MID-WAY
REGIONAL AIRPORT
DEVELOPMENT PLAN

AIRPORT DEVELOPMENT PLAN

for

MID-WAY REGIONAL AIRPORT
Midlothian/Waxahachie, Texas

Prepared for the

CITIES OF MIDLOTHIAN AND WAXAHACHIE

by

Coffman Associates, Inc.

August 2012

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Midlothian/Waxahachie, Texas

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Chapter One

INVENTORY

Chapter One
INVENTORY

The Cities of Midlothian and Waxahachie, in cooperation with the Texas Department of Transportation - Aviation Division (TxDOT), commissioned this Airport Development Plan. The goal of the plan is to analyze Mid-Way Regional Airport's capabilities and role and to plan for the timely development of new or expanded facilities that may be required to meet existing and future aviation demand. The specific purpose of this study is to provide the Cities of Midlothian and Waxahachie, TxDOT, and the Federal Aviation Administration (FAA) with a clear vision of necessary airport improvements over the next five years. This report will also include an updated Airport Layout Plan (ALP), which is a computer-aided drawing of the airport that represents the current condition of the airport and proposed improvements in the future. Any project for which the Cities of Midlothian and Waxahachie intend to request federal or state development funding must be depicted on the ALP.

The most recent Mid-Way Regional Airport Master Plan was completed in June 2003. Since that time, considerable funds have been invested into the airport, including a 1,500-foot runway and parallel taxiway extension,

construction of several hangar facilities, and land acquisition. Furthermore, substantial investments have also been made by private investors, including the fixed base operator (FBO) and other specialty aviation operators. It should be noted that the airport is currently undergoing a major terminal building renovation project that will be completed by December 2011.

The Cities of Midlothian and Waxahachie are responsible for overseeing all capital improvements at the airport and obtaining FAA and TxDOT development grants. In addition, the Cities of Midlothian and

Waxahachie oversee facility enhancements and infrastructure development conducted by private entities at the airport.

AIRPORT SYSTEM PLANNING ROLE

Airport planning exists on three levels: local, state, and national. Each level has a different emphasis and purpose. At the national level, Mid-Way Regional Airport is included in the National Plan of Integrated Airport Systems (NPIAS). The NPIAS includes 3,332 existing airports which are significant to national air transportation. Mid-Way Regional Airport is classified as a general aviation airport within the NPIAS.

The 2011-2015 NPIAS identifies $52.2 billion for airport development across the country. Of that total, approximately 22 percent is designated for the 2,560 existing and 39 planned general aviation airports identified. General aviation airports included in the NPIAS have an average of 31 based aircraft and account for 34 percent of the nation's general aviation fleet. **Exhibit 1A** shows the system breakdown of NPIAS airports and the funding need by airport category.

At the state level, the airport is included in the *Texas Airport System Plan: Update 2010* (TASP). The TASP includes 292 existing airports, 211 of which are identified in the NPIAS. Mid-Way Regional Airport is classified as a Business/Corporate airport within the TASP. The TASP provides for specific minimum design standards for several facilities based on an airport's service level and role to be further discussed in Chapter Two.

As part of the federal system, Mid-Way Regional Airport is eligible for federal grants as a part of the Airport Improvement Program (AIP). The State of Texas participates in the Federal Block Grant Program, which transfers the oversight authority of general aviation airports from the FAA to TxDOT. In this capacity, TxDOT administers federal grants as well as state airport grants. Eligible airport improvement projects for general aviation airports in Texas can receive 90 percent grant funding assistance, with the remaining ten percent being the responsibility of the local sponsor.

The Airport Master Plan is the primary local planning document. The Master Plan is intended to provide a 20-year vision for airport development based on aviation demand forecasts. As previously stated, the current Master Plan for Mid-Way Regional Airport is several years old. As a result, this is an appropriate time to revisit the development assumptions made during previous planning efforts.

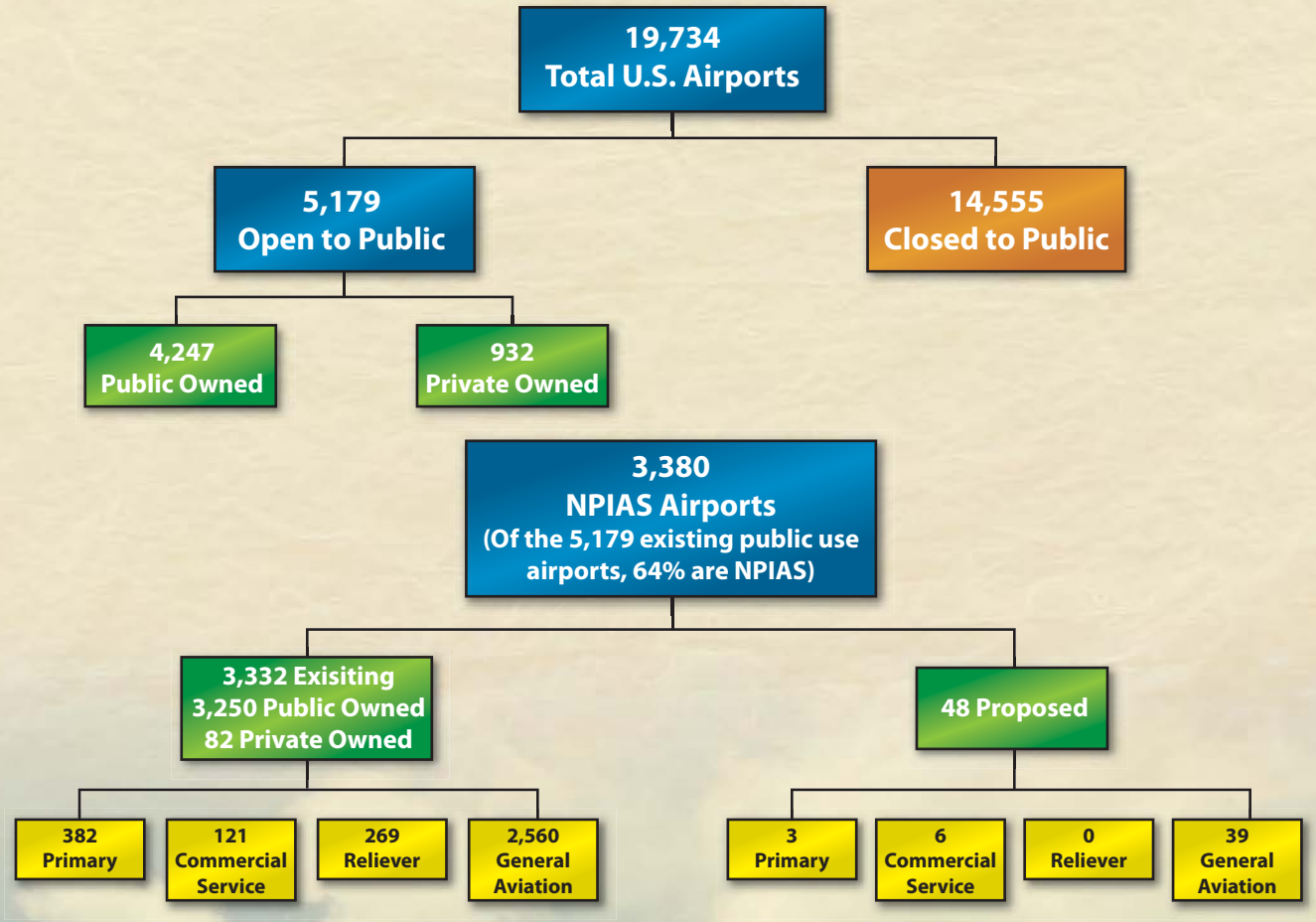
AIRPORT INVENTORY

Mid-Way Regional Airport serves the needs of a variety of aircraft ranging from small single engine piston-powered airplanes to corporate business jets. The airport is jointly owned and operated by the Cities of Midlothian and Waxahachie. An array of aviation services are provided in support of daily aircraft operations. The airport is situated at an elevation of 727 feet mean sea level (MSL).

There are currently 87 aircraft based at the airport. The existing based aircraft fleet mix is comprised of 62 single engine piston aircraft, 13 multi-engine piston aircraft, four jet aircraft, one helicopter, and seven gliders.

U.S. AIRPORT COMPOSITION

(January 2008)



FEDERAL FUNDING BY AIRPORT TYPE

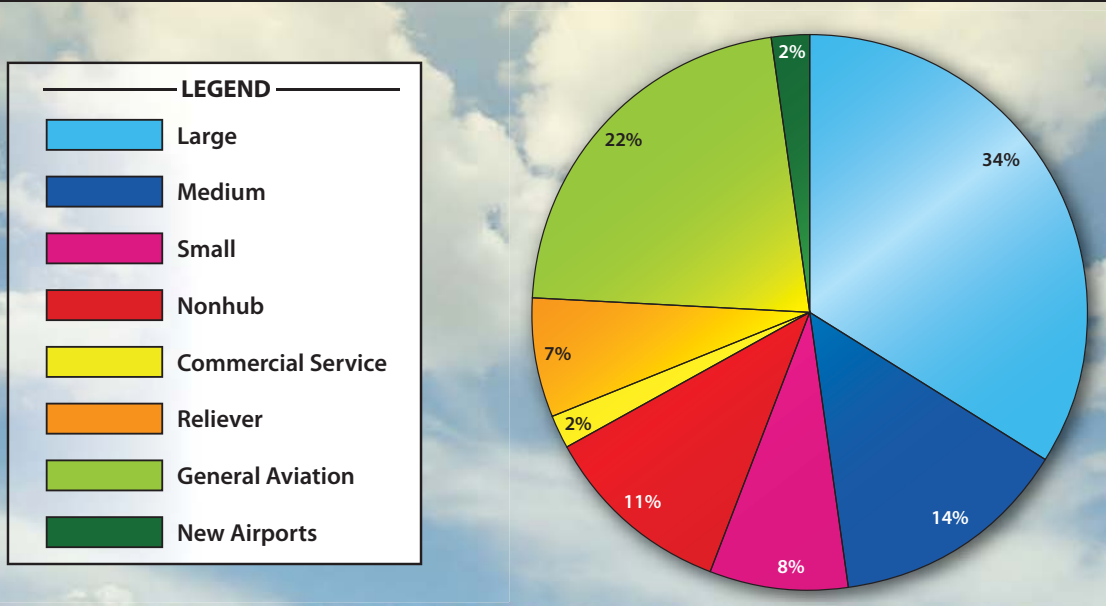


Exhibit 1A: NPIAS COMPOSITION & FUNDNG LEVELS

Airport facilities can be divided into two distinct categories: airside and landside. Airside facilities include those directly associated with aircraft operation such as runways, taxiways, lighting and marking, and navigational aids. Landside facilities include those necessary to provide a safe transition from surface to air transportation and support aircraft servicing, storage, maintenance, and operational safety on the ground.

AIRSIDE FACILITIES

Airside facilities are those providing for the movement of aircraft both on the ground and in the air and are depicted on **Exhibit 1B**. At Mid-Way Regional Airport, these facilities include a runway, taxiways, airfield lighting and marking aids, weather and communication aids, and navigational aids.

Runways

Mid-Way Regional Airport is served by one runway. Runway 18-36 is 6,500 feet long by 100 feet wide and is orientated north to south. **Table 1A** presents data specific to the runway. Other than the lengths and widths of the runway surface, the following items are included, as detailed:

- *Pavement type* – Indicates the surface material type.
- *Pavement condition* – FAA's current rating of runway pavement material.
- *Pavement strength* – Based on the construction of the pavement, a runway can provide differing load bearing capacities. Single wheel gear loading (SWL) refers to having one wheel per landing gear strut. Dual wheel loading (DWL) and dual tandem wheel loading (DTWL) include the design of aircraft landing gear with additional wheels on each landing gear strut, which distributes the aircraft weight across more of the pavement surface; thus, the surface itself can support a greater total aircraft weight.

TABLE 1A
Runway Data
Mid-Way Regional Airport

	Runway 18-36
Length	6,500'
Width	100'
Pavement Type	Asphalt/Concrete
Pavement Condition	Good
Pavement Strength	90,000 pounds DWL
Markings	Non-Precision
Lighting	MIRL
Elevation	727' MSL (Rwy 18) 686'MSL (Rwy 36)
Gradient	0.6%
Traffic Pattern	Standard Left

DWL - Dual Wheel Loading
MSL - Mean Sea Level

Source: Airport Facility Directory - South Central U.S. ; FAA Form 5010-1, *Airport Master Record*; Airport Records

- *Pavement markings* – Pavement markings aid in the movement of aircraft along airport surfaces and identify closed or hazardous areas on the airport. Runway markings provide pilots with designation and centerline stripes in basic form, while non-precision markings add threshold bars, edges, and touchdown zones.
- *Lighting* – Runway lighting is placed near the pavement edge to define the lateral limits of the pavement surface. Medium intensity runway lighting (MIRL) is typical of general aviation airports. Runway end lights also demark end of pavements.
- *Elevation* – Each runway end is situated at a specific point above MSL.

Those listed on the exhibit identify the MSL location of each runway end.

- *Gradient* – Runway gradient describes the effective slope of a runway surface. Runway pavement should be moderately sloped to allow for effective drainage, but not so as to reduce visibility from end to end.

Taxiways

The taxiway system at Mid-Way Regional Airport includes a parallel taxiway as well as entrance/exit and access taxiways. As depicted on **Exhibit 1B**, Runway 18-36 is supported by a parallel taxiway that extends between the runway ends on the west side of the runway. The parallel taxiway has a separation distance of 400 feet from the runway (centerline to centerline). There are five entrance/exit taxiways, one at each end of the runway and three between the runway ends. All active taxiways and their associated dimensions are listed in **Table 1B**.

TABLE 1B
Taxiway Data
Mid-Way Regional Airport

Designation	Length	Width
A	7,300'	40'
B	400'	40'
C	400'	40'
D	400'	40'

Source: Airport Records

Other taxiways serve more remote areas of the airfield, such as the hangar complexes and aircraft parking apron. In addition, hold aprons are available at each end of Runway 18-36 and adjacent to Taxiway B. The hold aprons allow pilots to perform flight checks, including engine run-ups, as well as a location where pilots can await a flight plan clearance prior to takeoff.

Airfield Lighting and Marking

Airfield lighting and marking systems extend an airport's usefulness into periods of darkness and/or poor visibility. A variety of systems are installed at Mid-Way Regional Airport for this purpose. The lighting and marking systems, categorized by function, are summarized as follows.

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 Mid-Way Regional Airport is located atop a pole structure adjacent to the southwest side of the aircraft parking apron.

As previously discussed, Runway 18-36 is equipped with MIRL. This type of runway lighting utilizes light fixtures placed near the edge of the pavement to define the lateral limits of the pavement. This lighting is essential for maintaining safe operations at night and/or during poor visibility minimums in order to positively identify the runway system. The runway ends 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 lens and green on the other half of the lens. The green portion of the lights are turned towards the approach surface and intended to be seen from landing aircraft, while the red portion is visible to aircraft on the runway surface.

