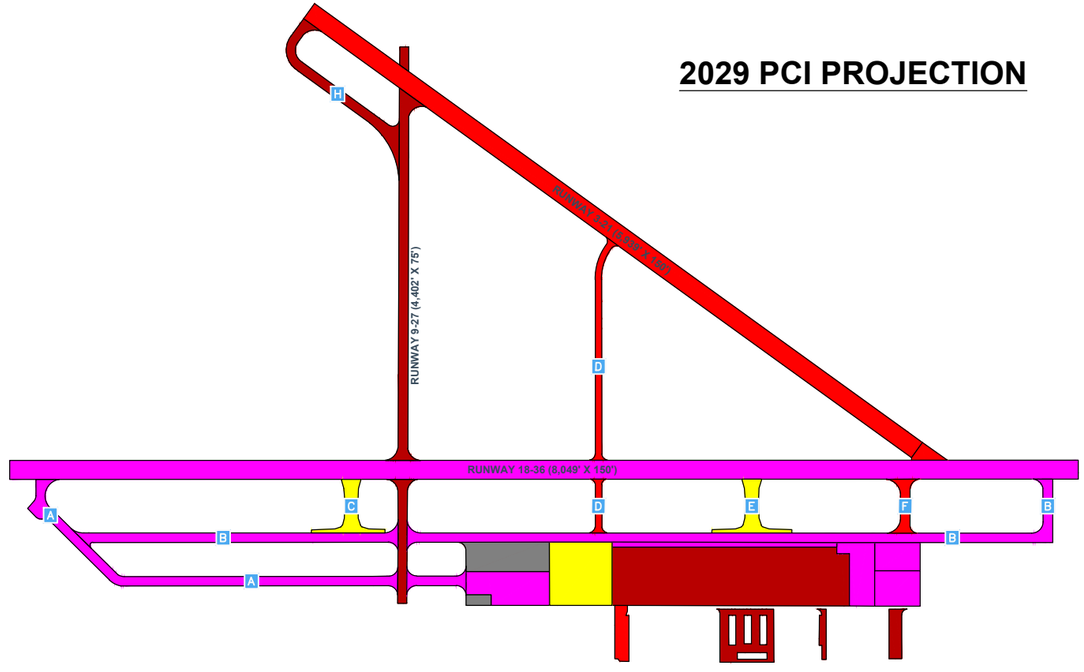
LEGEND

- Good
- Satisfactory
- Fair
- Poor
- Very Poor
- Serious
- Failed

2024 PCI PROJECTION



2029 PCI PROJECTION



SAN ANGELO REGIONAL AIRPORT

Exhibit 1C
AIRFIELD PAVEMENT CONDITIONS

Runway Edge and Threshold Lighting. All runways involved in nighttime use must have lighting which defines the extent of the runway. Runway edge lights are omni-directional and are located just outside the pavement area of the runway (white/yellow lights). Runway Threshold Lights are in a line along the landing or departing threshold at the touchdown end of a runway and define the beginning of the declared landing distance (green/red lights). These lights are placed to outline the edges of runways in low-light and restricted visibility conditions. Runway lighting systems have three different intensity levels: low, medium and high depending on the classification of the runway. San Angelo Regional Airport has high intensity runway lighting (HIRL) installed along Runway 3-21 and medium intensity runway lights (MIRL) installed along both Runway 18-36 and Runway 9-27.

Runway threshold lights

Taxiway edge lights are used to outline the edges of taxiway pavement during periods of low-light or restricted visibility conditions. These lights are omni-directional emitting blue light and are available in low or medium intensity systems. San Angelo Regional Airport uses Medium Intensity Taxiway Lights (MITL) which are can mounted and installed along all taxiways.

Runway End Identifier Lights (REILs) aid in the early identification of the runway or runway ends. They are usually used when there is a large concentration of lights or featureless terrain to provide rapid identification of the approach end of the runway during low-light or restricted visibility conditions. These lights are spaced equidistant apart, approximately 40 foot laterally from the edge of the runway. The system consists of two synchronized flashing white lights aimed toward the approach path. Runway 18 at San Angelo Regional Airport is equipped with REILs.

Visual Approach Lighting. A number of systems are in place to assist pilots with approaching the airport at night or in inclement weather conditions.

Visual Glide Slope Indicators (VGSI) are a set of lights at ground level used to assist pilots in landing. These lights identify the vertical approach path for the runway. Using this device correctly allows a pilot to visually see if the airplane is too high or too low. San Angelo Regional Airport has a VASI on Runway 21 and a PAPI on Runways 18 and 36.

A MALSR provides pilots with visual information on runway alignments, height perception, roll guidance and horizontal references. It is the standard configuration for a Category 1 precision runway and is used to align the aircraft with the centerline of the runway. San Angelo Regional Airport is equipped with a MALSR for Runway 3.

ODALS are used to identify the approach end and centerline of a runway. The system consists of 5 lead in lights spaced equally in line with the runway centerline and 2 lights placed perpendicular to the runway end. ODALS are installed for Runway 21.

The Rotating Beacon at the airport indicates to pilots the location of a lighted airport by sending out a beam of white and green lights in opposite directions. The rotating beacon is located north of the terminal on top of the ATCT.

Guidance Signs provide direction and location to pilots while moving about the airfield surface. There are several sign types, including: mandatory, location, boundary, direction, ending marker, destination, information and remaining distance signs. Mandatory signs are used to indicate critical holding areas and are usually placed at runway and taxiway intersections.

Runway 21 ODALS

Meteorological Facilities

Airport weather information is highly important to the safety of pilots, passengers, airplanes and even the airport itself. Several facilities are located on the airport to provide pilots with future and real time weather information. Facilities available to pilots using San Angelo Regional Airport include the following:

Wind Cones provide pilots with visual wind direction and velocity at the airfield. The Airport is equipped with three wind cones, located north of the intersection of Runway 3 and 36, north of the intersection of Runway 21 and 27 and east of Runway 18.

An ***Automated Surface Observing System (ASOS)*** is an airport weather data collection system that provides continuous, real time information and reports the weather conditions for the airport. The ASOS is the primary means of weather observation network in the United States. They measure a combination of crucial factors regarding local weather (barometric pressure, wind speed, temperature visibility, precipitation, and surface condition). Weather data communicated from an ASOS can be received in a variety of different ways, including: radio frequency, telephone and also by ground data link. The Airport is equipped with an ASOS system located east of the Runway 3 end.


Wind Cone


ASOS

Regional and Local Airspace and Navigation

According to the Aeronautical Information Manual (AIM), the FAA is responsible to ensure the safe, efficient, and secure use of the airspace by civil and military aviation. The Federal Aviation Act of 1958 established the FAA and made it responsible for the control of navigable airspace within the United States. The FAA then created the National Airspace System (NAS) with the intent to protect persons and property on the ground and to establish a safe and efficient airspace for civil, commercial, and military aviation interests. The NAS is made up of facilities for navigation, air traffic control, airports, technology, and rules and regulations required to operate within the system.

Today (2018), the FAA is leading a major modernization of the nation's air transportation system. This modernization project is known as NextGen. NextGen's goal is to increase the safety, efficiency, capacity, predictability, and resiliency of American aviation. The project brings together innovative technologies, capabilities, and procedures that improve how flight operations take place from departure to arrival. Airlines, general aviation operators, pilots, and air traffic controllers gain better information and tools that help passengers and cargo arrive at their destinations more quickly, while aircraft consume less fuel and produce fewer emissions. The transformation began in 2007 and has a target to have all major components in place by 2025. The technologies being utilized consist of aircraft-based equipment, ground-based equipment, and new procedures that utilize the new infrastructure for navigation, communication and safety. While some of the technology is already

being utilized in the airspace in and around San Angelo Regional Airport, this section will be based upon existing procedures and airspace and aircraft navigational capabilities.

The San Angelo Regional Airport operates within the NAS. The following sections will provide an overview of some of the key considerations regarding aircraft navigation and airport operations within the NAS as they relate to San Angelo Regional Airport. The following elements will be covered:

- National Airspace System description
- Air Traffic Areas and Aviation Communications
- Navigational Aids
- FAR Part 77 Imaginary Surfaces

National Airspace System

The National Airspace System (NAS) was created to ensure the safe and efficient use and operation within the airspace of the United States. The FAA has established an airspace structure through the Federal Aviation Regulations (FAR) that regulates and establishes procedures for aircraft that utilize the NAS. To better understand the airspace system a discussion about flight rules and weather conditions is necessary. Weather conditions determine the flight rules that an aircraft may operate and can affect physical separation between aircraft.

Weather and Flight Rules

Aircraft separation is critical to ensure safety of flight. The required separation varies depending upon aircraft type, weather, and flight rules being utilized. Aircraft separation requirements typically increase with poor weather conditions due to decreased visibility. Increased aircraft separation decreases airport capacity, while decreased aircraft separation increases airport capacity with more aircraft using the airport in a given amount of time.

There are two distinct categories of operational flight rules. Visual Flight Rules (VFR) and Instrument Flight Rules (IFR). These two sets of rules are linked to two categories of weather conditions. Visual Meteorological Conditions (VMC) and Instrument Meteorological Conditions (IMC). VMC exists during times of generally fair to good weather with visibility being good. IMC conditions existing in times of poor weather with low clouds and reduced visibility.

During VMC, aircraft may operate under VFR, and a pilot is primarily responsible for seeing and avoiding other aircraft and maintaining separation standards. Aircraft operating under VFR typically navigate by orientation to geographic and other visual references.

During IMC, aircraft must operate under IFR. Air traffic control exercises positive control over all aircraft in controlled airspace and is primarily responsible for aircraft separation. Aircraft and pilots must meet certain certification and proficiency requirements to operate under IFR. Aircraft may elect to operate IFR in VMC; however, the pilot, and not ATC, is primarily responsible for seeing and avoiding other aircraft.

Most of the commercial air traffic, regardless of weather and all operations at and above FL180, operate under IFR as required by Federal Aviation Regulations. To increase airport capacity, Air Traffic Control (ATC) can allow IFR aircraft to maintain visual separation when weather is VMC.

Airspace Classifications

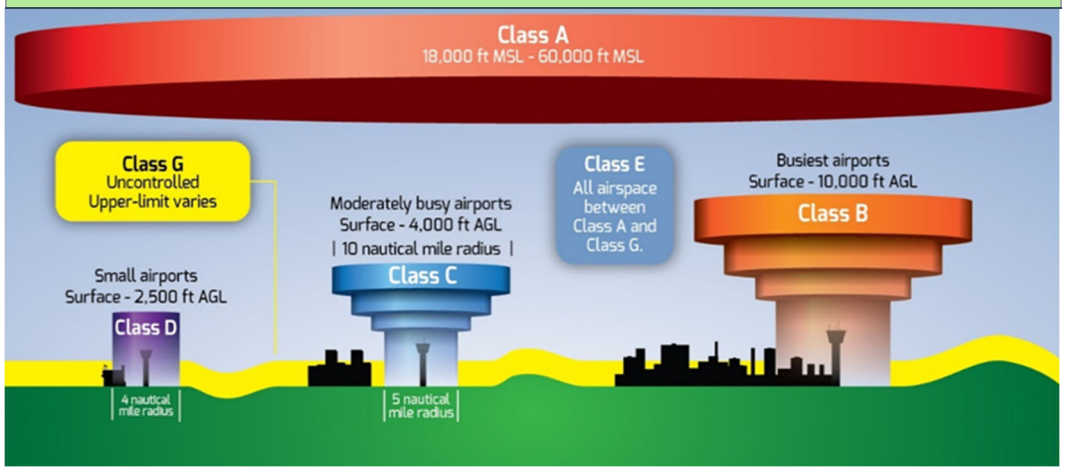
There are two primary types of airspace; controlled and uncontrolled. Controlled airspace means that IFR services are available to aircraft that elect to file IFR flight plans; it does not mean that all flights within the airspace are controlled by ATC. IFR services include ground-to-air radio communications, navigations aids, and air traffic services. Aircraft can operate under IFR in uncontrolled airspace, but they cannot file an IFR flight plan and IFR services are not available. Controlled airspace is intended to ensure separation of IFR traffic from other aircraft, both IFR and VFR.

