

Gainesville

MUNICIPAL AIRPORT

Airport Master Plan



GAINESVILLE MUNICIPAL AIRPORT
Gainesville, Texas

AIRPORT MASTER PLAN

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**Appendix A
GLOSSARY OF TERMS**

**Appendix B
ENVIRONMENTAL EVALUATION**



Chapter One
INVENTORY



INVENTORY

The inventory of existing conditions at Gainesville Municipal Airport will serve as an overview of the airport, its facilities, its role in regional and national aviation systems, and the relationship to development which has occurred around the airport over the years. The information delineated in this chapter attempts to provide a foundation, or starting point, for all subsequent evaluations.

This master plan required a comprehensive collection and evaluation of information relating to the airport and the surrounding area including the following:

- Physical inventories and descriptions of facilities and services now provided by the airport.
- An overview of existing regional plans and studies to determine their

potential influence on the development and implementation of the airport master plan.

- Background information pertaining to the City of Gainesville, the surrounding counties and the State of Texas. Analysis of these areas also includes descriptions of recent development which has taken place on the airport environs and plans for future development which may impact the airport.
- Population and socioeconomic information which provides an indication of the market and possible future development in the region and on the airport.

An accurate and complete inventory is essential to the success of a master plan. The inventory of existing conditions serves primarily as a basis,



or foundation upon which most of the analysis conducted in later chapters is formed. This information was obtained through on-site investigations of the airport and interviews with airport management, airport tenants, representatives of various government agencies, and local and regional economic agencies. Information was also obtained from available studies concerning the airport including the *Gainesville Municipal Airport Master Plan Study - 1975*, *Gainesville Municipal Airport - Airport Action Plan - 1999*, various environmental documents and the City of Gainesville Comprehensive Plan.

AIRPORT SYSTEM PLANNING ROLE

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

At the national level, Gainesville Municipal Airport is included in the *National Plan of Integrated Airport Systems* (NPIAS). This plan identifies 3,364 existing airports which are identified by the Federal Aviation Administration (FAA) as significant to the national air transportation system. The NPIAS plan is used by the FAA in administering the Airport Improvement Program(AIP). The NPIAS supports the FAA's strategic goals for safety, system efficiency and environmental compatibility by identifying specific airport improvements eligible for federal funding. An airport must be

included in the NPIAS to be eligible for federal funding assistance through the AIP program.

The 2001-2005 NPIAS identified \$46.2 billion for airport development. Of that approximately 13 percent is identified for general aviation (GA) airports. Gainesville Municipal Airport is classified as a GA airport in the NPIAS and thus is eligible for federal funding. The NPIAS includes over \$3.5 million in development costs for the airport over the five-year period.

Communities that do not receive scheduled commercial service may be included in the NPIAS as sites for GA airports if they account for enough activity (usually at least 10 locally-owned aircraft) and are at least 20 miles from the nearest NPIAS airport. The activity criterion may be relaxed for remote locations or other mitigating circumstances. Gainesville Municipal Airport exceeds both of these thresholds.

The 2,472 GA airports in the NPIAS tend to be distributed on a one-per-county basis in rural areas and are more often located near the county seat. These airports, with an average of 29 based aircraft, account for 37 percent of the nation's general aviation fleet. These airports are the most convenient source of air transportation for about 19 percent of the population and are particularly important to rural areas. Gainesville Municipal Airport has 70 based aircraft and an estimated average of 57 operations per day, thus making the airport further eligible for AIP funding.

At the state level, Texas Department of Transportation – Aviation Division (TxDOT) provides statewide planning to airports through its *Texas Airport System Plan* (TASP) document. The purpose of the TASP is to ensure that the state has an adequate and efficient system of airports to serve its aviation needs well into the future. The TASP defines the specific role of each airport in the state’s aviation system, identifies capital improvements, and provides a guide for programming federal and state development funds. Gainesville Municipal Airport is identified as a *Transport* airport by the TxDOT definition.

AIRPORT HISTORY

The Gainesville Army Airfield, as the airport was originally named, was constructed during World War II for use by the Third Air Force, which saw primary action in Europe. The airport originally had four runways, each 4,500 feet long by 150 feet wide. After the war the airport was decommissioned and reverted back to the stewardship of the City of Gainesville. Since that time the airport has served as a general aviation facility.

AIRPORT ADMINISTRATION

Gainesville Municipal Airport is owned and operated by the City of Gainesville. The City provides aircraft fueling and line services, in addition to maintaining the airport. The posted hours of operation are from 8:00 a.m. to 5:00

p.m. Airport staff are also on-call 24 hours a day, seven days a week. There are three full-time employees, who are city employees. The Airport Director reports to the City Manager for the City of Gainesville. The City of Gainesville also has an airport board to advise on matters concerning the airport. There are seven board members, each appointed by the mayor to serve a two-year term. The airport board has the authority to make recommendations to and advise the City Council on matters related to “planning, establishment, development, construction, enlargement, improvement, maintenance, equipment, operation, regulation and protection of the Gainesville Municipal Airport.”

DEVELOPMENT HISTORY

Throughout the years, many airport projects and studies have been undertaken. The most recent master plan was completed in 1975. In 1996, the terminal building was constructed. In 1997, an Airport Action Plan was contracted as well. The airport action plan called for some major improvements to the airport including:

- Runway rehabilitation
- Runway marking
- Taxiway rehabilitation
- Taxiway marking
- Apron repairs
- Installation of PAPI on Runway 35
- Installation of REILs on both ends of Runway 17-35
- Hiring a full-time airport manager

To date, nearly all of these projects have been completed. In addition, a new runway extension to the Runway 17 end brings the total length of runway 17-35 to 6,000 feet.

AIRPORT FACILITIES

Airport facilities can be functionally classified into two broad categories: airside and landside. The airside category includes those facilities which are needed for the safe and efficient movement of aircraft such as runways, taxiways, lighting and navigational aids. The landside category includes those facilities necessary to provide a safe transition from surface to air transportation and support aircraft servicing, storage, maintenance, and operational safety.

AIRSIDE FACILITIES

Existing airside facilities are identified on **Exhibit 1A. Table 1A** summarizes airside facility data for Gainesville Municipal Airport.

Runways

Gainesville Municipal Airport is served by two intersecting asphalt runways: Runway 17-35 and Runway 12-30. Runway 12-30 intersects the north end of Runway 17-35.

Runway 17-35

Runway 17-35, the primary runway, is 6,000 feet long by 100 feet wide and

oriented in a north-south manner. The runway recently had a 1,000 foot extension added to the north end. In addition, it has been slurry-sealed and new non-precision markings have been applied. The asphalt surface is in 'good' condition, the highest rating the FAA designates for runway condition.

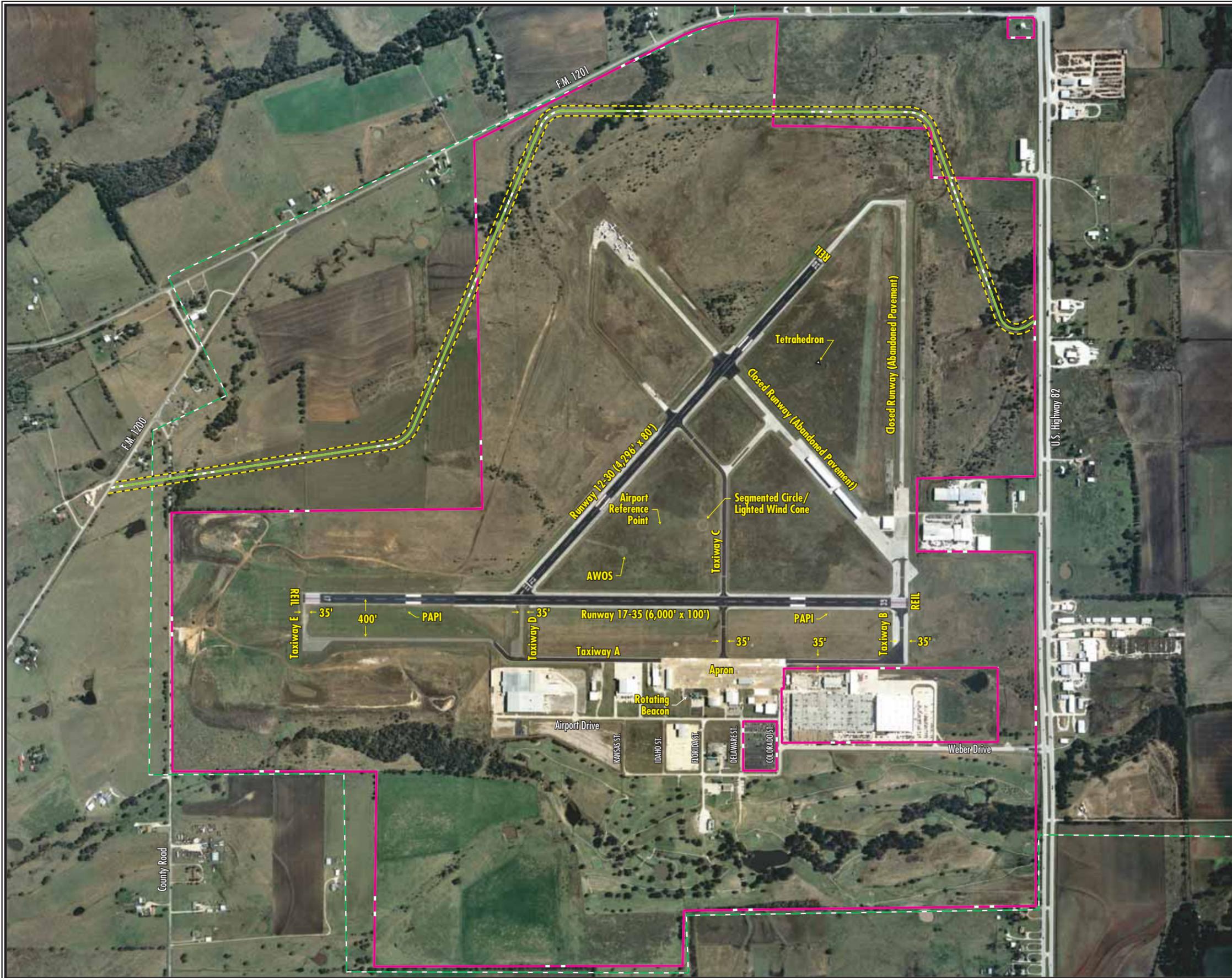
Runway 17-35 has a pavement strength of 15,000 pounds single wheel loading (SWL). SWL refers to the design of certain aircraft landing gear that have a single wheel on each main landing gear strut. Other landing gear configurations would include dual wheel, dual tandem wheel and double dual tandem. Each of these distributes more of the aircraft weight on runway and taxiway surfaces and thus the surface itself can support a greater total airplane weight.

Runway 12-30

The crosswind runway, Runway 12-30, is 4,296 feet long and 80 feet wide. It is oriented in a northwest to southeast manner. The runway has a rated pavement strength of 15,000 pounds SWL. This runway was also slurry-sealed in 2004 and is in 'good' condition. Runway 12-30 has basic markings.

Taxiways

The taxiway system at Gainesville Municipal Airport includes a full-length parallel taxiway, identified as taxiway A, and four connecting taxiways. Taxiway A is 35 feet wide and is 400 feet from the Runway 17-35 centerline at the narrowest point. There are four



LEGEND

-  Existing Airport Property Line
-  City Limit
-  Magnolia Gas Line
-  Magnolia Petroleum Company Easement
-  Abandoned Pavement



taxiways connecting to the runways, identified as taxiways B, C, D, and E as one moves from the south to the north. Each of these taxiways are also 35 feet wide. Taxiway C provides access to

Runway 12-30 near its center while taxiway D provides access to Runway 12-30 at the north end where it crosses the primary runway. Taxiway E connects to the new end of Runway 17.

TABLE 1A Airside Facility Data Gainesville Municipal Airport		
	Runway 17-35	Runway 12-30
Runway Length (feet)	6,000	4,296
Runway Width (feet)	100	80
Runway Surface	Asphalt	Asphalt
Surface Treatment	None	None
Condition	Good	Good
Runway Load Bearing Strength (pounds)		
Single Wheel Loading (SWL)	15,000	15,000
Runway Lighting	Medium Intensity (MIRL)	
Approach Aids	REILs 2-Light PAPI	
Instrument Approach Aids	17 - RNAV(GPS) 17-NDB	
Weather or Navigational Aids	AWOS Segmented Circle Lighted Wind Cone Tetrahedron	AWOS Segmented Circle Lighted Wind Cone Tetrahedron
Pavement Markings		
Runway	Non-precision Instrument	
Taxiway, Taxi-lanes, Aprons	Reflectors, Centerline, Tie-down	
PAPI - Precision Approach Path Indicator GPS - Global Positioning System AWOS - Automated Weather Observation System VOR/DME - Very high frequency Omnidirectional Range/Distance Measuring Equipment REIL - Runway End Identifier Lights <i>Source: Airport Facility Directory; South Central (April 2004).</i>		

Pavement Markings

Pavement markings aid in the movement of aircraft along airport surfaces and identify closed or hazardous areas on the airport. The non-precision markings on Runway 17-35 identify the runway designations, centerline, touchdown point, and aircraft holding positions. Runway 12-

30 has basic markings which identify the runway centerline and designation. Arrows are also painted on the displaced threshold of Runway 12.

Taxiway centerline markings are provided to assist pilots in maintaining proper clearance from pavement edges and objects near the taxiway/taxilane edges. Taxiway B also has pavement

edge markings because. Pavement edge markings also identify aircraft holding positions. The apron has centerline markings where Taxiway A traverses it.

Airfield Lighting

Airfield lighting systems extend an airport's usefulness into periods of darkness and/or poor visibility. A variety of lighting systems are installed at the airport for this purpose. These lighting systems, categorized by function, are summarized as follows. Runway 17-35 is equipped for nighttime operations. Runway 12-30 is only available for use with visual flight rules.

Identification Lighting: The location of the airport at night is universally identified by a rotating beacon. The rotating beacon projects two beams of light, one white and one green, 180 degrees apart. The rotating beacon at Gainesville Municipal Airport is located on the top of a scaffold structure to the north of the terminal building. It is raised approximately 40 feet off the ground.

Runway and Taxiway Lighting: Runway and taxiway lighting utilizes light fixtures placed near the edge of the pavement to define the lateral limits of the pavement. This lighting is essential for safe operations during night and/or times of low visibility in order to maintain safe and efficient access to and from the runway and aircraft parking areas.

The edges of the taxiways are identified by edge reflectors.

Runway 17-35 is equipped with medium intensity runway lighting (MIRL). Both ends of Runway 17-35 are equipped with threshold lighting to identify the landing threshold. Threshold lighting consists of specially designed light fixtures that are red on one-half of the lense and green the other half. The green portion of the light is turned toward the approach surface and intended to be seen from landing aircraft, while the red portion is visible to aircraft on the runway surface. Runway 12-30 does not have runway lighting.

Visual Approach Lighting: Both ends of Runway 17-35 are equipped with two-unit precision approach path indicators (PAPI). The PAPI consists of a system of lights, located to the left of the runway, that when interpreted by the pilot, give him or her an indication of being above, below, or on the designated descent path to the runway threshold. A PAPI system has a range of five miles during the day and up to twenty miles at night.

Runway End Identification Lighting: Runway end identification lights (REILs) provide rapid and positive identification of the approach ends of a runway. A REIL system has been installed on each end of Runway 17-35. A REIL consists of two synchronized flashing lights, located laterally on each side of the runway end, facing the approaching aircraft.

Airfield Signs: Airfield identification signs assist pilots in identifying their location on the airfield and direct them to their desired location. Lighted airfield signs at Gainesville Municipal

Airport are associated with Runway 17-35 and the taxiways. They are also located at hold positions, taxiway intersections, and at the intersection of the connecting taxiways. Although there are signs leading to Runway 12-30, they are not lighted.

Pilot-Controlled Lighting: At nighttime, MIRL associated with Runway 17-35 and the taxiway is set to low intensity. This system can be controlled through a pilot-controlled lighting system. This allows pilots to increase the intensity of the airfield lighting system from the aircraft, with use of the aircraft's radio transmitter.

Weather and Communication Aids

Gainesville Municipal Airport has one lighted wind cone, a segmented circle and a tetrahedron. The lighted wind cone provides information to pilots regarding wind conditions, such as direction and intensity. The segmented circle consists of a system of visual indicators designed to provide traffic pattern information to pilots. The tetrahedron is a device that is used as a landing direction indicator. The small end of the tetrahedron points in the direction of landing.

Gainesville Municipal Airport is equipped with an Automated Weather Observation System III (AWOS-III). An AWOS will automatically record weather conditions such as wind speed, wind gust, wind direction, temperature, dew point, altimeter setting, and density altitude. In addition, the AWOS-III will record visibility,

precipitation, and cloud height. This information is then transmitted at regular intervals. Aircraft in the vicinity can receive this information if they have their radio tuned to the correct frequency (118.375 Mhz). In addition, pilots and individuals can call a published telephone number and receive the information via an automated voice recording.

The AWOS-III at Gainesville is also outfitted with the optional system connection to the National Airspace Data Interchange Network, NADIN. With this connection the FAA provides the AWOS data to the Weather Messaging Switching Service (WMSC). From the WMSC, weather data is distributed to Flight Service Stations, the National Weather Service, commercial airports for pilot briefing, and other weather information outlets.

The airport is also equipped with a Ground Communications Outlet (GCO) which serves as a remote communications outlet (RCO). An RCO provides the airport a direct link with Fort Worth Center airspace control. An RCO is an unstaffed transmitter/receiver facility that is remotely controlled by air traffic personnel. RCOs were established to provide ground-to-ground communications between air traffic control specialists and pilots at satellite airports for delivering enroute clearances, issuing departure authorizations, and acknowledging instrument flight rules cancellations or departure/landing times. In addition, the GCO can be used to obtain current weather and airport information. The radio frequency is 121.725 Mhz.

Navigational Aids

Navigational aids are electronic devices that transmit radio frequencies, which pilots of properly equipped aircraft can translate into point-to-point guidance and position information. The types of electronic navigational aids available for aircraft flying to or from Gainesville Municipal Airport include non-directional beacon (NDB), very high frequency omni-directional range (VOR) facility, and global positioning system (GPS).

The NDB transmits nondirectional radio signals whereby the pilot of an aircraft, equipped with direction-finding equipment, can determine their bearing to or from the NDB facility in order to track to the beacon station. The Gainesville NDB is approximately four miles to the north of Runway 17. The Denison and Grindstone NDBs can also be used to track to the vicinity of the airport, at which point the pilot can continue by tracking to the Gainesville NDB.

The VOR, in general, provides azimuth readings to pilots of properly equipped aircraft transmitting a radio signal at every degree to provide 360 individual navigational courses. Frequently, distance measuring equipment (DME) is combined with a VOR facility (VOR-DME) to provide distance as well as direction information to the pilot. Military tactical air navigation aids (TACANs) and civil VORs are commonly combined to form a VORTAC. The VORTAC provides distance and direction information to both civil and military pilots. The Bowie VORTAC is approximately 32 miles to the west of

the airport. The Ardmore VORTAC is approximately 34 miles to the north of the airport.

GPS is an additional navigational aid for pilots. GPS was initially developed by the United States Department of Defense for military navigation around the world. GPS differs from a NDB or VOR in that pilots are not required to navigate using a specific facility. GPS uses satellites placed in orbit around the earth to transmit electronic radio signals, which pilots of properly equipped aircraft use to determine altitude, speed, and other navigational information. With GPS pilots can directly navigate to any airport in the country and are not required to navigate using a specific navigation facility. The FAA is proceeding with a program to gradually replace all traditional enroute navigational aids with GPS over the next few years. The FAA phase-out schedule for traditional navigational aids includes: NDBs by 2005 and VORs by 2010.

Area Airspace

The Federal Aviation Administration (FAA) Act of 1958 established the FAA as the responsible agency for the control and use of navigable airspace within the United States. The FAA has established the National Airspace System (NAS) to protect persons and property on the ground and to establish a safe environment for civil, commercial, and military aviation. The NAS is defined as the common network of U.S. airspace, including air navigational facilities; airports and landing areas; aeronautical charts;

associated rules, regulations and procedures; technical information; and personnel and material. System components shared jointly with the military are also included as part of this system.

To ensure a safe and efficient airspace environment for all aspects of aviation, the FAA has established an airspace structure that regulates and establishes procedures for aircraft using the National Airspace System. The U.S. airspace structure provides for categories of airspace, controlled and uncontrolled, and identifies them as Classes A, B, C, D, E, and G as described below. **Exhibit 1B** generally illustrates each airspace type in three-dimensional form.

- Class A airspace is controlled airspace and includes all airspace from 18,000 feet mean sea level (MSL) to Flight Level 600 (approximately 60,000 feet MSL).
- Class B airspace is controlled airspace surrounding high-activity commercial service airports (i.e., Dallas/Fort Worth International Airport).
- Class C airspace is controlled airspace surrounding lower-activity commercial service (i.e., Tucson International Airport) and some military airports.
- Class D airspace is controlled airspace surrounding low-activity commercial service and general

aviation airports with an airport traffic control tower (ATCT).

All aircraft operating within Classes A, B, C, and D airspace must be in constant contact with the air traffic control facility responsible for that particular airspace sector.

- Class E airspace is controlled airspace surrounding an airport that encompasses all instrument approach procedures and low-altitude federal airways. Only aircraft conducting instrument flights are required to be in contact with air traffic control when operating in Class E airspace. While aircraft conducting visual flights in Class E airspace are not required to be in radio contact with air traffic control facilities, visual flight can only be conducted if minimum visibility and cloud ceilings exist.
- Class G airspace is uncontrolled airspace that does not require communication with an air traffic control facility.

Airspace within the vicinity of Gainesville Municipal Airport is depicted on **Exhibit 1C**. The airspace for a seven nautical mile radius around the airport is Class E airspace with a floor 700 feet above ground level (AGL) and extending to 18,000 feet MSL. A four-mile long by four-mile wide extension of the Class E airspace to the north provides for the instrument approach procedures to Runway 17 described previously.

Airways and Jetways

Airways serve primarily smaller piston-engine, propeller-driven airplanes on shorter routes and at lower altitudes. Airways start at 1,200 feet above ground level (AGL) and extend upward to an altitude of 18,000 feet mean sea level (MSL). Airways are eight nautical miles wide. Airways are called "Victor" Airways because they run primarily between very high frequency omnidirectional radio range (VORs). The phonetic alphabet's term for "V", as in VOR, is Victor, thus they are referred to as "Victor" Airways.

There are four VORs in close proximity to Gainesville Municipal Airport. To the north is the Ardmore VORTAC. To the west is the Bowie VORTAC. To the northeast is the Texoma VOR-DME and to the east is the Bonham VORTAC. Victor airways criss-cross the airspace around Gainesville Municipal Airport connecting these VORs.

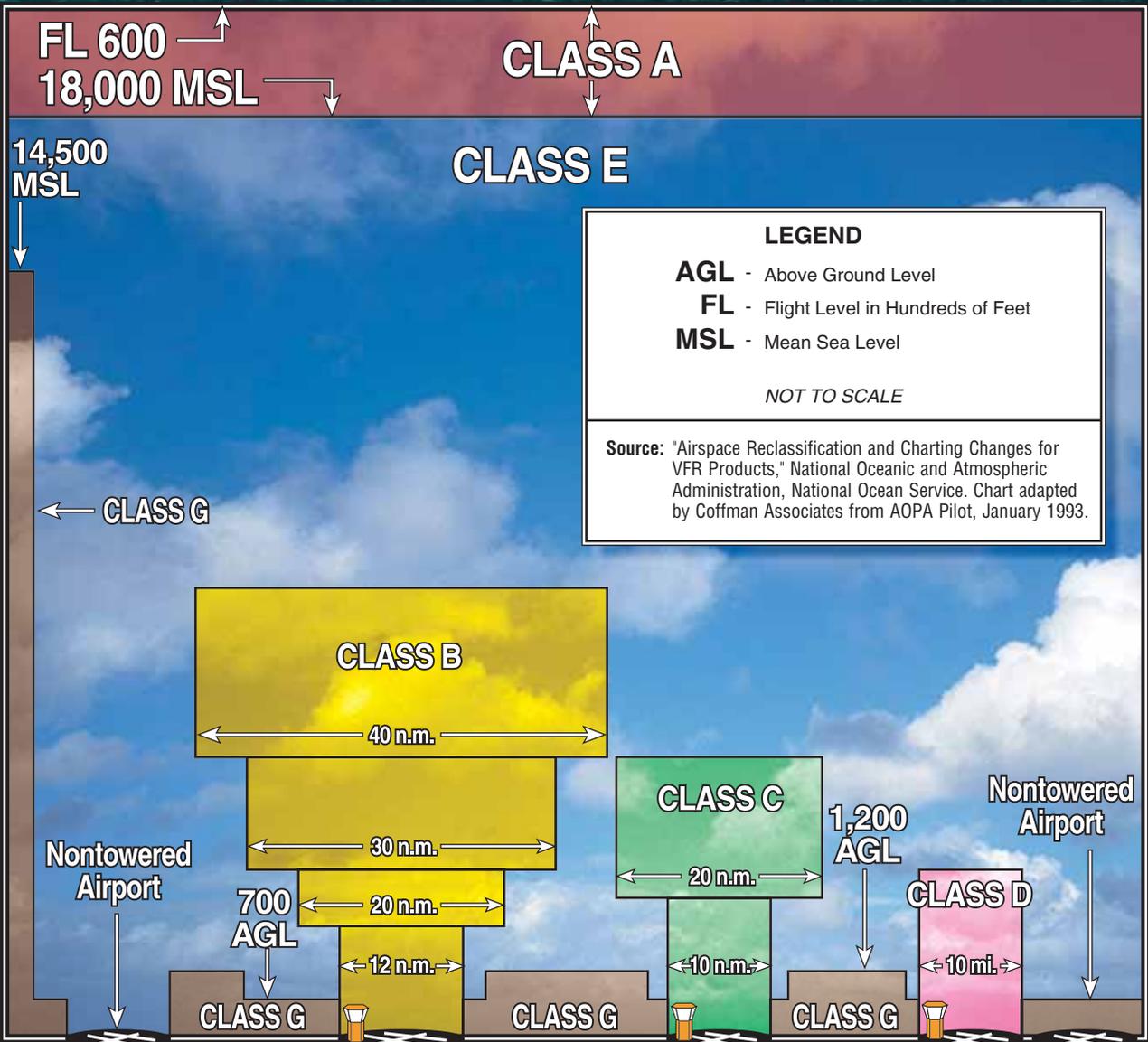
Jetways are actually called Jet Routes, and serve primarily airliners, jets, turboprops, and turbo-charged piston aircraft operating over longer distances. Jet Routes start at 18,000 MSL and extend upward to an altitude of 45,000 feet MSL (altitudes above 18,000 feet are called "flight levels" and are described as FL450 for 45,000 feet MSL). Jet Routes have names like J42, or J121. Jetways are identified on special instrument flight rules sectional charts.

Military Training Routes

Military Training Routes, or MTRs, are long, low-altitude corridors that serve as flight paths to a particular destination for military aircraft. The corridor is often 10 miles wide, 70 to 100 miles long, and may range from 500 to 1,500 feet above ground level; occasionally, they are higher. MTRs are designed to provide realistic low-altitude training conditions for pilots. In times of conflict, to avoid detection by enemy radar, tactical fighter aircraft are often called upon to fly hundreds of miles at low altitudes over varying terrain. Obviously, navigation is extremely difficult on high-speed low-altitude flights. That's why it is imperative that fighter pilots have ample opportunity to practice these necessary and demanding skills. There are a number of MTRs within a short distance of Gainesville Municipal Airport. Civilian aircraft are not restricted from operating in the vicinity of the MTRs although they should be aware of the locations of the MTR's and exercise special caution if they need to cross them.

Instrument Approach Procedures

Instrument approach procedures are a series of predetermined maneuvers established by the FAA, using electronic navigational aids to assist pilots in locating and landing at an airport during low visibility and cloud ceiling



LEGEND

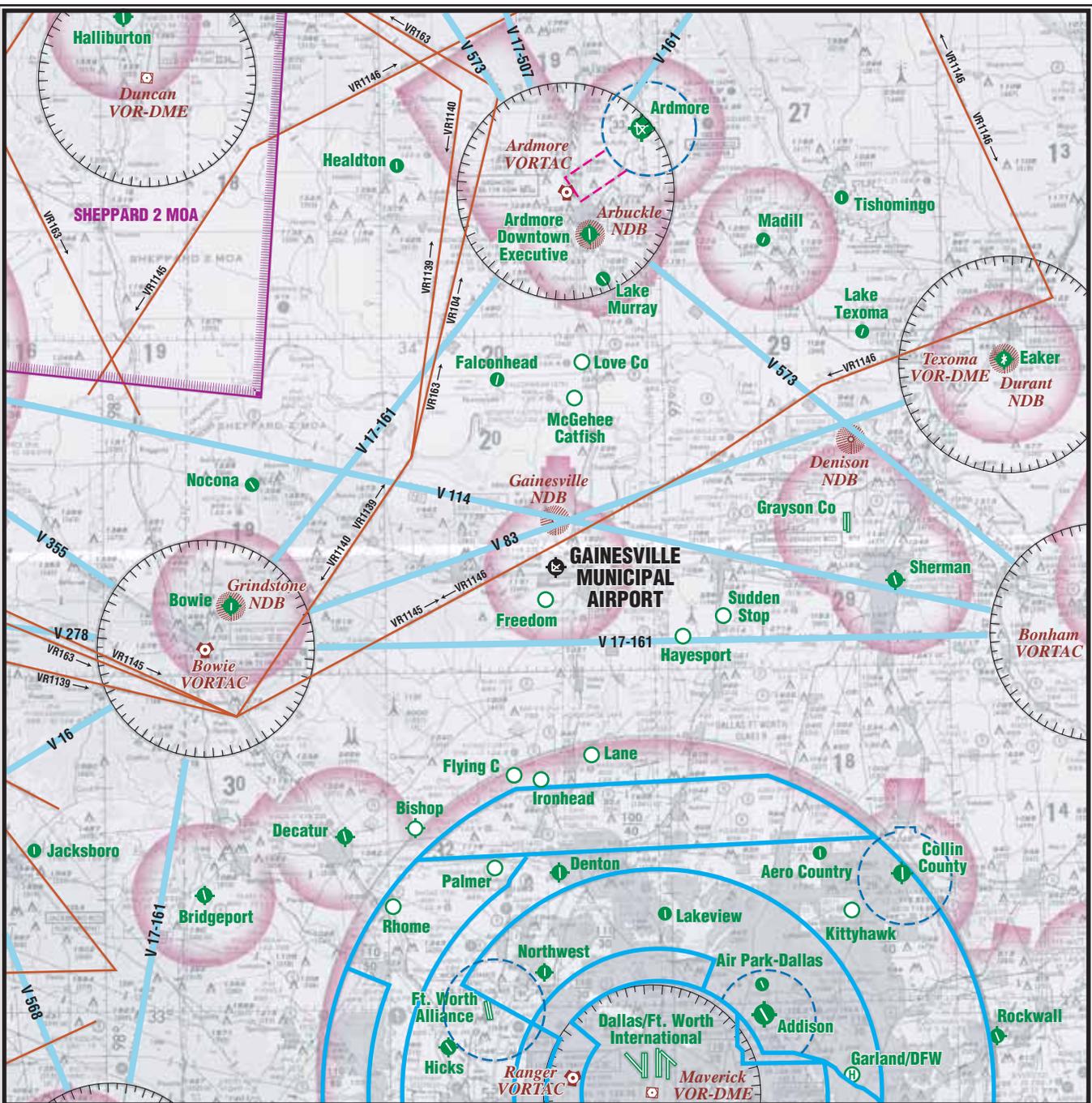
AGL - Above Ground Level
FL - Flight Level in Hundreds of Feet
MSL - Mean Sea Level

NOT TO SCALE

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

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





LEGEND

- | | | | |
|--|---|--|--|
| | Other than hard-surfaced runways | | Compass Rose |
| | Airport with hard-surfaced runways 1,500' to 8,069' in length | | Military Operations Area (MOA) |
| | Airports with hard-surfaced runways greater than 8,069' or some multiple runways less than 8,069' | | Military Training Routes |
| | Heliport Selected | | Victor Airways |
| | VORTAC | | Class B Airspace |
| | VOR-DME | | Class D Airspace |
| | Non-Directional Radiobeacon (NDB) | | Class E Airspace |
| | | | Class E Airspace with floor 700' above surface |



NOT TO SCALE

Source: Dallas Sectional Chart, US Department of Commerce, National Oceanic and Atmospheric Administration, March 18, 2004



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

Two instrument approaches have been approved for Gainesville Municipal Airport. Both approaches are non-precision approaches. In contrast to a precision approach, which provides both course guidance and vertical descent information to pilots, a non-precision approach provides only course guidance. A circling approach allows pilots to land on any active runway at the airport. While providing flexibility for the pilot to land on the runway most closely aligned with the prevailing wind at that time, a circling approach will have higher visibility and cloud ceiling minimums than other instrument approaches which are aligned with a particular runway end. This is done to provide pilots with sufficient visibility and ground clearance to navigate visually from the approach to the desired runway end for landing.

The RNAV (GPS) approach to Runway 17 at Gainesville Municipal Airport allows pilots to land on a straight-in approach when cloud ceilings are a minimum of 415 feet above the ground and visibility is not less than one mile

for aircraft with approach speeds below 121 knots. For aircraft on a straight-in approach with speeds of 121 knots or greater, the cloud ceiling minimums remain unchanged (415 feet) but the visibility increases to one and one-quarter mile.

The circling RNAV (GPS) approach provides for a cloud ceiling minimum of 475 feet above the ground for all aircraft below an approach speed of 141 knots. Aircraft with an approach speed of between 141 knots and 165 knots can be operated with a cloud ceiling minimum of not less than 615 feet. Visibility minimums will increase as the approach speed of the aircraft increases. Aircraft with approach speeds below 121 knots require at least one-mile visibility. Those aircraft between 121 knots and 140 knots approach speed, must have a minimum of one and one-half mile visibility. Finally, aircraft with approach speeds between 141 knots and 165 knots require two miles visibility.

The second non-precision approach is the NDB approach to Runway 17. This approach provides for both straight-in and circling landing patterns. The straight-in approach for all aircraft below an approach speed of 166 knots requires a cloud ceiling minimum of not less than 495 feet. Depending on the approach speed of the aircraft, the visibility minimum will range from one mile to one and one-half miles. The circling approach also has cloud ceiling minimums of 495 feet until the approach speed of the aircraft reaches above 141 knots, when the minimum is 615 feet above ground level. The visibility minimums again increase,

from one mile to two miles based on the approach speed of the aircraft.

There are no instrument procedures available for aircraft with approach

speeds greater than 166 knots. **Table 1B** graphically shows the minimums for the two non-precision instrument approaches approved for use at Gainesville Municipal Airport.

TABLE 1B Instrument Approach Data Gainesville Municipal Airport						
WEATHER MINIMUMS BY AIRCRAFT TYPE						
Category A and B		Category C		Category D		
CH	VIS	CH	VIS	CH	VIS	
RNAV (GPS) Runway 17 Approach						
Straight	415	1	415	1.25	415	1.25
Circling	475	1.25	475	1.5	615	2
NDB Runway 17 Approach						
Straight	495	1	495	1.25	495	1.5
Circling	495	1	495	1.5	615	2
Aircraft Categories are established based on 1.3 times the stall speed in landing configuration as follows: Category A/B: 0-120 knots Category C: 120-140 knots Category D: 141-165 knots CH - cloud height (feet above ground level) VIS - visibility minimums (miles)						
<i>Source: U.S. Terminal Procedures; South Central U.S., (June, 2004).</i>						

Local Operating Procedures

Gainesville Municipal Airport is situated at 839 feet above mean sea level (MSL). The traffic pattern altitude for all non-turbine powered aircraft is 1,000 feet above the airfield elevation (1,839 MSL). All turbine-powered aircraft are to use a traffic pattern altitude of 1,402 feet above the airfield (2,241 MSL). All runways utilize a left-hand traffic pattern.

Obstructions: Runway 17 has 31-foot tall trees, 1,303 feet from the runway end, which are 100 feet left of centerline. Pilots should implement a 35:1 approach slope angle to clear the obstruction. Runway 35 has a 30-foot tall powerline, which is marked, 1,100

feet from the runway end. Pilots should implement a 30:1 approach slope to safely clear the obstruction. Runway 12 has a 35-foot tall building which sits 848 feet from the runway end and is 125 feet right of centerline. Pilots should implement an 18:1 approach slope to clear the building.

Air Traffic Control

Gainesville Municipal Airport does not have an airport traffic control tower (ATCT); therefore, no formal terminal air traffic control services are available at the airport. Aircraft operating in the vicinity of the airport are not required to file any type of flight plan or to contact any air traffic control facility

unless they are entering airspace where contact is mandatory. Air traffic advisories and certain weather information can be obtained using the common traffic control frequency (CTAF), channel 123.0 Mhz, also known as UNICOM. Enroute air traffic control services are provided through the Fort Worth Center Air Route Traffic Control Facility (ARTCC), which controls aircraft in a large multi-state area. The Fort Worth Flight Service Station (FSS) provides additional traffic service to pilots operating in the vicinity of the airport. This FSS provides pilots with weather information, airport advisory service, flight planning processing, and communication with other air traffic control facilities.

LANDSIDE FACILITIES

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

TERMINAL BUILDING

There is a dedicated general aviation terminal building that was constructed by the city in 1996. The building is located west of the aircraft parking apron and includes flight planning facilities, a pilots' lounge, a conference room, a public lobby area, as well as

administrative offices. The terminal building has 2,794 square feet of enclosed space. There is an additional 924 square feet of outside space that is covered.

AIRCRAFT PARKING APRON

The aircraft apron area at Gainesville Municipal Airport is located directly to the east of the terminal building and provides space for aircraft parking, tie-downs and circulation. The apron area totals approximately 42,500 square yards, with 16 aircraft tie-down positions. The apron is served by self-serve Avgas fuel pumps. The apron area also fronts Tomlinson Aircraft Services and the Circuit Breaker Sales Aviation Maintenance hangar.

AIRCRAFT HANGAR FACILITIES

Hangar facilities at Gainesville Municipal Airport are comprised of conventional hangars, executive hangars, and T-hangars. T-hangars provide for separate hangar facilities within a larger contiguous facility. Several T-hangars are available for aircraft storage at the airport. Conventional hangars provide a large open space, free from roof support structures, and have the capability to accommodate several aircraft simultaneously. Conventional hangars are typically 10,000 square feet or greater. Executive hangars provide the same type of aircraft storage as conventional hangars, but are normally less than 10,000 square feet. The hangar facilities are identified on **Exhibit 1D**.

AIRPORT ROADS

The Gainesville Municipal Airport is served by Weber Drive which acts as the main access road to US Highway 82. Weber Drive connects to Airport Drive which leads to all of the businesses located on the west side of the airport. West Air Drive also provides access to the airport from US Highway 82. This road is not typically a public access road because it leads directly onto the airfield. There is a gate that prevents unauthorized vehicles from gaining access to the airfield. Those businesses that operate on the east side of the airport as well as aircraft owners with aircraft in the east side hangars do have a key to the gate. Any cars using this entrance would have to drive onto the airport taxiways in order to use the road.

Weber Aircraft is the largest employer in Gainesville. They operate on shifts which means that the employees all leave at the same time every day. The result is a large traffic jam at the intersection of Weber Drive and US Highway 82. Chapter Four of this document will address the possibility creating an alternate access road to the airport.

AUTOMOBILE PARKING

There are several parking lots available for automobile parking at Gainesville Municipal Airport. The airport terminal parking area totals approximately 16,000 square feet and provides approximately 27 total spaces, all constructed of asphalt. There is a parking lot adjacent to Tomlinson

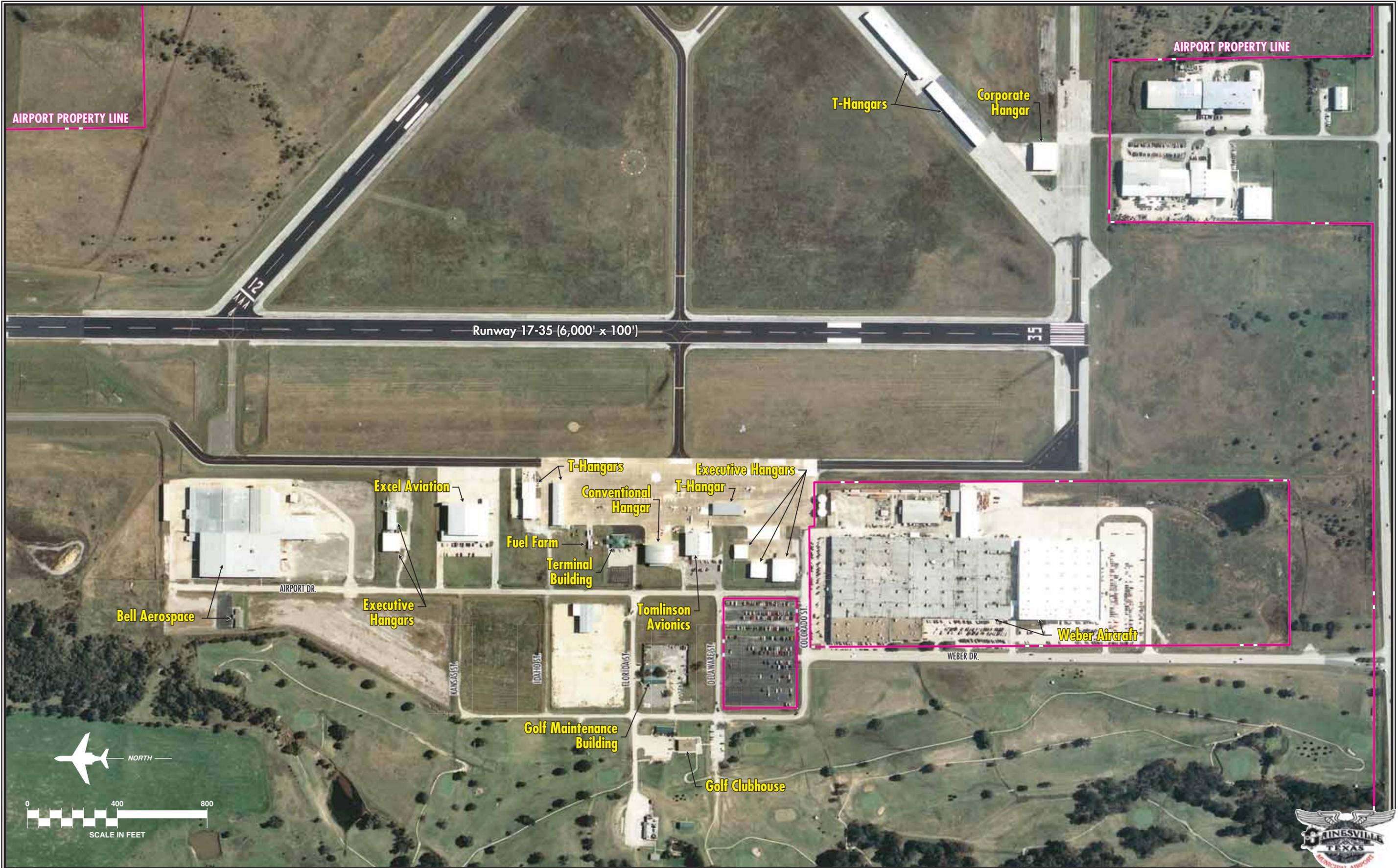
Aircraft Services of Texas, Inc., which has 41 parking spaces, also constructed of asphalt. Excel Aviation has 59 parking spaces and Bell Aerospace Services, Inc., has 24 additional spaces. All of the parking areas are in fair condition. In addition, there is a large gravel lot to the west of Bell Aerospace that is currently owned by the City of Gainesville. This lot is approximately 300,000 square feet.

FUEL FACILITIES

The airport's fuel storage facilities include two aboveground storage tanks. They are located adjacent to the terminal to the north. These are two 12,000-gallon tanks, one for Jet A and the other for Avgas. The airport also has two refueling trucks. One has a capacity of 2,000 gallons and is dedicated for Jet A fuel. The second has a capacity of 1,200 gallons and is dedicated for Avgas.

AIRCRAFT RESCUE AND FIREFIGHTING (ARFF)

There are no ARFF facilities permanently based at Gainesville Municipal Airport. The City of Gainesville Fire Department provides ARFF services as needed. Firehouse number one is located at 201 Santa Fe Street, approximately two miles east of the airport. This station houses six full-time firefighters. Apparatus include an engine truck, a quint (a truck with both a ladder and water storage), a rescue truck and a fire safety/mobile command trailer. There are two additional firehouses in Gainesville which will



provide additional firefighting and rescue services as needed.

UTILITIES

Water and sewer services at the airport are provided by the City of Gainesville. Electrical service is furnished by TXU. Natural gas is also available from TXU. SBC Southwestern Bell provides telephone and data access.

AIRPORT BUSINESSES

Those businesses that choose to locate on airport property or adjacent to the airport provide a significant economic impact to not only the airport, but also to the region. Encouraging businesses to locate in the vicinity of an airport is a good practice for a number of reasons. First, the business will benefit from being near a commerce and transportation hub. Second, the community will benefit because the airport will develop a buffer of industry and manufacturing that will restrict incompatible land uses, such as residential housing, from locating too close to the airport. Thirdly, business development on and around airports can generate a direct revenue stream to the airport. Some general aviation airports have done this successfully, leading to airport self-sufficiency.

On-Airfield Operations

On-airfield operators are defined as those businesses that directly serve customers at Gainesville Municipal Airport. Typically, these businesses

will have a hangar and direct access to the apron and runway system. Often these businesses are identified as fixed based operators (FBO). Historically, the FBO would be responsible for not only managing their own businesses, but also for management of the airport. As is the case at many general aviation airports, the owner of the airport, in this case the City of Gainesville, now directly manages the airport and provides many of the services formerly performed by the FBOs. These services include aircraft fueling, aircraft tiedowns, aircraft preheating, ground power, towing and jump starts. In addition, the terminal facility is owned and operated by the City of Gainesville.

Bell Aerospace Services, Inc. is located on the airport property. Their primary business is the maintenance of helicopters. The company is a subsidiary of Bell Helicopter Textron, Inc., which is a major manufacturer of helicopters for both civil and military use.

Excel Aviation is a fixed based operator (FBO) on the airfield. They are a Major Falcon Jet Maintenance Facility.

Tomlinson Aircraft Services is also an FBO on the airfield. Their business specializes in the installation and maintenance of avionics equipment that aids pilots in navigation. Tomlinson also has a significant aircraft maintenance operation and provides flight training.

Bright Aviation of Texas, Inc., is a new business on the airfield. This is an on demand charter operation and cargo service that can travel anywhere within

the contiguous United States. The owner utilizes a Cessna 310R aircraft for the business.

Circuit Breaker Sales Inc. houses their corporate flight department at the airport. They also perform general aircraft maintenance on several types of aircraft.

Sierra Mike bases their corporate flight department at the airport. They also provide aircraft maintenance.

Air Tejas, Inc. is an air cargo operation that bases their aircraft at the airport. They operate two DC-3's and three Convair's. Although the aircraft are based at Gainesville Municipal Airport, no cargo is handled to or from the airport.

North Texas Dusters and Sprayers also operates from Gainesville Municipal Airport. They perform crop dusting services in the North Texas region.

Flying Colors of Texas is a full-service aircraft painting and detailing operation. They are leasing an executive-style hangar owned by the Airport to conduct their business.

Off-Airfield Operations

Off-airfield operations are those businesses that locate on airport property or adjacent to the airport, but do not provide services to the aviation community directly at the airport. Weber Aircraft has a large manufacturing facility at the southwest end of the airport. They employ nearly 1,200 people in the manufacturing of commercial and business aircraft seats.

A number of businesses are located along West Air Drive at the south end of the airport. Spirex Southwest is a manufacturer and rebuilder of plasticating screws and barrels. Industrial Models is a manufacturer of motor vehicle parts and accessories. Finally, the Gainesville Municipal Golf Course occupies the airport property directly to the west of the airport.

Gainesville Municipal Airport has 16 businesses located at the airport. Nine of them are directly involved in aviation-related businesses that utilize the airport. The remaining eight businesses are located at the airport and do not regularly utilize the airport services in conducting their businesses.

Table 1C shows those businesses.

TABLE 1C Airport Businesses Gainesville Municipal Airport	
On-Airfield Businesses	Off-Airfield Businesses
Bell Aerospace Services, Inc.	Petroflex
Excel Aviation	Parson's Infrastructure and Technology Group, Inc.
Tomlinson Aircraft Services	Red River Country Club, Inc.
Circuit Breaker Sales	Gainesville Municipal Golf Course
Sierra Mike	Spirex
Air Tejas, Inc.	Industrial Models
North Texas Dusters and Sprayers	Crossarm
Bright Aviation	Weber Aircraft
Flying Colors of Texas	

AIRPORT SETTING

The purpose of this section is to summarize various studies and data collected to provide an understanding of the characteristics of the regional area. Within this section is a description of the airport setting, the ground access systems near the airport, the existing and future land use around the airport, local climate, and other regional airports. This information is important baseline data when developing forecasts for critical airport infrastructure to support demand over the planning period.

AIRPORT LOCATION AND ACCESS

As depicted on **Exhibit 1E**, Gainesville Municipal Airport is located in the north-central portion of Texas in Cooke County, approximately three miles northwest of the central business district (CBD) of the City of Gainesville. Gainesville is the county seat and the largest population center in the county with approximately 16,000 people. Gainesville is about seven miles south of the Red River, which defines most of the border between Texas and Oklahoma. The nearest large metropolitan area is the Dallas/Fort Worth Metroplex, which is about 70 south of the city. To the north, it is about 100 miles to Oklahoma City.

Cooke County has a population of approximately 37,000 people and includes approximately 874 square miles and 559,400 acres. Elevations range from 700 in the east to 1,255 feet in the west. The central section of the

county is part of the Grand Prairie; it is flanked by a small section of the Eastern Cross Timbers on the east and the Western Cross Timbers on the West. The rolling terrain is surfaced by mixed soils ranging from sandy to loam and from red to black. Grassy prairie predominates in the west. The county is forested mainly with blackjack oak, post oak, and hackberry, and with elm, pecan, walnut, and cottonwood along the creeks and rivers

The airport is located on approximately 1,336 acres of City-owned land. More than 500 acres is leased for agricultural purposes. Areas to the west and north of the airport lie outside the City property. Weber Drive is the primary access road to the airport. Weber Drive connects to Airport Drive, which is the access road for all of the on-airfield operators. West Air Drive also has access, but is not designed for public access because it enters directly onto the airfield. Both Weber and West Air Drives connect to US 82.

REGIONAL AIRPORTS

A review of public-use airports within a 30-nautical mile (nm) radius of Gainesville Municipal Airport was made to identify and distinguish the types of air service provided in the region. These airports were previously identified on **Exhibit 1C**. Information pertaining to each airport was obtained from FAA Form 5010, *Airport Master Record*.

Grayson County Airport is located 26 nm to the east of Gainesville Municipal Airport and is owned by Grayson

County and operated by the Grayson County Airport Board. The airport has a two-runway system. The primary runway, Runway 17L-35R is 9,000 feet long by 150 feet wide, with a SWL of 75,000 pounds. The runway is constructed of an asphalt/concrete mix and is in good condition. Runway 13-31 is the crosswind runway and is 2,300 feet long by 50 feet wide and is constructed of asphalt. There are 147 based aircraft. The airport averages approximately 44,000 operations per year. The primary runway has four instrument approaches including an ILS and GPS approach to runway 17L.

Denton Municipal Airport is located 27 nm to the south of Gainesville Municipal Airport. The airport is owned and operated by the City of Denton. The airport has a single runway that is 5,999 feet long by 150 feet wide. Runway 17-35 is constructed of asphalt and is in good condition with a SWL of 70,000 pounds. The airport is within the airspace of Dallas/Fort Worth International Airport and would be considered part of the Dallas Metroplex. With its large service area there are approximately 225 based aircraft. The airport supports approximately 113,000 operations annually.

Bowie Municipal Airport is located 29 nm to the west of Gainesville Municipal Airport. The airport is owned and operated by the City of Bowie. The airport is served by a single runway, Runway 17-35, which is 3,603 feet long by 60 feet wide. It is constructed of asphalt, which is in good condition, and has a SWL of 12,500 pounds. There is a total of 25 based

aircraft. The airport supports approximately 6,000 operations per year.

Ardmore Downtown Executive Airport is located 30 nm to the north of Gainesville Municipal Airport across the Red River, in Oklahoma. The airport is owned and operated by the City of Ardmore. Ardmore Executive Airport is served by Runway 17-35. The runway is 5,000 feet long by 75 feet wide, constructed of asphalt, with a SWL of 20,000 pounds. There are 79 based aircraft at the airport. More than 11,000 operations are reported annually at the airport.

Sherman Municipal Airport is located 31 nm to the east of Gainesville Municipal Airport. The airport is owned and operated by the City of Sherman. It is supported by Runway 16-34, which is 4,006 feet long by 75 feet wide. The runway is constructed of asphalt, in good condition, and has a SWL of 19,000 pounds. There are 21 based aircraft at the airport and 6,000 operations annually.

CLIMATE

Weather conditions are important to the planning and development of an airport. Temperature is an important factor in determining runway length requirements, while predominant wind direction and speed are used to determine optimum runway orientation. The need for navigational aids and lighting is determined by the percentage of time that visibility is impaired due to cloud coverage or other conditions such as fog or haze.

Gainesville’s climate can be described as subtropical, with mild winters and hot summers. The area is primarily affected by weather patterns from the Gulf of Mexico. Warm moist air from the Gulf dominates the weather from spring to fall, while cool air from the central plains dominates the weather in the winter. Average high temperatures range from 52 degrees Fahrenheit (F) in January, to 95 degrees F in July, according to the Weather Channel. TxDOT identified 96 degrees F as the high average for July. The area averages 32 inches of precipitation per

year, with the majority of rainfall occurring from April through June. **Table 1D** summarizes climatic data for the City of Gainesville, Texas.

Prevailing winds are southerly, with relatively little smog. Average wind speeds are between nine and 13 miles per hour. Gainesville Municipal receives about 61 percent of total possible sunshine annually, with 237 days out of the year either cloud-free or partly cloudy. July is the hottest month with an average high temperature of 95 degrees.

	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec
Temp Max.	52	57	66	74	81	89	95	94	87	77	64	55
Temp Min.	28	33	42	50	59	68	72	71	64	52	41	31
Days With Precip.	6	7	8	8	9	7	5	5	6	6	6	7
Average Precip. (in)	1.78	1.24	3.43	3.15	4.62	3.72	1.98	2.36	4.49	4.56	2.55	1.87
Wind Speed (mph)	11.1	11.8	12.8	12.6	11.4	11	10.1	9.3	9.6	10	10.9	10.9
Sunshine (%)	52	54	58	61	57	67	75	73	67	63	57	52
Days Clear of Clouds	10	10	10	9	9	11	15	15	13	14	12	11
Partly Cloudy Days	6	6	8	8	10	12	10	10	9	7	6	6
Cloudy Days	15	13	14	13	13	8	6	6	9	10	12	14

Source: The Weather Channel; www.city-data.com

AREA LAND USE AND CONTROL

Land use is important to the existing and potential needs of the airport. By understanding the land use issues surrounding the airport, more appropriate recommendations can be made for the future. Land uses

surrounding Gainesville Municipal Airport are varied and include a mix of recreation, industrial and residential development. To the west of the airport, industrial and recreational land uses provide a buffer between the airport and more sensitive land uses. To the south is a light industrial

complex. To the north and east of the airport, agricultural land uses dominated by farmsteads with large acreage is more common. **Exhibit 1F** shows the existing land use maps from the Gainesville Comprehensive Plan.

Land Use Plans

The City of Gainesville is directly responsible for planning and zoning on airport property and within the city limits. By Texas law, the City can also plan the land use for those unincorporated areas that are within one mile of the city boundary. This is called the extra territorial jurisdiction (ETJ). Much of the land outside of the city property surrounding the airport falls within the ETJ, and is zoned as rural residential development. It is desirable to reserve land which borders on an airport for more compatible uses such as industrial and manufacturing. Residential development around an airport, especially one expected to grow, is generally not a good idea as conflicts can develop over airport noise and expansion. **Exhibit 1G** shows the future land use plans that are currently part of the Comprehensive Plan.

Height and Hazard Zoning

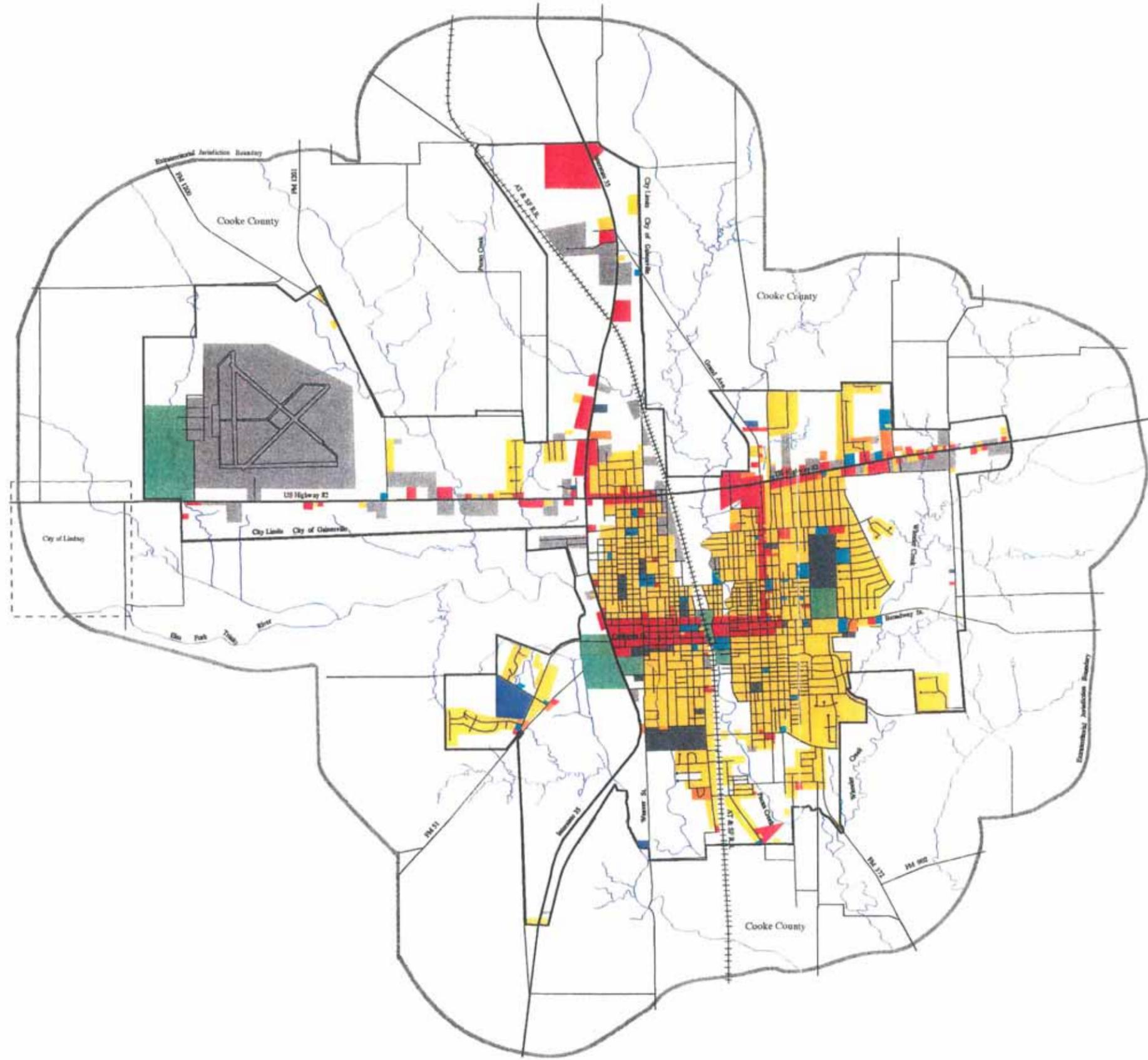
Height and hazard zoning in the vicinity of the airport is regulated by Ordinance number 397-12-88 of the City of Gainesville City Code. Specific zones, based on the F.A.R. Part 77 airspace plan, have been established in order to regulate the height of objects in the vicinity of the airport. Section Two of the ordinance established an aviation

overlay zoning district. In the event of a conflict between the aviation overlay zone and the underlying zoning, the more restrictive zoning will take precedence. Section three of the ordinance specifies 18 different types of businesses that are allowed in the airport zoning district. These include aircraft charter operations, pilot training, aircraft rental, and any other activity which can be regarded as an aeronautical activity. The ordinance was passed by the City Council in December of 1988, and maintains the height limitations established in City Ordinance number 154-12-79.

The height limitations are established to regulate and restrict the height of structures and objects of natural growth on and around the airport. The Ordinance establishes approach zones, transition zones, horizontal zones, and conical zones. Each of these zones serves to protect both the lives and property of airport users and those in the airport vicinity.

SOCIOECONOMIC CHARACTERISTICS

A variety of historical and forecast socioeconomic data has been collected for use in various elements of this master plan. This information provides essential background for use in determining aviation service level requirements. Aviation forecasts are related to the population base, economic strength of the region, and the ability of the region to sustain a strong economic base over an extended period of time. Historical and forecast data were obtained from the *Complete Economic*

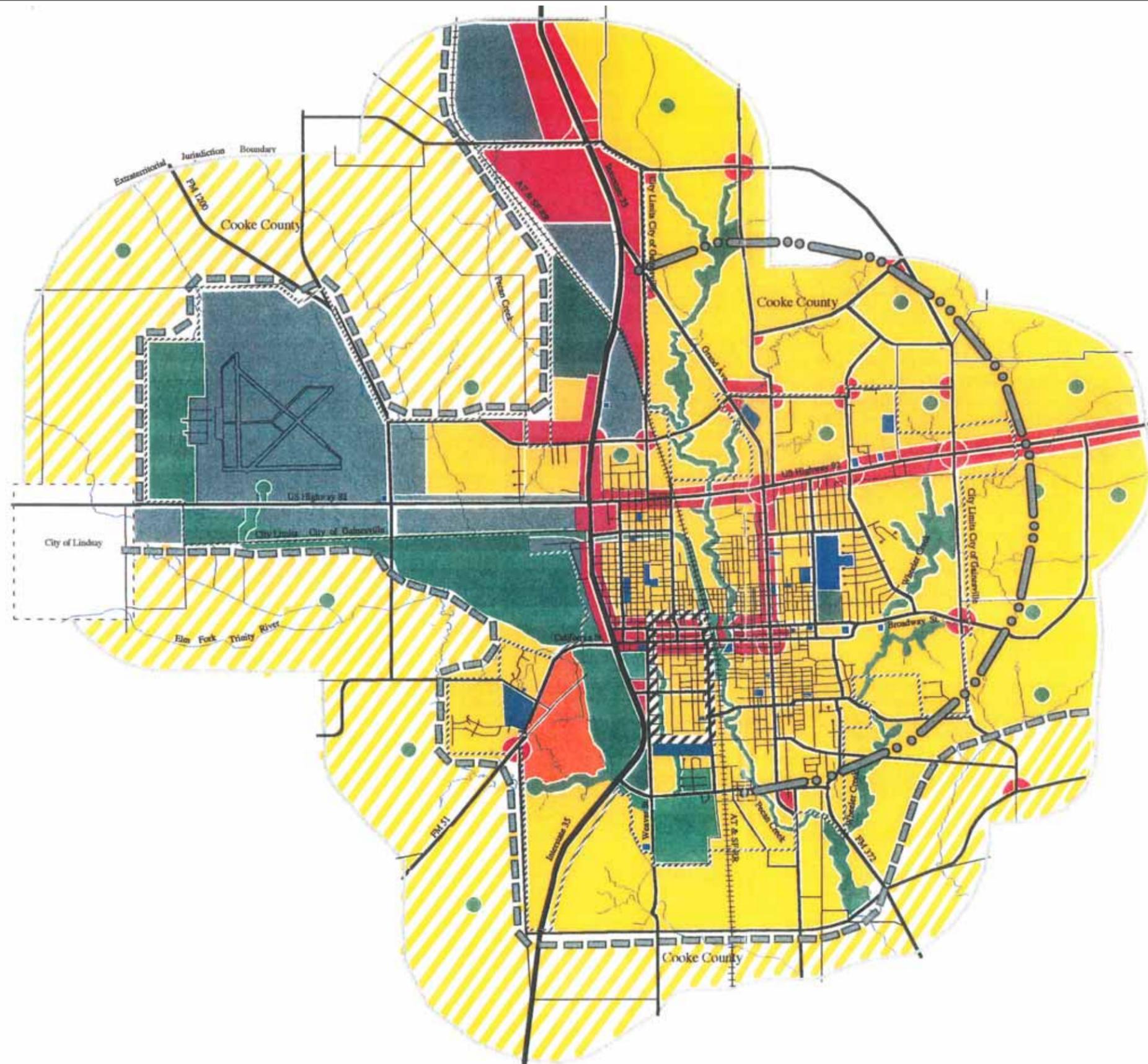


- LEGEND**
- Single Family
 - Multi-Family
 - Commercial
 - Industrial
 - Public
 - Quasi-Public
 - Parks and Recreation



Source: City of Gainesville, Texas
 Existing Land Use Map
 Municipal Planning Resources Group, Inc.





- LEGEND**
- Single Family
 - Multi-Family
 - Commercial
 - Industrial
 - Parks and Recreation
 - Public/Quasi-Public
 - Historic Area
 - Probable Rural Residential Development
 - Radial Urban Development



Source: City of Gainesville, Texas
 Future Land Use Plan
 Municipal Planning Resources Group, Inc.



and Demographic Data Source (CEDDS) 2004, which is published by Woods & Poole Economics, Inc. and compiled from data published by the U.S. Department of Commerce.

POPULATION

Population is one of the most important elements to consider when planning for future needs of the airport. Historical population data for Cooke and the surrounding counties, as well as the

City of Gainesville and the State of Texas are shown in **Table 1E**.

As shown in the table, all of the surrounding counties are expected to show steady if not substantial population growth over the next 20 years. Those counties closer to the Dallas/Fort Worth Metroplex (Metroplex) are expecting significant growth. Denton County is expected to grow by nearly 6 percent annually. Cooke County shows a robust annual growth rate of nearly 1.5 percent.

TABLE 1E					
Historical Population Statistics					
Cooke and Surrounding Counties					
County Populations	1970	1980	1990	2000	Avg. Annual Growth Rate (1970-2000)
Cooke County	23,560	27,840	31,010	36,470	1.47%
Grayson County	82,710	90,130	95,120	111,020	0.99%
Wise County	19,800	26,730	34,760	49,450	3.10%
Montague County	15,430	17,490	17,250	19,130	0.72%
Denton County	76,760	145,480	276,440	438,880	5.98%
Love County, OK	5,690	7,470	7,790	8,830	1.48%
City Populations					
Gainesville			15,125	15,538	0.27%
State Population					
Texas	11,198,655	14,225,513	16,986,510	20,851,790	2.09%
<i>Source: CEDDS 2004. Texas Water Development Board - 2006 Regional Water Plan</i>					

It is forecast that the strong growth in population for the City of Gainesville and the surrounding region will continue for the foreseeable future. **Table 1F** shows the population forecasts through the long term

planning period. All cities and counties listed are expected to grow through 2025. The City of Gainesville is projected to add more than 5,500 people by 2025, bringing its total population to more than 21,000.

TABLE 1F Forecast Population					
County Populations	2000	2010	2015	2025	Annual Growth Rate (2000-2025)
Cooke County	36,470	42,379	45,450	51,910	1.42%
Grayson County	111,020	120,460	124,980	134,880	0.78%
Wise County	49,450	63,440	70,120	83,860	2.14%
Montague County	19,130	20,013	20,562	21,790	0.52%
Denton County	438,880	623,660	708,680	882,180	2.83%
Love County, OK	8,830	9,500	9,880	10,720	0.78%
City Population*					
Gainesville	15,538	18,601	19,408	21,346	1.28%
State Population					
Texas	20,851,790	24,909,072	26,926,804	31,011,727	1.60%

*Source: Woods and Poole 2004. *Texas Water Development Board - 2006 Regional Water Plan. Interpolation by Coffman Associates.*

EMPLOYMENT

Analysis of a community's employment base can be valuable in determining the overall well-being of that community. In most cases, the community make-up and health are significantly impacted

by the availability of jobs, variety of employment opportunities, and types of wages provided by local employers. **Table 1G** provides historical employment characteristics in Gainesville Municipal from 1997 to the present.

TABLE 1G Employment Characteristics Cooke County								
	1997	1998	1999	2000	2001	2002	2003	2004*
Civilian Labor Force	16,435	16,914	17,157	17,500	17,844	16,915	17,776	17,809
Total Employment	15,821	16,360	16,633	16,949	17,001	16,023	16,926	17,027
Unemployment	614	554	524	551	843	892	850	782
Unemployment Rate	3.7	3.3	3.1	3.1	4.7	5.3	4.8	4.4

*Source: Texas Workforce Commission. *2004 Totals are Year-To-Date Averages (Jan-July)*

The unemployment rate has always been low in Cooke County compared to the national unemployment numbers (4.0 percent compared to 4.9 percent respectively, from 1997 to 2004). **Table 1G** also shows that Cooke County was significantly affected by the national

economic downturn in 2001, but is trending toward lower unemployment. Employment by economic sector is presented in **Table 1H**. Analyzing the employment mix can provide insight into the stability of the economic base for a region.