Taxiways at Mid-Way Regional Airport are equipped with centerline and edge reflectors to assist pilots in maintaining proper clearance from pavement edges and objects near the taxiways. It should be noted that the edge reflectors are solar-powered, which enables pilots to better identify the taxiway edges during

MID-WAY REGIONAL AIRPORT

LEGEND
Airport Property Line

NORTH

0 800 1600
SCALE IN FEET

DATE OF AERIAL:
September 2011

Spring Branch Rd.
Daniel Rd.
Long Branch Rd.
19th Ave.
Rex Odom Dr.
287 Highway

AWOS-III
Segmented Circle/
Lighted Windcone
REILs
PAPI-4
Runway 18-36 (6,500' x 100')
PAPI-4
Hold Apron
Hold Apron
Compass Rose
Hold Apron
Rotating Beacon

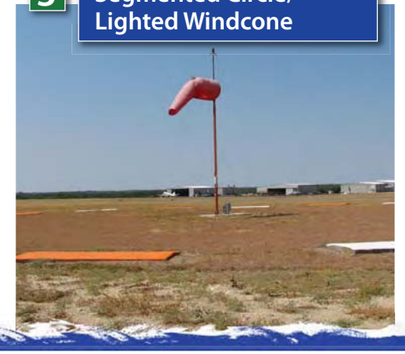
A B C D A

1 2 3 4

1 PAPI-4

2 AWOS-III

3 Segmented Circle/
Lighted Windcone



4 Rotating Beacon

Exhibit 1B: EXISTING AIRSIDE FACILITIES

nighttime conditions. Taxiway markings also include aircraft hold lines located on the entrance/exit taxiways. The hold lines on Taxiways A, B, C, and D are located 250 feet from the Runway 18-36 centerline.

Airfield signage assists pilots in identifying their location on the airfield and directing them to their desired location. The lighted signage system installed at Mid-Way Regional Airport includes runway and taxiway designations, holding positions, routing/directional, and runway exit signs.

A four-box precision approach path indicator (PAPI-4) is located on the right side serving Runway 18 and on the left side serving Runway 36. The PAPI-4 consists of a series of four lights that, when interpreted by pilots, give an indication of being above, below, or on the designated descent path to the runway. The PAPI-4 systems serving Runway 18-36 are located 901 feet and 695 feet, respectively, from each runway threshold. They have a visual range of five miles during the day and up to 20 miles at night.

Runway end identification lights (REILs) provide rapid and positive identification of the approach end of a runway. A REIL system has been installed on Runway 18 and consists of two synchronized flashing lights, located laterally on each side of the runway threshold, facing the approaching aircraft. It should be noted that this system is currently inoperative.

Airport lighting is connected to a pilot-controlled lighting (PCL) system. This PCL system allows pilots to increase the intensity of the runway lighting from the aircraft with the use of the aircraft's radio transmitter. The PCL at Mid-Way Regional Airport can be accessed on the common traffic advisory frequency (CTAF) 122.975 MHz.

Weather and Communication Aids

Mid-Way Regional Airport is equipped with a lighted wind cone and segmented circle which provides pilots information about wind conditions and traffic pattern usage. These facilities are located approximately 2,500 feet northeast of the Runway 36 threshold in a desirable midfield location.

An automated weather observation system (AWOS-III) is located at the airport. The AWOS-III automatically records weather conditions such as wind speed, wind gusts, wind direction, temperature, dew point, altimeter setting, density altitude, visibility, precipitation, sky condition, and cloud height. This information is then transmitted at regular intervals on radio frequency 119.575 MHz. The AWOS system is located approximately 2,500 feet southeast of the Runway 18 threshold.

Mid-Way Regional Airport utilizes a CTAF, which was mentioned in the previous section. This radio frequency (122.975 MHz) is used by pilots in the vicinity of the airport to communicate with each other about approaches to or departures from the airport. In addition, a UNICOM frequency, which shares the same frequency as the CTAF, is also available in which a pilot can obtain information from airport businesses that monitor the frequency.

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 in the vicinity of Mid-Way Regional Airport include the non-directional beacon (NDB), very high frequency omni-

directional range (VOR), and global positioning system (GPS).

The NDB transmits non-directional 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 Lancaster NDB is located approximately 12 nautical miles to the northeast of Mid-Way Regional Airport.

The VOR, in general, provides azimuth readings to pilots of properly equipped aircraft by transmitting a radio signal at every degree to provide 360 individual navigational courses. Frequently, distance measuring equipment (DME) is combined with a VOR facility (VOR/DME) to provide distance as well as directional information to the pilot. The Maverick VOR/DME is located approximately 25 nautical miles north of the airport.

GPS was initially developed by the United States Department of Defense for military navigation around the world and is currently being utilized more and more in civilian aircraft. GPS differs from an NDB or VOR in that pilots are not required to navigate using a specific ground-based 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. The FAA is proceeding with a program to gradually replace all traditional enroute navigational aids with GPS over the next 20 years. Airfield lighting and marking, weather and communication, and navigational aids are summarized in **Table 1C**.

TABLE 1C
Airside Facility Data
Mid-Way Regional Airport

	Runway 18-36
Runway Lighting	MIRL
Taxiway Lighting	Centerline and Edge Reflectors
Visual Approach Aids:	
Approach Slope Indicators	PAPI-4 (Rwy 18 & 36)
REILs	Yes (Rwy 18)*
Instrument Approach Aids	RNAV/GPS (Rwy 18 & 36)
Weather Navigational Aids	AWOS-III, GPS, VOR, NDB
Visual Aids	Segmented Circle, Lighted Wind Cone, Rotating Beacon

* Currently inoperative
REIL – Runway End Identifier Light
MIRL – Medium Intensity Runway Lighting
PAPI – Precision Approach Path Indicator
RNAV – Area Navigation
GPS – Global Positioning System
VOR – Very High Frequency Omnidirectional Range
NDB – Non-Directional Beacon

Source: Airport Facility Directory - South Central U.S.: FAA Form 5010-1, *Airport Master Record*; Airport Records

Instrument Approach Procedures

Instrument approach procedures are a series of predetermined maneuvers established by the FAA which utilize electronic navigational aids (such as those discussed in the previous section) to assist pilots in locating and landing at an

airport during low visibility and cloud ceiling 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 ceilings are below the minimums prescribed for the approach, the pilot cannot complete the instrument approach.

There are two approved instrument approach procedures for Mid-Way Regional Airport. Runways 18 and 36 are served by an area navigation (RNAV) GPS approach. A localizer performance with vertical guidance (LPV) approach for each runway end provides both course guidance and vertical descent information to pilots. A lateral navigation (LNAV) / vertical navigation (VNAV) approach minimums provide for course or vertical guidance. The RNAV (GPS) LPV approach to Runway 18 provides the lowest minimums available at the airport, allowing for landings when cloud ceilings are as low as 200 feet above ground level (AGL) and the visibility is restricted to ¾-mile.

Each approach also has circling minimums. Circling minimums allow 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 straight-in instrument approaches. **Table 1D** summarizes the approach capabilities at Mid-Way Regional Airport.

TABLE 1D
Instrument Approach Data
Mid-Way Regional Airport

	Weather Minimums by Aircraft Type							
	Category A		Category B		Category C		Category D	
	Cloud Height (feet AGL)	Visibility (miles)	Cloud Height (feet AGL)	Visibility (miles)	Cloud Height (feet AGL)	Visibility (miles)	Cloud Height (feet AGL)	Visibility (miles)
RNAV (GPS) Runway 18								
LPV DA	200	0.75	200	0.75	200	0.75	200	0.75
LNAV/VNAV DA	250	0.875	250	0.875	250	0.875	250	0.875
LNAV MDA	494	1	494	1	494	1.375	494	1.375
Circling	494	1	494	1	494	1.5	574	2
RNAV (GPS) Runway 36								
LPV DA	250	1	250	1	250	1	250	1
LNAV/VNAV DA	289	1	289	1	289	1	289	1
LNAV MDA	397	1	397	1	397	1	397	1.25
Circling	414	1	454	1	454	1.5	574	2

Aircraft categories are established based on 1.3 times the aircraft's stall speed in landing configuration as follows:
Category A: 0-90 knots
Category B: 91-120 knots
Category C: 121-140 knots
Category D: 141-166 knots
AGL - Above Ground Level
RNAV – Area Navigation
GPS - Global Positioning System
LPV – Localizer Performance with Vertical Guidance
LNAV – Lateral Navigation
VNAV – Vertical Navigation
DA – Decision Altitude
MDA – Minimum Descent Altitude

Source: U.S. Terminal Procedures SC-2 (October 2011)

LANDSIDE FACILITIES

Landside facilities are ground-based facilities that support aircraft operations and storage and provide interface for pilot/passenger handling functions. At a general aviation facility such as Mid-Way Regional Airport, these typically include a terminal building, aircraft hangars, aircraft parking aprons, airport businesses, and support facilities such as fuel storage, automobile parking, and utilities. Landside facilities are identified on **Exhibit 1C**.

Airport Terminal

The airport terminal building houses airport administration, a waiting lobby, a flight planning area, restroom facilities, and offices for various airport businesses and tenants. It was originally constructed in 1993. A major terminal building renovation project is currently underway that, when completed, will double the building's useful office space from approximately 4,000 to 8,000 square feet. Connected to the north side of the terminal building is a conventional hangar that is being leased by the airport's FBO. Upon completion of the building renovation project, the terminal and hangar combined will total approximately 18,500 square feet of space.

Aircraft Hangars

The airport has a broad mix of aircraft storage hangar types. T-hangars are smaller hangars designed to accommodate a single small aircraft. Box hangars are slightly larger than T-hangars and are constructed free of support columns. These hangars are typically less than 10,000 square feet and can house multiple single engine aircraft, but more often house larger multi-engine aircraft and small business jets. Box hangars are also utilized to accommodate airport businesses or maintenance operations. Conventional hangars are larger free-standing structures that are also typically utilized for airport businesses. Airport FBOs and maintenance businesses often utilize these types of hangars. Conventional hangars can also be utilized for bulk aircraft storage.

Table 1E presents the total number of aircraft storage hangar units and space available at the airport. There are 61 individual hangar units available at Mid-Way Regional Airport. These aircraft storage figures will be utilized as the baseline to project future aircraft storage hangar needs for the airport.

TABLE 1E
Aircraft Storage Hangars
Mid-Way Regional Airport

	T-hangars	Box Hangars	Conventional Hangars	Total
Units	48	11	2	61
Area (s.f.)	54,700	54,300	23,500	132,500

Source: Airport Records; Coffman Associates analysis

Aircraft Parking Apron

The main aircraft parking apron at Mid-Way Regional Airport totals approximately 20,100 square yards of space. It extends approximately 650 feet along the west side of the parallel taxiway adjacent to the east side of the terminal building

MID-WAY REGIONAL AIRPORT

1 Self-Service Fuel Facility

2 Airport Maintenance Facility

3 Fuel Farm

No.	Hangar Type (Number of Units)	Building Size (Square Feet)	Ownership	Occupant
1	T-Hangars (12)	13,750	Airport	Private Aircraft Storage
2	Box Hangars (3)	13,850	Airport	Private Aircraft Storage
3	T-Hangars (18)	20,500	Airport	Private Aircraft Storage
4	Box Hangar (1)	3,100	Airport	Arrae, Inc.
5	T-Hangars (18)	20,000	Airport	Private Aircraft Storage/ Midway Aircraft Maintenance
6	Box Hangar (1)	3,100	Airport	Big Q Aviation
7	Box Hangars (4)	16,900	Cities of Midlothian/Waxachachie	Big Q Aviation / Arrae, Inc./Private Aircraft Storage
8	Box Hangar (1)	8,800	Private	Trojan Phlyers, Inc.
9	Airport Terminal Building/ Conventional Hangar (1)	14,500	Airport	Airport Administration / Southern Star Aviation/ Big Q Aviation / Grimes & Associates
10	Conventional Hangar (1)	13,500	City of Waxahachie	Airborne Imaging / Airborne Resources
11	Box Hangar (1)	8,600	City of Waxahachie	A-One Aircraft Paint

Exhibit 1C: EXISTING LANDSIDE FACILITIES

and contains 42 marked tiedowns for smaller general aviation aircraft. There are additional parking apron areas located on the airport in close proximity to conventional and box hangars.

Airport Businesses

Mid-Way Regional Airport supports numerous businesses. **Table 1F** provides a current listing and brief description of these businesses.

TABLE 1F
Airport Businesses
Mid-Way Regional Airport

Company Name	Primary Business
Southern Star Aviation	FBO, Fuel, Maintenance
Midway Aircraft Maintenance	Maintenance, Inspection, Repair
Big Q Aviation	Tailwheel instruction, Sport pilot training, FAA designated pilot examiner
A-One Aircraft Paint	Painting, Interior, Maintenance and Instruments
Arrae, Inc.	Aerial surveying
Airborne Imaging	Airborne research and development
Airborne Resources	Global airborne research and development
Grimes & Associates	Environmental testing
Trojan Phlyers, Inc.	Aircraft demonstration team

Source: Airport Records

Fuel Facilities

The fuel farm at Mid-Way Regional Airport is located on the west of the T-hangar facilities. It contains two above-ground fuel storage tanks: one 12,000-gallon capacity tank is dedicated for the storage of Jet A fuel, and one 12,000-gallon capacity tank is dedicated for 100LL.

A self-service fuel facility is also located on the airport adjacent to the north side of the main aircraft parking apron. This facility consists of a fuel dispenser connected to a 500-gallon capacity above-ground storage tank and a credit card reader.

Automobile Parking

There are three automobile parking lots available for vehicle use at Mid-Way Regional Airport. A designated parking area for automobiles adjacent to the south and west sides of the terminal building and connecting conventional hangar provide for 20 marked spaces and additional unmarked parking. Two other public parking areas on the airport are located adjacent to aircraft hangars and aviation-related businesses south of the terminal area. A total of 18 marked parking spaces are located within these areas. In total, there are 38 marked automobile parking spaces and additional unmarked vehicle parking areas at Mid-Way Regional Airport.

Utilities

The availability and capacity of the utilities serving the airport are factors in determining the development potential of the airport, as well as the land immediately adjacent to the facility. The airport is supplied with electricity, water, and sanitary sewer. Electric service is provided by Oncor. The City of Midlothian and Sardis Lone Elm provide water to various fa-

cilities on the airfield. The City of Midlothian also provides sanitary sewer services.

Utility availability is a critical element when considering future expansion capabilities for both airside and landside components. A utility schematic plan is being prepared to accommodate existing and future improvements at Mid-Way Airport as a part of this study. This analysis will be detailed later in this report.

AIRPORT AND REGIONAL CHARACTERISTICS

The purpose of this section is to summarize various data collected to provide an understanding of Mid-Way Regional Airport and the surrounding area. This information serves as an important baseline when determining facility requirements for critical airport infrastructure to support future demand.

AIRPORT SETTING AND CLIMATE

Mid-Way Regional Airport sits on approximately 320 acres of property in the northwest quadrant of Ellis County, approximately five miles southeast of the City of Midlothian and five miles northwest of the City of Waxahachie. As depicted on **Exhibit 1D**, the airport is provided access to highway infrastructure linking it to regional area. On-airport access is provided by Rex Odom Drive extending north from U.S. Highway 287. U.S. Highway 287, located approximately one mile south of the airport, provides direct access to U.S. Highway 67 just a few miles west of the airport. From there, U.S. Highway 67 provides access to south-central portions of the greater Dallas metropolitan area in addition to U.S. Interstates 20 and 30. To the east of the airport, U.S. Highway 287 connects to U.S. Interstate 35 which, in turn, links directly to downtown Dallas and points beyond.

Weather conditions must be considered in the planning and development of an airport, as daily operations are affected by local weather. Temperature is a significant factor in determining runway length needs, while local wind patterns (both speed and direction) can affect the operation and capabilities of the runway. The need for navigational aids and lighting can be determined by the visibility and cloud ceiling conditions.

Mid-Way Regional Airport experiences a humid, subtropical climate with hot summers and mild winters. The average annual daily high temperature is 75.2 degrees Fahrenheit (F), ranging from 55.5 degrees F in January to 94.5 degrees F in August. Average low temperatures range between 33.8 degrees F in January to 73.3 degrees F in July, leading to an average annual daily low temperature of 54 degrees F.