The FAA has designated six classes of airspace, in accordance with the International Civil Aviation Organization (ICAO) airspace classifications. Airspace designated as Class A, B, C, D, or E is controlled airspace. Class F airspace is not used in the United States. Class G airspace is uncontrolled. **Exhibit 1D** provides a general graphic of airspace as well as details regarding each classification.

Special Use Airspace

Special use airspace (SUA), defined in **Table 1F**, consists of that airspace wherein activities must be confined because of their nature, or wherein limitations are imposed upon aircraft operations that are not a part of those activities, or both. SUA areas are depicted on aeronautical charts, except for controlled firing areas (CFA), temporary military operations area (MOA), and temporary restricted areas.

EXHIBIT 1D
Airspace Classifications

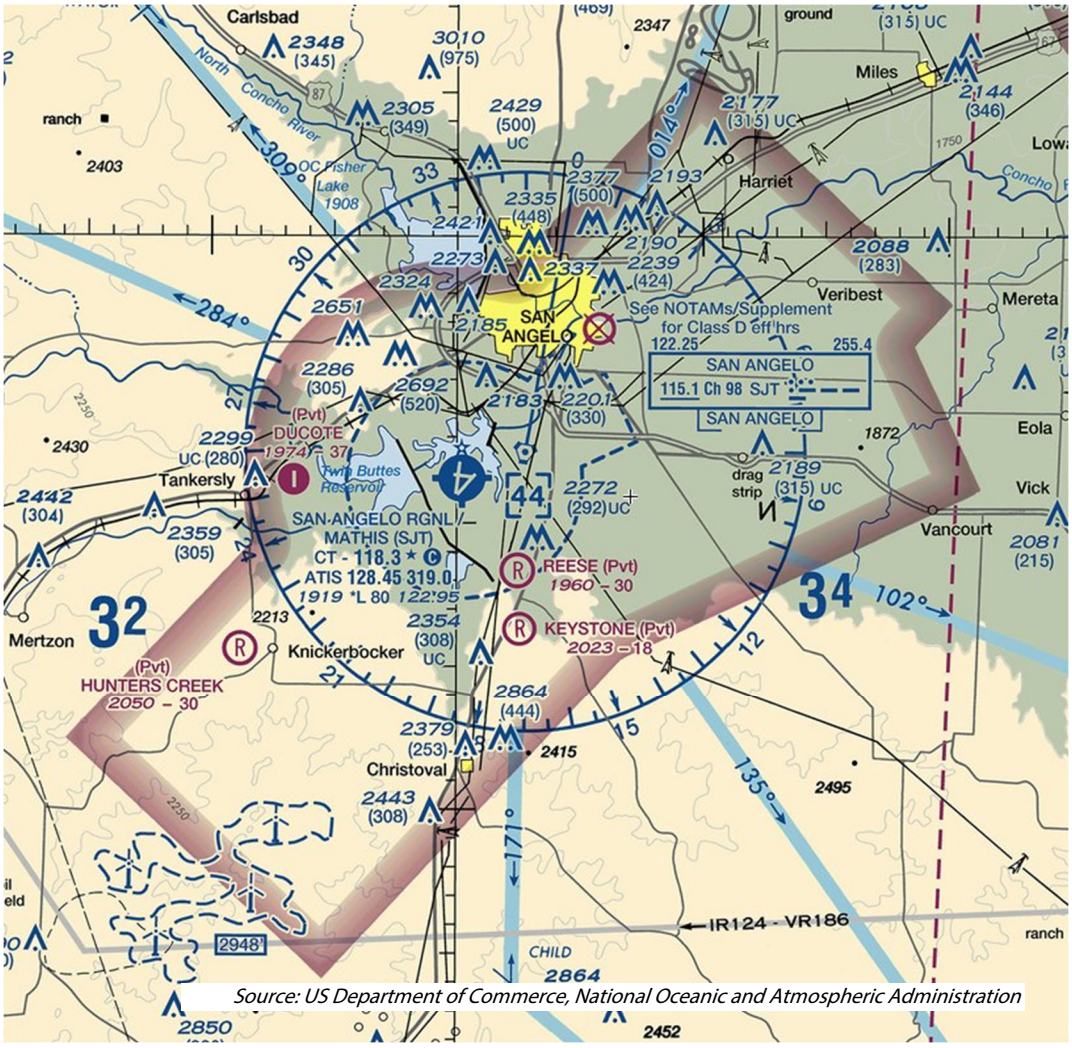


Airspace Class	Description
A	Generally, that airspace from 18,000 feet MSL up to and including 60,000 MSL, including the airspace overlying the waters within 12 nautical miles off the coast of the 48 contiguous States and Alaska within areas of domestic radio navigational signal or ATC radar coverage, and within domestic procedures are applied.
B	Generally, that airspace from the surface to 10,000 MSL surrounding the nation's busiest airports in terms of IFR operations or passenger enplanements. The configuration of each Class B airspace area is individually tailored and consists of a surface area and two or more layers (some Class B airspace areas resemble upside down wedding cakes) and is designed to contain all published instrument procedures once an aircraft enters the airspace. An ATC clearance is required for all aircraft to operate in the area, and all aircraft that are so cleared receive separation services within the airspace. The cloud clearance requirement for VFR operations is "clear of clouds."
C	Generally, that airspace from the surface to 4,000 feet above the airport elevation (charted in MSL) surrounding those airports that have an operational control tower, are serviced by a radar approach control, and that have certain number of IFR operations or passenger enplanements. Although the configuration of each Class C airspace area is individually tailored, the airspace usually consists of a 5 NM radius core surface area that extends from the surface up to 4,000 feet above the airport elevation, and a 10 NM radius shelf area that extends no lower than 1,200 feet up to 4,000 feet above the airport elevation.
D	Generally, Class D airspace extends upward from the surface to 2,500 feet above the airport elevation (charted in MSL) surrounding those airports that have an operational control tower. The configuration of each Class D airspace area is individually tailored and when instrument procedures are published, the airspace will normally be designed to contain the procedures.
E	Class E airspace is controlled airspace that is designated to serve a variety of terminal or in route purposes.
F	Not used in the United States.
G	Class G Airspace (uncontrolled) is that portion of airspace that has not been designated as Class A, Class B, Class C, Class D, or Class E airspace.

TABLE 1F
Special Use Airspace

Type	Description
Prohibited	Areas where, for reasons of national security, the flight of an aircraft is not permitted are designated as prohibited areas. Prohibited areas are depicted on aeronautical charts. For example, a prohibited area (P-56) exists over the White House and U.S. Capital.
Restricted	In certain areas, the flight of aircraft, while not wholly prohibited is subject to restrictions. These designated areas often have invisible hazards to aircraft, such as artillery firing, aerial gunnery, or guided missiles. Aircraft operations in these areas are prohibited during times when it is "active."
Warning	A warning area contains many of the same hazards as a restricted area, but because it occurs outside the U.S. airspace, aircraft operations cannot be legally restricted within the area. Warning areas are typically established over international waters along coastline of the United States.
Alert	Alert areas are shown on aeronautical charts to provide information of unusual types of aerial activities such as parachute jumping areas or high concentrations of student pilot training.
Military Operations Area	Military operations areas (MOA) are blocks of airspace in which military training and other military maneuvers are conducted. MOA's have specified floors and ceilings for containing military activities. VFR aircraft are not restricted from flying through MOAs while they are in operation but are encouraged to remain outside of the area.

It should be noted that medium density military training occurs in and around San Angelo Regional Airport. Military aircraft utilize military training routes, approach, and departure procedures published for the airport and are in the operational area of the airport. Additionally, the United States Customs and Border Protection, Air and Marine Division, operates unmanned aerial vehicles within the airport environment. A temporary flight restriction (TFR) area is established southeast of San Angelo Regional Airport to facilitate safe operations of the UAV during climb to altitude and descent from altitude. A detailed description of the TFR can be found within the notice to airmen system deployed by the FAA. The graphic on the following page depicts the airspace surrounding San Angelo Regional Airport.



Source: US Department of Commerce, National Oceanic and Atmospheric Administration

Air Traffic Service Areas and Aviation Communications

There are 22 geographic areas that are under the ATC jurisdiction in the United States. Air traffic services within each area are provided by air traffic controllers in Air Route Traffic Control Centers (ARTCC). The ARTCCs provide air traffic service to aircraft operating under IFR flight plans within controlled airspace, and primarily during the enroute phase of flight. Aircraft operating under VFR may also contact the ARTCC or other air traffic control services to request traffic advisory services. Traffic advisory service is used to alert pilots of other air traffic known in the vicinity of, or within the flight path of, the requesting aircraft. The airspace above San Angelo Regional Airport is within the Fort Worth ARTCC jurisdiction.

Aircraft approaching or departing an airport are also subject to airspace and air traffic control designed to serve the primary purpose of separating aircraft from one another. Approach and

Departure services are provided by San Angelo Approach/Departure control utilizing local radio communications and radar services with the physical location of the ATCT in Midland. Approach and departure control services are available from the Fort Worth ARTCC when the Midland-San Angelo approach control is closed. Midland-San Angelo approach and departure control services are available from 6:00am to 9:00pm.


Airport Traffic Control Tower

San Angelo Regional Airport is served by its ATCT. The ATCT controls aircraft operating within the airport movement area and within 4 nautical miles of the airport. The ATCT at San Angelo Regional airport operates daily from 7 am to 9 pm.

The primary means of controlling aircraft by ATCT is through radar systems supplemented by ground-to-air two-way radio communications. Altitude assignments, speed adjustments, and radar vectors are examples of techniques used by ATCT to ensure that aircraft maintain both lateral and vertical separation.

San Angelo Regional Airport is on the San Antonio aeronautical sectional chart. The Fort Worth Center can be contacted on 126.15. Communication facilities associated with the Airport include the local control tower (118.3), ground control (121.9) and approach and departure control (125.35).

Navigational Aids

Navigational aids are electronic equipment, both ground-based and satellite-based, that are utilized by properly-equipped aircraft to communicate position information and facilitate point-to-point navigation. There are different types of equipment available to pilots around San Angelo Regional Airport, both located on-airport or at other locations in the region. Many of these navigational aids (NAVAIDS) are available to enroute air traffic as well. Within the vicinity of San Angelo Regional Airport there is a VORTAC, NDB, and DME.