Economic Sector	2000	% of Total Employment (2000)	2025	% of Total Employment (2025)	Annual Growth Rate (2000-2025)
Mining	760	3.85%	840	2.76%	0.40%
Construction	1,390	7.05%	1,860	6.11%	1.17%
Manufacturing	3,080	15.62%	3,830	12.59%	0.88%
Transport., Comm., & Utilities	900	4.56%	1,170	3.84%	1.05%
Wholesale Trade	540	2.74%	670	2.20%	0.87%
Retail Trade	3,800	19.27%	5,850	19.22%	1.74%
Finance, Ins., & Real Estate	1,600	8.11%	2,670	8.77%	2.07%
Services	5,010	25.41%	9,630	31.65%	2.65%
Federal Civilian Government	80	0.41%	90	0.30%	0.47%
Federal Military Government	90	0.46%	100	0.33%	0.42%
State and Local Government	2,470	12.53%	3,720	12.22%	1.65%
Total Employment	19,720	100.00%	30,430	100.00%	1.75%

Source: CEDDS, Woods and Poole (2004)

As indicated in the table, the employment base of Cooke County is diversely spread across all industries. It is typical for a county with a diverse economy to have up to 50 percent of the employment base represented by retail and services. Cooke County has approximately 45 percent of its employment base represented by these two sectors. As a point of comparison, a tourist destination might see upwards of 80 percent of the employment base represented by retail and service industries. The County is also represented by nearly 16 percent of the employment in the manufacturing sector. Overall, the diversity of the economic base bodes well for the region so that if one sector of the economy slows then the other sectors can support the region.

The forecasts for 2025 indicate an overall annual growth rate of 1.75 percent in employment by sector. The economic base is forecast to show strong growth in the service and financial/real estate sectors. By 2025 nearly 10,700 people are projected to be added to the Cooke County employment base. This represents a 65 percent increase in the number of employed persons over 25 years.

Major Employers

Weber Aircraft, located at Gainesville Municipal Airport, is the largest employer in Gainesville. More than 1,100 union members manufacture aircraft seats and galleys. The Gainesville State School Youth

Detention Center employs approximately 325 people. Alan Ritchey, Inc. is a national transportation company moving commodities and goods across the country. They employ more than 1,500, with 200 at their Cooke County

headquarters. Those employed by the County and City total more than 425. Gainesville has a mixed economic base that is not dominated by a single economic sector. **Table 1J** shows the major employers in Cooke County.

Company Name	Product	Number of Employees
Weber Aircraft	Aircraft seats and galleys	1,169
Prime Outlets	Factory outlet shops	550
City and County Government	Government	435
Gainesville Hospital	Health care	310
Gainesville State School	Youth detention	324
North Central Texas College	Higher education	275
Alan Ritchey, Inc.	Transportation of goods	200
Petroflex, N.A., Inc.	Pipe and fittings	151
Spraylat Corporation	Powdered paint	130

Source: Community Profile from TXU Electric & Gas Economic Development Department, 2001

INCOME

Table 1K compares the per capita personal income (PCPI), adjusted to 1996 dollars, for Cooke County, the State of Texas, and the United States between 1990 and 2025. Per Capita Personal Income (PCPI) is a statistical measure of the amount of money available to each individual. Total personal income is the income received by persons from all sources; that is, from participation in production, from

both government and business transfer payments, and from government interest. As such, personal income includes all revenue streams, whether from government sources or private sources.

As indicated in the table, the PCPI for the State of Texas has slightly trailed that of the United States. Cooke County PCPI has experienced a higher annual growth than that of either the State or the United States.

Area	HISTORICAL		FORECAST			Annual Growth Rate (2000-2025)
	1990	2000	2010	2015	2025	
Cooke County	\$17,210	\$22,033	\$25,234	\$26,688	\$29,568	1.18%
State of Texas	\$20,374	\$26,066	\$28,691	\$30,361	\$34,080	1.08%
United States	\$22,856	\$27,712	\$30,680	\$32,470	\$36,510	1.11%

Source: CEDDS, Woods and Poole (2004)

SUMMARY

The information discussed in this inventory chapter provides a foundation upon which the remaining elements of the planning process will be constructed. Information on current airport facilities and utilization will serve as a basis, with additional analysis and data collection, for the development of forecasts of aviation activity and facility requirement determinations.

DOCUMENT SOURCES

As mentioned earlier, a variety of different sources were utilized in the inventory process. The following listing reflects a partial compilation of these sources. This does not include data provided by airport management as part of their records, nor does it include airport drawings and photographs which were referenced for information. On-site inventory and interviews with staff and tenants contributed to the inventory effort.

Airport/Facility Directory, South Central U.S., U.S. Department of Transportation, Federal Aviation Administration, National Aeronautical Charting Office, August 5, 2004 Edition.

Dallas-Fort Worth Sectional Aeronautical Chart, U.S. Department of Transportation, Federal Aviation Administration, National Aeronautical Charting Office, 71st edition, February 19, 2004.

National Plan of Integrated Airport Systems (NPIAS), U.S. Department of Transportation, Federal Aviation Administration, 2001-2005.

U.S. Terminal Procedures, South Central U.S., U.S. Department of Transportation, Federal Aviation Administration, National Aeronautical Charting Office, June 10, 2004, Edition.

Gainesville Municipal Airport Master Plan Study. Prepared by Shimek, Roming, Jacobs and Finkle, Consulting Engineers, 1975.

Gainesville Municipal Airport - Airport Action Plan. Prepared by KSA Engineers, Inc., 1999.

A number of internet Web sites were also used to collect information for the inventory chapter. These include the following:

FAA 5010 Data:
<http://www.airnav.com>

Texas Water Development Board:
<http://www.twdb.state.tx.us/home/index.asp>

Texas Workforce Commission:
<http://www.twc.state.tx.us>

U.S. Census Bureau:
<http://www.census.gov>

U.S. Department of Labor - Bureau of Labor Statistics:
http://www.bls.gov/cps/prev_yrs.htm

The City of Gainesville, Texas
<http://www.gainesville.tx.us/>

Gainesville Economic Development Corporation
<http://www.co.cooke.tx.us/>

Cooke County
<http://www.co.cooke.tx.us/>



Chapter Two

AVIATION DEMAND FORECASTS

AVIATION DEMAND FORECASTS



Facility planning must begin with a definition of the demand that may reasonably be expected to occur at the facility over a specific period of time. For Gainesville Municipal Airport, this involves forecasts of aviation activity indicators through the year 2025. In this master plan, forecasts of based aircraft, based aircraft fleet mix, annual aircraft operations, and operational peak periods will serve as the basis for facility development planning.

It is virtually impossible to predict, with certainty, year-to-year fluctuations of activity when looking 20 years into the future. However, a trend can be established which delineates long term growth potential. While a single line is often used to express the anticipated growth, it is important to remember that actual growth may fluctuate above and below this line. Forecasts serve as guidelines and planning must remain



flexible enough to respond to unforeseen facility needs. This is because aviation is affected by many external influences, as well as by the types of aircraft used and the nature of the available services and facilities at the airport.

Recognizing this, it is intended to develop a Master Plan for Gainesville Municipal Airport that will be demand-based rather than time-based. As a result, the reasonable levels of activity potential that are derived from this forecasting effort will be related to the planning horizon levels rather than dates in time. These planning levels will be established as levels of activity from which specific actions for the airport to consider will be presented.



In order to fully assess current and future aviation demand for Gainesville Municipal Airport, an examination of several key factors is needed. These include national and regional aviation trends, historical and forecast socioeconomic and demographic information of the area, competing transportation modes, and facilities. Consideration and analysis of these factors will ensure a comprehensive outlook for future aviation demand at Gainesville Municipal Airport.

The demand-based manner in which this master plan is being prepared is intended to accommodate variations in demand at the airport. Demand-based planning relates capital improvements to demand factors such as based aircraft operations, instead of points in time. This allows the airport to address capital improvement needs according to actual demand occurring at the airport. Therefore, should growth in aircraft operations, or based aircraft slow or decline, it may not be necessary to implement some improvement projects. However, should the airport experience accelerated growth, the plan will have accounted for that growth and will be flexible enough to respond accordingly.

SOCIOECONOMIC PROJECTIONS

The local socioeconomic conditions provide an important baseline for preparing aviation demand forecasts. Local socioeconomic variables such as population, employment, and income

can be an indicator for understanding the dynamics of the community and, in particular, the trends in aviation growth. The following is a summary of the research and projections presented in Chapter One.

POPULATION

Table 2A summarizes historical and forecast population estimates for the counties which surround Cooke County. Analysis of the surrounding counties will give a more comprehensive understanding of the socioeconomic situations that affects the region which supports Gainesville Municipal Airport. The analysis of historical population information for Cooke County indicates an annual growth rate of 1.64 percent between 1990 and 2000. Denton and Wise County had the highest annual growth rates at 4.73 and 3.59 percent respectively, over the same period. Denton and Wise Counties are significant suburban growth areas around the Dallas/Fort Worth Metroplex (Metroplex).

Future population data for Cooke County and the surrounding counties is also presented. The population for Cooke County is forecast to reach 51,910 by 2025. This projection equates to an annual growth rate of 1.42 percent between 2000 and 2025. The Counties of Denton and Wise are projected to continue to realize significant growth. As the population grows to the north of the Metroplex, Cooke County will also continue to grow.

TABLE 2A							
Socioeconomic Forecasts for the Cooke County Region							
Gainesville Municipal Airport							
	HISTORICAL		FORECAST			Annual Growth Rate	
	1990	2000	2010	2015	2025	1990 to 2000	2000 to 2025
Cooke County							
Population	31,010	36,470	42,380	45,450	51,910	1.64%	1.42%
Employment	13,518	19,720	24,034	26,205	30,412	3.85%	1.75%
PCPI	\$17,210	\$22,033	\$25,234	\$26,688	\$29,568	2.50%	1.18%
Wise County							
Population	34,760	49,450	63,440	70,120	83,860	3.59%	2.14%
Employment	10,821	18,128	23,828	26,541	31,800	5.30%	2.27%
PCPI	\$16,708	\$22,121	\$23,211	\$24,222	\$26,166	2.85%	0.67%
Montague County							
Population	17,250	19,130	20,010	20,560	21,790	1.04%	0.52%
Employment	7,018	7,635	8,222	8,647	9,563	0.85%	0.90%
PCPI	\$16,194	\$18,929	\$20,705	\$21,970	\$24,743	1.57%	1.08%
Denton County							
Population	276,440	438,880	623,660	708,680	882,180	4.73%	2.83%
Employment	96,058	158,824	209,355	240,125	314,314	5.16%	2.77%
PCPI	\$22,075	\$29,039	\$30,804	\$32,237	\$36,298	2.78%	0.90%
Grayson County							
Population	95,120	111,020	120,460	124,980	134,880	1.56%	0.78%
Employment	47,265	54,529	59,010	62,318	69,189	1.44%	0.96%
PCPI	\$18,688	\$21,867	\$23,854	\$25,316	\$28,409	1.58%	1.05%
Love County, OK							
Population	7,790	8,830	9,500	9,880	10,720	1.26%	0.78%
Employment	2,716	2,921	\$3,180	3,323	3,617	0.73%	0.86%
PCPI	\$15,778	\$16,108	18308	\$19,077	\$20,760	0.21%	1.02%

Source: Woods and Poole, CEDDS 2004. PCPI adjusted to \$1996

EMPLOYMENT

Historical and forecast employment data for the region is also presented in **Table 2A**. All counties are expected to show increasing employment through the forecast year of 2025, although not at the high rates of the 1990s. Over the forecast period, employment in Cooke County is expected to increase by 1.75 percent annually, compared to a population increase of 1.42 percent. Again, the Metroplex counties of Denton and Wise show significant increases in employment over the planning period.

PER CAPITA PERSONAL INCOME (PCPI)

Table 2A compares per capita personal income (adjusted to 1996 dollars) for the region. The region's average adjusted PCPI for 2000 is \$21,683. Denton County represented the region with the highest PCPI, \$29,039. Cooke and Wise County's PCPI were nearly identical, representing the second highest PCPI for the region. Although all of the selected counties are expected to see PCPI growth slow when compared to

the period from 1990 to 2000, Cooke County is projected to slow the least.

FORECASTING APPROACH

The development of aviation forecasts proceeds through both analytical and judgmental processes. A series of mathematical relationships is tested to establish statistical logic and rationale for projected growth. However, the judgement of the forecast analyst, based upon professional experience, knowledge of the aviation industry, and assessment of the local situation, is important in the final determination of the preferred forecast.

The most reliable approach to estimating aviation demand is through the utilization of more than one analytical technique. Methodologies frequently considered include trend line projections, correlation/regression analysis, and market share analysis.

Trend line projections are probably the simplest and most familiar of the forecasting techniques. By fitting growth curves to historical demand data, then extending them into the future, a basic trend line projection is produced. A basic assumption of this technique is that outside factors will continue to affect aviation demand in much the same manner as in the past. As broad as this assumption may be, the trend line projection does serve as a reliable benchmark for comparing other projections.

Correlation analysis provides a measure of direct relationship between

two separate sets of historic data. Should there be a reasonable correlation between the data sets, further evaluation using regression analysis may be employed.

Regression analysis measures the statistical relationship between dependent and independent variables yielding a “correlation coefficient.” The correlation coefficient (Pearson’s “r”) measures association between the changes in a dependent variable and independent variable(s). If the r-squared (r^2) value (coefficient determination) is greater than 0.95, it indicates good predictive reliability. A value below 0.95 may be used with the understanding that the predictive reliability is lower.

Market share analysis involves a historical review of airport activity as a percentage, or share, of a larger regional, state, or national aviation market. A historical market share trend is determined providing an expected market share for the future. These shares are then multiplied by the forecasts of the larger geographical area to produce a market share projection. This method has the same limitations as trend line projections, but can provide a useful check on the validity of other forecasting techniques.

It is important to note that one should not assume a high level of confidence in forecasts that extend beyond five years. Facility and financial planning usually require at least a 10-year view, since it often takes more than five years to complete a major facility development program. However, it is important to

use forecasts which do not overestimate revenue-generating capabilities or understate demand for facilities needed to meet public (user) needs.

A wide range of factors is known to influence the aviation industry and can have significant impacts on the extent and nature of air service provided in both the local and national markets. Technological advances in aviation have historically altered, and will continue to change, the growth rates in aviation demand over time. The most obvious example is the impact of jet aircraft on the aviation industry, which resulted in a growth rate that far exceeded expectations. Such changes are difficult, if not impossible, to predict, and there is simply no mathematical way to estimate their impacts. Using a broad spectrum of local, regional, and national socioeconomic and aviation information, and analyzing the most current aviation trends, forecasts are presented in the following sections.

The following forecast analysis examines each of the aviation demand categories expected at Gainesville Municipal Airport through 2025. Each segment will be examined individually, and then collectively, to provide an understanding of the overall aviation activity at Gainesville Municipal Airport through 2025.

AIRPORT SERVICE AREA

The initial step in determining the general aviation demand for an airport is to define its generalized service area. The airport service area is determined

primarily by evaluating the location of competing airports, their capabilities and services, and their relative attraction and convenience. Also, to aid in identifying the generalized service area for Gainesville Municipal Airport, a general aviation user/pilot survey was conducted. With this information, a determination can be made as to what volume of aviation demand would likely be accommodated by a specific airport. It should be noted that aviation demand often crosses geographical and political boundaries.

The airport service area is a geographical area where there is a potential market for airport services. Access to general aviation airports, commercial air service, and transportation networks enter into the equation to determine the size of a service area, as well as the quality of aviation facilities, distance, and other subjective criteria. Typically, the service area for a general aviation airport can extend up to 30 miles.

The proximity and level of service offered by other airports are largely the defining factor when describing the airport service area. A description of nearby airports was previously completed in Chapter One. Gainesville has five competing general aviation airports. Each of these airports is able to provide a similar level of service to the general aviation community.

As in any business enterprise, the more attractive the facility is in services and capabilities, the more competitive it will be in the market. As the level of attractiveness expands, so will the

service area. If an airport's attractiveness increases in relation to nearby airports, so will the size of the service area. If facilities are adequate and rates and fees are competitive at Gainesville Municipal Airport, some level of general aviation activity might be attracted to the airport from surrounding areas.

In determining the aviation demand for an airport, it is necessary to identify the role of that airport. The primary role of Gainesville Municipal Airport is to serve the needs of general aviation in the area. General aviation is a term used to describe a diverse range of aviation activities which includes all segments of the aviation industry except commercial air carriers and military. This includes recreational flying in single engine aircraft up to corporate business jets.

To aid in defining the service area, analysis of the user/pilot survey is presented. **Exhibit 2A** depicts the location by zip code of the eight respondents who have aircraft based at Gainesville Municipal Airport. As indicated on the exhibit, two based aircraft owners (having a total of six aircraft) live in Kerr County. The majority of the respondents live in Cooke County.

AIRPORT USER SURVEY

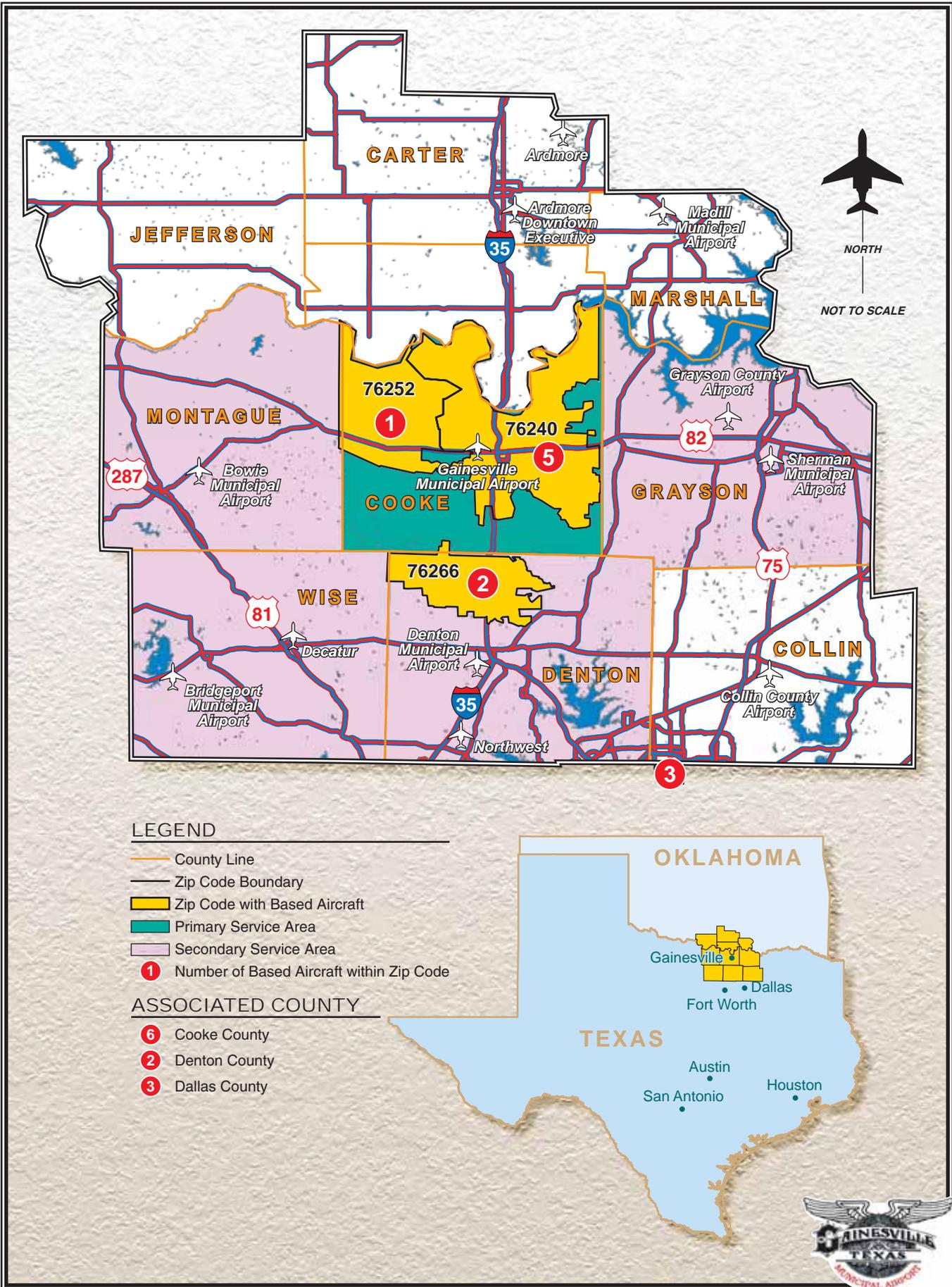
In order to obtain a profile of local general aviation users and their preferences, an airport user survey was conducted. The survey was sent to all registered aircraft owners living within a 30-mile radius, as identified by FAA

records. A total of 444 surveys were sent out, 79 responses were received (17.8 percent response rate), and eight indicated that they base at least one aircraft at Gainesville Municipal Airport as presented in **Table 2B**.

Two of these respondents indicated that they were contemplating the acquisition of at least one additional aircraft within the next five years. Responses indicated that each user conducts an average of 27 operations per month, with local training operations averaging eight percent of those operations. The respondents indicated that they use their aircraft for pleasure 57 percent of the time and business 43 percent of the time.

The remaining questions on the survey were related to owner preferences. **Table 2B** presents the priority categories and respondent rankings. The priority scale utilized number "1" as the highest priority and the number "7" as the lowest priority. Also, several respondents simply checked a category or did not prioritize at all. Checked categories were given the priority of "1", while unchecked categories were weighted with a "7".

The majority of respondents indicated several preferences which led them to base at the airport or has kept them at the airport. As indicated in the table, the highest priority for basing at the airport was for convenience (lived or worked closer to the airport). The next two highest priorities were the airport's aircraft hangar facilities (3.0) and lower storage fees (3.1). The lowest ranked category was navigational aids, which had a response average of 5.6.



LEGEND

- County Line
- Zip Code Boundary
- Zip Code with Based Aircraft
- Primary Service Area
- Secondary Service Area
- Number of Based Aircraft within Zip Code

ASSOCIATED COUNTY

- 6 Cooke County
- 2 Denton County
- 3 Dallas County



Exhibit 2A SERVICE AREA

TABLE 2B Pilot Survey Results Gainesville Municipal Airport					
Total Surveys Sent 444					
Total Survey Responses 79					
Response Rate 17.8%					
Respondents Based @ Gainesville 8					
Total Based Aircraft of Respondents 11					
Based respondents considering another aircraft in the next 5 years 2					
Primary Use of Aircraft Percent (%)					
<u>Business</u> 43.2			<u>Pleasure</u> 56.8		
Monthly Operations at Gainesville by these aircraft . . 302					
Average Operations for each aircraft per month 27					
Percent Touch-and-Go Operations per AC per month 8					
Primary Reasons for Basing at Gainesville					
<u>Convenience</u> 1.5	<u>Hangar Facilities</u> 3.0	<u>FBO/Terminal Services</u> 4.4	<u>Lower Aircraft Storage Costs</u> 3.1	<u>Runway Length</u> 4.6	<u>Navigational Aids</u> 5.6
Current Aircraft Storage Use					
<u>Tie-down</u> 1	<u>T-hangar</u> 4	<u>Individual</u> 1	<u>Multi</u> 2		
Preferred Aircraft Storage					
<u>Tie-down</u> 0	<u>T-hangar</u> 4	<u>Individual</u> 2	<u>Multi</u> 2		
Improvements Necessary at Gainesville					
<u>Runway/ Taxiway</u> 4.6	<u>Airport/ FBO Services</u> 5.3	<u>Air Cargo Apron</u> 3.8	<u>Hangars</u> 4.0	<u>Terminal Building</u> 6.4	<u>Navigational Aids</u> 3.5

The questionnaire also asked those surveyed what improvements were necessary at Gainesville Municipal Airport. This question also asked for a priority ranking with “1” as the highest. The responses indicated no unanimous needs. The need for improved navigational aids was the most common response. Several respondents also indicated the need for improvements to the apron areas. Hangar improvements was also a common response.

The respondents were also asked to provide general comments. Two of the based respondents requested an area for washing aircraft, or a wash rack. Another felt that a 7,000-foot long runway would attract corporate operators from the Metroplex. Along the same lines, another said they would like to see the infrastructure improved to attract new business to the airport. Finally, a couple of based aircraft owners wished to see more executive

type hangars for renters and transient aircraft.

Often a secondary service area may be defined to include surrounding counties. For Gainesville Municipal Airport, the secondary service area will include Montague, Wise, Denton, and Grayson counties. Love County in Oklahoma is not included in the secondary service area for a number of reasons. First, the growth of the Metroplex will push aircraft owners north toward Gainesville. Second, there are natural and cultural barriers between Oklahoma and Texas. The natural barrier is the Red River. The cultural barrier is the social and psychological distinctions between Texans and Oklahomans. As a result, those in Oklahoma will likely base their aircraft in Oklahoma when given a choice and the same is true for Texans. Third, the two airports in Ardmore, Oklahoma, are attractive for aircraft owners. Ardmore Municipal Airport has a 7,200-foot runway with a strength-rating of 24,000 pounds and a crosswind runway with a strength-rating of 36,000 pounds. They also have an ILS approach with three-quarters of a mile visibility minimums. Ardmore Downtown Airport has a 5,000-foot runway with a strength-rating of 20,000 pounds. They also have 80 based aircraft already.

There is a strong indication that as the Metroplex continues expanding northward, Gainesville Municipal Airport will benefit by being in a position to provide services to those new businesses and individuals. Thus, the primary service area for Gainesville Municipal Airport will continue to be

Cooke County, because of the number of competing airports in neighboring counties. A secondary service area will include the surrounding counties, but not those in Oklahoma. Denton and Wise counties, in particular, are more likely to supply potential users of the Airport.

AVIATION TRENDS

NATIONAL AVIATION TRENDS

Each year, the Federal Aviation Administration (FAA) publishes its national forecast. Included in this publication are forecasts for large air carriers, regional air carriers, general aviation, and FAA workload measures. The forecasts are prepared to meet budget and planning needs of the constituent units of the FAA and to provide information that can be used by state and local authorities, the aviation industry, and the general public. The current edition when this chapter was prepared was *FAA Aerospace Forecasts-Fiscal Years, 2004-2015*. The forecast uses the economic performance of the United States as an indicator of future aviation industry growth. Similar economic analyses are applied to the outlook for aviation growth in international markets.

In the seven years prior to the events of 9/11, the U.S. civil aviation industry experienced unprecedented growth in demand and profits. The impacts to the economy and aviation industry from the events of 9/11 were immediate and significant. However, the economic climate and aviation industry have been

recovering in the past year. The FAA expects the U.S. economy to recover rapidly over the next two years, growing moderately thereafter. This will positively influence the aviation industry, leading to passenger, air cargo, and general aviation growth throughout the forecast period (assuming that there will not be any new successful terrorists' incidents against either U.S. or world aviation).

Airline passengers are expected to recover to pre-9/11 levels by 2005, and then grow at 4.2 percent annually through 2015. Large air carriers will grow at 3.8 percent annually, while the regional/commuter airlines are expected to grow at an astonishing pace of 6.4 percent annually. Air cargo revenue-ton-miles (RTMs) are projected to grow at 3.5 percent annually. The number of active general aviation aircraft is expected to grow at 1.3 percent annually.

GENERAL AVIATION

Following more than a decade of decline, the general aviation industry was revitalized with the passage of the *General Aviation Revitalization Act* in 1994 (federal legislation which limits the liability on general aviation aircraft to 18 years from the date of manufacture). This legislation sparked an interest to renew the manufacturing of general aviation aircraft due to the reduction in product liability, as well as renewed optimism for the industry. The high cost of product liability insurance was a major factor in the decision by many American aircraft manufacturers

to slow or discontinue the production of general aviation aircraft.

However, this continued growth in the general aviation industry slowed considerably in 2001 and 2002, having been negatively impacted by the events of September 11. Thousands of general aviation aircraft were grounded for weeks, due to "no-fly zone" restrictions imposed on operations of aircraft in security-sensitive areas. This, in addition to the economic recession already taking place in 2001-02, has had a profoundly negative impact on the general aviation industry. Weak traffic demand, coupled with the failure of full-fare business travelers to return in any significant numbers, forced carriers to resort to discounting to fill empty seats. This had a devastating impact on both passenger yields and profits.

General aviation activity is expected to continue to experience slow growth in 2004 and return to more normal growth patterns beginning in 2005, as the U.S. economy reaches the peak of its recovery. The forecast assumes that the regulatory environment affecting general aviation will not change dramatically. The forecast also assumes that the fractional ownership market will continue to expand and bring new operators and shareholders into business aviation.

The active general aviation aircraft fleet is expected to increase at an average annual rate of 1.2 percent over the 13-year forecast period, increasing from 211,244 in 2002 to 246,415 in 2015. This growth includes the addition

of a new aircraft category, light sport aircraft, which is expected to enter the active fleet in 2004, and account for 20,915 aircraft in 2015. Light sport aircraft include small fixed wing airplanes, powered-parachutes, gyroplanes, ultralights, and others. Excluding these light sport aircraft, growth averages only 0.5 percent over the 13-year forecast period.

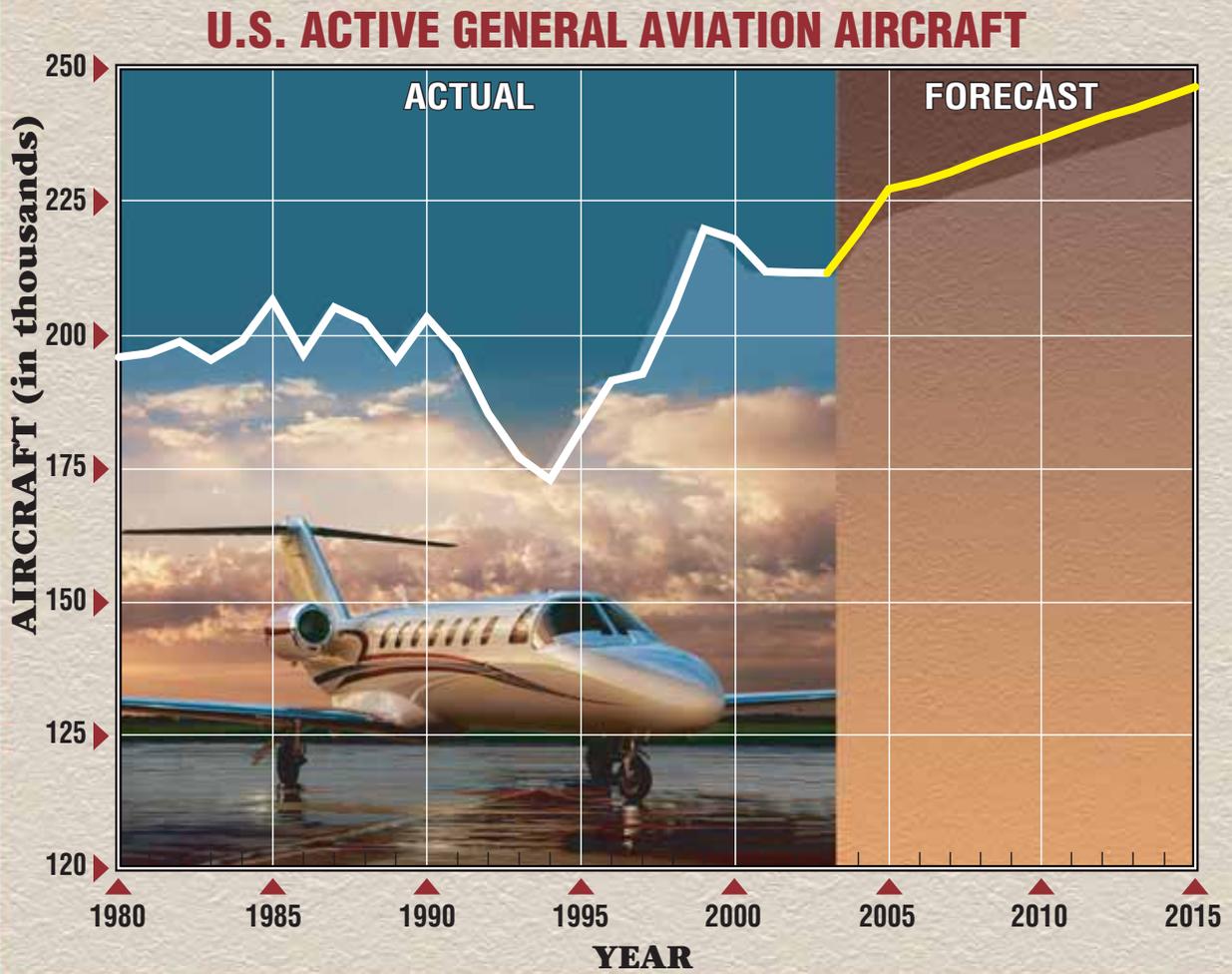
Exhibit 2B depicts the FAA forecast for active general aviation aircraft in the United States. The number of single-engine piston aircraft is projected to reach 148,450 in 2015, which represents an average annual growth rate of 0.3 percent. During this same time, the number of active multi-engine piston aircraft fleet is expected to decline by 0.5 percent. The number of turboprop aircraft is expected to increase at an average annual rate of 1.3 percent over the 13-year forecast period, while turbojet aircraft are forecast to increase on average by 4.9 percent annually. The rotorcraft fleet is forecast to grow only 0.6 percent annually through 2015, and the number of experimental aircraft is projected to increase at an average annual rate of 0.4 percent. Gliders and lighter-than-air aircraft are forecast to increase approximately 0.3 percent annually over the 13-year forecast period.

The declines in the aircraft utilization rates experienced in 2000 (down 3.2 percent) and 2001 (down 7.2 percent) were due, in part, to higher fuel prices and the 2001 U.S. economic recession. However, the restrictions placed on general aviation in the aftermath of the September 11 events, contributed

heavily to the decline in utilization in 2001. A strong recovery in the U.S. economy in 2004 and 2005 should lead to increased utilization rates for most categories of general aviation aircraft.

The total pilot population is projected to increase from an estimated 625,011 in 2003, to 777,730 by 2015, which represents an average annual growth rate of 1.6 percent. This includes the certification of 16,100 new sport pilots. The student pilot population increased 1.5 percent in 2003, and is forecast to increase at an annual rate of 1.9 percent (almost 1,800 students annually) over the 12-year forecast period, reaching a total of 108,430 in 2015. Growth rates for the other pilot categories over the forecast period are as follows: airline transport pilots, up 1.6 percent; recreational pilots, up 0.8 percent; rotorcraft only, up 1.0 percent; and glider only, up 0.2 percent.

Over the past several years, the general aviation industry has launched a series of programs and initiatives whose main goals are to promote and assure future growth within the industry. “No Plane, No Gain” is an advocacy program created in 1992 by the General Aviation Manufacturers Association (GAMA) and the National Business Aircraft Association (NBAA) to promote acceptance and increased use of general aviation as an essential, cost-effective tool for businesses. Other programs are intended to promote growth in new pilot starts and introduce people to general aviation. “Project Pilot” sponsored by the Aircraft Owners and Pilots Association (AOPA) promotes the training of new pilots in order to



U.S. ACTIVE GENERAL AVIATION AIRCRAFT (in thousands)

Year	FIXED WING				ROTORCRAFT			Sport Aircraft	Other	Total
	PISTON		TURBINE		Piston	Turbine	Experimental			
	Single Engine	Multi-Engine	Turboprop	Turbojet						
2003 (Est.)	143.4	17.5	6.9	8.5	2.4	4.3	22.0	N/A	6.4	211.2
2005	143.5	17.3	7.0	9.0	2.4	4.3	22.1	15.5	6.4	227.6
2010	146.2	16.9	7.6	12.0	2.6	4.4	22.7	18.1	6.5	236.9
2015	148.5	16.5	8.1	15.5	2.7	4.5	23.1	20.9	6.6	246.4

Source: FAA Aerospace Forecasts, Fiscal Years 2004-2015.

Notes: An active aircraft is one that has a current registration and was flown at least one hour during the calendar year.



increase and maintain the size of the pilot population. The “Be a Pilot” program is jointly sponsored and supported by more than 100 industry organizations. The NBAA sponsors “AvKids,” a program designed to educate elementary school students about the benefits of business aviation to the community, and career opportunities available to them in business aviation. Over the years, programs such as these have played an important role in the success of general aviation and will continue to be vital to its growth in the future.

GENERAL AVIATION FORECASTS

To determine the types and sizes of facilities that should be planned to accommodate general aviation activity, certain elements of this activity must be forecast. Indicators of general aviation demand include:

- Based Aircraft
- Based Aircraft Fleet Mix
- General Aviation Operations
- Peaking Operations
- Annual Instrument Approaches

The remainder of this chapter will examine historical trends with regard to these areas of general aviation and project future demand for these segments of general aviation activity at the airport.

INDICATORS FOR BASED AIRCRAFT

The number of based aircraft is the most basic indicator of general aviation demand. By first developing a forecast of based aircraft, the trend of other indicators can be projected based upon this trend and other factors characteristic to Gainesville Municipal Airport and the area it serves.

One method of forecasting based aircraft at an airport is to examine local aircraft ownership, or aircraft registrations in the airport’s service area. Using registered aircraft as a point of comparison has proved to be a good baseline because of the stringent rules the FAA has in place requiring all aircraft owners to register. By then comparing the historic aircraft registrations to historic based aircraft, a forecast can be developed. The primary service area for aircraft basing at Gainesville Municipal Airport is Cooke County. The secondary service area is portions of those Texas counties which border Cooke County. An examination of registered aircraft for Cooke County and the surrounding counties has been completed.

These counties were chosen after careful consideration of many factors including population centers near the airport, responses to the airport user survey, transportation access to the airport, etc. Love County, Oklahoma, which borders Cooke County to the north, was not included in this analysis for two primary reasons. First, Love

County, Oklahoma has had nearly the same number of registered aircraft for the last 15 years. Thus, to include Love County would be to include an outlier that could significantly alter the statistical analysis. Secondly, there is a cultural boundary between Oklahoma and Texas which is delineated by the

Red River. Typically, those in Oklahoma will do business in their state and those in Texas will do the same even though they border each other. Historical records of registered aircraft in the region are presented in **Table 2C**.

Year	County					Total
	Cooke	Wise	Montague	Denton	Grayson	
1990	48	72	16	482	145	763
1991	45	77	16	502	155	795
1992	43	98	15	517	163	836
1993	49	115	17	527	176	884
1994	52	122	15	572	179	940
1995	49	122	18	609	186	984
1996	54	134	24	616	193	1,021
1997	57	149	28	610	190	1,034
1998	61	155	34	654	200	1,104
1999	63	149	38	693	211	1,154
2000	63	154	38	735	227	1,217
2001	60	173	41	781	226	1,281
2002	64	172	44	792	226	1,298
2003	70	190	59	823	234	1,376
2004	76	195	60	856	233	1,420

Source: FAA Aircraft Registry Database (2004); Census of U.S. Civil Aircraft (1990-1994); Aircraft and Airmen Database from Avantext, Inc. (2001-2003); Aviation Goldmine CD from Software Innovations (1995-2000)

The table shows that each of the counties examined has seen steady growth over the past 15 years. Cooke County had 48 registered aircraft in 1990 and currently has 76 which is an annual growth rate (AGR) of 3.11 percent. Montague showed the greatest AGR with 9.21 percent. The AGR for Wise, Denton and Grayson was 6.87 percent, 3.90 percent, and 3.21 percent respectively.

Registered Aircraft Forecasts

Historical records of aircraft ownership in Cooke County, Wise County, Montague County, Denton County, and Grayson County were obtained and evaluated in preparing the forecast of registered aircraft.

The first registered aircraft forecast for the region was developed by comparing the aircraft registered in the five county region with the United States active

fleet of general aviation aircraft. **Table 2D** provides historical and forecasted aircraft registrations since 1995.

TABLE 2D			
Five County Registered Aircraft Forecasts as a Percent of Total U.S. Aircraft Registrations			
Gainesville Municipal Airport			
Year	U.S. Active Aircraft	Five County Registered Aircraft	% of U.S. Aircraft
1995	188,089	984	0.5232%
1996	191,129	1,021	0.5342%
1997	192,414	1,034	0.5374%
1998	204,711	1,104	0.5393%
1999	219,464	1,154	0.5258%
2000	217,533	1,217	0.5595%
2001	211,447	1,281	0.6058%
2002	211,244	1,298	0.6145%
2003	211,190	1,376	0.6515%
2004	219,100	1,420	0.6481%
Constant Share Forecast			
2010	236,900	1,536	0.6481%
2015	246,400	1,597	0.6481%
2025	266,600	1,728	0.6481%
Increasing Share Forecast			
2010	236,900	1,682	0.7100%
2015	246,400	1,898	0.7700%
2025	266,600	2,400	0.9000%
<i>Source: FAA Aerospace Forecast Data, U.S. Census of Civil Aircraft</i>			

As depicted in the table, the five-county region’s registrations have increased at a moderate pace since 1995. Between 1995 and 2004, 436 registered aircraft were added, with 27 of those in Cooke County. During that time, the five-county region’s registered aircraft increased from 0.5232 percent of U.S. active aircraft in 1995, to 0.6481 percent of U.S. active aircraft in 2004.

Two forecasts were developed considering the five-county region’s share of U.S. active aircraft. First, a forecast maintaining a constant 0.6481 percent of U.S. active aircraft was

developed. This forecast yields 1,728 aircraft by 2025. Next, an increasing share forecast following historical trends was developed. As presented in the table, the increasing share forecast yields 2,400 aircraft by 2025.

A second method of forecasting county aircraft registrations considers the number of aircraft per 1,000 residents in the five county region. **Table 2E** presents historical and forecast registered aircraft per 1,000 residents.

Two forecasts were developed considering aircraft registrations per

1,000 residents. First, a constant share of 1.89 aircraft per 1,000 residents yielded 2,221 registered aircraft in the five-county region by 2025. Next, an

increasing share projection reaching 2.30 aircraft per 1,000 residents yielded 2,702 aircraft registrations in the five-county region by 2025.

TABLE 2E			
Five-County Registered Aircraft Forecasts Per 1,000 Resident Population Projections			
Gainesville Municipal Airport			
Year	Five-County Registered Aircraft	Five-County Population	Aircraft Per 1,000 Residents
1995	984	519,400	1.89
1996	1,021	550,520	1.85
1997	1,034	573,950	1.80
1998	1,104	599,720	1.84
1999	1,154	628,670	1.84
2000	1,217	654,950	1.86
2001	1,281	684,270	1.87
2002	1,298	712,140	1.82
2003	1,376	732,370	1.88
2004	1,420	751,840	1.89
Constant Ratio Projection			
2010	1,626	859,949	1.89
2015	1,815	959,790	1.89
2025	2,221	1,174,617	1.89
Increasing Ratio Projection			
2010	1,720	859,949	2.00
2015	2,016	959,790	2.10
2025	2,702	1,174,617	2.30
<i>Sources: FAA Aerospace Forecast Data, CEDDS 2004 from Woods and Poole.</i>			

A trend line projection was also considered for forecasting registered aircraft in the five county region, yielding an “r²” value of 0.99. This projection yields 1,719 registered aircraft for 2010, 1,971 aircraft registrations for 2015, and 2,475 registrations for 2025. This is a very strong correlation.

Regression analysis was also conducted comparing the five-county population to registered aircraft. An “r²” value of 0.99 resulted. For 2010, this regression forecast yields 1,608 region-wide registrations. In 2015, the projection is 1,759 and for 2025 the projection is 2,211. **Table 2F** summarizes the six forecasts and shows the selected forecast numbers for registered aircraft in the five-county region.

TABLE 2F			
Five-County Region Registered Aircraft Projections			
Gainesville Municipal Airport			
PROJECTION	2010	2015	2025
Regression Analysis			
Trend Line ($r^2=0.99$)	1,719	1,971	2,475
vs. Population ($r^2=0.99$)	1,608	1,759	2,211
Market Share of U.S. Active Aircraft			
Constant Share	1,536	1,597	1,728
Increasing Share	1,682	1,898	2,400
Market Share of Registered Aircraft per 1,000 Pop in			
Five County Region			
Constant Share	1,626	1,815	2,221
Increasing Share	1,720	2,016	2,702
Selected Forecast	1,650	1,850	2,300

The forecasts developed for the five-county region's registered aircraft are depicted on **Exhibit 2C**. As shown, the forecasts are defined by the low-line (constant share of U.S. active aircraft projection) and the high projection (market share versus the five-county population growth). Since no single line stands out as the most reasonable, an average of the six forecasts was used to determine the selected forecast for registered aircraft in the five-county region.

BASED AIRCRAFT FORECASTS

Determining the number of based aircraft at an airport can be a challenging task. Typically, airports don't keep records of based aircraft. In the absence of local records, the FAA *Terminal Area Forecast* based aircraft data was used. From discussions with airport staff, it appears that the based aircraft data provided by the FAA is reasonably accurate. As such, the FAA data will provide the foundation for the following based aircraft forecast.

Now that registered aircraft for the service area has been forecast, based aircraft at Gainesville Municipal Airport can be examined in comparison to historical regional registered aircraft. **Table 2G** presents based aircraft at Gainesville Municipal Airport as a share of the five-county region registered aircraft projection. As presented in the table, aircraft based at Gainesville Municipal Airport as a share of the region's registered aircraft has generally increased since 1995.

Future based aircraft at Gainesville Municipal Airport will depend on several factors, including the economy and available airport facilities. Forecasts assume a reasonably stable economy and reasonable development of airport facilities necessary to accommodate aviation demand. The table presents both a constant market share projection and an increasing market share projection as a percentage of the regions registered aircraft. It is believed that Gainesville Municipal Airport will continue to be capable of accommodating increased demand over the planning period.

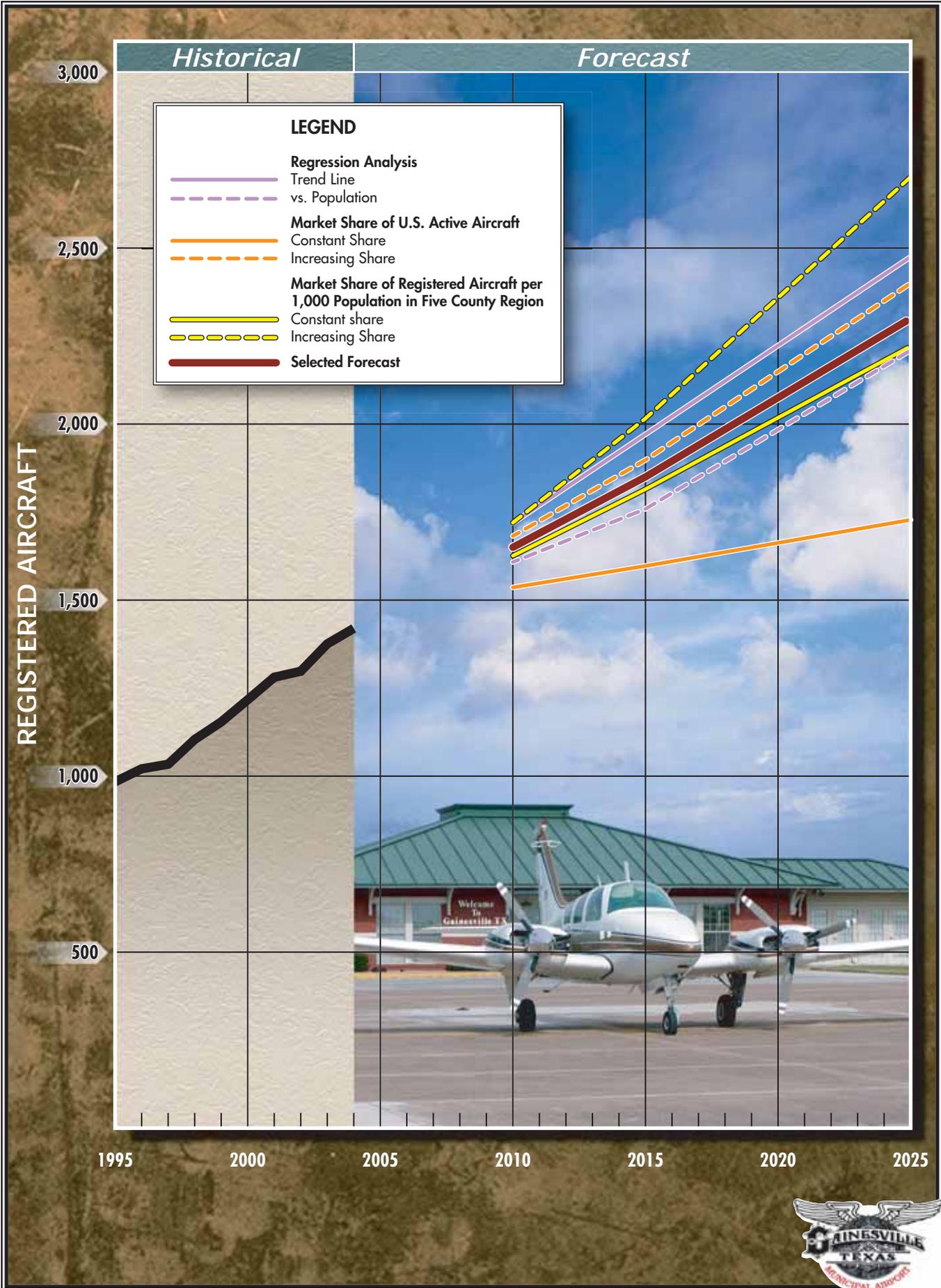
TABLE 2G			
Based Aircraft vs. Five-County Registered Aircraft			
Gainesville Municipal Airport			
Year	Gainesville Based Aircraft	Five-County Registered Aircraft	% of Registered Aircraft Based at Gainesville Municipal
1995	30	984	3.05%
1996	35	1,021	3.43%
1997	59	1,034	5.71%
1998	59	1,104	5.34%
1999	59	1,154	5.11%
2000	59	1,217	4.85%
2001	59	1,281	4.61%
2002	70	1,298	5.39%
2003	69	1,376	5.01%
2004	70	1,420	4.93%
Constant Market Share Projection			
2010	81	1,650	4.93%
2015	91	1,850	4.93%
2025	113	2,300	4.93%
Increasing Market Share Projection			
2010	100	1,650	6.06%
2015	129	1,850	7.00%
2025	204	2,300	8.88%
<i>Sources: FAA TAF</i>			

As presented in the table, the first based aircraft forecast considers that the airport would maintain a constant market share (4.93 percent) of the region's registered aircraft. This projection would yield 81 aircraft based at the airport in 2010, 91 aircraft in 2015, and 113 aircraft in 2025. The second forecast considers an increasing market share. This projection would yield 100 aircraft based at the airport in 2010, 129 aircraft in 2015, and 204 aircraft in 2025.

Regression analysis was also conducted on the data sets. When comparing based aircraft as the dependant variable to time, an "r²" value of 0.75 resulted. As discussed previously, it is optimal to have an "r²" value above 0.95, which would represent a very strong correlation; however, the projections do appear to be in line with

historical based aircraft trends. When comparing based aircraft to the regional population, an "r²" value of 0.80 resulted. Since the correlation is not as strong as desired, the resulting regression analysis is presented, but is considered the least when determining the forecast based aircraft.

The FAA TAF also contains projections of based aircraft. In 2010, 76 based aircraft are forecast. In 2015 and 2025, 81 and 94 based aircraft are forecast. Considering the historical trend of growth at Gainesville Municipal Airport, this forecast appears to be on the low end. If the airport is able to construct the necessary airside and landside elements it is reasonable to assume that the based aircraft forecast will be somewhat higher than the TAF forecast.



Another method of projecting based aircraft is to simply analyze the historical growth rate of based aircraft at the airport. The TAF report shows that there were 35 based aircraft in 1980, and 70 in 2004. This equates to an annual growth rate (AGR) of 2.8 percent. The forecast result is 83, 95 and 125 based aircraft for the planning horizons. When examining the data for 1995 to 2004 the AGR is 8.8 percent. This results in 116, 178, and 415 based

aircraft over the planning horizon. This would be a very high forecast and is the result of the recent enhancements to the airfield in terms of available hangars and pilot services. Because these two historical growth rate numbers appear to be statistical outliers a more moderate AGR of 5.8 percent is used. This results in a based aircraft forecast of 98, 130 and 229 over the planning period. **Table 2H** presents the historical growth rate analysis.

TABLE 2H			
Historical Growth Rate for Based Aircraft			
Gainesville Municipal Airport			
Forecast Year	Annual Growth Rate 1995-2004	Annual Growth Rate 1980-2004	Average Annual Growth Rate
	8.80%	2.80%	5.80%
2010	116	83	98
2015	178	95	130
2025	415	125	229

Table 2J shows a summary of the six forecasting methods analyzed for the based aircraft projection. **Exhibit 2D** visually graphs the trend lines for the forecast methods as well as the selected forecast. Cost-effective, safe, efficient, and orderly development of an airport should rely more upon actual demand at

an airport than a time-based forecast figure. Thus, in order to develop a master plan that is demand-based rather than time-based, a series of planning horizon milestones has been established that takes into consideration the reasonable range of based aircraft projections.

TABLE 2J			
Based Aircraft Projections			
Gainesville Municipal Airport			
FORECAST YEAR	2010	2015	2025
Regression Analysis			
Trend Line ($r^2=0.75$)	98	118	158
vs. Population ($r^2=0.80$)	97	116	158
Market Share of Five-County Registered Aircraft			
Constant Share	81	91	113
Increasing Share	100	129	204
FAA TAF	76	81	94
Historical Growth Rate (5.8%)	98	130	229
Selected Based Aircraft Forecast	90	110	150

The milestones were developed considering the potential of attracting additional based aircraft, not only providing timely goals. In actuality, the milestones may be higher than the median forecast range. By planning for a slightly higher level of aircraft, the plan can accommodate unexpected shifts, or changes, in the area's aviation demand. This will allow City officials to respond to unexpected changes in a timely manner. As a result, these milestones provide flexibility, while potentially extending this plan's useful life if aviation trends slow over the period.

The most important reason for utilizing milestones is that they allow the airport to develop facilities according to need generated by actual demand levels. The demand-based schedule provides flexibility in development, as development schedules can be slowed or expedited according to actual demand at any given time over the planning period. The resultant plan provides city officials with a financially-responsible and need-based program. The planning horizons for based aircraft that will be utilized for the remainder of this master plan are as follows:

- Short Term 90
- Intermediate Term 110
- Long Term 150

**BASED AIRCRAFT
FLEET MIX PROJECTION**

Knowing the aircraft fleet mix expected to utilize the airport is necessary to properly plan facilities that will best

serve the level of activity and the type of activities occurring at the airport.

The existing based aircraft fleet mix is comprised of forty-six single engine, fifteen multi-engine piston-powered aircraft, six jet-powered aircraft, two helicopters and an ultralight.

As detailed previously, the national trend is toward a larger percentage of sophisticated turboprop, jet aircraft, and helicopters in the national fleet. Active multi-engine piston aircraft are expected to be the only category of aircraft which shows a decrease in annual growth. Growth within each based aircraft category at the airport has been determined by comparison with national projections (which reflect current aircraft production) and consideration of local economic conditions.

The projected trend of based aircraft at Gainesville Municipal Airport includes a growing number of single and multi-engine aircraft and turboprop aircraft. Growth in turbojet aircraft is also expected to be strong. The based aircraft fleet mix projection for Gainesville Municipal Airport is summarized in **Table 2K**.

Currently, single-engine aircraft compose the largest segment of aircraft at Gainesville Municipal Airport, making up 66 percent of total based aircraft. The future based aircraft mix will continue to be dominated by single-engine aircraft, however turboprop, turbojet, and helicopters have all been forecast to increase. With the new improvements to the airport, including

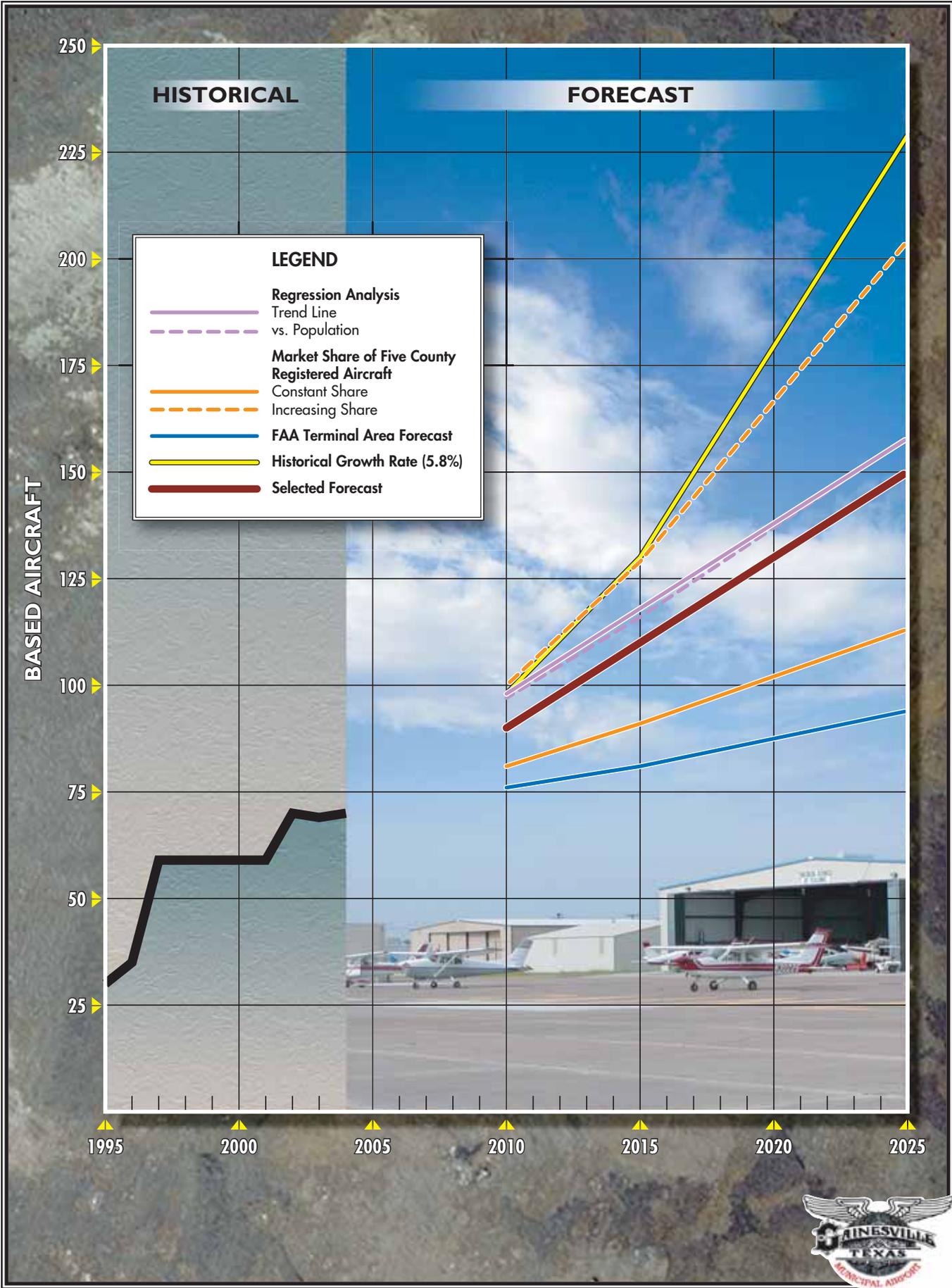


Exhibit 2D
BASED AIRCRAFT FORECASTS

the runway extension to 6,000 feet, as well as a growth in population and employment in Cooke County, it is

reasonable to expect jets and other turbo-powered aircraft to base at Gainesville Municipal Airport.

Aircraft Type	EXISTING		FORECAST					
	2004	%	Short Term	%	Inter. Term	%	Long Term	%
Single Engine	46	65.71%	61	67.78%	75	68.18%	105	70.00%
Multi-Engine	15	21.43%	15	16.67%	15	13.64%	17	11.33%
Turboprop	0	0.00%	2	2.22%	4	3.64%	6	4.00%
Jet	6	8.57%	8	8.89%	10	9.09%	14	9.33%
Helicopters	2	2.86%	3	3.33%	5	4.55%	7	4.67%
Sport/Other	1	1.43%	1	1.11%	1	0.91%	1	0.67%
Totals	70	100.00%	90	100.00%	110	100.00%	150	100.00%

Source: FAA 5010, Coffman Associates analysis

GENERAL AVIATION ANNUAL OPERATIONS

There are two types of operations at an airport: local and itinerant. A local operation is a takeoff or landing performed by an aircraft that operates within sight of the airport, or which executes simulated approaches or touch-and-go operations at the airport. Itinerant operations are those performed by aircraft with a specific origin or destination away from the airport. Generally, local operations are characterized by training operations. Typically, itinerant operations increase with business and commercial use, as business aircraft are used primarily to carry people from one location to another.

Due to the absence of an airport traffic control tower, actual annualized operational counts are not available for Gainesville Municipal Airport. For a historical reference, only general estimates of aircraft operations for the

airport are available. Historical aircraft operations for the airport have been assimilated from FAA Form 5010, AirportIQ.com, TxDOT's Airport Development Worksheet, and airport staff interviews.

Projections of annual operations have been developed by examining the number of operations per based aircraft. In attempts to quantify more reliably than simply estimating airport operations, the Texas Department of Transportation-Aviation Division (TxDOT) has established an ongoing operations monitoring system. The goal of this program is to ultimately establish a model that will provide more accurate counts.

TxDOT's model indicates that for airports similar to Gainesville Municipal Airport, annual operations typically equate to approximately 300 operations (200 local + 100 itinerant) per based aircraft. Airports with higher training operations (local operations)

will have a higher operation per based aircraft ratio, whereas airports with a higher percentage of transient aircraft operations will have a lower ratio. Airports in major metropolitan areas with high numbers of based aircraft, flight schools, and several fixed based operators typically will run upwards of 500 operations per based aircraft and a

60/40 split between local and itinerant operations. Gainesville Municipal Airport experiences approximately two-thirds of its operations as local, with the remaining one third, itinerant operations. **Table 2L** presents historical and forecast operations for Gainesville Municipal Airport.

TABLE 2L					
General Aviation Operations per Based Aircraft Projections					
Gainesville Municipal Airport					
Period	Based Aircraft	Itinerant Operations	Local Operations	Annual Operations	Operations per Based
2004	70	6,700	13,400	20,100	287
<i>Constant Ratio Projection</i>					
Short Term	90	9,000	18,000	27,000	300
Intermediate Term	110	11,000	22,000	33,000	300
Long Term	150	15,000	30,000	45,000	300
<i>Source: TxDOT Operations Model</i>					

Military Operations

Military operations account for a small portion of operations at Gainesville Municipal Airport. According to interviews with airport staff and the FAA Form 5010 there are approximately 100 military operations on an annual basis at the airport. These operations typically consist of some helicopters conducting minimal training exercises or refueling.

Fractional Ownership and Charter Operations

In the post 9/11 environment, many executives have opted to use private jets for their travel needs. Fractional Ownership programs were well positioned to meet this growing demand. There are a number of

companies including Citation Shares, Executive Jet Aviation (ExecuJet), and Flight Options which provide this service. Executives or individuals are able to purchase partial ownership, typically one-sixteenth of an aircraft. This gives them a certain allotment of time to use an aircraft in the fractional ownership fleet. In this regard, fractional ownership is much like owning a timeshare. From September 2003 to September 2004, there were 22 operations by fractional-ownership companies.

Fractional-ownership industry analyst, Aviation Resource Group, has forecast continued growth of approximately 15 percent per year. For forecasting purposes, a moderately increasing trend of 10 percent per year will be applied. By the long term forecast, fractional ownership operations will account for

148 annual operations at Gainesville Municipal Airport.

In addition to fractional-ownership programs, Gainesville Municipal Airport also attracts charter operations.

During the same one-year time period, there were 28 charter operations. By the long term forecast, charter operations would account for 188 annual operations. This information is included in **Table 2M**.

TABLE 2M								
Total Operations Forecast by Category								
Gainesville Municipal Airport								
Year	Based AC	GA Itinerant Operations	GA Local Operations	Total GA Operations	Military Itinerant	Fractional-Ownership	Charter Operations	Annual Operations
2004	70	6,700	13,400	20,100	100	22	28	20,250
Forecast								
2010	90	9,000	18,000	27,000	100	35	45	27,180
2015	110	11,000	22,000	33,000	100	57	73	33,230
2025	150	15,000	30,000	45,000	100	148	188	45,436

Source: 2004-TxDOT Operations Model (300 operations per based aircraft).

PEAKING CHARACTERISTICS

Many airport facility needs are related to the levels of activity during peak periods. The periods used in developing facility requirements for this study are as follows:

1. **Peak Month** - The calendar month when peak aircraft operations occur.
2. **Design Day** - The average day in the peak month. This indicator is derived by dividing the peak month operations by the number of days in the month.
3. **Busy Day** - The busy day of a typical week in the peak month.
4. **Design Hour** - The peak hour within the design day.

Without an airport traffic control tower, adequate operational information is not

available to directly determine peak general aviation operational activity at the airport. Therefore, peak period forecasts have been determined according to trends experienced at similar airports.

Typically, the peak month for activity at general aviation airports approximates 10 to 15 percent of the airport's annual operations. For planning purposes, peak month operations have been estimated as 12 percent of annual operations at Gainesville Municipal Airport. The design day operations were calculated by dividing the peak month by 30.

The busiest day of each week accounts for approximately 20 percent of weekly operations. Thus to determine the typical busy-day, the design day is multiplied by 1.4, which represents 20 percent of the days in a week ($7 * 0.2$). Design hour operations were determined using an industry standard

of 17.5 percent of the design day operations. The general aviation

peaking characteristics are summarized in **Table N**.

TABLE 2N				
Peak Operations Forecasts				
Gainesville Municipal Airport				
	Current	Short Term	Intermediate Term	Long Term
Annual Operations	20,250	27,180	33,230	45,436
Peak Month (12%)	2,430	3,262	3,988	5,452
Busy Day	113	152	186	254
Design Day	81	109	133	182
Design Hour (17.5%)	14	19	23	32

ANNUAL INSTRUMENT APPROACHES (AIAs)

An instrument approach, as defined by the FAA, is “an approach to an airport with the intent to land by an aircraft in accordance with an Instrument Flight Rule (IFR) flight plan, when visibility is less than three miles and/or when the ceiling is at or below the minimum initial approach altitude.” To qualify as an instrument approach at Gainesville Municipal Airport, aircraft must land at the airport after following one of the published instrument approach procedures. Forecasts of annual instrument approaches (AIAs) provide guidance in determining an airport’s requirements for navigational aid facilities. It should be noted that practice or training approaches do not count as annual AIAs

Typically, AIAs for airports with available instrument approaches utilized by advanced aircraft will average between one and two percent of

itinerant operations. For forecasting, a ratio of 2 percent of itinerant operations has been applied to project the short, intermediate and long term AIAs. Two percent has been an accepted industry standard for general aviation airports that currently or are expected to support corporate jet aircraft which is projected for Gainesville Municipal Airport over the planning period.

Table 2P summarizes forecast AIA’s for the planning period.

In the future, Gainesville Municipal Airport will be increasingly utilized by larger and more sophisticated aircraft. Also, the increased availability of low-cost navigational equipment could allow for smaller and less sophisticated aircraft to utilize instrument approaches. National trends indicate an increasing percentage of annual approaches given the greater availability of approaches at airports with GPS and the availability of more cost effective equipment.

TABLE 2P			
Annual Instrument Approach (AIAs) Projections			
Gainesville Municipal Airport			
Year	AIA's	Itinerant Operations	Ratio
Short Term	184	9,200	2.00%
Intermediate Term	224	11,200	2.00%
Long Term	308	15,400	2.00%

Source: FAA Terminal Area Forecast - Approach Operations

SUMMARY

This chapter has provided demand based forecasts of aviation activity at Gainesville Municipal Airport over the next 20 years. An attempt has been made to define the projections in terms of short, intermediate and long term expectations. Elements such as the local socioeconomic indicators, anticipated regional development and historical aviation data as well as national aviation trends were all

considered when determining future conditions.

The next step in the master planning process will be to assess the capacity of existing facilities, their ability to meet forecast demand, and to identify changes to the airfield and/or landside facilities which will create a more functional aviation facility. A summary of aviation forecasts is depicted on **Exhibit 2E**.