Average annual precipitation in the vicinity of the airport is 41.1 inches. A larger portion of the annual precipitation results from thunderstorm activity. Thunderstorms occur throughout the year, but are most prevalent during the spring months. The area occasionally experiences snowfall, freezing rain, and icy conditions during the winter months. Winds in the area are generally from the south, averaging 10.7 miles per hour. A summary of climatic data is presented in **Table 1G**.

Exhibit 1D: AIRPORT LOCATION AND VICINITY MAP

TABLE 1G
Climate Summary
Mid-Way Regional Airport

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Annual
Avg. Temp. (F)	44.6	48.0	55.2	63.9	72.6	79.7	83.6	83.8	76.7	66.3	55.3	45.9	64.6
Avg. High Temp. (F)	55.5	58.9	66.3	74.8	82.1	89.4	93.9	94.5	87.5	77.5	66.0	56.4	75.2
Avg. Low Temp. (F)	33.8	37.1	44.2	53.1	63.0	70.0	73.3	73.1	65.9	55.0	44.5	35.4	54.0
Avg. Precip. (in.)	2.6	2.7	3.3	3.3	4.4	4.4	3.5	2.3	3.4	4.8	3.2	3.2	41.1
Wind Speed (mph)	11.0	11.6	12.5	12.4	11.1	10.6	9.8	9.0	9.2	9.7	10.7	10.9	10.7
Sunny Days (%)	32	34	31	30	28	34	42	45	41	42	40	35	36
Pt. Cloudy Days (%)	18	20	23	25	27	36	38	35	31	28	22	20	27
Cloudy Days (%)	50	46	46	45	45	30	20	20	28	30	38	45	37

Source: National Climatic Data Center; www.weather.com

VICINITY AIRSPACE

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 United States airspace structure provides for two basic categories of airspace, controlled and uncontrolled, and identifies them as Classes A, B, C, D, E, and G.

As depicted on **Exhibit 1E**, Mid-Way Regional Airport operates in Class E airspace with a floor of 700 feet AGL extending to 4,000 feet AGL, where Class B airspace associated with Dallas/Fort Worth International Airport and Dallas Love Field begins. 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 flights can only be conducted if minimum visibility and cloud ceilings exist.

VICINITY AIRPORTS

There are several other airports of various size, capacities, and functions within the vicinity of Mid-Way Regional Airport. It is important to consider the capabilities and limitations of these airports when planning for future changes and improvements at Mid-Way Regional Airport. **Exhibit 1E** depicts the location of these airports in relation to Mid-Way Regional Airport, and **Exhibit 1F** provides information on public use airports within 25 nautical miles of the airport. Information pertaining to each airport was obtained from FAA Form 5010-1, *Airport Master Record*.

From analysis of public use airports in the region, it is evident that there are several facilities serving the needs of general aviation. This is especially true for areas to the north of Mid-Way Regional Airport where 11 reliever airports serve the Dallas/Fort Worth Metroplex. Mid-Way Regional Airport, however, is positioned well to accommodate general aviation demand for the surrounding region due to the array of services and facilities it has to offer, including a 6,500-foot runway, one of the longest in the area for general aviation aircraft. The competing airports in

the region each have unique qualities that may serve a specific segment of general aviation. These factors must be considered carefully in determining future aviation activity and market demand that could occur at Mid-Way Regional Airport.

AREA LAND USE AND ZONING

Land use surrounding an airport is an important consideration in airport planning. It is important for the operator of an airport, particularly a governmental body, to protect the airport environment from incompatible development so as to promote safe aircraft operation and for the safety of people and property on the ground. **Exhibits 1G** and **1H** present the land use plans for the cities of Midlothian and Waxahachie, respectively.

Land on and adjacent to Mid-Way Regional Airport is under the jurisdiction of the Cities of Midlothian and Waxahachie. The northern portions of airport property, as well as property adjacent to the north and west of the airport, are under the jurisdiction of the City of Midlothian. The southern portions of the airport and land adjacent to the south and east are located within the City of Waxahachie.

The majority of land surrounding the airport is currently used for agricultural purposes in the form of cultivated farmland and grazing pastures. There are some residential home sites located primarily east of the airport adjacent to Long Branch, Spring Branch, and Daniel Roads.

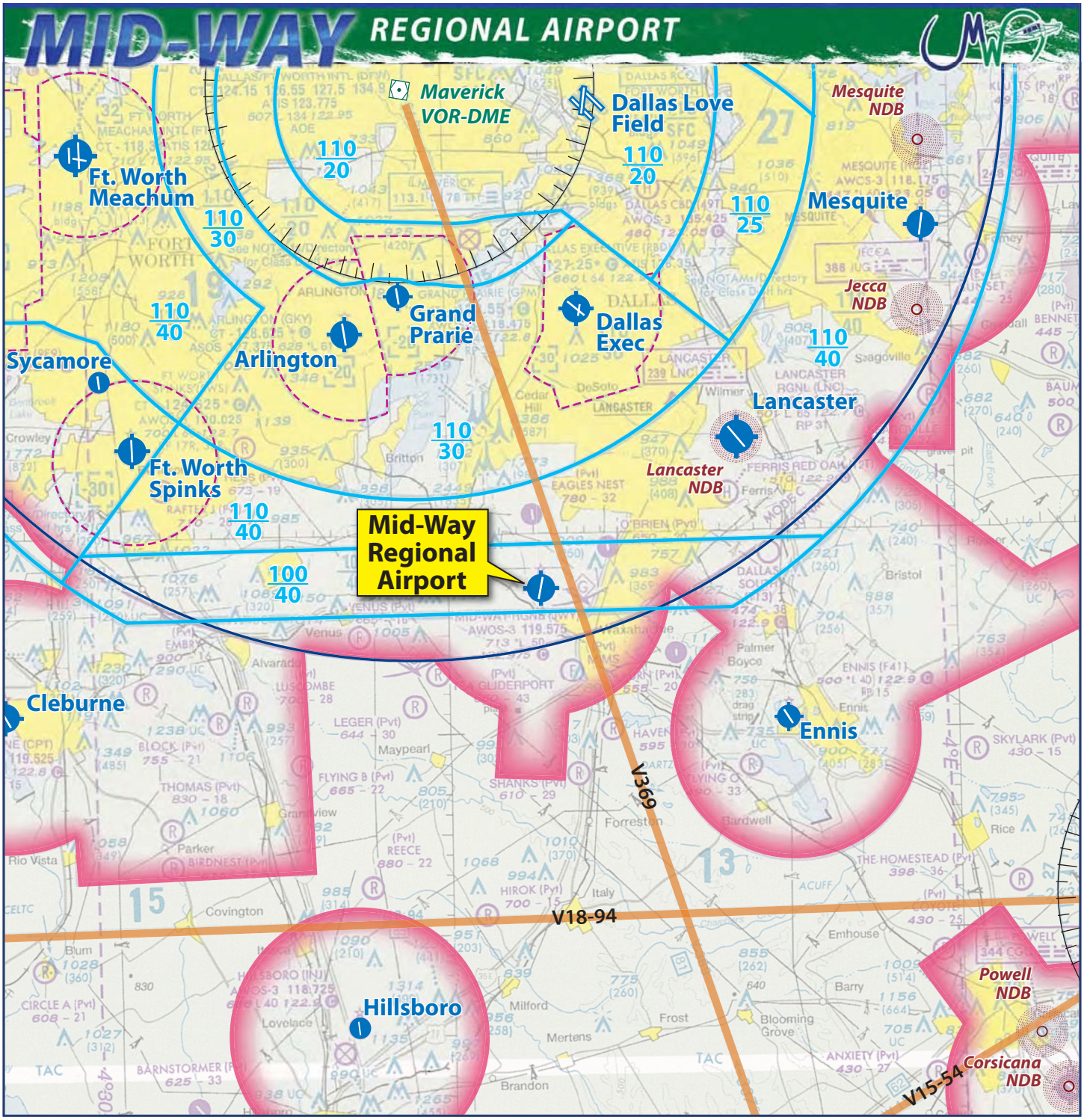
Under ideal conditions, the development immediately surrounding the airport can be controlled and limited to uses considered compatible. Compatible uses would include industrial and commercial development as well as agricultural activities. As identified on the exhibits, the land use plans for the Cities of Midlothian and Waxahachie call for compatible land uses primarily in the form of open space and vacant property mainly being utilized for agricultural purposes.

There are a number of methods by which governmental entities can ensure that land uses in and around airports are developed in a compatible manner. The objective of enforcing land use restrictions is to protect designated areas for the maintenance of operationally safe and obstruction-free airport activity.

Land use zoning is the most common land use control. Typically, zoning is developed through local ordinances and is often included in comprehensive plans. The primary advantage of zoning is that it can promote compatibility with the airport while leaving the land in private ownership. Zoning is subject to change; therefore, any potential alterations to the zoning code near the airport should be monitored closely for compatibility.

The Cities of Midlothian and Waxahachie have established an Airport Overlay Zone and Airport District, respectively, which provide for appropriate and compatible uses of land surrounding the airport and provide for the safe operation of the airport facility itself. In addition to the restriction of the overlay zone and districts, each municipality has further zoned the area adjacent to the airport for light industrial, agricultural, and large lots for single-family residential use.

Height restrictions are necessary to ensure that objects will not impair flight safety or decrease the operational capability of the airport. Title 14 of the Code of Federal Regulations (CFR) Part 77, *Objects Affecting Navigable Airspace*, defines



LEGEND

- Hard surfaced runways 1,500 ft. to 8069 ft. in length
- Airport with hard-surfaced runways1,500' to 8,069' in length
- Airports with hard-surfaced runways greater than 8,069' or some multiple runways less than 8,069'
- VOR-DME
- Non-directional Radiobeacon (NDB)
- Mode C
- Class B Airspace
- Class D Airspace
- Class E Airspace with floor 700 ft. above surface
- Victor Airways
- Compass Rose

NORTH

NOT TO SCALE

Source: Dallas South Sectional Charts, US Department of Commerce, National Oceanic and Atmospheric Administration 03/10/11

Exhibit 1E: VICINITY AIRSPACE

MID-WAY REGIONAL AIRPORT

Lancaster Regional Airport (LNC)

Airport Sponsor: City of Lancaster
Distance from JWY: 12 nm Northeast
Airport Classification: Reliever
Primary Runway: 13-31
Length: 6,502'
Width: 100'

Surface Type / Condition: Asphalt / Good
Strength Rating: 20,000 lbs. SWL; 60,000 lbs. DWL
Marking: Non-Precision
Runway Lighting: MIRL
Visual Navaids: PAPI-4; REILs
Based Aircraft: 142
Estimated Annual Operations: 67,100
Services Provided: Aircraft Fuel (100LL & Jet A), Aircraft Maintenance, Hangars, Tiedowns, Aircraft Avionics, Air Charter, Flight Training

Instrument Approaches	Weather Minimums*	
Type	*Cloud Height*	*Visibility*
RNAV (GPS)Rwy 31	200 (A/B/C/D)	0.75 (A/B/C/D)
NDB Rwy 31	613 (A/B/C/D)	1 (A/B); 1.75 (C); 2 (D)

Dallas Executive Airport (RBD)

Airport Sponsor: City of Dallas
Distance from JWY: 14 nm North
Airport Classification: Reliever
Primary Runway: 13-31
Length: 6,451'
Width: 150'

Surface Type / Condition: Asphalt and Concrete / Good
Strength Rating: 35,000 lbs. SWL; 60,000 lbs. DWL; 110,000 lbs. DTWL
Marking: Non-Precision (13); Precision (31)
Runway Lighting: MIRL
Visual Navaids: PAPI-4; VASI-4; REILs; LDIN
Based Aircraft: 185
Estimated Annual Operations: 54,251
Services Provided: Aircraft Fuel (100LL & Jet A), Aircraft Maintenance, Hangars, Tiedowns, Aircraft Avionics, Air Charter, Flight Training

Instrument Approaches	Weather Minimums*	
Type	*Cloud Height*	*Visibility*
ILS or LOC Rwy 31	200 (A/B/C/D)	0.75 (A/B/C/D)
Multiple RNAV (GPS)	250 (A/B/C/D)	1 (A/B/C/D)
Multiple VOR	422 (A/B/C/D)	1 (A/B); 1.25 (C/D)

Ennis Municipal Airport (F41)

Airport Sponsor: City of Ennis
Distance from JWY: 15 nm Southeast
Airport Classification: General Aviation
Primary Runway: 15-33
Length: 3,999'
Width: 50'

Surface Type / Condition: Asphalt / Good
Strength Rating: 18,000 lbs. SWL
Marking: Basic
Runway Lighting: MIRL
Visual Navaids: PAPI-2
Based Aircraft: 11
Estimated Annual Operations: 7,120
Services Provided: Aircraft Fuel (100LL & Jet A), Aircraft Maintenance, Hangars, Tiedowns,

Instrument Approaches	Weather Minimums*	
Type	*Cloud Height*	*Visibility*
VOR/DME-A	1,020 (A); 1,040 (B/C)	1 (A); 1.25 (B); 1.5 (C)

Arlington Municipal Airport (GKY)

Airport Sponsor: City of Arlington
Distance from JWY: 15 nm Northwest
Airport Classification: Reliever
Primary Runway: 16-34
Length: 6,080'
Width: 100'

Surface Type / Condition: Concrete / Good
Strength Rating: 60,000 lbs. SWL
Marking: Non-Precision (16); Precision (34)
Runway Lighting: MIRL
Visual Navaids: PAPI-4; REILs; MALSF
Based Aircraft: 250
Estimated Annual Operations: 151,600
Services Provided: Aircraft Fuel (100LL & Jet A), Aircraft Maintenance, Hangars, Tiedowns, Aircraft Avionics, Air Charter, Flight Training

Instrument Approaches	Weather Minimums*	
Type	*Cloud Height*	*Visibility*
ILS or LOC/DME Rwy 34	200 (A/B/C)	0.5 (A/B/C)
RNAV (GPS) Rwy 34	200 (A/B/C)	0.5 (A/B/C)
VOR/DME Rwy 34	460 (A/B/C)	1 (A/B); 1.25 (C)

Grand Prairie Municipal Airport (GPM)

Airport Sponsor: City of Grand Prairie
Distance from JWY: 16 nm Northwest
Airport Classification: Reliever
Primary Runway: 17-35
Length: 4,001'
Width: 75'

Surface Type / Condition: Concrete / Good
Strength Rating: 30,000 lbs. SWL
Marking: Non-Precision
Runway Lighting: MIRL
Visual Navaids: VASI-4; REILs
Based Aircraft: 186
Estimated Annual Operations: 98,001
Services Provided: Aircraft Fuel (100LL & Jet A), Aircraft Maintenance, Hangars, Tiedowns, Air Charter, Flight Training

Instrument Approaches	Weather Minimums*	
Type	*Cloud Height*	*Visibility*
RNAV (GPS)Rwy 35	411 (A/B)	2.25 (A/B)
VOR/DME Rwy 35	451 (A/B)	2.25 (A/B)

Fort Worth Spinks Airport (FWS)

Airport Sponsor: City of Fort Worth
Distance from JWY: 21 nm Northwest
Airport Classification: Reliever
Primary Runway: 17R-35L
Length: 6,002'
Width: 100'

Surface Type / Condition: Asphalt / Good
Strength Rating: 40,000 lbs. SWL; 50,000 lbs. DWL; 60,000 lbs. DTWL
Marking: Precision
Runway Lighting: MIRL
Visual Navaids: PAPI-4; MALSR
Based Aircraft: 170
Estimated Annual Operations: 82,948
Services Provided: Aircraft Fuel (100LL & Jet A), Aircraft Maintenance, Hangars, Tiedowns, Aircraft Avionics, Flight Training, Aircraft Painting