A VORTAC (VHF Omnidirectional Range / Tactical Air Navigation) is a ground based electronic navigation aid transmitting very high frequency signals, 360 degrees in azimuth oriented from magnetic north, with equipment used to measure, in nautical miles, the slant range distance of an aircraft from the navigation aid. A VORTAC provides VOR azimuth, TACAN azimuth, and TACAN distance measuring equipment (DME) at one site. The San Angelo VORTAC is 1.8 nautical miles from the airport at 60 degrees.

A non-directional beacon (NDB) is an L/MF radio beacon transmitting non-directional signals whereby the pilot of an aircraft equipped with direction finding equipment can determine his bearing to or from the radio beacon and track to or from the station. There is one NDB located 5.7 nautical miles

from the airport at 214 degrees. The NDB known as WOOLE is also the Locator Outer Marker/Initial Approach Fix (LOM/IAF) for the Instrument Landing System (ILS) approach to Runway 3.

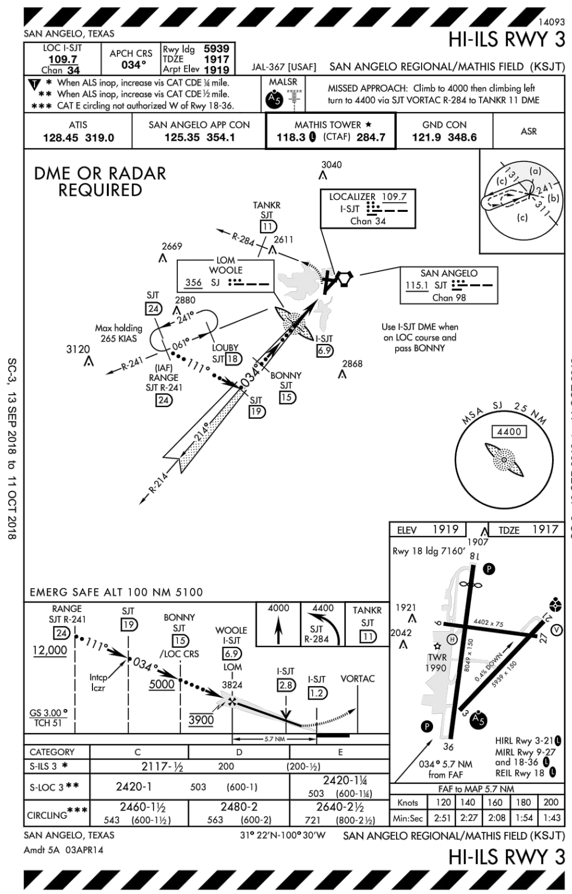
There is a network of low-altitude published federal airways (Victor Airways), in the vicinity of the airport which traverse the area and span between regional ground-based VOR/DME and VORTAC sites. Victor airways include airspace within parallel lines located four nautical miles on either side of the airway and extend 1,200 feet above the terrain up to, but not including, 18,000 MSL. There are 4 victor airways in the vicinity of San Angelo Regional Airport that utilize the San Angelo VORTAC. They are V68, V76, V77, and V556.

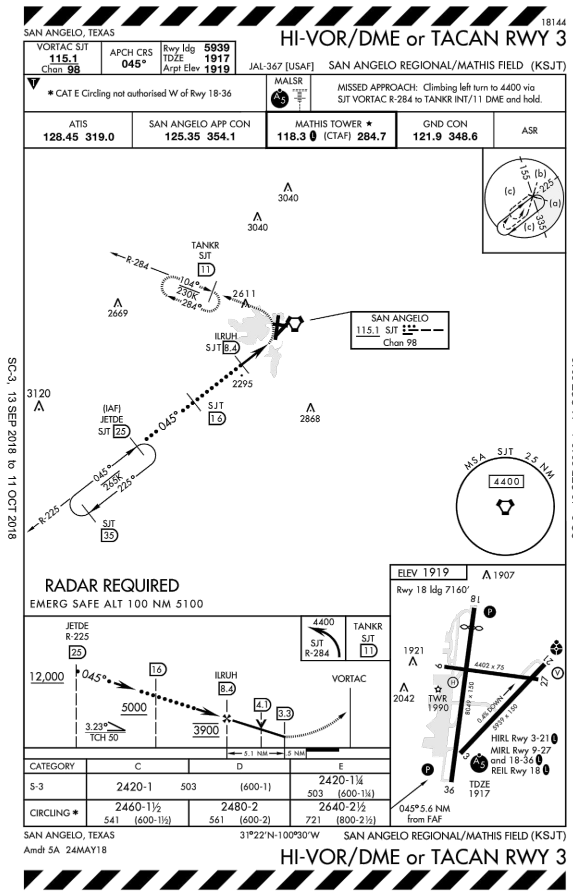
There are 11 published instrument approach procedures for San Angelo Regional Airport. There are 9 for Runway 3-21 and 2 for runway 18-36. The Instrument Landing System (ILS) consisting of localizer and glide slope equipment installed on Runway 3 has the lowest minima of the published approaches. **Exhibits 1E-a and 1E-b** depict the current approach plates for these published instrument procedures.

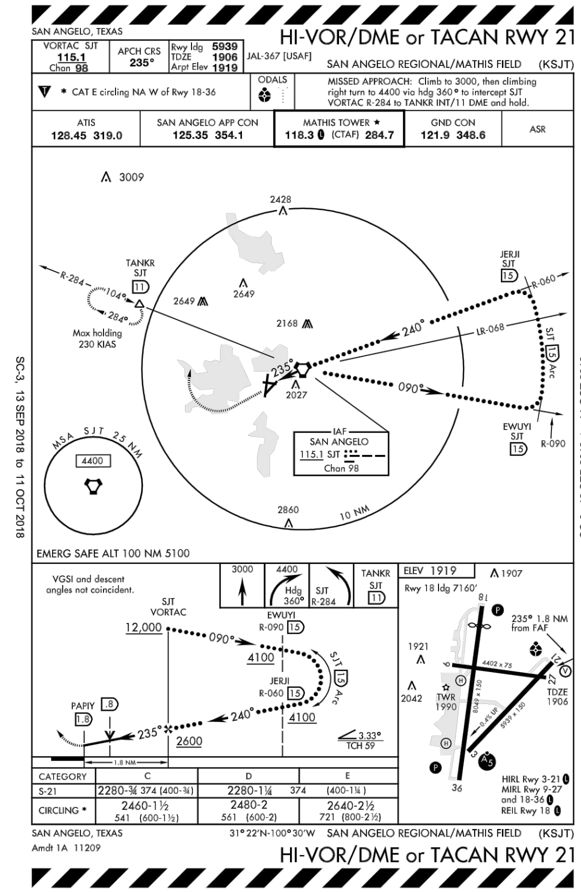
Part 77 Airspace Surfaces

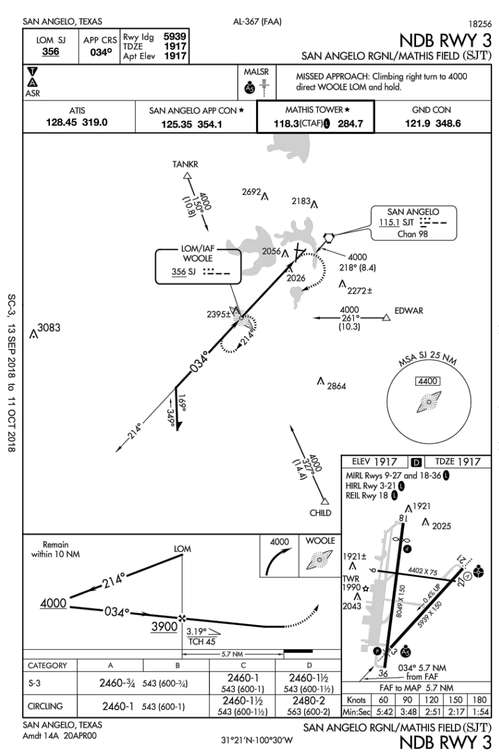
Federal Aviation Regulations (FAR) Part 778, *Objects Affecting Navigable Airspace*, is a tool used to protect the airspace over and around a given airport and each of its runway approaches, from potential obstructions to air navigation. It is important to note that as a federal regulation, all airports included in the NAS are subject to the requirements of Part 77. To determine whether an object is an obstruction to air navigation, Part 77 establishes several imaginary surfaces in relation to an airport and to each runway end. The dimensions and slopes of these surfaces depend on the configuration and approach categories of each airport's runway system. The size of the imaginary surface depends largely upon the type of approach to the runway in question. The Part 77 surfaces can be a tool for the City in reviewing proposed development in the vicinity of the airport and for establishing locally enforceable height and hazard zoning regulations. The City of San Angelo has developed a zoning ordinance based upon historically accepted Part 77 information.

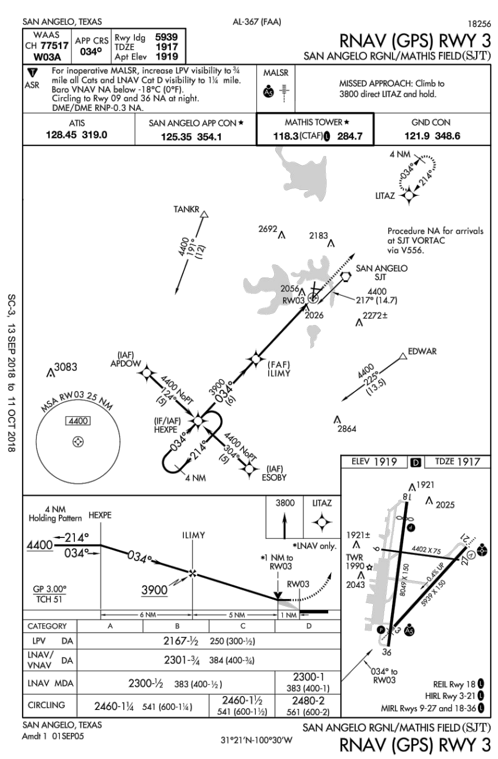
The principal imaginary surfaces are depicted and generally described on the following pages.