2004	Short Term	Intermediate Term	Long Term
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BASED AIRCRAFT FORECASTS

Single Engine	46	61	75	105
Multi-Engine	15	15	15	17
Turboprop	0	1	2	3
Jet	6	9	13	20
Helicopters	2	3	4	4
Ultralight	1	1	1	1
Total Based Aircraft	70	90	110	150

OPERATIONS FORECASTS

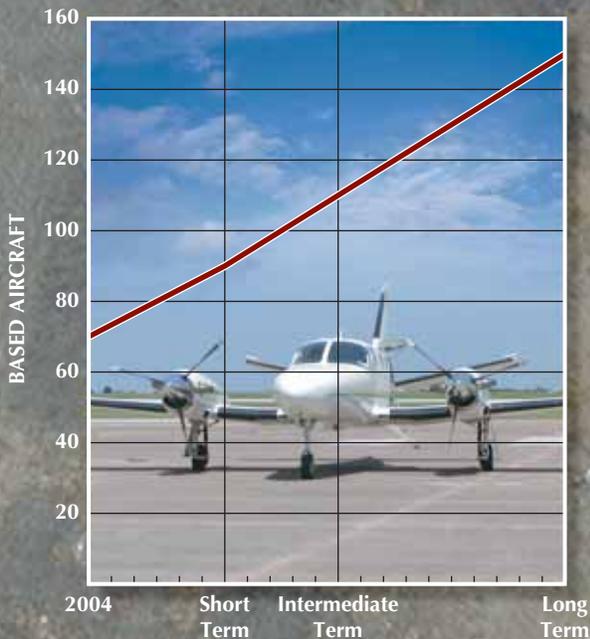
Itinerant	6,900	9,200	11,200	15,400
Local	13,400	18,000	22,000	30,000
Total Annual Operations	20,300	27,200	33,200	45,400

PEAK OPERATIONS

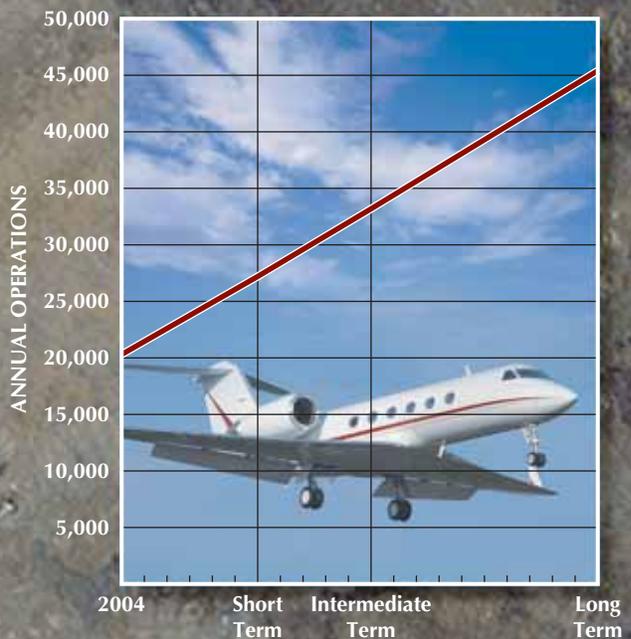
Peak Month	2,430	3,262	3,988	5,452
Busy Day	113	152	186	254
Design Day	81	109	133	182
Design Hour	14	19	23	32

AIA's	138	184	224	308
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BASED AIRCRAFT FORECASTS



OPERATIONS FORECASTS





Chapter Three

AIRPORT FACILITY REQUIREMENTS

AIRPORT FACILITY REQUIREMENTS



To properly plan for the future of Gainesville Municipal Airport, it is necessary to translate forecast aviation demand into the specific types and quantities of facilities that can adequately serve this identified demand. This chapter uses the results of the forecasts conducted in Chapter Two, as well as established planning criteria, to determine the airfield (i.e., runways, taxiways, navigational aids, marking and lighting) and landside (i.e., hangars, aircraft parking apron, and automobile parking) facility requirements.

The objective of this effort is to identify, in general terms, the adequacy of the existing airport facilities, outline what new facilities may be needed, and when these may be needed to accommodate forecast demands. Having established these facility requirements, alternatives for providing these facilities will be evaluated in Chapter Four, to determine the most cost-effective and efficient means for implementation.



PLANNING HORIZONS

The cost-effective, efficient, and orderly development of an airport should rely more upon actual demand at an airport than on a time-based forecast figure. In order to develop a master plan that is demand-based rather than time-based, a series of planning horizon milestones has been established for Gainesville Municipal Airport that take into consideration the reasonable range of aviation demand projections prepared in Chapter Two.

It is important to consider that the actual activity at the airport may be



higher or lower than projected activity levels. By planning according to activity milestones, the resulting plan can accommodate unexpected shifts, or changes, in the area's aviation demand. It is important that the plan accommodate these changes so that the airport staff can respond to unexpected changes in a timely fashion. These milestones provide flexibility, while potentially extending this plan's useful life if aviation trends slow over time.

The most important reason for utilizing milestones is that they allow the airport to develop facilities according to need

generated by actual demand levels. The demand-based schedule provides flexibility in development, as development schedules can be slowed or expedited according to actual demand at any given time over the planning period. The resulting plan provides airport officials with a financially responsible, need-based program. **Table 3A** presents the planning horizon milestones for each aircraft activity category. The planning milestones of short, intermediate, and long term generally correlate to the five, ten, and twenty-year periods used in the previous chapter.

TABLE 3A			
Planning Horizons			
Gainesville Municipal Airport			
	Short Term	Intermediate Term	Long Term
OPERATIONS			
<i>Itinerant</i>			
Military	100	100	100
Fractional-Ownership	40	60	150
Charter	50	70	190
General Aviation	9,000	11,000	15,000
Total Itinerant	9,190	11,230	15,440
<i>Local</i>			
General Aviation	18,000	22,000	30,000
Total Local	18,000	22,000	30,000
TOTAL OPERATIONS	27,190	33,230	45,440
Annual Instrument Approaches	184	224	308
Total Based Aircraft	90	110	150

Note: Operations are rounded to the nearest tenth.

In this chapter, existing components of the airport are evaluated so that the capacities of the overall system are identified. Once identified, the existing capacity is compared to the planning horizon milestones to determine where deficiencies currently exist or may be expected to materialize in the future. Once deficiencies in a component are

identified, a more specific determination of the approximate sizing and timing of the new facilities can be made.

AIRFIELD REQUIREMENTS

Airfield requirements include the need for those facilities related to the arrival

and departure of aircraft. The adequacy of existing airfield facilities at Gainesville Municipal Airport has been analyzed from a number of perspectives, including:

- Airfield Capacity
- Runways
- Taxiways
- Navigational Approach Aids
- Airfield Lighting, Marking, and Signage

AIRFIELD DESIGN STANDARDS

The selection of appropriate Federal Aviation Administration (FAA) and Texas Department of Transportation (TxDOT) - Aviation Division design standards for the development and location of airport facilities is based primarily upon the characteristics of the aircraft which are currently using, or are expected to use, the airport.

The FAA has established a coding system to relate airport design criteria to the operational and physical characteristics of aircraft expected to use the airport. This code, the airport reference code (ARC), has two components: the first component, depicted by a letter, is the aircraft approach speed (operational characteristic); the second component, depicted by a Roman numeral, is the airplane design group and relates to aircraft wingspan (physical characteristic). Generally, aircraft approach speed applies to runways and runway-related facilities, while aircraft wingspan primarily relates to separation criteria involving taxiways, taxilanes, and landside facilities.

Exhibit 3A depicts typical aircraft within each ARC.

According to FAA Advisory Circular (AC) 150/5300-13, Change 8, *Airport Design*, an aircraft's **approach category** is based upon 1.3 times its stall speed in landing configuration at that aircraft's maximum certificated weight. The five approach categories used in airport planning are as follows:

Category A: Speed less than 91 knots.

Category B: Speed 91 knots or more, but less than 121 knots.

Category C: Speed 121 knots or more, but less than 141 knots.

Category D: Speed 141 knots or more, but less than 166 knots.

Category E: Speed greater than 166 knots.

The **airplane design group (ADG)** is based upon the aircraft's wingspan. The six ADGs used in airport planning are as follows:

Group I: Up to but not including 49 feet.

Group II: 49 feet up to but not including 79 feet.

Group III: 79 feet up to but not including 118 feet.

Group IV: 118 feet up to but not including 171 feet.

Group V: 171 feet up to but not including 214 feet.

Group VI: 214 feet or greater.

CRITICAL AIRCRAFT

The critical aircraft is the largest aircraft or family of aircraft which account for 250 or more operations

annually. Once the critical aircraft is identified, the appropriate airport design standards can be applied.

The design standards have been developed in order to assure that existing and planned facilities will be adequate to meet specific aircraft demands. Gainesville Municipal Airport is currently designated as a *non-MSA Transport Airport* in the *Texas Airport System Plan (TASP)*. In general, transport airports are designed to handle business jet and turboprop aircraft. This designation generally corresponds to a design standard of ARC C-II.

In order to determine facility requirements, an actual ARC should first be determined, then appropriate airport design criteria can be applied. According to the *Policies and Standards* document from TxDOT, the critical aircraft, or aircraft family, must have or be forecast to have at least 250 annual itinerant operations within one year and 500 itinerant operations within five years. To determine if Gainesville Municipal Airport will possibly meet this threshold, a review of the type of aircraft currently using and expected to use Gainesville Municipal Airport follows.

The FAA recommends designing airport functional elements to meet the requirements of the most demanding ARC for that airport. The majority of aircraft currently operating at the airport are small single-engine aircraft weighing less than 12,500 pounds. The airport is also used by corporate aircraft ranging up to 50,000 pounds, such as the Challenger 604. These aircraft

include many business jets and some larger general aviation propeller aircraft.

Defining the actual critical aircraft can sometimes be a difficult task. Typically, the design aircraft is based upon the most demanding aircraft actually based at the airport. Many times, more than one aircraft can compose the critical aircraft. In some cases, one aircraft could be the most critical for approach speed (e.g., ARC C-I), while another for wingspan (e.g., ARC B-III). Considering all aircraft types at the airport is important to ensure all facilities at the airport are properly planned.

For airports similar to Gainesville Municipal Airport, the critical aircraft can often be defined by a family of similar aircraft which operate at the airport on a regular basis. Based aircraft at an airport similar to Gainesville Municipal Airport will account for approximately 300 operations per year according to TxDOT. Given this consideration, the largest of the based aircraft would be the based critical aircraft.

There are currently 15 multi-engine piston aircraft based at the airport. These aircraft range from ARC A-I to ARC B-I. In addition, there are six jets based at the airport. A review of based aircraft at the airport indicates that the most critical aircraft based at the airport is a Cessna Citation II. The Cessna Citation II is a jet aircraft, categorized as ARC B-II. Other based aircraft of note are a Mitsubishi MU2 jet (ARC A-I), Cessna 414 (B-I), and a number of other Cessna jet aircraft in ARC B-I. Responses from the user

A-I



- Beech Baron 55
- **Beech Bonanza**
- Cessna 150
- Cessna 172
- Piper Archer
- Piper Seneca

C-I, D-I



- **Lear 25, 35, 55**
- Israeli Westwind
- HS 125

B-I less than 12,500 lbs.



- Beech Baron 58
- Beech King Air 100
- Cessna 402
- **Cessna 421**
- Piper Navajo
- Piper Cheyenne
- Swearingen Metroliner
- Cessna Citation I

C-II, D-II



- **Gulfstream II, III, IV**
- Canadair 600
- Canadair Regional Jet
- Lockheed JetStar
- Super King Air 350

B-II less than 12,500 lbs.



- **Super King Air 200**
- Cessna 441
- DHC Twin Otter

C-III, D-III



- Boeing Business Jet
- B 727-200
- **B 737-300 Series**
- MD-80, DC-9
- Fokker 70, 100
- A319, A320
- Gulfstream V
- Global Express

B-I, II over 12,500 lbs.



- Super King Air 300
- Beech 1900
- Jetstream 31
- Falcon 10, 20, 50
- Falcon 200, 900
- **Citation II, III, IV, V**
- Saab 340
- Embraer 120

C-IV, D-IV



- **B-757**
- B-767
- DC-8-70
- DC-10
- MD-11
- L1011

A-III, B-III



- DHC Dash 7
- **DHC Dash 8**
- DC-3
- Convair 580
- Fairchild F-27
- ATR 72
- ATP

D-V



- **B-747 Series**
- B-777

Note: Aircraft pictured is identified in bold type.



survey and airport interviews indicate that the owners of these aircraft operate them regularly.

Transient operations are also an important consideration when analyzing the critical aircraft for an airport. Because corporate jet aircraft are usually larger, in terms of weight and wingspan, than piston aircraft, an examination of jet operations at the airport over the last year is presented.

Jet Operations

The airport is also used by larger and faster business jets including the Cessna Citation and Learjet family of aircraft. These jet aircraft are produced in several different model types, with ARCs ranging from ARC B-I to D-II. Although the total jet operations currently do not meet the threshold to warrant a design standard beyond its current classification as ARC B-II, in the future that could change. As a result, an extensive discussion on the jet aircraft in use at the airport will be given.

Table 3B presents private jet operations at Gainesville Municipal Airport from September 29, 2003 to September 30, 2004 (12-month operational count). The data presented in the table includes only operations conducted by privately-owned and operated business jets. As presented in the table, Gainesville Municipal Airport has experienced a total of 332 operations over the last year. The most demanding aircraft in terms of ARC design standard has been the Gulfstream II which is in ARC D-I.

Aircraft such as the Challenger 600 and various Israel Aircraft Industries models such as the Galaxy also utilize the airport and have an ARC of C-I.

It is important to note that these operations present the absolute minimum number of private business jet operations at Gainesville Municipal Airport. Operations are only “logged” if the aircraft executes (either opens or closes) an IFR flight plan on the ground at Gainesville Municipal Airport. Many aircraft operators, however, elect to file their flight plan in the air after departure, or close their flight plan in the air prior to landing at the airport. In either situation, the operations are not credited to the airport and would not be reflected in the table above. Based on this information, it is reasonable to assume that the actual number of private business jet operations at Gainesville Municipal Airport is somewhat higher than presented in the table.

The table also presents the number of operations by aircraft type. The Falcon 20/2000 performed the most business jet operations (96) at the airport. The ARC B-II family of aircraft, which includes the Falcon 20/2000, accounted for more than 56 percent of all business jet operations. Aircraft such as the Beech 400, Hawker and (IAI) Astra, accounted for an additional 26.5 percent of the business jet operations. Overall, more than 82 percent of transient business jet operations at the airport were conducted by aircraft in ARC B-II or greater. This accounts for a total of 274 of the 332 recorded transient jet operations at Gainesville Municipal Airport.

TABLE 3B					
Total Private Jet Operations					
Gainesville Municipal Airport					
September 29, 2003 to September 30, 2004					
ARC	Aircraft Type	Annual Operations	Percent	Number of Jets	Percent
B-I	Cessna 500	20	6.0%	4	6.3%
B-I	Cessna 501	4	1.2%	2	3.1%
B-I	Cessna 525	32	9.6%	6	9.4%
B-I	Mitsubishi (MU-300)	2	0.6%	1	1.6%
Total B-I		58	17.5%	13	20.3%
B-II	Cessna 550	24	7.2%	8	12.5%
B-II	Cessna 560	10	3.0%	3	4.7%
B-II	Cessna 650	24	7.2%	1	1.6%
B-II	Falcon 10	18	5.4%	2	3.1%
B-II	Falcon 20	96	28.9%	15	23.4%
B-II	Falcon 50	10	3.0%	3	4.7%
B-II	Hawker 800	4	1.2%	2	3.1%
Total B-II		186	56.0%	34	53.1%
C-I	Beech 400	12	3.6%	2	3.1%
C-I	Hawker 700	2	0.6%	1	1.6%
C-I	Lear 31	12	3.6%	3	4.7%
C-I	Lear 35	2	0.6%	1	1.6%
C-I	Lear 45	16	4.8%	2	3.1%
Total C-I		44	13.3%	9	14.1%
C-II	Challenger 600	8	2.4%	1	1.6%
C-II	Galaxy/Astra Family	32	9.6%	5	7.8%
Total C-II		40	12.0%	6	9.4%
D-I	Lear 60	2	0.6%	1	1.6%
Total D-I		2	0.6%	1	1.6%
D-II	Gulfstream II	2	0.6%	1	1.6%
Total D-II		2	0.6%	1	1.6%
Total Activity		332	100.0%	64	100.0%

Source: AirportIQ.com utilizing FAA data. 9-29-03 to 9-30-04

Based on interviews with airport staff, there is regular traffic from aircraft in ARC B-II. The Beech Super King Air was identified as an aircraft that makes frequent operations at the airport. This aircraft has an approach speed of 103 knots and a wing span of 54.5 feet. These measures place the Beech Super King Air into ARC B-II.

As presented in **Table 3C**, the airport was utilized by a wide variety of corporate users with varying

originations and destinations. The business and originations/destinations listed are not the only ones for each aircraft, however, they represent the most demanding operations (e.g., longest haul lengths). Most of the private operators over the last year originated from, or were destined to an intrastate location. A large portion of the traffic, however, originated from, or departed to points beyond the State of Texas, including frequent trips to both the east and west coasts.

TABLE 3C**Representative Private Jet Operations
Gainesville Municipal Airport**

			Most Demanding Representative Users	
Aircraft Type	Operations	ARC	Name	Origin/Destination
Falcon 20	8	B-II	Wintergreen Finance Inc.	Mc Ghee Tyson
Falcon 20	4	B-II	Wells Fargo Bank	Fort Worth Meacham
IAI 1124	8	C-II	Wisdon Center Inc.	Nashville, Memphis, El Paso
Falcon 10	6	B-II	Tom Brown Inc.	Midland
Cessna 650	24	B-II	Tailwind East LLC	Duplin, CO., Fort Worth Meacham, Orlando
Falcon 10	12	B-II	Starflight LLC	Lakefront
Cessna 500	10	B-II	Sharon Shay Shelton	Dallas-Love, San Antonio, Eagle County
Falcon 20	8	B-II	Sierra Bravo Graco Inc.	Martin State
Falcon 20	16	B-II	Ross Airplane LLC	McAlester, Wood County, Fort Worth Meacham
Falcon 20	10	B-II	Rogers Enterprises of Idaho	Mena Intl., McCook, Laredo, Sedona
Cessna 525	20	B-I	Molded Fiber Glass Co.	Ashtabula County, Austin, Pueblo
Cessna 550	6	B-II	Mixed Wing LLC	Boise, Port Isabel
IAI 1124	10	C-II	Mike Murdock Evangelistic	Leesville, Shreveport, Charlotte, Jacksonville
Falcon 20	8	B-II	Jeff Gordon Inc.	Houston-Hobby, Teterboro, Fort Worth
Lear 31A	6	C-I	Gurley Jeep, Oldsmobile, Cadillac	Chicago-Midway, McCarran, Page Field
Falcon 20	6	B-II	Goody's Family Clothing, Inc.	McGhee Tyson
Beech 400	6	B-II	Florida Air, Inc.	Jacksonville, Gallatin
Challenger 600	8	C-II	Fleet National Bank	Adams Field, Scottsdale, Dallas-Love
Falcon 20	10	B-II	American Jet Air Medical Corp.	Lakeland, Denton, Houston-Hobby
Lear 45	12	C-I	Airsouth Inc.	McKinney, Springdale
Other Jet	134	B-I/D-II		
Total	332			

IAI 1124: Israel Aircraft Industries

Source: AirportIQ.com utilizing FAA data. September 29, 2003 - September 30, 2004

Another segment of corporate aircraft users operates under F.A.R. Part 135 (air taxi) rules for hire and through fractional-ownership programs. Air taxi operators are governed by FAA rules which are more stringent than those required for private aircraft owners, and are generally considered charter operators. Fractional-ownership

operators are actual aircraft owners who acquire a portion of an aircraft with the ability to use any aircraft in the program's fleet. These programs have become quite popular over the last several years, especially since 9-11. Some of the most notable fractional-ownership programs include Executive Jet Aviation, Bombardier Business Jet

Solutions, Citation Shares, and Flight Options. From September of 2003, to September of 2004, these operators accounted for 50 additional operations. The majority of the aircraft used by fractional and air taxi operators are in ARC B-II or larger.

Considering the last year's operations by private and air taxi/fractional ownership operations, the airport's current critical aircraft should consider the full range of Cessna Citation models. These were commonly-used aircraft at the airport. These aircraft range up to ARC B-II. By far the most common jet aircraft operated at the airport was the Falcon 20 (200), also included in ARC B-II. More than 80 operations by aircraft in ARC categories greater than B-II were also conducted.

It is likely that Gainesville Municipal Airport will be frequented by larger corporate aircraft on the order of 250 or more operations per year, within the planning period, as factors presented above influence potential demand. Over the last year, there was a minimum of 382 annual jet operations at the airport (332 private, plus 50 fractional/air taxi). Of those, approximately 18 percent fall in ARC C-I and above. Utilization of corporate aircraft has become a cost-effective manner in which to transport executives and other personnel. The cost benefit can be attributed to the newer, fuel-efficient jet aircraft which can close the expense gap between the seat on the corporate jet versus the seat on the commercial carrier. Other benefits such as significant time savings and on-call convenience make it a very attractive alternative.

As previously discussed, one of the most visible trends in general aviation today is the growth of fractional-ownership programs. Planning for fractional-ownership aircraft is difficult as it is an on-demand service, however, since these aircraft currently operate at the airport, planning should consider meeting the needs of the majority of highly-utilized fractional-ownership aircraft. These aircraft range up to ARC D-III. Thus, future facility planning should include the potential for the airport to be utilized by the majority of business jets on the market, although not necessarily to the D-III standard.

In order to identify the critical aircraft which will make at least 250 annual operations, it is necessary to analyze what type of aircraft corporate operators might base at and/or utilize at Gainesville Municipal Airport on a regular basis. It can be expected that the majority of corporate aircraft utilizing the airport in the future will be turboprop aircraft and business jet aircraft ranging up to ARC C/D-II (e.g., Cessna Citation). It can also be expected that business jet usage will increase above the 250 annual operational level which is used to identify the critical aircraft.

The previous chapter indicated that 14 business jets are forecast to be based at the airport in the long range planning period. Thus, the combination of operations by based business jet aircraft, along with transient corporate jet operations, will determine the critical aircraft for the airport.

As previously mentioned, most of all active business jets fall within ARC B-II. The remainder range up to ARC D-II. It is unlikely that the airport will base, or be used on a frequent basis (250 times annually) by ARC D-II business jets, however, the airport will be increasingly utilized by ARC C/D-II such as Learjets and Hawkers. Moreover, it is very likely that aircraft in ARC C-I through D-II categories such as the G-III, G-IV, Challenger 600, or Sabre 65 will increasingly utilize the airport over the planning period.

Critical Design Aircraft Conclusion

Based upon operational estimates, it is the transient jet traffic that meets the threshold of 250 operations per year. More than 82 percent of these operations are by aircraft in ARC B-II or greater. Thus, the current critical aircraft at the airport is in design group B-II.

In the short term, the critical aircraft can be expected to transition to C-II. Future aircraft mix can expect to include a larger percentage of corporate aircraft. Increased corporate aircraft utilization is typical at general aviation airports surrounded by growing or established population and employment centers. Once utilized only by large conglomerate-type corporations, corporate aircraft (especially jets) have been increasingly utilized by a wider variety of companies. FAA trends indicate that businesses are increasingly utilizing corporate aircraft. This is also evident by the substantial growth of fractional ownership

programs. The fractional-ownership programs have recently announced increased numbers of aircraft owners to meet this growing demand.

As the Dallas/Fort Worth Metroplex continues to expand to the north, Cooke County can expect positive population and employment growth. This trend will position the airport well for serving the growing business community. In addition, Gainesville Municipal Airport has already developed a reputation in the general aviation community for a clean, attractive airport, with highly competitive fuel prices. Other amenities such as the availability of courtesy cars, also attracts air traffic.

Given all these considerations, the current planning should conform to ARC B-II to accommodate existing based aircraft, as well as itinerant business jet use. Ultimate planning, however, should conform to at least ARC C/D-II to meet the needs of business aircraft up to and including the G-IV. It should be noted that aircraft in ARC D-III require substantially more design criteria. For this reason, airfield design may not be capable of fully accommodating these aircraft. Analysis presented below will consider the airfield requirements, including runway lengths required by both C-II and D-II aircraft.

It is not necessary to develop the entire airport to ARC C/D-II standards. The primary runway would need to be capable of accommodating the largest aircraft and should be planned to C/D-II standards. The crosswind runway provides wind coverage for small aircraft. Therefore, it is recommended

that ARC B-II design standards be applied to the ultimate design and development of the secondary runway at the airport.

The airfield facility requirements outlined in this chapter correspond to the design standards described in FAA's Advisory Circular 150/5300-13, Change 8, *Airport Design*. The following airfield facilities are outlined to describe the scope of facilities that would be necessary to accommodate the airport's role throughout the planning period. To assist in determining future requirements for the airport, the remainder of this chapter identifies airfield and landside requirements for the primary and secondary runway.

AIRFIELD CAPACITY

A demand/capacity analysis measures the capacity of the airfield facilities (i.e., runways and taxiways) in order to identify and plan for additional development needs. The capacity of the airport's two-runway system can provide up to 230,000 annual operations. FAA Order 5090.3B, *Field Formulation of the National Plan of Integrated Airport Systems (NPIAS)*, indicates that improvements should be considered when operations reach 60 percent of the airfield's annual service volume (ASV). If the projected long range planning horizon level of operations comes to fruition (45,440), the airfield's ASV will not exceed the 60 percent level. Thus, additional airfield capacity enhancements are not required.

RUNWAYS

The adequacy of the existing runway system at Gainesville Municipal Airport has been analyzed from a number of perspectives, including runway orientation, runway length, pavement strength, width, and safety standards. From this information, requirements for runway improvements were determined for the airport.

Runway Orientation

The airport is served by two runways. Primary Runway 17-35 is orientated in a north-south manner. For the operational safety and efficiency of an airport, it is desirable for the primary runway to be oriented as close as possible to the direction of the prevailing wind. This reduces the impact of wind components perpendicular to the direction of travel of an aircraft that is landing or taking off (defined as a crosswind).

FAA Advisory Circular 150/5300-13, Change 8, *Airport Design*, recommends that a crosswind runway should be made available when the primary runway orientation provides for less than 95 percent wind coverage for specific crosswind components. The 95 percent wind coverage is computed on the basis of the crosswind component not exceeding 10.5 knots (12 mph) for ARC A-I and B-I; 13 knots (15 mph) for ARC A-II and B-II; 16 knots (18 mph) for ARC C-I through D-II; and 20 knots for ARC A-IV through D-VI.

Wind data specific to the airport was not available, however, data for Dallas/Fort Worth International Airport (1988-1997) provides adequate information for use in this study. This data is graphically depicted on the wind rose in **Exhibit 3B**.

As depicted on the exhibit, primary Runway 17-35 provides 96.02 percent wind coverage for 10.5 knot crosswinds, 98.14 percent at 13 knots, and 99.48 percent at 16 knots. Runway 12-30 provides 85.95 percent wind coverage at 10.5 knots and as the wind increases the coverage increases. Both runways combined provide for 98.92 percent wind coverage at 10.5 knots and 99.92 percent coverage at 16 knots.

Although Runway 17-35 exceeds the 95 percent wind coverage threshold, Runway 12-30 should be maintained through the planning period. Runway 12-30 can serve as the crosswind runway during wind conditions, but is more likely to be needed during closures or construction on the primary runway.

The analysis indicates that the existing runway system provides adequate crosswind coverage for all aircraft. It should be noted, however, due to geographical differences, this data could be somewhat different from what is actually experienced in Gainesville. Without more applicable information, however, a site-specific determination cannot be made. Thus, based on the analysis using the best available information, future plans for an additional crosswind runway do not need to be considered.

Runway Length

The determination of runway length requirements for the airport is based on five primary factors:

- Critical aircraft type expected to use the airport.
- Stage length of the longest nonstop trip destination.
- Mean maximum daily temperature of the hottest month.
- Runway gradient.
- Airport elevation.

An analysis of the existing and future fleet mix indicates that large business jets will continue to be the most demanding aircraft on runway length at Gainesville Municipal Airport. Currently, there are six business jets based at the airport, and many transient jet operations occur at the airport. The typical itinerant business aircraft range from the Cessna Citation family, to Learjets, to Falcons as presented previously in **Tables 3B and 3C**.

Aircraft operating characteristics are affected by three primary factors: the mean maximum daily temperature of the hottest month, the airport's elevation, and the gradient of the runway. An increase in the maximum difference in runway centerline elevation increases the runway requirement in large aircraft weighing

less than 60,000 pounds, while an increase in haul length of airplanes weighing more than 60,000 pounds will also increase runway lengths for these aircraft.

The mean maximum daily temperature of the hottest month for Gainesville Municipal Airport is 96 degrees Fahrenheit (F). The airport elevation is 839 feet above mean sea level (MSL). The elevation difference for Runway 17-35 is 48.9 feet, and for Runway 12-30, it is 34 feet. Runway 17-35 has a longitudinal gradient of 0.94 percent and Runway 12-30 is 0.96 percent. For aircraft in approach categories A and B, the runway longitudinal gradient cannot exceed two percent. For aircraft in approach categories C and D, the maximum longitudinal grade is 1.5 percent.

Table 3D outlines the runway length requirements for various classifications of aircraft that utilize Gainesville Municipal Airport. These standards were derived from the *FAA Airport Design Computer Program* for recommended runway lengths. As with other design criteria, runway length requirements are based upon the critical aircraft or grouping of aircraft with at least 250 annual operations.

Based upon the forecast of aircraft fleet mix through the long range planning period, Gainesville Municipal Airport should be designed to accommodate, at a minimum, 75 percent of business jet aircraft at 60 percent useful load, which typically correlates to ARC C-II aircraft.

According to the FAA design program, to fully accommodate 75 percent of

these aircraft at 60 percent useful load, the runway length should be at least 5,380 feet. To accommodate 100 percent of business jets at 60 percent useful load (generally correlating to ARC D-II), the runway should be 6,490 feet long. Currently Runway 17-35 is 6,000 feet, which falls short of the requirements of ARC C/D-II business jet aircraft.

The program also provides an estimation of runway lengths for general aviation aircraft weighing more than 60,000 pounds. This group includes the Gulfstream family of aircraft and some new long-range corporate jets. The estimate of runway length requirements for the large corporate aircraft over 60,000 pounds considers all airfield data, but also considers the typical haul distance for up to 1,000 miles. As indicated in **Table 3D**, aircraft weighing more than 60,000 pounds, with haul lengths of 1,000 miles, require a runway approximately 6,300 feet long.

It is important, then, to examine the runway length requirements of specific aircraft currently utilizing or planned to utilize Gainesville Municipal Airport in the future. **Table 3E** presents the runway length needs (for both take-offs and landings on a contaminated runway such as very heavy rain, ice, or snow) for a wide variety of business jets. Figures in the table consider maximum take-off and landing weights. It should be noted that landings during contaminated runway conditions increase significantly for aircraft with single landing gear configurations due to hydroplaning potential.

ALL WEATHER WIND COVERAGE

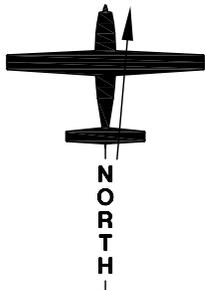
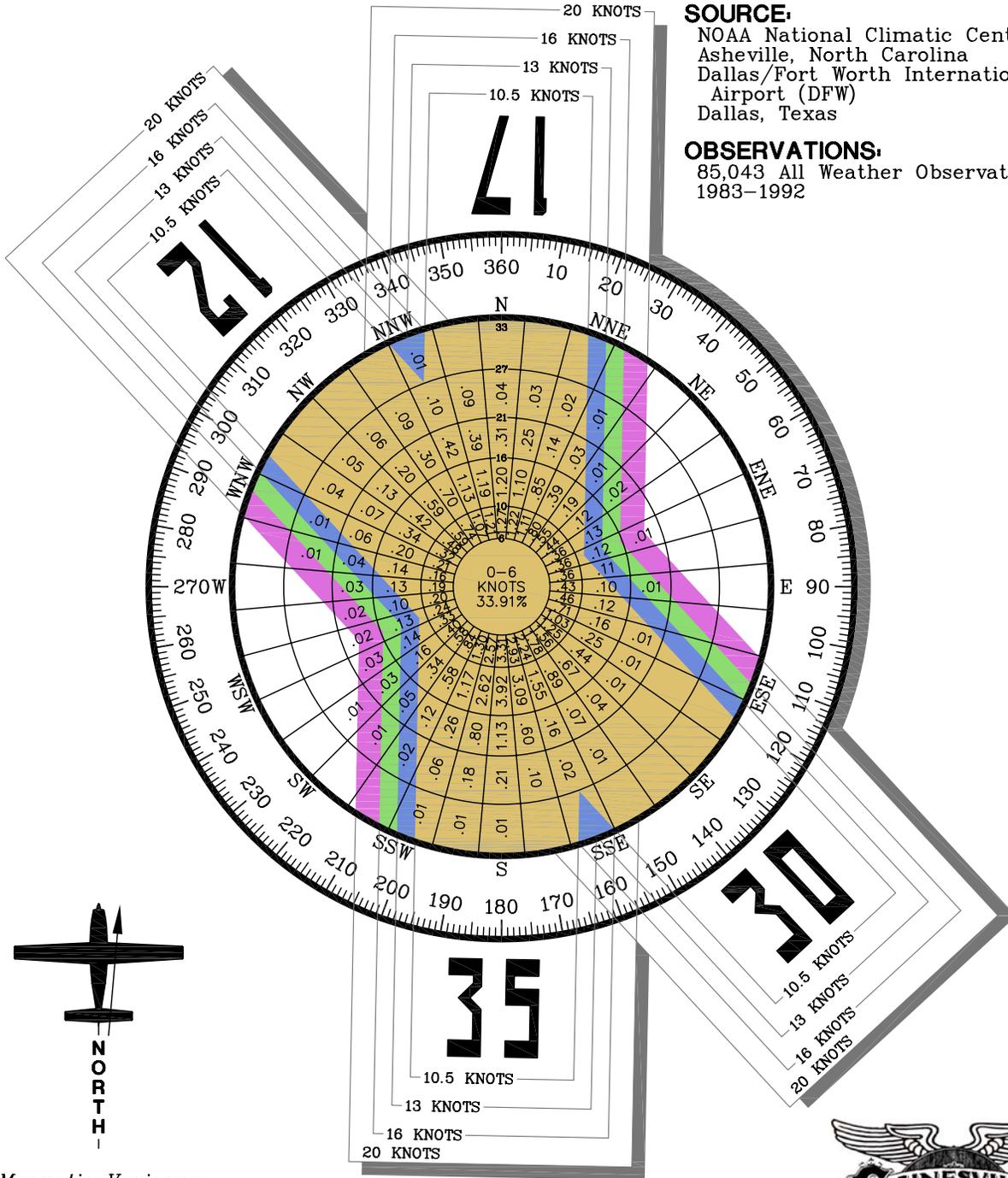
Runways	10.5 Knots	13 Knots	16 Knots	20 Knots
Runway 12-30	85.95%	93.15%	97.96%	99.60%
Runway 17-35	96.02%	98.14%	99.48%	99.87%
Combined	98.92%	99.63%	99.92%	99.99%

SOURCE:

NOAA National Climatic Center
 Asheville, North Carolina
 Dallas/Fort Worth Internation
 Airport (DFW)
 Dallas, Texas

OBSERVATIONS:

85,043 All Weather Observations
 1983-1992



Magnetic Variance
 04° 59' East (April 2005)
 Annual Rate of Change
 00° 07' West (April 2005)



TABLE 3D	
Runway Length Requirements	
Gainesville Municipal Airport	
AIRPORT AND RUNWAY DATA	
Airport elevation	839 feet
Mean daily maximum temperature of the hottest month	96.00 F
Maximum difference in runway centerline elevation	49 feet
Length of haul for airplanes of more than 60,000 pounds	1,000 miles
Dry runways	
RUNWAY LENGTHS RECOMMENDED FOR AIRPORT DESIGN	
Small airplanes with less than 10 passenger seats	
75 percent of these small airplanes	2,900 feet
95 percent of these small airplanes	3,400 feet
100 percent of these small airplanes	4,100 feet
Small airplanes with 10 or more passenger seats	4,600 feet
Large planes of 60,000 pounds or less	
75 percent of business jets at 60 percent useful load	5,400 feet
100 percent of business jets at 60 percent useful load	6,500 feet
Airplanes of more than 60,000 pounds	6,300 feet
<i>Source: FAA Airport Design Computer Program utilizing Chapter Two of AC 150/5325-4A, Runway Length Requirements for Airport Design.</i>	

In general, the data specific to each airplane presented in **Table 3E** is similar to the generalized output by the FAA computer program (presented in **Table 3D**). Obviously, airport planning cannot always conform to the worst case (maximum load) scenario. Planning should at least conform to providing a runway length capable of accommodating the majority of aircraft, the majority of the year. In other words, the runway should be capable of handling business jets with typical weight loading during moderate heat conditions.

Several aircraft which currently utilize the airport on an infrequent basis require runway lengths longer than 6,000 feet. The Lear 35, Gulfstream II, Hawker, and Challenger require up to 7,000 feet. Many of these aircraft will be capable of operating at the airport but will be weight restricted during hot

weather days. Weight restrictions can include taking less fuel and making an additional stop along the intended route, boarding fewer passengers, or taking less cargo. During cooler days, the weight restrictions could be minor or may be unnecessary.

Given the need to accommodate the majority of business aircraft, consideration will be given to providing a runway length of at least 6,500 feet (100 percent at 60 percent useful load). This length would better suit many business jet operators during hot periods, allowing them greater operational flexibility. This length would also be more attractive to potential businesses in Cooke County. This also holds true for the attraction of fractional-ownership aircraft operators. Available runway length is a primary issue in site selection by corporate pilots.

TABLE 3E Business Jet Runway Length Requirements Gainesville Municipal Airport			
Aircraft Type	Runway Length Required for (in feet)		
	Take-off @ 95° F	Landings on Dry Runway	Landings on Contaminated Runway
Beechjet 400	5,900	4,500	6,000
Canadair Challenger CL600	6,500	5,500	7,000
Cessna 550	5,500	2,900	6,000
Cessna 650	6,000	5,300	6,100
G-IV	7,000	5,400	6,200
Hawker 125-700/800	7,000	4,000	6,000
Hawker 1000	6,500	5,000	5,600
Isreal Aircraft Industries			
- Astra SPX	7,000	5,000	5,000
- Westwind	6,500	3,500	7,000
Lear			
- 35	6,000	3,400	7,000
- 55	7,100	3,200	6,400

Source: Aircraft operating manuals

Analysis in the next chapter will examine potential runway extensions that could be achieved. The analysis will factor constraints which could hinder runway extension including roads, environmental considerations, and costs. It is important to note that TxDOT and the FAA will require specific justification for the runway to be extended. The type of aircraft, its specific runway requirements and frequency of operation will need to be provided for funding assistance. Therefore, current record-keeping of business jet operators should be enhanced to include company names, aircraft types, and frequency of operation at the airport. Also, airport administration should request that corporate aircraft operating at the

airport provide, in writing, their established runway length requirements.

Runway 12-30 should remain a B-II runway with the ability to accommodate 100 percent of small airplanes. In this case, the FAA computer program calls for a runway of at least 4,100 feet in length. Runway 12-30 exceeds this design requirement, thus its current length should be maintained.

Runway Width

Runway 17-35 is currently 100 feet wide and Runway 12-30 is 80 feet wide. FAA design standards call for a runway width of 75 feet to serve aircraft up to

ARC B-II, as long as the instrument approach minimums are greater than three-quarters mile. For lower approach minimums and for aircraft in approach categories C and D, the runway should be 100 feet wide. Also, TxDOT standards call for a 100-foot-wide runway for transport category airports. Runway 17-35 currently meets FAA and TxDOT criteria for runway width.

Runway 12-30 is 80 feet wide. The width meets design standards for aircraft up to design group II. This runway is not planned to accommodate aircraft beyond the ARC B-II design standard and thus has an adequate width through the planning period.

Runway Strength

As previously mentioned, the pavement for Runway 17-35 is currently 15,000 pounds single wheel loading (SWL), while Runway 12-30 can also support 15,000 pounds SWL. The strength of the runway will need to be increased in order to accommodate some of the current traffic and much of the future traffic. Future planning should consider providing a strength of up to 60,000 pounds SWL for Runway 17-35 to meet the future-planned critical aircraft requirements of larger business jet aircraft. The crosswind runway should be planned for a SWL strength of 30,000 pounds.

As previously discussed, aircraft such as the Beech 400 and Cessna Citation II and III use the airport. These aircraft

have single wheel landing gear designs and a maximum landing weight above 15,000 pounds. That means the current strength of both runways is less than the maximum weight of aircraft which currently use the airport.

It should be noted, that the pavement strength rating is not the maximum weight limit. Therefore, aircraft weighing more than the certified strength can operate on the runway on an infrequent basis. Heavy aircraft operations can shorten the life span of airport pavements. For this reason, consideration must be given to the adequacies of existing and future pavement strengths so that proper weight capacities can be planned for which will meet the needs of airport users, while minimizing maintenance costs of overloading.

Although there is no available data for the strength of the runways to support a dual-wheel configuration, a planning estimate of 25,000 DWL can be assumed. Aircraft with DWL landing configurations which use the airport include Falcon 20/2000, with a maximum ramp weight of 35,000 pounds, and the Challenger 600, with a maximum ramp weight of 51,000 pounds.

The runway strength is a critical issue that needs to be addressed in the short term planning period. The runways should be cored and analyzed to determine the actual current strength, and then programming should be put in place to strengthen both runways.

Safety Areas

Consideration of runway length requirements must also factor FAA design criteria regarding runway safety area (RSA), object free area (OFA), runway protection zones (RPZ), object free zones (OFZ) and height clearances. The dimensions of the RSA, OFA and OFZ are determined by the approach speed of the critical aircraft or aircraft family. The current critical aircraft family is ARC B-II, as previously determined. Ultimate planning will examine the criteria necessary as ARC C/D-II becomes the critical aircraft family. The RPZ and height clearances are determined by the approved instrument approach procedures for the runway.

Runway Safety Area

The RSA is defined in FAA Advisory Circular 150/5300-13, Change 8, *Airport Design*, as a “surface surrounding the runway prepared or suitable for reducing the risk of damage to airplanes in the event of an undershoot, overshoot, or excursion from the runway.” The RSA is centered on the runway, reaching out in accordance to the approach speed of the critical aircraft using the runway. The FAA requires the RSA to be cleared and graded, drained by grading or storm sewers, capable of accommodating the design aircraft and fire and rescue vehicles, and free of obstacles not fixed by navigational purpose.

The FAA has placed a higher significance on maintaining adequate RSAs at all airports due to recent

aircraft accidents. Under *Order 5200.8*, effective October 1, 1999, the FAA established a *Runway Safety Area Program*. The Order states, “The goal of the Runway Safety area Program is that all RSAs at federally obligated airports ... shall conform to the standards contained in Advisory Circular 150/5300-13 *Airport Design*, to the extent practical.” Each Regional Airports Division of the FAA is obligated to collect and maintain data on the RSA for each runway at the airports, and perform airport inspections. Texas, as a block grant state, has given the inspection and data collection responsibility to TxDOT for general aviation airports.

For ARC A/B-II aircraft, the FAA calls for the RSA to be 150 feet wide and extend 300 feet beyond the runway ends. Analysis in the previous section indicated that Runway 17-35 should be planned to accommodate aircraft up to and including ARC C/D-II. The RSA for ARC C/D-II aircraft is 500 feet wide and extending 1,000 feet beyond each runway end.

Object Free Area

The runway OFA is “a two dimensional ground area surrounding runways, taxiways, and taxilanes which is clear of objects except for objects whose location is fixed by function (i.e., airfield lighting).” The OFA is centered on the runway, extending out in accordance to the critical aircraft design category utilizing the runway.

For ARC A/B-II aircraft, and approaches of not less than three-

quarters of a mile, the FAA calls for the OFA to be 500 feet wide, extending 300 feet beyond each runway end. In order to meet design criteria for the future critical aircraft (ARC C/D-II), the OFA would require a cleared area 800 feet wide, extending 1000 feet beyond each runway end. Both runways conform to RSA and OFA standards for current critical aircraft design (ARC B-II).

Obstacle Free Zones

Runways served by an instrument approach, as is Runway 17, must consider FAA's criteria for the OFZ. The OFZ is an imaginary surface which precludes object penetrations, including taxiing and parked aircraft. The only allowance for OFZ obstructions is visual navigational aids mounted on frangible bases which are fixed in their location by function.

FAA criterion requires the OFZ to extend 200 feet beyond the runway ends by 400 feet wide (200 feet on either side of the runway centerline) for runways utilized by large aircraft and served by an instrument approach. The OFZ is established to ensure the safety of aircraft operations. If the OFZ is obstructed, the airport's approaches could be removed, or approach minimums could be increased.

Currently, there are no OFZ obstructions at Gainesville Municipal Airport. Future planning should maintain the OFZ.

Runway Protection Zones

Another consideration is the FAA requirement for cleared approaches. The runway protection zone (RPZ) is a trapezoidal area centered on the runway and typically beginning 200 feet beyond the runway end. The RPZ has been established by the FAA to provide an area clear of obstructions and incompatible land uses, in order to enhance the protection of approaching aircraft, as well as people and property on the ground. The dimensions of the RPZ vary according to the visibility minimums serving the runway and the type of aircraft operating on the runway.

The FAA does not necessarily require the fee simple acquisition (outright property purchase) of the RPZ area, but recommends that airports maintain positive control over development within the RPZ. It is preferred that the airport own the property through fee simple acquisition, however, avigation easements (acquiring control of designated airspace within the RPZ) can be pursued if fee simple purchase is not possible. It should be noted, however, that avigation easements can cost nearly as much as the underlying land value and may not fully prohibit incompatible land uses from the RPZ. Also, the area encompassed by the RPZ envelops a portion of the required RSA, OFA, and areas needed for installation of approach lighting systems, all of which would be required for purchase.

It should be noted that the RPZ for ARC C/D II aircraft would be larger than the current RPZ, and would extend into areas outside the existing airport property line. The dimensions for RPZs, considering ARC C/D II aircraft, are detailed in **Table 3F**. Future plans should consider acquiring any property not contained inside the existing or planned RPZs.

Runway Separation

The FAA Advisory Circular 150/5300-13, *Airport Design*, also discusses separation distances between aircraft and various areas on the airport. The separation distances are a function of the approaches approved for the airport and the critical aircraft. Under current conditions (ARC B-II, approaches not less than three-quarters mile) the taxiways need to be at least 240 feet from the runway centerline.

Aircraft parking areas should be at least 250 feet from the runway centerline and an additional 66 feet from and fixed or immovable object. Thus the aircraft parking areas should have no less than 306 feet separation. The FAA airport design computer program calls for a separation of at least 400 feet. Currently, the taxiways are at least 400 feet from the runway centerline and the aircraft parking areas are further still from the runway centerline.

The future critical aircraft will fall into ARC C/D-II. The lowest approach minimums suggested are three-quarters

f a mile. Under these circumstances the taxiways and parking aprons should be at least 400 and 500 feet from the runway centerline respectively. The airport currently meets these FAA design standards. Should the critical aircraft progress into the C/D-III design group in the future, these standards will still apply.

Building Restriction Lines (BRL) are imaginary planes emanating from the runway centerline at a slope angle of 7:1 that define the tallest structure allowable below the plane. **Table 3F** shows that the closest a 20 foot tall structure can be to the runway centerline is 390 feet for approaches not lower than one mile. For approaches below one mile, the closest a 20 foot tall structure can be to the runway centerline is 640 feet.

TAXIWAYS

Taxiways are constructed primarily to facilitate aircraft movements to and from the runway system. Some taxiways are necessary simply to provide access between the aprons and runways, whereas other taxiways become necessary as activity increases at an airport, to provide safe and efficient use of the airfield.

As detailed in Chapter One, the taxiway system at Gainesville Municipal Airport consists of a parallel taxiway and four entrance/exit taxiways serving Runway 17-35. All taxiways were recently slurry sealed and now have a uniform width of 35 feet.

TABLE 3F				
Design Standards				
Gainesville Municipal Airport				
	Runway 17-35		Runway 12-30	
	EXISTING	ULTIMATE	EXISTING	ULTIMATE
	17-35	17-35	12-30	12-30
Approach Visibility Minimums	1 mile GPS & NDB (17)	3/4 mile (GPS)	Visual	1 mile GPS
Runway Length and Width	6000 x 100	7000 x 100	4296 x 80	4296 x 80
Airport Reference Code (ARC)	B-II	Up to ARC C/D-II	B-II	B-II
Runways				
Pavement Strength (lbs.)	15,000	60,000 SWL	15,000	30,000 SWL
Runway Safety Area				
Width (feet)	150	500	150	150
Length Beyond Runway End (ft.)	300	1000	300	300
Object Free Area				
Width (ft.)	500	800	500	500
Length Beyond Runway End (ft.)	300	1000	300	300
Obstacle Free Zone				
Width (ft.)	400	400	400	400
Length Beyond Runway End (ft.)	200	200	200	200
Runway Protection Zones				
Inner Width (ft.)	500	1000	500	500
Outer Width (ft.)	700	1510	700	700
Length (ft.)	1,000	1,700	1,000	1,000
Taxiways				
Width (ft.)	35	35	35	35
OFA (ft.)	131	131	131	131
Shoulder Width	10	10	10	10
Centerline to Fixed or Movable Object (ft.)	66	66	66	66
Runway Centerline to:				
Parallel Taxiway Centerline (ft.)	240	400	240	240
Aircraft Parking Area (ft.)	400	500	400	400
Primary Surface (Part 77)	500	1,000	500	500
Building Restriction Line (ft.)				
20 ft. Height Clearance	390	640	390	390
35 ft. Height Clearance	495	735	495	495
Approach Slope	20:1	34:1	20:1	20:1

Consideration should be given to the addition of taxiways, as needed, to improve airfield circulation and capacity. The current taxiway layout appears efficient for Runway 17-35, however, if Runway 17-35 were to be extended, another exit taxiway should be added. An additional exit taxiway would significantly improve airfield

efficiencies and would increase the runway's capacity.

Taxiway width is determined by the Airplane Design Group (ADG) of the most demanding aircraft to use the taxiway. As mentioned previously, the current critical aircraft for the airport falls within ADG II. FAA criteria call

for a 35-foot width for taxiways serving aircraft within Design Group II. All taxiways at the airport currently meet this requirement. If ADG III is to be considered, the taxiways serving these aircraft should be 50 feet wide.

There are two taxiways serving Runway 12-30. Taxiway D connects to the north end of Runway 12, while Taxiway C connects to the center of the runway. Design principles call for taxiway access to each end of a runway as well as a parallel taxiway when feasible. At a minimum, taxiway access should be planned for the end of Runway 30, and ideally, a parallel taxiway should be planned for the length of Runway 12-30.

NAVIGATIONAL AIDS AND INSTRUMENT APPROACHES

Airport and runway navigational aids are based on FAA recommendations, as defined in DOT/FAA Handbook 7031.2B, *Airway Planning Standard Number One*, FAA Advisory Circular 150/5300-2D, *Airport Design Standards, Site Requirements for Terminal Navigation Facilities*, and TxDOT's *Policies and Standards*.

Navigational aids provide two primary services to airport operations: precision guidance to specific runway and/or nonprecision guidance to a runway or the airport itself. The basic difference between a precision and nonprecision navigational aid is that the former provides electronic descent, alignment (course), and position guidance, while the nonprecision navigational aid provides only alignment and position location information; no elevation

information is given. The necessity of such equipment is usually determined by design standards predicated on safety considerations and operational needs. The type, purpose, and volume of aviation activity expected at the airport are factors in the determination of the airport's eligibility for navigational aids.

Global Positioning System

The advancement of technology has been one of the most important factors in the growth of the aviation industry in the second half of the twentieth century. Much of the civil aviation and aerospace technology has been derived and enhanced from the initial development of technological improvements for military purposes. The use of orbiting satellites to confirm an aircraft's location is the latest military development to be made available to the civil aviation community.

Global positioning systems (GPS) use two or more satellites to derive an aircraft's location by a triangulation method. The accuracy of these systems has been remarkable, with initial degrees of error of only a few meters. As the technology improves, it is anticipated that GPS may be able to provide accurate enough position information to allow categories II and III precision approaches, independent of any existing ground-based navigational facilities. In addition to the navigational benefits, it has been estimated that GPS equipment will be much less costly than existing precision approach landing systems.

Instrument Approach Procedures

Instrument approach procedures (IAP) are a series of predetermined maneuvers established by the FAA, using electronic navigational aids that assist pilots in locating and landing at an airport during low visibility and cloud ceiling conditions. At Gainesville Municipal Airport, there are two published instrument approaches for Runway 17. There are no instrument approach procedures for Runway 12-30 or Runway 35.

The capability of an instrument approach is defined by the visibility and cloud ceiling minimums associated with the approach. Visibility minimums define the horizontal distance that the pilot must be able to see to complete the approach. Cloud ceilings define the lowest level a cloud layer (defined as feet above the ground) can be situated for a pilot to complete the approach. If the observed visibility or cloud ceiling is below the minimums prescribed for the approach, the pilot cannot complete the instrument approach.

Future planning considers the increased use of the airport by corporate aircraft. These aircraft users are often dependent upon instrument approaches. In fact, some corporate flight departments are excluded from using airports without instrument approaches. Considering these aircraft, future planning must also consider improved instrument approach procedures.

Improvement to the instrument approach capability of the airport is warranted. Currently, only Runway 17

provides instrument approaches. When conditions do not meet the minimums for cloud ceiling and visibility, the runway is not available, which leads to diversions and cancelled flights. In some cases, pilots may wish to avoid the airport if inclement weather is forecast, to avoid the cost of diversion.

The IAPs for Gainesville Municipal Airport were previously discussed in detail in Chapter One. The GPS Runway 17 approach affords the lowest cloud ceiling (415 AGL) and visibility minimums (one mile). Ultimate planning will consider the implementation of approach minimums down to not lower than three-quarters mile, utilizing GPS technologies for Runway 17 and 35. The possibility of implementing these approaches will be studied in the next chapter.

Runway 12-30 is being planned for a GPS IAP providing not lower than one mile visibility minimums. This will be adequate for the planning period.

Visual Approach Aids

To provide pilots with visual glideslope and descent information, visual approach slope indicators (VASIs) or precision approach path indicators (PAPIs) are commonly found to the side of the runway. These systems can consist of either a two- or four-box unit. Four-box systems are recommended for use by business jet aircraft. Currently, both ends of Runway 17-35 are served by two-box precision approach path indicators (PAPI-2). Ultimate planning should consider upgrading these units to the four-box system.

Runway 12-30 should also be outfitted with either a VASI-2 or a PAPI-2 on both ends of the runway by the ultimate planning period.

Runway 17-35 does not currently have an approach lighting system (ALS). An ALS is required for precision approaches of less than one mile. Examples of these systems include an omni-directional approach lighting system (ODALS), lead-in lighting system (LDIN), and medium intensity approach lighting system (MALS).

The airport currently has lighted wind cones and a segmented circle which provide pilots with information about wind conditions and traffic patterns. In addition, an airport beacon assists in identifying the airport at night. Each of these facilities should be maintained in the future.

AIRFIELD LIGHTING AND MARKING

Currently, there are a number of lighting and pavement marking aids serving pilots using the airport. The lighting and marking aids assist pilots in locating the airport during night or poor weather conditions, as well as assist in the ground movement of aircraft.

Airport Identification Lighting

The location of the airport at night is universally indicated by a rotating beacon. For civil airports, a rotating beacon projects two beams of light, one white and one green, 180 degrees apart.

At Gainesville Municipal Airport, the beacon is located on top of a scaffold structure to the north of the terminal building. The existing rotating beacon is adequate and should be maintained in the future.

Runway and Taxiway Lighting

Runway identification lighting provides the pilot with a rapid and positive identification of the runway. Currently, Runway 17-35 is equipped with medium intensity runway lighting (MIRL). MIRL is recommended in the short term for Runway 12-30. TxDOT *Policies and Standards* indicate that airports having more than 100 based aircraft should be served with taxiway lights, as well as taxiway guidance signs. Taxiway lighting is not currently provided, however, the taxiways are equipped with centerline reflectors. The airport should consider the installation of medium intensity taxiway lighting (MITL) for the taxiways serving Runway 17-35 by the long term of the planning period.

Runway End Identification Lighting

The most basic system involves runway end identifier lights (REILs). The FAA and TxDOT indicate that REILs should be considered for all lighted runways at airports not planned for a more sophisticated approach lighting system (ALS). Both ends of Runway 17-35 have REILs installed. These systems should be maintained until a more sophisticated ALS is implemented.

REILs should be planned for Runway 12 and 30.

Pilot-Controlled Lighting

Gainesville Municipal Airport is equipped with pilot-controlled lighting (PCL). PCL allows pilots to control the intensity of the runway and taxiway lighting using the radio transmitter in the aircraft. PCL also provides for more efficient use of energy. This system should be maintained through the planning period.

Airfield Signs

Airfield identification signs assist pilots in identifying their location on the airfield and directing them to their desired location. Lighted signs are installed on all taxiways and runway intersections serving Runway 17-35. Signs are available for Runway 12-30, but they are not lighted. All of these signs are new and should be maintained.

Pavement Markings

Runway markings are designed according to the type of instrument approach available on the runway. FAA AC 150/5340-1F, *Marking of Paved Areas on Airports*, provides guidance necessary to design an airport's markings. Runway 17-35 is equipped with nonprecision markings. The nonprecision markings are adequate, even if additional approaches are approved. These markings should be properly maintained. Runway 12-30

has basic markings which should be maintained until such time that GPS approaches with visibility minimums not lower than one mile are pursued. **Exhibit 3C** summarizes the existing and planned airside needs.

HEIGHT CLEARANCE CRITERIA

In order to protect the airspace and approaches to each runway from hazards which would affect the safe and efficient operation of the airport, federal criteria have been established (FAR Part 77) for use by local planning jurisdictions to control the height of objects in the vicinity of the airport. Part 77 established several "imaginary" surfaces surrounding the airport which considers height clearances of objects within a 10,000-foot radius (up to 50,000 feet beyond the approach end of a precision approach).

The FAA is in the process of updating F.A.R. Part 77 to ensure conformity with recent changes to airport design standards, however, it is not known at this time when new guidelines will become available. TxDOT has asked that draft changes to the Part 77 document received to date be incorporated into this planning document. The next chapter examines these criteria as they apply to Gainesville Municipal Airport.

The City of Gainesville adopted height hazard zoning around the airport environment on April 13, 1983. This zoning should be updated anytime there is a change to the runway system at the airport. With the recent runway extension to 6,000 feet, there is a

possibility that this zoning is outdated. The City and airport staff should determine that the current zoning reflects the new runway extension. Any future changes to the runway system should also be reflected in updated airport zoning.

LANDSIDE REQUIREMENTS

Landside facilities are those necessary for the handling of aircraft and passengers while on the ground. These facilities provide the essential interface between the air and ground transportation modes. The capacity of the various components of each area was examined in relation to projected demand to identify future landside facility needs. This includes components for commercial service and general aviation needs such as:

- C Aircraft Hangars
- C Aircraft Parking Aprons
- C General Aviation Terminal
- C Auto Parking and Access
- C Airport Support Facilities

HANGARS

Utilization of hangar space varies as a function of local climate, security, and owner preferences. The trend in general aviation aircraft, whether single- or multi-engine, is toward more sophisticated aircraft (and, consequently, more expensive aircraft); therefore, many aircraft owners prefer enclosed hangar space to outside tie-downs.

The demand for aircraft storage hangars is dependent upon the number and type of aircraft expected to be based at the airport in the future. For planning purposes, it is necessary to estimate hangar requirements based upon forecast operational activity. However, hangar development should be based upon actual demand trends and financial investment conditions.

While a majority of aircraft owners prefer enclosed aircraft storage, a number of based aircraft will still tie-down outside (due to the lack of hangar availability, hangar rental rates, and/or operational needs). Therefore, enclosed hangar facilities do not necessarily need to be planned for each based aircraft. At Gainesville Municipal Airport, nearly all the based aircraft are currently stored in hangar space. According to staff interviews, the aircraft that are stored outside do not use the ramp or apron tie-downs. There are two DC-3s and three Convairs, used for cargo operations, that are stored on the abandoned runway on the east side of Runway 12-30.

General aviation airports similar to Gainesville Municipal will typically see about 95 percent of the based aircraft stored in enclosed hangars, with the remaining five percent stored outside on the apron. It should be noted that the airport maintains a waiting list of 15 aircraft owners which desire hangar space. Most of these aircraft owners currently base their aircraft at other regional airports or private airports.

Gainesville Municipal Airport offers a number of T-hangar spaces. T-hangars are popular with aircraft owners having

 <p>RUNWAY</p>	<p>AVAILABLE</p>	<p>SHORT TERM</p>	<p>LONG TERM</p>
 <p>TAXIWAYS</p>	<p>Runway 17-35 Full-length parallel taxiway (400' runway/taxiway separation) 4 exits All taxiways 35' wide</p> <p>Runway 12-30 2 exits (center and north end)</p>	<p>Runway 17-35 Same</p> <p>Runway 12-30 Same</p>	<p>Runway 17-35 Add exit taxiway to runway extension</p> <p>Runway 12-30 Taxiway to 30 end Parallel taxiway</p>
 <p>NAVIGATIONAL AIDS</p>	<p>AWOS-III Segmented Circle Lighted Windcones</p> <p>Runway 17-35 17 - 1 mile GPS 17 - 1 mile NDB</p> <p>Runway 12-30 None</p>	<p>Same</p> <p>Runway 17-35 Same</p> <p>Runway 12-30 None</p>	<p>Same</p> <p>Runway 17-35 3/4 mile GPS</p> <p>Runway 12-30 1 mile GPS</p>
 <p>LIGHTING & MARKING</p>	<p>Rotating Beacon</p> <p>Runway 17-35 MIRL Taxiway Reflectors Non-Precision Marking</p> <p>Runway 12-30 Basic Markings</p>	<p>Rotating Beacon</p> <p>Runway 17-35 Same</p> <p>Runway 12-30 Add MIRL, REIL's Non-Precision Marking</p>	<p>Rotating Beacon</p> <p>Runway 17-35 Add MITL, MALS</p> <p>Runway 12-30 Same</p> 

one aircraft. T-hangars are individual spaces within a larger structure. Aircraft owners are allowed privacy and individual access to their space. Conventional hangars are typically 10,000 square feet or larger. They are open space facilities with no supporting structure interference. Often, other airport services are offered from the conventional hangars. At Gainesville Municipal Airport, the FBO operates part of their operation out of the large conventional hangar to the south of the terminal building. Executive hangars are typically utilized by owners of larger aircraft or multiple aircraft. These are usually smaller than 10,000 square feet and offer the same open-space storage area as conventional hangars. There are a number of executive hangars at the airport.

Currently, there are 43 enclosed T-hangar positions available on the airport. The facility to the north of the terminal building has eight T-hangar spaces. To the north of that facility, three more T-hangars are attached to the back of an executive hangar. On the apron, to the east of the FBO building, is a six-unit T-hangar. On the abandoned runway, perpendicular to Runway 12-30, is a 10-unit and a 16-unit T-hangar facility. For T-hangars, a planning standard of 1,200 square feet per based aircraft will be used to determine future requirements.

The current storage mix indicates that approximately 60 percent of all hangared aircraft are in T-hangars, 30 percent are in conventional hangars and the remaining 10 percent are in executive hangars. At airports similar to Gainesville, one will typically find

nearly all multi-engine aircraft are stored in a covered hangar facility. Gainesville is a little unusual because of the DC-3's and the Convairs stored outside but not on the apron. As a result, hangar forecasts will rely on a storage mix that is more in line with general aviation airports similar to Gainesville Municipal Airport.

Typically, 80 percent of the single-engine aircraft are stored in T-hangars with the remaining 20 percent in conventional and executive hangars. Of the multi-engine, turboprop, jet, and glider aircraft, 20 percent are in T-hangars and 80 percent are in conventional and executive hangars. For this study, we will use a standard storage mix of 95 percent based single-engine aircraft stored in a hangar facility, while 100 percent of the helicopters, twin-engines, gliders, and ultra-lights will be considered to be in a hangar facility.

As the trend toward more sophisticated aircraft continues throughout the planning period, it is important to determine the need for more conventional and executive hangars. A planning standard of 1,200 square feet was used for single-engine aircraft, and 2,500 square feet for multi-engine, jet, and helicopters.

Since portions of conventional and executive hangars are also used for aircraft maintenance, servicing, and office space, 15 percent of the total conventional /executive space is reserved for these requirements.

Table 3G indicates that the airport should plan, in the short term, for more

T-hangars and possibly more executive hangars. The four large conventional hangars at the airfield appear to meet the storage demand for this type of unit

through the planning period. Maintenance and office facilities are included in the conventional and executive hangar numbers.

TABLE 3G				
Aircraft Storage Hangar Requirements				
Gainesville Municipal Airport				
	Current	Future Requirements		
		Short Term	Intermediate Term	Long Term
Total Aircraft to be Hangared	68	87	106	145
T-Hangars	41	54	68	98
Executive Hangars	7	10	13	19
Conventional Hangars	20	23	25	28
Hangar Requirements				
T-Hangar Area (s.f.)	55,000	64,700	81,400	118,300
Executive Hangars (s.f.)	23,000	24,600	32,800	48,500
Conventional Hangars (s.f.)	87,000	60,500	65,600	71,000
Total Hangar Area (s.f.)	165,000	149,800	179,800	237,800

AIRCRAFT PARKING APRON

A parking apron should provide space for the number of locally-based aircraft that are not stored in hangars, transient aircraft and for maintenance activity. As discussed in the previous section, airports similar in characteristics to Gainesville Municipal Airport, hangar approximately 95 percent of based aircraft. Using this standard, Gainesville would currently need aircraft tie-down space for only two aircraft and space for five aircraft by the long term forecast. For local tie-down needs, an additional five spaces are identified for maintenance activity. A planning criterion of 650 square yards per aircraft was used to determine the apron requirements for local aircraft.

FAA Advisory Circular 150/5300-13 suggests a methodology by which transient apron requirements can be

determined from knowledge of busy-day operations. At Gainesville Municipal Airport, the number of itinerant spaces required was determined to be approximately 18 percent of the busy-day itinerant operations. A planning criterion of 800 square yards per aircraft was applied to determine future transient apron requirements for single- and multi-engine aircraft. For business jets (which can be much larger), a planning criterion of 1,600 square yards per business jet position was used. For planning purposes, 85 percent of these spaces are assumed to be utilized by non-jet aircraft, which is in line with national trends.

Total apron parking requirements are presented in **Table 3H**. Currently, apron area at the airport totals approximately 42,500 square yards, with approximately 16 total tie-down positions. The large apron is a benefit to the airport, having once been a

military installation. As the table shows, it is not anticipated that more apron area will be needed, but some

additional tie-downs will be necessary by the intermediate term.

TABLE 3H General Aviation Aircraft Parking Apron Requirements Gainesville Municipal Airport				
	Available	Short	Intermediate	Long
Single, Multi-engine Transient Aircraft Positions		8	9	13
Apron Area (s.y.)		6,200	7,600	10,400
Transient Business Jet Positions		1	2	2
Apron Area (s.y.)		2,200	2,700	3,700
Locally-Based Aircraft Positions		8	9	10
Apron Area (s.y.)		5,200	5,700	6,700
Total Positions	16	17	20	25
Total Apron Area (s.y.)	42,500	13,600	16,000	20,800

GENERAL AVIATION TERMINAL FACILITIES

General aviation terminal facilities have several functions. Space is required for pilots' lounge, flight planning, concessions, management, storage, and various other needs. This space is not necessarily limited to a single, separate terminal building, but can include space offered by fixed base operators for these functions and services. Currently, the airport offers a separate terminal building which provides approximately 2,800 square feet of space. The existing terminal facility was completed in 1996.

The methodology used in estimating general aviation terminal facility needs is based on the number of airport users expected to utilize general aviation facilities during the design hour. General aviation space requirements were then based upon providing 90 square feet per design hour itinerant passenger. Design hour itinerant

passengers is determined by multiplying design hour itinerant operations by the number of passengers on the aircraft (multiplier). An increasing passenger count is used to account for the likely increase in larger, more sophisticated aircraft using the airport. **Table 3J** outlines the general aviation terminal facility's space requirements for Gainesville Municipal Airport. It is forecast that the existing terminal facilities will meet airport needs through the planning period.

SUPPORT REQUIREMENTS

Various facilities that do not logically fall within classifications of airfield, terminal building, or general aviation areas have also been identified. These other areas provide certain functions related to the overall operation of the airport, and include: automobile parking, fuel storage, and aircraft rescue and firefighting facilities.

TABLE 3J				
General Aviation Terminal Area Facilities				
Gainesville Municipal Airport				
	Available	Short Term	Intermediate Term	Long Term
Design Hour Operations	14	19	23	32
Design Hour Itinerant Operations	5	6	8	11
Multiplier (passengers and visitors)	1.8	1.9	2.1	2.5
Total Design Hour Itinerant Passengers	8	12	16	26
General Aviation Building Space (s.f.)	2,794	1,072	1,435	2,376

AUTOMOBILE PARKING

General aviation vehicular parking demands have been determined for Gainesville Municipal Airport. Space determinations were based on an evaluation of existing airport use, as well as industry standards. Terminal automobile parking spaces required to meet general aviation itinerant and FBO operator demands were calculated by multiplying design hour itinerant passengers by the industry standards of 1.9, 2.1, and 2.5 for each planning period. This multiplier represents the anticipated increase in corporate operations.

The parking requirements of based aircraft owners should also be considered. Although some owners prefer to park their vehicles in their hangars, safety can be compromised when automobile and aircraft movements are intermixed. For this reason, separate parking requirements, which consider one-half of based aircraft at the airport, were applied to general aviation automobile parking space requirements. Parking requirements for the airport are summarized in **Table 3K**.

Gainesville Municipal Airport recently doubled the size of their terminal parking area, which is reflected in the current figures. It is forecast that activity will grow such that additional terminal area parking may be necessary by the short to intermediate term. There appears to be adequate parking for those patrons going to the FBOs at the airport, through the long term planning period.

Those businesses and the aircraft owners utilizing the T-hangars located on the east side of the airport, do not currently have a designated parking lot. This is not unusual since most will park their vehicle in the hangar or to the side. It is a good planning practice to have dedicated parking places for vehicles at airports. Consideration should be given to developing smaller, dedicated parking lots to serve these needs. In addition, more public general aviation parking spaces should be developed in strategically appropriate places.

TABLE 3K Vehicle Parking Requirements Gainesville Municipal Airport				
	Available	Future Requirements		
		Term	Term	Term
Design Hour Passengers	8	12	15	23
Terminal Vehicle Spaces	27	23	32	59
Parking Area (s.f.)	16,000	9,100	12,900	23,500
General Aviation Spaces	124	45	55	75
Parking Area (s.f.)	42,200	18,000	22,000	30,000
Total Parking Spaces	151	68	87	134
Total Parking Area (s.f.)	58,200	27,100	34,900	53,500

FUEL STORAGE

Gainesville Municipal Airport has a fuel farm to the north of the terminal building. There are two above-ground, 12,000-gallon storage tanks, one for Jet A fuel and the other for Avgas fuel. There is a self-serve pump on the apron to the east of the terminal building. With a credit card, one can get Avgas 24 hours-a-day. After hours, Jet A fuel is also available by contacting airport staff. There are also two refueling trucks. The Jet-A fuel truck has a 2,000-gallon capacity and the Avgas truck has a 1,200-gallon capacity.