Instrument Approaches	Weather Minimums*	
Type	*Cloud Height*	*Visibility*
ILS Rwy 35L	200 (A/B/C/D)	0.5 (A/B/C/D)
RNAV (GPS) Rwy 17R	287 (A/B/C/D)	1 (A/B/C/D)
RNAV (GPS) Rwy 35L	250 (A/B/C/D)	0.5 (A/B/C/D)

Hillsboro Municipal Airport (INJ)

Airport Sponsor: City of Hillsboro
Distance from JWY: 24 nm Southwest
Airport Classification: General Aviation
Primary Runway: 16-34
Length: 3,998'
Width: 60'

Surface Type / Condition: Asphalt / Good
Strength Rating: 12,500 lbs. SWL
Marking: Non-Precision
Runway Lighting: MIRL
Visual Navaids: PAPI-2
Based Aircraft: 20
Estimated Annual Operations: 6,000
Services Provided: Aircraft Fuel (100LL & Jet A), Tiedowns

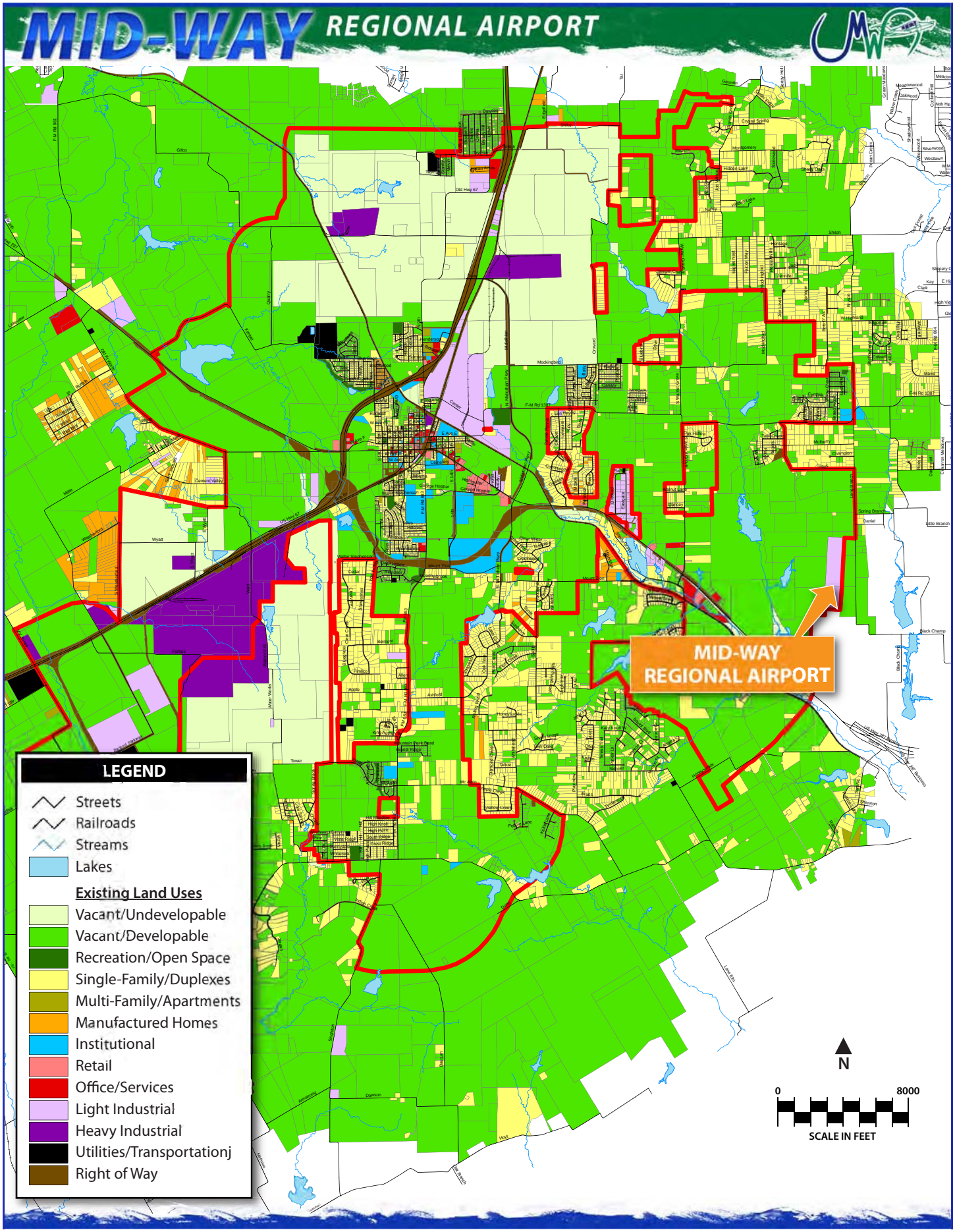
Instrument Approaches	Weather Minimums*	
Type	*Cloud Height*	*Visibility*
RNAV (GPS) Rwy 16	250 (A/B)	1 (A/B)
RNAV (GPS) Rwy 34	250 (A/B)	1 (A/B)

ABBREVIATIONS KEY

DME - Distance Measuring Equipment
DTWL - Dual-Tandem Wheel Loading
DWL - Dual Wheel Loading
GPS - Global Positioning System
ILS - Instrument Landing System
LDIN - Lead-in Lighting System
LOC - Localizer
MALSF - Medium Intensity Approach Lighting System with Sequenced Flashing Lights
MALSR - Medium Intensity Approach Lighting System with Runway Alignment Indicator Lights
MIRL - Medium Intensity Runway Lights
NDB - Nondirectional Radio Beacon
nm - Nautical Miles
PAPI - Precision Approach Path Indicator
REIL - Runway End Identification Lights
RNAV - Area Navigation
SWL - Single Wheel Loading
VASI - Visual Approach Slope Indicator
VOR - Very High Frequency Omni-directional Range

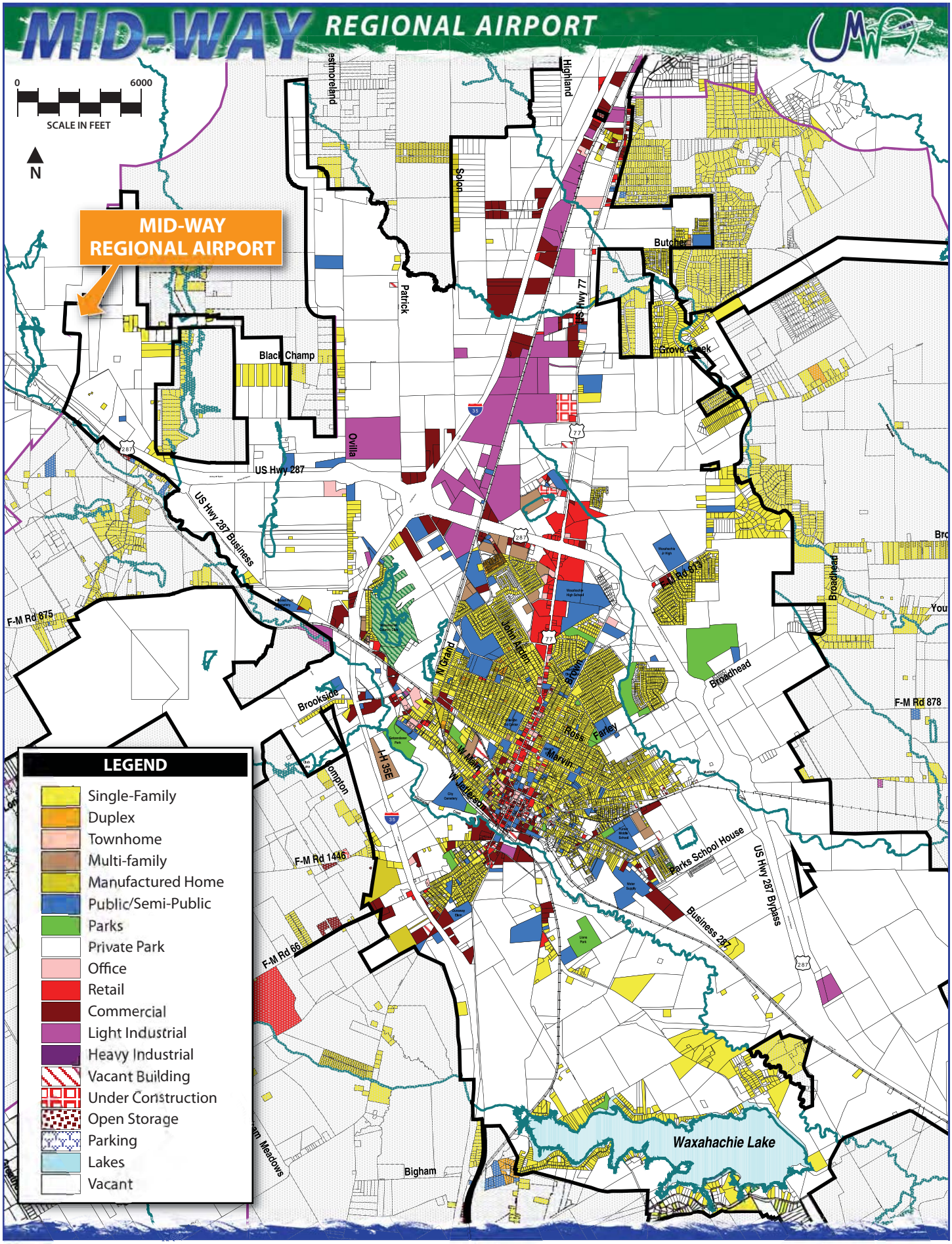
* - Denotes lowest approved cloud heights in feet AGL and visibility minimums in miles

Exhibit 1F: VICINITY AIRPORTS



Source: 2005 Land Use Map

Exhibit 1G: MIDLOTHIAN EXISTING LAND USE



Source: 2007 Comprehensive Plan

Exhibit 1H: WAXAHACHIE EXISTING LAND USE

a series of imaginary surfaces surrounding airports. Mid-Way Regional Airport has enacted an Airport Hazard Zoning Ordinance that adheres to and supports the height restriction guidelines set forth in 14 CFR Part 77. The ordinance, established in 2009, considers an ultimate runway length of 6,500 feet, which now exists.

ENVIRONMENTAL INVENTORY

Information regarding the environmental resources at Mid-Way Regional Airport has been taken from the following sources: Final Environmental Assessment (EA) for Proposed Improvements at Mid-Way Regional Airport (2006) and internet research, agency maps, and other existing literature. The purpose of the forthcoming inventory is to identify potential environmental sensitivities that might affect future improvements at the airport.

Air Quality

The United States 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) set by the EPA consist of primary and secondary standards for six criteria pollutants: ozone (O_3); carbon monoxide (CO); sulfur dioxide (SO_2); nitrogen oxide (NO); particulate matter (PM_{10}); and lead (Pb). The *National Environmental Policy Act* (NEPA), as implemented by the FAA (Orders 5050.4B, *NEPA Implementing Instructions for Airport Actions*, and 1050.1E, *Environmental Impacts: Policies and Procedures*) require various levels of review depending on whether or not the airport is located within an attainment area for air quality standards.

Mid-Way Regional Airport is located within Ellis County, which is classified as a serious nonattainment area for the 8-hour ozone standard.[1] Airports within nonattainment (or maintenance) areas must meet the requirements of the General Conformity Rule provided in the federal *Clean Air Act*. Airports in attainment areas are assumed to conform.

Coastal Resources

The Mid-Way Regional Airport is not located within any coastal areas and, therefore, is not within the jurisdiction of the Texas Coastal Management Program (CMP) boundaries. The airport is located approximately 275 miles northwest of the closest coastal area, which is near Galveston, Texas.

Department of Transportation Act: Section 4(f)

Section 4(f) of the *Department of Transportation Act of 1966*, as amended, protects publicly owned lands, including public parks, recreation areas, wildlife and waterfowl refuges, and significant historical sites, from development if there are any feasible and prudent alternatives. Even if there is no physical taking of such lands, adverse impacts and land use incompatibilities are to be avoided.

The closest publicly owned Section 4(f) lands to Mid-Way Regional Airport are public parks and recreational areas located in Waxahachie, approximately five miles to the southeast. According to the Texas Parks and Wildlife Department

website, there are no wildlife management areas, wildlife or waterfowl refuges, or State parks located within Ellis County.[2] Based on the National Register of Historic Places (NRHP), the nearest listed historic sites are also located within Waxahachie.[3]

Farmlands

According to the Soil Survey website of the Natural Resources Conservation Service (NRCS), soils on airport property are primarily Stephen silty clay, Eddy gravelly clay loam, and Eddy soils.[4] Other soil types on the airport are Austin and Frio silty clays. Only the Austin silty clay, 1 to 3 percent, is classified as prime farmland. This soil type occurs on airport property in three small locations along Rex Odom Drive and north of the airport along 19th Avenue.

Fish, Wildlife, and Plants

There are three federally listed endangered birds and one endangered mammal listed for Ellis County based on the Texas Parks and Wildlife Department's (TPWD) *Annotated County Lists of Rare Species*.[5] The following species are listed as endangered: golden-cheeked warbler (*Setophaga chrysoparia*), interior least tern (*Sterna antillarnum athalossos*), whooping crane (*Grus americana*), and red wolf (*Canis rufus*). Sprague's pipet (*Anthus* spragueii) is a candidate for listing by the federal government; however, only those species actually listed are protected under the federal *Endangered Species Act* (ESA).

Additional species are listed by the State of Texas as threatened in Ellis County and include several species of birds, mollusks, and one reptile. The Texas Department of Transportation defines protected species to include all species listed by the United States Fish and Wildlife Service (USFWS) as threatened or endangered, species that have been proposed for listing or are candidates for listing by the USFWS, all species listed as threatened or endangered by the TPWD, and all species protected by the *Migratory Bird Treaty Act* (MBTA). In general, the MBTA can be said to protect all native North American birds (FAA 2006); birds protected under the MBTA may nest, winter, or migrate throughout the area. Birds observed in the project area and protected by the MBTA include, but are not limited to, the mourning dove, eastern meadowlark, savannah sparrow, and white-crowned sparrow.

Table 1H summarizes the information available for federal and state listed species as of August 17, 2011, according to the TPWD website. As can be seen in the table, many species of migratory birds may be present at certain times of the year, including those protected by the ESA and the MBTA. Therefore, nesting surveys will be necessary to ascertain the potential for impacts to sensitive and protected species as development projects are proposed at the airport. Contact should be made directly to the USFWS prior to any Section 7 consultation pursuant to the ESA to receive the most up-to-date information regarding federally listed species.

The airport is located within the Northern Blackland Prairie ecoregion of Texas, which is characterized by fine, clayey soils and primarily supports tall grassland. However, vegetation in the proximity of the airport includes pasture vegetation and cropland, fencerow vegetation, and woodland as well. Much of airport property is regularly mowed with fence row

vegetation occurring in a single line of trees along most of the fences in the area.

Woodland areas on the western side of the airport include hackberry, Ashe juniper, and honey-locust trees and are associated with unnamed drainage tributaries of North Prong Creek to the west. Woodland areas located in the southeast corner of the airport may or may not include similar vegetation. Soils in these woodland areas are classified as broken alluvial soils by the NRCS.