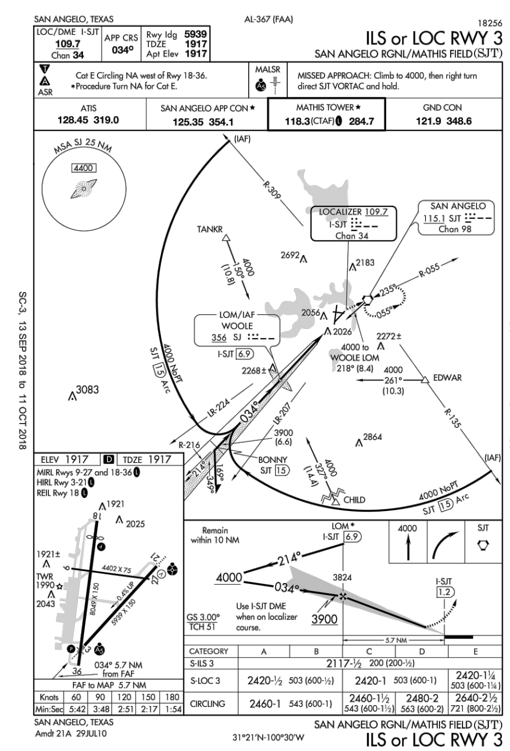
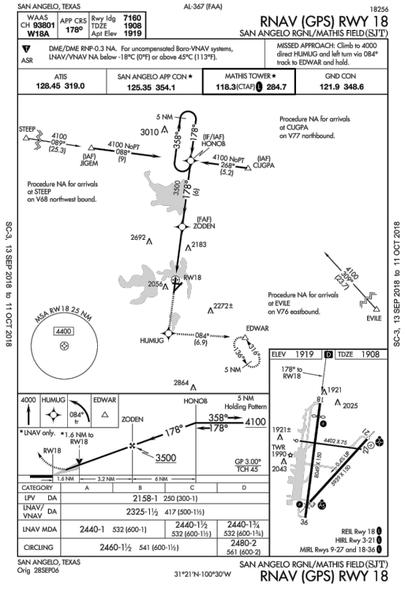
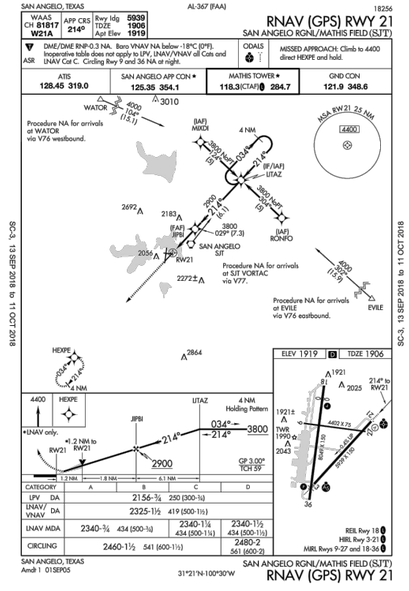
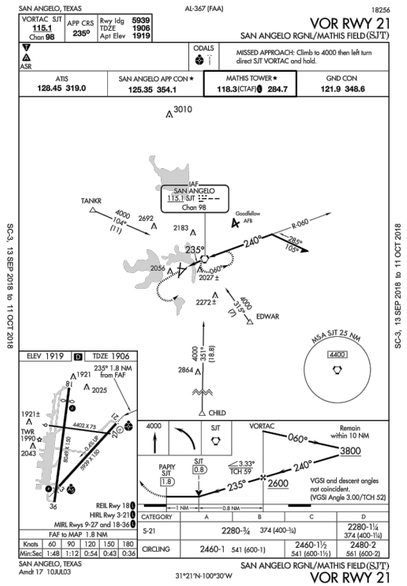
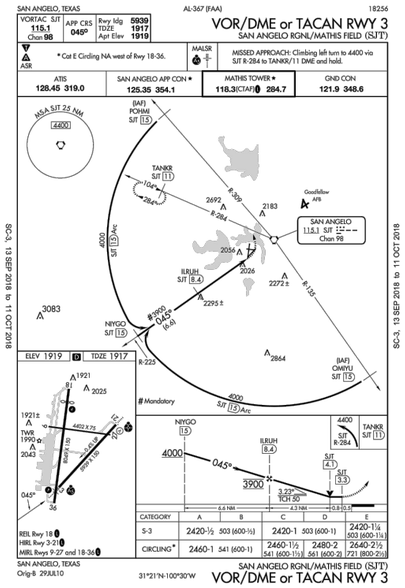


Exhibit 1E-a
INSTRUMENT APPROACH PLATES









N1

RADAR MINS

18144

RADAR INSTRUMENT APPROACH MINIMUMS

BIGGS AAF (KBIF), TX (Fort Bliss) (Amdt 6A, 15288 USA) ELEV **3948**

RADAR - 124.15 307.0 NA

	RWY	GS/TCH/RPI	CAT	DH/ MDA-VIS	HAT/ HATh/ HAA	CEIL-VIS
ASR[1]	21		AB	**4360**-½	412	(500-½)
			CD	**4360**-¾	412	(500-¾)
			E	**4360**-1	412	(500-1)
CIR[2]	21		AB	**4400**-1	452	(500-1)
			C	**4400**-1⅛	452	(500-1⅛)
			DE	**4500**-2	552	(600-2)

CAUTION: Steeply rising terrain exceeding 7100 ft 4 miles W of airport.
[1]When ALSF inop, increase CAT E visibility to 1¼.
[2]CAT E circling W of Rwy 3-21 not authorized.

CORPUS CHRISTI NAS (KNGP), (TRUAX FLD) TX (18088 USN) ELEV **19**

RADAR - (E) 6835 124.65 270.8 284.6 337.2 354.8

	RWY	GS/TCH/RPI	CAT	DH/ MDA-VIS	HAT/ HATh/ HAA	CEIL-VIS
PAR[1]	13R[2]	3.0°/41/781	ABCDE	**110**-¼	100	(100-¼)
	31L	3.0°/43/820	ABCDE	**117**-½	100	(100-½)
	35	3.0°/45/835	ABCDE	**117**-½	100	(100-½)
	17	3.0°/39/700	ABCDE	**131**-½	118	(200-½)
PAR W/O GS[1]	17		ABCDE	**300**-1¼	287	(300-1¼)
	13R[2]		ABCDE	**360**-1	350	(400-1)
	31L		ABCDE	**420**-1¼	403	(500-1¼)
	35		ABCDE	**440**-1¼	423	(500-1¼)
PAR W/O GS SIDESTEP[1]	13L		ABCDE	**360**-1¼	347	(400-1¼)
	31R		ABCDE	**400**-1¼	382	(400-1¼)
ASR	13L		ABCDE	**380**-1	367	(400-1)
	13R[2]		AB	**440**-¾	430	(500-¾)
			CDE	**440**-1	430	(500-1)
	17		ABCDE	**360**-1	347	(400-1)
	31R		AB	**500**-1	482	(500-1)
			CDE	**500**-1¼	482	(500-1¼)
	31L		AB	**500**-1	483	(500-1)
			CDE	**500**-1¼	483	(500-1¼)
	35		AB	**500**-1	483	(500-1)
			CDE	**500**-1¼	483	(500-1¼)
	4		AB	**500**-1	483	(500-1)
			CDE	**500**-1¼	483	(500-1¼)
CIR[6]	ALL RWYS		A	**500**-1	481	(500-1)
			B	**500**-1¼	481	(500-1¼)
			C	**540**-1½	521	(600-1½)
			D	**620**-2	601	(700-2)
			E	**620**-2¼	601	(700-2¼)

(CONTINUED ON NEXT PAGE)

SC-3

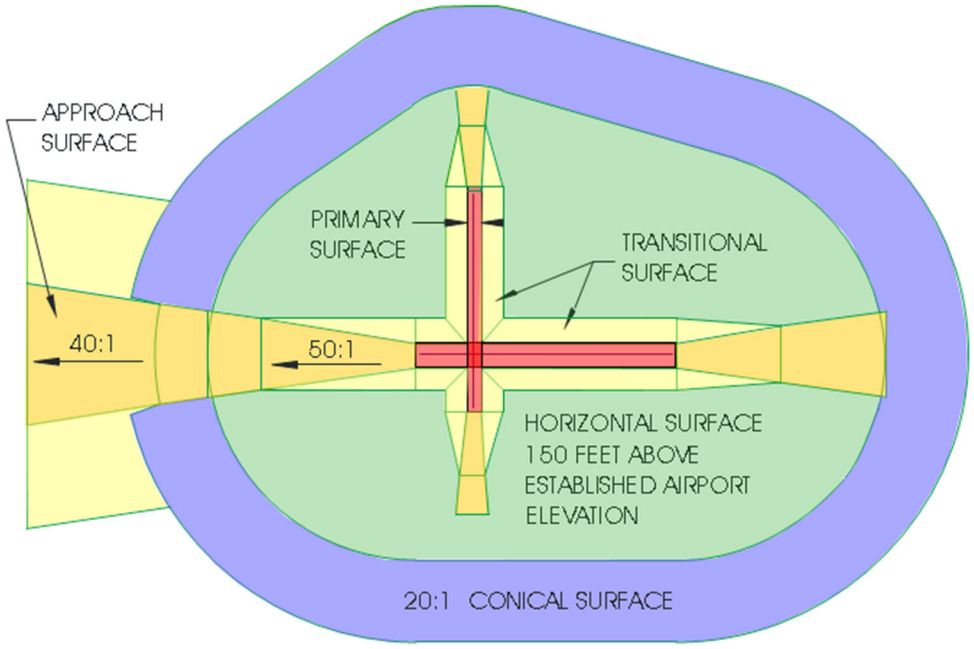
13 SEP 2018 to 11 OCT 2018

RADAR INSTRUMENT APPROACH MINIMUMS

RADAR MINS

18144

N1



Primary Surface. The primary surface is longitudinally centered on the runway and extends 200 feet beyond each runway end. The elevation of any point on the primary surface is the same as the elevation along the nearest associated point on the runway centerline. The primary surfaces for Runways 18-36 and 3-21 are 1,000 feet wide and centered on the runway. The primary surface for Runway 9-27 is 500 feet and centered on the runway.

Approach Surface. The approach surface is also established for each runway end. The approach surface begins at the end of the primary surface, extends upward and outward, and is centered along an extended runway centerline. The approach surface leading to each runway is based upon the type of approach available (instrument or visual) or planned.

In an effort to protect the airport from future adjacent incompatible land uses, approach surfaces with instrument approach procedures are planned to each runway end. The approach surface to Runways 3, 21, and 36 extends a horizontal distance of 10,000 feet at a 50:1 slope with an additional 40,000 feet at a slope of 40:1. The outer width of the approach surface is 16,000 feet. The non-precision approach surface for Runway 18 extends a horizontal distance of 10,000 feet to a width of 3,500 feet and slopes upward at a 34:1 slope. Runway 9-27 is planned to remain visual approach only. The approach surfaces for each runway end of Runway 9-27 extend a horizontal distance of 5,000 feet with an approach slope of 20:1.

Transitional Surface. Each runway has a transitional surface that begins at the outside edge of the primary surface at the same elevation as the runway. The transitional surface also connects with the approach surfaces of runways with precision approaches, such as that existing for Runway 3 and planned for Runways 21 and 36. The surface rises at a slope of 7:1, up to a height 150 feet above the highest runway elevation. At that point, the transitional surface ends and the horizontal surface begins.

Horizontal Surface. The horizontal surface is established at 150 feet above the highest elevation of the runway surface. Having no slope, the horizontal surface connects the transitional surface and the approach surfaces to the conical surface at a distance of 10,000 feet from the end of the primary surface of each runway.

Conical Surface. The conical surface begins at the outer edge of the horizontal surface then continues for an additional 4,000 feet horizontally at a slope of 20:1. Therefore, at 4,000 feet from the horizontal surface, the elevation of the conical surface is 350 feet above the highest airport elevation.

Landside Facilities

Landside facilities are those that support the users of the airport, specifically the aircraft and pilot or passenger handling functions. These facilities include the commercial service passenger terminal complex, cargo facilities, fixed base operators (FBO), general aviation facilities and support facilities including fuel storage, automobile parking, roadway access, and aircraft rescue and firefighting.

Commercial Service Terminal Complex

Commercial service facilities are located adjacent to and at the approximate midpoint of Runway 18-36. Vehicular access to the terminal building from the City of San Angelo is via Knickerbocker Road, Reary Blvd. and Terminal Circle.