Fuel storage requirements are typically based upon maintaining a two-week supply of fuel during an average month. However, more frequent deliveries can reduce the fuel storage capacity require-

ment. Generally, fuel tanks should be of adequate capacity to accept a full refueling tanker, which is approximately 8,000 gallons, while maintaining a reasonable level of fuel in the storage tank.

Fuel sales records are maintained by airport staff. As presented in **Table 3L**, fuel sales have shown steady growth over the past six years. When the forecast fuel sales are segmented into biweekly sales, the current storage capacity will be exceeded for Avgas in the short term, while Jet A fuel storage will be exceeded by the intermediate term. One option to address this potential storage issue is to increase the frequency of fuel deliveries. By the long term planning period, it is suggested that additional fuel storage facilities be constructed.

TABLE 3L Yearly Historical and Forecast Fuel Sales Gainesville Municipal Airport							
	HISTORICAL				FORECAST*		
	FY '98-'99	FY '00-'01	FY '01-'02	FY '03-'04*	FY '09-'10	FY '14-'15	FY '24-'25
Avgas (gal.)	90,200	174,700	201,500	236,200	320,000	510,500	836,400
Jet A (Gal.)	28,300	115,100	108,500	131,700	220,300	313,300	522,400

* *Interpolated by Coffman Associates*

AIRCRAFT RESCUE AND FIREFIGHTING

Gainesville Municipal Airport is not currently served by a dedicated aircraft rescue and firefighting facility (ARFF). The airport is provided with rescue and fire assistance from Fire Station Number One, approximately two miles from the airport.

ARFF services do not necessarily have to be located on the airport. Only certified airports providing scheduled passenger service with greater than nine passenger seats are required to provide ARFF services. Many corporate flight departments, however, are requesting ARFF services at the airports they utilize. ARFF facilities and personnel costs are substantial, thus, many times not feasible for smaller communities. If services are requested, consideration should be given to meeting "Index A" standards, which includes aircraft less than 90 feet in length and requires on-vehicle carrying of at least one of the following:

- C 500 pounds of sodium-based dry chemical or halon 1211; or

- C 450 pounds of potassium-based dry chemical and water with a commensurate quantity of Aqueous Film Forming Foam (AFFF), to total 100 gallons for simultaneous dry chemical and AFFF foam application.

SUMMARY

The intent of this chapter has been to outline the facilities required to meet potential aviation demands projected for Gainesville Municipal Airport for the planning horizon. A summary of the airfield and general aviation facility requirements is presented on **Exhibits 3C and 3D**.

Following the facility requirements determination, the next step is to determine a direction of development which best meets these projected needs. The remainder of the master plan will be devoted to outlining this direction, its schedule, and its cost.

AIRCRAFT STORAGE HANGARS



	AVAILABLE	SHORT TERM NEED	INTERMEDIATE NEED	LONG TERM NEED
T-hangar Positions	43	54	68	98
Executive Hangar Positions	7	10	13	19
Conventional Hangar Positions	20	23	25	28
T-Hangar Area (s.f.)	55,000	64,700	81,400	118,300
Executive Hangar Area (s.f.)	23,000	24,600	32,800	48,500
Conventional Hangar Area (s.f.)	87,000	60,500	66,600	71,000
Total Hangar Area (s.f.)	165,000	149,800	180,800	237,800

APRON AREA



	AVAILABLE	SHORT TERM NEED	INTERMEDIATE NEED	LONG TERM NEED
Transient Positions	N/A	9	11	15
Locally-Based Aircraft Positions	N/A	8	9	10
Total Positions	16	17	20	25
Total Apron Area (s.y.)	42,500	13,600	16,000	20,800

TERMINAL SERVICES AND VEHICLE PARKING



	AVAILABLE	SHORT TERM NEED	INTERMEDIATE NEED	LONG TERM NEED
Terminal Building Space (s.f.)	2,794	1,072	1,435	2,376
Terminal Parking Spaces	27	23	32	59
Terminal Parking Area (s.f.)	16,000	9,100	12,900	23,500
General Aviation Parking Spaces	124	45	55	75
General Aviation Parking Area (s.f.)	42,200	18,000	22,000	30,000



Chapter Four
ALTERNATIVES



ALTERNATIVES

In the previous chapter, airside and landside facilities required to satisfy the demand for the long range planning period were identified. The next step in the planning process is to evaluate reasonable ways these facilities can be provided. There can be countless combinations of design alternatives, but the alternatives presented are those with the greatest potential for implementation.

Any development proposed for a master plan is evolved from an analysis of projected needs for a set period of time. Though the needs were determined by the best methodology available, it cannot be assumed that future events will not change these needs. The master planning process attempts to develop a viable concept for meeting the needs caused by projected demands for the next twenty years. However, no plan of action should be developed which may be inconsistent with the future goals and

objectives of the City of Gainesville and its citizens, who have a vested interest in the development and operation of the airport.

The development alternatives for Gainesville Municipal Airport can be categorized into two functional areas: the **airside** (runways, navigational aids, taxiways, etc.) and **landside** (general aviation hangars, apron, and terminal area). Within each of these areas, specific facilities are required or desired. In addition, the utilization of the remaining airport property to provide revenue support for the airport and to benefit the economic development and well-being of the regional area must be considered.

Each functional area interrelates and affects the development potential of the others. Therefore, all areas must be examined individually, then coordinated as a whole to ensure the



final plan is functional, efficient, and cost-effective. The total impact of all these factors on the existing airport must be evaluated to determine if the investment in Gainesville Municipal Airport will meet the needs of the community, both during and beyond the planning period.

The alternatives considered are compared using environmental, economic, and aviation factors to determine which of the alternatives will best fulfill the local aviation needs. With this information, as well as the input and direction from local government agencies and airport users, a final airport concept can evolve into a realistic development plan.

When analyzing alternatives for development, consideration must first be given to a “do-nothing” or “no-build” alternative. Additional consideration will be given to the possibility of removing aviation services altogether and transferring aviation activity to surrounding airports.

NON-DEVELOPMENT ALTERNATIVES

Non-development alternatives include the “no-build” or “do-nothing” alternative, transferring service to an existing airport, or developing an airport at a new location. These alternatives need to be examined first to determine whether future development of Gainesville Municipal Airport is in the best interest of the City of Gainesville and the region as a whole.

“DO-NOTHING” ALTERNATIVE

The "do-nothing" alternative essentially considers keeping the airport in its present condition and not providing for any type of improvement to the existing facilities. The primary result of this alternative would be the inability of the airport to satisfy the projected aviation demands of the airport service area.

Cooke County has experienced strong growth in all socioeconomic categories over the past several decades. Forecasts indicate this trend will likely continue throughout and beyond the long term planning horizon. Moreover, the City of Gainesville is the county seat of government and the economic hub for Cooke County. It is common for the major city in a county to have an active airport which meets the needs of recreational users as well as business users. These reasons, combined with favorable regional and national aviation forecasts, indicate a future need for improved facilities at Gainesville Municipal Airport. Improvements recommended in the previous chapter include a longer primary runway, providing a higher pavement weight bearing strength, improvements to the taxiway system, improvements to navigational aids, improvements to the ground access routes, and the construction of additional hangar facilities. Without these improvements, regular users of the airport and potential future users of the airport will be constrained from taking maximum advantage of the airport's air transportation capabilities.

The unavoidable consequence of the “do-nothing” alternative would involve the airport’s inability to attract potential airport users. Corporate aviation plays a major role in the transportation of business leaders and key employees. Thus, an airport’s facilities are often the first impression many corporate officials will have of the community. If the airport does not have the capability to meet hangar, apron, or airfield needs of potential users, the City and County’s capability to attract the major sector businesses that rely on air transportation could be diminished.

The long term consequences of the "do-nothing" alternative extend beyond the immediate Cooke County area. The entire service area would be negatively affected. As advancements are made to other regional airports, Gainesville Municipal Airport could begin to lose their existing demand and could be severely hampered from attracting new businesses that rely on a highly functional airport. As a result, the net effect could be a reduced economic benefit from the airport.

A significant impact of this alternative will likely be the inability to attract certain businesses and industries seeking locations with adequate and convenient aviation facilities. Gainesville Municipal Airport has much to offer in terms of airside and landside facilities. Without regular maintenance and additional improvements, existing and potential users and businesses for Gainesville Municipal Airport could be lost.

To propose no further development at Gainesville Municipal Airport could adversely affect the long term viability of the airport, resulting in further direct negative economic effects on the community. Therefore, the “do-nothing” alternative is not considered to be prudent or feasible.

TRANSFER AVIATION SERVICES

The alternative of shifting aviation services to another existing airport was found to be an undesirable alternative, due to the distance to other airports and the importance that the existing airport has on the economic well-being of the City. The closest public general aviation airport with similar characteristics is Grayson County Airport which is 26 nautical miles (nm) (22.5 miles) away. The next closest is Denton Municipal Airport which is 27 nm (23.5 miles) away. In addition, the City, Texas Department of Transportation - Aviation Division (TxDOT) and the Federal Aviation Administration (FAA) have contributed to significant improvements at the airport in recent years. To abandon these investments and transfer aviation services to another airport would result in an investment with little or no return.

Transferring aviation services should only be considered if Gainesville could not be capable of meeting the needs of the expanding aviation community. Gainesville is in a unique position to satisfy this expanding need, particularly because of the large land areas available for development.

If a shift of aviation services to any of the regional airports were pursued, current users of Gainesville Municipal Airport would be forced to travel to a more distant and less convenient airport. Furthermore, the continuing growth expected in the area demonstrates the need for a highly-functional and convenient airport.

General aviation airports play a major role in the way companies conduct their business. These airports are becoming increasingly important in the post 9/11 aviation environment. Corporate aircraft use is becoming more affordable, not only for businesses, but also for individuals. Gainesville Municipal Airport is expected to accommodate business aircraft traffic for companies located or conducting business in and around Cooke County. This role is not easily replaced by shifting demand to another airport in the system without tremendous expense.

CONSTRUCTION OF A NEW AIRPORT SITE

The alternative of developing an entirely new airport facility in the area to meet projected aviation demand was also considered, but similarly found to be an unacceptable alternative, primarily due to economic and environmental considerations. Land acquisition, site preparation, and the construction of a new airport near an urbanized area can be a very difficult and costly action. Closing Gainesville Municipal Airport would mean the loss of a substantial investment in a sizable

transportation facility. In a situation where public funds are limited, the replacement of a functional and expandable airport facility would represent an unjustifiable loss of a significant public investment.

From social, political, and environmental standpoints, the commitment of a large land area must also be considered. The public sentiment toward new airports in the last several years has been very negative, primarily because a new airport normally requires the acquisition of several large parcels of privately-owned property. Furthermore, the development of a new airport, similar to Gainesville Municipal Airport, would likely take a minimum of seven years to become a reality. In addition, the potential exists for significant environmental impacts associated with disturbing a large land area when developing a new airport site.

The primary condition at which evaluating a new airport site would be considered feasible is if the current annual operations approach airfield capacity or if the airport becomes constrained by natural and/or constructed barriers. Typically, a two-runway system can accommodate 230,000 annual operations. If an airport reaches approximately 60 percent of operational capacity, then it is appropriate to consider capacity-increasing alternatives including the feasibility of a new airport. Gainesville Municipal Airport is not projected to reach that volume until well beyond the long-term planning period of this study.

There are some constructed barriers to airport expansion. To the south, US Highway 82 is a major surface transportation route. Relocation or tunneling under this highway would be extremely expensive and not very prudent considering the alternative of expanding to the north. To the north are County Road 404 and Farm-to-Market (FM) Roads 1200 and 1201. These roads carry much less traffic and could easily be relocated, compared to US 82. Thus, the physical constraints of the airport environ can be overcome primarily to the north.

Overall, transferring services to an existing airport in the region or to an entirely new facility are unreasonable alternatives that should not be pursued at this time. Gainesville Municipal Airport is fully capable of accommodating the long term aviation demands of the area and should be developed in response to those demands. The airport has the potential to continue to develop as a quality general aviation airport that could greatly enhance the economic development of the community.

The previous chapter identified facilities necessary to meet the forecast demand throughout the planning period. The purpose of the remainder of this chapter is to evaluate alternatives that meet the needs of the airport. The necessary facilities and design concerns are examined in the paragraphs to follow.

ALTERNATIVE ISSUES

A commitment to remain at the existing site and develop facilities sufficient to meet the long term aviation demands entails the following requirements:

- Provide sufficient airside and landside capacity to meet the long range planning horizon demand levels of the area.
- Develop the airport in accordance with the currently established FAA and TxDOT criteria.

Chapter Three, Facility Requirements, outlined specific types and quantities of facilities necessary to meet projected aviation demands throughout the planning period. Expansion will be required to meet the long range planning horizon level of demand. The remainder of this chapter will describe various alternatives for airside and landside facility development. Before actual airside and landside alternatives are presented, however, it is necessary to discuss items which are factored into the development of the various alternatives. **Exhibit 4A** outlines alternative issues to be considered in this analysis.

RUNWAYS

Analysis in the previous chapter indicated that Runway 17-35 provides adequate length for most general

aviation airplanes. The current runway length, however, falls short of the requirements for many of the larger and faster business aircraft which currently operate at the airport on an infrequent basis. The analysis considers an increasing trend of corporate aircraft operations at the airport over the planning period.

As presented in the previous chapter, the primary runway is adequate to support much of the business jet fleet at 60 percent useful load. To accommodate 100 percent of the business jets weighing less than 60,000 pounds at 60 percent useful load, FAA design criterion calls for the runway to be approximately 6,500 feet long.

In late 2004, the FAA released Draft Advisory Circular (AC) 150/5325-4B, *Runway Length Requirements for Airport Design*. This AC identifies those aircraft that define a certain percentage of the active aircraft fleet and the percentage of the useful load that can be accommodated by the runway lengths. For example, the “75 percent fleet at 60 percent useful load” provides a runway length *sufficient to satisfy the operational requirements* of approximately 75 percent of the fleet at 60 percent useful load. The AC defines what business jet aircraft constitute 75 percent. The AC also provides direction on runway length for aircraft operating at 90 percent useful load.

Paragraph 306 of the AC recognizes that general aviation airports are being used more frequently by business jets.

General Aviation (GA) airports “that receive regular use by large airplanes over 12,000 pounds, in addition to business jets, should provide a runway length comparable to non-GA airports. That is, the extension of an existing runway can be justified at an existing GA airport that has a need to accommodate heavier airplanes on a frequent basis.” This is the exact scenario that Gainesville Municipal Airport needs to plan.

The top half of **Table 4A** presents a partial list of those aircraft that make up 75 percent of the active business jet fleet. The bottom half represents the remaining 25 percent of airplanes that make up 100 percent of the fleet. The generalized runway length calculations for both of these aircraft groups was presented on Table 3D.

Using the mean maximum daily temperature of 96 degrees in July, recommended runway lengths were calculated applying the principals of the new AC. Four different runway lengths are defined, as presented in **Table 4B**.

Forecast future demand at Gainesville Municipal Airport indicates that the airport should strive to accommodate all business jet operations up to and including those in ARC C/D-II. Thus, alternative analysis will consider the possibility of lengthening Runway 17-35 to at least 6,500 feet. While this length may not be fully capable of accommodating all aircraft needs throughout the year, it will be adequate for most business jet operations.

AIRFIELD CONSIDERATIONS

- Consider FAA Design Criteria Upgrade to ARC C/D-II
- Consider Extending Runway 17-35 up to 7,000'
- Land Acquisition
- Analysis of Improved Instrument Approach Procedures
- Evaluate Impacts of Safety Area Considerations



LANDSIDE CONSIDERATIONS

- Maximize Available Property for Facility Development
- Develop Conventional, Executive and T-Hangars
- Consider Sound Facility Locating Strategies
- Identify Property Available for Non-Aviation Development
- Apply Design Standards for Separation Distances
- Provide for Automobile Access to Structures
- Improve Airport Ground Access Routes



TABLE 4A	
Aircraft Type as a Percent of the Business Jet Fleet	
Gainesville Municipal Airport	
Manufacturer	Model
Airplanes that make up 75 percent of the business jet fleet per Table 3D	
Beech Jet	400
Cessna	500, 525A, 550, 560, 650,
Dassault	Falcon 10, 20, 50
Hawker	400, 600
IAI	Westwind 1123, 1124
Learjet	20, 31, 35, 36, 45
Mitsubishi	300
Sabreliner	40, 60, 75, 80
Airplanes that make up the remaining 25 percent of business jet fleet per Table 3D	
Bombardier	Challenger
Cessna	650, 750
Dassault	Falcon 900, 900EX, 2000
IAI	Astra 1125, Galaxy 1126
Learjet	55, 60
Hawker	800, 800EX, 1000
Sabreliner	65, 75
<i>Source: FAA AC 150/5325-4B</i>	

TABLE 4B	
Runway Lengths at 96 Degrees	
Gainesville Municipal Airport	
Aircraft Stipulation	Runway Length
75 percent of fleet at 60 percent useful load	5,410'
75 percent of fleet at 90 percent useful load	7,760'
100 percent of fleet at 60 percent useful load	6,530'
100 percent of fleet at 90 percent useful load	9,940'
<i>Source: AC150/5325-4B</i>	

Further runway analysis in the previous chapter indicated that many of the business jets that operate at the airport have longer runway needs on very hot days or on contaminated runways (wet or rainy conditions). The Gulfstreams, Hawkers, Westwinds and Lear 55s, all report a need for more than 6,500 feet of runway for takeoff when temperatures are 95 degree or more. As reported in Chapter One, 96 degrees is the average high temperature in the month of July. A runway that is

longer than 6,500 feet will also allow for longer travel lengths for the business jets. The need for large aircraft to depart with less fuel and making intermittent fuel stops would be reduced with a longer runway. The ability to travel non-stop to a destination is very attractive to both corporate flight departments and to fractional jet owners. Thus, further extension of the runway to 7,000 feet will also be considered.

Runway 12-30 provides critical crosswind coverage for the runway system at Gainesville Municipal Airport. TxDOT recommends that commercial service airports provide a crosswind runway that is at least 80 percent of the length of the primary runway. Since currently there is no scheduled commercial service at Gainesville Municipal Airport and commercial service is not forecast during this planing period, the existing crosswind runway length will be adequate. Instead, improvements of instrument approaches, as well as lighting and taxiways serving Runway 12-30 are considered. Runway 12-30 is planned to remain within ARC B-II design standards.

TAXIWAYS

The current layout of the taxiway system at Gainesville Municipal Airport is adequate from a functional perspective. The parallel taxiway serving Runway 17-35 meets the FAA standard, which calls for the taxiway to be at least 240 feet from runway centerline for ARC A and B-II aircraft, with approach minimums of not lower than one mile. The parallel taxiway at Gainesville Municipal Airport has 400 feet of separation from the runway at its closest point. As the airport transitions to ARC C/D-II design, the minimum taxiway separation is 300 feet, while the preferred separation for this category is 400 feet.

Additional parallel and partial taxiways should be constructed as development and demand warrant. It is desirable to

limit the number of runway crossing movements that taxiing aircraft need to make. A number of the alternatives to follow show additional taxiways. These taxiways are based on full development of the airport.

AIRFIELD DESIGN STANDARDS

Planning for the increased use of the airport by corporate aircraft will substantially change the airfield design criteria for Gainesville Municipal Airport. Of primary concern are the runway safety areas (RSA) and runway object free areas (OFA), as well as other separation criteria discussed below.

Runway Safety Area

The FAA describes the RSA as "*a defined surface surrounding the runway prepared or suitable for reducing the risk of damage to airplanes in the event of an undershoot, overshoot or excursion from the runway.*" The RSA is an integral part of the runway environment. RSA dimensions are established in Advisory Circular (AC) 150/5300-13, *Airport Design*, Change 8, and are based on the ARC of the critical aircraft for the airport. The RSA is intended to provide a measure of safety in the event of an aircraft's excursion from the runway, by significantly reducing the extent of personal injury and aircraft damage during overruns, undershoots, and veer-offs. According to the AC, the RSA must be . . .

- 1) cleared and graded and have no potentially hazardous ruts,

bumps, depressions, or other surface variations;

- 2) drained by grading or storm sewers to prevent water accumulation;
- 3) capable, under dry conditions, of supporting aircraft rescue and firefighting equipment, and the occasional passage of aircraft without causing structural damage to the aircraft; and
- 4) free of objects, except for objects that need to be located in the safety area because of their function.

Furthermore, the FAA has placed a higher significance on maintaining adequate RSAs at all airports due to recent aircraft accidents. Under Order 5200.8, the FAA established the Runway Safety Area Program. The Order states, "The goal of the Runway Safety Area Program is that all RSAs at federally-obligated airports and all RSAs at airports certificated under 14 CFR Part 139 shall conform to the standards contained in Advisory Circular 150/5300-13, *Airport Design*, to the extent practical." Under the Order, each Regional Airports Division of the FAA is obligated to collect and maintain data on the RSA for each runway at federally-obligated airports.

In late 2004, a notable change to AC 150/5300-13, *Airport Design*, pertained to RSAs. Previously, the FAA required the same RSA on both ends of the runway, based on the ARC of the critical aircraft. The new change

recognizes different RSA measurements for take-off and landing. Only 600 feet of RSA is now required prior to the approach end of the runway, whereas 1,000 feet is still required beyond the runway end for ARC C/D-II. The intent of this change is to allow airports with significant physical constraints, such as a creek or highway off the runway end, to avoid shortening the runway. Even with the new standard, all airports should strive for the full RSA on both runway ends.

Currently, the airport's critical aircraft falls in ARC B-II. Thus, the required RSA for both runways is 150 feet wide, extending 300 feet beyond both runway ends. An upgrade to ARC C/D-II design standards increases both dimensions of this requirement. The ARC C/D-II standard for RSA increases to extend 1,000 feet beyond each runway end and is 500 feet wide. Alternative analysis must consider providing adequate RSA, while also providing for additional runway length.

The existing RSA for both runways is adequate, considering ARC B-II aircraft design standards, as depicted on the left side of **Exhibit 4B**. The right side of **Exhibit 4B** depicts the safety areas when the airport progresses to C/D-II design standards without other improvements being made. As depicted, the enlarged RSA and OFA would remain on airport property. Approximately 13 acres of the RPZ on both ends of the runway fall outside of airport property.

It should be noted, an airport's shift to ARC C/D-II standards is not something

that is decided upon by the airport or its ownership. It is simply a function of the type of aircraft that operate at the airport on a frequent basis (more than 250 times annually). The transition would occur only when actual operations and activity at the airport dictate. The aviation demand and facility requirement analyses, presented in the previous chapters, included the likelihood that the airport will be increasingly utilized by ARC C-I through D-II aircraft.

It is important that the airport have a plan in place for the transition to ARC C/D-II aircraft design. Many airports across the country have failed to plan for such a transition and are now constrained. As a result, these airports do not meet FAA design criteria and face significant development challenges and liability issues. For this reason, the analysis will consider the airport's potential need to transition to the higher design standard.

Object Free Area

The runway OFA is defined in FAA Advisory Circular 150/5300-13, Change 8, *Airport Design*, as an area centered on the runway extending laterally and beyond each runway end, in accordance with the critical aircraft design category utilizing the runway. The OFA must provide clearance of all ground-based objects protruding above the RSA edge elevation, unless the object is fixed by function serving air or ground navigation. For ARC B-II design, the OFA is 500 feet wide, extending 300 feet beyond each runway end. Under

most circumstances, the OFA will be the same length as the RSA.

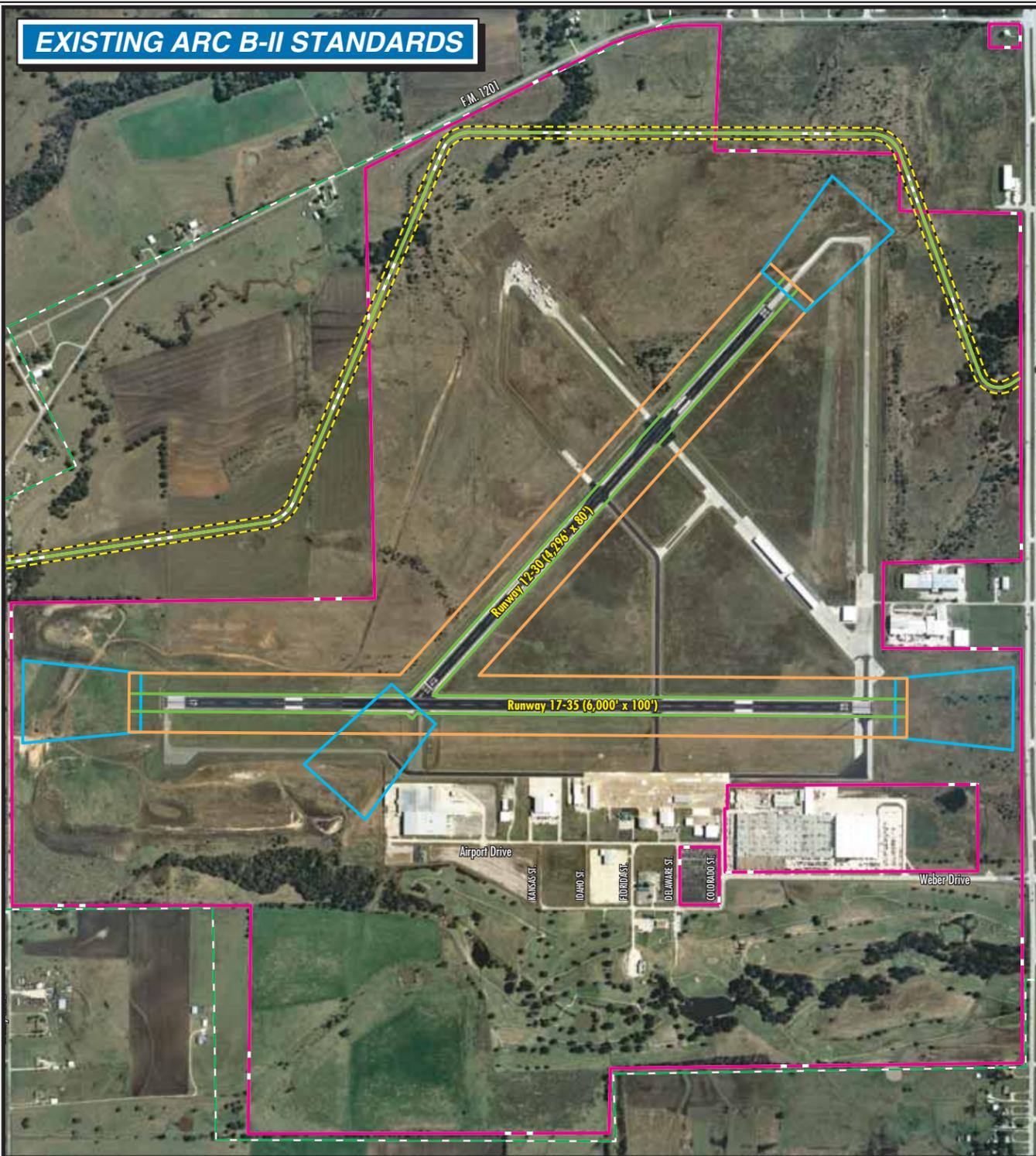
As with the RSA standards, the OFA increases significantly for ARC C/D-II aircraft. For ARC C/D-II aircraft design, the OFA should be 800 feet wide and extend 1,000 feet beyond the runway ends. It should be noted that in some cases, the terrain encompassing the OFA may fall significantly below the RSA elevation. In those cases, objects can be in the OFA as long as they do not rise above the elevation of the RSA at any given lateral position.

Runway Protection Zone

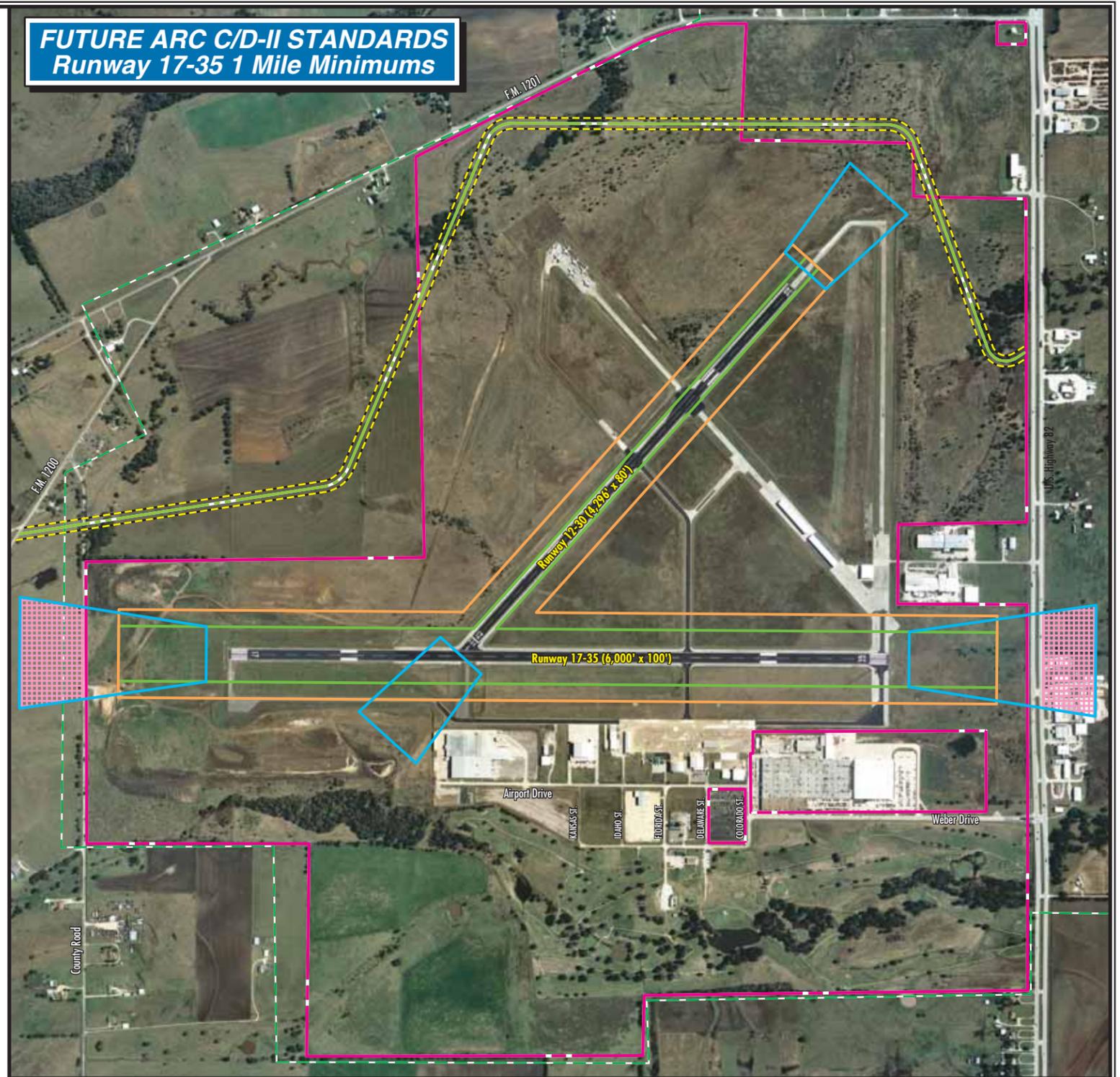
The runway protection zone (RPZ) is a trapezoidal surface which begins 200 feet from the runway threshold. The RPZ is a designated area beyond the runway end that the FAA encourages airports to own or, in some fashion, maintain positive control over. The goal of the RPZ standard is to prevent incompatible land uses and to increase safety for both pilots and those on the ground. Unlike the RSA, the RPZ can have objects located in them provided the objects are not obstructions under Federal Air Regulations (F.A.R.) Part 77, *Objects Affecting Navigable Airspace* or FAA Order 8260.3B, *Terminal Instrument Procedures* (TERPS). It should be noted, however, that the FAA places high priority on maintaining the RPZ free of items that attract groupings of people or permanent residences.

The FAA does not necessarily require the fee simple acquisition of the RPZ area, but highly recommends that the

EXISTING ARC B-II STANDARDS



FUTURE ARC C/D-II STANDARDS Runway 17-35 1 Mile Minimums



LEGEND

- - - Airport Property Line
- ▨ Property Acquisition
- Runway Protection Zone (RPZ)
- Object Free Area (OFA)
- Runway Safety Area (RSA)
- - - Magnolia Gas Line
- - - Magnolia Petroleum Company Easement



airport have positive control over development within the RPZ. Although it is preferred that the airport own the RPZ land, avigational easements (providing control of airspace within the RPZ) can be pursued if fee simple purchase is not possible. It should be noted, however, avigation easements can often cost as much as 80 percent of the full property value and may not adequately prohibit incompatible land uses from locating in the RPZ. For planning purposes, therefore, all alternatives will assume the fee simple acquisition of safety areas which would extend beyond existing property line.

Taxiway/Taxilane Design Standards

The taxiway system at an airport consists of all aircraft transport surfaces, excluding the runway. It is typically designated with a yellow centerline for the movement of aircraft to and from the runways. Taxiways are primary transport surfaces linked with the runway and its operation. Such surfaces would include a parallel taxiway, entrance/exit taxiways, and connecting taxiways.

Taxilanes are those surfaces that would typically realize a lower level of aircraft activity because the taxilanes provide direct ingress/egress to a specific location or airport facility. An example of a taxilane would be the surface which links to a T-hangar complex. Not all aircraft will use that surface, only those going to and from the T-hangars.

FAA AC 150/5300-13, *Airport Design*, Change 8, provides standards for taxiway object free area (TOFA) surrounding the taxiway system. The TOFA is based on the critical aircraft design group which will utilize the particular taxiway. Group II aircraft with wingspans from 49 feet to 79 feet require the taxiway OFA to be 131 feet wide. Group III aircraft, with wingspans from 79 feet to 118 feet, require a 186-foot-wide taxiway OFA. The taxilane OFA for group II aircraft is 115 feet wide, whereas it increases to 162 feet wide for group III aircraft.

In the various alternatives to follow, the more stringent taxiway OFA standards for group III aircraft are applied where feasible and/or practical. This is done to provide for an added level of safety and to position the airport to accommodate larger aircraft in the future without significant additional expense.

INSTRUMENT APPROACH CONSIDERATIONS

This section will present information regarding the potential for improved approach procedures. Where possible, approach minimums should be as low as possible considering safety and financial constraints.

A key priority which needs to be considered is protecting the airport from the potential for flight obstructions. The FAA has established criteria aimed at protecting the airport from these flight obstructions. First, FAA criterion

stipulates that obstructions not be placed too near the runway ends or parallel to the runway. The obstruction clearance requirements are based on the ARC and/or the weight of the critical aircraft, as well as the type of approaches established or planned for the airport. For visual approaches and/or approaches not lower than one-mile visibility for ARC B-II aircraft, minimum obstruction clearance is required. For ARC C/D-II aircraft, however, the obstruction criterion is more protective.

The two primary resources for determining airspace obstructions are the FAA's F.A.R. Part 77, *Objects Affecting Navigable Airspace* and *Terminal Instrument Procedures*, or TERPS. Part 77 is more of a filter which identifies potential obstructions, whereas TERPS is the critical tool in determining actual flight obstruction. In fact, TERPS analysis is used to evaluate and develop instrument approach procedures including visibility minimums and cloud heights associated with approved approaches.

Analysis in the previous chapter indicated that the plan should consider improved instrument approach capabilities for both Runway 17-35 and Runway 12-30. The first step in identifying potential airspace obstructions is the evaluation of the appropriate threshold siting surfaces (TSS). TSS is an imaginary surface which represents the most critical approach area nearest the runway end.

The TSS is defined by the visibility minimums of the approach and aircraft

type utilizing the approach. At Gainesville Municipal Airport, the lowest visibility minimum for aircraft in categories A and B is one mile for both straight-in and circling approaches. Straight-in approaches for category C and D aircraft have a minimum of one and one-quarter mile. Circling approach minimums for category C aircraft is one and one-half mile and for category D aircraft the minimum is two miles.

Gainesville Municipal Airport should request approval and implementation of approaches providing not lower than three-quarters mile visibility minimums for Runways 17 and 35. Approaches providing not lower than three-quarters mile minimums will allow operations at the airport, when in the past, aircraft may have had to divert to another airport for landing, or delay departure from their origination point awaiting weather improvements at Gainesville. In addition, the forecast increase in the operation of business jets at the airport provides a need for improved instrument approaches.

Many commercial service airports have approved instrument approaches with visibility minimums as low as one-half mile with a 200-foot cloud height ceiling. This is referred to as a Category (CAT) I approach. CAT I approaches require an approach lighting system, a glide-slope antenna, and a localizer. In addition, certain criteria must be met, such as reaching a minimum threshold of annual instrument approaches (AIAs) or regular weather conditions that warrant an instrument landing system (ILS) approach.

With advancements in Global Positioning System (GPS) navigation, traditional ILS approaches have become cost-prohibitive and are rarely supported by the FAA. Moreover, in an area like Cooke County where heavy fog is rare, the difference between visibility minimums as low as one-half mile versus minimums not lower than three-quarters of a mile are minute. For purposes of this study, the ultimate design alternative will consider approaches providing not lower than three-quarters mile visibility minimums.

To achieve three-quarters mile visibility minimums, both ends of the primary runway will need either an approach lighting system or a glide slope antenna. Examples of approach lighting systems would include a medium intensity approach lighting system (MALs), omnidirectional approach lighting system (ODALS) or a lead-in light system (LDIN).

Preliminary Obstruction Analysis

The existence of an approach lighting system will only qualify a runway end for approaches with three-quarter mile visibility minimums. Analysis of potential obstructions is the final determiner if that minimum can be approved. This section is a preliminary examination of potential obstructions to both runways. A more detailed analysis will be provided later with the airport layout plan set.

Under AC 150/5300-13, *Airport Design*, Change 8, the TSS surface begins 200

feet from the runway threshold and is centered on the extended runway centerline. For approaches with visibility minimums lower than one mile but greater than or equal to three-quarters mile, the surface will be 400 feet wide on each side of the runway, extending out 10,000 feet to a width of 1,900 feet on each side of the runway centerline. The requirement also includes maintaining an obstruction free clearance for a 20:1 approach slope.

Exhibits 4C and **4D** present an analysis of the TSS associated with existing and alternative approach procedures for Runway 17-35 and Runway 12-30, respectively. The TSS defined by the orange line represents the existing condition for the runway ends. The blue and red TSS conditions are tied to specific runway alternatives that will be detailed later in this chapter. The top portions of the exhibits display the plan, or “overhead” view of each TSS. The bottom half of each exhibit depicts the profile view of the TSS conditions. The profile view illustrates the 20:1 approach slope for the associated TSS condition.

The right side of **Exhibit 4C** presents the airspace obstruction evaluation for Runway 35 considering existing and alternative conditions. The TSS scenarios assume three-quarter mile visibility minimums with straight-in approaches for large aircraft. There is one obstruction identified, that being a tree that penetrates the TSS surface by 0.5 feet. None of the alternatives change the Runway 35 threshold, and the lowering of the approach minimums to three-quarters mile does not change

the TSS surface, thus the TSS line will remain the same.

The left side of **Exhibit 4C** presents obstruction analysis for the Runway 17 end. The orange line again represents the existing condition. The red line represents the TSS with a 500-foot runway extension and the blue line represents the TSS surface with a 1,000-foot extension.

Under each scenario, there are penetrations to the TSS surface. The existing penetrations include the gravel utility road to the north of the runway. Since this road is on airport property and thus has controlled access, it is not likely that any mitigation would be necessary. Of greater concern is the penetration of the TSS by the terrain itself.

TxDOT standards for obstruction analysis allow for some variation in the obstruction survey data. Vertically, the allowed variation is +/- three feet, while horizontally the allowed variation is 20 feet. The data then serves as a filter which allows the FAA to make a determination of whether any potential obstructions need physical surveys. It should be noted that complete obstruction analysis will be included with the Airport Layout Plan (ALP), which will be presented in the next chapter.

Exhibit 4D presents airspace obstruction analysis for Runway 12-30. The red line represents the condition of a day/night runway for A and B airplanes only. As depicted, there are

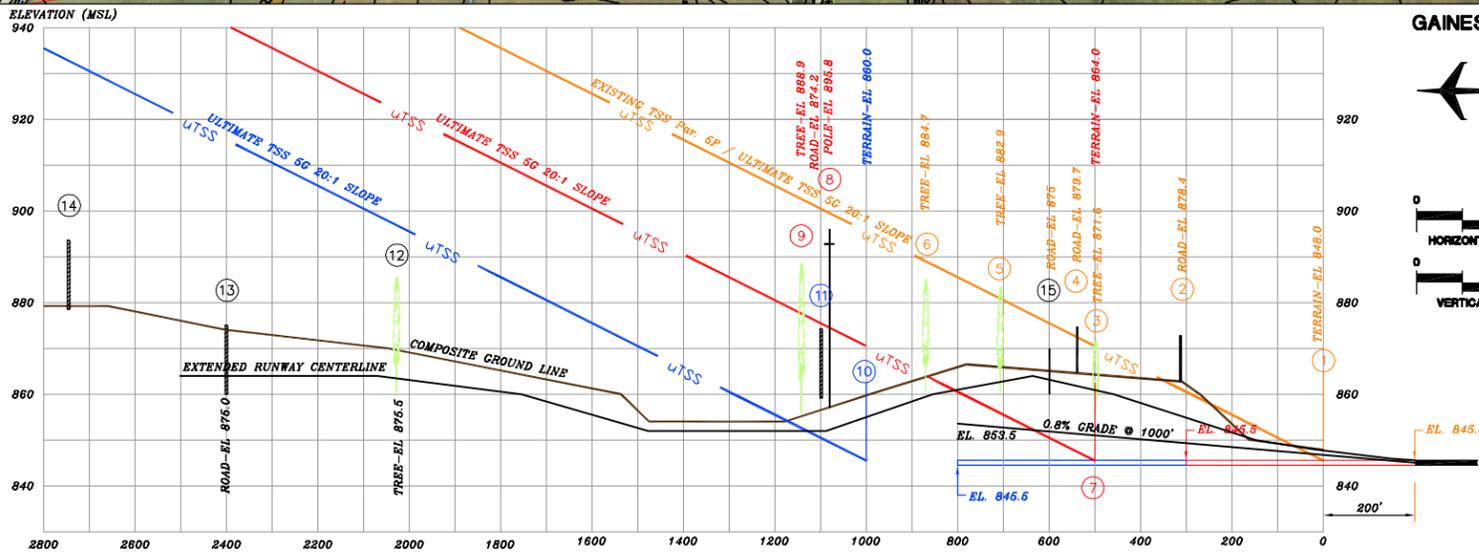
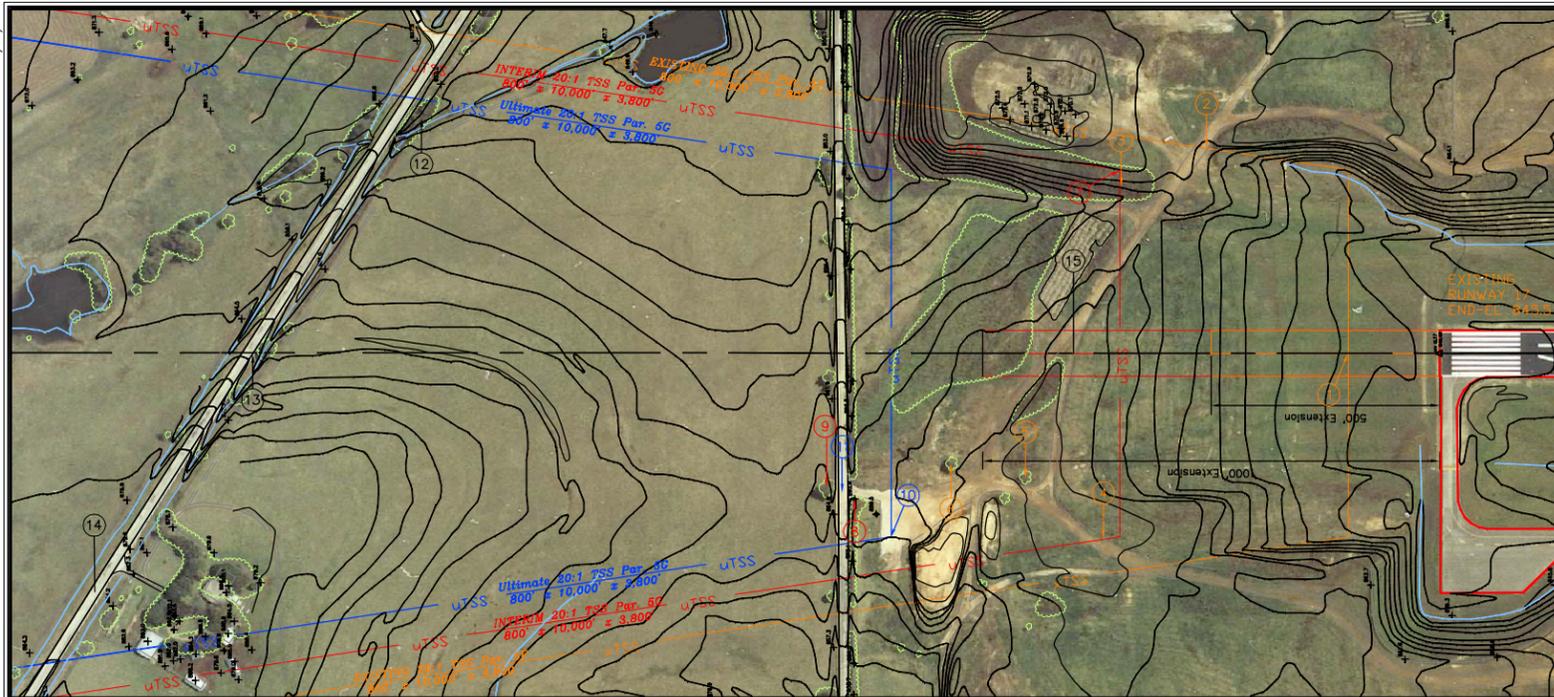
no obstructions to the TSS surface on either end of the runway.

The clearance of the TSS surface to Taxiway A is approximately 24 feet. When large business jets, such as the Gulfstream V with a tail height of 26 feet, use Taxiway A, the tail of the aircraft could create a penetration to the TSS surface. Two options are available to solve this problem. First, hold-lines can be placed on Taxiway A in order to warn against taxiing while another aircraft is on approach to Runway 12. Second, Runway 12 can be further displaced approximately 10 feet, in order to provide for tail clearance of the TSS by the critical aircraft using the airport.

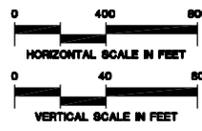
LANDSIDE CONSIDERATIONS

The orderly development of the airport terminal area can be the most critical, and probably the most difficult, development to control on the airport. A development approach of taking the path of least resistance can have a significant effect on the long term viability of an airport. Allowing development without regard to a functional plan could result in a haphazard array of buildings and small ramp areas, which will eventually preclude the most efficient use of the valuable space along the flight line.

Activity in the terminal area should be divided into three areas at an airport. The high-activity area should be planned and developed as the area providing aviation services on the



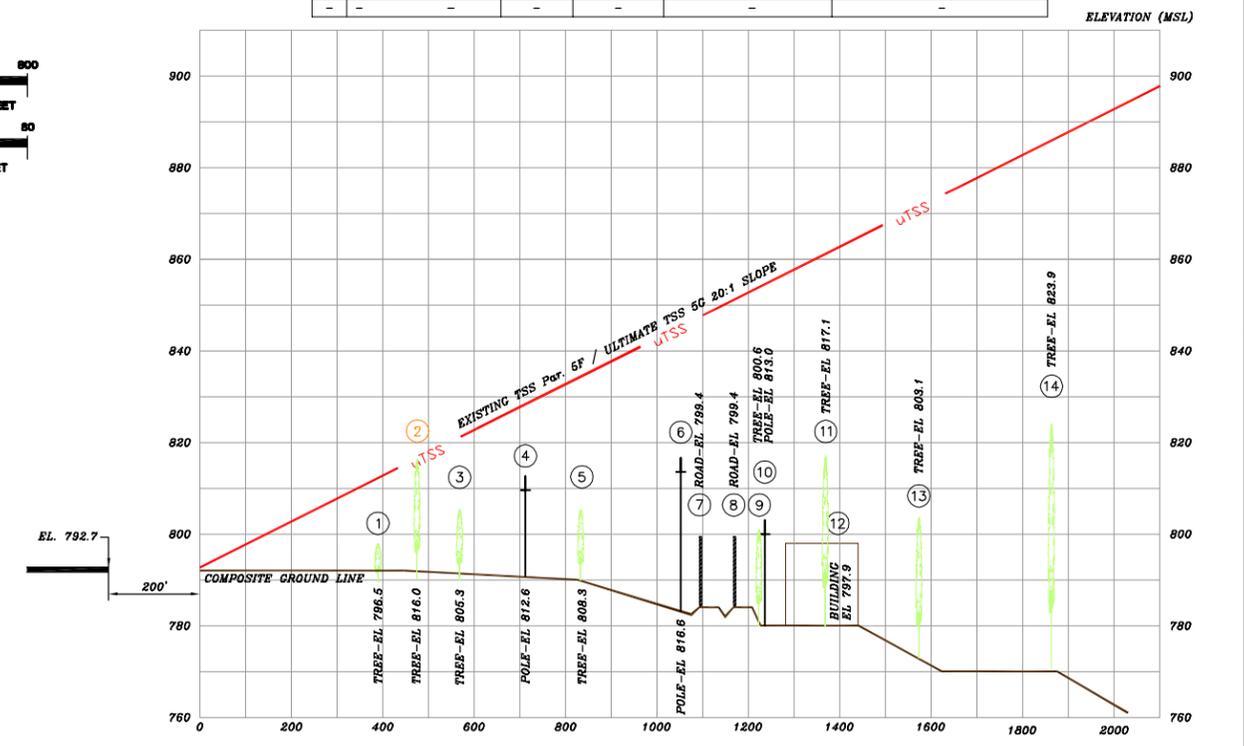
GAINESVILLE MAPPING 10/30/04

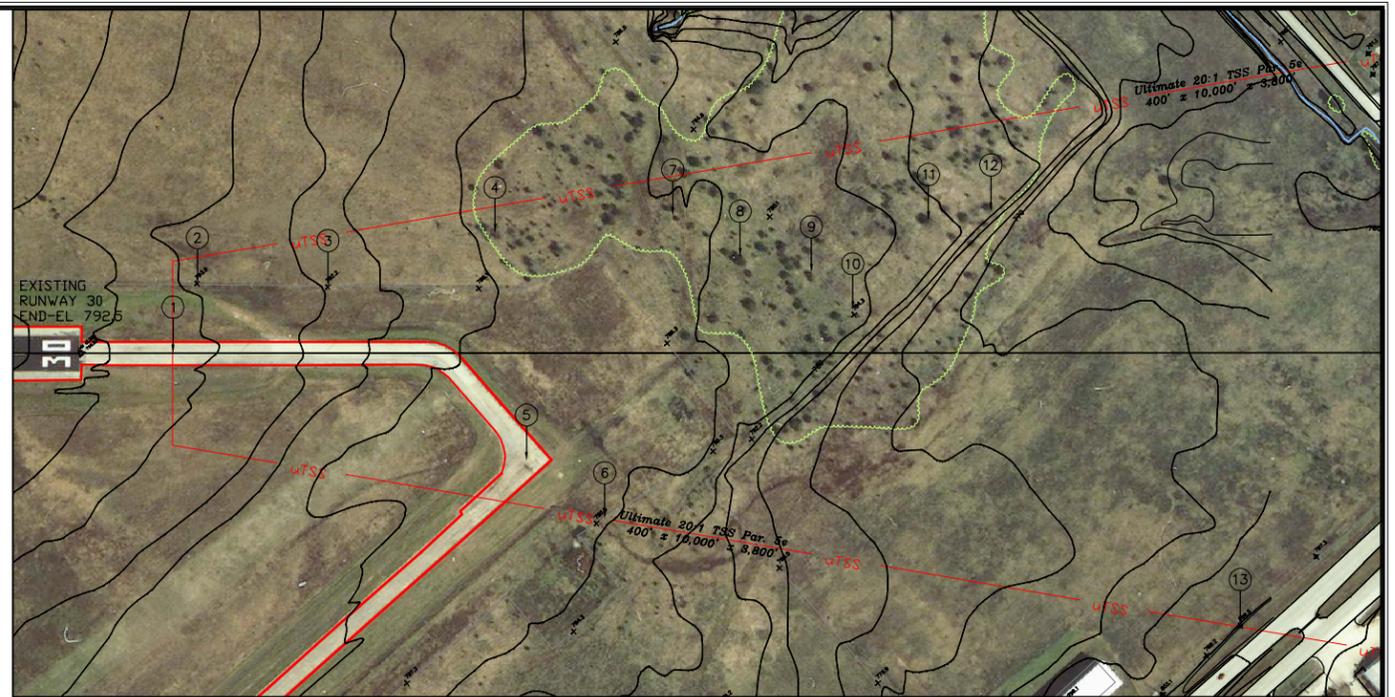
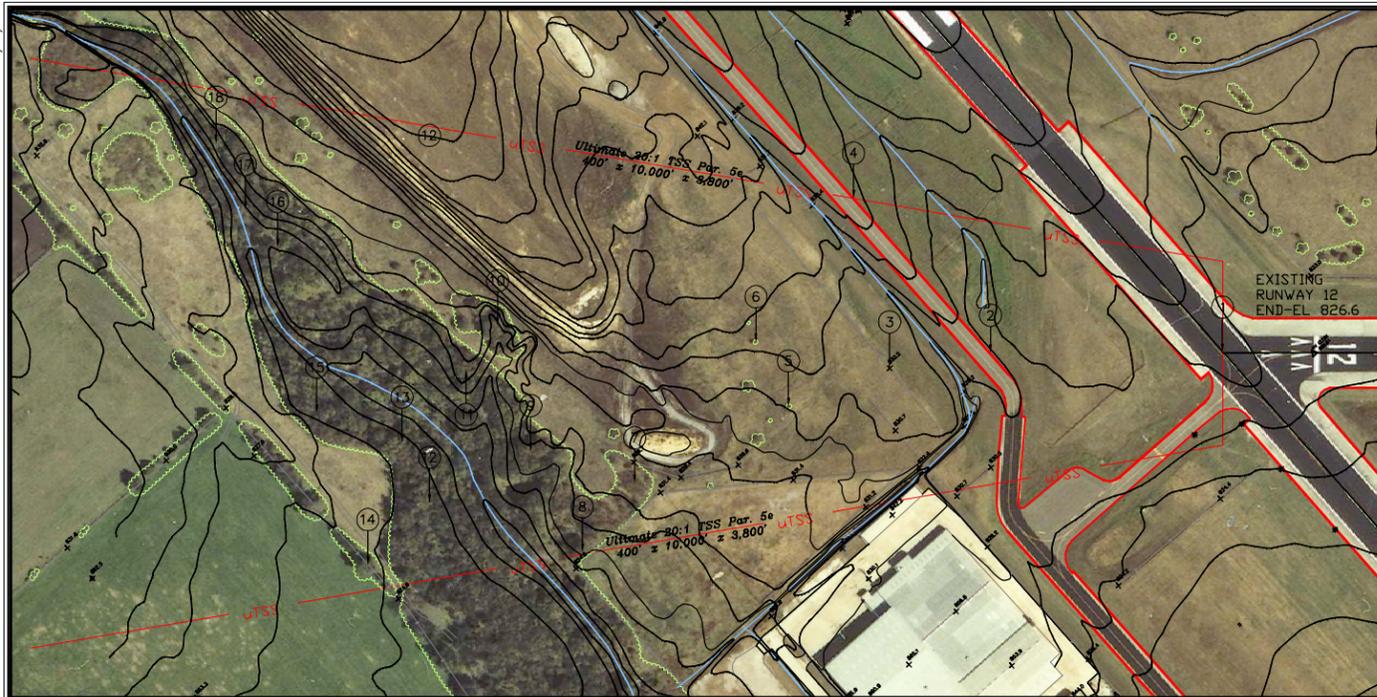


EXISTING/ULTIMATE RW 35 Threshold Siting Surface Obstructions						
No.	Object Description	Top Elevation	Runway Elevation	Distance fm Surface	Existing TSS Par 5F 20:1 Slope	Ultimate TSS Par 5G 20:1 Slope
2	TREE	EL. 816.0	EL. 792.7	476'	CLEAR BY 0.5'	CLEAR (TRIM OR REMOVE)
-	-	-	-	-	-	-

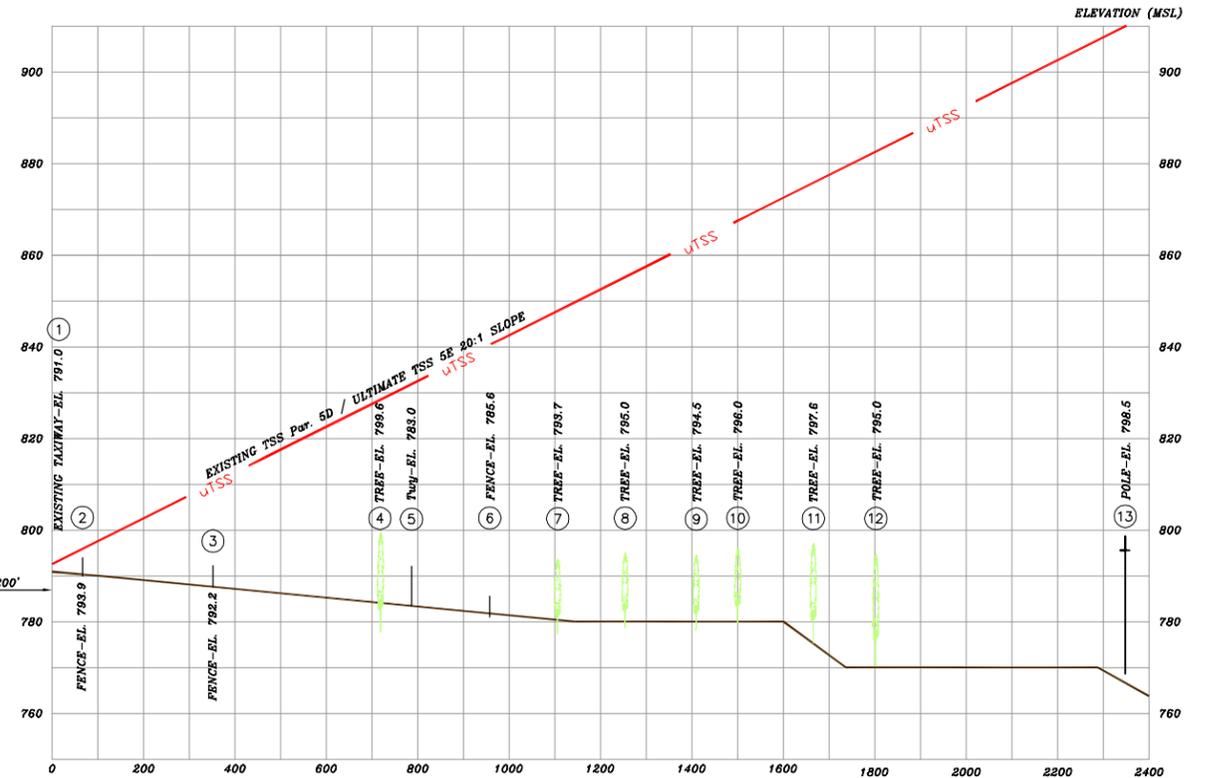
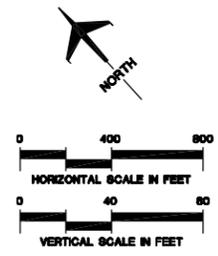
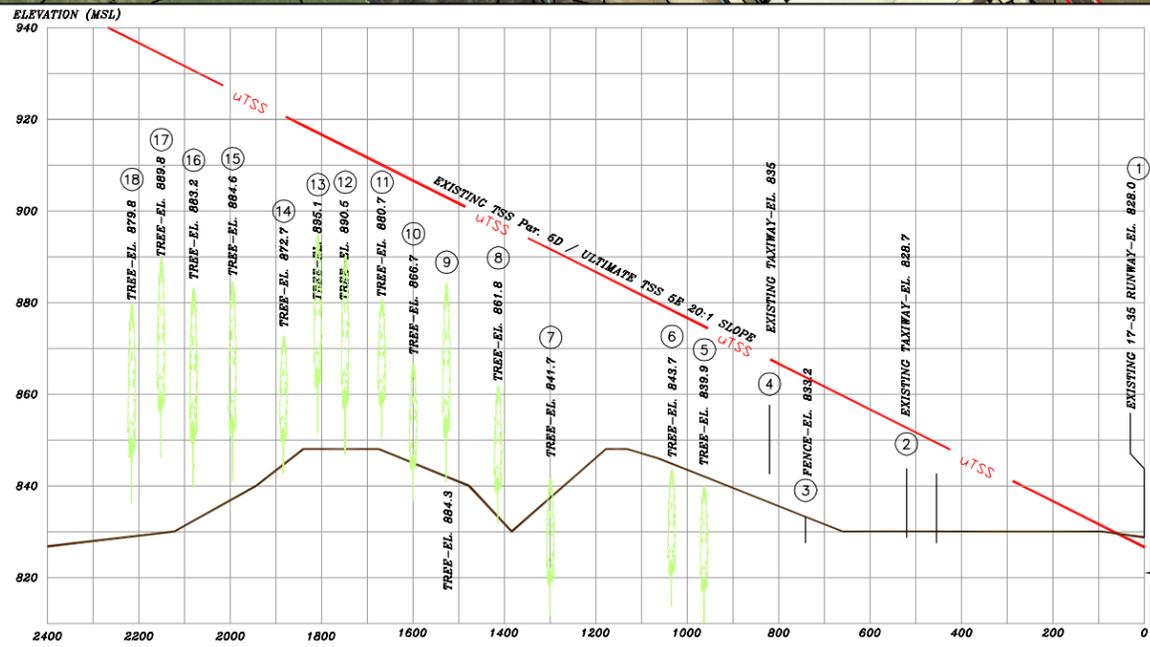
EXISTING/ULTIMATE RW 17 Threshold Siting Surface Obstructions								
No.	Object Description	Top Elevation	Runway Elevation	Distance fm Surface	Existing TSS Par 5F 20:1 Slope	Alt 1 Ultimate TSS Par 5G 20:1 Slope	Alt 2 Ultimate TSS Par 5G 20:1 Slope	Alt 3 Ultimate TSS Par 5G 20:1 Slope
1	TERRAIN	EL. 848	EL. 845.5	0'	3.5'	3.5'		
2	ROAD	EL. 878.4	EL. 845.5	309.7'	17.4'	17.4'		
3	TREE	EL. 871.6	EL. 845.5	496.7'	1.3'	1.3'		
4	ROAD	EL. 879.7	EL. 845.5	535.8'	7.4'	7.4'		
5	TREE	EL. 882.9	EL. 845.5	706.3'	2'	2'		
ALTERNATIVE 2								
4	ROAD	EL. 879.7	EL. 845.5	35.8'			32.4'	
5	TREE	EL. 882.9	EL. 845.5	206.3'			27.1'	
6	TREE	EL. 884.0	EL. 845.5	369.4'			20'	
7	TERRAIN	EL. 864.0	EL. 845.5	0'			18.5'	
8	POLE	EL. 895.8	EL. 845.5	579.9'			21.3'	
9	TREE	EL. 888.9	EL. 845.5	641.5'			11.3'	
ALTERNATIVE 3								
8	POLE	EL. 895.8	EL. 845.5	79.9'				46.3'
9	TREE	EL. 888.9	EL. 845.5	141.5'				36.3'
10	TERRAIN	EL. 860.0	EL. 845.5	0'				14.5'
11	ROAD	EL. 874.2	EL. 845.5	95.5'				23.9'

* ELEVATIONS ADJUSTED UPWARD 10' FOR PRIVATE ROAD, 15' FOR PUBLIC ROADWAY, 17' FOR INTERSTATE HIGHWAY.





GAINESVILLE MAPPING 10/30/04



EXISTING/ULTIMATE RW 12 Threshold Siting Surface Obstructions

No.	Object Description	Runway Top Elevation	Distance fm Surface	Existing TSS Par 5D 20:1 Slope	Ultimate TSS Par 5E 20:1 Slope
-	NONE	-	-	-	-
-	-	-	-	-	-
-	-	-	-	-	-

* ELEVATIONS ADJUSTED UPWARD 10' FOR PRIVATE ROAD, 15' FOR PUBLIC ROADWAY, 17' FOR INTERSTATE HIGHWAY.

EXISTING/ULTIMATE RW 30 Threshold Siting Surface Obstructions

No.	Object Description	Runway Top Elevation	Distance fm Surface	Existing TSS Par 5D 20:1 Slope	Ultimate TSS Par 5E 20:1 Slope
-	NONE	-	-	-	-
-	-	-	-	-	-
-	-	-	-	-	-

* ELEVATIONS ADJUSTED UPWARD 10' FOR PRIVATE ROAD, 15' FOR PUBLIC ROADWAY, 17' FOR INTERSTATE HIGHWAY.



airport. An example of the high-activity area is the aircraft parking apron, which provides outside storage and circulation of aircraft. In addition, large conventional hangars housing fixed base operators (FBOs) and corporate aviation departments, or for use as storage for a large number of aircraft, would be considered a high-activity use. A conventional hangar structure in the high-activity area should be a minimum of 6,400 square feet (80 feet by 80 feet). If space is available, it is more common to plan these hangars for 150' x 150' to 200' x 200'. The best location for high-activity areas is along the flight line near midfield, for ease of access to all areas of the airfield.

The medium-activity category defines the next level of airport use and primarily includes smaller corporate aircraft that may desire their own executive or conventional hangar storage on the airport. A hangar in the medium-activity use area should be at least 50 feet by 50 feet, or a minimum of 2,500 square feet. The best location for medium-activity use is off the immediate flight line, but still with ready access to the runway/taxiway system. Parking and utilities such as water and sewer should also be provided in this area.

The low-activity use category defines the area for storage of smaller single and twin-engine aircraft. Low-activity users are personal or small business aircraft owners who prefer individual space in shade or T-hangars. Low-activity areas should be located in less-conspicuous areas, off the flight line.

This use category will require electricity, but generally does not require water or sewer utilities.

In addition to the functional compatibility of the terminal area, the proposed development concept should provide a first-class appearance for Gainesville Municipal Airport. Consideration to aesthetics should be given high priority in all public areas, as the airport can many times serve as the first impression a visitor may have of the community.

The existing terminal area at Gainesville Municipal Airport has been developed with mixed-activity areas. The existing development layout, however, does not appear to be causing efficiency problems. In the future, consideration should be given to developing facilities with greater separation between activity levels.

Ideally, terminal area facilities at general aviation airports should follow a linear configuration parallel to the primary runway. The linear configuration allows for maximizing available space, while providing ease of access to terminal facilities from the airfield. Each landside alternative will address development issues. Separation of activity levels and efficiency of layout will be provided as well.

With approximately 1,336 acres, Gainesville Municipal Airport has the land area to provide adequate airside and landside facilities to meet projected aviation demand. In addition, the airport can use land which is not projected to be necessary for airport

operations, for non-aviation revenue-generating purposes, such as business/industrial parks.

Attracting both aviation and non-aviation businesses to the airport environs serves many positive purposes. First, it would generate direct revenue for the airport in the form of lease revenue. Second, it would provide additional jobs for local citizens as well as bolster the tax base for the City and County. Third, the development of these businesses would create a buffer between the airport and incompatible land uses, such as residential housing.

AIRFIELD ALTERNATIVES

The following section describes two airfield development alternatives. These alternatives consider upgrading Runway 17-35 to ARC C/D-II design criteria, extending the runway to 6,500 feet and ultimately 7,000 feet, and providing taxiway improvements. Approaches to Runway 17-35 are considered with not lower than three-quarter mile visibility minimums. Runway 12-30 is considered for an instrument (GPS) approach with visibility minimums not lower than one mile. Runway 12-30 is designed to remain at B-II design standards.