TABLE 1H
Protected Species that may Potentially Occur in Ellis County

Species	Listing	Potential to Occur
Golden-cheeked warbler	Federally and state endangered	Unknown; species nests in juniper - oak woodland
Interior least tern	Federally and state endangered	Not expected to occur regularly - Migratory
Whooping crane	Federally and state endangered	Not expected to occur regularly - Migratory
Red wolf	Federally and state endangered	Not expected to occur because it is known to be extirpated from the region.
Sprague's pipit	Federal candidate	Not expected to occur regularly - Migratory
American peregrine falcon	State threatened	Not expected to occur regularly - Migratory
Peregrine falcon	State threatened	Not expected to occur regularly - Migratory
Bald eagle	State threatened	Not expected to occur regularly - Migratory
White-faced ibis	State threatened	Not expected to occur regularly - Migratory
Wood stork	State threatened	Not expected to occur regularly - Migratory
Louisiana pigtoe	State threatened	Not expected to occur due to lack of habitat on airport property. Needs year-round water source.
Texas heelsplitter	State threatened	Not expected to occur due to lack of habitat on airport property. Needs year-round water source.
Texas pigtoe	State threatened	Not expected to occur due to lack of habitat on airport property. Needs year-round water source.
Alligator snapping turtle	State threatened	Not expected to occur due to lack of habitat on airport property. Needs year-round water source.

Source: Texas Parks and Wildlife Department (TPWD), *Annotated County Lists of Rare Species*. Available at: http://gis2.tpwd.state.tx.us/ReportServer$GIS_EPASDE_SQL/Pages/ReportViewer.aspx?%2fReport+Project2%2fReport5&rs:Command=Render&county=Ellis, accessed on October 10, 2011.

Floodplains

The Federal Emergency Management Agency's (FEMA) Flood Insurance Rate Maps were consulted to determine potential flooding issues related to Mid-Way Regional Airport. Most of the airport is designated as Zone X on the FEMA floodplain maps (Map ID #s 48139C0090D).[6] Zone X identifies areas determined to be outside of the 500-year floodplain. However, the southeast corner of the Runway 36 runway protection zone (RPZ) is within the 100-year floodplain of a tributary

to Waxahachie Creek. The 100-year floodplain of North Prong Creek is located approximately ½-mile to the west of the airport terminal building. (See the discussion on Water Quality/Wetlands/Waters of the United States for more information on area-wide drainage.)

Hazardous Materials and Waste

According to the EPA's EJView online tool, there is one site at the airport that currently reports to the EPA as a Resource Conservation and Recovery Act (RCRA) site. The closest Superfund site to the airport is approximately ten miles west of the airport off of Ward Street in the City of Midlothian.[7]

Historical, Architectural, Archeological and Cultural Resources

As discussed in the 2006 EA on proposed improvements at the airport, a cultural resources literature review completed as part of that study determined that the airport property has been previously surveyed for cultural resources. Two cultural resources sites were recorded at the airport; neither site exists today and neither site was eligible for listing on the NRHP. A third site was located adjacent to the airport on the east side, but no further information regarding its significance is available.

It should be noted, however, that an earlier cultural resources survey at the airport most likely corresponded to the airport's boundaries at the time of the survey. The airport boundaries have since been enlarged to include a runway extension and associated safety areas. Therefore, it is possible that portions of the airport have not yet been surveyed and previously unknown cultural resources may be present. If ground disturbance is planned for areas that have not been previously surveyed, additional cultural resource surveys would be necessary.

Three additional previously recorded sites occur within one mile of the airport. Two sites are located approximately ½-mile to the east, and one site is located approximately one mile east of the northeast corner of the airport boundaries. As discussed previously under Section 4(f) resources, there are no sites currently listed on the NRHP within a five-mile radius of the airport.

Water Quality/Wetlands/Waters of the United States

According to the NCRS Soil Survey, there are no hydric soils present on airport property.[8] Hydric soils are one indication that wetlands may be present. In addition, based on previous environmental inventories and assessments conducted at the airport, there are no known jurisdictional waterways or wetlands occurring within the airport boundaries (FAA 2006).

The U.S. Army Corps of Engineers (USACOE) regulates the discharge of dredged or fill materials into waters of the U.S., including wetlands under Section 404 of the *Clean Water Act*. Wetlands are defined in *Executive Order 11990, Protection of Wetlands*, as "those areas that are inundated by surface or groundwater with a frequency sufficient to support and under normal circumstances does or would support a prevalence of vegetation or aquatic life that requires saturated or sea-

sonably saturated soil conditions for growth and reproduction."

There are several ephemeral drainages that serve as tributaries located immediately west and southeast of the airport property line. Water quality at the airport is protected through the airport's National Pollutant Discharge Elimination System/Texas Pollutant Discharge Elimination System (NPDES/TPDES) permit. As a requirement of the permit, the airport has prepared a storm water pollution prevention plan (SWPPP) that addresses sources of potential pollution and identifies measures to minimize and control such contaminants.

Ellis County includes portions of four different watersheds. The airport is located in the Chambers Creek watershed (USGS Cataloging Unit: 12030109). According to the EPA for reporting year 2008, this watershed does not contain waters listed on the *Clean Water Act* Section 303(d) list of impaired waters.[9] The State of Texas has published a draft list of impaired waters for 2010. On this list, no waters of Chamber Creek or its tributaries were listed.[10]

Wild and Scenic Rivers

There are no Wild or Scenic Rivers, as designated by the *Wild and Scenic Rivers Act*, as amended, in the vicinity of Mid-Way Regional Airport. The only Wild or Scenic River designation in Texas is the Rio Grande, located along the southwestern border of the State.[11]

SOCIOECONOMIC PROFILE

Socioeconomic characteristics are collected and examined to derive an understanding of the dynamics of growth within the vicinity of Mid-Way Regional Airport. This information is important in determining aviation demand level requirements, as most general aviation demand can be directly related to the socioeconomic condition of the area. Statistical analysis of population, employment, and income trends can define the economic strength of the region and the ability of the region to sustain a strong economic base over an extended period of time.

Table 1J presents historical and forecast population for the Cities of Midlothian and Waxahachie, Ellis County, and the State of Texas. The area surrounding Mid-Way Regional Airport has experienced strong growth in population since 1990, with the City of Midlothian leading the way at an unprecedented 6.48 percent average annual growth rate (AAGR). The City of Waxahachie and Ellis County have also accounted for strong AAGRs, at 2.47 percent and 3.50 percent, respectively. As a point of comparison, the population for the State of Texas grew at 1.99 percent annually. Forecast population trends through the year 2030 continue to show positive growth, although at a slower rate when compared to the previous 20 years.

Historical and forecast employment is presented in **Table 1K.** Similar to population statistics, total employment in the area has been strong since 1990, with Ellis County growing at 2.75 annually. Although the recent downturn in the economy has affected the employment base, Ellis County continues to sustain an economy that provides a variety of employment options serving multiple industries. Future employment projections indicate that Ellis County's employment base will grow similar to that of the State of Texas.

TABLE 1J
Historical and Forecast Population

Year	City of Midlothian	City of Waxahachie	Ellis County	State of Texas
Historical				
1990	5,141	18,168	85,167	16,986,510
2000	7,480	21,426	111,360	20,944,937
2010	18,037	29,621	169,514	25,213,445
AAGR (1990-2010)	6.48%	2.47%	3.50%	1.99%
Forecast				
2020	33,000	39,000	233,654	29,650,388
2030	45,000	46,342	293,665	33,712,020
AAGR (2010-2030)	4.68%	2.26%	2.79%	1.46%

AAGR - Average Annual Growth Rate

Source: North Central Texas Council of Governments; Texas Water Development Board

Per capita personal income (PCPI) for Ellis County and the State of Texas is also shown in **Table 1K**. PCPI is determined by dividing total income by population. In order for PCPI to grow, income must outpace population growth. Ellis County has experienced an AAGR of over one percent since 1990, which is slightly lower than the state average. Forecast projections indicate a slight increase in PCPI annual growth rates for Ellis County during the next 20 years.

TABLE 1K
Historical and Forecast Employment and Per Capita Income

	Historical				Forecast		
	1990	2000	2010	AAGR (1990-2010)	2020	2030	AAGR (2010-2030)
Employment							
Ellis County	33,845	46,596	58,178	2.75%	67,780	77,823	1.47%
State of Texas	9,242,902	12,151,380	14,508,220	2.28%	17,011,000	19,646,190	1.53%
Per Capita Income							
Ellis County	$21,246	$29,468	$27,369	1.27%	$31,108	$35,676	1.33%
State of Texas	$23,924	$31,750	$32,559	1.55%	$36,797	$42,127	1.30%

AAGR - Average Annual Growth Rate

Source: Texas Workforce Commission; Woods & Poole Complete Economic and Demographic Data (2011)

DOCUMENT SOURCES

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 airport staff contributed to the inventory effort.

Airport / Facility Directory, South Central U.S., U.S. Department of Transportation, Federal Aviation Administration, National Aeronautical Charting Office, October 2011.

Dallas / Fort Worth Aeronautical Chart, U.S. Department of Transportation, Federal Aviation Administration, National Aeronautical Charting Office, October 2011.

U.S. Terminal Procedures, South Central, U.S. Department of Transportation, Federal Aviation Administration, National Aeronautical Charting Office, October 2011.

National Plan of Integrated Airport Systems (NPIAS) 2011-2015, U.S. Department of Transportation, Federal Aviation Administration, September 2010.

Texas Airport System Plan Update 2010, Texas Department of Transportation, March 2010.

Final Environmental Assessment for Proposed Improvements at Mid-Way Regional Airport, August 2006.

FAA Form 5010-1, *Airport Master Record*.

The Complete Economic and Demographic Data Source, 2011, Woods & Poole Economics.

City of Midlothian, TX.

City of Waxahachie, TX.

North Central Texas Council of Governments.

Texas Water Development Board.

Texas Workforce Commission.

Endnotes:

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[2] www.tpwd.state.tx.us/landwater/, accessed on October 10, 2011
[3] http://www.nationalregisterofhistoricplaces.com/tx/Ellis/districts.html, accessed on October 11, 2011
[4] http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx, accessed on October 11, 2011
[5] http://gis2.tpwd.state.tx.us/ReportServer$GIS_EPASDE_SQL/Pages/ReportViewer.aspx?%2fReport+Project2%2fReport5&rs:Command=Render&county=Ellis, accessed on October 10, 2011
[6] http://msc.fema.gov/webapp/wcs/stores/servlet/FemaWelcomeView?storeId=10001&catalogId=10001&langId=-1, accessed on October 12, 2011
[7] http://epamap14.epa.gov/ejmap/ejmap.aspx?wherestr=131%20Airport%20Drive%2C%20Midlothian%2C%20Texas, accessed on October 13, 2011
[8] http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx, accessed on October 11, 2011
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[10] http://m.tceq.texas.gov/assets/public/compliance/monops/water/10twqi/2010_303d.pdf, accessed on October 13, 2011
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Chapter Two

FACILITY REQUIREMENTS

Chapter Two

FACILITY REQUIREMENTS

To properly plan for the future of Mid-Way Regional Airport, it is necessary to translate potential aviation demand into specific types and quantities of facilities that can adequately serve this demand. This chapter uses the results of an updated set of aviation demand forecasts for Mid-Way Regional Airport, as well as established planning criteria, to determine the airfield (i.e., runway, 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 and outline what new facilities may be needed and when they may be needed to accommodate forecast demand. Having established these facility requirements, alternatives for providing these facilities will be evaluated in Chapter Three to determine the most practical, cost-effective, and efficient direction for future development.

AIRPORT FORECASTS

An updated set of aviation demand forecasts for Mid-Way Regional Airport has been established to include based aircraft, fleet mix, annual operations, and peaking characteristics over the next five years. With this information, specific components of the airside and landside system can be evaluated to determine their capacity to accommodate future demand.

BASED AIRCRAFT

As discussed in Chapter One, airport records indicate that there are 87 aircraft currently based at the airport. Future based aircraft at Mid-Way Regional Airport will depend on several factors, in-

cluding the regional economic conditions, available airport facilities, fuel costs, competing airports, and other socioeconomic factors. Nationally, economic conditions for the last several years have been poor; however, economic conditions in the state of Texas have remained strong. It is assumed that a reasonably stable and growing economy will emerge in the short term and additional development of airport facilities will be necessary to accommodate aviation demand. Competing airports in the region will also play a role in deciding demand; however, Mid-Way Regional Airport should fare well in this competition as it is served by a 6,500-foot runway and has the capability of expanding to meet future demand.

The Federal Aviation Administration's (FAA) *Terminal Area Forecast (*TAF) projection indicates that there are currently 91 based aircraft at Mid-Way Regional Airport. TAF projections include based aircraft increasing to 93 in the next five years and then holding steady at 95 for the next 20 years.

Given the airport's location in proximity to the Dallas/Fort Worth Metroplex, the facilities it has to offer, and projected growth in socioeconomic indicators as presented in Chapter One, it can be assumed that based aircraft for Mid-Way Regional could grow at a higher rate than forecasted in the FAA TAF. Furthermore, the airport has a hangar waiting list of approximately 20 aircraft. If more hangars are constructed at the airport, there would be little difficulty in filling the hangars.

The TAF does not adequately factor local conditions for general aviation airports. For example, most areas in the country are emerging from a significant economic downturn. This is not the case for Texas, and specifically, the Midlothian-Waxahachie region. It is clear from the hangar waiting list that pent up demand already exists. As southwardly growth from the Metroplex continues, additional aviation demand will pressure aviation facilities at Mid-Way Regional Airport. For this reason, the TAF forecast is not considered reasonable.

The scope of this study did not include the development of new detailed aviation demand forecasts; however, a generalized based aircraft projection has been made. The projection considers national and regional aviation trends as well as the forecasts prepared in the previous master plan study. For purposes of this study, based aircraft were projected to grow by 4.8 percent annually over the next five years. As such, the selected based aircraft forecast for this study considers 110 aircraft through the short term planning period.

BASED AIRCRAFT FLEET MIX

Knowing the aircraft fleet mix expected to utilize Mid-Way Regional Airport is necessary to properly plan for facilities that will best serve the level of activity and the type of activities occurring at the airport. As previously discussed in Chapter One, the existing based aircraft fleet mix is comprised of 62 single engine piston aircraft, 13 multi-engine piston aircraft, four jets, one helicopter, and seven gliders.

The national trend is toward a larger percentage of sophisticated turboprop aircraft, jets, 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. The fleet mix for each based aircraft category at the airport has been de-

termined by comparison with national projections and consideration of local conditions.

ANNUAL OPERATIONS

General aviation operations are classified as either local or itinerant. A local operation is a take-off 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.

Due to the absence of an airport traffic control tower (ATCT), actual operational counts are not available for Mid-Way Regional Airport. The FAA TAF estimates that the airport experiences 37,300 total annual operations. The TAF also utilizes this figure for its 20-year forecast number. While the TAF current estimate appears reasonable, the flat-line growth trend does not. A forecast increase in aircraft utilization and the number of general aviation hours flown nationally, along with projected growth in based aircraft, support future growth in annual operations at Mid-Way Regional Airport.

For the purposes of this study, current annual operations have been estimated at 37,300. Due to projected based aircraft growth and other national and regional aviation demand factors, the planning forecast for use in this study projects 46,500 annual operations for 2016, which equates to a 3.7 percent annual growth rate.

Currently, the FAA TAF is projecting local operations at 67 percent of overall operations. For the purposes of this study, the TAF local operation percentage is carried forward through the five-year planning horizon, resulting in 30,200 local operations and 16,300 itinerant operations for 2016.

PEAKING CHARACTERISTICS

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

- Peak Month – The calendar month when peak aircraft operations occur.
- Busy Day – The busy day of a typical week in the peak month.
- 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.
- Design Hour – The peak hour within the design day.

The peaking characteristics along with based aircraft, fleet mix, and annual operations forecasts to be utilized during this study are summarized in **Table 2A**.