Commercial Service Terminal Building

Over the past decade the commercial service terminal has undergone two major overhauls. The first, completed in 2007, included a remodel and expansion of the concourse, adding a second level boarding area with two gates as well as a ground level boarding area with an additional gate. In 2015 the City completed a remodel of the remaining portions of the terminal building which included the modernization and remodel of the airline counters, baggage claim, security checkpoint, administrative offices, and passenger meet and greet areas.

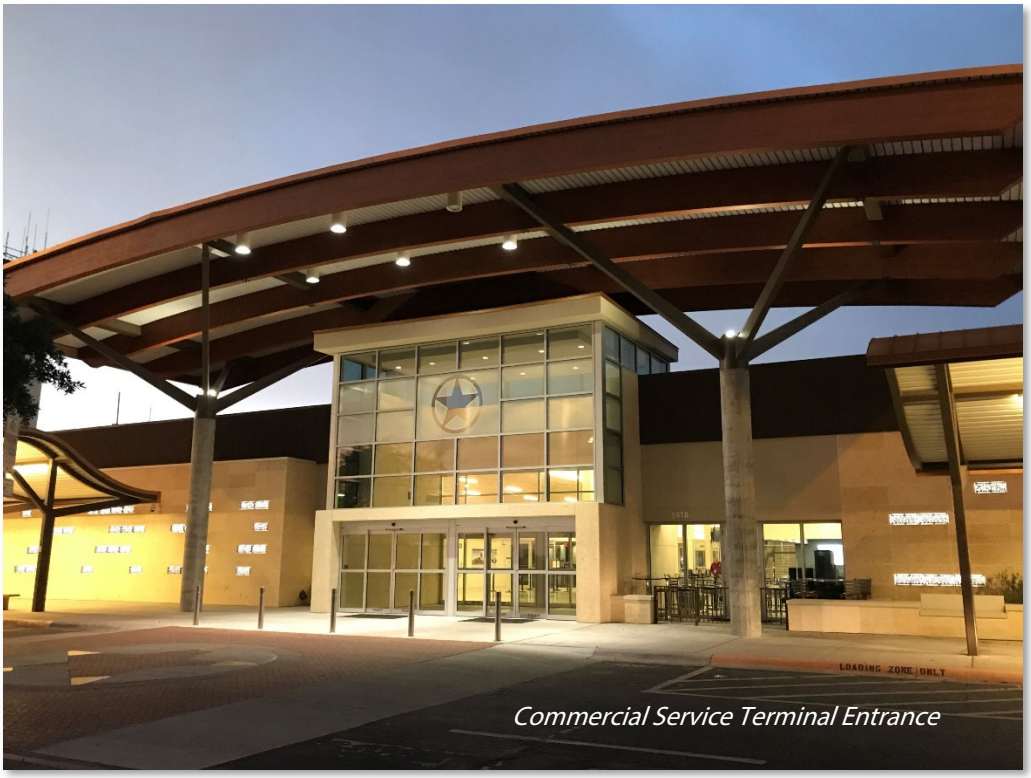
Exhibit 1F depicts the various functional areas of the terminal building along with square footage for each use. Upon entering the terminal building a café and restaurant are located to one's right and ticketing is to the left. Restrooms, rental car counters, tenant space, baggage claim and passenger meet and greet areas make up the remaining portions of the public areas on this level. Secure areas include the airport's administrative offices, airline offices and baggage handling, mechanical space, and the Transportation and Security Administration (TSA) screening area.

Office Space	1,095 SF	Vertical Circulation	878 SF	Secure Circulation	1,282 SF
Ticket Counter	456 SF	Concession Food Services	2,644 SF	Non-Secure Circulation	8,338 SF
Administration	3,117 SF	Concession Serv. (Private)	1,342 SF	Baggage Area	1,290 SF
TSA/SSCP	2,482 SF	Storage Area	925 SF	Rental Car Service	784 SF
Holdroom	3,765 SF	Maintenance	921 SF	Restrooms	1,177 SF

CONCOURSE LEVEL

SAN ANGELO REGIONAL AIRPORT

Exhibit 1F
TERMINAL BUILDING LAYOUT



Commercial Service Terminal Entrance

Once departing passengers leave the TSA screening area signage directs them t to Gates 1 and 2, located on the second floor of the terminal or Gate 3 located on the ground floor. Currently operations are primarily handled via the jet bridges on the 2nd floor.

The terminal remodel ensured ADA access requirements are met. An elevator is available for access to the second floor and all restroom facilities are ADA compliant. Passenger convenience was considered during the terminal remodel and functional spaces were determined based on typical passenger flows and expectations. Future growth needs were also considered, and additional space was included for additional rental car counter space, additional airlines, and gate expansion.

Additional conveniences within the terminal include wi-fi and numerous outlets for the charging of devices including cell phones, laptops, or tablets. Post security vending machines are present for the purchase of drinks or snacks.

Terminal Arrival and Departure

As depicted on **Exhibit 1G**, vehicle access to the terminal building is provided by Terminal Circle Road, which is a one way, two lane road which loops around the short- and long-term terminal parking area. Terminal Circle is accessed via Reary Boulevard which connects with Knickerbocker Road.

The terminal arrival and departure area, or the terminal curb, is a very important feature of the overall terminal design as it needs to allow for the orderly arrival and departure of passengers. The terminal

SAN ANGELO REGIONAL AIRPORT

Exhibit 1G
TERMINAL VEHICLE PARKING AND CIRCULATION

curb at San Angelo Regional Airport is approximately 300 feet long and contains areas for drop off and pick up.

Upon arriving at the terminal, the first set of doors along the curb is for departing passengers and visitors. Upon entering the doors departing passengers will see the ticketing counters and kiosks immediately to the left. Beyond those areas is the TSA security checkpoint.

Further down the terminal curb is another set of doors, typically used by arriving passengers. Upon landing at the airport and departing the aircraft and terminal secured area, passengers will find the rental car counters and baggage claim to their right. Doors to the curb, rental car lot, and short- and long-term parking are beyond the rental car counters at the far end of the terminal.

Terminal Access and Parking

The primary airport entrance, Reary Boulevard, is located to the west of the airport, intersecting Knickerbocker Road. Reary Boulevard is a 4-lane divided roadway with two lanes in each direction, connecting it with S. Terminal Circle which loops through the primary parking areas of the airport. Stewart Lane, located just a little further down on Knickerbocker Road, is an alternative access road intersecting at Reary Boulevard. There are guidance signs providing directions to and from the airport.

San Angelo Regional Airport offers a variety of areas available for vehicle parking. The primary parking lots include short term, long term and overflow parking. **Exhibit 1G** depicts the parking locations and direction of traffic entering and exiting the airport. Each parking lot is paved and in immediate proximity to the terminal building. Parking at the Airport is free, lighted and monitored by airport and city police. These parking lots are mostly used for passenger parking, while there are designated employee parking areas in other locations and tenants generally park adjacent to their aircraft/storage hangars. The short-term parking area which is located closest to the terminal building has 103 regular parking spaces and 12 handicap spaces. The long-term parking lot, located to the west of the short-term lot, has 242 regular parking spaces. Just to the south of the long-term is the overflow parking lot which has 115 regular parking spaces.

Several rental car companies serve San Angelo Regional Airport. These include Avis, Hertz, Dollar/Thrifty and Budget Rent A Car. The ready/return parking lot for these companies is located on the northern side of the short-term parking area and a total of 76 parking spaces are available.

Cargo Facilities

Both Federal Express (FedEx) and UPS utilize San Angelo Regional Airport. Federal Express uses Cessna Caravan aircraft and UPS, through their contractor Ameriflight, uses Swearingen Merlin aircraft. Both operations have a morning and evening operation with activity increasing over the holidays.

UPS package handling occurs on the apron areas whereas FedEx leases hangar space to sort packages and load onto trucks.

Fixed Base Operators

Fixed base operators (FBOs) provide aeronautical services such as fueling, aircraft storage, tie-downs and parking, aircraft rental, aircraft maintenance, flight instruction, and catering. Currently, two FBOs operate at the airport, Ranger Aviation and Skyline Aviation.

Ranger Aviation provides standard FBO services - aircraft rental, flight instruction and refueling - as well as aircraft painting, interior refurbishment, line services, and maintenance. The company leases over 300,000 square feet of space in 8 hangars located across the airport, as noted on **Exhibit 1H**. Ranger currently maintains a fuel farm with three tanks, one 12,000 gallon AvGas, one 15,000 gallon JetA, and a decommissioned 10,000 gallon JetA.

Skyline is a full service FBO that offers aircraft management, fueling, flight training, hangar rental and aircraft sales. Skyline leases a 15,000 square foot hangar and maintains a fuel farm with a 20,000-gallon JetA tank and a 12,000 AvGas tank.

FACILITIES (100)	
100	AIRPORT RESCUE FIREFIGHTING FACILITY
101	U.S. CUSTOMS AND BORDER PROTECTION
102	VACANT HANGAR "AMCOM"
103	U.S. CUSTOMS AND BORDER PROTECTION
104	RANGER AVIATION PAINT FACILITY
105	ELECTRICAL VAULT
106	FUEL STORAGE TANKS
107	VACANT OFFICE
108	VACANT HANGAR

FACILITIES (200)	
200	MAINTENANCE BUILDING
201	AIR TRAFFIC CONTROL TOWER (ATCT)
202	TERMINAL COMPLEX
203	RANGER AVIATION
204	FEDERAL EXPRESS
205	RANGER AVIATION
206	WEST TEXAS WEATHER MODIFICATION
207	COSA EMERGENCY OPERATIONS CENTER
208	TSA OFFICE
209	WESTERN LITTLE LEAGUE

FACILITIES (300)	
300	RANGER AVIATION
301	RANGER AVIATION
302	RANGER AVIATION
303	POOR BOY AVIONICS
304	FIRST FLIGHT
305	T-HANGAR
306	T-HANGAR
307	T-HANGAR
308	T-HANGAR
309	SKYLINE
310	T-HANGAR
311	L-3 VERTEX AEROSPACE
312	RANGER AVIATION PAINT FACILITY
313	PRIVATE HANGAR
314	FUEL STORAGE TANKS
315	PRECISION AIRCRAFT SERVICES
316	T-HANGAR
317	T-HANGAR

RUNWAY 9-27

RUNWAY 18-36

RUNWAY 3-21

NORTH APRON

TERMINAL APRON

SOUTH APRON

HANGAR RD.

HANGAR RD.

KNICKERBOCKER RD.

FAA RD.

REARY BLVD.

STEWART LN.

SAN ANGELO REGIONAL AIRPORT

Exhibit 1H
LANDSIDE FACILITIES

General Aviation Businesses and Tenants

A number of additional business, companies, governmental agencies, and private individuals located at San Angelo Regional Airport. **Exhibit 1H** depicts the location of the tenants described below.

U.S. Customs and Border Protection (CBP) Air and Marine Division, occupies approximately 92,000 square feet of hangar and office space at the north end of the apron. From this facility they complete multiple missions including the operation of four Unmanned Aircraft Systems (UAS) to conduct border security missions from the airport and maintenance and overhaul for all the aircraft within their fleet. CBP operations have been increasing continuously over the past few years and it is anticipated that they will continue to increase their airport footprint. CBP currently leases Building 101 and have plans to extend operations into Building 103.