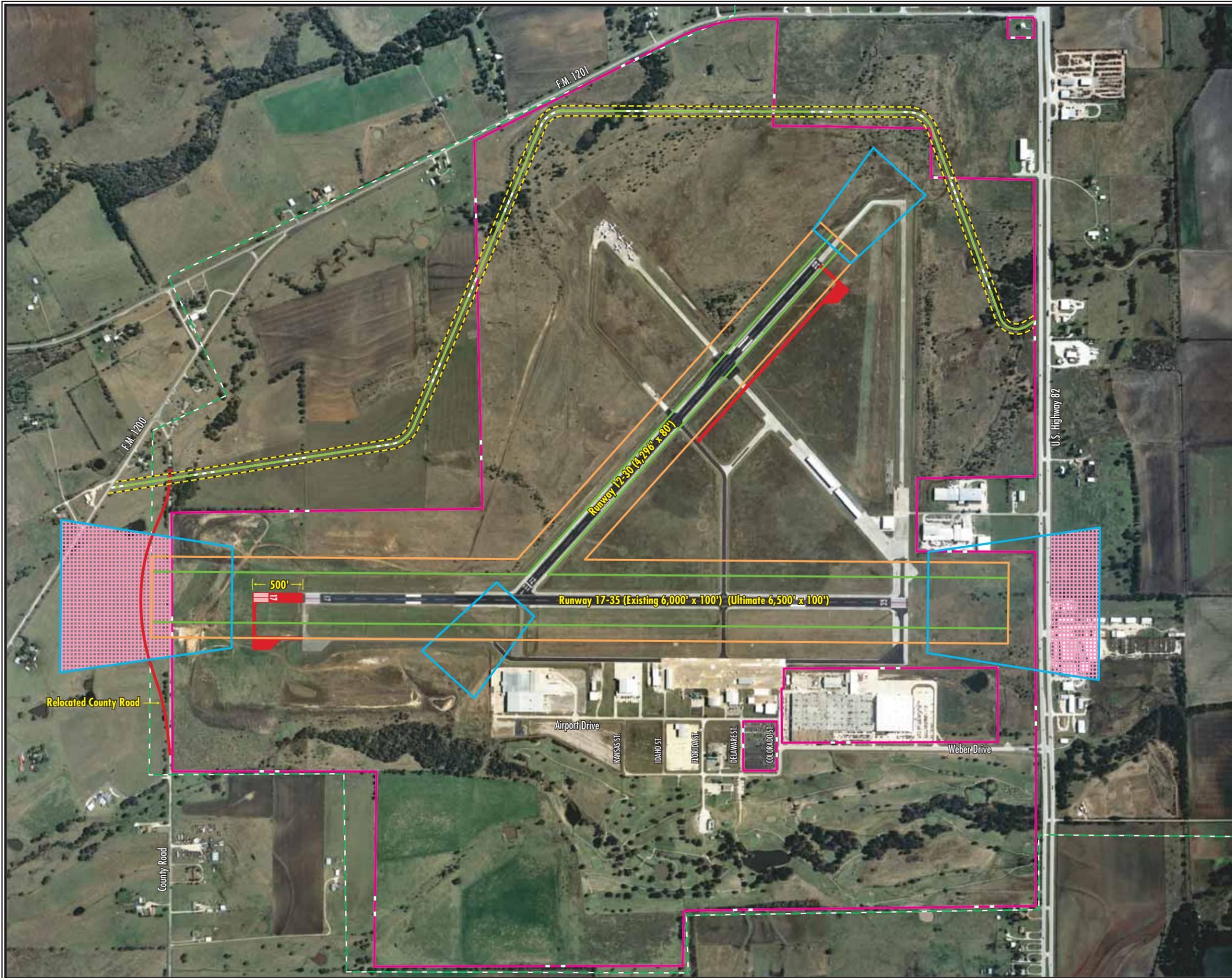
Both alternatives consider providing the runway extension on the north end. A southerly extension is not considered fiscally feasible for a number of reasons. First, US Highway 82 would need to be either relocated or bridged. Second, many of the businesses on the south side of US Highway 82 would need to be

relocated. It is very expensive to relocate commercial businesses. For these reasons a southerly extension is not considered further.

AIRFIELD ALTERNATIVE A

Alternative A, depicted on **Exhibit 4E**, considers the potential to extend Runway 17-35, 500 feet to the north, achieving a runway length of 6,500 feet. This addition to the runway would extend the RSA and OFA beyond the existing property line, across County Road 404. As depicted, County Road 404 would need to be rerouted north of the proposed RSA and OFA. Although the relocated road could pass through the RPZ, as long as it didn't then constitute an obstruction to the TSS, it is recommended that the road be relocated completely outside of all safety areas.

The proposed RSA, OFA, and RPZ would all extend beyond the current property boundary, necessitating land acquisition to the north. The total area of land outside the property line but within the safety area is approximately 34 acres. The OFA and RSA combined are 3.78 acres. At a minimum the airport would need to acquire the RSA and OFA areas outside of the property line, but it is further recommended that the airport acquire the RPZ. At the very least the airport should have positive control over what is developed in the RPZ. The use of avigational easements is a common practice, but even easements can cost up to 80 percent of the acquisition price. Where



LEGEND

-  Existing Airport Property Line
-  City Limit
-  Magnolia Gas Line
-  Magnolia Petroleum Company Easement
-  Property Acquisition
-  Ultimate Pavement
-  Runway Protection Zone (RPZ)
-  Object Free Area (OFA)
-  Runway Safety Area (RSA)



possible, it is recommended to purchase all lands which fall into all safety areas.

On the south end of the runway, the RSA and OFA fall on airport property. Twenty-two (22) acres of the RPZ extends beyond the property boundary. Falling within the RPZ on the south end is a portion of US Highway 82 and a number of commercial/industrial building to the south of the highway. It is very expensive to buy businesses and relocate them. Avigational easements should be obtained for those areas in the RPZ south of US Highway 82.

It should be noted that FAR Part 77, *Objects Affecting Navigable Airspace*, currently provides legal protection from height obstructions. Part 77 defines a series of imaginary surfaces surrounding airports. The imaginary surfaces consist of the approach zone, conical zones, transitional zones and horizontal zones. Objects, such as trees, towers, buildings or roads which penetrate any of these surfaces are considered by the FAA to be an obstruction to air navigation. Thus, some avigational protection is already provided.

AIRFIELD ALTERNATIVE B

A second option for satisfying projected airfield needs is to provide for a 1,000-foot northerly extension. This would bring the total runway length to 7,000 feet. Again the RSA and OFA extend an additional 1,000 feet beyond the runway threshold. These areas then cross County Road 404, necessitating

the relocation of the road. **Exhibit 4F** depicts this alternative.

The total area of land outside the north-end property line, but within the safety areas, is approximately 47 acres. The OFA and RSA are approximately 13 acres. As with the previous alternative, approximately 22 acres on the south-end RPZ is off airport property. The same recommendations for safety area ownership would apply.

AIRFIELD ALTERNATIVES SUMMARY

The analysis performed above considered several methods which attempt to provide additional runway length to meet increased demand by corporate aircraft, while also attempting to meet FAA and TxDOT design criteria. Alternative A, the northerly 500-foot extension of Runway 17-35, would provide enough runway length to meet the needs of most business jets.

Alternative B proposes a 1,000-foot northerly extension to Runway 17-35. This alternative is preferred and will increase the opportunity for C/D-II aircraft to utilize the airport in a safe manner. As previously mentioned, many business jets which currently operate at Gainesville Municipal Airport have circumstances under which runway lengths of 7,000 feet or greater are preferred. Both alternatives satisfy projected runway length and safety area needs for the airport through the long term planning period.

Either Alternative A or B would be acceptable to meet the projected needs of aircraft utilizing the airport. Alternative A would be slightly less expensive. Eventually, Alternative B will need to be implemented, so it is likely that in the long term it is less expensive to provide for the 1,000-foot extension all at once rather than doing two separate projects of 500 feet each. The final, or recommended concept, will be refined after meetings with the City, Planning Advisory Committee, TxDOT, and the public.

LANDSIDE ALTERNATIVES

The following section describes three landside development alternatives. These alternatives consider general aviation facility development providing separation of activity levels. The goal of this analysis is to indicate development potentials which would provide the City with a specific goal for future development. The resultant plan will aid the City in strategic marketing of available properties.

Each of the landside alternatives will address the forecast needs from the previous chapter of this plan. This will include long term needs for more T-hangars and conventional hangar space. With the growth in jet traffic utilizing Gainesville Municipal Airport, there is an additional need for executive hangar space as well. Elements such as automobile parking, fuel storage, and aircraft apron area are addressed in order to appropriately support new structure development.

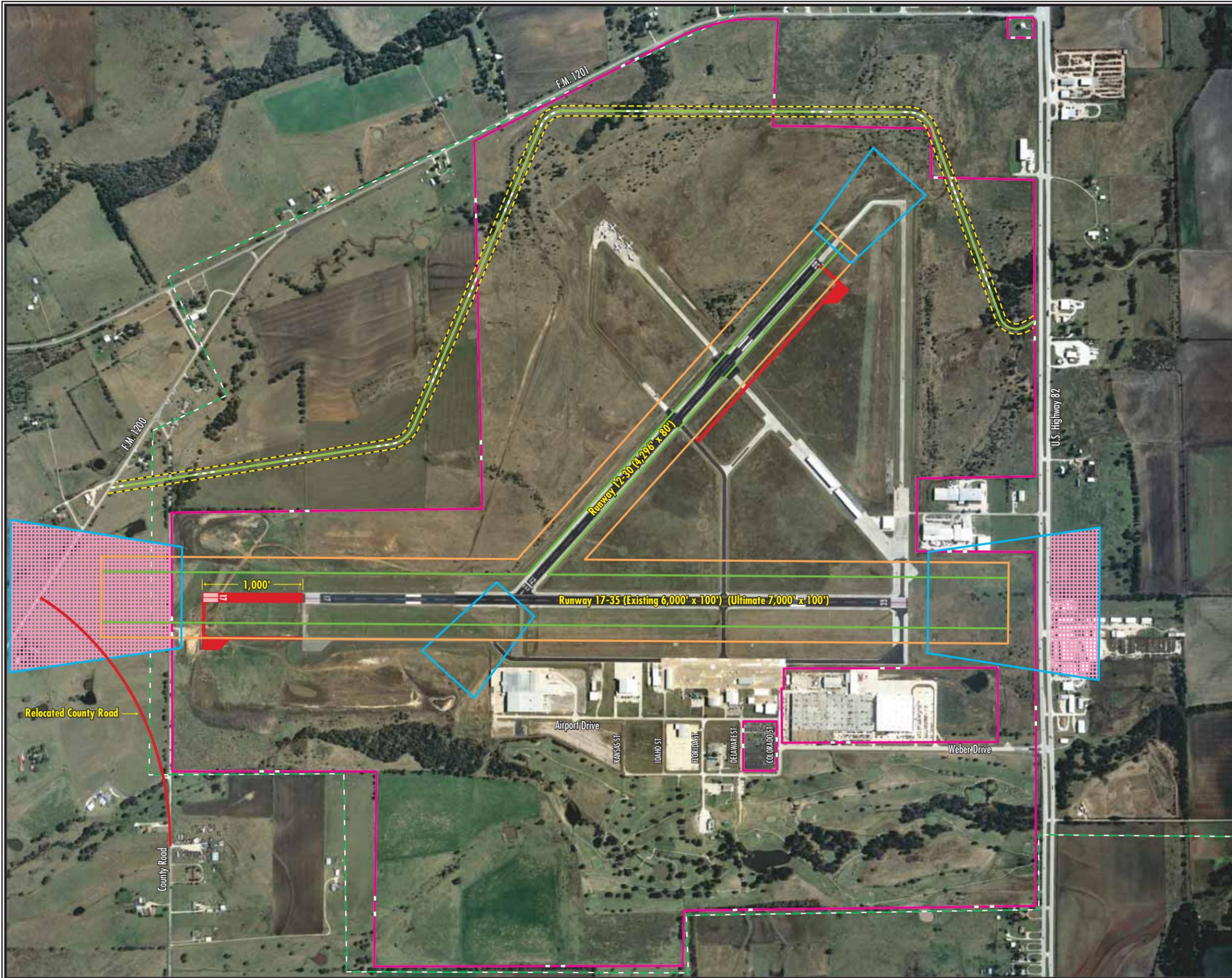
Gainesville Municipal Airport encompasses approximately 1,336 acres. Because of this, the possibilities for development alternatives are endless. The following development alternatives analysis utilizes accepted airport planning methodologies in conjunction with FAA AC 5300/13 Change 8, *Airport Design*.

GENERALIZED LAND USE

There are four areas which will be given specific attention for planned development. The first is the existing flight line. The second is the area to the west of the north end of Runway 17-35. The third is the area on the southeast side of the airfield. This area currently includes two T-hangar and a box hangar development. The fourth area is to the east of Runway 12-30. Although development to the east of Runway 12-30 is likely a long-term vision, proper planning now will ensure that this valuable airfield space is properly developed when demand warrants. **Exhibit 4G** depicted the generalized land use plan for future airport development.

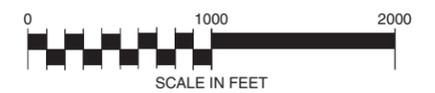
ECONOMIC DEVELOPMENT AREAS

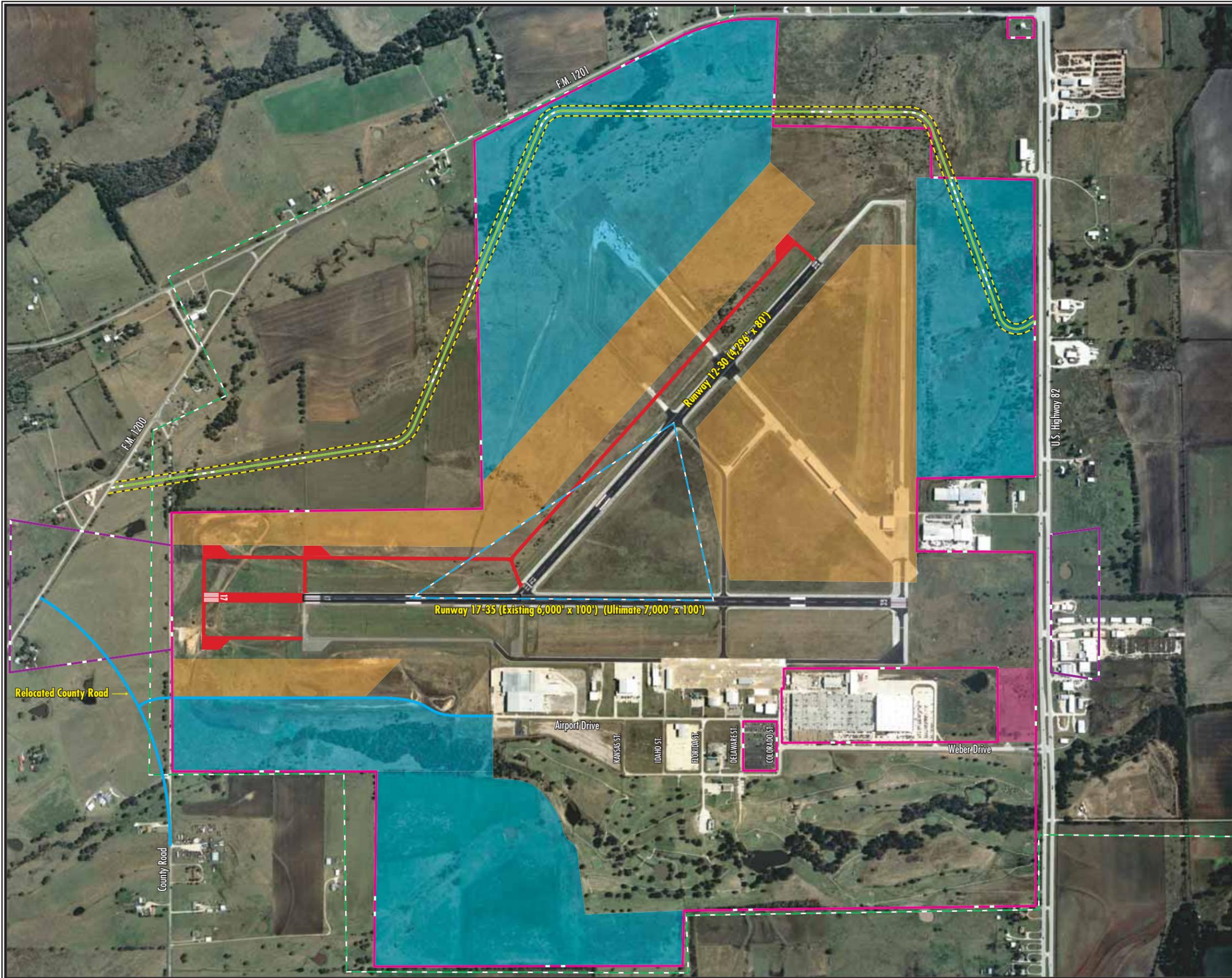
The airfield space to the east of Runway 12-30 should be designated for future airside growth and short term industrial growth. The first 1,000 feet from the runway centerline should be reserved for direct airside development. This would include a parallel taxiway to



LEGEND

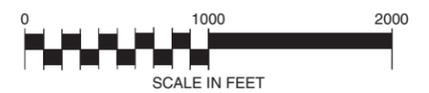
-  Existing Airport Property Line
-  City Limit
-  Magnolia Gas Line
-  Magnolia Petroleum Company Easement
-  Property Acquisition
-  Ultimate Pavement
-  Runway Protection Zone (RPZ)
-  Object Free Area (OFA)
-  Runway Safety Area (RSA)





LEGEND

-  Existing Airport Property Line
-  Ultimate Airport Property Line
-  City Limit
-  Magnolia Gas Line
-  Magnolia Petroleum Company Easement
-  Line of Sight Clear Zone
-  Ultimate Pavement
-  Airfield Development
-  Industrial Development
-  Commercial Development



Runway 12-30 with at least 400 feet of separation. The next 100 feet should be reserved for separation between the taxiway and other objects such as aircraft tie-downs. The remaining 500 feet should be designated for apron and hangar development. All of the land beyond this airside development buffer can be used for compatible land uses such as an industrial park.

Developing the east side of the airfield as an industrial/business park will require significant study prior to implementation. There are currently no utilities to this part of the airfield. The expense associated with providing sewer and other utilities will need to be addressed.

In 1996, an environmental site assessment was conducted on a 50-acre parcel located in the southeast corner of the airport property. The conclusion identifies various drainage systems and a vacant chrome plating facility to the east of FM 1201 as potential areas of concern. Thus, prior to development of the east side of the airfield, further environmental study will likely be needed.

AUTOMOBILE PARKING

Limiting vehicular traffic on the airfield is considered prudent for two very important reasons. First, the interaction of automobiles and aircraft is not especially safe. This should be limited, where possible, to airport service and maintenance vehicles. Second, in the post 9/11 aviation environment, airport security is a

concern. Dedicated road and parking access should be provided to all airfield structures. For those structures where dedicated road access is not feasible, secure gating should be planned for in the future. Currently there is no regulation for general aviation airports to limit access, but appropriate planning today can address both of these airfield concerns.

SEPARATION DISTANCES

FAA and TxDOT design standards call for minimum separation distances between aircraft and objects. The taxiway/taxilane object free area (TOFA) identifies this separation based on the airport reference code (ARC). Gainesville Municipal Airport is forecast to be in ARC C/D-II in the short term. The TOFA for group II (those with wingspans from 49 to 79 feet) aircraft is 131 feet. For group III aircraft (those with wingspans from 79 to 118 feet) the TOFA is 186 feet. Standards for taxilanes are slightly less. Where possible, separation distances for group III aircraft is provided.

The three alternatives described below are not the only options for development. In some cases, a portion of one alternative could be intermixed with another. Also, some development concepts could be replaced with others. The plan only serves as a guide for the City. Many times, airport operators change their plan to meet the needs of specific users. The goal in analyzing landside development alternatives is to

focus future development so that airport property can be maximized.

ACCESS ROADS

Currently there is only one road, Weber Drive, which provides access to the airport by connecting with Airport Drive. As discussed previously, this road becomes congested at regular times during the day due to shift-change at Weber Aircraft. Each of the landside alternatives presented will address this concern by extending Airport Drive to County Road 404 to the north.

LANDSIDE ALTERNATIVE A

This alternative first addresses potential development of the terminal flight line. It is often more cost effective to first utilize any available land along the flight line. Typically, utilities and sanitation lines are already in place or only minor extensions are necessary.

The terminal flight line at Gainesville Municipal Airport is near developmental capacity. There are very few areas available for development. As shown on **Exhibit 4H**, a box hangar and apron are proposed on the parcel immediately south of the Bell Helicopter complex. Moving south, a taxilane to the south of Excel Aviation is proposed, providing access to a 10-unit T-hangar structure. This taxilane is continued across Airport Drive to another T-hangar complex. Two 20-unit T-hangars could be placed in the parcel surrounded by Idaho and Kansas

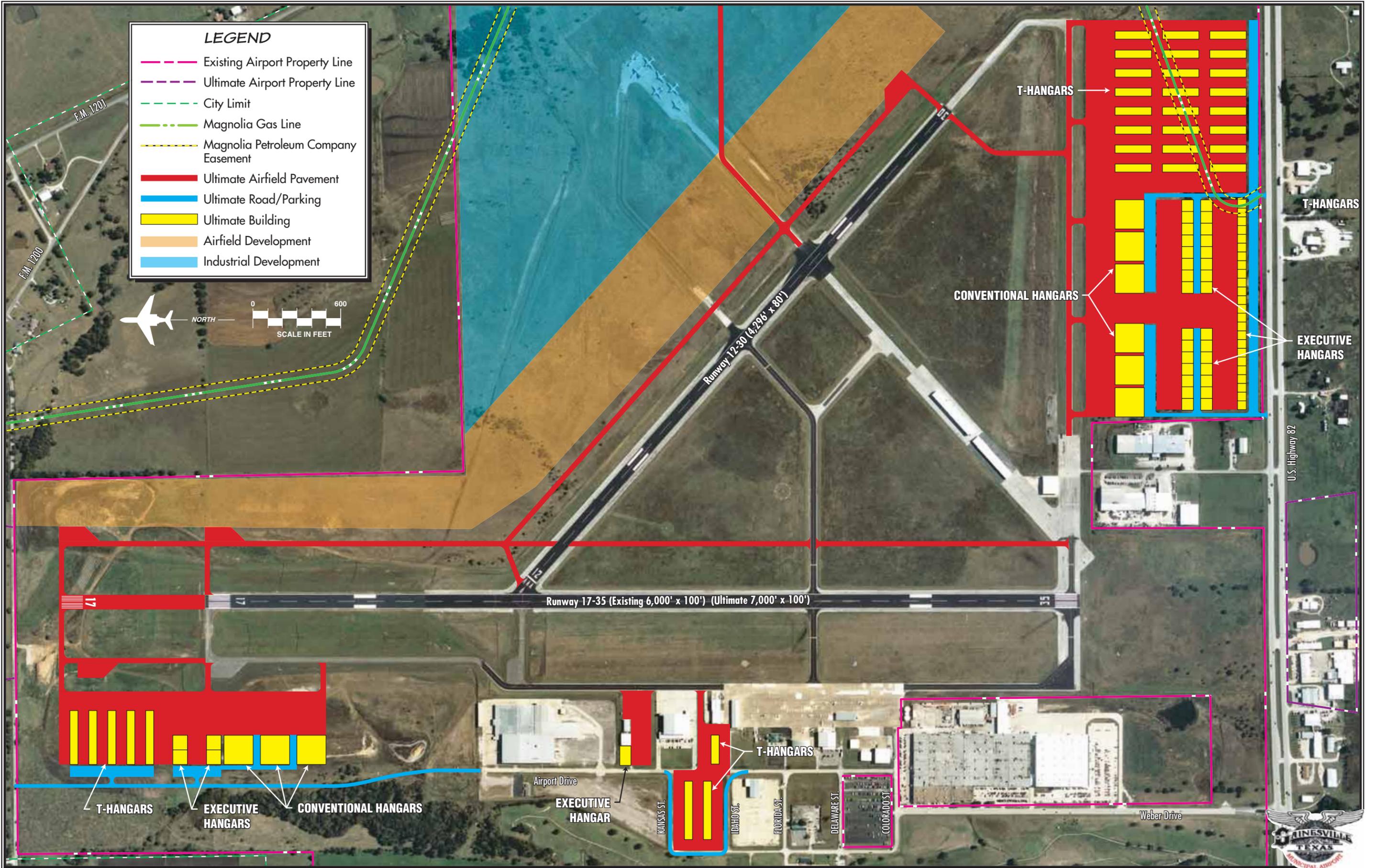
Streets. Primary Airport Drive traffic would then need to be diverted around the T-hangar complex.

The next best location for landside development would be to the north of Bell Helicopter. Appropriately separated from the future helipads and RPZ for Runway 12 is a proposed set of conventional hangars. Some executive hangars could then be located further to the north. Finally a series of T-hangars is proposed as a low activity area at the northernmost point of the apron.

Further development is shown for the south side of the airfield. The abandoned taxiway would need to be rehabilitated and an apron created. Several large 200' x 200' conventional hangars are depicted fronting the improved taxiway. To the south of the conventional hangars is a series of executive hangars which measure 80' x 80'. Further south is a row of 60' x 60' box hangars. Further east is a T-hangar complex, again occupying the low-activity areas.

As proposed, development of this part of the airfield will necessitate an eastern parallel taxiway to Runway 17-35. It is not ideal to have aircraft crossing the runway, and this movement should be minimized as much as possible. Without an eastern parallel taxiway, aircraft departing Runway 17 would be required to cross the runway to Taxiway A. In addition, airfield capacity would be reduced without the second parallel taxiway.

The area to the east of Runway 12-30 is generally planned. A taxiway is shown



extending into the proposed business park area. This represents the possibility of developing an industrial/commercial business park with the capability to make the park additionally attractive to potential businesses that have a need for airfield access.

LANDSIDE ALTERNATIVE B

This alternative provides for additional options for development of the existing flight line without diverting Airport Drive. Two T-hangars are proposed to the north of the existing fuel farm. Additional box hangars and an apron could be located to the north of Excel Aviation, as depicted.

The area to the north of Bell Helicopter is planned for four large conventional hangars, executive hangars and T-hangars at the far north end. Airport Drive is shown extending to County Road 404, providing for secondary airport access. Alternative 2 is presented on **Exhibit 4J**.

A significant feature of this alternative is the development of the airfield immediately to the south of Taxiway C. This plan strives to incorporate the existing development pattern.

A series of large conventional hangars is proposed facing the primary runway in the southeastern portion of the airport. These types of hangars are typically reserved for aviation businesses such as fixed based operators (FBOs), flight schools or maintenance facilities. To the east of

the conventional hangars is a group of executive hangars. In the center of this development, T-hangars are shown which continue the existing T-hangar layout. The far east side of this large apron area has additional conventional and executive hangars.

As an airport attracts more based aircraft, additional amenities are desired. This alternative also includes the construction of a wash rack. A wash rack is a designated area for aircraft owners to wash their airplanes. A wash rack requires increased drainage and collection capability. When planning for a wash rack, environmental issues can also arise, as people tend to use cleaning agents to wash their aircraft.

A parallel taxiway to Runway 12-30 is also proposed. Like the eastern parallel to Runway 17-35 proposed in alternative A, this parallel taxiway serves to minimize runway crossings and to increase airfield capacity.

The area to the south of the taxiway to the Runway 30 end is designated for industrial/commercial development. An aesthetically pleasing entryway from Highway 82 is proposed. This entryway would provide access to not only any business park development, but also to all east-side airfield development.

LANDSIDE ALTERNATIVE C

Alternative 3, depicted on **Exhibit 4K**, combines many of the elements previously presented, with slight variations. The infield between the two runways is again developed, but is

proposed perpendicular to Runway 12-30 rather than parallel to Runway 17-35. This alternative also considers a variation for development of the northwest end of Runway 17-35. As before, Airport Drive is depicted extending to the county road.

The area to the south of the taxiway which once led to the Runway 30 end is identified as an industrial park with airfield access capability. Again, an aesthetically pleasing boulevard-type entry from Highway 82 is developed.

This alternative places T-hangars in the center of the large apron. Spreading out from the center is a series of executive hangars. Finally, the outer portion of the apron is developed with the large conventional hangars. Adequate taxiway development is also shown.

LANDSIDE SUMMARY

All three alternatives propose development which would exceed the demand levels forecast in this plan. Actual demand levels will likely dictate facility development. For example, if the airport were required to house a large number of small aircraft, the decision to build (or allow private developers to build) T-hangars would be prudent. However, if corporate aircraft are more demanding, executive or conventional hangar development would be necessary.

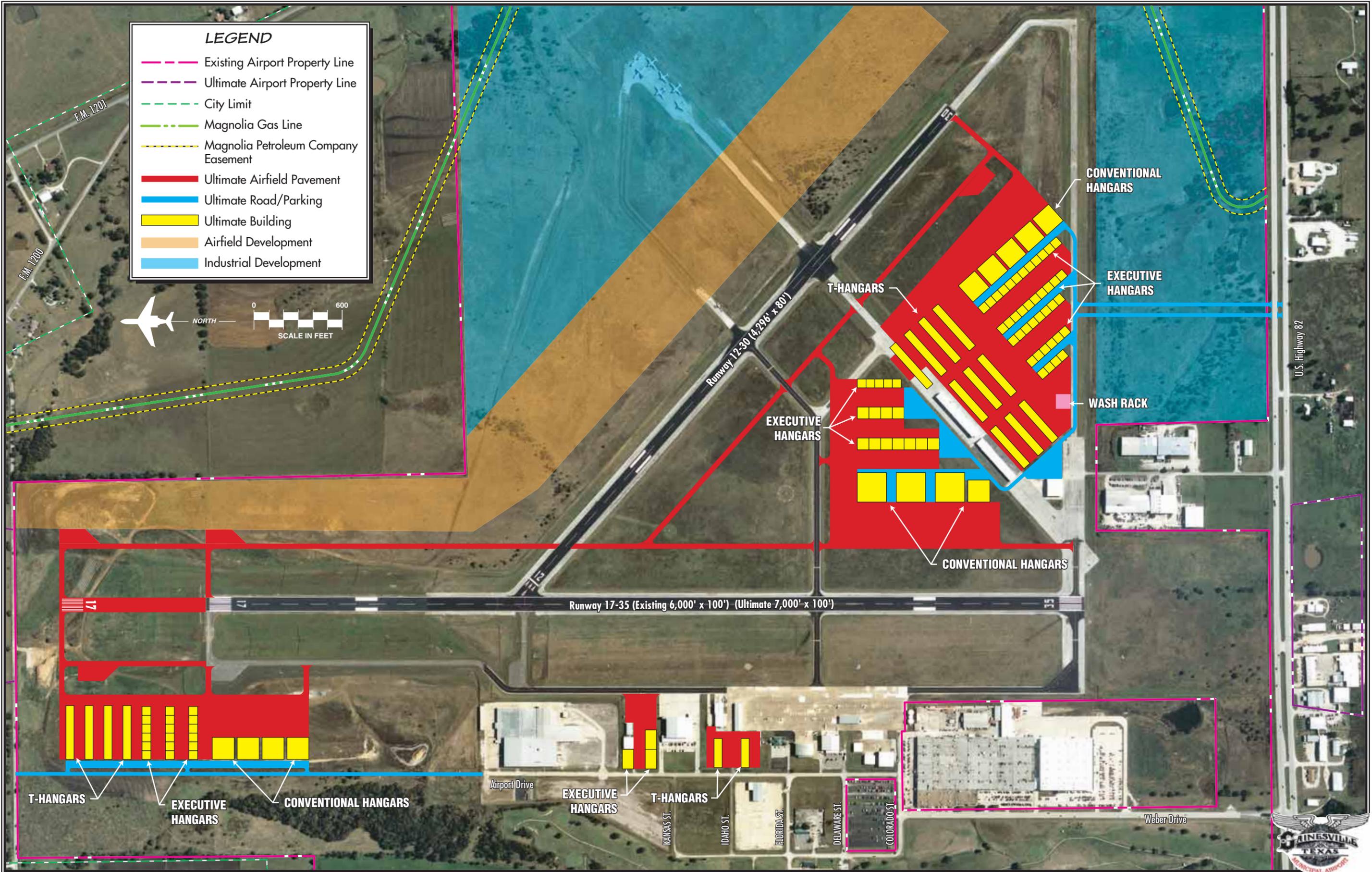
The ultimate plan will provide the City the means to meet the future demands

in an efficient manner. Each alternative does, however, give the City a future vision of what the airport could become. This vision is important, as it shifts the focus from haphazard, build-as-you-go development to a long-term, focused development process. As a result, the City will be capable of providing a first-class airport which maximizes airport property.

SUMMARY

The process utilized in assessing the airside and landside development alternatives involved a detailed analysis of short and long term requirements, as well as future growth potential. Current airport design standards were considered at every stage in the analysis. Safety, both air and ground, were given a high priority in the analysis of alternatives.

After review and input from the Planning Advisory Committee (PAC), City officials, and the public, a recommended concept will be developed by the consultant. The resultant plan will represent an airside facility that fulfills safety design standards, and a landside complex that can be developed as demand dictates. The development plan for Gainesville Municipal Airport must represent a means by which the airport can evolve in a balanced manner, both on the airside and landside, to accommodate the forecast demand. In addition, the plan must provide flexibility to meet activity growth beyond the long range planning horizon.



The following chapters will be dedicated to refining the basic concept into a final plan, with recommendations to ensure

proper implementation and timing for a demand-based program.



Chapter Five
AIRPORT PLANS



AIRPORT PLANS

The airport master planning process has evolved through several analytical efforts in the previous chapters. These efforts intended to analyze future aviation demand, establish airside and landside needs, and evaluate options for the future development of the airport and its facilities.

In the previous chapter, several development alternatives were analyzed to explore different options for the future growth and development of Gainesville Municipal Airport. The development alternatives were refined into a single recommended concept for the master plan after meeting with the Planning Advisory Committee (PAC), who provided feedback to the consultant. It is expected that this concept will be further refined after the final review meeting with the PAC. This chapter describes, in narrative and graphic form, the recommended direction for the future use and

development of Gainesville Municipal Airport.

RECOMMENDED CONCEPT

The recommended master plan concept incorporates airside development elements suggested in Alternative B, presented in Chapter Four - Alternatives. Landside development closely follows the improvements suggested in Landside Alternative B. As a result, the recommended concept provides the airport with the ability to meet the increasing demands on the airport by corporate aircraft, while also providing adequate space for small, general aviation aircraft operators.

It is important to note that the finalized concept provides for anticipated facility needs over the next twenty years, as well as establishing a vision and direction for meeting facility needs



beyond the planning period. The following sections summarize specific airside and landside recommendations included in the final concept. The recommended concept is shown on **Exhibit 5A**.

AIRFIELD DESIGN STANDARDS

The Federal Aviation Administration (FAA) and the Texas Department of Transportation (TxDOT) - Aviation Division have established design criteria to define the physical dimensions of runways and taxiways, and the imaginary surfaces surrounding them which protect the safe operation of aircraft at the airport. These design standards also define the separation criteria for the placement of landside facilities.

As discussed previously, FAA and TxDOT design criteria primarily center around the airport's critical design aircraft. The critical aircraft is the most demanding aircraft or family of aircraft which will conduct 250 or more operations (take-offs or landings) per year at the airport. Factors included in airport design are an aircraft's wingspan, approach speed, and in some cases, the runway approach visibility minimums. The FAA has established the Airport Reference Code (ARC) to relate these factors to airfield design standards.

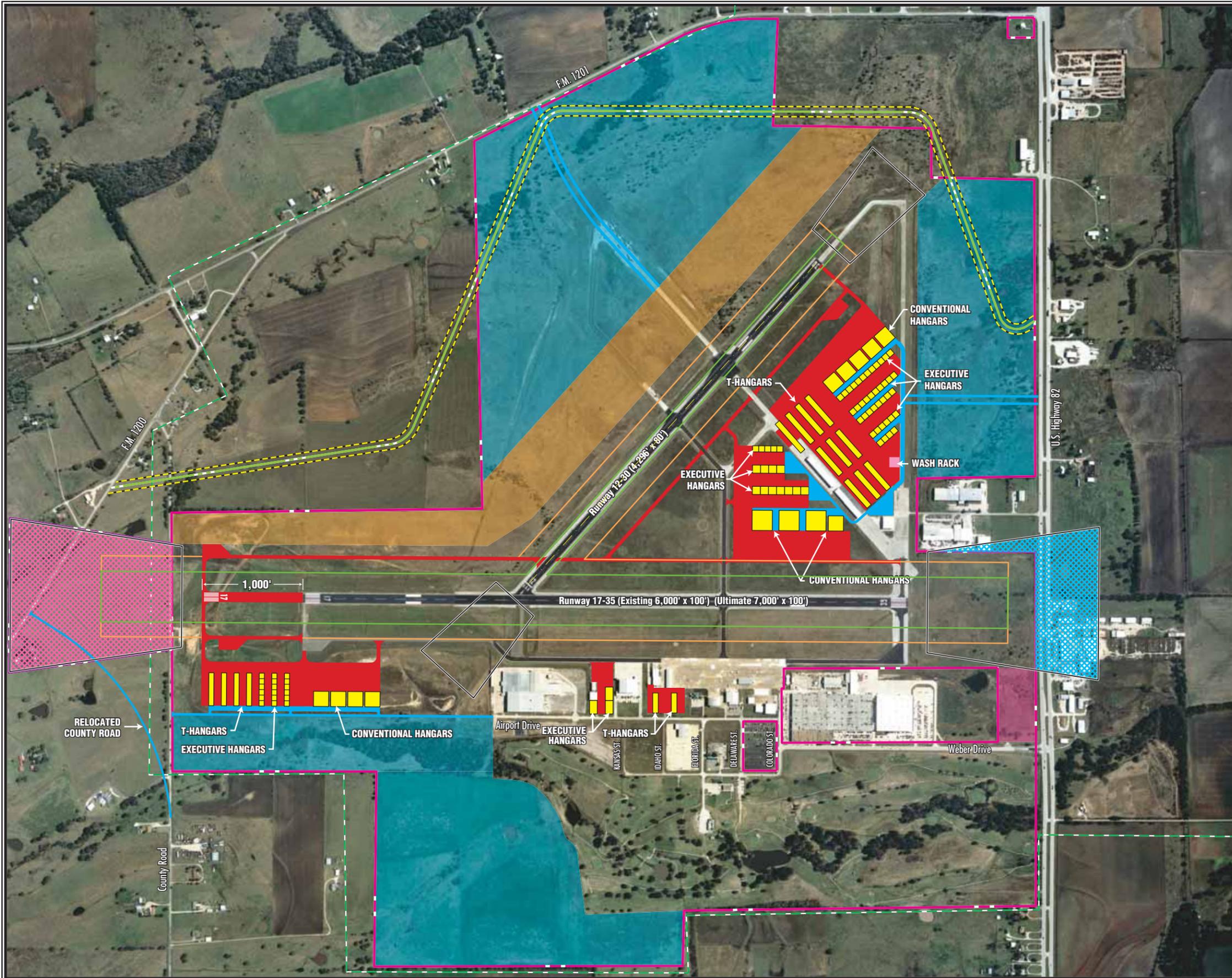
Gainesville Municipal Airport is presently used by a wide range of general aviation aircraft. The majority of these aircraft include single and multi-engine aircraft which fall into ARC A-I and B-I categories. In

addition, larger business turboprop and turbojet aircraft that fall within approach categories B, C, and D are using the airport more frequently.

Analysis conducted in Chapter Three - Facility Requirements, concluded that **the existing critical aircraft falls in ARC B-II**. This determination is founded upon the largest based aircraft being a Cessna Citation II (model 550) business jet, as well as frequent itinerant business jet activity. Much of the itinerant business jet activity is conducted by Falcon business jets utilizing the services of Excel Aviation, a speciality maintenance and repair fixed base operator (FBO) on the airfield.

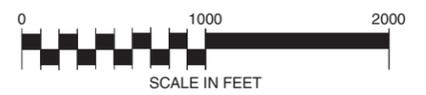
The master plan anticipates that business jet aircraft use at the airport will increase in the future, consistent with national trends and FAA forecasts. In addition, Excel Aviation will likely continue to attract Falcon jet maintenance activity. The newer Falcon jets fall in ARC C-II. Finally, activity of fractional-ownership operators at Gainesville Municipal Airport is projected to increase with national trends. Each of these factors indicates that **the future critical aircraft for Gainesville is forecast to transition to ARC C/D-II**.

Planning up to ARC C/D-II will allow the airport to accommodate the majority of business jets on the market today. Moreover, meeting ARC C/D-II design requirements will ensure that the airport is suitable to meet the existing and future demands of business users, ensuring that the City of Gainesville will remain competitive with other



LEGEND

- Existing Airport Property Line
- Ultimate Airport Property Line
- City Limit
- Magnolia Gas Line
- Magnolia Petroleum Company Easement
- Property Acquisition
- Property Easement
- Ultimate Pavement
- Ultimate Building
- Ultimate Road/Parking
- Runway Protection Zone (RPZ)
- Object Free Area (OFA)
- Runway Safety Area (RSA)
- Airfield Development
- Industrial Development
- Commercial Development



regional municipalities. **Table 5A** summarizes the airport design

standards to be applied at Gainesville Municipal Airport.

Table 5A Airfield Planning Design Standards (Ultimate) Gainesville Municipal Airport				
	Existing		Ultimate	
	Runway 17-35	Runway 12-30	Runway 17-35	Runway 12-30
DESIGN STANDARDS				
Airport Reference Code (ARC)	B-II	B-II	C/D-II	B-II
Lowest Visibility Minimum	1 mile	N/A	3/4 mile	1 mile
Runways				
Length (ft.)	6,000	4,296	7,000	4,296
Width (ft.)	100	80	100	75
Pavement Strength (lbs.)				
Single Wheel (SWL)	15,000	15,000	60,000	30,000
Shoulder Width (ft.)	10	10	10	10
Runway Safety Area				
Width (ft.)	150		500	150
Length Beyond Runway End (ft.)	300		1,000	300
Length Prior to Landing (ft.)	300		600	300
Object Free Area				
Width (ft.)	500		800	500
Length Beyond Runway End (ft.)	300		1,000	300
Obstacle Free Zone				
Width (ft.)	200		400	400
Length Beyond Runway End (ft.)	400		200	200
Taxiways				
Width (ft.)	35		35	35
OFA (ft.)	131		131	131
Centerline to Object (ft.)	66		66	66
Runway Centerline to:				
Parallel Taxiway Centerline (ft.)	400	240	400	240
Aircraft Parking Area (ft.)	500	250	500	250
Building Restriction Line (ft.)				
20-ft. Height Clearance	390		640	390
35-ft. Height Clearance	495		745	495
Runway Protection Zones				
Inner Width (ft.)	500		1,000	500
Outer Width (ft.)	700		1,510	700
Length (ft.)	1,000		1,700	1,000
Threshold Siting Surface (TSS)	20:1		20:1	20:1

Source: FAA Advisory Circular 150/5300-13, Airport Design, Change 8

AIRSIDE RECOMMENDATIONS

The recommended airside concept is presented on **Exhibit 5A**. Of primary consideration is providing the runway

system with the means to accommodate the larger and faster business jet aircraft which currently operate at the airport and are projected to account for the critical aircraft in the near future.

To meet these needs, the ultimate plan includes a 1,000-foot northerly extension of Runway 17-35.

This extension will allow the runway to provide adequate operational length for nearly all of the business jet aircraft in the fleet. This length would meet the needs of aircraft such as the Lear 35, the Gulfstream II, the Hawker 1000, and the Challenger 604, each of which can require up to 7,000 feet of operational length under hot weather conditions. This length provides additional benefits to long haul operators. Aircraft departing Gainesville Municipal Airport would be able to take on heavy loads (fuel, cargo, and passenger) under most conditions, except for extremely hot days. Additionally, the FAA requires fractional-ownership operators to inflate their operational length requirements by 20 percent.

When the airport transitions to an ARC C/D-II airport, the various safety areas increase substantially in size. The runway safety area (RSA) increases from 150 feet wide by 300 feet beyond the runway ends for ARC B-II, to 500 feet wide by 1,000 feet beyond the runway ends for ARC C/D-II. The RSA needs to be cleared and graded level to the runway end, and it must provide adequate drainage. Emergency vehicles and aircraft must have the ability to traverse the RSA on occasion. This design standard will necessitate a grading and stabilization project on the north end of Runway 17-35. On the south end of Runway 17-35, some minor grading and tree removal will be needed.

The object free area (OFA) will increase in size from 500 feet wide by 300 feet beyond the runway end, to 800 feet wide by 1,000 feet beyond the runway end. Although the OFA does not require that vehicles and aircraft have the ability to traverse the surface, there cannot be any penetration to the surface at the lateral runway elevation. Thus, the Runway 17-35 earthworks project would also apply to the OFA in order to avoid any ground penetration to this surface.

The Runway Protection Zone (RPZ) is a trapezoidal area, beginning 200 feet from the runway end, that varies in size based on the approved instrument approaches to the runways. When the existing runway system transitions to C/D-II, the RPZs on both ends of Runway 17-35 will extend beyond airport property. At the south end of the runway, the land use in this area is primarily commercial business. Ideally, the airport would acquire this property fee-simple in order to maintain positive control over the land use in this area. As acquisition and relocation of businesses would be cost-prohibitive, it is recommended that avigation easements be purchased for this area.

Avigation easements are a common method of gaining positive control over the airspace near airports. Typically, the cost associated with avigation easements is lower than fee-simple acquisition. Avigation easements will provide the airport with the ability to manage the airspace within the easement. A common implementation of an avigation easement would allow the airport to limit the height of trees or preclude construction of approach penetrations.

At the north end of Runway 17-35, the RPZ extends across County Road (CR) 404 onto privately-owned property. Exhibit 4B in the previous chapter provides a visual depiction of the various safety areas for the airport under the ARC C/D-II condition. This depiction assumes that the only element that changes at the airport is the critical aircraft. Ultimate planning, however, considers many improvements and upgrades to the airfield system.

As discussed previously, the ultimate recommended development plan considers a 1,000-foot northerly extension of Runway 17-35 and improvements to instrument approaches. This extension will place portions of the RSA and OFA beyond airport property. The RSA and OFA, which encompass approximately 13 acres, must be owned by the airport. These areas will need to be cleared and graded according to RSA and OFA standards. In addition, the RSA and OFA extend beyond CR 404, which will necessitate relocation of this road as indicated on **Exhibit 5A**.

With improved instrument approaches with visibility minimums not lower than three-quarters mile, the RPZs are somewhat larger than the existing RPZ. Approximately 47 acres of the ultimate Runway 17 RPZ, of which 13 acres is the RSA and OFA, extends onto private property. There is one house that falls within this area. The recommended plan considers fee-simple acquisition of all of the RPZ and relocation of the homeowners. Under certain conditions determined by TxDOT, an aviation easement for the RPZ may be sufficient.

It should be noted that TxDOT will require specific justification for the extension of Runway 17-35 before funding is provided. The planned length will ensure that the airport will be capable of accommodating all projected aircraft activity. During hot weather conditions, some aircraft may need to takeoff with less fuel or payload; however, the proposed runway length should not be a limiting factor in any business aircraft (up to ARC D-II) owner's decision to base or operate at Gainesville Municipal Airport.

All safety areas for the current and ultimate condition for Runway 12-30 meet FAA and TxDOT standards and remain on airport property.

The design of taxiway and apron areas must also consider the critical aircraft identified for Gainesville Municipal Airport. The primary consideration is given to the wingspan of the most demanding aircraft to operate at the airport. The parallel and connecting taxiways, transient apron areas, and aircraft maintenance areas have all been designed to accommodate aircraft within airplane design group II, wherever appropriate. This standard requires taxiways to be at least 35 feet wide for aircraft in ARC C/D-II. Current and future planned taxiways meet this standard. Other taxiway considerations are discussed in the landside section to follow.

The existing pavement strength rating for both runways is 15,000 pounds single wheel loading (SWL). As more operations are conducted by larger and heavier aircraft, there is a possibility

that the pavement may begin to fail sooner than expected. The plan recommends that the pavement strength rating for Runway 17-35 be increased to 60,000 SWL. Crosswind Runway 12-30 should be increased to 30,000 SWL. An engineering study to determine the actual pavement strength rating should be conducted to determine if the necessary improvements can be accomplished by overlay, or if a full reconstruction of the runways would be needed. For the purposes of this plan, a full reconstruction of the runways is considered.

Analysis in previous chapters indicated that plans should be made to upgrade the instrument approach capabilities of the airport. Currently, Gainesville Municipal Airport is served by two instrument approaches to the Runway 17 end only. The lowest approved visibility minimums are one mile for aircraft in approach categories A and B, one and one-quarter mile for aircraft in approach category C and one and one-half mile for aircraft in approach category D. It is recommended that these approaches be improved to visibilities down to three-quarters of a mile for all approach categories for both ends of Runway 17-35. Achieving these minimums would require the installation of an approach lighting system.

Ultimate instrument approaches to the crosswind runway consider approach minimums not lower than one mile. Global positioning system (GPS) approaches are most appropriate as the desired minimums can be achieved with no additional equipment needed. The

airport should begin the process of gaining approaches to Runway 12-30 as soon as feasible.

LANDSIDE DEVELOPMENT

Existing landside facilities are located in two primary areas of the airport: the terminal area and the infield area between Runway 17-35 and Runway 12-30. Storage facilities include T-hangars, executive hangars, and large FBO-type conventional hangars. Projected growth in aviation activity indicates a need for additional hangars of each type. It should be noted that the airport maintains a waiting list of 15 aircraft owners with a desire to lease aircraft storage space.

The primary goal of landside facility planning is to provide adequate aircraft storage space, while also maximizing operational efficiencies and land uses. Achieving this goal yields a development scheme which segregates aircraft users (large vs. small aircraft) while maximizing the airport's revenue potential.

Exhibit 5A depicts the recommended landside development plan for the airport. Review by the PAC, TxDOT, and airport staff concluded that Landside Alternative B, presented in Chapter Four, was most desirable at this time.

The plan includes maximizing the space in the terminal area. Immediately north of the terminal building, two ten-unit T-hangar facilities along with appropriate taxiway access are proposed. Since there is an existing T-

hangar in this area, it is appropriate to consider similar development rather than constructing a larger hangar which would attract larger aircraft creating potential conflicts for aircraft movement.

To the immediate north of Excel Aviation is an existing executive hangar. The recommended plan considers further development of this area with three executive hangars and the appropriate apron and taxilane area. This development plan again maintains the segregation of landside facilities.

Once these recommended terminal area facilities are constructed, little development space remains in the existing terminal area. The recommended plan considers the development of a north terminal apron with storage facilities for each category of hangar type. This plan would require the extension of Airport Drive to CR 404. The extension of Airport Drive to CR 404 should be considered as soon as feasible, since the single entrance to the airport creates daily congestion problems with the heavy traffic associated with Weber Aircraft.

The recommended plan considers the development of facilities on the infield between Runways 17-35 and 12-30. The first portions of this area to be developed should be those facilities along Runway 17-35. A portion of the eastside parallel taxiway would also need to be constructed at this time to provide for efficient movement of aircraft. Access roads and automobile parking are also proposed in support of this development.

Remaining airport property left undeveloped in this plan has been identified for recommended land uses. The first 1,000 feet east of the runways are reserved for future aviation-only development. All areas not reserved for aviation development should be considered for industrial/commercial development. Business parks are a land use to be encouraged around airports as the land lease revenue can bring the airport closer to becoming a financially self-sufficient entity.

The ultimate landside plan exceeds the needs and goal of this planning effort. Consideration of facility development beyond the scope of this planning effort will, however, provide the City with a vision which will yield a first-class aviation facility capable of maintaining revenues which exceed operational costs. It should be noted that the development of all facilities should consider aesthetics as a high priority. The airport is often the first and last impression a corporate decision-maker has of the community. Consideration should always be given to the development of facilities which meet aviation demand while presenting a positive image to all users.

AIRPORT LAYOUT PLAN SET

Per FAA and TxDOT requirements, an official Airport Layout Plan (ALP) has been developed for Gainesville Municipal Airport and can be found at the end of this chapter. The ALP drawing graphically presents the existing and ultimate airport layout

plan. The ALP is used by FAA and TxDOT to determine funding eligibility for future development projects.

The ALP was prepared on a computer-aided drafting (CAD) system for future ease of use. The computerized plan provides detailed information of existing and future facility layout on multiple layers that permit the user to focus in on any section of the airport at a desirable scale. The plan can be used as base information for design and can be easily updated in the future to reflect new development and more detail concerning existing conditions as made available through design surveys.

A number of related drawings, which depict the ultimate airspace and landside development, will be included with the ALP once the draft master plan concept detailed in this chapter is finalized. The following provides a brief discussion of the additional drawings to be included with the ALP.

AIRSPACE DRAWING

Federal Aviation Regulation (F.A.R.) Part 77, **Objects Affecting Navigable Airspace**, was established for use by local authorities to control the height of objects near airports. The Part 77 Airspace Plan included in this master plan is a graphic depiction of this regulatory criterion. The Part 77 Airspace Plan is a tool to aid local authorities in determining if proposed development could present a hazard to aircraft using the airport. The Airspace Plan can be a critical tool for the airport sponsor's use in planning against future development limitations.

The City of Gainesville should do all in its power to ensure development stays below the Part 77 surfaces to protect the future role of the airport. The following discussion will describe those approach surfaces that make up the recommended F.A.R. Part 77 operations at Gainesville Municipal Airport.

F.A.R. PART 77 IMAGINARY SURFACES

The Part 77 Airspace Plan assigns three-dimensional imaginary areas to each runway. These imaginary surfaces emanate from the runway centerline and are dimensioned according to the visibility minimums associated with the approach to the runway end and size of aircraft to operate on the runway. The Part 77 imaginary surfaces include the primary surface, approach surface, transitional surface, horizontal surface, and conical surface. Part 77 imaginary surfaces are described in the following paragraphs.

- **PRIMARY SURFACE**

The primary surface is an imaginary surface longitudinally centered on the runway. The primary surface 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. Under Part 77 regulations, the primary surface for the future approaches to existing Runway 17-35 is 1,000 feet wide.

- **APPROACH SURFACE**

An approach surface is also established for each runway. The approach surface begins at the same width as the primary surface and extends upward and outward from the primary surface end and is centered along an extended runway centerline. The future approach surface to Runways 17 and 35 extends 10,000 feet from the end of the primary surface at an upward slope of 34 to 1 to a width of 4,000 feet.

- **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 each runway. The surface rises at a slope of 7 to 1 up to a height 150 feet above the highest runway elevation. At that point, the transitional surface is replaced by the horizontal surface.

- **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 and approach surfaces to the conical surface at a distance of 10,000 feet from the end of the primary surfaces of each runway.

- **CONICAL SURFACE**

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

INNER PORTION OF THE APPROACH SURFACE PLAN

The Inner Portion of the Approach Surface Plan is a scaled drawing of the RPZ, RSA, OFZ, and OFA for each runway end. A plan and profile view of each RPZ is provided to facilitate identification of obstructions that lie within these safety areas. Detailed obstruction and facility data is provided to identify planned improvements and the disposition of obstructions.

TERMINAL AREA PLAN

The Terminal Area Plan provides greater detail concerning landside improvements and at a larger scale than on the ALP. This drawing depicts the east development plans.

ON-AIRPORT LAND USE PLAN

The objective of the On-Airport Land Use Plan is to coordinate uses of the

airport property in a manner compatible with the functional design of the airport facility. Airport land use planning is important for the orderly development and efficient use of available space.

There are two primary considerations for airport land use planning: first, to secure those areas essential to the safe and efficient operation of the airport, and second, to determine compatible land uses for the balance of the property which would be most advantageous to the airport and community. The plan depicts the recommendations for ultimate land use development on the airport. When development is proposed, it should be directed to the appropriate land use area depicted on this plan.

PROPERTY MAP

The Property Map provides information on the acquisition and identification of all land tracts under control of the airport.

OBSTRUCTION SURVEY DRAWING

The Obstruction Survey Drawing (OSD) is a new requirement as a part of the ALP drawing set. It is a visual representation of the topography and obstructions within the runway end environment. The OSD is developed for any runway currently served or planned to be served by an instrument approach procedure.

The OSD includes the evaluation of three critical surfaces: the obstruction

identification surface (OIS), the primary surface, and threshold siting surface (TSS). Any penetrations to the ultimate planned surfaces are presented on this drawing. Any penetrations to the TSS surface need remediation.

Runway 17-35 is planned for non-precision type approaches with not lower than three-quarters mile visibility minimums and a 1,000-foot extension to the north. There are a number of potential obstructions identified on the north end. These include an airport service road and some trees. The service road is on airport property and its access is controlled. The trees would need to be trimmed. On the southern end, there are no obstructions to the TSS surface, thus no remediation is required.

Runway 12-30 is planned for non-precision type approaches with visibility minimums not lower than one mile. The transition of the runway from visual approaches to non-precision instrument approaches shows some penetration. There are a number of trees and bushes to the side of the runway that would penetrate the primary surface and these should be removed. There is a fence near the end of Runway 30 that will need to be relocated. Finally, Taxiway A would be an obstruction, and hold lines are suggested as remediation.

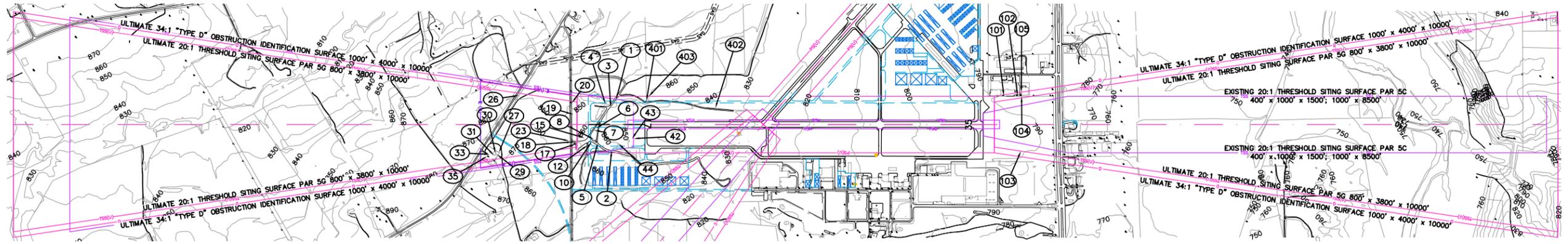
SUMMARY

The recommended master plan concept has been developed in conjunction with the PAC, the City of Gainesville, and the local citizens, and is designed to

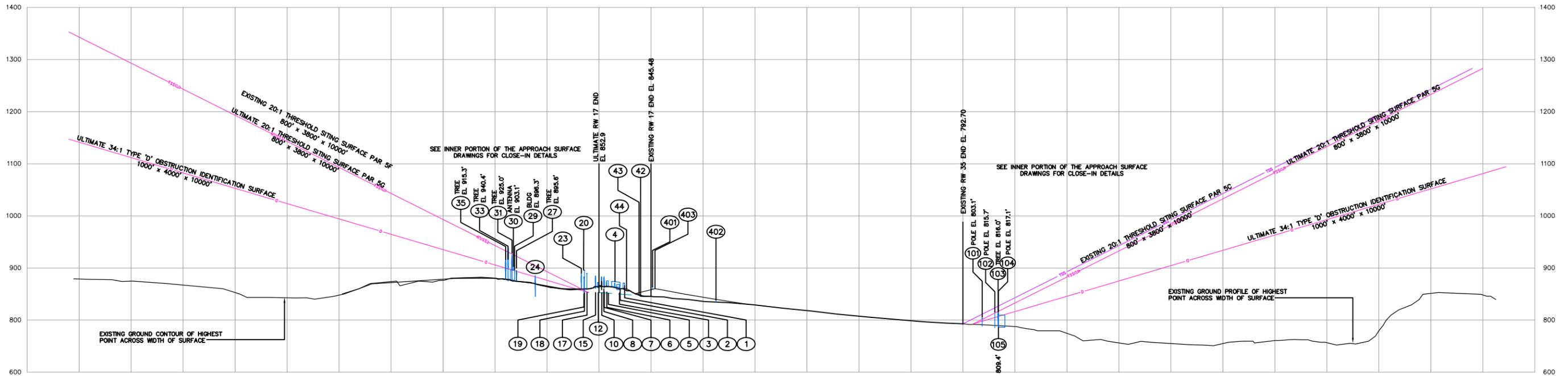
assist the City in making decisions on future development and growth of Gainesville Municipal Airport. This plan provides the necessary development to accommodate and satisfy the anticipated growth over the next twenty years and beyond.

Flexibility will be very important to future development at the airport. Activity projected over the next twenty years may not occur as predicted. The

plan has attempted to consider demands that may be placed on the airport even beyond the twenty-year planning horizon to ensure that the facility will be capable of handling a wide range of circumstances. The recommended plan provides the City with a general guide that if followed can maintain the airport's long term viability and allow the airport to continue to provide air transportation service to the region.



RUNWAY 17-35 PLAN



RUNWAY 17-35 PROFILE

Obstruction Table

No.	Object Description	Distance fm RW End	Offset fm RW C/L	Top Elev (MSL)	Existing OIS Penetration	Existing TSS Penetration	Primary Surf Penetration	Ultimate OIS Penetration	Ultimate TSS Penetration	Obstruction Remediation
1	CONSTRUCTION ROAD	507.0	446.0 L	871.0	N/A	10.8	22.1	N/A	N/A	CLOSED ROAD; NAR
2	CONSTRUCTION ROAD	595.2	459.2 R	872.4	N/A	7.7	22.8	N/A	N/A	CLOSED ROAD; NAR
3	CONSTRUCTION ROAD	608.9	311.3 R	868.6	11.7	3.3	18.9	N/A	N/A	CLOSED ROAD; NAR
4	TREE	695.8	363.3 L	871.6	N/A	2.0	20.9	N/A	N/A	REMOVE
5	CONSTRUCTION ROAD	820.6	343.0 R	875.1	11.9	CLEAR	23.7	N/A	N/A	CLOSED ROAD; NAR
6	TREE	856.2	60.5 R	873.2	9.0	CLEAR	21.5	N/A	N/A	REMOVE
7	TREE	900.0	102.2 R	875.5	10.0	CLEAR	23.5	N/A	N/A	REMOVE
8	TREE	907.0	272.8 R	882.9	17.2	2.6	31.0	N/A	N/A	REMOVE
10	TREE	950.8	314.1 R	883.1	16.1	0.7	30.9	N/A	N/A	REMOVE
12	CONSTRUCTION ROAD	1009.3	375.3 R	872.0	3.3	CLEAR	19.2	N/A	N/A	CLOSED ROAD; NAR
15	TREE	1068.5	239.8 R	884.7	14.3	CLEAR	31.9	N/A	N/A	REMOVE
17	POLE	1232.1	351.0 R	889.5	14.2	CLEAR	N/A	N/A	N/A	20:1 TSS CLEAR; NAR
18	POLE	1279.5	317.6 R	895.8	19.1	CLEAR	N/A	N/A	N/A	20:1 TSS CLEAR; NAR
19	POLE	1288.0	183.0 L	882.4	5.5	CLEAR	N/A	N/A	N/A	20:1 TSS CLEAR; NAR
20	POLE	1291.9	381.5	881.1	4.1	CLEAR	N/A	N/A	N/A	20:1 TSS CLEAR; NAR
23	TREE	1341.2	292.6 R	888.9	10.4	CLEAR	N/A	N/A	N/A	20:1 TSS CLEAR; NAR
26	TREE	1227.2	513.2 L	884.9	CLEAR	CLEAR	N/A	1.8	CLEAR	20:1 TSS CLEAR; NAR
27	TREE	1585.8	502.5 R	895.6	CLEAR	CLEAR	N/A	1.9	CLEAR	20:1 TSS CLEAR; NAR
29	BLDG	1622.8	529.6 R	896.3	CLEAR	CLEAR	N/A	1.6	CLEAR	20:1 TSS CLEAR; NAR
30	ANTENNA	1648.5	507.0 R	903.1	CLEAR	CLEAR	N/A	7.6	CLEAR	20:1 TSS CLEAR; NAR
31	TREE	1675.0	547.9 R	925.0	7.3	CLEAR	N/A	28.7	CLEAR	20:1 TSS CLEAR; NAR
33	TREE	1749.8	535.1 R	940.4	20.5	CLEAR	N/A	41.9	10.0	TRIM
35	TREE	1796.1	565.0 L	915.3	CLEAR	CLEAR	N/A	15.5	CLEAR	20:1 TSS CLEAR; NAR
42	GROUND	200.0	247.0 R	846.1	N/A	1.2	N/A	N/A	N/A	GRADE TO CLEAR TSS
43	GROUND	229.3	252.5 R	850.0	4.2	3.5	N/A	N/A	N/A	GRADE TO CLEAR TSS
44	GROUND	469.9	435.5 R	860.0	7.2	1.6	N/A	N/A	N/A	GRADE TO CLEAR TSS
101	POLE	368.7	510.8 R	803.1	N/A	N/A	N/A	5.4	N/A	20:1 TSS CLEAR; NAR
102	POLE	614.0	501.0 R	815.7	N/A	N/A	N/A	10.8	N/A	20:1 TSS CLEAR; NAR
103	TREE	676.1	471.4 L	816.0	N/A	N/A	N/A	9.3	NONE	20:1 TSS CLEAR; NAR
104	POLE	683.4	502.9 R	817.1	N/A	N/A	N/A	10.2	N/A	20:1 TSS CLEAR; NAR
105	BLDG	636.9	572.6 R	809.4	N/A	N/A	N/A	3.8	N/A	20:1 TSS CLEAR; NAR
401	FENCE POST	-33.8	417.6 L	864.1	N/A	N/A	19.2	N/A	N/A	REMOVE FENCE
402	FENCE	-1249.0	290.5 L	838.9	N/A	N/A	3.2	N/A	N/A	REMOVE FENCE
403	GROUND	-76.2	433.6 L	860.0	N/A	N/A	15.1	N/A	N/A	GRADE TO 849.0'

I hereby certify that the information provided herein has been compiled from field surveys conducted under my direct supervision and that said information complies with the areas, obstruction identification surfaces (OISs), obstruction selection criteria, and accuracy requirements of FAA No. 405, "Standards for Aeronautical Surveys and Related Products" (including Change 1, effective April 15, 1998) for the type of survey being performed.

Surveyor's Name: _____
 Surveyor's License #: _____ Affix Seal:

- GENERAL NOTES:
- AN OBSTRUCTION SURVEY TYPE 'D' MEETING THE STANDARDS OF FAA #405 WAS PERFORMED ON NOVEMBER 10-11, 2004 BY GEODETIC, SAN ANTONIO, TX.
 - THE EXISTING HEIGHT HAZARD ZONING ORDINANCE FOR THIS AIRPORT WAS ADOPTED ON 13 APRIL 1983. RUNWAY 17-35, 5000' X 100', ZONED LENGTH IS 5000' OTHER THAN UTILITY NONPRECISION INSTRUMENT. RUNWAY 12-30, 4663' X 75', ZONED 5000', OTHER THAN UTILITY.
 - ELEVATIONS ADJUSTED UPWARD 10' FOR PRIVATE ROADS; 15' FOR PUBLIC ROADWAYS.

ALL OFFSETS DESCRIBED AS RIGHT (R) OR LEFT (L) OF THE EXTENDED RUNWAY CENTERLINE AS SEEN FROM AN APPROACHING AIRCRAFT.

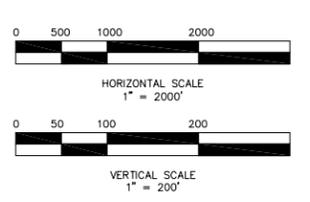
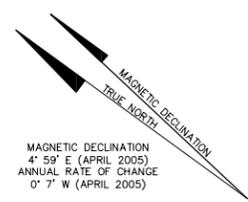
NO ACTION REQUIRED (NAR)

ANY OBSTRUCTION REMEDIATION TIME TABLE IS CONTINGENT UPON DEVELOPMENT, ACCEPTANCE AND IMPLEMENTATION OF AN ENGINEERED DESIGN OF THE ULTIMATE PLAN AS PROPOSED BY THIS ALP. LAND ACQUISITIONS, EASEMENTS AND AGREEMENTS BETWEEN PROPERTY OWNERS AND AIRPORT SPONSOR MAY ALSO FACTOR INTO TIMETABLE FOR OBSTRUCTION REMEDIATION. THEREFORE, THE FOLLOWING SUGGESTED TIME FRAMES FOR REMEDIATION SHOULD BE UNDERSTOOD TO BE ESTIMATES ONLY:

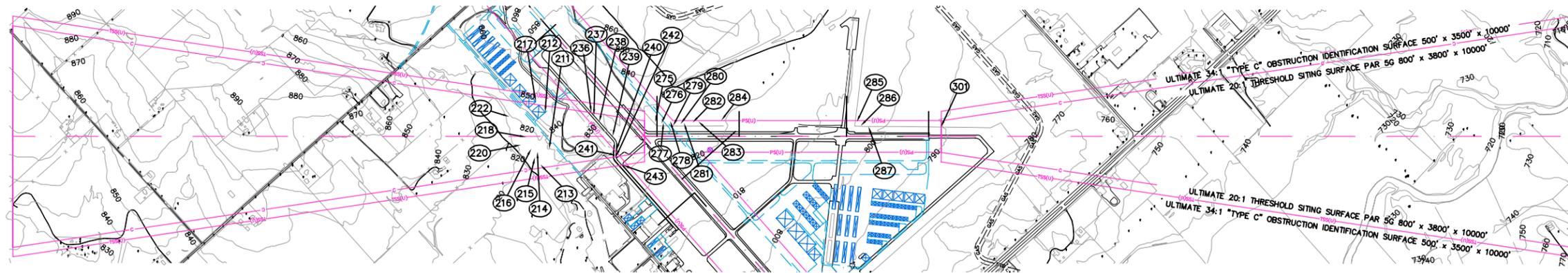
OBJECTS THAT PENETRATE THE ULTIMATE PRIMARY SURFACE TO BE REMOVED PRIOR TO CONSTRUCTION OF 1000' RUNWAY 17 EXTENSION.

GROUND PENETRATIONS TO THE EXISTING PRIMARY SURFACE TO BE GRADED PRIOR TO CONSTRUCTION OF 1000' RUNWAY 17 EXTENSION TO MEET THE CRITERIA SET FORTH IN SECTION 77.25 (C) - PART 77 OBJECTS AFFECTING NAVIGABLE AIRSPACE.