TABLE 2A Short Term Planning Horizon Activity Summary Mid-Way Regional Airport	Base Year (2011)	Short Term (2016)
BASED AIRCRAFT		
Single Engine Piston	62	77
Multi-Engine Piston	13	14
Turboprop	0	3
Jet	4	7
Helicopters	1	2
Gliders	7	7
Total Based Aircraft	**87**	**110**
ANNUAL OPERATIONS		
Itinerant	12,300	16,300
Local	25,000	30,200
Total Operations	**37,300**	**46,500**
PEAK PERIOD CHARACTERISTICS		
Peak Month	4,849	6,045
Busy Day	226	282
Design Day	162	202
Design Hour	28	35
Source: Airport Records; FAA Terminal Area Forecast; Coffman Associates analysis		

TEXAS AIRPORT SYSTEM PLAN ROLE

The *Texas Airport System Plan: Update 2010* (TASP) classifies airports in the state by service level and role. The six classifications are:

- Commercial Service
- Reliever
- Business/Corporate
- Community Service
- Basic Service
- Heliport

Mid-Way Regional Airport is classified as a business/corporate airport in the TASP. A business/corporate airport is defined as a general aviation facility that provides access to turboprop and jet aircraft and is located where there is sufficient population or economic activity to support a moderate to high level of aircraft activity and provides capacity in metropolitan areas. A business/corporate airport is forecast to have 500 or more annual business/corporate aircraft operations within five years, or have two permanently based jets. These airports are generally located in a service area containing an average population of at least 10,000 people that generates approximately $100 million annually in local economic activity.

AIRPORT FUNCTION

In addition to the defined roles for Texas airports, the TASP further sub-divides airports into functional categories specifically related to the type of use that the airport is expected to accommodate. These functional categories and their definitions are included in **Table 2B**.

TABLE 2B

TASP Airport Functional Categories
Mid-Way Regional Airport

CATEGORY	TYPICAL ARC	FUNCTION
Access	A-I, B-I	Airports with minimal service.
Remote	A-I, B-I	Airports that support remote activities such as ranching, oil production, and medical access.
Agricultural	A-I, B-I	Airports that serve areas of intense agricultural production.
Special Use	A-I, B-I, B-II, C-II	Airports that are used for seasonal activities such as tourism, hunting, or other recreational purposes.
Industrial	B-II through D-IV	Airports that support aviation-related businesses and/or adjacent to established industrial activity.
Multi-purpose	A-I, B-I, B-II, C-II	Airports that serve diversified operations.
Regional	B-II, C-II, C-III	Airports that support higher performance aircraft typically associated with charter or commuter service.
Reliever*	**B-II, C-II, C-III, D-II**	**Airports that increase access to general aviation in a community and relieves congestion at commercial service airports.**
Commercial	C-II through D-VI	Airports that receive scheduled passenger service with more than 2,500 annual enplanements.

* Airports in the TASP can serve the function of a reliever facility although not recognized or designated as such by the FAA

Source: Texas Airport System Plan: Update 2010

Mid-Way Regional Airport is assigned as a reliever facility within the TASP's functional classification of airports. As noted in the table, the TASP functionally identifies several airports as reliever facilities, although they have not been designated as such by the FAA. Mid-Way Regional Airport serves as an example as it is designated by the FAA as a general aviation facility. Nonetheless, its functional classification as a reliever facility in the TASP exemplifies the value that Mid-Way Regional Airport has within the state's airport system.

CRITICAL DESIGN AIRCRAFT

The design standards applied to an airport are based on the type of aircraft with the most demanding Airport Reference Code (ARC) expected to regularly use the facility. Regular use is defined by the Texas Department of Transportation – Aviation Division (TxDOT) as that aircraft or family of aircraft that will perform at least 250 annual operations at the airport.

The ARC, as described in FAA Advisory Circular (AC) 150/5300-13, *Airport Design*, is a coding system to help identify and determine the appropriate design criteria for an individual airport. The ARC correlates the design and layout of the airport to the operational and physical characteristics of the critical design aircraft. The identified critical design aircraft directly influences pertinent safety criteria such as runway length, runway width, separation distances, building setbacks, and the dimensions of required

safety areas surrounding the runway and taxiway system.

The ARC has two components. The first component, depicted by a letter, is the aircraft approach category, which relates to aircraft approach speed (operational characteristic). The second component, depicted by a Roman numeral, is the airplane design group (ADG), which relates to aircraft wingspan and tail height (physical characteristics). Generally, aircraft approach speed applies to runways and runway-related facilities, while airplane wingspan primarily relates to separation criteria involving taxiways, taxilanes, and landside facilities. **Table 2C** presents the ARC criteria.

TABLE 2C
Airport Reference Codes

Aircraft Approach Category		
Category	*Speed*	
A	< 91 Knots	
B	91- < 121 Knots	
C	121- < 141 Knots	
D	141- <166 Knots	
E	>= 166 Knots	
Airplane Design Group[1]		
Group	*Tail Height (ft)*	*Wingspan (ft)*
I	< 20	< 49
II	20- < 30	49- < 79
III	30- < 45	70- < 118
IV	45- < 60	118- < 171
V	60- < 66	171- < 214
VI	66- < 80	214- < 262

Source: FAA Advisory Circular (AC) 150/5300-13, *Airport Design*
[1] Utilize the most demanding category.

Exhibit 2A presents examples of ARC categories and their corresponding aircraft type. The FAA recommends designing airport functional elements to meet the requirements for the most demanding civilian ARC for that airport. In order to determine airfield design requirements, the critical aircraft and critical ARC must be determined and then appropriate airport design criteria can be applied.

According to the TASP, Mid-Way Regional Airport's current critical aircraft falls within ARC C-II. Of the 87 based aircraft at Mid-Way Regional Airport, the majority of these are single and multi-engine piston aircraft which fall within approach categories A and B and ADG I. There are also four jets based at the airport, including the Eclipse 500, Cessna 525B, Lear 60, and Lockheed T-33. These jets fall within approach categories A, B, and D and ADGs I and II. Furthermore, an examination of transient jet aircraft utilizing Mid-Way Regional Airport was made. Records indicate that a wide range of jets have utilized the airport in the recent past, ranging from smaller Cessna Citation jets in ARCs B-I and B-II up to the Challenger 600 and Gulfstream G150 in ARCs C-II and D-II, respectively.

The future critical design aircraft will continue to be driven by the types of business jets utilizing the airport. Runway 18-36 has been designed and constructed to ARC C-II standards. It should be planned to accommodate aircraft in ARC C/D-II through the short term planning horizon.

It is not necessary to design all airfield elements to the same ARC. The design of taxiway and apron areas should consider the wingspan requirements of the most demanding aircraft to operate within that specific functional area on the airport. General aviation transient apron and larger conventional hangar areas should consider ADG II requirements to accommodate the largest transient business jets such as the Cessna Citations, Challengers, and Gulfstream models. T-hangars and smaller box hangar areas should consider ADG I requirements as these commonly

MID-WAY REGIONAL AIRPORT

A-I

- Beech Baron 55
- **Beech Bonanza**
- Cessna 150
- Cessna 172
- Cessna Citation Mustang
- Eclipse 500
- Piper Archer
- Piper Seneca

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

B-II *less than 12.500 lbs.*

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

B-I, B-II *over 12,500 lbs.*

- Super King Air 350
- Beech 1900
- Jetstream 31
- Falcon 10, 20, 50
- Falcon 200, 900
- **Citation II**, III, IV, V
- Saab 340
- Embraer 120

A-III, B-III

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

C-I, D-I

- Beech 400
- **Lear 25, 31, 35, 45, 55, 60**
- Israeli Westwind
- HS 125-400, 700

C-II, D-II

- Cessna Citation III, VI, VIII, X
- **Gulfstream II, III, IV**
- Canadair 600
- ERJ-135, 140, 145
- CRJ-200/700
- Embraer Regional Jet
- Lockheed JetStar

C-III, D-III

- ERJ-170, 190
- CRJ 700, 900
- Boeing Business Jet
- **B 737-300 Series**
- MD-80, DC-9
- Fokker 70, 100
- A319, A320
- Gulfstream V
- Global Express

C-IV, D-IV

- **B-757**
- B-767
- C-130
- DC-8-70
- MD-11

D-V

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

Note: Aircraft pictured is identified in bold type.

Exhibit 2A: AIRPORT REFERENCE CODES

serve smaller single engine and multi-engine piston aircraft.

AIRPORT DESIGN STANDARDS

The TASP presents the following minimum design criteria for each defined role of general aviation airports in Texas. As already mentioned, Mid-Way Regional Airport is classified as a business/corporate airport. **Table 2D** presents the TASP design standards for each airport service role. The minimum design standards for Mid-Way Regional Airport are highlighted in bold text.

TABLE 2D
TASP Airport Design Standards
Mid-Way Regional Airport

Minimum Standard	Basic Service	Community Service I	Community Service II	Business/Corporate Reliever
Design Standard (ARC)	A-I/B-I	B-I/B-II	B-II	**B-II through D-IV**
Runway	Length: 95% of the small aircraft fleet	Length: 95% of the small aircraft fleet	Length: 100% of the small aircraft fleet	**Length: 75% at 60% useful load; Minimum of 5,000 feet**
	Width: 60 feet	Width: 60 feet	Width: 75 feet	**Width: 100 feet**
	Strength: 12,500 pounds SWL	Strength: 12,500 pounds SWL	Strength: 30,000 pounds SWL	**Strength: 30,000 pounds SWL**
Taxiway	Runway end turnarounds and access to apron	Runway end turnarounds and access to apron	Full or partial parallel taxiway	**Full-length parallel taxiway**
Apron	360 s.y. for itinerant and 300 s.y. for based	360 s.y. for itinerant and 300 s.y. for based	360 s.y. for itinerant and 300 s.y. for based	**360 s.y. for itinerant and 300 s.y. for based**
Approach	Visual	Non-precision, 1-mile visibility	Non-precision, 1-mile visibility	**GPS LPV, 3/4-mile visibility**
Lighting	MIRL and taxiway turnout lights	MIRL and taxiway turnout lights	MIRL, taxiway centerline or edge reflectors on taxiway to lighted runway	**MIRL, taxiway centerline striping or reflectors and turnout lights from the active runway**
Visual Aid	Wind indicator, segmented circle, beacon	Lighted wind indicator, segmented circle, rotating beacon, PAPI	Lighted wind indicator, segmented circle, rotating beacon, PAPI	**Lighted wind indicator, segmented circle, rotating beacon, PAPI, REIL**
Facilities/ Services	Location specific	AWOS, fuel, terminal building	AWOS, fuel, airfield signage, terminal building	**AWOS, fuel, lighted airfield signage, terminal building**
Design Aircraft	Single engine and light twin	Light twin and turboprop	Turboprop and light business jet	**Business jet**

MIRL - Medium Intensity Runway Lighting
PAPI - Precision Approach Path Indicator
REIL - Runway End Identification Light
LPV - Localizer Performance with Vertical Guidance
AWOS - Automated Weather Observation System
ARC- Airport Reference Code
GPS - Global Positioning System
SWL - Single Wheel Loading

Source: TxDOT-Aviation Division, *Policies and Standards* and *Texas Airport System Plan: Update 2010*

As can be seen from reviewing the table, Mid-Way Regional Airport meets the design criteria for business/corporate airports as defined in the TASP. Analysis later in this chapter will further define airside and landside standards and make recommendations for future development of the airport.

AIRFIELD CAPACITY

An airport's airfield capacity is expressed in terms of its annual service volume (ASV). ASV is a reasonable estimate of the maximum level of aircraft operations that can be accommodated in a year without incurring significant delay factors. As aircraft operations surpass the ASV, delay factors increase exponentially.

FACTORS AFFECTING ANNUAL SERVICE VOLUME

This analysis takes into account specific factors about the airfield in order to calculate the airport's ASV. These various factors are depicted on **Exhibit 2B**. The following describes input factors as they relate to Mid-Way Regional Airport and include airfield layout, weather conditions, aircraft mix, and operations.

- **Runway Configuration –** The existing airfield configuration consists of a single runway supported by a full-length parallel taxiway. Runway 18-36 is 6,500 feet long by 100 feet wide.

- **Runway Use –** Runway use in capacity conditions is controlled by wind and/or airspace conditions. For Mid-Way Regional Airport, the direction of take-offs and landings are generally determined by the speed and direction of the wind. Based upon information received from airport staff, Runway 18 is more favorably orientated for predominant winds and is utilized approximately 80 percent of the time.

- **Exit Taxiways –** Exit taxiways have a significant impact on airfield capacity since the number and location of exits directly determines the occupancy time of an aircraft on the runway. Based upon mix, only taxiways between 2,000 and 4,000 feet from the landing threshold can be counted in the exit rating. Runway 18-36 is credited with one exit in each direction.

- **Weather Conditions –** The airport operates under visual meteorological conditions (VMC) a large majority of the time. It is common for airports in the vicinity of the Dallas/Fort Worth Metroplex to experience VMC conditions over 90 percent of the time. Instrument meteorological conditions (IMC) are defined when cloud ceilings are between 500 and 1,000 feet and visibility minimums are between one and three miles. Poor visibility conditions (PVC) apply for minimums below 500 feet and one mile. IMC and PVC conditions are rare, occurring less than ten percent of the time at Mid-Way Regional Airport. For airports that experience higher percentages of IMC and PVC conditions, their ASV can be decreased due to the extended period of time an aircraft will remain in the flight pattern as it conducts an instrument approach procedure to the airport.

- **Aircraft Mix** – Aircraft mix for the capacity analysis is defined in terms of four aircraft classes. Classes A and B consist of small and medium-sized propeller and some jet aircraft, all

MID-WAY REGIONAL AIRPORT

AIRFIELD LAYOUT

Runway Configuration

Runway Use

Number of Exits

WEATHER CONDITIONS

VMC
Visual Meteorological Conditions

IMC
Instrument Meteorological Conditions

PVC
Poor Visibility Conditions

AIRCRAFT MIX

Category A & B Aircraft

Category C Aircraft

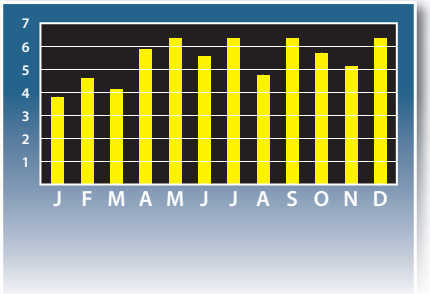
Category D Aircraft

OPERATIONS

Arrivals

Departures

Total Annual Operations



Touch-and-Go Operations

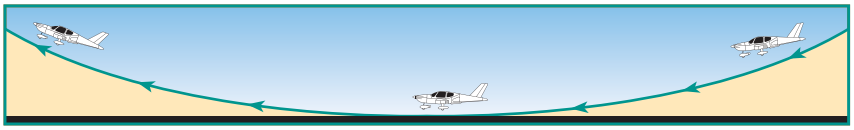


Exhibit 2B: AIRFIELD CAPACITY FACTORS

weighing 12,500 pounds or less. These aircraft are associated primarily with general aviation activity, but do include some air taxi, air cargo, and commuter aircraft. Class C consists of aircraft weighing between 12,500 pounds and 300,000 pounds. These aircraft include most business jets and some turboprop aircraft. Class D aircraft consists of large aircraft weighing more than 300,000 pounds. The airport does not experience operations by Class D aircraft. Class C operations are estimated to be less than five percent of total annual operations. The remainder is operations by Class A and B aircraft.

- **Percent Arrivals** – Percent arrivals generally follow the typical 50/50 percent split.

- **Touch-and-Go Activity** – According to the FAA TAF, current and projected local operations account for approximately 65 percent of total annual operations.