West Texas Weather Modification Association (WTWMA) operates from Hangar 206. Using Piper Comanche aircrafts, WTWMA conducts a cloud seeding program over 6 million acres of land.

Poor Boy Avionics leases the 8,000 square foot hangar (building 303) to conduct aircraft repair and maintenance services on aircrafts, helicopters and jets.

First Flight is an air ambulance company providing medical fixed wing air transport. Currently First Flight leases building 304, a 1,300 square foot hangar to house 1 King Air Aircraft.

L-3 Vertex Aerospace is a military rotary and fixed wing aircraft services company. L-3 Vertex is currently leasing Hangar 311 which is approximately 13,000 square feet in size.

Precision Aircraft Services is an aircraft and helicopter maintenance services company that offers preventative maintenance, repairs and rebuilds. Currently they lease the 11,000 square foot hangar referred to as Hangar 315.

Apron Areas

The aircraft apron provides an area for aircraft parking, storage, boarding, fueling operations and allows access to hangars or buildings. Apron areas are marked with taxilanes, tie-downs, secure area and non-movement boundaries. The apron is constructed of concrete. San Angelo Regional Airport has 3 primary apron areas. For the purposes of this master plan, apron areas will be described as the North, Terminal, and South Aprons as described below.

North Apron begins at the terminus of Taxiway Alpha and continues south to the Terminal Apron. Currently this area is used for aircraft storage and houses a number of retired regional jets owned by Envoy Air as well as one helicopter landing pad marked on the pavement. This apron is approximately 40,000 square yards.

Terminal Apron is adjacent to the commercial service terminal building and is contained within the Security Identification Display Area (SIDA). This area is a special security area designated to comply with FAA requirements directed by Federal Aviation Regulation (FAR) part 107.205. The Terminal Apron is accessed only by commercial service or charter aircraft and is marked to accommodate aircraft at three gates, two accessed via jet bridge and one ground level. This apron is approximately 24,500 square yards in size.

South Apron begins at the edge of the terminal apron and extends the remaining length of the apron area. Several businesses and tenants utilize this apron to provide access to hangar storage and airport businesses. This apron is approximately 135,000 square yards.

Support Facilities

Support facilities are critical to providing the necessary support to aircraft ground operations. These facilities include, among others, fuel storage, airport maintenance, aircraft rescue and firefighting (ARFF), and airfield access. The location of the facilities described below is shown on **Exhibit 1J**.

Airport Maintenance

The City of San Angelo is responsible for overall maintenance procedures completed at the Airport. There are maintenance facilities located in two areas of the airfield. The first is located in (Building

LEGEND

- Fence
- Perimeter road
- Water Line
- Sanitary Sewer
- Automatic Gate
- Manual Gate

Airport Maintenance Building

Wastewater Treatment Facility (Inactive)

RUNWAY 3–21 (5,939' X 150')

RUNWAY 9–27 (4,402' X 75')

RUNWAY 18–36 (8,049' X 150')

ARFF Facility

Airport Maintenance

Avis Service Facility

Hertz Service Facility

COSA Fuel Depot

Water Treatment Facility (Inactive)

KNICKERBOCKER RD

REARY BLVD

FM 584

SAN ANGELO REGIONAL AIRPORT

Exhibit 1J
AIRFIELD SUPPORT FACILITIES

200) just east of the ATCT building, this building is approximately 1,900 square feet in size. The second is at a location east of Runway 3. Airfield maintenance equipment is stored in and around this facility, it is approximately 3,400 square feet in size with roughly 5,000 square feet of parking and storage area.

Aircraft Rescue and Firefighting Facilities (ARFF)

Part 139 airports are required to provide ARFF services during air carrier operations. Each certificated airport maintains equipment and personnel based on an ARFF index established according to the length of aircraft and scheduled daily flight frequency. There are five indices, A through E, with A applicable to the smallest aircraft and E applicable to the largest aircraft. San Angelo Regional Airport falls within ARFF index B. As such, the Airport is required to maintain a fleet of equipment and properly trained personnel consistent with this standard.

The San Angelo Regional Airport ARFF facility is located on the airfield at the northwest end of Taxiway A, adjacent to Runway 18. This position provides direct access to the ramp areas, taxiways and runways. The facility is owned and serviced by the City of San Angelo. The building is 6,500 square feet with two bay automatic doors that house two ARFF vehicles. It includes housing or living quarters with all the necessities as well as a command and communications center.

The ARFF facility houses the following equipment:

- Primary Firefighting Vehicle – 2018 Oshkosh Striker 4x4 (Purchased 2017)
  - 1,500 Gallons of Water
  - 210 Gallons of Firefighting Foam
  - 550 Pounds of Dry Chemical

- Backup Firefighting Vehicle – 2003 Oshkosh Striker 1500
  - 1,500 Gallons of Water
  - 230 Gallons of Firefighting Foam
  - 450 Pounds of Dry Chemical

Fencing and Security

Airport fencing is installed to prevent unauthorized access by individuals or vehicles from entering the airfield. It also helps protect wildlife and defines the outer airport property boundaries. San Angelo Regional Airport is equipped with security fencing completely enclosing airfield property.

Rental Car Service Areas

Avis and Hertz both maintain on-site centers for maintenance and services.
The Avis service facility is located along Stewart Lane which is west of the terminal building. The servicing facility is approximately 600 square feet with 18,000 square feet of vehicle parking and storage.

The Hertz service facility is located across the street from Avis on Stewart Lane. The facility is approximately 1,150 square feet with 15,500 square feet of vehicle parking and storage.

Utilities

Available utilities at the airport include water, sanitary sewer, electricity, gas, waste disposal and communication. The availability of utilities is vital to its daily operation and future growth potential. Having access to these services tremendously increases the opportunity of expansion for the airport and the surrounding area. Existing utility facilities are depicted on **Exhibit 1J**.

The City of San Angelo provides both water and sanitary sewer service to the airport. Water is supplied through a 12" line located along Knickerbocker Rd. to the west of the airport. Sanitary Sewer is routed with a 12" pipe flowing into a lift station and then pumped into the main sanitary sewer trunk discharging through a 4" force main.

Electricity is provided by American Electric Power (AEP) and is available throughout the airport. Natural gas is provided by Atmos Energy and is available to certain facilities located on the north side of the airport. This area includes the Aircraft Rescue and Firefighting Facility (100), U.S. Customs and Border Protection Facility (101), Border Patrol Facility (103), Ranger Aviation Hangar (108), ATCT (201) and the Terminal Building (202). All other facilities are supplied with liquified petroleum gas (LPG). Telephone and communication services are provided by Suddenlink Communications.

The on-airport water and wastewater treatment systems are currently not in operation. These systems were constructed by the military and then transferred to the city when the airport changed from military to civilian use. The water treatment facility is located on the west side of the airport near Knickerbocker Road and the wastewater treatment facility is located on the southeast side of the property.

Area Land use

Land use around an airport can have major impacts on the operations and future growth and viability of the airport. It is critical that land use planning take into consideration the presence of the airport and the potential impacts operation of the facility can have on surrounding land uses. Currently the airport is surrounded by undeveloped, open space, to the south east and west. To the north of the airport is a mix of residential, recreational, and commercial land uses.

City of San Angelo Zoning

Zoning is the public regulation of land use and involves the adoption of ordinances that divide a community into various districts or zones. Within each district, only certain uses of land are allowed, such as residential, commercial, industrial, etc. Typical zoning regulations also address things such as the height of a building, number of people that can occupy a building, lot area, setbacks, parking, signage, and density.

In 1996 the City adopted revisions to the original 1954 Zoning Ordinance. Chapter 12 of the City of San Angelo Code of Ordinances contains the zoning requirements for property contained within the city limits. Chapter 12, Attachment A, Section 104 states that the "Zoning Ordinance is adopted for the

purpose of promoting the public health, safety and general welfare of the citizens of San Angelo. More specifically, this Zoning Ordinance provides for the division of land into different districts that, in combination with regulations pertaining to such districts, are designed in accordance with a comprehensive plan to achieve objectives that include, but are not limited to, the following:

1. Promote the beneficial and appropriate development of all land and the most desirable use of land in accordance with a well-considered plan;
2. Protect the character and the established pattern of desirable development in each area;
3. Prevent or minimize land use incompatibilities and conflicts among different land uses;
4. Maintain property values by stabilizing expectations and ensuring predictability in development; and
5. Establish a process that effectively and fairly applies the regulations and standards of this Zoning Ordinance and respects the rights of property owners and the interests of citizens."

Twenty-one zoning districts are defined within the ordinance. **Exhibit 1K** depicts the zoning designations in the vicinity of the airport.[3]

As depicted on the exhibit, the area encompassing San Angelo Regional Airport is zoned as PD – Planned Development. The purpose of the PD district, applicable to the airport, is to allow diversification of uses, structures, and open spaces and to promote flexibility of design in a manner compatible with existing and allowed uses of land on adjacent properties and to provide an appropriate balance between the intensity of development and the ability to provide adequate supporting public facilities and services.

Comprehensive Plan

A local comprehensive plan is a strategic long-range document that addresses land use and zoning as it relates to growth and development of a municipality. With respect to an airport that lies within a community, it is critical that local comprehensive planning efforts acknowledge and address the issue of land use compatibility near an airport.

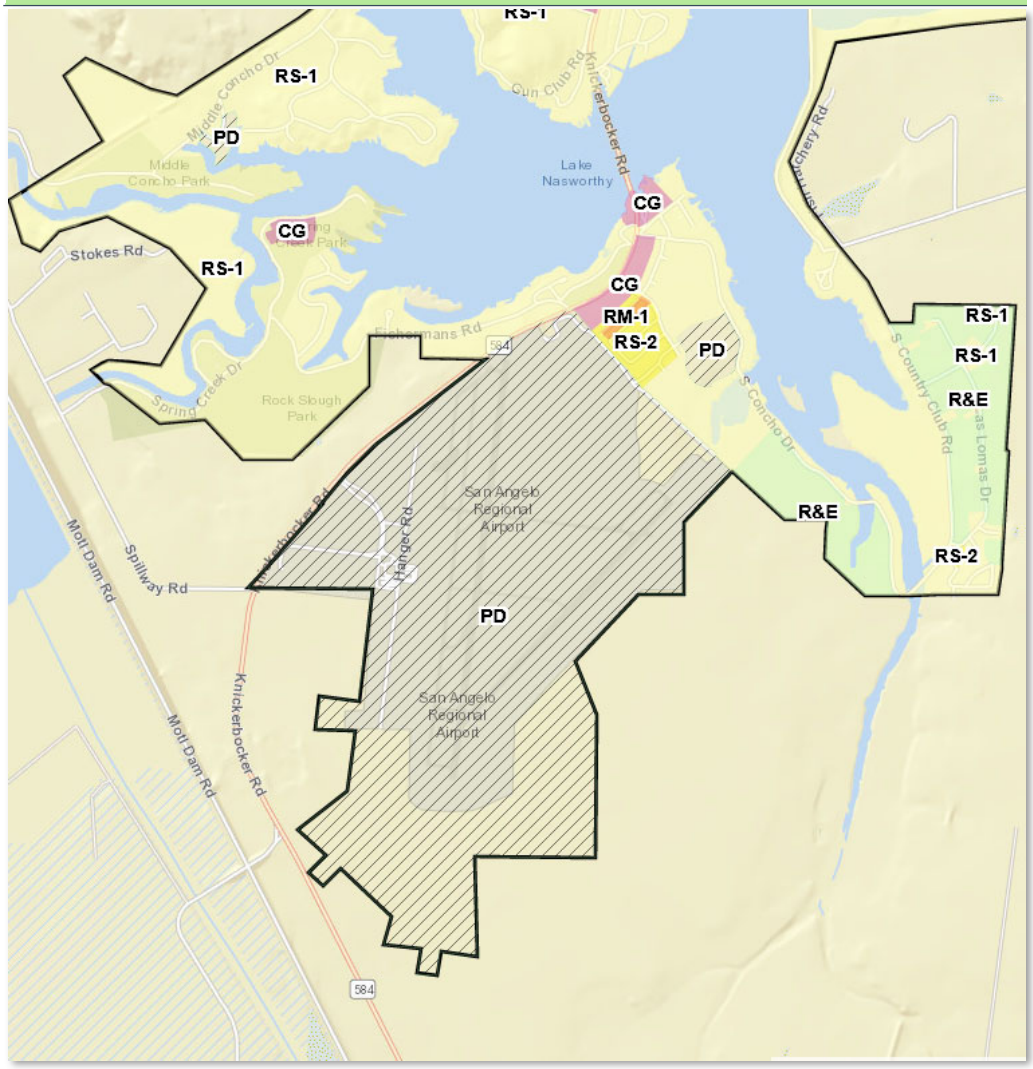
In 2003, the City of San Angelo completed the *San Angelo Comprehensive Plan*. Within a few years, new insight and continued growth pressure dictated the need for updating key sections of that document, particularly the vision and strategy for its implementation. This led to the preparation of the *San Angelo Strategic Plan, 2009 update to the San Angelo*