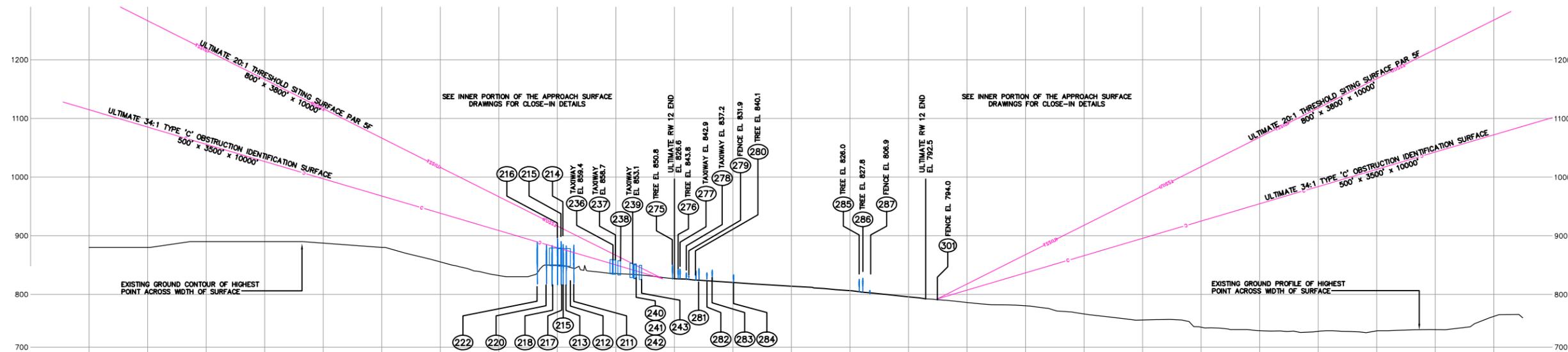
TREES THAT PENETRATE THE ULTIMATE THRESHOLD SITING SURFACE TO BE REMOVED TO ACHIEVE THE ULTIMATE TSS CLEARANCE.



TEXAS DEPARTMENT OF TRANSPORTATION AVIATION DIVISION		AIRPORT SPONSOR	
<input type="checkbox"/> ALP APPROVED ACCORDING TO FAA AC 150/5300-13 CH 8 PLUS THE REQUIREMENTS OF A FAVORABLE ENVIRONMENTAL FINDING PRIOR TO THE START OF ANY LAND ACQUISITION OR CONSTRUCTION AND AN FAA FORM 7460-1 SUBMITTED PRIOR TO ANY CONSTRUCTION ON AIRPORT PROPERTY		CURRENT AND FUTURE DEVELOPMENT DEPICTED ON THIS ALP IS APPROVED AND SUPPORTED BY AIRPORT SPONSOR	
<input type="checkbox"/> ALP APPROVED ACCORDING TO FAA AC 150/5300-13 CH 8 PLUS THE CONDITIONS/COMMENTS IN LETTER DATED:		TITLE, AIRPORT SPONSOR'S REPRESENTATIVE	
DIRECTOR, AVIATION DIVISION		SIGNATURE	
PREPARED BY: Lee's Summit, Mo. 64063 (816) 524-3500, Fax (2575) Coffman Phoenix Office: 4835 E. Cactus Road Suite 235 Scottsdale, Az. 85254 (602) 993-6999, Fax (7196)		M. Dmyterko July 2005 DESIGNED BY DATE D. Hopkins July 2005 DRAWN BY DATE J. Harris July 2005 CHECKED BY DATE	
SURVEY DRAWING: TYPE D SURVEY GAINESVILLE MUNICIPAL AIRPORT GAINESVILLE, TEXAS			
SHEET 2 OF 11			



RUNWAY 12-30 PLAN



RUNWAY 12-30 PROFILE

No.	Object Description	Distance fm RW End	Offset fm RW C/L	Top Elev (MSL)	Ult Primary Surf Penetration	Ultimate OIS Penetration	Ultimate TSS Penetration	Obstruction Remediation
211	TREE	1718.1	214.2 R	884.3	N/A	13.7	CLEAR	20:1 TSS CLEAR; NAR
212	HANGAR	1776.7	380.3 L	878.0	N/A	5.6	CLEAR	20:1 TSS CLEAR; NAR
213	TREE	1846.4	439.7 R	883.2	N/A	8.8	CLEAR	20:1 TSS CLEAR; NAR
214	TREE	1900.0	244.1 R	885.3	N/A	9.3	CLEAR	20:1 TSS CLEAR; NAR
215	TREE	1335.6	326.7 R	885.3	N/A	8.3	CLEAR	20:1 TSS CLEAR; NAR
216	TREE	1995.3	195.4 R	895.1	N/A	16.3	CLEAR	20:1 TSS CLEAR; NAR
217	HANGAR	1925.9	548.8 L	879.0	N/A	2.2	CLEAR	20:1 TSS CLEAR; NAR
218	TREE	2087.2	17.0 R	883.7	N/A	2.2	CLEAR	20:1 TSS CLEAR; NAR
220	TREE	2184.0	130.4 R	884.6	N/A	0.2	CLEAR	20:1 TSS CLEAR; NAR
222	TREE	2341.3	312.5 L	889.8	N/A	0.8	CLEAR	20:1 TSS CLEAR; NAR
236	TAXIWAY	1043.1	377.2 L	859.4	N/A	8.6	CLEAR	20:1 TSS CLEAR; NAR
237	TAXIWAY	806.5	331.1 L	858.7	N/A	9.0	CLEAR	20:1 TSS CLEAR; NAR
238	TAXIWAY	917.3	231.8 L	857.4	N/A	10.3	CLEAR	20:1 TSS CLEAR; NAR
239	TAXIWAY	711.7	0.0	853.1	N/A	12.1	1.5	ADD HOLD MARKING
240	TAXIWAY	649.4	220.4 R	852.0	N/A	12.8	3.5	ADD HOLD MARKING
241	TAXIWAY	656.0	295.1 R	851.9	N/A	12.5	3.1	ADD HOLD MARKING
242	TAXIWAY	655.7	318.0 R	851.0	N/A	11.6	2.2	ADD HOLD MARKING
243	TAXIWAY	558.8	453.7 R	849.7	N/A	13.1	5.8	ADD HOLD MARKING
275	TREE	29.6/-4325.8	229.0 L/R	850.8	N/A	N/A	N/A	REMOVE TREE
276	TREE	-63.7/-4231.3	207.9 L/R	843.8	17.2	N/A	N/A	REMOVE TREE
277	TREE	-96.6/-4198.4	218.2 L/R	842.9	16.3	N/A	N/A	REMOVE TREE
278	TREE	-205.2/-4090.0	242.5 L/R	837.2	11.8	N/A	N/A	REMOVE TREE
279	FENCE	-248.3/-4047.1	166.0 L/R	831.9	6.6	N/A	N/A	REMOVE FENCE
280	TREE	-368.2/-3926.8	198.4 L/R	840.1	15.9	N/A	N/A	REMOVE TREE
281	TREE	-420.9/-3875.3	214.7 L/R	843.3	19.1	N/A	N/A	REMOVE TREE
282	TREE	-557.3/-3738.8	219.2 L/R	837.2	11.2	N/A	N/A	REMOVE TREE
283	TREE	-646.2/-3648.7	238.1 L/R	842.0	18.7	N/A	N/A	REMOVE TREE
284	TREE	-1011.8/-3283.2	251.3 L/R	833.8	13.0	N/A	N/A	REMOVE TREE
285	TREE	-3158.4/-1136.5	229.3 L/R	826.0	21.5	N/A	N/A	REMOVE TREE
286	TREE	-3219.2/-1075.8	168.7 L/R	827.8	23.5	N/A	N/A	REMOVE TREE
287	FENCE	-3339.5/-955.5	157.9 L/R	806.9	5.9	N/A	N/A	REMOVE FENCE
301	FENCE	792.5	148.1 R	794.0	N/A	2.0	2.0	REMOVE FENCE

GENERAL NOTES:

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2. THE EXISTING HEIGHT HAZARD ZONING ORDINANCE FOR THIS AIRPORT WAS ADOPTED ON 13 APRIL 1983. RUNWAY 17-35, 5000' X 100', ZONED LENGTH IS 5000' OTHER THAN UTILITY NONPRECISION INSTRUMENT. RUNWAY 12-30, 4663' X 75', ZONED 5000', OTHER THAN UTILITY.
3. ELEVATIONS ADJUSTED UPWARD 10' FOR PRIVATE ROADS; 15' FOR PUBLIC ROADWAYS.

ALL OFFSETS DESCRIBED AS RIGHT (R) OR LEFT (L) OF THE EXTENDED RUNWAY CENTERLINE AS SEEN FROM AN APPROACHING AIRCRAFT.

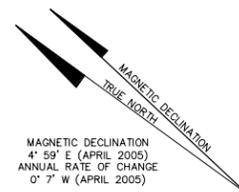
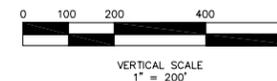
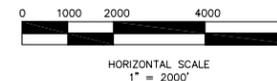
NO ACTION REQUIRED (NAR)

ANY OBSTRUCTION REMEDIATION TIME TABLE IS CONTINGENT UPON DEVELOPMENT, ACCEPTANCE AND IMPLEMENTATION OF AN ENGINEERED DESIGN OF THE ULTIMATE PLAN AS PROPOSED BY THIS ALP. LAND ACQUISITIONS, EASEMENTS AND AGREEMENTS BETWEEN PROPERTY OWNERS AND AIRPORT SPONSOR MAY ALSO FACTOR INTO TIMETABLE FOR OBSTRUCTION REMEDIATION. THEREFORE, THE FOLLOWING SUGGESTED TIME FRAMES FOR REMEDIATION SHOULD BE UNDERSTOOD TO BE ESTIMATES ONLY:

FENCE TO BE REMOVED AS SOON AS FEASIBLE.

TREES THAT PENETRATE THE ULTIMATE PRIMARY SURFACE TO BE REMOVED.

HOLDING POSITION MARKINGS TO BE ADDED TO TAXIWAY 'A' IN ACCORDANCE WITH AC 150/5140-1J, PAR. 23B TO ACHIEVE ULTIMATE TSS CLEARANCE.



I hereby certify that the information provided herein has been compiled from field surveys conducted under my direct supervision and that said information complies with the areas, obstruction identification surfaces (OISs), obstruction selection criteria, and accuracy requirements of FAA No. 405, "Standards for Aeronautical Surveys and Related Products" (including Change 1, effective April 15, 1998) for the type of survey being performed.

Surveyor's Name: _____
 Surveyor's License #: _____ Affix Seal:

TEXAS DEPARTMENT OF TRANSPORTATION AVIATION DIVISION

ALP APPROVED ACCORDING TO FAA AC 150/5300-13 CH 8 PLUS THE REQUIREMENTS OF A FAVORABLE ENVIRONMENTAL FINDING PRIOR TO THE START OF ANY LAND ACQUISITION OR CONSTRUCTION AND AN FAA FORM 7460-1 SUBMITTED PRIOR TO ANY CONSTRUCTION ON AIRPORT PROPERTY

ALP APPROVED ACCORDING TO FAA AC 150/5300-13 CH 8 PLUS THE CONDITIONS/COMMENTS IN LETTER DATED: _____

DIRECTOR, AVIATION DIVISION _____ DATE _____

PREPARED BY: 237 N.W. Blue Parkway Suite 100 Lee's Summit, Mo. 64063 (816) 524-3500, Fax (2575) Coffman Phoenix Office: 4835 E. Cactus Road Suite 235 Scottsdale, Az. 85254 (602) 993-6999, Fax (7196) www.coffmanassociates.com

AIRPORT SPONSOR

CURRENT AND FUTURE DEVELOPMENT DEPICTED ON THIS ALP IS APPROVED AND SUPPORTED BY AIRPORT SPONSOR

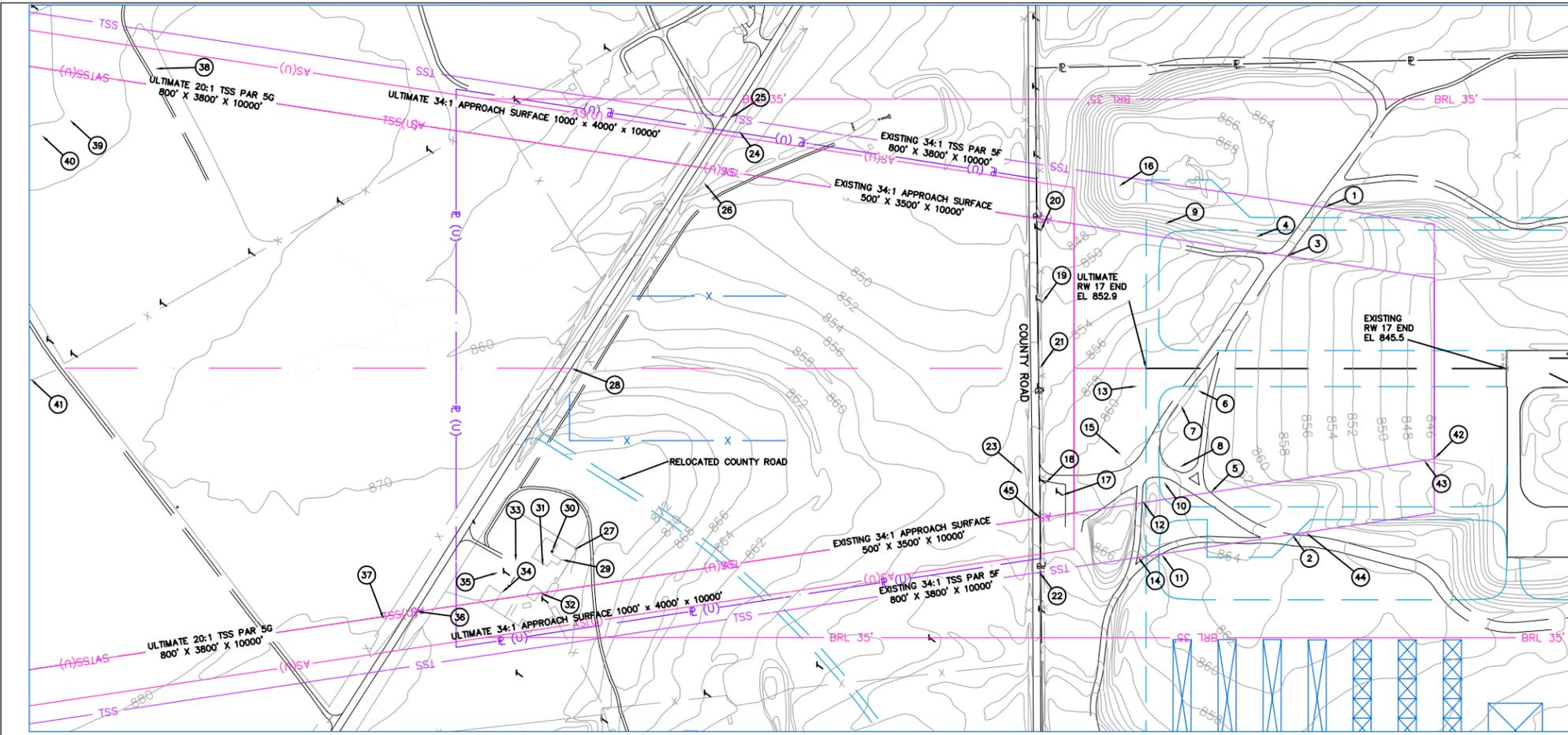
TITLE, AIRPORT SPONSOR'S REPRESENTATIVE _____

SIGNATURE _____ DATE _____

M. Dmyterko July 2005
 DESIGNED BY DATE
 D. Hopkins July 2005
 DRAWN BY DATE
 J. Harris July 2005
 CHECKED BY DATE

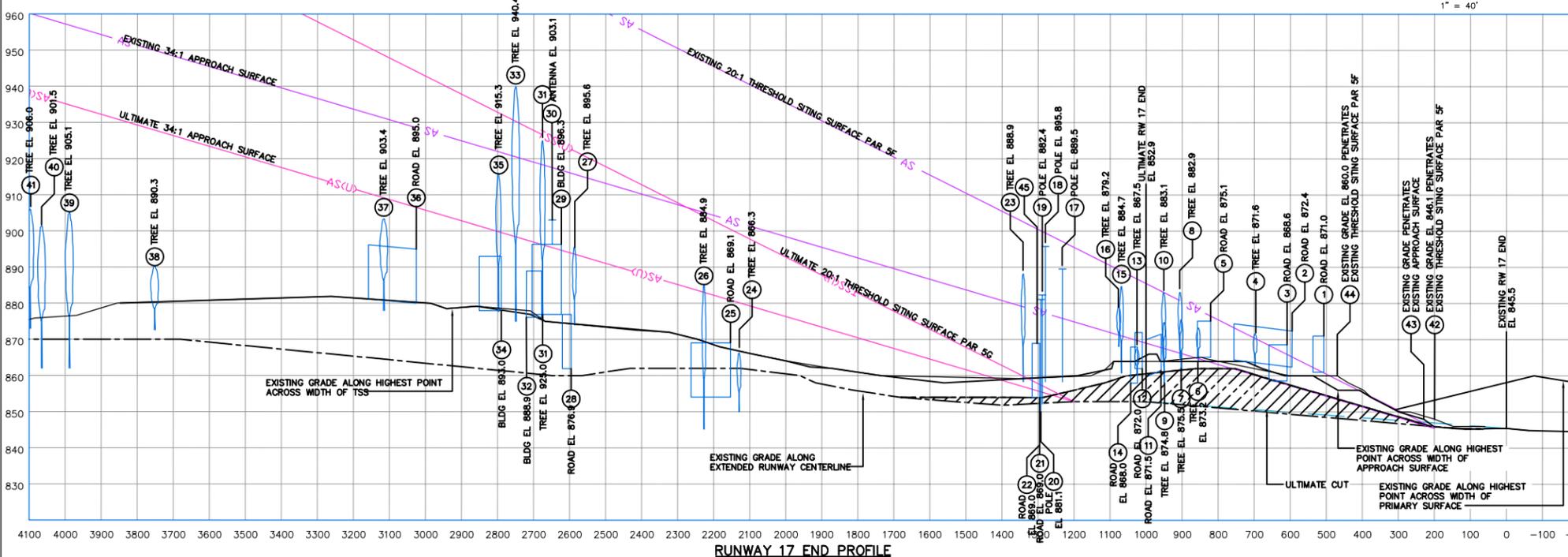
SURVEY DRAWING: TYPE D SURVEY
GAINESVILLE MUNICIPAL AIRPORT
GAINESVILLE, TEXAS

SHEET 3 OF 11



RUNWAY 17 END PLAN

- GENERAL NOTES:**
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 2. THE EXISTING HEIGHT HAZARD ZONING ORDINANCE FOR THIS AIRPORT WAS ADOPTED ON 13 APRIL 1983. RUNWAY 17-35, 5000' X 100', ZONED LENGTH IS 5000' OTHER THAN UTILITY NONPRECISION INSTRUMENT. RUNWAY 12-30, 4663' X 75', ZONED 5000', OTHER THAN UTILITY.



Existing Obstruction Table							
No.	Object Description	Top Elev (MSL)	Offset fm Exist RW C/L	Distance fm Exist RW End	34:1 Exist App Penetration	20:1 Exist TSS Penetration	Obstruction Remediation
1	CONSTRUCTION ROAD	871.0	446.0 L	507.0	N/A	10.2	CLOSED ROAD; NAR
2	CONSTRUCTION ROAD	872.4	459.2 R	595.2	N/A	2.7	CLOSED ROAD; NAR
3	CONSTRUCTION ROAD	868.6	311.3 R	608.9	11.1	2.7	CLOSED ROAD; NAR
4	TREE	871.6	363.3 L	694.0	N/A	1.4	TRIM OR REMOVE
5	CONSTRUCTION ROAD	875.1	343.0 R	820.6	11.4	CLEAR	20:1 TSS CLEAR; NAR
6	TREE	873.2	60.5 R	856.2	8.4	CLEAR	20:1 TSS CLEAR; NAR
7	TREE	875.5	102.2 R	900.0	9.4	CLEAR	20:1 TSS CLEAR; NAR
8	TREE	882.9	272.8 R	907.0	16.6	2.1	TRIM OR REMOVE
9	TREE	874.8	400.3 L	948.6	N/A	CLEAR	NAR
10	TREE	883.1	314.1 R	950.8	15.5	0.1	TRIM OR REMOVE
11	ROAD	871.5	513.5 R	958.9	N/A	CLEAR	NAR
12	CONSTRUCTION ROAD	872.0	375.3 R	1009.3	2.7	CLEAR	NAR
13	TREE	867.5	48.8 R	1023.4	CLEAR	CLEAR	NAR
14	ROAD	868.0	523.1 R	1024.3	N/A	CLEAR	NAR
15	TREE	884.7	239.8 R	1068.5	13.7	CLEAR	20:1 TSS CLEAR; NAR
16	TREE	879.2	503.5 L	1076.7	N/A	CLEAR	NAR
17	POLE	889.5	351.0 R	1232.1	13.7	CLEAR	20:1 TSS CLEAR; NAR
18	POLE	895.8	317.6 R	1279.5	18.6	CLEAR	20:1 TSS CLEAR; NAR
19	POLE	882.4	183.0 L	1288.0	4.9	CLEAR	20:1 TSS CLEAR; NAR
20	POLE	881.1	381.5 L	1291.9	3.5	CLEAR	20:1 TSS CLEAR; NAR
21	ROAD	869.0	0.0	1295.4	CLEAR	CLEAR	NAR
22	ROAD	869.0	566.9 R	1295.4	N/A	CLEAR	NAR
23	TREE	888.9	292.6 R	1341.2	9.9	CLEAR	20:1 TSS CLEAR; NAR
24	TREE	866.3	659.6 L	2128.9	N/A	CLEAR	NAR
25	ROAD	893.0	693.0 L	2153.6	N/A	CLEAR	NAR
26	TREE	884.9	513.2 L	2227.2	CLEAR	CLEAR	NAR
27	TREE	895.6	502.5 R	2585.8	CLEAR	CLEAR	NAR
28	TREE	876.9	0.0	2595.8	CLEAR	CLEAR	NAR
29	BLDG	896.3	529.6 R	2622.8	CLEAR	CLEAR	NAR
30	ANTENNA ON BLDG	903.1	507.0 R	2648.5	CLEAR	CLEAR	NAR
31	TREE	925.0	547.9 R	2675.0	6.7	CLEAR	20:1 TSS CLEAR; NAR
32	BLDG	888.9	622.3 R	2677.7	CLEAR	CLEAR	NAR
33	TREE	940.4	535.1 R	2749.8	19.9	CLEAR	20:1 TSS CLEAR; NAR
34	BLDG	893.0	622.5 R	2789.6	CLEAR	CLEAR	NAR
35	TREE	915.3	565.0 L	2796.1	CLEAR	CLEAR	NAR
36	ROAD	895.0	673.1 R	3025.4	CLEAR	CLEAR	NAR
37	TREE	903.4	695.7 R	3115.9	N/A	CLEAR	NAR
38	TREE	890.4	828.4 L	3751.4	N/A	CLEAR	NAR
39	TREE	905.1	687.3 L	3987.9	CLEAR	CLEAR	NAR
40	TREE	901.5	662.5 L	4065.5	CLEAR	CLEAR	NAR
41	TREE	906.0	29.1 R	4095.9	CLEAR	CLEAR	NAR
42	GROUND	845.9	247.0 R	200.0	N/A	0.5	GRADE TO CLEAR TSS
43	GROUND	850.0	252.5 R	231.7	3.6	2.9	GRADE TO CLEAR TSS
44	GROUND	860.0	435.5 R	437.0	6.6	1.0	GRADE TO CLEAR TSS

Ultimate Obstruction Table							
No.	Object Description	Top Elev (MSL)	Offset fm Ult RW C/L	Distance fm Ult RW End	34:1 Ult App Penetration	20:1 Ult TSS Penetration	Obstruction Remediation
17	POLE	889.5	351.0 R	232.1	35.7	35.0	REMOVE
18	POLE	895.8	317.6 R	279.5	40.6	38.9	REMOVE
19	POLE	882.4	183.0 L	288.0	26.9	25.1	REMOVE
20	POLE	881.1	381.5 L	291.9	25.5	23.6	REMOVE
21	ROAD	869.0	0.0	295.4	13.3	13.3	TO BE RELOCATED
23	TREE	888.9	292.6 R	341.2	31.8	28.9	REMOVE
26	TREE	884.9	513.2 L	1227.2	1.8	CLEAR	20:1 TSS CLEAR; NAR
27	TREE	895.6	502.5 R	1585.8	1.9	CLEAR	20:1 TSS CLEAR; NAR
29	BLDG	896.3	529.6 R	1622.8	1.6	CLEAR	20:1 TSS CLEAR; NAR
30	ANTENNA ON BLDG	903.1	507.0 R	1648.5	7.6	CLEAR	20:1 TSS CLEAR; NAR
31	TREE	925.0	547.9 R	1675.0	28.7	CLEAR	20:1 TSS CLEAR; NAR
33	TREE	940.4	535.1 R	1749.8	41.9	10.0	REMOVE
35	TREE	915.3	565.0 L	1796.1	15.5	CLEAR	20:1 TSS CLEAR; NAR
45	ROAD	915.3	515.9 R	293.7	13.3	11.4	TO BE RELOCATED

ELEVATIONS ADJUSTED UPWARD 10' FOR PRIVATE ROAD, 15' FOR PUBLIC ROADWAY, 17' FOR INTERSTATE HIGHWAY, 23' FOR RAILROADS

ALL OFFSETS DESCRIBED AS RIGHT (R) OR LEFT (L) OF THE EXTENDED RUNWAY CENTERLINE AS SEEN FROM APPROACHING AIRCRAFT.

NO ACTION REQUIRED (NAR)

ANY ULTIMATE OBSTRUCTION REMEDIATION TIME TABLE IS CONTINGENT UPON DEVELOPMENT, ACCEPTANCE AND IMPLEMENTATION OF AN ENGINEERED DESIGN OF THE ULTIMATE PLAN AS PROPOSED BY THIS ALP. LAND ACQUISITIONS, EASEMENTS AND AGREEMENTS BETWEEN PROPERTY OWNERS AND AIRPORT SPONSOR MAY ALSO FACTOR INTO THE TABLE FOR OBSTRUCTION REMEDIATION. THEREFORE, THE FOLLOWING SUGGESTED TIME FRAMES FOR REMEDIATION SHOULD BE UNDERSTOOD TO BE ESTIMATES ONLY.

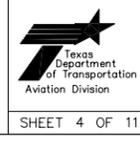
CONSTRUCTION ROADS USED DURING THE PREVIOUS RUNWAY 17 EXTENSION ARE CLOSED TO ALL VEHICLES.

TREES THAT PENETRATE THE EXISTING APPROACH AND THRESHOLD SITING SURFACES TO BE TRIMMED OR REMOVED TO ACHIEVE EXISTING TSS CLEARANCE.

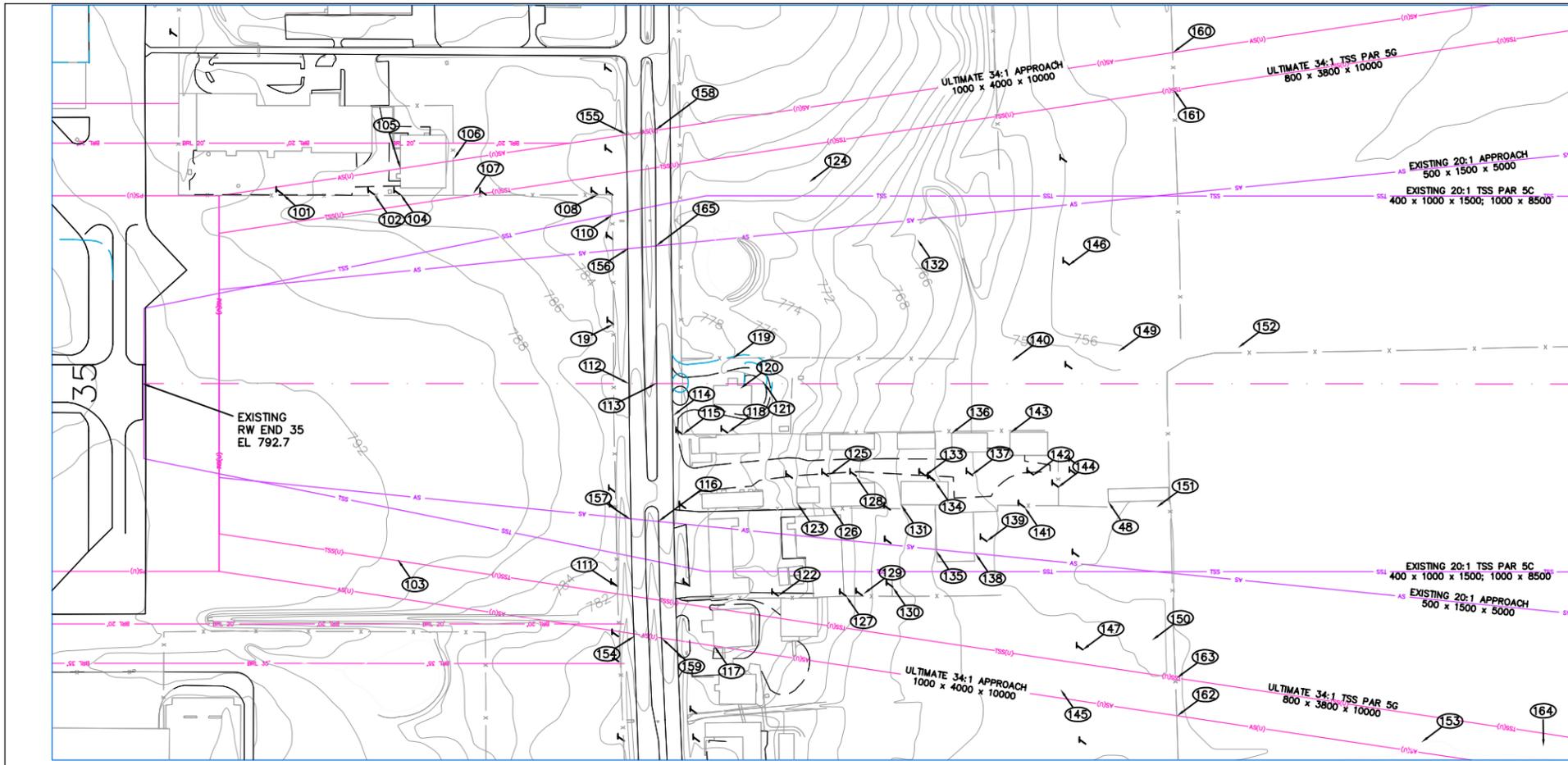
TREES THAT PENETRATE THE ULTIMATE APPROACH AND THRESHOLD SITING SURFACES TO BE TRIMMED OR REMOVED TO ACHIEVE ULTIMATE TSS CLEARANCE.

<p>TEXAS DEPARTMENT OF TRANSPORTATION AVIATION DIVISION</p> <p><input type="checkbox"/> ALP APPROVED ACCORDING TO FAA AC 150/5300-13 CH 8 PLUS THE REQUIREMENTS OF A FAVORABLE ENVIRONMENTAL FINDING PRIOR TO THE START OF ANY LAND ACQUISITION OR CONSTRUCTION AND AN FAA FORM 7460-1 SUBMITTED PRIOR TO ANY CONSTRUCTION ON AIRPORT PROPERTY</p> <p><input type="checkbox"/> ALP APPROVED ACCORDING TO FAA AC 150/5300-13 CH 8 PLUS THE CONDITIONS/COMMENTS IN LETTER DATED:</p>		<p>AIRPORT SPONSOR</p> <p>CURRENT AND FUTURE DEVELOPMENT DEPICTED ON THIS ALP IS APPROVED AND SUPPORTED BY AIRPORT SPONSOR</p>	
<p>DIRECTOR, AVIATION DIVISION</p> <p>DATE</p>		<p>SIGNATURE</p> <p>DATE</p>	
<p>PREPARED BY: 237 N.W. Blue Parkway Suite 100 Lee's Summit, Mo. 64063 (816) 524-3500, Fax (2575) Coffman Phoenix Office: 4835 E. Cactus Road Suite 235 Scottsdale, Az. 85254 (602) 993-6999, Fax (7196)</p>		<p>TITLE, AIRPORT SPONSOR'S REPRESENTATIVE</p> <p>DATE</p>	
<p>Coffman Associates Airport Consultants www.coffmanassociates.com</p>		<p>M. Dmyterko July 2005 DESIGNED BY DATE D. Hopkins July 2005 DRAWN BY DATE J. Harris July 2005 CHECKED BY DATE</p>	

IPASD RUNWAY 17
GAINESVILLE MUNICIPAL AIRPORT
GAINESVILLE, TEXAS



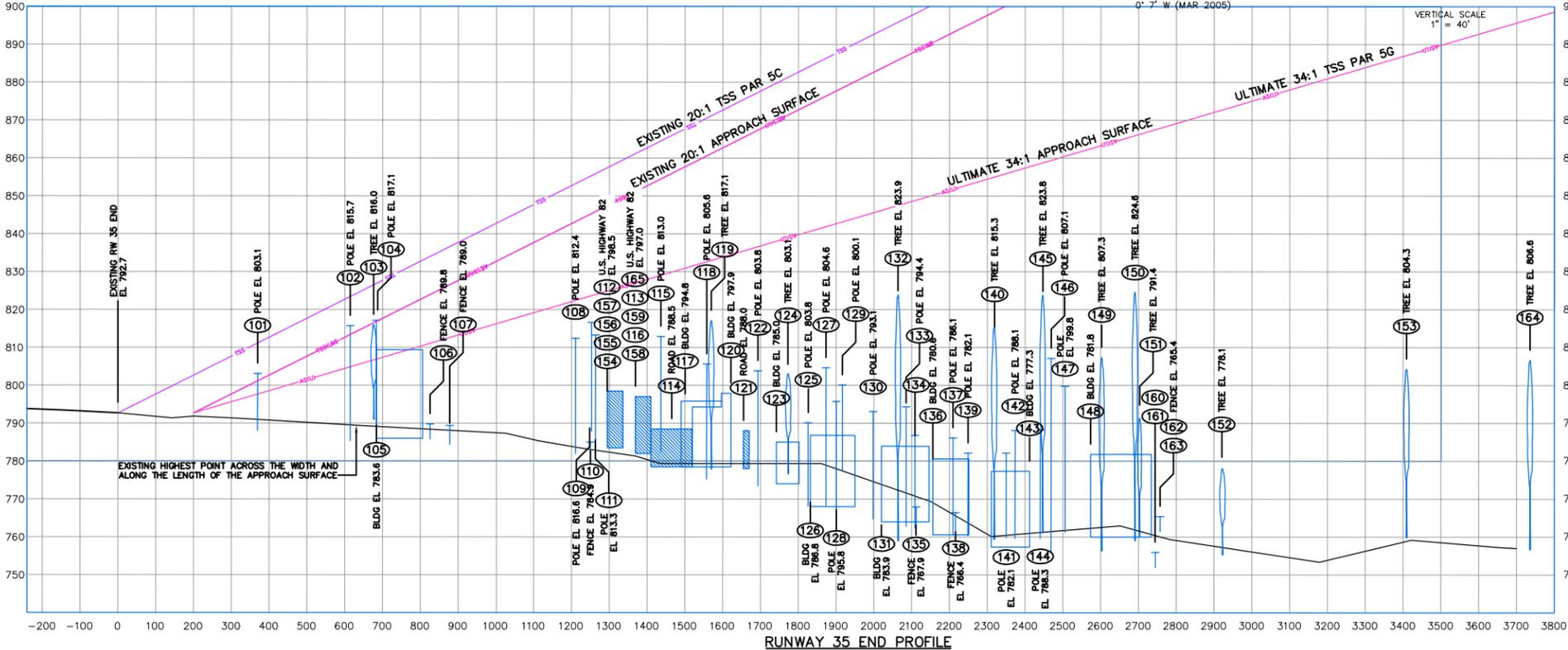
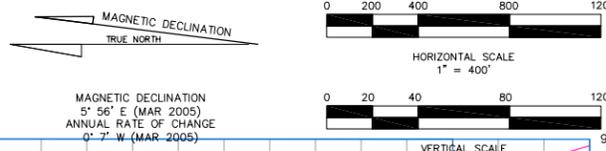
Coffman Associates R:\CAD\Hogland\Map\GAINESVILLE_IPASD_RUNWAY17_05.dwg Printed Date: 8-04-05 01:17:42 PM D:\Hogland



RUNWAY 35 END PLAN

GENERAL NOTES:

1. AN OBSTRUCTION SURVEY TYPE 'D' MEETING THE ACCURACY STANDARDS OF FAA #405 WAS PERFORMED ON NOVEMBER 10-11, 2004 BY GEODETX, SAN ANTONIO, TX.
2. THE EXISTING HEIGHT HAZARD ZONING ORDINANCE FOR THIS AIRPORT WAS ADOPTED ON 13 APRIL 1983. RUNWAY 17-35, 5000' X 100', ZONED 5000', OTHER THAN UTILITY, NONPRECISION INSTRUMENT. RUNWAY 12-30, 4663' X 75', ZONED 5000', OTHER THAN UTILITY, NONPRECISION INSTRUMENT.



RUNWAY 35 END PROFILE

Obstruction Table									
No.	Object Description	Distance from RW End	Offset from RW C/L	Top Elev (MSL)	Existing 20:1 App Penetration	Existing 20:1 TSS Penetration	Ultimate 34:1 App Penetration	Ultimate 34:1 TSS Penetration	Obstruction Remediation
101	POLE	368.7	510.8 R	803.1	N/A	N/A	5.4	NONE	20:1 CLEAR; NO ACTION REQUIRED
102	POLE	614.0	501.0 R	815.7	NONE	N/A	10.8	NONE	20:1 CLEAR; NO ACTION REQUIRED
103	TREE	676.1	471.4 L	816.0	NONE	N/A	9.3	NONE	20:1 CLEAR; NO ACTION REQUIRED
104	POLE	683.4	502.9 R	817.1	NONE	N/A	10.2	NONE	20:1 CLEAR; NO ACTION REQUIRED
105	BLDG	636.9	572.6 R	809.4	NONE	N/A	3.8	NONE	20:1 CLEAR; NO ACTION REQUIRED
106	FENCE	825.3	593.7 R	789.8	NONE	N/A	NONE	NONE	TO REMAIN
107	FENCE	877.3	501.5 R	789.0	NONE	N/A	NONE	NONE	TO REMAIN
108	POLE	1209.7	503.5 R	812.4	NONE	N/A	NONE	NONE	TO REMAIN
109	POLE	1247.1	158.1 R	816.6	NONE	N/A	NONE	NONE	TO REMAIN
110	FENCE	1249.1	449.8 R	784.9	NONE	N/A	N/A	N/A	TO REMAIN
111	POLE	1262.8	538.8 L	813.3	N/A	N/A	NONE	NONE	TO REMAIN
112	STATE HWY 82	1294.1	0.0	798.5	NONE	NONE	NONE	NONE	TO REMAIN
113	STATE HWY 82	1410.4	0.0	797.0	NONE	NONE	NONE	NONE	TO REMAIN
114	STATE HWY 82	1982.9	85.0 L	788.5	NONE	NONE	NONE	NONE	TO REMAIN
115	POLE	1434.9	134.8 L	813.0	NONE	NONE	NONE	NONE	TO REMAIN
116	ROAD	1372.2	367.2 L	797.0	NONE	NONE	NONE	NONE	NONE
117	BLDG	1489.3	703.9 L	794.8	NONE	NONE	NONE	NONE	NONE
118	POLE	1556.0	131.3 L	805.6	NONE	NONE	NONE	NONE	NONE
119	TREE	1569.2	66.9 R	817.1	NONE	NONE	NONE	NONE	NONE
120	BLDG	1599.8	26.7 L	797.9	NONE	NONE	NONE	NONE	NONE
121	ROAD	2238.1	0.0	788.0	NONE	NONE	NONE	NONE	NONE
122	POLE	2250.1	565.1 L	803.8	N/A	N/A	NONE	NONE	TO REMAIN
123	BLDG	1714.4	318.0 L	785.0	NONE	NONE	NONE	NONE	NONE
124	TREE	1772.1	536.5 R	803.1	N/A	N/A	NONE	NONE	NONE
125	POLE	1824.7	242.8 L	803.8	NONE	NONE	NONE	NONE	NONE
126	BLDG	1831.3	332.9 L	786.8	NONE	NONE	NONE	NONE	NONE
127	POLE	1872.9	565.1 L	804.6	N/A	N/A	NONE	NONE	NONE
128	POLE	1900.0	247.8 L	795.8	NONE	NONE	NONE	NONE	NONE
129	POLE	1917.0	565.6 L	800.1	NONE	NONE	NONE	NONE	NONE
130	POLE	1997.4	541.6 L	793.1	NONE	N/A	NONE	NONE	NONE
131	BLDG	2018.7	322.3 L	783.9	NONE	NONE	NONE	NONE	NONE
132	TREE	2062.5	383.9 R	823.9	NONE	NONE	NONE	NONE	NONE
133	POLE	2084.9	237.7 L	794.4	NONE	NONE	NONE	NONE	NONE
134	POLE	2107.3	260.6 R	786.8	NONE	NONE	NONE	NONE	NONE
135	FENCE	2111.2	441.5 L	767.9	NONE	NONE	NONE	NONE	NONE
136	BLDG	2154.5	131.4 L	780.6	NONE	NONE	NONE	NONE	NONE
137	POLE	2208.8	243.9 L	786.1	NONE	NONE	NONE	NONE	NONE
138	FENCE	2214.6	451.8 R	786.4	NONE	NONE	NONE	NONE	NONE
139	POLE	2247.4	419.1 L	782.1	NONE	NONE	NONE	NONE	NONE
140	TREE	2317.1	62.8 R	815.3	NONE	NONE	NONE	NONE	NONE
141	POLE	2349.2	411.8 R	782.1	NONE	NONE	NONE	NONE	NONE
142	POLE	2372.1	329.0 L	788.1	NONE	NONE	NONE	NONE	NONE
143	BLDG	2410.4	129.4 L	777.3	NONE	NONE	NONE	NONE	NONE
144	POLE	2439.3	274.7 L	788.3	NONE	NONE	NONE	NONE	NONE
145	TREE	2446.2	813.4 L	823.8	NONE	NONE	NONE	NONE	NONE
146	POLE	2468.4	316.7 R	807.1	NONE	NONE	NONE	NONE	NONE
147	POLE	2505.1	707.8 L	799.8	NONE	NONE	NONE	NONE	NONE
148	BLDG	2571.7	280.2 L	781.8	NONE	NONE	NONE	NONE	NONE
149	TREE	2571.7	87.8 R	807.3	NONE	NONE	NONE	NONE	NONE
150	TREE	2689.3	681.7 L	824.6	NONE	NONE	NONE	NONE	NONE
151	TREE	2702.6	327.9 L	791.4	NONE	NONE	NONE	NONE	NONE
152	TREE	2920.7	98.5 R	778.1	NONE	NONE	NONE	NONE	NONE
153	TREE	3408.8	953.4 L	804.3	NONE	NONE	NONE	NONE	NONE
154	STATE HWY 82	1306.9	673.1 L	793.0	NONE	NONE	NONE	NONE	NONE
155	STATE HWY 82	1284.7	661.5 R	799.0	NONE	NONE	NONE	NONE	NONE
156	STATE HWY 82	1288.1	359.1 R	797.0	NONE	NONE	NONE	NONE	NONE
157	STATE HWY 82	1299.1	359.9 L	799.0	NONE	NONE	NONE	NONE	NONE
158	STATE HWY 82	1360.5	674.5 R	786.0	NONE	NONE	NONE	NONE	NONE
159	STATE HWY 82	1381.6	677.1 L	793.2	NONE	NONE	NONE	NONE	NONE
160	FENCE	2743.1	881.7 R	755.9	NONE	NONE	NONE	NONE	NONE
161	FENCE	2743.1	782.1 R	755.9	NONE	NONE	NONE	NONE	NONE
162	FENCE	2754.6	883.3 L	765.4	NONE	NONE	NONE	NONE	NONE
163	FENCE	2754.6	783.3 L	765.4	NONE	NONE	NONE	NONE	NONE
164	TREE	3735.5	964.3 L	806.6	NONE	NONE	NONE	NONE	NONE
165	STATE HWY 82	1360.5	370.2 R	780.5	NONE	NONE	NONE	NONE	NONE

ELEVATIONS ADJUSTED UPWARD 10' FOR PRIVATE ROAD, 15' FOR PUBLIC ROADWAY, 17' FOR INTERSTATE HIGHWAY, 23' FOR RAILROADS

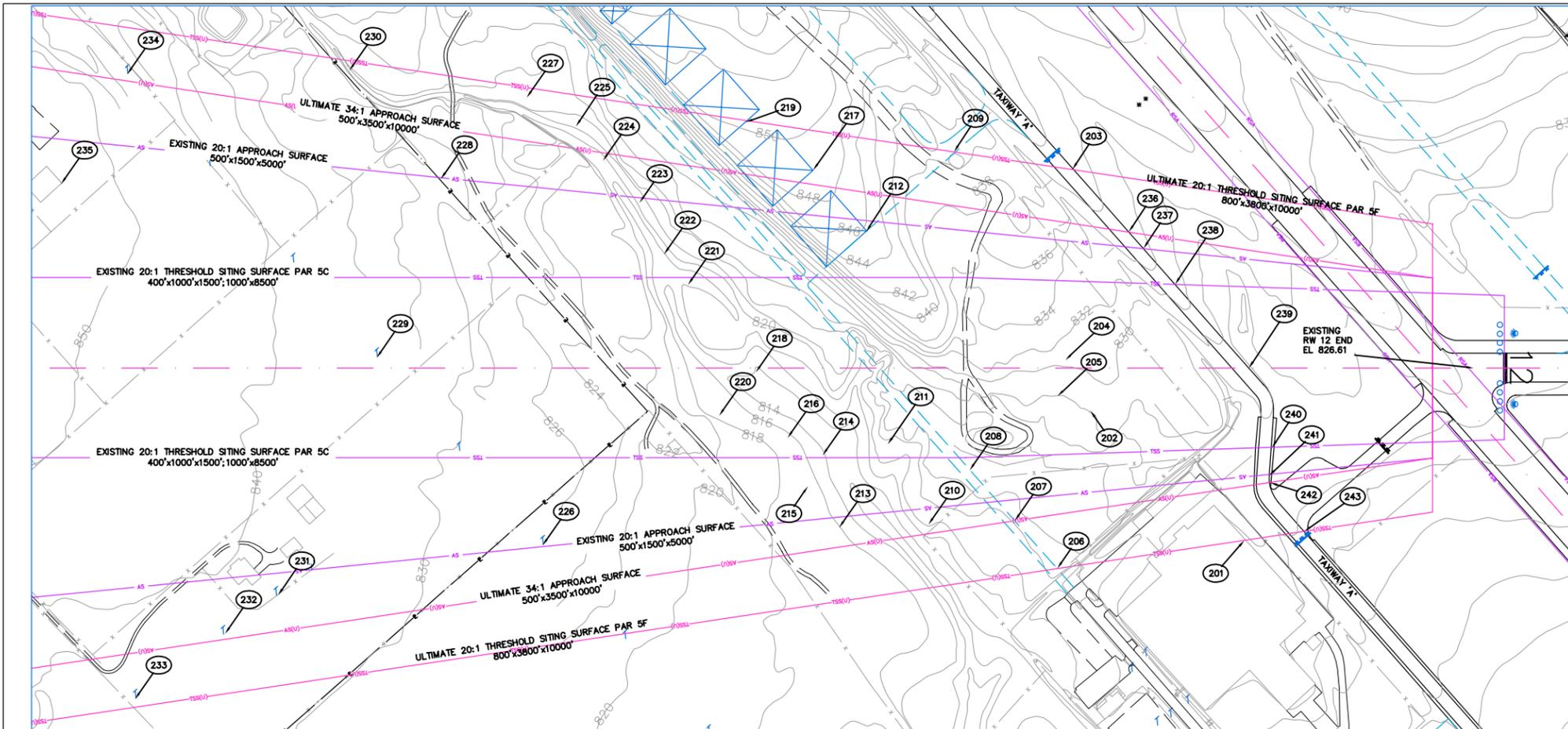
ALL OFFSETS DESCRIBED AS RIGHT (R) OR LEFT (L) OF THE EXTENDED RUNWAY CENTERLINE AS SEEN FROM APPROACHING AIRCRAFT.

ANY OBSTRUCTION REMEDIATION TIME TABLE IS CONTINGENT UPON DEVELOPMENT, ACCEPTANCE AND IMPLEMENTATION OF AN ENGINEERED DESIGN OF THE ULTIMATE PLAN AS PROPOSED BY THIS ALP. LAND ACQUISITIONS, EASEMENTS AND AGREEMENTS BETWEEN PROPERTY OWNERS AND AIRPORT SPONSOR MAY ALSO FACTOR INTO TIME TABLE FOR OBSTRUCTION REMEDIATION. THEREFORE, THE FOLLOWING SUGGESTED TIME FRAMES FOR REMEDIATION SHOULD BE UNDERSTOOD TO BE ESTIMATES ONLY.

POLES THAT PENETRATE THE ULTIMATE APPROACH AND THRESHOLD SITING SURFACES SHALL BE RELOCATED OUTSIDE THE LIMITS OF ULTIMATE THRESHOLD SITING SURFACE OR OTHERWISE LINES SHALL BE ENCAPSULATED AND BURIED TO ACHIEVE ULTIMATE APPROACH.

ITEM #3, TREE CLEARED ULTIMATE THRESHOLD SITING SURFACE BY 1/2 OF ONE FOOT AT TIME OF SURVEY. TREE TO BE TRIMMED OR REMOVED PRIOR TO GRANTING OF ULTIMATE APPROACH.

TEXAS DEPARTMENT OF TRANSPORTATION AVIATION DIVISION <input type="checkbox"/> ALP APPROVED ACCORDING TO FAA AC 150/5300-13 CH 8 PLUS THE REQUIREMENTS OF A FAVORABLE ENVIRONMENTAL FINDING PRIOR TO THE START OF ANY LAND ACQUISITION OR CONSTRUCTION AND AN FAA FORM 7460-1 SUBMITTED PRIOR TO ANY CONSTRUCTION ON AIRPORT PROPERTY <input type="checkbox"/> ALP APPROVED ACCORDING TO FAA AC 150/5300-13 CH 8 PLUS THE CONDITIONS/COMMENTS IN LETTER DATED:		AIRPORT SPONSOR CURRENT AND FUTURE DEVELOPMENT DEPICTED ON THIS ALP IS APPROVED AND SUPPORTED BY AIRPORT SPONSOR TITLE, AIRPORT SPONSOR'S REPRESENTATIVE SIGNATURE _____ DATE _____	
DIRECTOR, AVIATION DIVISION PREPARED BY: 237 N.W. Blue Parkway Suite 100 Lee's Summit, Mo. 64063 (816) 524-3500, Fax (2575) Coffman Phoenix Office: 4835 E. Cactus Road Suite 235 Scottsdale, Az. 85254 (602) 993-6999, Fax (7196)		DATE SIGNATURE M. Dmyterko DATE July 2005 DRAWN BY D. Hopkins DATE July 2005 CHECKED BY J. Harris DATE July 2005	
IPASD RUNWAY 35 GAINESVILLE MUNICIPAL AIRPORT GAINESVILLE, TEXAS			



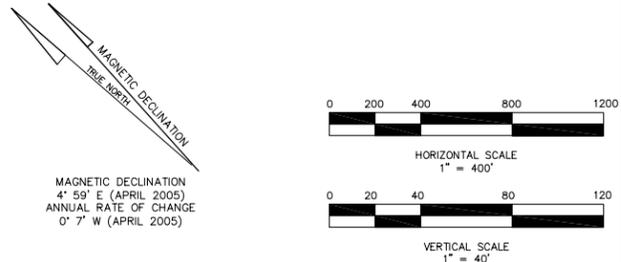
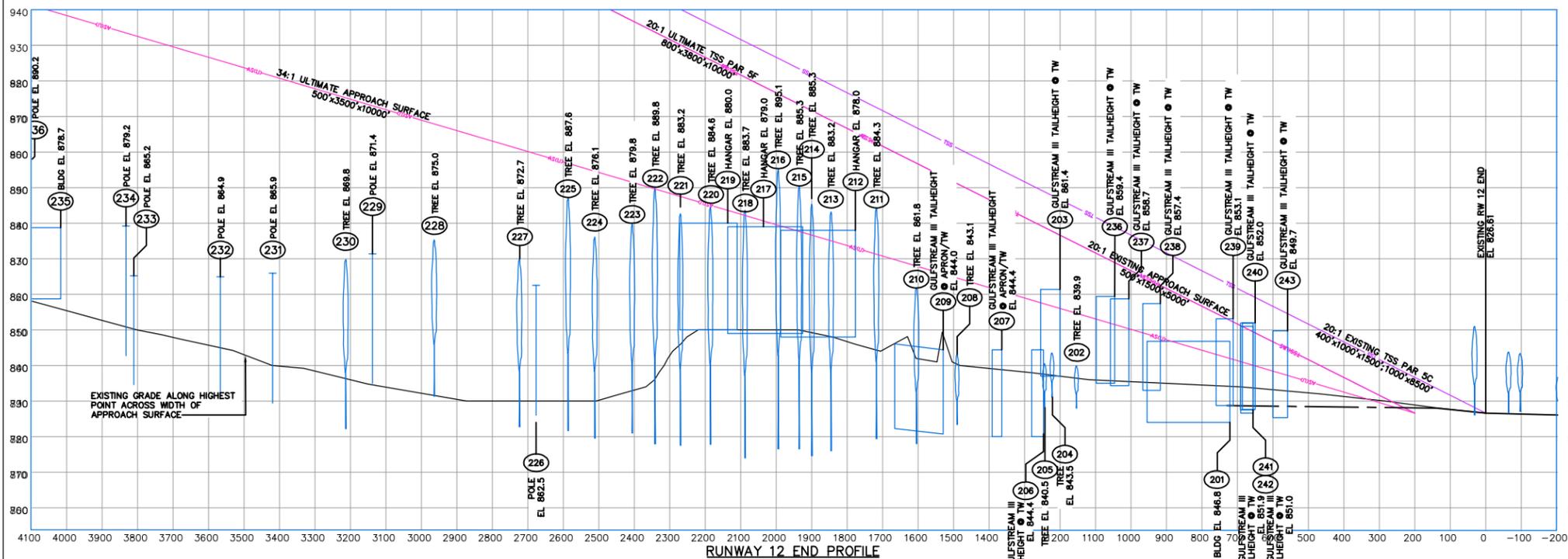
No.	Object Description	Top Elev (MSL)	Offset fm Exist RW C/L	Distance fm Exist RW End	Exist 20:1 App Penetration	Exist 20:1 TSS Penetration	Ult 34:1 App Penetration	Ult 20:1 TSS Penetration	Obstruction Remediation
201	BLDG	846.8	148.1 L	721.7	CLEAR	CLEAR	N/A	CLEAR	NO ACTION REQUIRED
202	TREE	839.9	258.9 R	1154.2	CLEAR	CLEAR	CLEAR	CLEAR	NO ACTION REQUIRED
203	TAXIWAY	961.4	369.1 R	1200.1	N/A	N/A	N/A	CLEAR	NO ACTION REQUIRED
204	TREE	843.5	296.8 R	1221.9	CLEAR	CLEAR	CLEAR	CLEAR	NO ACTION REQUIRED
205	TREE	840.5	0.0	1242.8	CLEAR	CLEAR	CLEAR	CLEAR	NO ACTION REQUIRED
206	TAXIWAY	844.4	207.2 R	1246.7	N/A	N/A	N/A	CLEAR	NO ACTION REQUIRED
207	TAXIWAY	844.4	97.4 R	1364.4	N/A	N/A	CLEAR	CLEAR	NO ACTION REQUIRED
208	TREE	843.1	572.3 R	1490.6	CLEAR	N/A	CLEAR	CLEAR	NO ACTION REQUIRED
209	TAXIWAY	844.0	172.9 R	1529.6	N/A	N/A	N/A	CLEAR	NO ACTION REQUIRED
210	TREE	861.8	91.6 R	1605.1	N/A	N/A	CLEAR	CLEAR	NO ACTION REQUIRED
211	TREE	884.3	620.5 R	1718.1	CLEAR	CLEAR	13.7	CLEAR	ULT 20:1 TSS CLEAR; NAR
212	HANGAR	878.0	286.6 R	1718.7	CLEAR	N/A	5.6	CLEAR	ULT 20:1 TSS CLEAR; NAR
213	TREE	883.2	481.5 R	1846.4	N/A	N/A	8.8	CLEAR	ULT 20:1 TSS CLEAR; NAR
214	TREE	885.3	307.3 R	1900.0	CLEAR	CLEAR	9.3	CLEAR	ULT 20:1 TSS CLEAR; NAR
215	TREE	885.3	599.9 R	1935.6	CLEAR	N/A	8.3	CLEAR	ULT 20:1 TSS CLEAR; NAR
216	TREE	895.1	738.2 L	1995.3	CLEAR	CLEAR	16.3	CLEAR	ULT 20:1 TSS CLEAR; NAR
217	HANGAR	879.0	752.1 L	1925.9	N/A	N/A	2.2	CLEAR	ULT 20:1 TSS CLEAR; NAR
218	TREE	883.7	597.5 L	2087.2	CLEAR	CLEAR	2.2	CLEAR	ULT 20:1 TSS CLEAR; NAR
219	HANGAR	880.0	624.4 L	2136.7	N/A	N/A	N/A	CLEAR	NO ACTION REQUIRED
220	TREE	884.6	761.4 R	2184.0	CLEAR	CLEAR	0.2	CLEAR	ULT 20:1 TSS CLEAR; NAR
221	TREE	883.2	624.1 L	2289.8	CLEAR	CLEAR	CLEAR	CLEAR	NO ACTION REQUIRED
222	TREE	889.8	450.3 L	2341.3	CLEAR	N/A	0.8	CLEAR	ULT 20:1 TSS CLEAR; NAR
223	TREE	879.8	500.9 L	2408.3	CLEAR	N/A	CLEAR	CLEAR	NO ACTION REQUIRED
224	TREE	876.1	626.7 R	2511.8	N/A	N/A	CLEAR	CLEAR	NO ACTION REQUIRED
225	TREE	887.6	514.6 R	2587.1	N/A	N/A	N/A	CLEAR	NO ACTION REQUIRED
226	POLE	862.5	650.0 R	2676.7	CLEAR	N/A	CLEAR	CLEAR	NO ACTION REQUIRED
227	TREE	872.7	293.7 L	2722.8	N/A	N/A	N/A	CLEAR	NO ACTION REQUIRED
228	TREE	875.0	78.6 R	2963.5	CLEAR	N/A	CLEAR	CLEAR	NO ACTION REQUIRED
229	POLE	871.4	252.2 L	3138.3	CLEAR	CLEAR	CLEAR	CLEAR	NO ACTION REQUIRED
230	TREE	869.8	245.6 R	3213.8	N/A	N/A	N/A	CLEAR	NO ACTION REQUIRED
231	POLE	865.9	58.1 R	3419.3	N/A	N/A	CLEAR	CLEAR	NO ACTION REQUIRED
232	POLE	864.9	256.9 L	3566.6	N/A	N/A	CLEAR	CLEAR	NO ACTION REQUIRED
233	POLE	865.2	108.8L	3811.0	N/A	N/A	N/A	CLEAR	NO ACTION REQUIRED
234	POLE	879.2	56.9 L	3832.8	N/A	N/A	N/A	CLEAR	NO ACTION REQUIRED
235	BLDG	878.7	0.0	4017.2	CLEAR	N/A	CLEAR	CLEAR	NO ACTION REQUIRED
236	TAXIWAY	859.4	377.2 L	1043.1	CLEAR	CLEAR	8.0	CLEAR	ULT 20:1 TSS CLEAR; NAR
237	TAXIWAY	858.7	331.1 L	1005.2	CLEAR	N/A	8.4	CLEAR	ULT 20:1 TSS CLEAR; NAR
238	TAXIWAY	857.4	231.8 L	917.3	CLEAR	CLEAR	9.7	CLEAR	ULT 20:1 TSS CLEAR; NAR
239	TAXIWAY	853.1	0.0	711.7	CLEAR	CLEAR	11.4	0.9	ADD HOLD MARKING TO PROTECT TSS
240	TAXIWAY	852.0	220.4 R	649.4	CLEAR	CLEAR	12.2	2.9	ADD HOLD MARKING TO PROTECT TSS
241	TAXIWAY	851.9	295.1 R	656.0	CLEAR	N/A	11.9	2.5	ADD HOLD MARKING TO PROTECT TSS
242	TAXIWAY	851.0	318.0 R	655.7	CLEAR	N/A	11.0	1.6	ADD HOLD MARKING TO PROTECT TSS
243	TAXIWAY	849.7	453.7 R	558.8	CLEAR	N/A	12.5	5.1	ADD HOLD MARKING TO PROTECT TSS

ELEVATIONS ADJUSTED UPWARD 10' FOR PRIVATE ROAD, 15' FOR PUBLIC ROADWAY, 17' FOR INTERSTATE HIGHWAY, 23' FOR RAILROADS
 ALL OFFSETS DESCRIBED AS RIGHT (R) OR LEFT (L) OF THE EXTENDED RUNWAY CENTERLINE AS SEEN FROM APPROACHING AIRCRAFT.
 NO ACTION REQUIRED (NAR)
 HOLDING POSITION MARKINGS TO BE ADDED TO TAXIWAY 'A' IN ACCORDANCE WITH AC 150/5140-1J, PAR. 23B TO ACHIEVE ULTIMATE TSS CLEARANCE.
 ANY ULTIMATE OBSTRUCTION REMEDIATION TIME TABLE IS CONTINGENT UPON DEVELOPMENT, ACCEPTANCE AND IMPLEMENTATION OF AN ENGINEER DESIGN OF THE ULTIMATE PLAN AS PROPOSED BY THIS ALP. LAND ACQUISITIONS, EASEMENTS AND AGREEMENTS BETWEEN PROPERTY OWNERS AND AIRPORT SPONSOR MAY ALSO FACTOR INTO THE TABLE FOR OBSTRUCTION REMEDIATION. THEREFORE, THE FOLLOWING SUGGESTED TIME FRAMES FOR REMEDIATION SHOULD BE UNDERSTOOD TO BE ESTIMATES ONLY.
 CONSTRUCTION ROADS USED DURING THE PREVIOUS RUNWAY 17 EXTENSION ARE CLOSED TO ALL VEHICLES.
 HOLD LINES AT TAXIWAY "A" TO BE ADDED TO ACHIEVE ULTIMATE 20:1 THRESHOLD SITING SURFACE CLEARANCE.

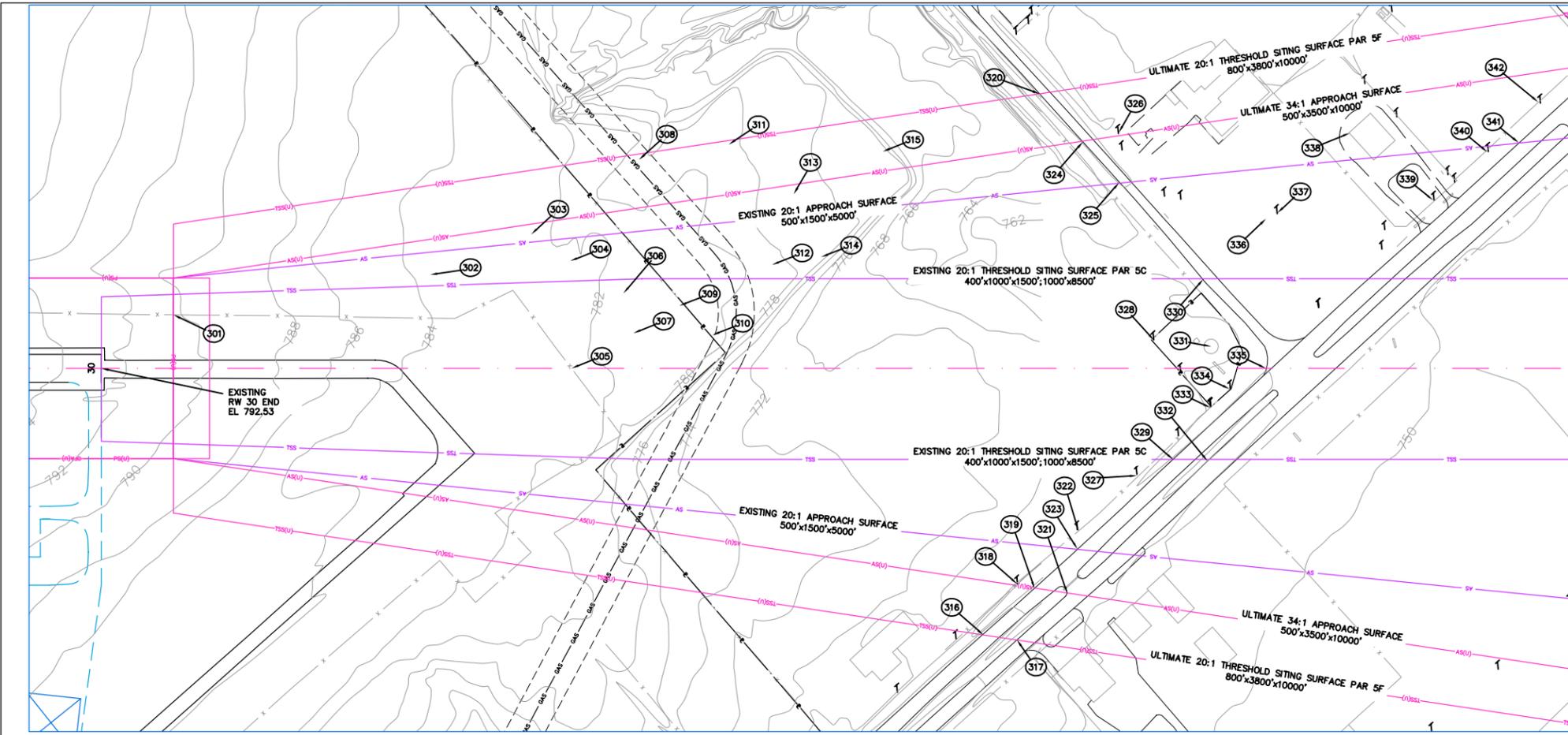
RUNWAY 12 END PLAN

GENERAL NOTES:

1. AN OBSTRUCTION SURVEY TYPE 'C' MEETING THE STANDARDS OF FAA #405 WAS PERFORMED ON NOVEMBER 10-11, 2004 BY GEODETIX, SAN ANTONIO, TX.
2. THE EXISTING HEIGHT HAZARD ZONING ORDINANCE FOR THIS AIRPORT WAS ADOPTED ON 13 APRIL 1983. RUNWAY 17-35, 5000' X 100', ZONED LENGTH IS 5000' OTHER THAN UTILITY NONPRECISION INSTRUMENT. RUNWAY 12-30, 4663' X 75', ZONED 5000', OTHER THAN UTILITY.



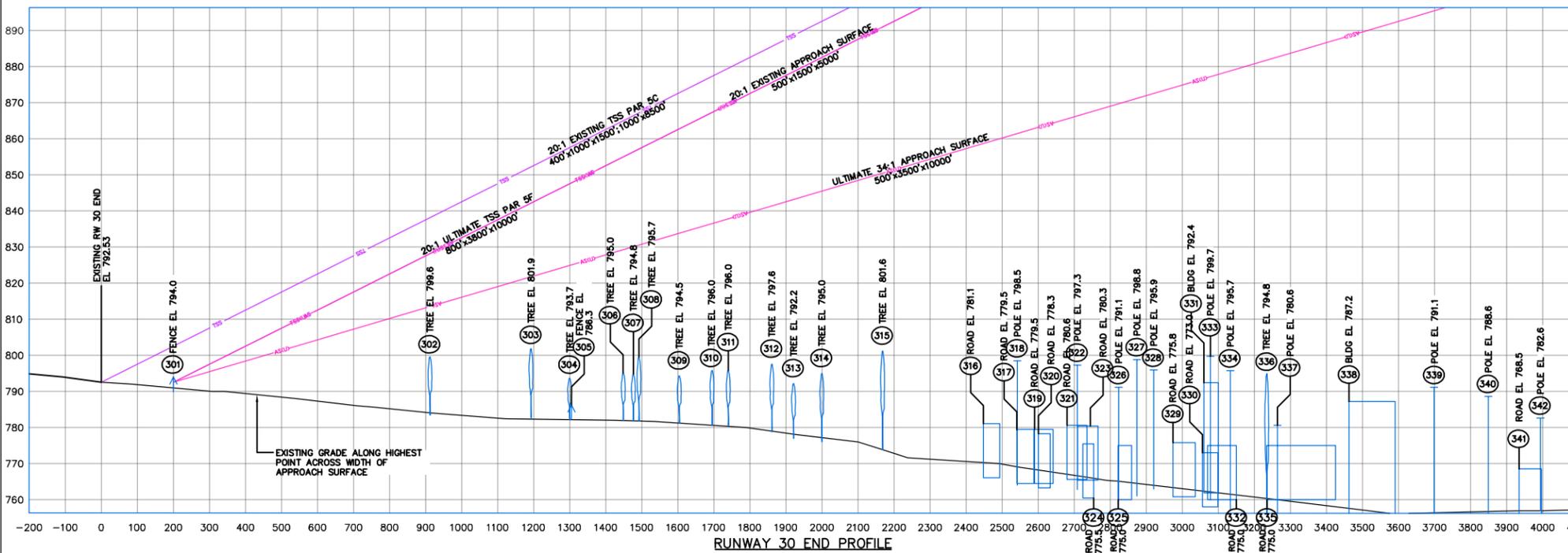
TEXAS DEPARTMENT OF TRANSPORTATION AVIATION DIVISION <input type="checkbox"/> ALP APPROVED ACCORDING TO FAA AC 150/5300-13 CH 8 PLUS THE REQUIREMENTS OF A FAVORABLE ENVIRONMENTAL FINDING PRIOR TO THE START OF ANY LAND ACQUISITION OR CONSTRUCTION AND AN FAA FORM 7460-1 SUBMITTED PRIOR TO ANY CONSTRUCTION ON AIRPORT PROPERTY <input type="checkbox"/> ALP APPROVED ACCORDING TO FAA AC 150/5300-13 CH 8 PLUS THE CONDITIONS/COMMENTS IN LETTER DATED:		AIRPORT SPONSOR CURRENT AND FUTURE DEVELOPMENT DEPICTED ON THIS ALP IS APPROVED AND SUPPORTED BY AIRPORT SPONSOR TITLE AIRPORT SPONSOR'S REPRESENTATIVE _____ SIGNATURE _____ DATE _____	
DIRECTOR, AVIATION DIVISION _____ DATE _____ PREPARED BY: 237 N.W. Blue Parkway Suite 100 Lee's Summit, Mo. 64063 (816) 524-3500, Fax (2575) Coffman Phoenix Office: 4835 E. Cactus Road Suite 235 Scottsdale, Az. 85254 (602) 993-6999, Fax (7196)		M. Dmyterko July 2005 D. Hopkins July 2005 J. Harris July 2005	



RUNWAY 30 END PLAN

GENERAL NOTES:

1. AN OBSTRUCTION SURVEY TYPE "C" MEETING THE STANDARDS OF FAA #405 WAS PERFORMED ON NOVEMBER 10-11, 2004 BY GEODETIX, SAN ANTONIO, TX.
2. THE EXISTING HEIGHT HAZARD ZONING ORDINANCE FOR THIS AIRPORT WAS ADOPTED ON 13 APRIL 1983. RUNWAY 17-35, 5000' X 100', ZONED LENGTH IS 5000' OTHER THAN UTILITY NONPRECISION INSTRUMENT. RUNWAY 12-30, 4663' X 75', ZONED 5000', OTHER THAN UTILITY.