- **Peak Period Operations** – For the airfield capacity analysis, aver-age daily operations and average peak hour operations during the peak month are utilized. Typical operations activity is important in the calculation of an airport's ASV as "peak demand" levels occur sporadically. The peak periods used in the capacity analysis are representative of normal operational activity and can be exceeded at various times throughout the year.

CAPACITY ANALYSIS CONCLUSION

In accordance with FAA guidelines specified in FAA AC 150/5060-5, *Airport Capacity and Delay*, the ASV of a single runway configuration comparable to Mid-Way Regional Airport will range between 200,000 and 230,000 annual operations. The current operational level for the airport represents approximately 19 percent of the airfield's ASV, if the ASV is considered at the low end of the typical range of 200,000 annual operations. Through the short term planning period, total annual aircraft operations are expected to represent 23 percent of the airfield's ASV.

FAA Order 5090.3B, *Field Formulation of the National Plan of Integrated Airport Systems* (NPIAS), indicates that improvements for airfield capacity should be considered when operations reach 60 percent of the airfield's ASV. While no significant capacity improvements will be necessary, options to improve airfield efficiency will still be considered and evaluated in the next chapter.

AIRSIDE FACILITIES

Airside facilities are related to the arrival and departure of aircraft. The adequacy of existing airfield facilities at Mid-Way Regional Airport has been analyzed from a number of perspectives, including:

- Runways
- Safety Area Design Standards
- Taxiways
- Airfield Lighting, Marking, and Signage
- Navigational and Approach Aids

RUNWAYS

Runway conditions such as orientation, length, pavement strength, and width at Mid-Way Regional Airport were analyzed. From this information, requirements for

runway improvements were determined for the airport.

Runway Orientation

For the operational safety and efficiency of an airport, it is desirable for the primary runway to be orientated as closely as possible to the direction of the prevailing winds. 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 AC 150/5300-13, *Airport Design*, recommends that a crosswind runway should be made available when the primary runway orientation provides less than 95 percent wind coverage for specific crosswind conditions. The 95 percent wind coverage is computed on the basis of crosswinds not exceeding 10.5 knots for small aircraft weighing less than 12,500 pounds and from 13 to 20 knots for aircraft weighing over 12,500 pounds. Wind data specific to Mid-Way Regional Airport was obtained from the airport's automated weather observation system (AWOS-III) and is depicted on **Exhibit 2C**.

Based upon historical wind data, Runway 18-36 exceeds 95 percent for all crosswind components. Therefore, based on this analysis, the runway system at the airport is properly orientated and no additional runway orientations need to be planned.

Runway Length

Runway length is the most important consideration when evaluating the airside facility requirements for future aircraft serving Mid-Way Regional Airport. Runway length requirements are based upon five primary elements:

- Airport elevation
- Mean daily maximum temperature of the hottest month
- Runway gradient
- Critical aircraft expected to use the runway
- Stage length of the longest non-stop trip destination

Mid-Way Regional Airport recently had a 1,500-foot extension added to the north end of Runway 18-36. The existing length of 6,500 feet is adequate for the current mix of general aviation aircraft utilizing the airport. Forecast future demand through the next five years indicates that the airport should strive to accommodate all business jets up to and including those in ARC C/D-II. A runway length of 6,500 feet is capable of serving these aircraft for most operational conditions. Therefore, the existing length on Runway 18-36 should be maintained through the short term planning horizon of this study.

Runway Width

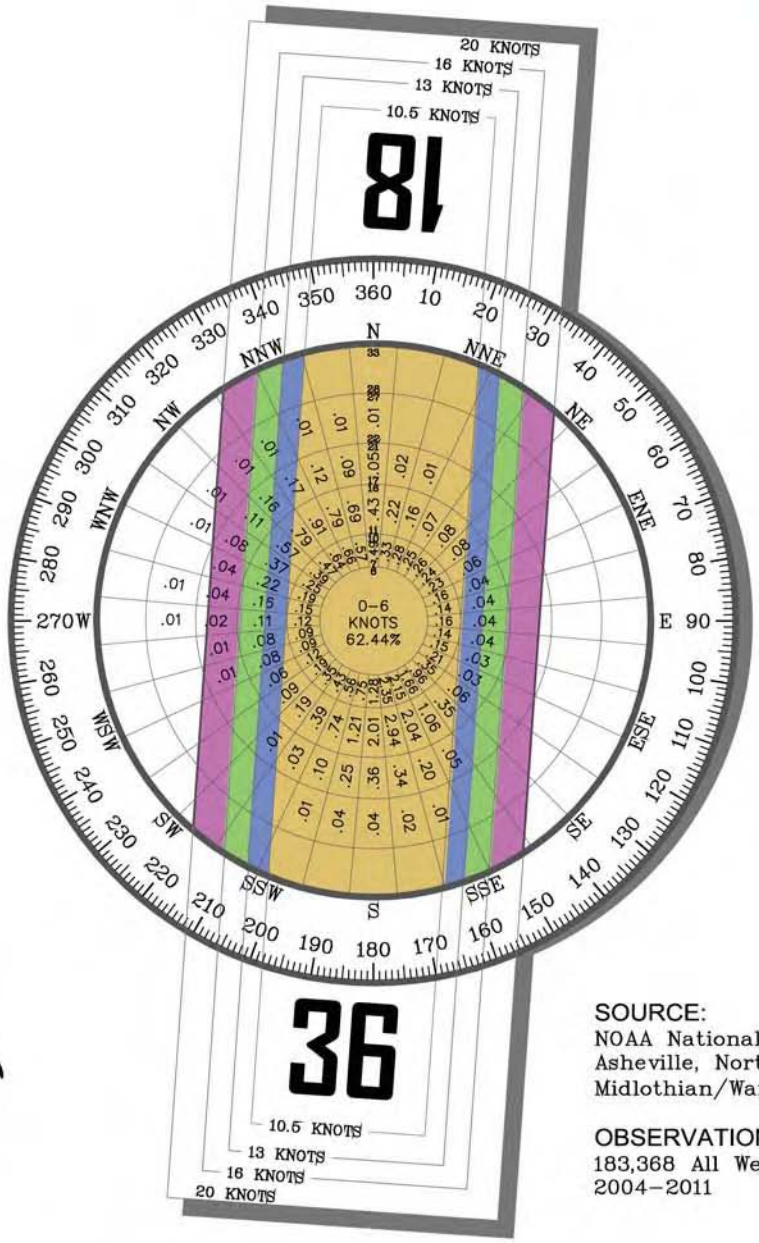
Runway 18-36 is currently 100 feet wide. FAA design standards call for a runway width of 100 feet to serve aircraft in ARC C/D-II. In addition, TxDOT standards call for a 100-foot-wide runway for business/corporate airports. As such, Runway 18-36 currently meets FAA and TxDOT criteria for runway width. This width should be maintained throughout the planning period.

Runway Strength

An important feature of airfield pavement is its ability to withstand repeated use by aircraft of significant weight. Following the business/corporate airport recommended design criteria in the TASP, the minimum pavement strength should be at

ALL WEATHER WIND COVERAGE

Runways	10.5 Knots	13 Knots	16 Knots	20 Knots
Runway 18–36	*97.35%*	*98.81%*	*99.69%*	*99.93%*



SOURCE:
NOAA National Climatic Center
Asheville, North Carolina
Midlothian/Waxahachie, Texas

OBSERVATIONS:
183,368 All Weather Observations
2004–2011

NORTH

Magnetic Declination
4° 0' East (November 2011)
Annual Rate of Change
00° 07' West (November 2011)

least 30,000 pounds single wheel loading (SWL). Although the published pavement strength of Runway 18-36 is 30,000 pounds, the airport engineer has indicated that the runway is rated at 90,000 pounds dual wheel loading (DWL).

It should be noted that the pavement strength rating is not the maximum weight limit allowable. Aircraft weighing more than the certified strength can operate on the runway on an infrequent basis. However, heavy aircraft operations can shorten the life span of airport pavements. The existing pavement strength of 90,000 pounds DWL on Runway 18-36 will adequately serve existing and future aircraft operations through the short term planning horizon.

Turf Runway

As a part of this Airport Development Plan, an evaluation will be made for the potential construction of a 3,000-foot unpaved (turf) runway at Mid-Way Regional Airport. Typically, a turf runway is constructed to primarily serve small aircraft needs.

As previously discussed, the airport is home to a fleet of gliders that conduct operations on a regular basis at the airport. In order for the gliders to become airborne, they are towed behind an engine-propelled aircraft (tow plane). Once at a desired altitude, the glider is separated from the tow plane at which time it can effectively glide in search of thermals, eventually returning to the airport. At Mid-Way Regional Airport, this process involves positioning a glider on Runway 18-36 and connecting it to a tow plane for takeoff. Upon landing and coming to a full stop on the runway, the glider is either repositioned to become airborne again or towed from the runway to an adjacent taxiway.

During the time in which the glider, tow plane, and required personnel are on the runway, the airport is effectively closed for other aircraft for take-off and landing operations. In order to provide a more efficient use of operations and increase the level of safety on the airfield, the potential construction of a turf runway at Mid-Way Regional Airport is considered feasible.

A turf runway can serve the majority of glider operations, thereby allowing the existing runway to serve powered aircraft operations.

In order to construct a 3,000-foot turf runway for small aircraft and glider operations, substantial work would be needed to improve an area that could accommodate such. Moreover, the runway would have to be parallel to and adequately separated (a minimum of 700 feet) from the existing runway (centerline to centerline). Furthermore, justification for the use of this runway would be needed in order to obtain federal and state grant funding assistance. Most parallel runways are typically justified for airfield capacity reasons. As previously outlined, Mid-Way Regional Airport will not require substantial airfield capacity improvements. The justification for the parallel turf runway would be for safety and efficiency.

Analysis in Chapter Three will present alternatives for the potential of a turf runway at Mid-Way Regional Airport. Several factors, including the runway's ARC and associated safety areas, will need to be considered in making a determination for its existence. In addition, the development potential on and adjacent to the airport will also need to be analyzed before recommending a turf runway.

SAFETY AREA DESIGN STANDARDS

The FAA has established several imaginary surfaces to protect aircraft operational areas and keep them free from obstructions or incompatible land uses that could affect an aircraft's safe operation, as well as protecting persons and property on the ground. These include the runway safety area (RSA), object free area (OFA), obstacle free zone (OFZ), and runway protection zone (RPZ).

The entire RSA, OFA, and OFZ should be under the direct control of the airport sponsor to ensure these areas remain free of obstacles and can be readily accessed by maintenance and emergency personnel. It is not required that the RPZ be under airport ownership, but it is strongly recommended. An alternative to outright ownership of the RPZ is the purchase of avigation easements (acquiring control of designated airspace within the RPZ) or having sufficient land use control measures in place which ensure that the RPZ remains free of incompatible development.

Dimensional standards for the various safety areas associated with the runways are a function of the ARC, as well as the approach visibility minimums. At Mid-Way Regional Airport, Runway 18-36 should be planned to meet design standards for ARC C/D-II and ¾-mile visibility minimums.

Runway Safety Area

The RSA is "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 an excursion from the runway." The RSA must be free from any obstructions and be graded and stabilized to accommodate the weight of the airport's critical aircraft.

The dimension of the RSA is dependent upon the critical aircraft at the airport. For ARC C/D-II, the RSA is 500 feet wide, centered on the runway, and extends 1,000 feet beyond both ends of the runway. The airport maintains adequate RSA and should continue maintaining the RSA in the future.

Object Free Area

The OFA is an area centered on the runway and taxiway centerlines, provided to enhance the safety of aircraft operations. Only those objects that need to be located in the OFA for air navigation or aircraft ground maneuvering purposes are allowed.

Of particular interest is the runway OFA, which is designed to ensure that the wings of an aircraft traversing the RSA will not impact obstructions outside the RSA. Its dimensions are also based on the airport's critical aircraft. For ARC C/D-II, the runway OFA is 800 feet wide (centered on the runway) and extends 1,000 feet beyond the ends of the runway. The OFA on Runway 18-36 is adequately maintained.

Obstacle Free Zone

An OFZ is a volume of airspace that is required to be clear of objects, except for frangible items required for navigation of aircraft. The OFZ for Runway 18-36 is 400 feet wide, centered along the runway, and extends 200 feet beyond the runway ends. OFZ standards are met on Runway 18-36.

Runway Protection Zone

The RPZ is defined as an area off the ends of the runway, designed to enhance the protection of people and property on the ground. The RPZ is trapezoidal in shape and centered about the extended runway centerline. The dimensions of an RPZ are a function of the runway ARC and approach visibility minimums. The RPZ is a two-dimensional space that primarily serves to identify an area where incompatible land uses should not be located. Land uses considered incompatible with the RPZ include any uses which attract groupings of people who occupy the space for long periods of time.

As previously discussed, the lowest existing instrument approach visibility minimums for Mid-Way Regional Airport are ¾-mile with 200-foot cloud ceilings on Runway 18. The corresponding RPZ dimension calls for a 1,000-foot inner width, extending outward 1,700 feet to a 1,510-foot outer width. For the not-lower-than-one-mile visibility minimums serving Runway 36, the existing RPZ has an inner width of 500 feet, overall length of 1,700 feet, and an outer width of 1,010 feet.

The airport currently maintains both RPZs on existing airport property owned in fee. In the future, should the approach minimums to Runway 36 be lowered to ¾-mile, the Runway 36 RPZ would increase in size similar to the existing Runway 18 dimensions and positive control of additional property would be needed south of the airport. The property could be acquired either through fee-simple acquisition or an avigation easement.

Runway 18-36
Design Standards Summary

Table 2E summarizes the design requirements for Runway 18-36 at Mid-Way Regional Airport according to associated ARC and approach minimums (where applicable). **Exhibit 2D** further depicts the safety standard design requirements. Presently, the airport meets all existing design requirements for RSA, OFA, OFZ, and RPZs. As previously discussed, improved visibility minimums to Runway 36 could necessitate property acquisition on the south side of the runway via fee-simple or avigation easement.

TABLE 2E
Runway Design Standards
Mid-Way Regional Airport

	Runway 18	Runway 36
Airport Reference Code	C/D-II	
Approach Visibility Minimums	3/4-mile	≥ 1 mile - Existing
Runway Safety Area		
Width (feet)	500	
Length Beyond Runway End (feet)	1,000	
Object Free Area		
Width (feet)	800	
Length Beyond Runway End (feet)	1,000	
Obstacle Free Zone		
Width (feet)	400	
Length Beyond Runway End (feet)	200	
Runway Protection Zone		
Inner Width (feet)	1,000	500
Outer Width (feet)	1,510	1,010
Length (feet)	1,700	1,700

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

Turf Runway Design Standards

As previously discussed, this study will assess the need to construct a 3,000-foot turf runway at the airport. The aforementioned FAA AC 150/5300-13, *Airport Design*, does not specifically call out design standards for turf runways; nonetheless, certain standards must be applied.

A future turf runway should be designed to ARC B-I design standards for aircraft weighing less than 12,500 pounds, in which the following design standards would apply.

- Runway length is determined by the type of aircraft. Because RSA and unpaved runways, by definition, are the same, the length is used to describe both.
- Runway width corresponds to RSA width, or 120 feet for ARC B-I aircraft weighing less than 12,500 pounds, because the RSA and unpaved runways are the same by definition.
- The object free area width is 250 feet (ARC B-I aircraft weighing less than 12,500 pounds) as centered on the runway, and length is the same as the unpaved runway length.
- The obstacle free zone length is the same as the unpaved runway length. The width is 250 feet, centered on the runway.
- The RPZs begin at the runway end.

Table 2F presents the design standards that would apply to a turf runway at Mid-Way Regional Airport.