Comprehensive Plan. The purpose of this document was "to provide the City of San Angelo with positioning strategies for catalyst projects
that deliberately target public initiatives in an effort to attract property investment and reinvestment."[4]

[4] *San Angelo Strategic Plan, 2009 update to the San Angelo Comprehensive Plan* assessed October 2018, http://www.cosatx.us/home/showdocument?id=1714

Both of these planning processes culminated with the preparation of a Vision Plan. The purpose of this plan was to make certain that plans for future development were heading in the right direction, assuring economic vitality and promoting the interests of the citizens. **Exhibit 1L** shows the vision of the area surrounding the airport.

EXHIBIT 1K
Zoning in Airport



[1] City of San Angelo Zoning Ordinance, accessed October 2018, http://z2codes.franklinlegal.net/franklin/Z2Browser2.html?showset=sanangeloset

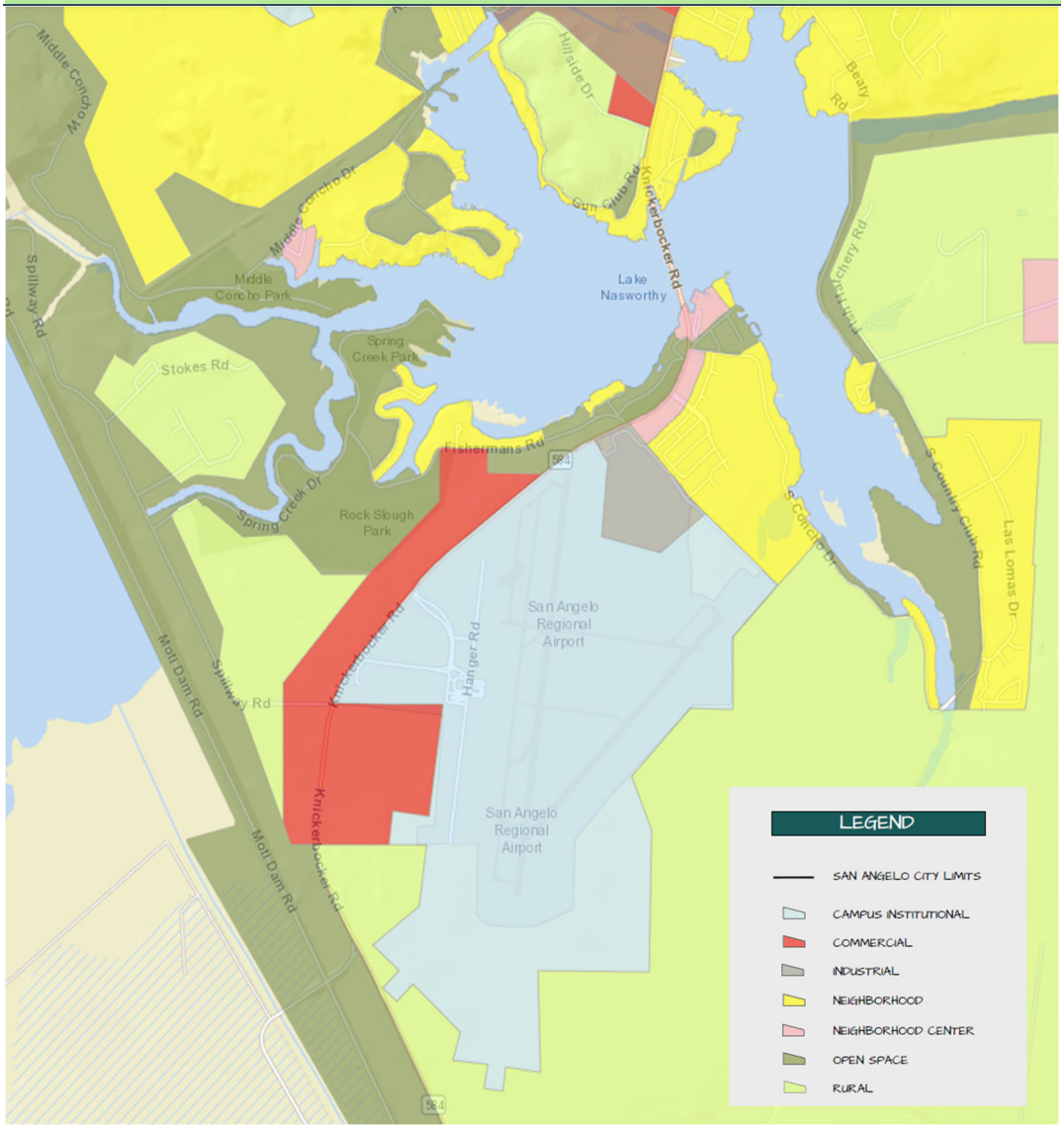
Lake Nasworthy Master Plan and Implementation Strategy

In November 2013 the City of San Angelo concluded a planning process for Lake Nasworthy.[5] The areas evaluated as part of this process included areas immediately north of the Airport. The purpose of the planning process was to identify issues and opportunities for a Lake Nasworthy redevelopment strategy. Potential improvements to existing parks, trails, and other public spaces were described as well as growth of the commercial and tourist-related facilities such as hotels, restaurants, and campgrounds.

Access to San Angelo Regional Airport is primarily provided via Knickerbocker Road. This road bisects the areas evaluated as part of the lake planning study. Improvements outlined within the master plan and implementation strategy could provide benefits to the airport as it continues to grow and develops through the proximity of planned lodging and restaurants. That said, it is critical the City consider the presence of the airport as development projects are approved to ensure long term viability of the airport and airspace protection.

[5] Lake Nasworthy Master Plan and Implementation Strategy, accessed October 2018, http://www.cosatx.us/home/showdocument?id=1028

EXHIBIT 1L
Comprehensive Plan



ENVIRONMENTAL INVENTORY

As defined within Chapter 5 of FAA AC /150-5070.6B, *Airport Master Plans*, the purpose of considering environmental factors in airport master planning is to assist with a thorough evaluation of airport development alternatives and to provide information that will help expedite subsequent environmental reviews. Environmental reviews, in accordance with the *National Environmental Policy Act (NEPA) of 1969*, are required prior to the issuance of AIP funds for airport development projects or the approval of projects depicted on the airport's ALP. FAA Orders 1050.1, Environmental Impacts:

Policies and Procedures and 5050.4, *National Environmental Policy Act (NEPA) Implementing Instructions for Airport Actions*, define the various levels of review as well as format and content. FAA Order 1050.1 defines a number of environmental impact categories that are to be evaluated through a NEPA process. Most relevant to an airport master plan in West Texas are the following:

- Biological resources
- Cultural or historic resources
- Wetlands
- Floodplains and surface waters
- Air quality

The following pages provide an inventory of each of these resources.

Biological Resources

In 2011 a Wildlife Hazard Assessment was prepared for the Airport. As part of the assessment existing biological resource habitats were inventoried. **Exhibit 1M** depicts the results of the inventory. Field investigations undertaken for this master plan found that much of the data within the 2011 assessment is still accurate and valid.

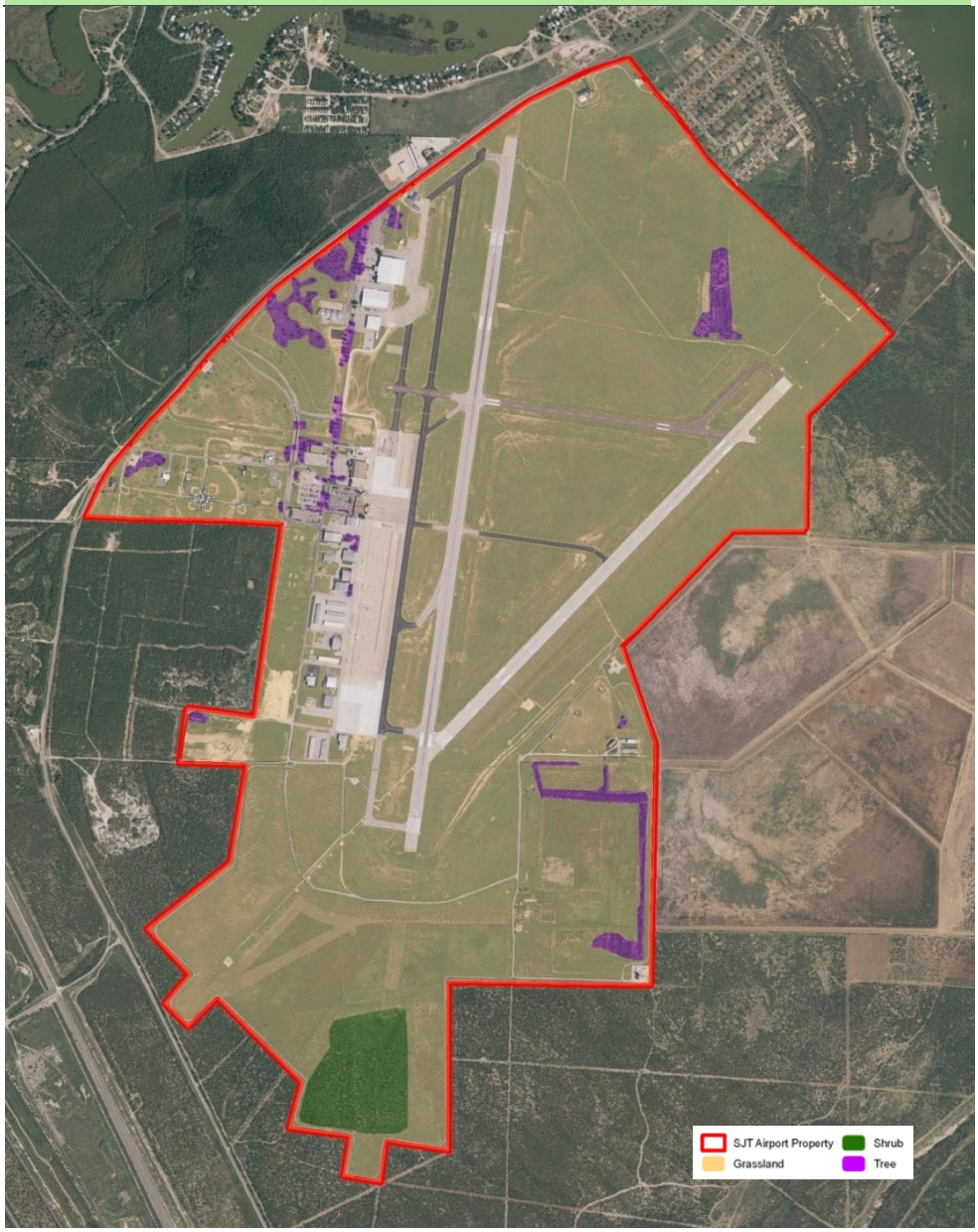
Three habitats are present on Airport property – grassland, shrub, and tree. Grasses and herbaceous flowering plants comprise the majority of the vegetation on the airport property. Dominant grasses and forbs within the airport include Bermudagrass, western ragweed, little bluestem, silverleaf nightshade, common sandbur, curly mesquite, Johnsongrass, white tridens, silver bluestem, old threeawn, purple threeawn, scarlet muskflower, sideoats grama, perennial pepperweed, common sunflower, common broomweed, Texas skullcap, and Texas croton, with the occasional woody species, such as wolfberry.