RUNWAY 30 END PROFILE

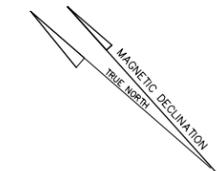
Obstruction Table									
No.	Object Description	Top Elev (MSL)	Offset fm Exist RW C/L	Distance fm Exist RW End	Exist 20:1 App Penetration	Exist 20:1 TSS Penetration	Ult 34:1 App Penetration	Ult 20:1 TSS Penetration	Obstruction Remediation
301	FENCE	794.0	148.1 L	200.0	1.5	1.5	1.5	1.5	REMOVE FENCE
302	TREE	799.6	258.9 R	912.4	CLEAR	N/A	CLEAR	CLEAR	NO ACTION REQUIRED
303	TREE	801.9	369.1 R	1192.8	N/A	N/A	CLEAR	CLEAR	NO ACTION REQUIRED
304	TREE	793.7	296.8 R	1300.0	CLEAR	N/A	CLEAR	CLEAR	NO ACTION REQUIRED
305	FENCE	786.3	0.0	1304.9	CLEAR	CLEAR	CLEAR	CLEAR	NO ACTION REQUIRED
306	TREE	795.0	207.2 R	1448.9	CLEAR	CLEAR	CLEAR	CLEAR	NO ACTION REQUIRED
307	TREE	794.8	97.4 R	1476.9	CLEAR	CLEAR	CLEAR	CLEAR	NO ACTION REQUIRED
308	TREE	795.7	572.3 R	1492.4	CLEAR	CLEAR	CLEAR	CLEAR	NO ACTION REQUIRED
309	TREE	794.5	172.9 R	1604.4	CLEAR	CLEAR	CLEAR	CLEAR	NO ACTION REQUIRED
310	TREE	796.0	91.6 R	1695.3	CLEAR	CLEAR	N/A	N/A	NO ACTION REQUIRED
311	TREE	796.0	620.5 R	1740.4	N/A	N/A	N/A	N/A	NO ACTION REQUIRED
312	TREE	797.6	286.6 R	1861.3	CLEAR	N/A	CLEAR	CLEAR	NO ACTION REQUIRED
313	TREE	792.2	481.5 R	1921.6	N/A	N/A	CLEAR	CLEAR	NO ACTION REQUIRED
314	TREE	795.0	307.3 R	1997.4	CLEAR	N/A	CLEAR	CLEAR	NO ACTION REQUIRED
315	TREE	801.6	599.9 R	2168.7	N/A	N/A	N/A	N/A	NO ACTION REQUIRED
316	ROAD	781.1	738.2 L	2448.4	N/A	N/A	N/A	N/A	NO ACTION REQUIRED
317	ROAD	779.5	752.1 L	2541.7	N/A	N/A	N/A	N/A	NO ACTION REQUIRED
318	POLE	798.5	597.5 L	2542.4	N/A	N/A	CLEAR	CLEAR	NO ACTION REQUIRED
319	ROAD	779.5	624.4 L	2590.4	N/A	N/A	CLEAR	CLEAR	NO ACTION REQUIRED
320	ROAD	778.3	761.4 R	2601.0	N/A	N/A	N/A	N/A	NO ACTION REQUIRED
321	ROAD	780.6	624.1 L	2680.2	N/A	N/A	CLEAR	CLEAR	NO ACTION REQUIRED
322	POLE	797.3	450.3 L	2708.9	CLEAR	N/A	CLEAR	CLEAR	NO ACTION REQUIRED
323	ROAD	780.3	500.9 L	2709.3	CLEAR	N/A	CLEAR	CLEAR	NO ACTION REQUIRED
324	ROAD	775.5	626.7 R	2724.4	N/A	N/A	CLEAR	CLEAR	NO ACTION REQUIRED
325	ROAD	775.0	514.6 R	2821.9	CLEAR	N/A	CLEAR	CLEAR	NO ACTION REQUIRED
326	POLE	791.1	650.0 R	2823.6	CLEAR	CLEAR	CLEAR	CLEAR	NO ACTION REQUIRED
327	POLE	798.8	293.7 L	2874.3	CLEAR	N/A	CLEAR	CLEAR	NO ACTION REQUIRED
328	POLE	795.9	78.6 R	2920.5	CLEAR	CLEAR	CLEAR	CLEAR	NO ACTION REQUIRED
329	ROAD	775.8	252.2 L	2974.1	CLEAR	CLEAR	CLEAR	CLEAR	NO ACTION REQUIRED
330	ROAD	773.0	245.6 R	3055.8	CLEAR	CLEAR	CLEAR	CLEAR	NO ACTION REQUIRED
331	BLDG	792.4	58.1 R	3060.0	CLEAR	CLEAR	CLEAR	CLEAR	NO ACTION REQUIRED
332	ROAD	775.0	256.9 L	3070.3	CLEAR	CLEAR	CLEAR	CLEAR	NO ACTION REQUIRED
333	POLE	799.7	108.8L	3081.1	CLEAR	CLEAR	CLEAR	CLEAR	NO ACTION REQUIRED
334	POLE	795.7	56.9 L	3133.2	CLEAR	CLEAR	CLEAR	CLEAR	NO ACTION REQUIRED
335	ROAD	775.0	0.0	3234.0	CLEAR	CLEAR	CLEAR	CLEAR	NO ACTION REQUIRED
336	TREE	794.8	413.5 R	3234.0	CLEAR	N/A	CLEAR	CLEAR	NO ACTION REQUIRED
337	POLE	780.6	428.0 R	3283.8	CLEAR	N/A	CLEAR	CLEAR	NO ACTION REQUIRED
338	BLDG	787.2	650.6 R	3462.7	CLEAR	N/A	CLEAR	CLEAR	NO ACTION REQUIRED
339	POLE	791.1	217.7 R	3700.0	CLEAR	N/A	CLEAR	CLEAR	NO ACTION REQUIRED
340	POLE	788.6	352.2 R	3849.3	CLEAR	N/A	CLEAR	CLEAR	NO ACTION REQUIRED
341	ROAD	768.5	375.7 R	3934.5	CLEAR	N/A	CLEAR	CLEAR	NO ACTION REQUIRED
342	POLE	782.6	486.2 R	3993.9	N/A	N/A	CLEAR	CLEAR	NO ACTION REQUIRED

ELEVATIONS ADJUSTED UPWARD 10' FOR PRIVATE ROAD, 15' FOR PUBLIC ROADWAY, 17' FOR INTERSTATE HIGHWAY, 23' FOR RAILROADS

ALL OFFSETS DESCRIBED AS RIGHT (R) OR LEFT (L) OF THE EXTENDED RUNWAY CENTERLINE AS SEEN FROM APPROACHING AIRCRAFT.

ANY ULTIMATE OBSTRUCTION REMEDIATION TIME TABLE IS CONTINGENT UPON DEVELOPMENT, ACCEPTANCE AND IMPLEMENTATION OF AN ENGINEERED DESIGN OF THE ULTIMATE PLAN AS PROPOSED BY THIS ALP. LAND ACQUISITIONS, EASEMENTS AND AGREEMENTS BETWEEN PROPERTY OWNERS AND AIRPORT SPONSOR MAY ALSO FACTOR INTO TIME TABLE FOR OBSTRUCTION REMEDIATION. THEREFORE, THE FOLLOWING SUGGESTED TIME FRAMES FOR REMEDIATION SHOULD BE UNDERSTOOD TO BE ESTIMATES ONLY.

FENCE TO BE REMOVED AS SOON AS FEASIBLE.



MAGNETIC DECLINATION
4° 59' E (APRIL 2005)
ANNUAL RATE OF CHANGE
0° 7' W (APRIL 2005)



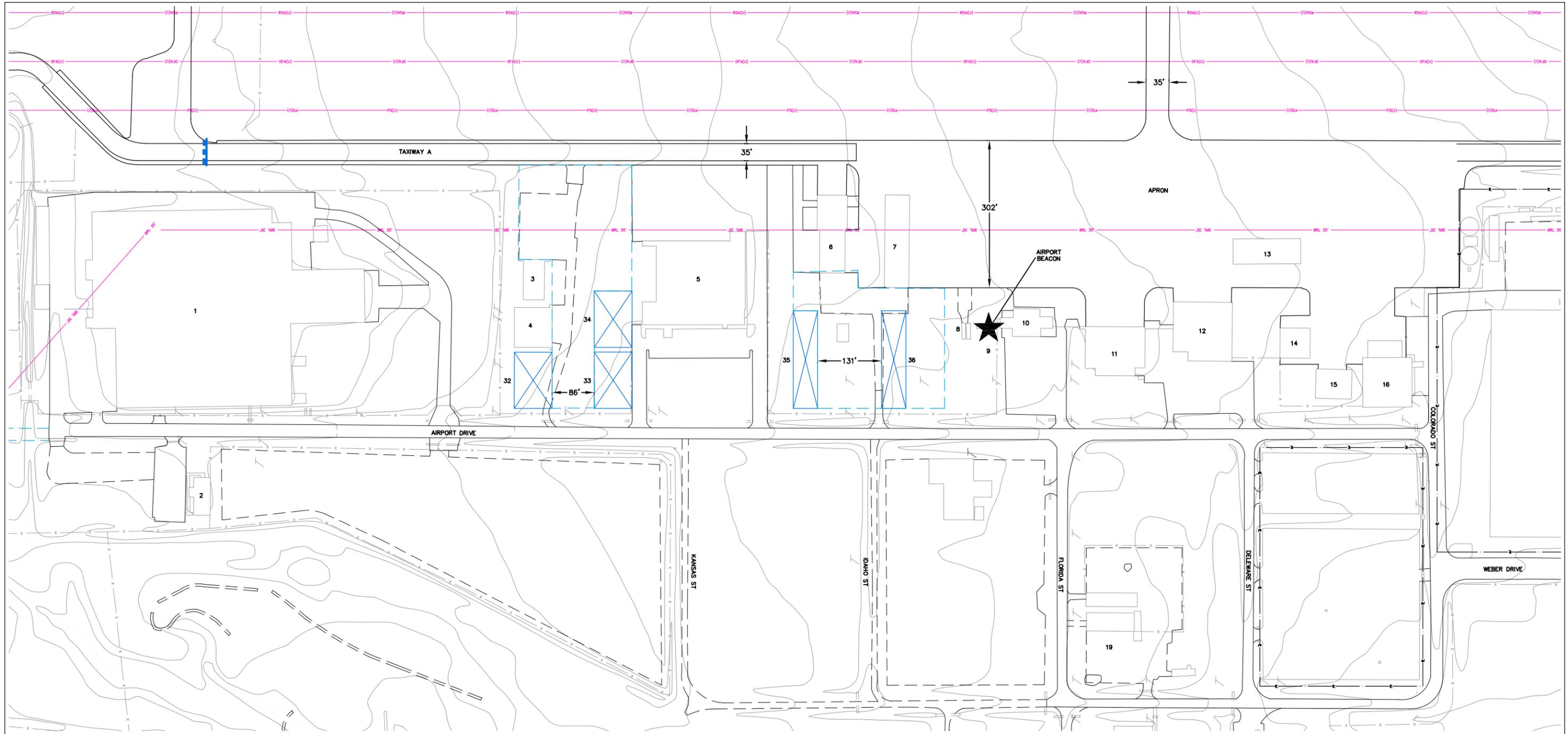
HORIZONTAL SCALE
1" = 400'



VERTICAL SCALE
1" = 40'

TEXAS DEPARTMENT OF TRANSPORTATION AVIATION DIVISION <input type="checkbox"/> ALP APPROVED ACCORDING TO FAA AC 150/5300-13 CH 8 PLUS THE REQUIREMENTS OF A FAVORABLE ENVIRONMENTAL FINDING PRIOR TO THE START OF ANY LAND ACQUISITION OR CONSTRUCTION AND AN FAA FORM 7460-1 SUBMITTED PRIOR TO ANY CONSTRUCTION ON AIRPORT PROPERTY <input type="checkbox"/> ALP APPROVED ACCORDING TO FAA AC 150/5300-13 CH 8 PLUS THE CONDITIONS/COMMENTS IN LETTER DATED:		AIRPORT SPONSOR CURRENT AND FUTURE DEVELOPMENT DEPICED ON THIS ALP IS APPROVED AND SUPPORTED BY AIRPORT SPONSOR TITLE AIRPORT SPONSOR'S REPRESENTATIVE _____ SIGNATURE _____ DATE _____	
DIRECTOR, AVIATION DIVISION _____ DATE _____ PREPARED BY: 237 N.W. Blue Parkway Suite 100 Lee's Summit, Mo. 64063 (816) 524-3500, Fax (2575) COFFMAN ASSOCIATES, INC. 4835 E. Cactus Road Suite 235 Scottsdale, Az. 85254 (602) 993-6999, Fax (7196)		M. Dmyterko July 2005 D. Hopkins July 2005 J. Harris July 2005 CHECKED BY _____ DATE _____	
IPASD RUNWAY 30 GAINESVILLE MUNICIPAL AIRPORT GAINESVILLE, TEXAS			

Coffman Associates R:\CAD\Projects\Map\GAINESVILLE_TMD_05.dwg Printed Date: 8-04-05 01:23:15 PM D:\hpl\hpl



BUILDING TABLE			
BLDG. #	DESCRIPTION		TOP ELEVATION
	EXISTING	ULTIMATE	
1	FBO	NA	868.5'
2	FBO	NA	831.8'
3	EXECUTIVE HANGAR	NA	836.1'
4	EXECUTIVE HANGAR	NA	837.7'
5	FBO	NA	853.6'
6	T-HANGAR	NA	835.9'
7	T-HANGAR	NA	829.3'
8	FUEL FARM	NA	819.2'
9	AIRPORT BEACON	NA	865.1'
10	TERMINAL	NA	828.0'
11	CONVENTIONAL HANGAR	NA	846.2'
12	FBO	NA	836.3'
13	T-HANGAR	NA	820.3'
14	EXECUTIVE HANGAR	NA	824.6'
15	EXECUTIVE HANGAR	NA	824.6'
16	EXECUTIVE HANGAR	NA	830.5'
19	GOLF MAINTENANCE	NA	814.4'
32	N/A	EXECUTIVE HANGAR	837.0'
33	N/A	EXECUTIVE HANGAR	837.0'
34	N/A	EXECUTIVE HANGAR	837.0'
35	N/A	T-HANGARS	832.0'
36	N/A	T-HANGARS	832.0'

ULTIMATE ELEVATIONS WILL VARY DUE TO FINAL GRADING AND DRAINAGE PLAN

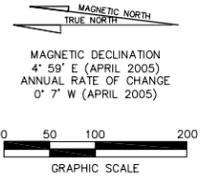
LEGEND		
	EXISTING	ULTIMATE
RUNWAY/TAXIWAY/APRON/PAVEMENT		
BUILDINGS/FACILITIES		
AIRPORT PROPERTY LINE		
WIND CONE AND SEGMENTED CIRCLE		
THRESHOLD LIGHTS		
AIRPORT BEACON		N/A
FENCE LINE		
TELEPHONE/POWER POLE LINE		N/A
BUILDING RESTRICTION LINE (BRL)	N/A	N/A
GROUND CONTOURS		N/A
HOLD POSITION AND SIGN		

GENERAL NOTES

SURVEY MAPPING PERFORMED NOVEMBER 10-11, 2004 BY GEODETX, INC., SAN ANTONIO, TX.

THE EXISTING HEIGHT HAZARD ZONING ORDINANCE FOR THIS AIRPORT WAS ADOPTED ON 13 APRIL 1983. RUNWAY 17-35, 5000' X 100', ZONED LENGTH IS 5000' OTHER THAN UTILITY NONPRECISION INSTRUMENT. RUNWAY 12-30, 4663' X 75', ZONED 5000', OTHER THAN UTILITY, NONPRECISION INSTRUMENT.

ALL REFERENCE DATUM NAD 83 HORIZONTAL, NAVD 88 VERTICAL



TEXAS DEPARTMENT OF TRANSPORTATION AVIATION DIVISION		AIRPORT SPONSOR	
<input type="checkbox"/> ALP APPROVED ACCORDING TO FAA AC 150/5300-13 CH 8 PLUS THE REQUIREMENTS OF A FAVORABLE ENVIRONMENTAL FINDING PRIOR TO THE START OF ANY LAND ACQUISITION OR CONSTRUCTION AND AN FAA FORM 7460-1 SUBMITTED PRIOR TO ANY CONSTRUCTION ON AIRPORT PROPERTY		CURRENT AND FUTURE DEVELOPMENT DEPICTED ON THIS ALP IS APPROVED AND SUPPORTED BY AIRPORT SPONSOR	
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DIRECTOR, AVIATION DIVISION	DATE	SIGNATURE	DATE
PREPARED BY: 237 N.W. Blue Parkway Suite 100 Lee's Summit, Mo. 64063 (816) 524-3500, Fax (2575) Coffman Phoenix Office: 4835 E. Cactus Road Suite 235 Scottsdale, Az. 85254 (602) 993-6999, Fax (7196)	DATE		DATE
		M. Dmyterko	July 2005
		D. Hopkins	July 2005
		J. Harris	July 2005
TERMINAL AREA DRAWING GAINESVILLE MUNICIPAL AIRPORT GAINESVILLE, TEXAS			
SHEET 8 OF 11			

PROPERTY DATA						
TRACT	ACRES	TITLE	GRANTOR	VOLUME/PAGE	DATE	FUNDING
1-B	150.0	DEED W/O WARRENTY	UNITED STATES OF AMERICA	331/29	8/4/1948	-
2-B	150.0	DEED W/O WARRENTY	UNITED STATES OF AMERICA	331/29	8/4/1948	-
3-B	146.5	DEED W/O WARRENTY	UNITED STATES OF AMERICA	331/29	8/4/1948	-
4-B	61.035	DEED W/O WARRENTY	UNITED STATES OF AMERICA	331/29	8/4/1948	-
5-B	146.48	DEED W/O WARRENTY	UNITED STATES OF AMERICA	331/29	8/4/1948	-
6-B (1)	115.5	DEED W/O WARRENTY	UNITED STATES OF AMERICA	331/29	8/4/1948	-
6-B (2)	50.0	DEED W/O WARRENTY	UNITED STATES OF AMERICA	331/29	8/4/1948	-
7-B	200.0	DEED W/O WARRENTY	UNITED STATES OF AMERICA	331/29	8/4/1948	-
8-B	115.5	DEED W/O WARRENTY	UNITED STATES OF AMERICA	331/29	8/4/1948	-
9-B	86.0	DEED W/O WARRENTY	UNITED STATES OF AMERICA	331/29	8/4/1948	-
10-B	47.0	DEED W/O WARRENTY	UNITED STATES OF AMERICA	331/29	8/4/1948	-
11-B	43.3	DEED W/O WARRENTY	UNITED STATES OF AMERICA	331/29	8/4/1948	-
13	80.56	WARRENTY DEED	MARGARET BEZNER, ET AL	821/591	8/4/1991	-
14	12.121	WARRENTY DEED	CITY OF GAINESVILLE	773/316	1/18/1988	-

FUTURE PROPERTY DATA						
TRACT	ACRES	TITLE	GRANTOR	GRANTEE	DATE	FUNDING
A	57.33	WARRANTY DEED	COOK COUNTY	GAINESVILLE MUNICIPAL AIRPORT		
B	17.00	EASEMENT	CITY OF GAINESVILLE	GAINESVILLE MUNICIPAL AIRPORT		

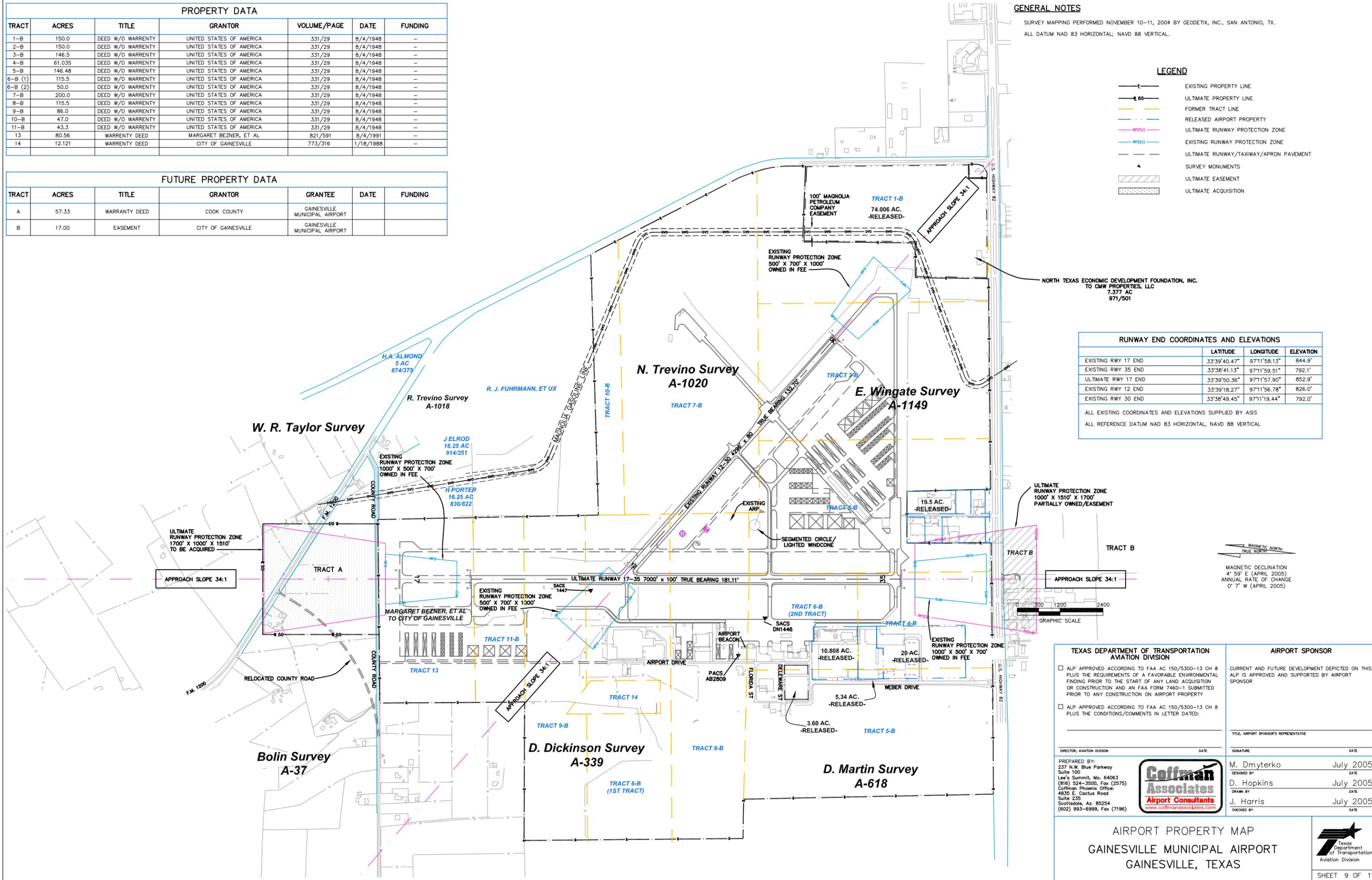
GENERAL NOTES
 SURVEY MAPPING PERFORMED NOVEMBER 10-11, 2004 BY GEODETIX, INC., SAN ANTONIO, TX.
 ALL DATUM NAD 83 HORIZONTAL; NAVD 88 VERTICAL.

- LEGEND**
- EXISTING PROPERTY LINE
 - ULTIMATE PROPERTY LINE
 - FORMER TRACT LINE
 - RELEASED AIRPORT PROPERTY
 - ULTIMATE RUNWAY PROTECTION ZONE
 - EXISTING RUNWAY PROTECTION ZONE
 - ULTIMATE RUNWAY/TAXIWAY/APRON PAVEMENT
 - SURVEY MONUMENTS
 - ULTIMATE EASEMENT
 - ULTIMATE ACQUISITION

RUNWAY END COORDINATES AND ELEVATIONS

	LATITUDE	LONGITUDE	ELEVATION
EXISTING RWY 17 END	33°39'40.47"	97°11'58.13"	844.9'
EXISTING RWY 35 END	33°38'41.13"	97°11'59.51"	792.1'
ULTIMATE RWY 17 END	33°39'50.36"	97°11'57.90"	852.9'
EXISTING RWY 12 END	33°39'18.27"	97°11'56.78"	826.0'
EXISTING RWY 30 END	33°38'49.45"	97°11'19.44"	792.0'

ALL EXISTING COORDINATES AND ELEVATIONS SUPPLIED BY ASIS
 ALL REFERENCE DATUM NAD 83 HORIZONTAL, NAVD 88 VERTICAL

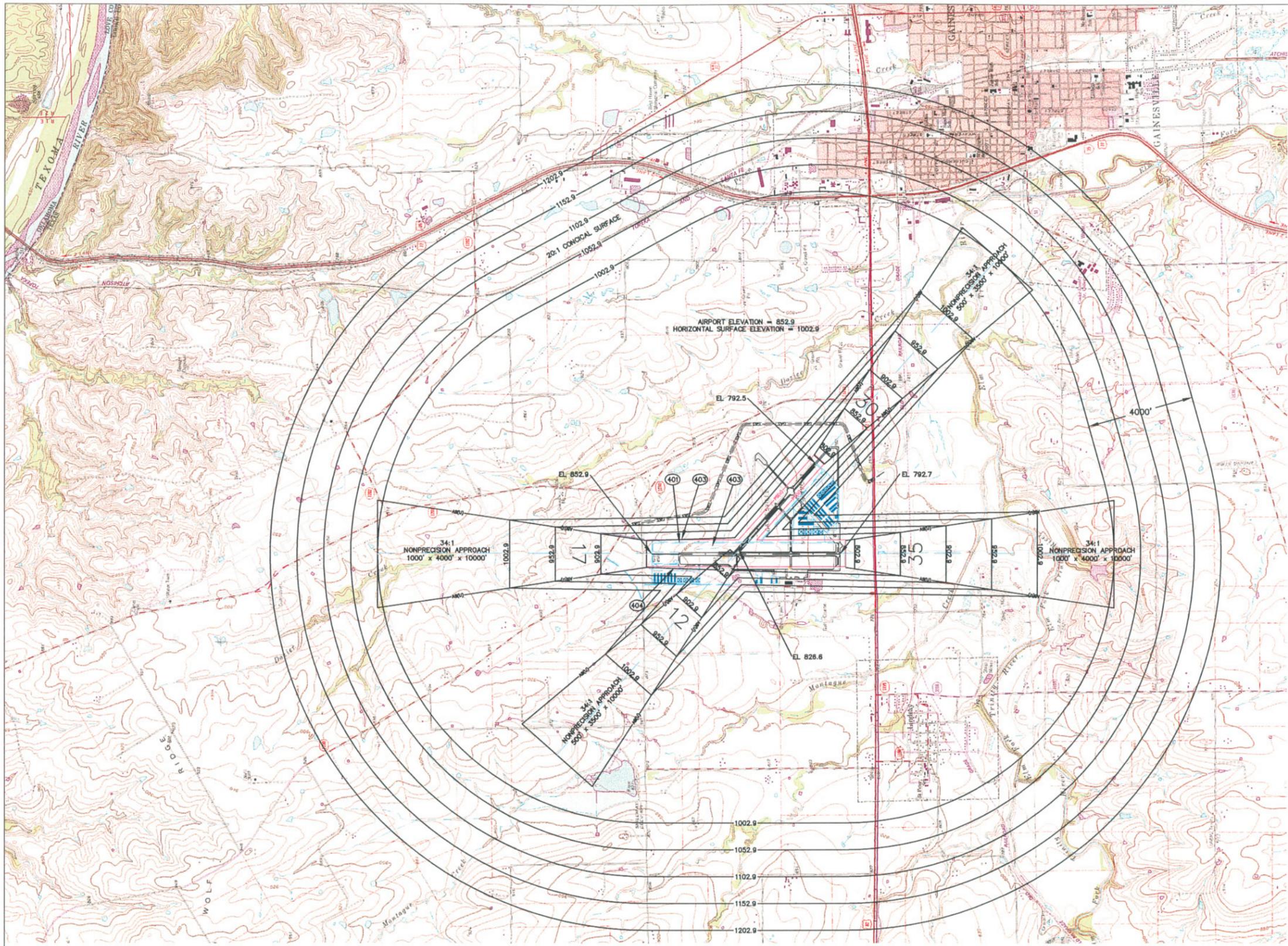


TEXAS DEPARTMENT OF TRANSPORTATION AVIATION DIVISION		AIRPORT SPONSOR	
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DIRECTOR, AVIATION DIVISION	DATE	TITLE, AIRPORT SPONSOR'S REPRESENTATIVE	
PREPARED BY: 237 N.W. Blue Parkway Suite 100 Lee's Summit, Mo. 64063 (816) 524-3500, Fax (2575) Coffman Phoenix Office: 4835 E. Cactus Road Suite 235 Scottsdale, Az. 85254 (602) 993-6999, Fax (7196)	DATE	SIGNATURE	DATE
		M. Dmyterko	July 2005
		D. Hopkins	July 2005
		J. Harris	July 2005

AIRPORT PROPERTY MAP
 GAINESVILLE MUNICIPAL AIRPORT
 GAINESVILLE, TEXAS



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Obstruction Table						
No.	Object Description	Top Elev (MSL)	Offset from RW C/L	Distance from RW End	Penetration	Obstruction Remediation
401	FENCE POST	864.1	417.6 L	-33.8	19.2	REMOVE FENCE
402	FENCE	838.9	290.5 L	-1249.0	3.2	REMOVE FENCE
403	GROUND	460.0	433.6 L	-76.2	15.1	GRADE TO 849.0
404	FENCE	862.7	505.2 R	-849.5	14.6	REMOVE FENCE

ALL OFFSETS DESCRIBED AS RIGHT (R) OR LEFT (L) OF THE EXTENDED RUNWAY CENTERLINE AS SEEN FROM APPROACHING AIRCRAFT.

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FENCING THAT PENETRATES PRIMARY AND TRANSITIONAL SURFACE TO BE REMOVED AS SOON AS FEASIBLE.

GROUND THAT PENETRATES PRIMARY SURFACE TO BE GRADED AS SOON AS FEASIBLE.

GENERAL NOTES

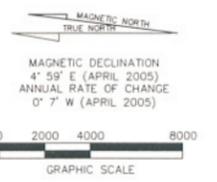
SURVEY MAPPING PERFORMED NOVEMBER 10-11, 2004 BY GEODETIX, INC., SAN ANTONIO, TX.

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REFER TO THE INNER PORTION OF APPROACH DRAWINGS PLAN AND PROFILE VIEW DETAILS FOR CLOSE-IN OBSTRUCTIONS.

ALL EXISTING ELEVATIONS ON THIS DRAWING SUPPLIED BY ASIS

ALL REFERENCE DATUM NAD 83 HORIZONTAL, NAVD 88 VERTICAL



<p>TEXAS DEPARTMENT OF TRANSPORTATION AVIATION DIVISION</p> <p><input type="checkbox"/> ALP APPROVED ACCORDING TO FAA AC 150/5300-13 CH 8 PLUS THE REQUIREMENTS OF A FAVORABLE ENVIRONMENTAL FINDING PRIOR TO THE START OF ANY LAND ACQUISITION OR CONSTRUCTION AND AN FAA FORM 7460-1 SUBMITTED PRIOR TO ANY CONSTRUCTION ON AIRPORT PROPERTY</p> <p><input type="checkbox"/> ALP APPROVED ACCORDING TO FAA AC 150/5300-13 CH 8 PLUS THE CONDITIONS/COMMENTS IN LETTER DATED:</p>	<p>AIRPORT SPONSOR</p> <p>CURRENT AND FUTURE DEVELOPMENT DEPICTED ON THIS ALP IS APPROVED AND SUPPORTED BY AIRPORT SPONSOR</p> <p>TITLE AIRPORT SPONSOR'S REPRESENTATIVE _____</p> <p>SIGNATURE _____ DATE _____</p>
<p>PREPARED BY: 237 N.W. Blue Parkway Suite 100 Lee's Summit, Mo. 64063 (816) 524-3500, Fax (2375) DESIGNED BY: Coffman Phoenix Office: 4835 E. Cactus Road Suite 235 Scottsdale, Az. 85254 (602) 993-6999, Fax (7196)</p>	<p>Coffman Associates Airport Consultants www.coffmanassociates.com</p> <p>M. Dmyterko July 2005 DATE D. Hopkins July 2005 DATE J. Harris July 2005 DATE</p>

AIRSPACE
GAINESVILLE MUNICIPAL AIRPORT
GAINESVILLE, TEXAS

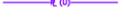


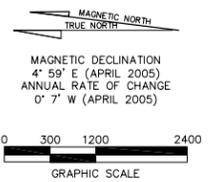
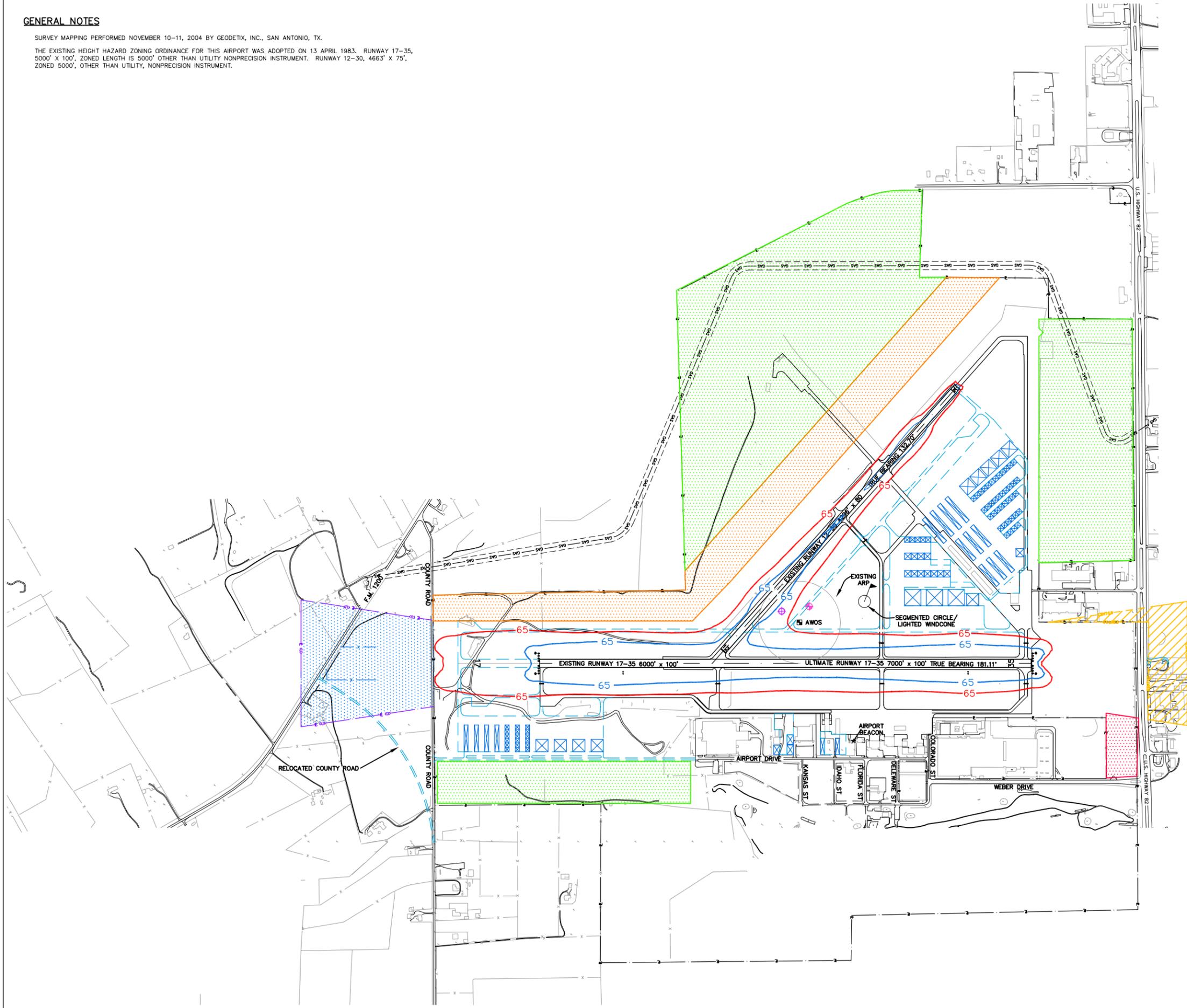
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GENERAL NOTES

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LEGEND

- AIRFIELD DEVELOPMENT 
- INDUSTRIAL DEVELOPMENT 
- COMMERCIAL DEVELOPMENT 
- ULTIMATE EASEMENT 
- ULTIMATE PROPERTY ACQUISITION 
- EXISTING 65 LDN NOISE CONTOUR 
- ULTIMATE 65 LDN NOISE CONTOUR 
- EXISTING PROPERTY LINE 
- ULTIMATE PROPERTY LINE 



TEXAS DEPARTMENT OF TRANSPORTATION AVIATION DIVISION		AIRPORT SPONSOR	
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		M. Dmyterko July 2005 DESIGNED BY DATE D. Hopkins July 2005 DRAWN BY DATE J. Harris July 2005 CHECKED BY DATE	
LAND USE DRAWING GAINESVILLE MUNICIPAL AIRPORT GAINESVILLE, TEXAS			
			 SHEET 11 OF 11

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Chapter Six
FINANCIAL PLAN

FINANCIAL PLAN



The analyses completed in previous chapters evaluated development needs at the airport over the next twenty years and beyond based on forecast activity and operational efficiency. Next, an important element of the master planning process is the application of basic economic, financial, and management rationale to each development item so that the feasibility of each item contained in the plan can be assured. The purpose of this chapter is to provide financial management information and tools which will help make the master plan achievable and successful.

The presentation of the financial plan and its feasibility has been organized into three sections. First, the airport development schedule is presented in narrative and graphic form. Secondly, capital improvement funding sources on the federal, state, and local levels are identified and discussed. Finally, the chapter presents a cash flow analysis

which analyzes the financial feasibility of the recommended Capital Improvement Program (CIP).

AIRPORT DEVELOPMENT SCHEDULES AND COST SUMMARIES

Once the specific needs and improvements for the airport have been established, the next step is to determine a realistic schedule and the associated costs for implementing the plan. This section will examine the overall cost of each item in the development plan and present a development schedule. The recommended improvements are grouped by the planning horizons: short term, intermediate term, and long term. **Table 6A** summarizes the key milestones for each of the three planning horizons.



TABLE 6A Planning Horizon Milestone Summary Gainesville Municipal Airport				
	2004	Short Term	Intermediate Term	Long Term
ANNUAL OPERATIONS				
Total Itinerant	6,900	9,200	11,200	15,400
Total Local	13,400	18,000	22,000	30,000
Total Operations	20,300	27,200	33,200	45,400
BASED AIRCRAFT				
Single Engine	46	61	75	105
Multi-Engine	15	15	15	17
Turboprop	0	1	2	3
Jet	6	9	13	20
Helicopters	2	3	4	4
Ultralight/Other	1	1	1	1
Total Based Aircraft	70	90	110	150
Total AIAs	138	184	224	308

A key aspect of this planning document is the use of demand-based planning milestones. The short term planning horizon contains items of highest priority. These items should be considered for development based on actual demand levels within the next five years. As short term horizon activity levels are reached, it will then be time to program for the intermediate term based upon the next activity milestones. Similarly, when the intermediate term milestones are reached, it will be time to program for the long term activity milestones.

Most development items included in the recommended concept will need to follow demand indicators. For example, the plan includes construction of new hangar aprons and taxiways. Based aircraft will be the indicator for additional hangar needs. If based aircraft growth occurs as projected, additional hangars will need to be constructed to meet the demand. If growth slows or does not occur as

projected, hangar pavement projects can be delayed. As a result, capital expenditures will be undertaken as needed, which leads to a responsible use of capital assets. Some development items do not depend on demand, such as pavement maintenance. These types of projects typically are associated with day-to-day operations and should be monitored and identified by airport management.

As a master plan is a conceptual document, implementation of these capital projects should only be undertaken after further refinement of their design and costs through architectural and engineering analyses. Moreover, projects could require waste water and drainage improvements. The financial plan addresses this concern, but any future development should include analysis of the capacity of the infrastructure to support the growth.

The cost estimates presented in this chapter have been increased to allow for

contingencies that may arise on the project. Capital costs presented here should be viewed only as estimates subject to further refinement during design. Nevertheless, these estimates are considered sufficiently accurate for planning purposes. Cost estimates for each of the development projects listed in the capital improvement plan are listed in current (2005) dollars. **Exhibit 6A** presents the proposed capital program for Gainesville Municipal Airport (GLE).

SHORT TERM IMPROVEMENTS

The Texas Department of Transportation (TxDOT) - Aviation Division is the distribution source for federal and state grant funding for the Gainesville Municipal Airport. Due to the large number of requests from airports across the state and the limited funding available, TxDOT's grant process will generally only provide an airport with intermittent funding assistance. This is to say that TxDOT may provide funding for a project in the current fiscal year, but may not provide additional assistance for several years thereafter. This typically holds for large capital improvement projects. Smaller projects or maintenance needs can be met annually, depending upon the need and funding availability. For these reasons, development projects in each planning horizon have been planned according to priority needs versus specific years.

The short term projects have not been assigned specific years because TxDOT's funding cycle typically allows

for grants on an "as-needed" basis as funds become available. TxDOT will assimilate the capital projects provided in this plan into their CIP. If funding assistance is not available from TxDOT, the City will need to request discretionary funding assistance from the Federal Aviation Administration (FAA). Discretionary funding is more difficult to receive, as Gainesville Municipal Airport must not only compete with other state airports, but also with other airports across the country.

The short term planning horizon CIP considers 11 projects for the roughly five-year period and is presented on **Exhibit 6B**. The transition to airport reference code (ARC) C/D-II necessitates a larger runway protection zone (RPZ). The RPZ on the Runway 35 end will extend off airport property. It is recommended that an aviation easement over this area be obtained. This area encompasses approximately 22 acres and is estimated to cost \$65,000, of which 90 percent is eligible for TxDOT funding.

Portions of the existing cattle fencing on the east side of the airport would cross into the runway safety areas (RSAs) once the transitions to ARC C/D-II occurs. Planning considers removing and replacing this fencing. This project will provide added security to the airport and improve safety by keeping various animals away from the airport.

Numerous landside improvements are considered in the short term. Development of the terminal area includes construction of an apron and

taxilanes to support additional T-hangars and executive hangars. The plan also includes the construction of two ten-unit T-hangar facilities by the City. It is assumed that executive and conventional hangar construction will be undertaken by private developers. The T-hangar on the main apron is planned to be removed, as its location reduces operational efficiencies on the apron. One possibility is to relocate this hangar to the new T-hangar area just north of the terminal building.

Ongoing maintenance of airport surfaces is considered throughout the plan. Most surfaces have recently been reconstructed or rehabilitated. The main apron is the only major surface in need of maintenance in the short term. The plan does include Routine Airport Maintenance Program (RAMP) projects totaling \$300,000. RAMP can provide up to \$30,000 in state funds on an annual basis as long as the City matches it with another \$30,000.

The last project listed in the short term is the extension of Airport Drive to County Road 404 to the north. This project will relieve the daily congestion that occurs on airport roads, primarily during shift changes at Weber Aircraft. This project assumes that the road will be constructed at the same grade as planned future development at the north end of the terminal area. To accomplish this, large portions of ground will need to be excavated. By undertaking this project in the short term, it will eliminate the need to potentially replace the road should it be constructed at the existing grade.

Short term projects presented on Exhibit 6A and graphically depicted on Exhibit 6B have been estimated to cost approximately \$5.2 million. Of that total, the local share is projected to be \$3.2 million.

INTERMEDIATE TERM IMPROVEMENTS

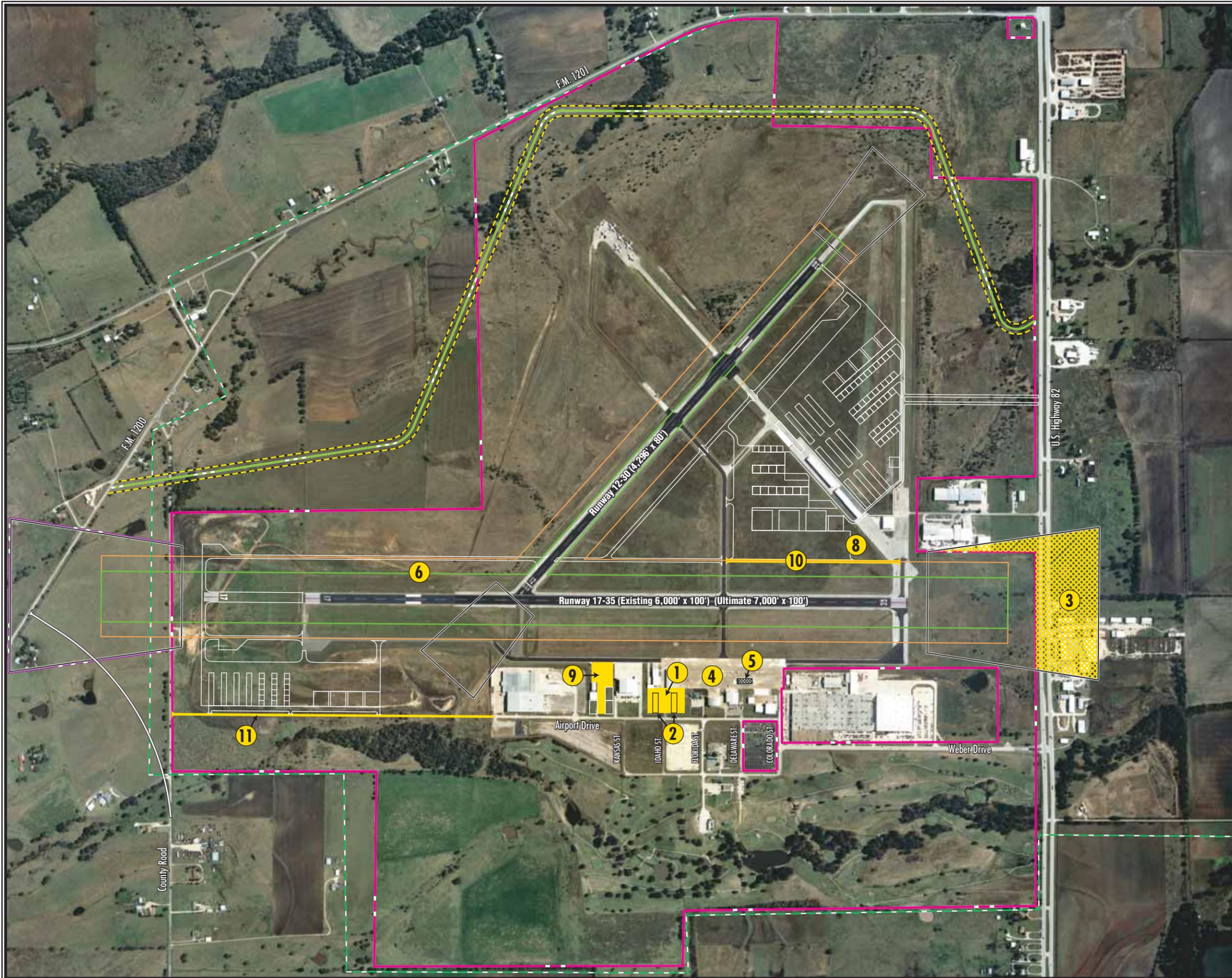
The intermediate term CIP considers the full transition of the airport to ARC C/D-II design standards, and as such, proposes improving the strength of the primary runway, improving the instrument approaches, and developing the airport centerfield. Both the intermediate and long term improvements are depicted in **Exhibit 6C**.

Reconstruction of Runway 17-35 is planned in order to address the probability that the existing strength rating of 15,000 pounds single-wheel loading (SWL) will be inadequate to support frequent operations by aircraft in ARC C/D-II. As discussed in previous chapters, a pavement evaluation study should be conducted to determine the actual current pavement strength rating and the condition of base materials. A number of methods are employed to accomplish this, including “coring” the runway or utilizing non-invasive remote sensing technologies.

The runway safety area (RSA) and object free area (OFA) serving Runway 17-35 will need improvements in order to meet ARC C/D-II design standards. The RSA and OFA will need to extend

	Project Cost	TxDOT Eligible	Local Share
SHORT TERM PROGRAM (0-5 YEARS)			
1. Construct Taxilanes for 20 T-hangars (8,888 sy)	\$635,000	\$571,500	\$63,500
2. Construct 20 T-hangars (Two 10-unit facilities)	600,000	0	600,000
3. Acquire Runway 35 RPZ Easement (22 acres)	65,000	58,500	6,500
4. Rehabilitate Apron (34,800 sy)	126,000	113,400	12,600
5. Remove T-hangar on Apron (100-series)	10,000	0	10,000
6. Improve Perimeter Fencing (Eastside - 5,000 lf)	84,500	76,050	8,450
7. Miscellaneous RAMP Projects	300,000	150,000	150,000
8. Improve Utilities for Centerfield Development	750,000	0	750,000
9. Construct Apron for Executive Hangars (6,666 sy)	565,000	508,500	56,500
10. Construct Taxiway for Centerfield Development (1,800' x 35')	591,000	532,350	59,150
11. Extend Airport Drive to County Road 404 (3,200 lf)	1,456,000	0	1,456,000
SHORT TERM PROGRAM (0-5 YEARS)	\$5,182,500	\$2,010,300	\$3,172,700
INTERMEDIATE TERM PROGRAM (6-10 YEARS)			
1. Reconstruct Runway 17-35 to 60,000 lbs. (includes bore testing)	\$6,500,000	\$5,850,000	\$650,000
2. Construct Access Road/Parking for Centerfield Development (2,700 lf)	297,000	0	297,000
3. Construct Centerfield Apron (16,666 s.y.)	1,408,277	1,267,449	140,828
4. Grade Runway 17-35 RSA and OFA ARC C/D-II Standards	750,000	675,000	75,000
5. Install MALS on Runways 17 and 35	840,000	756,000	84,000
6. Construct Centerfield Taxiways (8,900 sy)	636,350	572,715	63,635
7. Construct 20 T-hangars (Two 10-unit facilities)	600,000	0	600,000
8. Rehabilitate Taxiways A, B, C, D, and E	256,000	230,400	25,600
9. Rehabilitate/Remark Runway 12-30	147,000	132,300	14,700
10. Install REILs and MIREL on Runway 12-30	111,800	100,620	11,180
11. Miscellaneous RAMP Projects	300,000	150,000	150,000
INTERMEDIATE TERM PROGRAM (6-10 YEARS)	\$11,846,427	\$9,734,484	\$2,111,943
LONG TERM PROGRAM (11-20 YEARS)			
1. Clean and Seal Ramp Apron Joints	\$74,000	\$66,600	\$7,400
2. Construct Aircraft Wash Rack	50,000	45,000	5,000
3. Acquire Land for Runway 17 Extension (47 acres)	535,000	481,500	53,500
4. Relocate County Road 404 out of RSA and OFA	200,000	18,000	20,000
5. Extend Runway 17 & Parallel Taxiway 1,000 ft. North	4,110,000	3,699,000	411,000
6. Extend Utilities to North Along Airport Drive	500,000	0	500,000
7. Earthwork/Site Preparation for North Terminal Area	1,200,000	540,000	660,000
8. Construct Taxiways for Centerfield Development	636,350	572,715	63,635
9. Construct 20 T-hangars (Two 10-unit facilities)	600,000	0	600,000
10. Construct North Terminal Area Apron (33,333 sy)	3,250,000	2,925,000	325,000
11. Construct North Terminal Taxilanes for Hangars	850,000	765,000	85,000
12. Construct 20 T-hangars (Two 10-unit facilities)	600,000	0	600,000
13. Reconstruct 12-30 to 30,000 lbs SWL	2,565,000	2,308,500	256,500
14. Construct East Parallel Taxiway for Runway 17-35 (5,200' x 35')	3,300,000	2,970,000	330,000
15. Install Medium Intensity Taxiway Lighting (MITL)	260,000	234,000	26,000
16. Miscellaneous RAMP Projects	300,000	150,000	150,000
LONG TERM PROGRAM (11-20 YEARS)	\$19,030,350	\$14,775,315	\$4,093,035
TOTAL PROGRAM COSTS	\$36,059,277	\$26,520,099	\$9,377,678



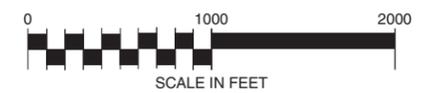


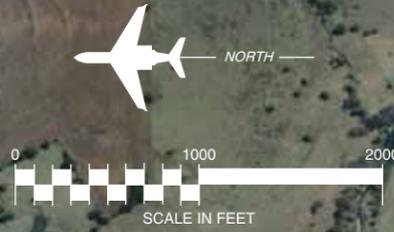
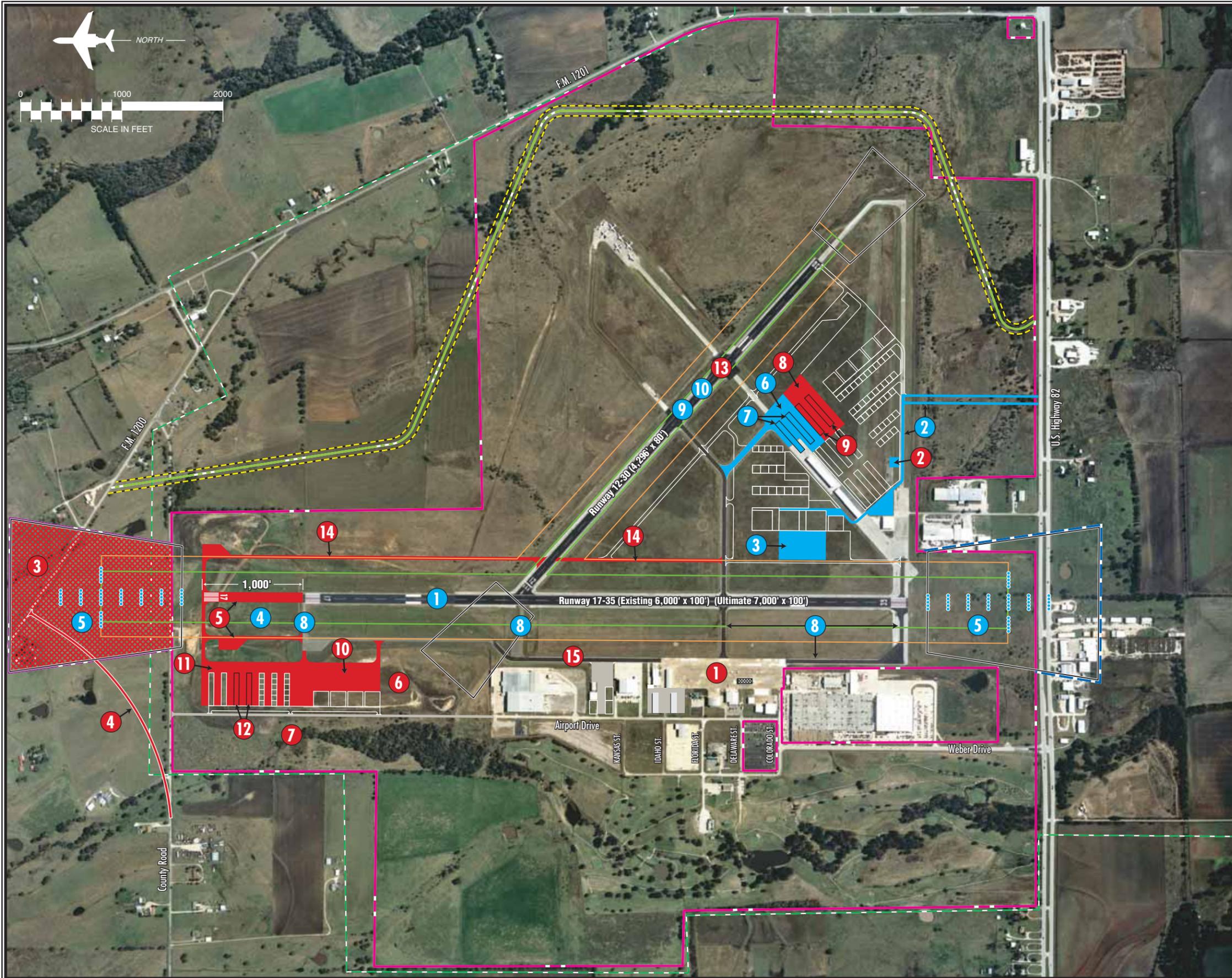
LEGEND

- Existing Airport Property Line
- Ultimate Airport Property Line
- City Limit
- Magnolia Gas Line
- Magnolia Petroleum Company Easement
- Runway Protection Zone (RPZ)
- Object Free Area (OFA)
- Runway Safety Area (RSA)
- Short Term Improvements

SHORT TERM IMPROVEMENTS

- 1** Construct Taxilanes for 20 T-hangars (8,888 sy)
- 2** Construct 20 T-hangars (Two 10-unit facilities)
- 3** Acquire Runway 35 RPZ Easement (22 acres)
- 4** Rehabilitate Apron (34,800 sy)
- 5** Remove T-hangar on Apron (100-series)
- 6** Improve Perimeter Fencing (Eastside - 5,000 lf)
- 7** Miscellaneous Ramp Projects
- 8** Improve Utilities for Centerfield Development
- 9** Construct Apron for Executive Hangars (6,666 sy)
- 10** Construct Taxiway for Centerfield Development (1,800' x 35')
- 11** Extend Airport Drive to County Road 404 (3,200 lf)





LEGEND

- Existing Airport Property Line
- Ultimate Airport Property Line
- Ultimate Airport Lease Line
- City Limit
- Magnolia Gas Line
- Magnolia Petroleum Company Easement
- Runway Protection Zone (RPZ)
- Object Free Area (OFA)
- Runway Safety Area (RSA)
- Intermediate Term Improvements
- Long Term Improvements

INTERMEDIATE TERM IMPROVEMENTS

- 1** Reconstruct Runway 17-35 to 60,000 lbs. (includes bore testing)
- 2** Construct Access Road/Parking for Centerfield Development (2,700 lf)
- 3** Construct Centerfield Apron (16,666 s.y.)
- 4** Grade Runway 17-35 RSA and OFA ARC C/D-II Standards
- 5** Install MALS on Runways 17 and 35
- 6** Construct Centerfield Taxiways (8,900 sy)
- 7** Construct 20 T-hangars (Two 10-unit facilities)
- 8** Rehabilitate Taxiways A, B, C, D, and E
- 9** Rehabilitate/Remark Runway 12-30
- 10** Install REILs and MIRL on Runway 12-30
- 11** Miscellaneous RAMP Projects

LONG TERM IMPROVEMENTS

- 1** Clean and Seal Ramp Apron Joints
- 2** Construct Aircraft Wash Rack
- 3** Acquire Land for Runway 17 Extension (47 acres)
- 4** Relocate County Road 404 out of RSA and OFA
- 5** Extend Runway 17 & Parallel Taxiway 1,000 ft. North
- 6** Extend Utilities to North Along Airport Drive
- 7** Earthwork/Site Preparation for North Terminal Area
- 8** Construct Taxiways for Centerfield Development
- 9** Construct 20 T-hangars (Two 10-unit facilities)
- 10** Construct North Terminal Area Apron (33,333 sy)
- 11** Construct North Terminal Taxilanes for Hangars
- 12** Construct 20 T-hangars (Two 10-unit facilities)
- 13** Reconstruct 12-30 to 30,000 lbs SWL
- 14** Construct East Parallel Taxiway for Runway 17-350 (5,200' x 35')
- 15** Install Medium Intensity Taxiway Lighting (MITL)
- 16** Miscellaneous RAMP Projects



1,000 feet beyond the runway ends to meet the upgraded standards. On the Runway 17 end, a significant grading project will need to be undertaken. It is estimated that more than 200,000 cubic yards of dirt will need to be moved. Some relatively minor improvements will need to be undertaken on the south end.

As recommended, approaches with visibility minimums not lower than three-quarter-mile should be requested of the FAA for Runway 17-35. Approaches with minimums below one mile require an approach lighting system. A medium intensity approach lighting system (MALS) is an example of an approach lighting system that meets this requirement and is recommended.

Airfield development includes the addition of runway end identification lighting (REIL) and medium intensity runway lighting (MIRL) to Runway 12-30. With these improvements, the airport can begin the process of obtaining approved global positioning system (GPS) instrument approaches with visibilities not lower than one mile for both ends of Runway 12-30. These additions are considered particularly important because utilization of the crosswind runway will likely increase as operations increase. Other airside improvements include the installation of taxiway reflectors to those areas without them, and the installation of hold lines on Taxiway A.

Intermediate term landside development is considered for the centerfield of the airport. This location

is immediately ready for development as the area is relatively flat and most utilities are reasonably close. A portion of the planned eastside parallel taxiway is considered to provide for the efficient and safe movement of aircraft to and from the runway. Without this taxiway improvement, aircraft operators would be forced to cross the runway when entering or leaving the centerfield development. This is an inefficient maneuver and should be avoided if possible.

The proposed eastside access road from U.S. Highway 82 will need to be constructed to support anticipated growth of the centerfield area. This road is planned as a boulevard-type construction, designed to present a positive image of the City to airport users. The road provides access to a proposed conventional hangar complex as well as potential new T-hangars.

The conventional hangar apron is initially designed to support two large, fixed base operator (FBO) type hangars. Again, it is presumed that these hangars will be constructed privately and the airport will receive land lease fees. A T-hangar apron is also constructed to support the development of two additional T-hangars, and the stub taxiway leading to the T-hangar area is rehabilitated. When planning the location and the construction sequence of the T-hangars, consideration is given to reducing the taxiing time for aircraft to and from the runway.

Remaining projects in the intermediate term CIP include ongoing surface

maintenance and rehabilitation of Runway 12-30. Various RAMP projects are also included.

Projects included in the intermediate term have been estimated to cost \$11.8 million, as presented on Exhibit 6A and graphically depicted on Exhibit 6C. The total local share is \$2.1 million.

LONG TERM IMPROVEMENTS

Several projects included in the long term horizon are associated with the 1,000-foot northerly extension of Runway 17. Prior to the construction of the runway extension, an Environmental Assessment (EA) will need to be undertaken. Typically, when a runway is proposed to be extended, an EA needs to be completed, unless a categorical exclusion is obtained. On occasion, a more comprehensive Environmental Impact Statement (EIS) will need to be undertaken. At this time, it is believed that an EA will meet the environmental study requirements necessary for the proposed runway extension project.

As presented previously, both the RSA and the OFA have to be owned in fee by the airport. Both of these areas would extend beyond the current airport property line and would need to be acquired fee-simple. Although the area encompassing the RPZ does not technically have to be owned by the airport, it is strongly recommended. The recommended concept provides for the acquisition of 47 acres of land to the north of the runway extension that will

encompass these safety areas. The RPZ includes at least one home, and fair market value of this property is included in the CIP. In addition, there is a possibility that the current owner of the property would be unwilling to sell just that portion of property needed for the safety areas. In this case, the entire parcel may need to be purchased and the expense would increase.

County Road 404 north of the airport would traverse the RSA and OFA when the extension is undertaken. This necessitates the relocation of the road. One possible alignment is presented on **Exhibit 6C**. The associated taxiway and hold apron to the west of the runway extension is also included in the overall runway extension project. The relocation of the PAPI-2 approach path indicator for Runway 17 will also need to be done at this time.

The eastside parallel taxiway is considered for the long term CIP. This taxiway will include a hold apron at the north end and will cross Runway 12-30, ultimately connecting with the centerfield FBO apron. As the predominant wind direction is from south to north, this taxiway is needed to provide aircraft utilizing the centerfield storage facilities a safe and efficient route to the north end for take-off run to the south.

As the airport is utilized on a more frequent basis by larger and heavier aircraft, the current strength rating of Runway 12-30 may lead to premature pavement failure. Reconstruction of the runway to a strength rating of 30,000 pounds is recommended at this time.

Forecasts suggest that the number of based aircraft may reach 100 by the intermediate term of the master plan. Typically, airports with 100 or more based aircraft are eligible for funding for medium intensity taxiway lighting (MITL) from TxDOT. This project is included in the intermediate CIP.

The long term CIP includes continued hangar development in the airport centerfield area. Two additional T-hangar facilities are planned. Again, the location of these hangars provides fairly quick and efficient access to the runway system.

Development of the proposed north terminal area is considered feasible at this time. Prior to construction, a significant amount of earthwork/site preparation will be needed. Utilities will need to be extended to the area as well. The north terminal area includes the possibility of each hangar type. An apron is recommended to front the area designated for larger FBO-type hangars. Taxilanes are proposed for both executive and T-hangars as well. Finally, two more T-hangar structures are considered.

Total long term projects listed on Exhibit 6A and graphically depicted on Exhibit 6C have been estimated to cost approximately \$19 million in today's (2005) dollars. The local share is \$4.1 million.

The CIP covers potential demand-based development at Gainesville Municipal Airport over the next 20 years. Many of the planned facilities at the airport are not included in the CIP, as they are

projected to be necessary beyond the scope of this plan. Some of those projects may include completion of the centerfield development area and site preparation of areas identified as appropriate for industrial/manufacturing businesses.

IMPROVEMENTS SUMMARY

Most of the airport improvements presented in the recommended concept are demand-based. These facilities should be constructed to serve an existing demand at the airport at that time. This plan does not support building facilities in order to attract activity (the "if you build it, they will come" scenario). Because the plan is demand-based rather than time-based, it provides the airport management and the City of Gainesville with the flexibility to develop facilities as needed. Should demand increase at a greater rate than is forecast, implementation of these improvements can be advanced. Should demand slow, the life of the master plan is effectively increased.

CAPITAL IMPROVEMENTS FUNDING

Financing capital improvements at the airport will not rely solely on the financial resources of the airport. Capital improvement funding is available through various grant-in-aid programs on both the state and federal levels. The following discussion outlines key sources of funding potentially available for capital

improvements at Gainesville Municipal Airport.

FEDERAL GRANTS

Through federal legislation over the years, various grant-in-aid programs have been established to develop and maintain a system of public airports across the United States. The purpose of this system and its federally-based funding is to maintain national defense and to promote interstate commerce. The most recent legislation affecting the federal funding was enacted in late 2003 and is entitled the *Century of Aviation Reauthorization Act*, or *Vision 100*.

The four-year bill covers FAA fiscal years 2004, 2005, 2006, and 2007. This bill presented similar funding levels to the previous bill - *Air 21*. Airport Improvement Program (AIP) funding was authorized at \$3.4 billion in 2004, \$3.5 billion in 2005, \$3.6 billion in 2006, and \$3.7 billion in 2007. This new bill provides the FAA and ultimately TxDOT the opportunity to plan for longer term projects versus simple one-year reauthorizations.

The source for *Vision 100* funds is the Aviation Trust Fund. The Aviation Trust Fund was established in 1970 to provide funding for aviation capital investment programs (aviation development, facilities and equipment, and research and development). The Aviation Trust Fund also finances the operation of the FAA. It is funded by user fees, taxes on airline tickets, aviation fuel, and various aircraft parts.

Funds are distributed each year by the FAA from appropriations by Congress. A portion of the annual distribution is to primary commercial-service airports based upon enplanement levels. If Congress appropriates the full amounts authorized by *Vision 100*, eligible general aviation airports could receive up to \$150,000 of funding each year in Non-Primary Entitlement (NPE) funds (National Plan of Integrated Airport Systems [NPIAS] inclusion is required for general aviation entitlement funding). Gainesville Municipal Airport is eligible for the full \$150,000 in NPE funds for fiscal year 2005.

The remaining AIP funds are distributed by the FAA based upon the priority of the project for which they have requested federal assistance through discretionary apportionments. A National Priority Ranking System is used to evaluate and rank each airport project. Those projects with the highest priority are given preference in funding. The State's federal funding allotment must be distributed to many airports each year. As a result, TxDOT will typically limit the size of grants given to a single airport sponsor to ensure adequate funding for the State airport system as a whole. Thus, the costs of implementing the runway extension may require the City to attract discretionary funding assistance.

STATE FUNDING PROGRAM

The State of Texas participates in the federal State Block Grant Program. Under the State Block Grant Program, the FAA annually distributes general

aviation state apportionment and discretionary funds to TxDOT. The state then distributes grants to state airports. In compliance with TxDOT's legislative mandate that it "apply for, receive, and disburse" federal funds for general aviation airports, TxDOT acts as the agent of the local airport sponsor. Although these grants are distributed by TxDOT, they contain all federal obligations.

The State of Texas also distributes funding to general aviation airports from the Highway Trust Fund as the Texas Aviation Facilities Development Program. These funds are appropriated each year by the State Legislature. Once distributed, these grants contain State obligations only.

The establishment of a CIP for the State entails first identifying the need, then establishing a ranking or priority system. Identifying all State airport project needs allows TxDOT to establish a biennial program and budget for development costs. The most recent TxDOT CIP, *Aviation Improvement Program 2005-2007*, assumed that approximately \$22 million in annual federal AIP grants, which includes \$17 million in Non-Primary Entitlements, and \$15 million in State funds would be available.

The TxDOT biennial program establishes a project priority system based upon the following objectives (in order of importance):

- enhance safety
- preserve existing facilities
- bring airport up to standards

- upgrade facilities to aid airport in providing for larger aircraft with longer stage lengths
- improve airport capacity
- new airport construction to provide new access to a previously unserved area
- new airports to provide capacity relief to existing airports

Each airport project for Gainesville Municipal Airport must be identified and programmed into the state CIP and compete with other airport projects in the state for federal and state funds. In Texas, airport development projects that meet TxDOT's discretionary funds eligibility requirements receive 90 percent funding from the AIP State Block Grant Program. Eligible projects include airfield and apron facilities. Historically, revenue-generating improvements such as fuel facilities, utilities, and hangars have not been eligible for AIP funding. *Vision 100*, however, provides the allowance for NPE funds to be utilized for hangar or fuel farm construction if all other airfield needs have been addressed.

TxDOT has also established the RAMP to help general aviation airports maintain, and in some circumstances, construct new facilities. The program was initially designed to help airports maintain airside and landside pavements, but has recently been expanded to include construction of new facilities. RAMP is an annual funding source in which TxDOT will provide a 50 percent funding match for projects up to \$60,000. Examples of new facility construction projects eligible under RAMP include constructing airport

access roads, paving the airport public parking lot, and hangar maintenance.

Newer programs in the TxDOT funding mechanism include terminal building and airport traffic control tower (ATCT) funding. TxDOT has funded terminal building construction on a 50-50 basis, up to a \$600,000 total project cost. It should be noted that TxDOT has recently considered upgrading the total cost allowance on a case-by-case basis. The airport is already served by a terminal building; however, this program could be used to expand the existing facility when additional space is needed.

TxDOT also funds the construction of up to two ATCTs statewide per year. TxDOT has recently changed the program so that ATCT funding could be provided on a 90-10 basis, similar to eligible grant projects. The construction of an ATCT is not planned for Gainesville Municipal Airport at this time.

FAA FACILITIES AND EQUIPMENT PROGRAM

The Airway Facilities Division of the FAA administers the national Facilities and Equipment (F&E) Program. This annual program provides funding for the installation and maintenance of various navigational aids and equipment for the national airspace system and airports. Under the F&E program, funding is provided for FAA airport traffic control towers, enroute navigational aids (such as a VOR), and on-airport navigational aids (such as

REILs and approach lighting systems). As activity levels and other developments warrant, the airport may be considered by the FAA Airways Facilities Division for the installation and maintenance of navigational aids through the F&E program.

FINANCING OF DEVELOPMENT PROGRAM

Earlier in this chapter, programmed expenditures were presented in current (2005) dollars. Future expenditures were categorized according to assigned financing responsibilities, with the airport's responsible expenditures the primary focus of these feasibility analyses. In this section, the base costs, assumed to be the financing responsibility of the airport, are adjusted to reflect availability to determine the projected local share of these proposed capital expenditures in current dollars. Financing assumptions are then made, and the projected annual airport cost of these planned expenditures is estimated for incorporation into the cash flow analysis.

At the outset, it must be emphasized that long term feasibility analyses such as these must be based on many assumptions. In practice, projects will be undertaken when demand actually warrants, thus changing underlying assumptions. Further, the actual financing of capital expenditures will be a function of airport circumstances at the time of project implementation (i.e., revenue bond financing would likely not be used unless the actual level of

airport earnings and reserves, along with entitlement and discretionary grants available at a particular time, were insufficient to meet project costs). As a result, the assumptions and analyses prepared for the master plan must be viewed in the context of their primary purpose: to examine whether there is a reasonable expectation that recommended improvements will be financially feasible and implementable.

The balance of project costs, after consideration has been given to the various grants available, must be funded through airport resources. Usually, this is accomplished through the use of airport earnings and reserves, to the extent possible, with the remaining costs financed through obligation bonding mechanisms.

The airport is owned and operated by the City of Gainesville through the collection of various rates and charges from general aviation and other non-aviation revenue sources. The majority of collected revenues are generated by airport operations; however, some revenues are associated with non-aviation operators on the airport. There are, however, restrictions on the use of revenues collected by the airport. All receipts, excluding bond proceeds or related grants and interest, are irrevocably pledged to the punctual payment of operating and maintenance expenses, payment of debt service for as long as bonds remain outstanding, or to additions or improvements to airport facilities. **Table 6B** presents historical expenses and revenues for Gainesville Municipal Airport.

TABLE 6B					
Historical Operational Revenues & Expenditures					
Gainesville Municipal Airport					
Category	FY 00/01	FY 01/02	FY 02/03	FY 03/04	FY 04/05
OPERATING REVENUES					
Land Leases and Rentals	\$108,416	\$109,703	\$95,128	\$135,797	\$127,582
Fuel Sales	523,130	529,620	551,267	513,481	640,000
Miscellaneous	11,818	67,368	5,260	6,442	4,450
<i>Total Operating Revenues</i>	<i>\$643,364</i>	<i>\$706,691</i>	<i>\$651,655</i>	<i>\$655,720</i>	<i>\$772,032</i>
OPERATING EXPENSES					
Salaries and Benefits	\$86,603	\$107,739	\$108,386	\$122,674	\$112,018
Supplies, Repair and Maint.	481,434	426,859	509,848	472,216	505,900
Miscellaneous	30,438	46,882	33,063	35,374	33,938
Utilities	15,141	10,927	14,554	28,447	19,850
Depreciation and Amortization	69,280	59,237	67,906	68,093	67,754
<i>Total Operating Expenses</i>	<i>\$682,896</i>	<i>\$651,644</i>	<i>\$733,757</i>	<i>\$726,804</i>	<i>\$739,460</i>
ANNUAL OPERATING INCOME/(LOSS)	-\$39,532	\$55,047	-\$82,102	-\$71,084	\$32,572
Source: Airport Records					

OPERATING REVENUES

Operating revenues at Gainesville Municipal Airport include land leases, hangar rentals, fuel sales, and other income. As shown on **Table 6B**, revenues for the five years have fluctuated between operational profits and loss. It should be noted that operating revenues do not include grants received or transfers in from other City departments. There is not currently a formal annual subsidy to the airport from the City. Also, the figures for fiscal year 2004/2005 are budgeted, not actuals.

The largest revenue center by far for the airport is fuel sales. In fact, fuel sales total nearly 83 percent of the airport's total annual revenues. The City is the only fuel retailer on the airport. Hangar and building rentals represent the next largest revenue source for the airport. These revenue streams include the T-hangar rentals and land leases for privately-developed T-hangars, conventional hangar land leases, aircraft apron tie-down rentals, aviation-related ground/building leases (e.g., Bell Aero), agricultural leases, and miscellaneous non-aviation land leases/building leases, accounting for approximately 17 percent of the airport's total annual revenues. The remaining revenue sources are from miscellaneous fees/charges.

General aviation airports typically offer two types of land leases. Agricultural land leases typically range between \$.05 and \$.15 per acre per year. Currently, there are two agricultural leases for grazing and hay cultivation of

560 acres of airport property. Another type of land lease involves private development of aviation or non-aviation facilities, such as hangars that need access to the taxiway and runway system or non-aviation uses such as the bingo operator.

The airport also supports two municipal uses, a golf course, and a water well and pump station. None of these operations are under lease and have not contributed to the airport's annual revenue. On February 16, 1999, the FAA issued *Policy and Procedures Concerning the Use of Airport Revenue*, in the Federal Register. As of this publication date, "mineral and water rights represent a part of the airport property and its value." (Vol. 64, No. 30, Federal Register, Tuesday, February 16, 1999, p. 7702). Under FAA grant assurances, the City agrees that it will charge fair and equitable rates on airport property. Thus, the water well and pumping station located on the southeast corner of airport property is considered an airport revenue source. As such, the airport should collect a water rights payment based on the volume of water extracted by the pumping station.

A distinction is drawn between airport revenues derived from the collection of land leases and revenue collected from mineral and water rights. The FAA indicates that the airport should collect water and mineral rights payments for those resources extracted from airport property. Land lease payments for municipal services, such as the golf course and the land on which sits the water well and pumping station, have

historically been treated differently by the FAA under certain circumstances.

As the City of Gainesville owns the airport and provides City funds toward operating the airport, fair and equitable land leases of these two uses may simply be the financial support of revenue shortfalls and capital expenditures. It is not uncommon for municipalities or even the FAA to utilize airport property for little or no charge. If, however, the property being utilized is needed to develop improved aviation facilities, the charges should be fair market rates.

For Gainesville Municipal Airport, it appears that the collection of no revenue for land currently used for the golf course and the water well and pumping station is reasonable. Review of historic golf course revenues and expenditures indicates that the golf course operates with a significant annual deficit. The water tower provides a valuable commodity to the City and the region. If a fair and marketable rate were put in place, the lease of the approximately one-acre parcel could generate approximately \$4,400 for the airport each year. This rate would be far less than the City's contribution to the remaining revenue shortfalls which need to be gapped on an average basis over the last five years.

The City should also be prepared to provide water rights revenue to the airport as directed by the FAA and the grant assurances to which the City has

agreed. If in the future the airport becomes self-sufficient without the need for City resources to cover shortfalls, a fair/market land lease rate should be requested for the water well and pumping station. The golf course lease should stipulate that some rate, even less than market, should be paid if the facility generates an annual income.

OPERATING EXPENSES

Generalized operating expenses for Gainesville Municipal Airport include personnel services, supplies (e.g., fuel), maintenance, utilities, debt service/amortization, and other miscellaneous expenses. Fuel is the largest cost center for the airport, with personnel services being second, at nearly three times less. The miscellaneous category includes expenses for training, subscriptions, insurance, professional services, etc.

As is evident from the table, the airport has not generally maintained a positive operational income over the last five years. The existing revenues do not generally meet operational costs. Airports similar to Gainesville Municipal Airport typically do not maintain a positive operating income. It should always be a goal of a general aviation airport to be self-sufficient and hopefully generate a positive cash flow. The following section will discuss opportunities available for the airport to increase its revenues, over time, to achieve these goals.

FUTURE CASH FLOW

Revenues

Revenues are anticipated to continue to grow with aviation activity. As more aircraft base at the airport, additional revenues from hangar rent and fuel sales will increase proportionately. Revenues will also be bolstered by transient aircraft activity that increases fuel sales, and aviation business that can result in commission fees to the airport. Commission fees are a service charge that the airport collects from FBOs based on the sale of certain products and services. Currently, there are no FBO commission fees collected, however, this is a possible revenue source as more businesses locate at the airport.

As previously mentioned, existing airport revenues are derived from land leases (both aviation and non-aviation related), hangar and building rentals, fuel sales, and land leases on agricultural tracts. Future revenue projections considered slightly increasing current fee rates for existing hangar and land leases. It is planned that future conventional and executive hangar construction will be by private entities. The plan considers T-hangar development by the City. New hangar and ground leases will need to be established in such a manner that the City will be able to amortize its development costs over a reasonable time period.

Should the City decide to construct T-hangar facilities, costs can generally equal \$30,000 per unit. Thus, a 20-unit

T-hangar could cost as much as \$600,000 to construct. To retire the bond debt service for the construction of a 20-unit facility over a 15-year period at a six percent interest rate, individual hangar rates would need to be at least \$200 per month. This does not include the construction of additional taxilane access to the hangars. T-hangar taxilanes, however, may be funded at 90 percent by TxDOT (state or federal grants-in-aid).

If the City does not construct the proposed hangar facilities, the City's only capital cost would be 10 percent of the taxilane construction (the remaining 90 percent would come from federal or state grants). The City has been open to the development of privately-owned hangars in the past. Privately-owned facilities offer the City significant savings.

Gainesville Municipal Airport also has a unique opportunity to generate greater revenue through the development of business parks on airport property. Historically, the City has engaged in non-aviation land/building leases for areas on the west side of the airport. Much of this property is now utilized. In the future, additional development could occur on the east and southeast sides of the airport. Specifically, industrial/commercial development could be encouraged in the area immediately northeast of Runway 12-30 and south along U.S. Highway 82. It should be noted that the City would be required to improve the areas, readying them for this type of development. Industrial parks can generate substantial

revenues for an airport over time; however, they typically require significant up-front costs associated with utility and roadway improvements.

Cash flow projections indicate future revenues should rise at a greater rate than expenses. The analysis presents average annual projections for each planning horizon. As presented in **Table 6C**, the City should be capable of obtaining sufficient operating revenues to offset expenses. Revenue and expense projections have been made for the end of each planning horizon. Thus, each planning horizon considers the facilities and services required to meet demand requirements.

Expenses

Future expenses could vary depending upon the City's desire to develop, operate, and maintain additional hangars. Similarly, future expenses could be higher if the City develops on-airport industrial/commercial properties. It is likely that revenue bonds would be necessary to fund this construction. Also, the City could expect maintenance costs and administrative costs associated with operating the facilities.

TABLE 6C			
Projections of Operational Revenues & Expenditures			
Gainesville Municipal Airport			
Category	Short Term	Intermediate Term	Long Term
OPERATING REVENUES			
Land Leases and Rentals	\$151,117.92	\$200,495.57	\$299,219.38
Fuel Sales	675,957.06	822,405.11	1,108,971.02
Miscellaneous	4,585.29	4,819.19	5,194.20
Total Operating Revenues	\$831,660.27	\$1,027,719.87	\$1,413,384.60
OPERATING EXPENSES			
Salaries and Benefits	\$129,983.73	\$165,895.84	\$240,978.33
Supplies, Repair, and Maintenance	561,564.40	666,962.34	866,479.15
Miscellaneous	37,117.38	43,029.22	53,855.16
Utilities	22,362.91	27,207.90	36,688.46
Depreciation and Amortization	74,101.33	85,903.75	107,516.72
Total Operating Expenses	\$825,129.75	\$988,999.05	\$1,305,517.82
AVERAGE ANNUAL OPERATING INCOME/(LOSS)	\$6,530.52	\$38,720.82	\$107,866.78

As the airport continues to grow, additional employees may ultimately be needed. Most successful general aviation airports have at least one full-time airport manager. Often, the airport staff can include up to ten employees. Gainesville Municipal

Airport's future staffing requirements could reach five employees over the long term. Potential airport employees could include a full-time airport manager, an operations manager, a full-time administrative assistant, and up to two maintenance personnel.

It should be noted that proposed capital improvements may at times exceed the City's ability to fund them from general funds. Thus, debt service (contractual) obligations will likely continue through the long term planning horizon. Projects which may require bonding and subsequent debt service expense include projects associated with the extension of Runway 17-35 to 7,000 feet, hangar construction (if the City chooses to construct T-hangars), and infrastructure improvements to the centerfield, northern terminal area, and industrial parks. Future cash flow analysis is presented in **Table 6C**.

SUMMARY

The best means to begin the implementation of the recommendations in this master plan is to first recognize that planning is a continuous process that does not end with completion and approval of this document. Rather, the ability to continuously monitor the existing and forecast status of airport activity must be provided and maintained. The issues upon which this master plan is based will remain valid for a number of years. The primary goal is for the airport to evolve into a facility that will best serve the air transportation needs of the region and become a self-supporting economic generator for the City of Gainesville.

The actual need for facilities is most appropriately established by airport activity levels rather than a specified date. For example, projections have been made as to when additional hangars may be needed at the airport.

In reality, however, the timeframe in which the development is needed may be substantially different. Actual demand may be slower to develop than expected. On the other hand, high levels of demand may establish the need to accelerate the development. Although every effort has been made in this master planning process to conservatively estimate when facility development may be needed, aviation demand will dictate when facility improvements need to be delayed or accelerated.

The real value of a usable master plan is in keeping the issues and objectives in the minds of the managers and decision-makers so that they are better able to recognize change and its effect. In addition to adjustments in aviation demand, decisions made as to when to undertake the improvements recommended in this master plan will impact the period that the plan remains valid. The format used in this plan is intended to reduce the need for formal and costly updates by simply adjusting the timing. Updating can be done by the manager, thereby improving the plan's effectiveness.

In summary, the planning process requires the City of Gainesville to consistently monitor the progress of the airport in terms of aircraft operations and based aircraft. Analysis of aircraft demand is critical to the timing and need for new airport facilities. The information obtained from continually monitoring airport activity will provide the data necessary to determine if the development schedule should be accelerated or decelerated.



Appendix A

GLOSSARY OF TERMS



Appendix

A

GLOSSARY OF TERMS

ACCELERATE-STOP DISTANCE AVAILABLE (ASDA): see declared distances.

AIR CARRIER: an operator which: (1) performs at least five round trips per week between two or more points and publishes flight schedules which specify the times, days of the week, and places between which such flights are performed; or (2) transport mail by air pursuant to a current contract with the U.S. Postal Service. Certified in accordance with Federal Aviation Regulation (FAR) Parts 121 and 127.

AIRPORT REFERENCE CODE (ARC): a coding system used to relate airport design criteria to the operational (Aircraft Approach Category) to the physical characteristics (Airplane Design Group) of the airplanes intended to operate at the airport.

AIRPORT REFERENCE POINT (ARP): The latitude and longitude of the approximate center of the airport.

AIRPORT ELEVATION: The highest point on an airport's usable runway expressed in feet above mean sea level (MSL).

AIRPORT LAYOUT DRAWING (ALD): The drawing of the airport showing the layout of existing and proposed airport facilities.

AIRCRAFT APPROACH CATEGORY: a grouping of aircraft based on 1.3 times the stall speed in their landing configuration at their maximum certificated landing weight. The categories are as follows:

- *Category A:* Speed less than 91 knots.
- *Category B:* Speed 91 knots or more, but less than 121 knots.
- *Category C:* Speed 121 knots or more, but less than 141 knots.
- *Category D:* Speed 141 knots or more, but less than 166 knots.
- *Category E:* Speed greater than 166 knots.

AIRPLANE DESIGN GROUP (ADG): a grouping of aircraft based upon wingspan. The groups are as follows:

- *Group I:* Up to but not including 49 feet.
- *Group II:* 49 feet up to but not including 79 feet.
- *Group III:* 79 feet up to but not including 118 feet.
- *Group IV:* 118 feet up to but not including 171 feet.
- *Group V:* 171 feet up to but not including 214 feet.
- *Group VI:* 214 feet or greater.

AIR TAXI: An air carrier certificated in accordance with FAR Part 135 and authorized to provide, on demand, public transportation of persons and property by aircraft. Generally operates small aircraft "for hire" for specific trips.



AIRPORT TRAFFIC CONTROL TOWER (ATCT): a central operations facility in the terminal air traffic control system, consisting of a tower, including an associated instrument flight rule (IFR) room if radar equipped, using air/ground communications and/or radar, visual signaling, and other devices to provide safe and expeditious movement of terminal air traffic.

AIR ROUTE TRAFFIC CONTROL CENTER (ARTCC): a facility established to provide air traffic control service to aircraft operating on an IFR flight plan within controlled airspace and principally during the enroute phase of flight.

ALERT AREA: see special-use airspace.

ANNUAL INSTRUMENT APPROACH (AIA): an approach to an airport with the intent to land by an aircraft in accordance with an IFR flight plan when visibility is less than three miles and/or when the ceiling is at or below the minimum initial approach altitude.

APPROACH LIGHTING SYSTEM (ALS): an airport lighting facility which provides visual guidance to landing aircraft by radiating light beams by which the pilot aligns the aircraft with the extended centerline of the runway on his final approach and landing.

APPROACH MINIMUMS: the altitude below which an aircraft may not descend while on an IFR approach unless the pilot has the runway in sight.

AUTOMATIC DIRECTION FINDER (ADF): an aircraft radio navigation system which senses and indicates the

direction to a non-directional radio beacon (NDB) ground transmitter.

AUTOMATED WEATHER OBSERVATION STATION (AWOS): equipment used to automatically record weather conditions (i.e. cloud height, visibility, wind speed and direction, temperature, dew-point, etc...)

AUTOMATED TERMINAL INFORMATION SERVICE (ATIS): the continuous broadcast of recorded non-control information at towered airports. Information typically includes wind speed, direction, and runway in use.

AZIMUTH: Horizontal direction expressed as the angular distance between true north and the direction of a fixed point (as the observer's heading).

BASE LEG: A flight path at right angles to the landing runway off its approach end. The base leg normally extends from the downwind leg to the intersection of the extended runway centerline. See "traffic pattern."

BEARING: the horizontal direction to or from any point, usually measured clockwise from true north or magnetic north.

BLAST FENCE: a barrier used to divert or dissipate jet blast or propeller wash.

BUILDING RESTRICTION LINE (BRL): A line which identifies suitable building area locations on the airport.

CIRCLING APPROACH: a maneuver initiated by the pilot to align the aircraft with the runway for landing when flying



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a predetermined circling instrument approach under IFR.

CLASS A AIRSPACE: see Controlled Airspace.

CLASS B AIRSPACE: see Controlled Airspace.

CLASS C AIRSPACE: see Controlled Airspace.

CLASS D AIRSPACE: see Controlled Airspace.

CLASS E AIRSPACE: see Controlled Airspace.

CLASS G AIRSPACE: see Controlled Airspace.

CLEAR ZONE: see Runway Protection Zone.

CROSSWIND: wind flow that is not parallel to the runway of the flight path of an aircraft.

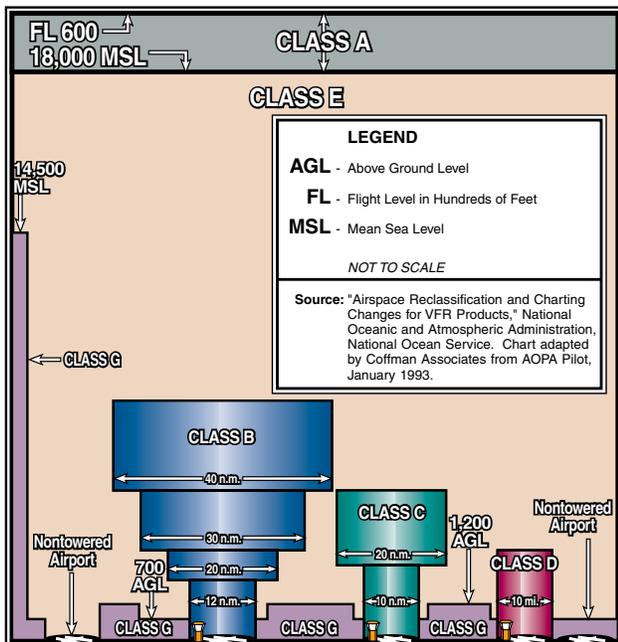
COMPASS LOCATOR (LOM): a low power, low/medium frequency radio-beacon installed in conjunction with the instrument landing system at one or two of the marker sites.

CONTROLLED AIRSPACE: airspace of defined dimensions within which air traffic control services are provided to instrument flight rules (IFR) and visual flight rules (VFR) flights in accordance with the airspace classification. Controlled airspace in the United States is designated as follows:

- **CLASS A:** generally, the airspace from 18,000 feet mean sea level (MSL) up to but not including flight level FL600. All persons must operate their aircraft under IFR.
- **CLASS B:** generally, the airspace from the surface to 10,000 feet MSL surrounding the nation's busiest airports. The configuration of Class B airspace is unique to each airport, but typically consists of two or more layers of air space and is designed to contain all published instrument approach procedures to the airport. An air traffic control clearance is required for all aircraft to operate in the area.
- **CLASS C:** generally, the airspace from the surface to 4,000 feet above the airport elevation (charted as MSL) surrounding those airports that have an operational control tower and radar approach control and are served by a qualifying number of IFR operations or passenger enplanements. Although individually tailored for each airport, Class C airspace typically consists of a surface area with a five nautical mile (nm) radius and an outer area with a 10 nautical mile radius that extends from 1,200 feet to 4,000 feet above the airport elevation. Two-way radio communication is required for all aircraft.
- **CLASS D:** generally, that airspace from the surface to 2,500 feet above the airport elevation (charted as MSL) surrounding those airport that have an operational control tower. Class D air space is individually tailored and configured to encompass published instrument approach procedures. Unless otherwise authorized, all

persons must establish two-way radio communication.

- **CLASS E:** generally, controlled airspace that is not classified as Class A, B, C, or D. Class E airspace extends upward from either the surface or a designated altitude to the overlying or adjacent controlled airspace. When designated as a surface area, the airspace will be configured to contain all instrument procedures. Class E airspace encompasses all Victor Airways. Only aircraft following instrument flight rules are required to establish two-way radio communication with air traffic control.
- **CLASS G:** generally, that airspace not classified as Class A, B, C, D, or E. Class G airspace is uncontrolled for all aircraft. Class G airspace extends from the surface to the overlying Class E airspace.



CONTROLLED FIRING AREA: see special-use airspace.

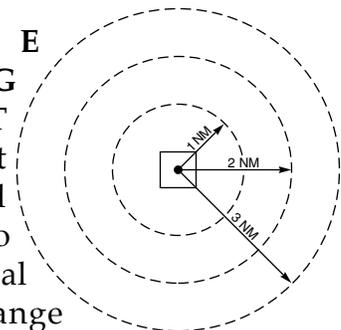
CROSSWIND LEG: A flight path at right angles to the landing runway off its upwind end. See “traffic pattern.”

DECLARED DISTANCES: The distances declared available for the airplane’s takeoff runway, takeoff distance, accelerate-stop distance, and landing distance requirements. The distances are:

- **TAKEOFF RUNWAY AVAILABLE (TORA):** The runway length declared available and suitable for the ground run of an airplane taking off;
- **TAKEOFF DISTANCE AVAILABLE (TODA):** The TORA plus the length of any remaining runway and/or clear way beyond the far end of the TORA;
- **ACCELERATE-STOP DISTANCE AVAILABLE (ASDA):** The runway plus stopway length declared available for the acceleration and deceleration of an aircraft aborting a takeoff; and
- **LANDING DISTANCE AVAILABLE (LDA):** The runway length declared available and suitable for landing.

DISPLACED THRESHOLD: a threshold that is located at a point on the runway other than the designated beginning of the runway.

DISTANCE MEASURING EQUIPMENT (DME): Equipment (airborne and ground) used to measure, in nautical miles, the slant range



distance of an aircraft from the DME navigational aid.

DNL: The 24-hour average sound level, in A-weighted decibels, obtained after the addition of ten decibels to sound levels for the periods between 10 p.m. and 7 a.m. as averaged over a span of one year. It is the FAA standard metric for determining the cumulative exposure of individuals to noise.

DOWNWIND LEG: A flight path parallel to the landing runway in the direction opposite to landing. The downwind leg normally extends between the crosswind leg and the base leg. Also see “traffic pattern.”

EASEMENT: The legal right of one party to use a portion of the total rights in real estate owned by another party. This may include the right of passage over, on, or below the property; certain air rights above the property, including view rights; and the rights to any specified form of development or activity, as well as any other legal rights in the property that may be specified in the easement document.

ENPLANED PASSENGERS: the total number of revenue passengers boarding aircraft, including originating, stop-over, and transfer passengers, in scheduled and non-scheduled services.

FINAL APPROACH: A flight path in the direction of landing along the extended runway centerline. The final approach normally extends from the base leg to the runway. See “traffic pattern.”

FIXED BASE OPERATOR (FBO): A provider of services to users of an airport. Such services include, but are not limited to, hangaring, fueling, flight training, repair, and maintenance.

FRANGIBLE NAVAID: a navigational aid which retains its structural integrity and stiffness up to a designated maximum load, but on impact from a greater load, breaks, distorts, or yields in such a manner as to present the minimum hazard to aircraft.

GENERAL AVIATION: that portion of civil aviation which encompasses all facets of aviation except air carriers holding a certificate of convenience and necessity, and large aircraft commercial operators.

GLIDESLOPE (GS): Provides vertical guidance for aircraft during approach and landing. The glideslope consists of the following:

1. Electronic components emitting signals which provide vertical guidance by reference to airborne instruments during instrument approaches such as ILS; or
2. Visual ground aids, such as VASI, which provide vertical guidance for VFR approach or for the visual portion of an instrument approach and landing.

GLOBAL POSITIONING SYSTEM: See “GPS.”

GPS - GLOBAL POSITIONING SYSTEM: A system of 24 satellites



used as reference points to enable navigators equipped with GPS receivers to determine their latitude, longitude, and altitude.

HELIPAD: a designated area for the takeoff, landing, and parking of helicopters.

HIGH-SPEED EXIT TAXIWAY: a long radius taxiway designed to expedite aircraft turning off the runway after landing (at speeds to 60 knots), thus reducing runway occupancy time.

INSTRUMENT APPROACH: A series of predetermined maneuvers for the orderly transfer of an aircraft under instrument flight conditions from the beginning of the initial approach to a landing, or to a point from which a landing may be made visually.

INSTRUMENT FLIGHT RULES (IFR): Rules governing the procedures for conducting instrument flight. Also a term used by pilots and controllers to indicate type of flight plan.

INSTRUMENT LANDING SYSTEM (ILS): A precision instrument approach system which normally consists of the following electronic components and visual aids:

1. Localizer.
2. Glide Slope.
3. Outer Marker.
4. Middle Marker.
5. Approach Lights.

LANDING DISTANCE AVAILABLE (LDA): see declared distances.

LOCAL TRAFFIC: aircraft operating in the traffic pattern or within sight of the

tower, or aircraft known to be departing or arriving from the local practice areas, or aircraft executing practice instrument approach procedures. Typically, this includes touch-and-go training operations.

LOCALIZER: The component of an ILS which provides course guidance to the runway.

LOCALIZER TYPE DIRECTIONAL AID (LDA): a facility of comparable utility and accuracy to a localizer, but is not part of a complete ILS and is not aligned with the runway.

LORAN: long range navigation, an electronic navigational aid which determines aircraft position and speed by measuring the difference in the time of reception of synchronized pulse signals from two fixed transmitters. Loran is used for enroute navigation.

MICROWAVE LANDING SYSTEM (MLS): an instrument approach and landing system that provides precision guidance in azimuth, elevation, and distance measurement.

MILITARY OPERATIONS AREA (MOA): see special-use airspace.

MISSED APPROACH COURSE (MAC): The flight route to be followed if, after an instrument approach, a landing is not affected, and occurring normally:

1. When the aircraft has descended to the decision height and has not established visual contact; or



2. When directed by air traffic control to pull up or to go around again.

MOVEMENT AREA: the runways, taxiways, and other areas of an airport which are utilized for taxiing/hover taxiing, air taxiing, takeoff, and landing of aircraft, exclusive of loading ramps and parking areas. At those airports with a tower, air traffic control clearance is required for entry onto the movement area.

NAVAID: a term used to describe any electrical or visual air navigational aids, lights, signs, and associated supporting equipment (i.e. PAPI, VASI, ILS, etc..)

NOISE CONTOUR: A continuous line on a map of the airport vicinity connecting all points of the same noise exposure level.

NONDIRECTIONAL BEACON (NDB): A beacon transmitting nondirectional signals whereby the pilot of an aircraft equipped with direction finding equipment can determine his or her bearing to and from the radio beacon and home on, or track to, the station. When the radio beacon is installed in conjunction with the Instrument Landing System marker, it is normally called a Compass Locator.

NONPRECISION APPROACH PROCEDURE: a standard instrument approach procedure in which no electronic glide slope is provided, such as VOR, TACAN, NDB, or LOC.

OBJECT FREE AREA (OFA): an area on the ground centered on a runway, taxiway, or taxilane centerline provided to

enhance the safety of aircraft operations by having the area free of objects, except for objects that need to be located in the OFA for air navigation or aircraft ground maneuvering purposes.

OBSTACLE FREE ZONE (OFZ): the airspace below 150 feet above the established airport elevation and along the runway and extended runway centerline that is required to be kept clear of all objects, except for frangible visual NAVAIDs that need to be located in the OFZ because of their function, in order to provide clearance for aircraft landing or taking off from the runway, and for missed approaches.

OPERATION: a take-off or a landing.

OUTER MARKER (OM): an ILS navigation facility in the terminal area navigation system located four to seven miles from the runway edge on the extended centerline indicating to the pilot, that he/she is passing over the facility and can begin final approach.

PRECISION APPROACH: a standard instrument approach procedure which provides runway alignment and glide slope (descent) information. It is categorized as follows:

- **CATEGORY I (CAT I):** a precision approach which provides for approaches with a decision height of not less than 200 feet and visibility not less than 1/2 mile or Runway Visual Range (RVR) 2400 (RVR 1800) with operative touchdown zone and runway centerline lights.



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- **CATEGORY II (CAT II):** a precision approach which provides for approaches with a decision height of not less than 100 feet and visibility not less than 1200 feet RVR.
- **CATEGORY III (CAT III):** a precision approach which provides for approaches with minima less than Category II.

PRECISION APPROACH PATH INDICATOR (PAPI): A lighting system providing visual approach slope guidance to aircraft during a landing approach. It is similar to a VASI but provides a sharper transition between the colored indicator lights.

PRECISION OBJECT FREE AREA (POFA): an area centered on the extended runway centerline, beginning at the runway threshold and extending behind the runway threshold that is 200 feet long by 800 feet wide. The POFA is a clearing standard which requires the POFA to be kept clear of above ground objects protruding above the runway safety area edge elevation (except for frangible NAVAIDS). The POFA applies to all new authorized instrument approach procedures with less than 3/4 mile visibility.

PROHIBITED AREA: see special-use airspace.

REMOTE COMMUNICATIONS OUTLET (RCO): an unstaffed transmitter receiver/facility remotely controlled by air traffic personnel. RCOs serve flight service stations (FSSs). RCOs were established to provide ground-to-ground communications between air

traffic control specialists and pilots at satellite airports for delivering enroute clearances, issuing departure authorizations, and acknowledging instrument flight rules cancellations or departure/landing times.

REMOTE TRANSMITTER/RECEIVER (RTR): see remote communications outlet. RTRs serve ARTCCs.

RELIEVER AIRPORT: an airport to serve general aviation aircraft which might otherwise use a congested air-carrier served airport.

RESTRICTED AREA: see special-use airspace.

RNAV: area navigation - airborne equipment which permits flights over determined tracks within prescribed accuracy tolerances without the need to overfly ground-based navigation facilities. Used enroute and for approaches to an airport.

RUNWAY: a defined rectangular area on an airport prepared for aircraft landing and takeoff. Runways are normally numbered in relation to their magnetic direction, rounded off to the nearest 10 degrees. For example, a runway with a magnetic heading of 180 would be designated Runway 18. The runway heading on the opposite end of the runway is 180 degrees from that runway end. For example, the opposite runway heading for Runway 18 would be Runway 36 (magnetic heading of 360). Aircraft can takeoff or land from either end of a runway, depending upon wind direction.



RUNWAY BLAST PAD: a surface adjacent to the ends of runways provided to reduce the erosive effect of jet blast and propeller wash.

RUNWAY END IDENTIFIER LIGHTS (REIL): Two synchronized flashing lights, one on each side of the runway threshold, which provide rapid and positive identification of the approach end of a particular runway.

RUNWAY GRADIENT: the average slope, measured in percent, between the two ends of a runway.

RUNWAY PROTECTION ZONE (RPZ): An area off the runway end to enhance the protection of people and property on the ground. The RPZ is trapezoidal in shape. Its dimensions are determined by the aircraft approach speed and runway approach type and minima.

RUNWAY SAFETY AREA (RSA): a defined surface surrounding the runway prepared or suitable for reducing the risk of damage to airplanes in the event of an undershoot, overshoot, or excursion from the runway.

RUNWAY VISUAL RANGE (RVR): an instrumentally derived value, in feet, representing the horizontal distance a pilot can see down the runway from the runway end.

RUNWAY VISIBILITY ZONE (RVZ): an area on the airport to be kept clear of permanent objects so that there is an unobstructed line-of-sight from any point five feet above the runway centerline to

any point five feet above an intersecting runway centerline.

SEGMENTED CIRCLE: a system of visual indicators designed to provide traffic pattern information at airports without operating control towers.

SHOULDER: an area adjacent to the edge of paved runways, taxiways or aprons providing a transition between the pavement and the adjacent surface; support for aircraft running off the pavement; enhanced drainage; and blast protection. The shoulder does not necessarily need to be paved.

SLANT-RANGE DISTANCE: The straight line distance between an aircraft and a point on the ground.

SPECIAL-USE AIRSPACE: airspace of defined dimensions identified by a surface area wherein activities must be confined because of their nature and/or wherein limitations may be imposed upon aircraft operations that are not a part of those activities. Special-use airspace classifications include:

- *ALERT AREA:* airspace which may contain a high volume of pilot training activities or an unusual type of aerial activity, neither of which is hazardous to aircraft.
- *CONTROLLED FIRING AREA:* airspace wherein activities are conducted under conditions so controlled as to eliminate hazards to nonparticipating aircraft and to ensure the safety of persons or property on the ground.

- **MILITARY OPERATIONS AREA (MOA):** designated airspace with defined vertical and lateral dimensions established outside Class A airspace to separate/segregate certain military activities from instrument flight rule (IFR) traffic and to identify for visual flight rule (VFR) traffic where these activities are conducted.
- **PROHIBITED AREA:** designated airspace within which the flight of aircraft is prohibited.
- **RESTRICTED AREA:** airspace designated under Federal Aviation Regulation (FAR) 73, within which the flight of aircraft, while not wholly prohibited, is subject to restriction. Most restricted areas are designated joint use. When not in use by the using agency, IFR/VFR operations can be authorized by the controlling air traffic control facility.
- **WARNING AREA:** airspace which may contain hazards to nonparticipating aircraft.

STANDARD INSTRUMENT DEPARTURE (SID): a preplanned coded air traffic control IFR departure routing, preprinted for pilot use in graphic and textual form only.

STANDARD TERMINAL ARRIVAL (STAR): a preplanned coded air traffic control IFR arrival routing, preprinted for pilot use in graphic and textual or textual form only.

STOP-AND-GO: a procedure wherein an aircraft will land, make a complete stop on the runway, and then commence a takeoff from that point. A stop-and-go is recorded as two operations: one

operation for the landing and one operation for the takeoff.

STRAIGHT-IN LANDING/APPROACH: a landing made on a runway aligned within 30 degrees of the final approach course following completion of an instrument approach.

TACTICAL AIR NAVIGATION (TACAN): An ultra-high frequency electronic air navigation system which provides suitably-equipped aircraft a continuous indication of bearing and distance to the TACAN station.

TAKEOFF RUNWAY AVAILABLE (TORA): see declared distances.

TAKEOFF DISTANCE AVAILABLE (TODA): see declared distances.

TAXILANE: the portion of the aircraft parking area used for access between taxiways and aircraft parking positions.

TAXIWAY: a defined path established for the taxiing of aircraft from one part of an airport to another.

TAXIWAY SAFETY AREA (TSA): a defined surface alongside the taxiway prepared or suitable for reducing the risk of damage to an airplane unintentionally departing the taxiway.

TETRAHEDRON: a device used as a landing direction indicator. The small end of the tetrahedron points in the direction of landing.

THRESHOLD: the beginning of that portion of the runway available for landing. In some instances the landing threshold may be displaced.



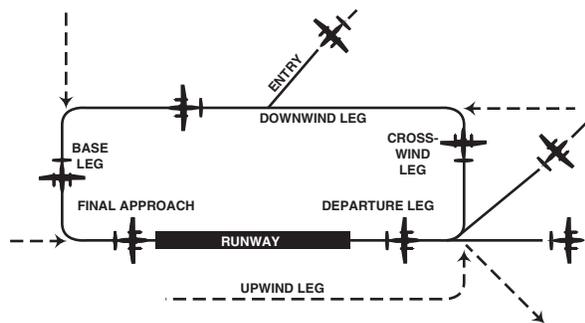
TOUCH-AND-GO: an operation by an aircraft that lands and departs on a runway without stopping or exiting the runway. A touch-and-go is recorded as two operations: one operation for the landing and one operation for the takeoff.

TOUCHDOWN ZONE (TDZ): The first 3,000 feet of the runway beginning at the threshold.

TOUCHDOWN ZONE ELEVATION (TDZE): The highest elevation in the touchdown zone.

TOUCHDOWN ZONE (TDZ) LIGHTING: Two rows of transverse light bars located symmetrically about the runway centerline normally at 100-foot intervals. The basic system extends 3,000 feet along the runway.

TRAFFIC PATTERN: The traffic flow that is prescribed for aircraft landing at or taking off from an airport. The components of a typical traffic pattern are the upwind leg, crosswind leg, downwind leg, base leg, and final approach.

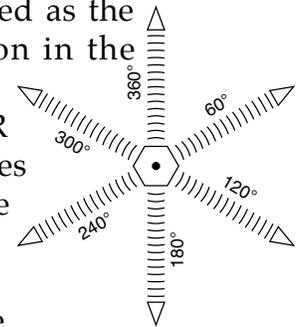


UNICOM: A nongovernment communication facility which may provide airport information at certain airports. Locations and frequencies of UNICOM's are shown on aeronautical charts and publications.

UPWIND LEG: A flight path parallel to the landing runway in the direction of landing. See "traffic pattern."

VECTOR: A heading issued to an aircraft to provide navigational guidance by radar.

VERY HIGH FREQUENCY/ OMNIDIRECTIONAL RANGE STATION (VOR): A ground-based electronic navigation aid transmitting very high frequency navigation signals, 360 degrees in azimuth, oriented from magnetic north. Used as the basis for navigation in the national airspace system. The VOR periodically identifies itself by Morse Code and may have an additional voice identification feature.



VERY HIGH FREQUENCY OMNIDIRECTIONAL RANGE STATION/ TACTICAL AIR NAVIGATION (VORTAC): A navigation aid providing VOR azimuth, TACAN azimuth, and TACAN distance-measuring equipment (DME) at one site.

VICTOR AIRWAY: A control area or portion thereof established in the form of a corridor, the centerline of which is defined by radio navigational aids.

VISUAL APPROACH: An approach wherein an aircraft on an IFR flight plan, operating in VFR conditions under the control of an air traffic control facility and having an air traffic control authorization, may proceed to the airport of destination in VFR conditions.



VISUAL APPROACH SLOPE INDICATOR (VASI): An airport lighting facility providing vertical visual approach slope guidance to aircraft during approach to landing by radiating a directional pattern of high intensity red and white focused light beams which indicate to the pilot that he is on path if he sees red/white, above path if white/white, and below path if red/red. Some airports serving large aircraft have three-bar VASI's which provide two visual guide paths to the same runway.

VISUAL FLIGHT RULES (VFR): Rules that govern the procedures for conducting flight under visual conditions. The term VFR is also used in the United States to indicate weather conditions that are equal to or greater than minimum VFR requirements. In addition, it is used by pilots and controllers to indicate type of flight plan.

VOR: See "Very High Frequency Omnidirectional Range Station."

VORTAC: See "Very High Frequency Omnidirectional Range Station/Tactical Air Navigation."

WARNING AREA: see special-use airspace.

ABBREVIATIONS

AC:	advisory circular	ARFF:	aircraft rescue and firefighting
ADF:	automatic direction finder	ARP:	airport reference point
ADG:	airplane design group	ARTCC:	air route traffic control center
AFSS:	automated flight service station	ASDA:	accelerate-stop distance available
AGL:	above ground level	ASR:	airport surveillance radar
AIA:	annual instrument approach	ASOS:	automated surface observation station
AIP:	Airport Improvement Program	ATCT:	airport traffic control tower
AIR-21:	Wendell H. Ford Aviation Investment and Reform Act for the 21st Century	ATIS:	automated terminal information service
ALS:	approach lighting system	AVGAS:	aviation gasoline - typically 100 low lead (100LL)
ALSF-1:	standard 2,400-foot high intensity approach lighting system with sequenced flashers (CAT I configuration)	AWOS:	automated weather observation station
ALSF-2:	standard 2,400-foot high intensity approach lighting system with sequenced flashers (CAT II configuration)	BRL:	building restriction line
APV:	instrument approach procedure with vertical guidance	CFR:	Code of Federal Regulations
ARC:	airport reference code	CIP:	capital improvement program
		DME:	distance measuring equipment
		DNL:	day-night noise level

DWL: runway weight bearing capacity for aircraft with dual-wheel type landing gear

DTWL: runway weight bearing capacity for aircraft with dual-tandem type landing gear

FAA: Federal Aviation Administration

FAR: Federal Aviation Regulation

FBO: fixed base operator

FY: fiscal year

GPS: global positioning system

GS: glide slope

HIRL: high intensity runway edge lighting

IFR: instrument flight rules (FAR Part 91)

ILS: instrument landing system

IM: inner marker

LDA: localizer type directional aid

LDA: landing distance available

LIRL: low intensity runway edge lighting

LMM: compass locator at middle marker

LOC: ILS localizer

LOM: compass locator at ILS outer marker

LORAN: long range navigation

MALS: medium intensity approach lighting system

MALSR: medium intensity approach lighting system with runway alignment indicator lights

MIRL: medium intensity runway edge lighting

MITL: medium intensity taxiway edge lighting

MLS: microwave landing system

MM: middle marker

MOA: military operations area

MSL: mean sea level

NAVAID: navigational aid

NDB: nondirectional radio beacon

NM: nautical mile (6,076 .1 feet)

NPES: National Pollutant Discharge Elimination System

NPIAS: National Plan of Integrated Airport Systems



NPRM: notice of proposed rule-making

ODALS: omnidirectional approach lighting system

OFA: object free area

OFZ: obstacle free zone

OM: outer marker

PAC: planning advisory committee

PAPI: precision approach path indicator

PFC: porous friction course

PFC: passenger facility charge

PCL: pilot-controlled lighting

PIW: public information workshop

PLASI: pulsating visual approach slope indicator

POFA: precision object free area

PVASI: pulsating/steady visual approach slope indicator

RCO: remote communications outlet

REIL: runway end identifier lighting

RNAV: area navigation

RPZ: runway protection zone

RSA: Runway Safety Area

RTR: remote transmitter/receiver

RVR: runway visibility range

RVZ: runway visibility zone

SALS: short approach lighting system

SASP: state aviation system plan

SEL: sound exposure level

SID: standard instrument departure

SM: statute mile (5,280 feet)

SRE: snow removal equipment

SSALF: simplified short approach lighting system with sequenced flashers

SSALR: simplified short approach lighting system with runway alignment indicator lights

STAR: standard terminal arrival route

SWL: runway weight bearing capacity for aircraft with single-wheel type landing gear

STWL: runway weight bearing capacity for aircraft with single-wheel tandem type landing gear



TACAN:	tactical air navigational aid
TDZ:	touchdown zone
TDZE:	touchdown zone elevation
TAF:	Federal Aviation Administration (FAA) Terminal Area Forecast
TODA:	takeoff distance available
TORA:	takeoff runway available
TRACON:	terminal radar approach control
VASI:	visual approach slope indicator
VFR:	visual flight rules (FAR Part 91)
VHF:	very high frequency
VOR:	very high frequency omnidirectional range
VORTAC:	VOR and TACAN collocated



Appendix B

ENVIRONMENTAL EVALUATION

Appendix B

ENVIRONMENTAL

EVALUATION

Gainesville Municipal Airport

A review of the potential environmental impacts associated with proposed airport projects is an essential consideration in the airport master plan process. The primary purpose of this Appendix is to review the proposed improvement program for Gainesville Municipal Airport to determine whether the proposed actions could, individually or collectively, have the potential to significantly affect the quality of the environment. The information contained in this Appendix was obtained from various internet websites and analyses by the consultant.

Construction of the improvements depicted on the Airport Layout Plan (ALP) will require compliance with the *National Environmental Policy Act (NEPA) of 1969*, as amended, to receive federal financial assistance. For projects not “categorically excluded” under FAA Order 1050.1E, *Environmental Impacts: Policies and Procedures*, compliance with NEPA is generally satisfied through the preparation of an Environmental Assessment (EA). Instances in which significant environmental impacts are expected, an Environmental Impact Statement (EIS) may be required. While this portion of the master plan is not designed to satisfy the NEPA requirements for a categorical exclusion, EA, or EIS, it is intended to supply a preliminary review of environmental issues that would need to be analyzed in more detail within the NEPA process. This evaluation considers all environmental categories required for the NEPA process as outlined in FAA Order 1050.1E and Order 5050.4A, *Airport Environmental Handbook*.

PROPOSED DEVELOPMENT

Previous analysis has indicated that increased aviation demand will lead to the potential need for an upgrade to the runway system (airside), as well as additional aircraft storage facilities (landside) at Gainesville Municipal Airport. The recommended development concept is presented on **Exhibit 5A**.

Airside improvements at the airport include a 1,000-foot runway extension to the north. This extension will bring the total runway length to 7,000 feet. The Runway Safety Area (RSA) and Object Free Area (OFA) will extend an additional 1,000 feet from the end of the runway resulting in the need to relocate Country Road 404. The project also proposes to acquire, or control through easements, the Runway Protection Zone (RPZ) for both ends of Runway 17-35. A full-length parallel taxiway is planned east of Runway 17-35. A partial parallel taxiway is planned for the north-east end of Runway 12-30.

Landside improvements include the addition of hangars on northwest portions of airport property as well as within the area east of the Runway 35 end and south of Runway 12-30.

ENVIRONMENTAL ANALYSIS

The following section provides a description of the environmental resources which could be impacted by the proposed airport developments.

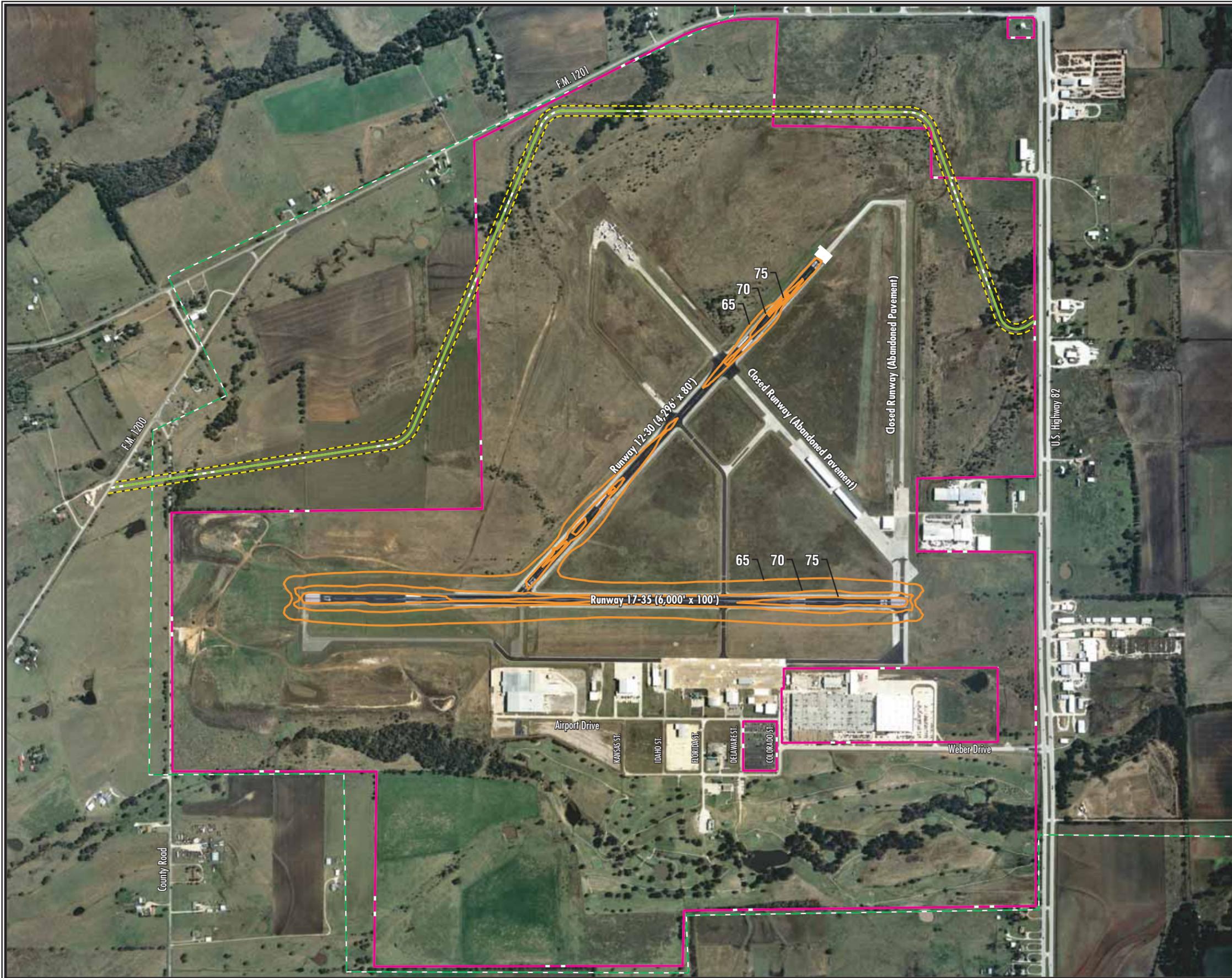
Review of Environmental Resources	
<p>Air Quality. The U.S. Environmental Protection Agency (EPA) has adopted air quality standards that specify the maximum permissible short-term and long-term concentrations of various air contaminants. The National Ambient Air Quality Standards (NAAQS) consist of primary and secondary standards for six criteria pollutants which include: Ozone (O₃), Carbon Monoxide (CO), Sulfur Dioxide (SO₂), Nitrogen Dioxide (NO₂), Particulate matter (PM10 and PM 2.5), and Lead (Pb). Various levels of review apply within both NEPA and permitting requirements. Potentially significant air quality impacts associated with an FAA project or action would be demonstrated by the project or action exceeding one or more of the NAAQS for any of the time periods analyzed.</p>	<ul style="list-style-type: none">• Gainesville Municipal Airport is located within Cooke County, Texas, which is in attainment for all criteria pollutants.• Construction-related air quality impacts are anticipated to be less-than-significant with the use of best management practices (BMPs) during the construction of proposed airport improvements.

Review of Environmental Resources (Continued)	
<p>Coastal Resources. Federal activities involving or affecting coastal resources are governed by the Coastal Barriers Resource Act (CBRA), the Coastal Zone Management Act (CZMA), and E.O. 13089, Coral Reef Protection.</p>	<ul style="list-style-type: none"> No impacts. The airport is not located within a Coastal Management Zone or Coastal Barrier Area.
<p>Compatible Land Use. The compatibility of existing and planned land uses in the vicinity of an airport is usually associated with the extent of the airport's noise impacts. Typically, significant impacts will occur over noise-sensitive areas within the 65 DNL noise contour.</p>	<ul style="list-style-type: none"> The proposed airport improvements will not result in noise impacts to noise-sensitive development, as no noise-sensitive development is contained within the existing or future 65 DNL noise contours.
<p>Construction Impacts. Construction impacts typically relate to the effects on specific impact categories, such as air and water quality or noise, during construction.</p>	<ul style="list-style-type: none"> Less-than-significant construction-related air and water quality impacts are anticipated with the use of BMPs during construction. Noise impacts which could be realized during construction are also anticipated to be less than significant, as surrounding land uses are primarily agricultural in nature. All applicable permits and certificates must be obtained prior to construction.
<p>Department of Transportation Act, Section 4(f). A significant impact would occur when a proposed action involves more than a minimal physical use of a Section 4(f) property, (publicly owned land from a public park, recreation area, or wildlife and waterfowl refuge of national, state, or local significance, or any land from a historic site of national, state, or local significance) or is deemed a "constructive use" substantially impairing the 4(f) property where mitigation measures do not reduce or eliminate the impacts. Substantial impairment would occur when impacts to Section 4(f) lands are sufficiently serious that the value of the site in terms of its prior significance and enjoyment are substantially reduced or lost.</p>	<ul style="list-style-type: none"> Gainesville Municipal Golf Course is located on the southwest portion of airport property. Proposed airport improvements are not located in this area. No impacts are anticipated. The proposed development will not require the use of Section 4(f) lands.

Review of Environmental Resources (Continued)	
<p>Farmlands. Under the <i>Farmland Protection Policy Act</i> (FPPA), federal agencies are directed to identify and take into account the adverse effects of federal programs on the preservation of farmland, to consider appropriate alternative actions which could lessen adverse effects, and to assure that such federal programs are, to the extent practicable, compatible with state or local government programs and policies to protect farmland. The FPPA guidelines apply to farmland classified as prime or unique, or of state or local importance as determined by the appropriate government agency, with concurrence by the Secretary of Agriculture.</p>	<ul style="list-style-type: none"> • According to the Natural Resource Conservation Service (NRCS) only the southwest portion of the airport property is designated as prime farmland. The Gainesville Municipal Golf Course is located on this site. None of the proposed improvements are located in this area. Therefore, no impacts to prime or unique farmland are anticipated.
<p>Fish, Wildlife, and Plants. The U.S. Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS) determines that a significant impact will result when the proposed action would likely jeopardize the continued existence of a species in question, or would result in the destruction or adverse modification of a federally-designated critical habitat in the area. Lesser impacts, as outlined by agencies and organizations having jurisdiction, may result in a significant impact.</p>	<ul style="list-style-type: none"> • Review of the U.S. Fish and Wildlife Service, Southwest Region, Endangered Species List indicates the potential presence of three listed species in Cooke County. The listed species are the bald eagle (threatened), the interior least tern (endangered), and the whooping crane (endangered). These species have aquatic habitats (nests near coastal areas, rivers, lakes, and reservoirs). These habitat types are not present within the development area. The whooping crane is known to utilize prairies and cropland for feeding. • Based on this information, no impacts to protected species are anticipated; however, coordination with the USFWS should be undertaken prior to the development of airfield improvements.
<p>Floodplains. Significant impacts to floodplains occur when a proposed action results in notable adverse impacts on natural and beneficial 100-year floodplain values.</p>	<ul style="list-style-type: none"> • No impacts anticipated. The majority of airport property is identified as Zone C on the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRM). Zone C is identified as areas of minimal flooding. • Portions of airport property are identified as being in Zone B. These are areas between the limits of the 100-year flood and 500-year flood or certain areas subject to 100-year flooding with average depths less than one (1) foot or where the contributing drainage area is less than one square mile; or areas protected by levees from the base flood. Airport improvements are not contained within a designated 100-year floodplain.

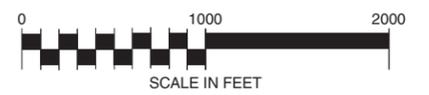
<p>Hazardous Materials, Pollution Prevention, and Solid Waste. The airport must comply with applicable pollution control statutes and requirements. Impacts may occur when changes to the quantity or type of solid waste generated, or type of disposal, differ greatly from existing conditions.</p>	<ul style="list-style-type: none"> • A Phase I environmental site assessment was performed in 1996 on 50 acres of property immediately southeast of the airport. This land was historically used as pasture land; however, a vacant chrome plating facility was located adjacent to the site. The original 50-acre site was reduced to a 29.5-acre property. The Texas Natural Resource Conservation Commission (TNRCC) issued a Certificate of Completion for the site. • A Phase II site investigation was completed on a 38.004-acre tract of land on the airport as a follow-up to a previous study that was completed under the Voluntary Cleanup Section of the TNRCC. The measured concentrations of pollutants were documented to be significantly below the allowable levels under the TNRCC guidelines. It was determined within the Phase II report that the airport presents no threat to human health or the environment. • Additional study may be required to determine any additional potential contamination areas on airport property. • The areas along the Magnolia Petroleum Company easement may need special consideration prior to development. • The airport will need to continue to comply with their NPDES operating permit, which will ensure that pollution control measures are in place at the airport. As development occurs at the airport, the permit will need to be modified to reflect the additional impervious surfaces and storm water retention facilities. • As a result of increased operations at the airport, solid waste will likely increase; however, these increases are not anticipated to be significant.
<p>Historical, Architectural, Archaeological, and Cultural Resources. Impacts may occur when the proposed project causes an adverse effect on a property which has been identified (or is unearthed during construction) as having historical, architectural, archaeological, or cultural significance.</p>	<ul style="list-style-type: none"> • According to the Texas Historic Sites Atlas, no known historic or cultural resources are located in the areas proposed for development. • A cultural resources survey would likely be required to eliminate potential impacts to unidentified resources for those areas which have not been previously disturbed.

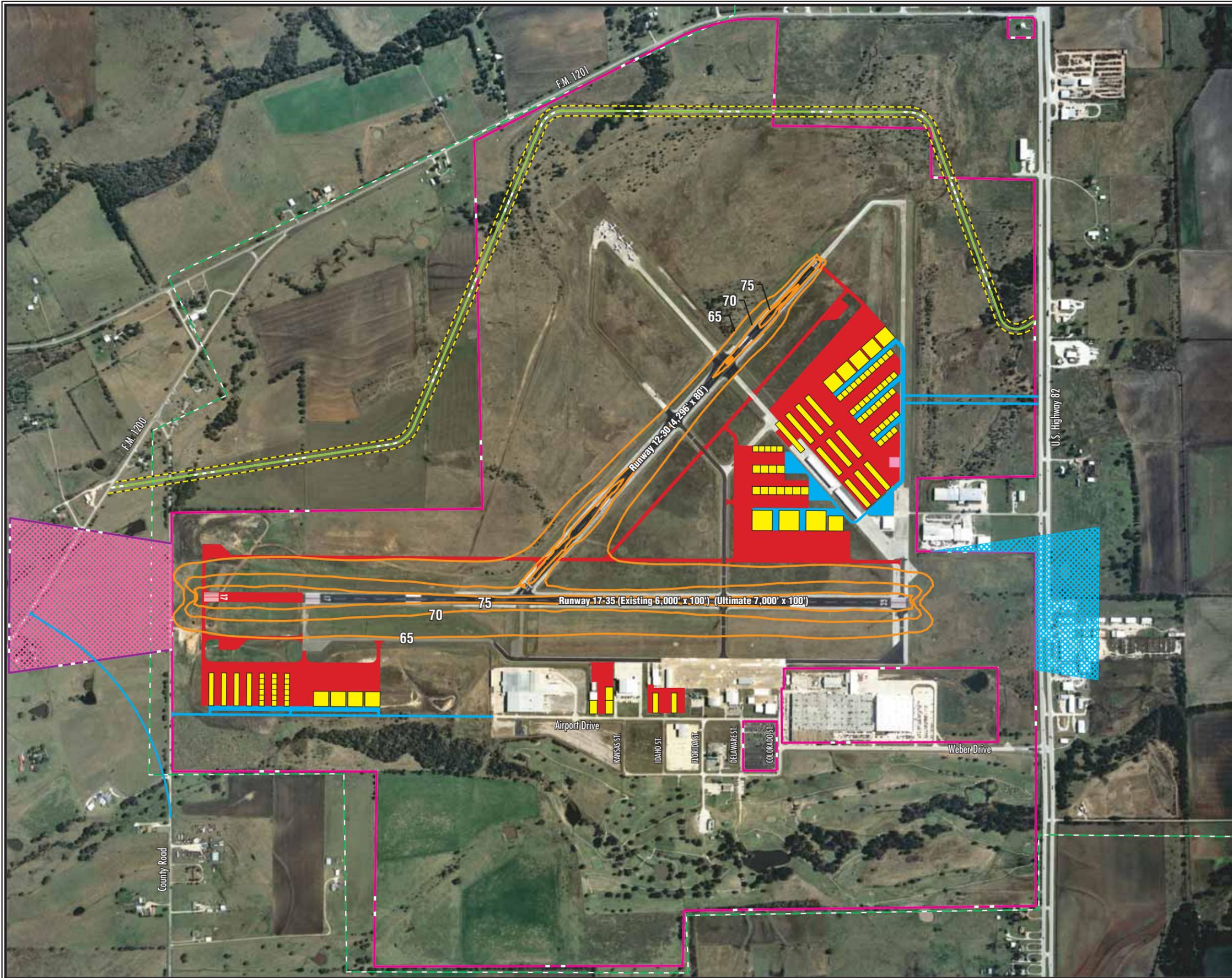
Review of Environmental Resources (Continued)	
<p>Light Emissions and Visual Impacts. Impacts occur when lighting associated with an action will create an annoyance among people in the vicinity or interfere with their normal activities. Visual impacts relate to the extent that the development contrasts with the existing environment and whether the jurisdictional agency considers this contrast objectionable.</p>	<ul style="list-style-type: none"> • The 1,000-foot extension to Runway 17-35 will result in the relocation of associated airfield lighting; however, impacts resulting from this relocation are not anticipated to be significant as the airport is located in an area of very low-density residential development. • Additional hangars will introduce new light sources in the area. These lights can be shielded so they do not significantly add to light pollution. • Visual impacts to the area surrounding the airport are not anticipated to be significant as the airport will continue to operate in a manner similar as it does today.
<p>Natural Resources and Energy Supply. In instances of major proposed actions, power companies or other suppliers of energy will need to be contacted to determine if the proposed project demands can be met by existing or planned facilities.</p>	<ul style="list-style-type: none"> • The proposed alternative will likely result in a less-than-significant impact to energy supply and natural resources. Any impacts would be a result of increased operations and upgraded facilities.
<p>Noise. The Yearly Day-Night Average Sound Level (DNL) is used in this study to assess aircraft noise. DNL is the metric currently accepted by the FAA, EPA, and Department of Housing and Urban Development (HUD) as an appropriate measure of cumulative noise exposure. These three agencies have each identified the 65 DNL noise contour as the threshold of incompatibility.</p>	<ul style="list-style-type: none"> • As depicted on Exhibit A, the existing noise exposure contours remain entirely on airport property. No existing noise sensitive institutions or development are impacted by noise in excess of 65 DNL. • The ultimate 65 DNL noise contour, depicted on Exhibit B, remains entirely on airport property.
<p>Secondary (Induced) Impacts. These impacts address those secondary impacts to surrounding communities resulting from the proposed development, including shifts in patterns of population growth, public service demands, and changes in business and economic activity to the extent influenced by airport development.</p>	<ul style="list-style-type: none"> • Significant shifts in patterns of population movement or growth, or public service demands, are not anticipated as a result of the proposed development. It could be expected, however, that the proposed development would potentially induce positive socioeconomic impacts for the community over a period of years. The airport, with expanded facilities and services, would be expected to attract additional users. It is also expected to encourage tourism, industry, and trade and to enhance the future growth and expansion of the community's economic base. Future socioeconomic impacts resulting from the proposed development are anticipated to be primarily positive in nature.



LEGEND

- Existing Airport Property Line
- City Limit
- Magnolia Gas Line
- Magnolia Petroleum Company Easement
- DNL Noise Contour





LEGEND

- Existing Airport Property Line
- Ultimate Airport Property Line
- City Limit
- Magnolia Gas Line
- Magnolia Petroleum Company Easement
- Property Acquisition
- Property Easement
- Ultimate Pavement
- Ultimate Building
- Ultimate Road/Parking
- DNL Noise Contour



Review of Environmental Resources (Continued)	
<p>Socioeconomic Impacts, Environmental Justice, and Children’s Environmental Health and Safety Risks. Impacts occur when disproportionately high and adverse human health or environmental effects occur to minority and low-income populations; disproportionate health and safety risks occur to children; and extensive relocation of residents, businesses, and disruptive traffic patterns are experienced.</p>	<ul style="list-style-type: none"> • The proposed development includes acquisition of approximately 34 acres north of the airport. This land would be acquired to gain full control over the runway protection area (RPZ) for Runway 17 as well as the object free area (OFA) and the runway safety area (RSA). This property consists of at least one residential unit. The property acquisition process, including the acquisition of any residences, must comply with the <i>Uniform Relocation Assistance and Real Property</i>. • County Road 404 will need to be relocated outside of the Runway 17 OFA and RSA. The existing road will remain operational while the new road is under construction. • An easement will be required over approximately 22 acres to the south. This easement will result in the airport having control over the RPZ on Runway 35 without having to incur the high cost of acquiring the industrial and commercial facilities which are located within the RPZ.
<p>Water Quality. Water quality concerns associated with airport expansion most often relate to domestic sewage disposal, increased surface runoff and soil erosion, and the storage and handling of fuel, petroleum, solvents, etc.</p>	<ul style="list-style-type: none"> • The airport will need to continue to comply with their existing National Pollution Discharge Elimination System (NPDES) operations permit. As the proposed airport improvements are developed, this permit will need to be revisited and potentially revised. • With regard to construction activities, the airport and all applicable contractors will need to obtain and comply with the requirements and procedures of the construction-related NPDES General Permit, including the preparation of a <i>Notice of Intent</i> and a <i>Stormwater Pollution Prevention Plan</i>, prior to the initiation of product construction activities.
<p>Wetlands. Wetlands are defined by Executive Order 11990, <i>Protection of Wetlands</i>, as those areas that are inundated by surface or groundwater with a frequency sufficient to support, and under normal circumstances, does or would support a prevalence of vegetation or aquatic life that requires saturated or seasonally saturated soil conditions for growth and reproduction.</p>	<ul style="list-style-type: none"> • A field survey would be required to determine the presence of wetlands or other waters of the U.S. Potential impacts cannot be determined at this time.
<p>Wild and Scenic Rivers. Wild and scenic rivers (WSR) are designated by the Wild and Scenic River Act. A National Rivers Inventory (NRI) is maintained to identify those river segments which are protected under this act.</p>	<ul style="list-style-type: none"> • No impacts. The airport is not located near any designated wild and scenic rivers.



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