These stands are dominated by mesquite trees with stands of live oak present just outside the perimeter fence in the northwest portion of the Airport.

Cultural or Historic Resources

The Texas Historical Atlas (Atlas) was queried to identify known cultural or historic resources on or near airport property. The Atlas features over 300,000 site records, including data on Official Texas Historical Markers and National Register of Historic Places properties in Texas. No historic sites were identified as occurring on airport property, the nearest historical site is located north of the airport on the far side of Lake Nasworthy.

EXHIBIT 1M
On-Airport Habitats



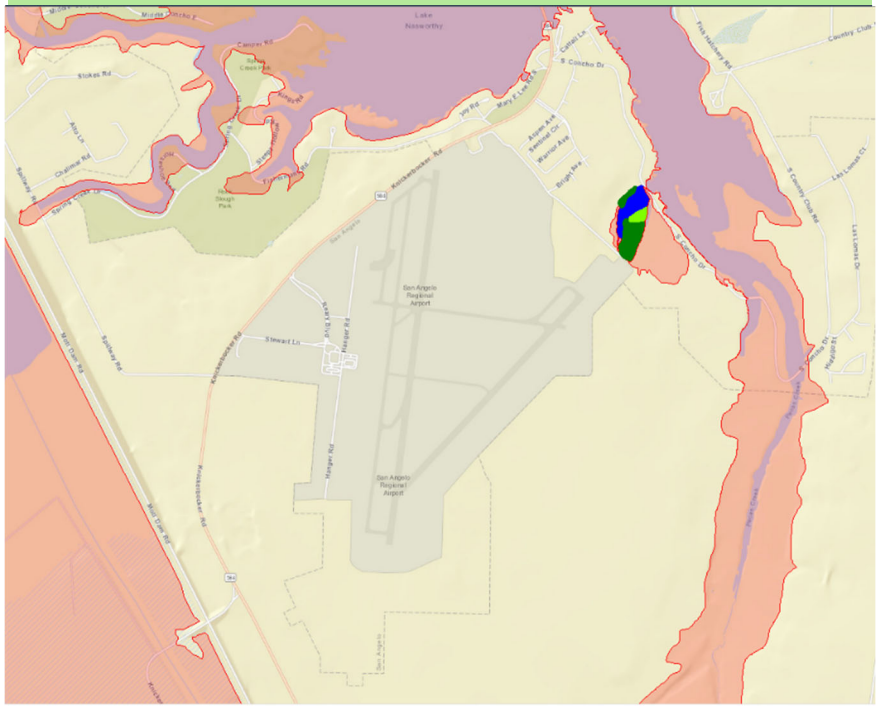
Wetlands

The USFWS National Wetland Inventory Maps were queried to identify wetland resources in the vicinity of the airport. Wetlands were identified at the north end of Runway 3-21. They are connected to Lake Nasworthy via a drainage beneath South Concho Drive. **Exhibit 1N** depicts the location of this wetland resource.

Floodplains and Surface Water

A review of FEMA Floodplain mapping reveals numerous floodplain resources in the vicinity of the airport. Additionally, numerous lakes, rivers, and other water bodies are located within the airport environs. These resources are directly impacted by rainfall and the water levels fluctuate. **Exhibit 1N** illustrates the location of these water resources.

EXHIBIT 1N
Wetland and Floodplain Resources



Air Quality

The United States (U.S.) Environmental Protection Agency (EPA) established National Ambient Air Quality Standards (NAAQS) based on health risks for six pollutants - carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), lead (Pb), ozone (O_3), and two classifications of particulate matter (PM), PM measuring 10 micrometers or less in diameter (PM_{10}), and PM measuring 2.5 micrometers or less in diameter ($PM_{2.5}$). An area with ambient air concentrations exceeding the NAAQS for a criteria pollutant is said to be a nonattainment area for the pollutant's NAAQS, while an area where ambient concentrations are below the NAAQS is considered an attainment area. San Angelo Regional Airport is located in Tom Green County, Texas. According to the EPA Green Book the county is in attainment for all pollutants.

SOCIOECONOMIC PROFILE

Socioeconomic information provides background on area population, employment and income. These measures indirectly identify trends in the local area which may contribute to changes in airport activity. Generally, socioeconomics analyzes how societies progress, stagnate or regress due to the nature of their local or regional economy. This information is very important when planning for future growth of an airport because it is directly influenced by the surrounding economic factors related to the area. Data used within this profile was obtained from local sources unless otherwise noted.

Regional Information

The Concho Valley Council of Governments (CVCOG), formed in 1967, is made up of 13 counties surrounding the City of San Angelo. These counties include Coke, Concho, Crockett, Irion, Kimble, Mason, McCulloch, Menard, Reagan, Schleicher, Sterling, Sutton and Tom Green Counties. The region covers over 16,000 square miles, with San Angelo being the largest metropolitan city. The population of the region as of the 2010 census is 154,192. Ranching, farming, oil and gas dominate the economy of this region as a whole.

Population

A growing population can have positive effects on the surrounding economy and more specifically the airport. A larger or increasing population percentage has the potential to add higher demands for aviation activities in the area. The trend of growth, whether it be rising or falling, plays a major role in the planning effort of the airport.

San Angelo is located within Tom Green County; whose population was at 110,224 when the last census was taken in 2010. The City of San Angelo accounts for approximately 85% of the total population of Tom Green County and is an assertive part of the area, with a recorded population of 93,200. In 2016, a new estimate was published that showed San Angelo had increased its population growth by about 8%, from 2010. This increase is most likely related to the increase in companies moving into the city, which create more jobs and higher demands for the community. Education services, Goodfellow Air Force Base, health care services, historical tourism and the oil and gas industry also help contribute to this increase. **Table 1G**, shows the historical population data recorded for the City of San Angelo, Tom Green, Texas and the United States.

TABLE 1G
Historic Population

	1980	1990	2000	2010	Average 10 - Year Growth Rate	2016 (Estimate)
City of San Angelo	73,240	84,462	88,439	93,200	7.56%	100,450
Tom Green County	84,784	98,458	104,010	110,224	8.23%	117,944
State of Texas	14,229,191	16,986,510	20,851,820	25,145,561	17.25%	27,904,862
United States	226,545,805	248,709,873	281,421,906	308,745,538	9.76%	325,719,178

Source: U.S. Census Bureau and the Texas Demographic Center

Employment

Another significant socioeconomic measurement that records the stability and overall well-being of the surrounding economy is employment. This is directly related to the nature of disposable income in the area, which can either help or harm the local economy depending on high/low levels of unemployment. Major employment industries surrounding the City of San Angelo include education, health care, trade or retail-sale, hospitality, manufacturing, services, construction, agriculture, oil and gas. The unemployment rate in San Angelo since the 2010 census was 5.2% and seems to be on a steady decline. As of 2017 the estimated unemployment rate is 3.4%. **Table 1H**, provides the historic unemployment rates recorded for the City of San Angelo, Tom Green, Texas and the United States.

TABLE 1H
Historic Unemployment Rate

	1995	2000	2005	2010	2015	Current (Estimate)
City of San Angelo	4.3%	4.4%	4.7%	7.1%	3.9%	3.4%
Tom Green County	4.1%	4.3%	4.6%	7.1%	3.8%	3.4%
State of Texas	5.8%	4.6%	5.7%	8.3%	4.5%	4%
United States	5.6%	4%	5.3%	9.8%	5.7%	4.1%

Source: Bureau of Labor Statistics

Major employers within the community include the following:

- Goodfellow Airforce Base (2,688)
- Shannon Health System (2,467)
- San Angelo ISD (2,069)
- Angelo State University (1,455)

- The City of San Angelo (909)
- San Angelo Community Medical Center (865)
- San Angelo State Supported Living Center (861)
- Tom Green County (764)
- Ethicon (618)
- Sitel, Inc. (613)
- BlueCross BlueShield (400)
- Lone Star Beef Processors (400)

Income

Income is another socioeconomic measurement tool that can be indicative of new business development. As income levels in the area increase it is likely that the demand for aviation activities will increase as well.

Median household income is the amount that divides the total income distribution into two equal groups, where half of the households earn more, and half of the households earn less. This method is more accurate than taking the average or mean household income because it can give a closer look at the area's actual economic status. **Table 1J**, shows the Median Household Income levels of San Angelo and Tom Green County. In 2010, the average median household income level of the State of Texas was $47,266 and for the whole United States it was $55,093.

TABLE 1J
Historic Median Household Income

	2012	2013	2014	2015	2016	Annual Growth Rate
City of San Angelo	$46,947	$47,409	$45,909	$49,053	$49,096	1.05%
Tom Green County	$43.393	$44,545	$45,261	$47,756	$48,221	2.58%
State of Texas	$53,027	$51,406	$53,875	$56,473	$58,148	2.22%
United States	$53,701	$53,838	$54,398	$56,480	$57,617	1.46%

Source: The U.S. Census Bureau and Data USA

SUPPORTING DOCUMENTS

A number of studies were consulted for the collection of information during the preparation of this chapter. These documents include the following:

- Airport Master Plan Update, Mathis Field, Parkhill, Smith and Cooper, Inc., 1995.
- Wildlife Hazard Assessment, SWCA, 2012
- San Angelo Regional Airport, Taxiway Utilization Plan, Coffman Associates, 2012
- San Angelo Regional Airport Layout Plan and Land Use Study, Coffman Associates, 2014
- Pavement Prioritization Plan, KSA, 2018
- Pavement Management Plan, KSA, 2017