TABLE 2F
Turf Runway Design Standards
Mid-Way Regional Airport

	Turf Runway
Design Standard	ARC B-1*
Approach Visibility Minimums	VFR
Runway Length (feet)	3,000
Runway Width (feet)	120
Runway Safety Area	
Width (feet)	120
Length Beyond Runway End (feet)	0
Object Free Area	
Width (feet)	250
Length Beyond Runway End (feet)	0
Obstacle Free Zone	
Width (feet)	250
Length Beyond Runway End (feet)	0
Runway Protection Zone	
Inner Width (feet)	250
Outer Width (feet)	450
Length (feet)	1,000

*Airplanes weighing less than 12,500 pounds
VFR - Visual Flight Rules

Source: FAA Advisory Circular 150/5300-13, *Airport Design*; Turf Runway Design Presentation by FAA

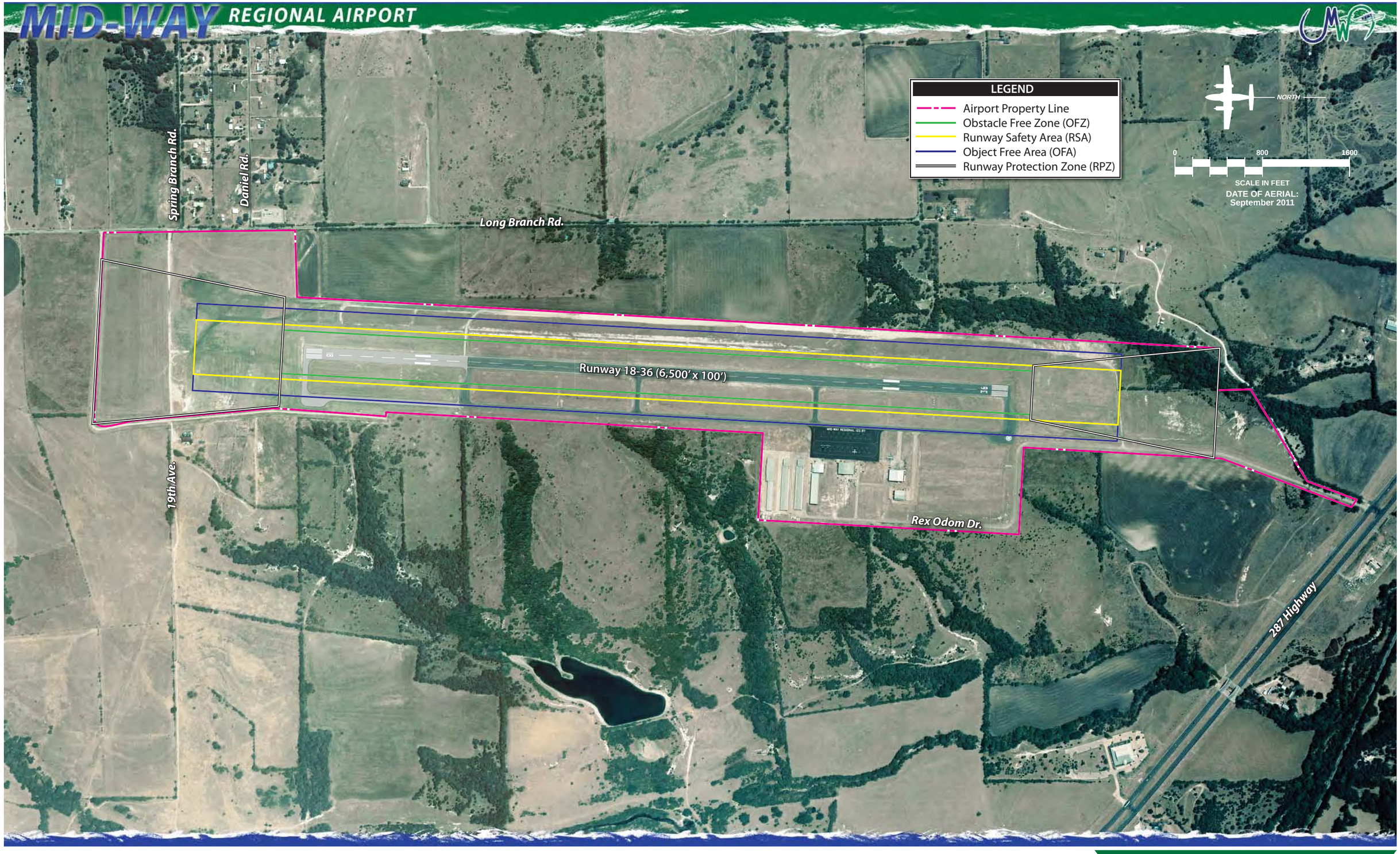


Exhibit 2D: EXISTING SAFETY AREAS

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. Design standards for separation between the runways and parallel taxiways are based upon the wingspan of the critical aircraft using the runway.

Runway 18-36 is served by a full-length parallel taxiway. The taxiway is located 400 feet west of the Runway 18-36 centerline. The runway-to-parallel taxiway separation meets FAA standards for ARC C/D-II aircraft with visibility minimums as low as ½-mile.

All taxiways located on the airfield are at least 40 feet wide and conform to FAA and TxDOT standards for ARC C/D-II taxiway width. Taxiways A, B, C, and D are entrance/exit taxiways which connect the runway and parallel taxiway. No additional connecting taxiways are needed on the west side of the runway. Future development east of Runway 18-36 will dictate the need for potential taxiways serving this area.

Hold aprons are available at each end of Runway 18-36. A third hold apron is also located adjacent to the north side of Taxiway B. These areas allow aircraft to prepare for departure off the taxiway surface. This allows aircraft ready to depart to bypass the aircraft in the holding apron. These holding aprons should be maintained through the planning period. Taxiway requirements are summarized in **Table 2G**.

TABLE 2G
Taxiway Design Standards
Mid-Way Regional Airport

	Existing	Short Term ADG II
Taxiway Width (feet)	40	35
Taxiway Safety Area Width (feet)	79	79
Taxiway Object Free Area Width (feet)	131	131
Taxiway Centerline to:		
Fixed or Moveable Object (feet)	65.5	65.5
Runway Centerline to:		
Parallel Taxiway Centerline (feet)	400	300
Holding Positions (feet)	250	258*

* If critical design aircraft transitions to approach category D.

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

AIRFIELD LIGHTING, MARKING, AND SIGNAGE

There are a number of lighting and pavement marking aids serving pilots using the airport. These aids assist pilots in locating the airport and runway at night or in poor visibility conditions. They also 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. The existing beacon should be maintained through the planning period.

Runway and Taxiway Lighting

Runway identification lighting provides the pilot with a rapid and positive identification of the runway and its alignment. Runway 18-36 is served by medium intensity runway lighting (MIRL). This system should be maintained through the planning period. No lighting should be planned for a future turf runway.

Taxiways at Mid-Way Regional Airport are equipped with centerline and edge reflectors. This system should be maintained through the short term.

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 the runway and taxiways at Mid-Way Regional Airport. All of these signs should be maintained throughout the planning period.

Pavement Markings

Each end of Runway 18-36 currently has non-precision markings. Runway markings should be designed according to the type of instrument approach and visibility minimums available on the runway. Given that not-lower-than ¾-mile visibility minimums are offered with the global positioning system (GPS) localizer performance with vertical guidance (LPV) approaches serving Runway 18-36, non-precision markings should be adequate for each runway end during the short term planning horizon.

The hold position markings associated with Runway 18-36 at Mid-Way Regional Airport are set at 250 feet from the runway centerline, which conform to ARC C-II design standards. If the airport transitions to ARC D-II design, the hold lines would need to be shifted one foot away from the runway for every 100 feet above mean sea level (MSL) the airport is situated. As currently pointed out, the airport is at 727 feet MSL. Thus, for ARC D-II design, the holdlines would need to be shifted to be 258 feet from runway centerline.

NAVIGATIONAL AND APPROACH AIDS

Electronic and visual guidance to arriving aircraft enhance the safety and capacity of the airfield. Such facilities are vital to the success of the airport and provide additional safety to passengers using the air transportation system. While instrument approach aids are especially helpful during poor weather, they are often used by pilots conducting flight training and operating larger jet aircraft when visibility is good.

Instrument Approach Procedures

The airport currently has excellent instrument approach capability. As previously discussed, the GPS approach serving Runway 18 offers LPV that provides for 200-foot cloud ceilings and ¾-mile visibility minimums. The LPV approach to Runway 36 provides for 250-foot cloud ceilings and one mile visibility minimums. Facility planning through the short term should maintain these approaches; however, in the event that visibility minimums serving Runway 36 are lowered to ¾-mile, the RPZ would further expand in size and necessitate the need for positive control of property south of the runway. No instrument approaches will be considered for the turf runway.

Visual Approach Aids

A four-box precision approach path indicator (PAPI-4) is installed on the approach end of each runway. PAPI lights provide pilots with visual descent information to the runway touchdown zone. The PAPIs should be maintained through the planning period.

Although not required, it is recommended that an approach lighting system be installed on Runway 18 given that it supports a lower-than-one-mile visibility minimum approach. Typically, a medium intensity approach lighting system (MALS) is installed at airports for the purpose of supporting an instrument approach with visibility minimums as low as ¾-mile, which currently exists on Runway 18. As such, facility planning will consider MALS extending north of the approach end of Runway 18.

Runway end identification lights (REILs) are flashing lights that facilitate identification of the runway end. REILs should be installed on runway ends that are not served by a more sophisticated approach lighting system. As a result, REILs should be planned for Runway 36 to compliment the REILs already serving Runway 18. A summary of the airside facilities previously discussed is presented on **Exhibit 2E**.

LANDSIDE FACILITIES

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 general aviation needs such as:

- General Aviation Terminal Services
- Aircraft Hangars
- Aircraft Parking Aprons
- Support Facilities

GENERAL AVIATION TERMINAL SERVICES

The general aviation facilities at the airport are often the first impression of the community that corporate officials and other visitors will encounter. General aviation terminal facilities at an airport provide space for passenger waiting, pilots' lounge, pilot 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 (FBOs) and other specialty operators which provide these functions and services. At Mid-Way Regional Airport, general aviation terminal services are provided by a terminal building that houses airport administration as well as space for FBO operations. As mentioned in Chapter One, a major renovation project is currently underway that, when completed, will double the terminal building's available space from approximately 4,000 to 8,000 square feet.

The methodology used in estimating general aviation terminal facility needs was based upon the number of airport users expected to utilize general aviation facilities during the design hour. Space requirements for terminal facilities were based on providing 150 square feet per design hour itinerant passenger. **Table 2H** outlines the space requirements for

general aviation terminal services at Mid-Way Regional Airport during the next five years. As shown in the table, up to 4,000 square feet of space could be needed in the short term for general aviation passengers. Given the size of the terminal building upon completion of the renovation project, there should be adequate terminal facility area provided during the foreseeable future.

TABLE 2H
General Aviation Terminal Area Facilities
Mid-Way Regional Airport

	Currently Available	Short Term Need
General Aviation Services Facility Area (s.f.)	8,000*	4,000
Design Hour Passengers	18	27
Auto Parking Spaces	38**	125

*Space available after terminal renovation
**Additional unmarked parking spaces are provided

Source: Coffman Associates analysis

General aviation vehicular parking demands have also been determined for Mid-Way Regional 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, FBO, and specialty aviation operator demands were calculated by multiplying design hour itinerant passengers by 2.0 for current conditions and increasing to 2.2 for the short term to account for projected increases in corporate aircraft operations.

The parking requirements of based aircraft owners should also be considered. Although some owners prefer to park their vehicles in their hangar, 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. Utilizing this methodology, parking requirements for general aviation activity call for 125 spaces through the short term planning horizon. There are 38 marked automobile parking spaces and additional unmarked parking areas at Mid-Way Regional Airport currently serving airport users. Automobile parking requirements are summarized in **Table 2H**.

AIRCRAFT 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 versus outside tiedowns.

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 devel-

MID-WAY REGIONAL AIRPORT

AVAILABLE		SHORT TERM NEED
RUNWAYS		
Runway 18-36 6,500' x 100' 90,000 lbs. DWL 3/4-mile visibility (Rwy 18) 1-mile visibility (Rwy 36) ARC C/D-II		**Runway 18-36** Same **Turf Runway** 3,000' x 120' Visual Approaches ARC B-I (small airplanes)
TAXIWAYS		
Parallel Taxiway 400 runway/taxiway separation 5 exits 40' wide		Additional exits dependant upon east side development
NAVIGATIONAL APPROACH AIDS		
RNAV GPS LPV (Rwy 18-36) AWOS-III Lighted Wind Cone Segmented Circle PAPI-4 (Rwy 18-36) REILs (Rwy 18)		MALS (Rwy 18) REILS (Rwy 36)
LIGHTING, MARKING, SIGNAGE		
Airport Beacon MIRL Taxiway centerline & edge reflectors Pilot-controlled lighting Hold Positions - 250' Non-Precision Markings (Rwy 18-36)		Hold Positions - 258'*

ARC: Airport Reference Code
AWOS: Automated Weather Observation System
DWL: Dual Wheel Loading
GPS: Global Positioning System
LPV: Localizer Performance with Vertical Guidance
MALS: Medium Intensity Approach Lighting System
MIRL: Medium Intensity Runway Lightning
PAPI: Precision Approach Path Indicator
REIL: Runway End Identification Light
RNAV: Area Navigation

* If critical design aircraft transitions to approach category D

Exhibit 2E: AIRSIDE FACILITY RECOMMENDATIONS

opment should be based upon actual demand trends and financial investment conditions.

While most aircraft owners prefer enclosed aircraft storage, a number of based aircraft may still tiedown 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.

Hangar types vary in size and function. T-hangars are popular with aircraft owners having only one small aircraft. These hangars provide 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. Box 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. Future hangar use has been determined based on current usage and industry standards.

Currently, there are 48 T-hangar positions available on the airport. For these hangars, a planning standard of 1,200 square feet per based aircraft will be used to determine future requirements.

As the trend toward more sophisticated aircraft continues throughout the planning period, it is important to determine the need for larger hangars as well. For box hangars, a planning standard of 2,000 square feet per aircraft was utilized, and for conventional hangars, a planning standard of 2,500 square feet per aircraft was utilized.

Since portions of box and conventional hangars are also used for aircraft maintenance and servicing, requirements for maintenance/service hangar area were estimated using a planning standard of 175 square feet per based aircraft. Future hangar requirements for the airport are summarized in **Table 2J**.

TABLE 2J
Aircraft Storage Hangar Requirements
Mid-Way Regional Airport

	Currently Available	Short Term Need
Total Based	87	110
T-hangar Positions	48	63
Box Hangar Positions	27	34
Conventional Hangar Positions	10	10
Hangar Area Requirements		
T-Hangar Area (s.f.)	54,700	75,100
Executive Hangar Area (s.f.)	54,300	68,800
Conventional Hangar Area (s.f.)	23,500	24,500
Maintenance Area (s.f.)		16,500
Total Hangar Storage Area (s.f.)	**132,500***	**184,900**

*Includes total hangar/maintenance area currently at airport

Source: Airport Records; Coffman Associates analysis

The analysis shows that there is currently a need for approximately 52,400 square feet of hangar storage space through the short term planning horizon. It is estimated that there will be a need for 15 additional T-hangar positions and approximately 20,400 square feet of space. During the next five years, there is a forecast need for an additional 14,500 square feet of box hangar space. Conventional hangar space needs are forecast to only slightly increase during the short term.

It should be noted that hangar requirements are generalized in nature and based on the airport forecasts for the next five years. The actual need for hangar space will depend on the desires of future users. For example, some hangars may be utilized for non-aircraft storage; yet from a planning standpoint, they have an aircraft storage capacity. Therefore, the needs of an individual user may differ from the calculated space necessary.

AIRCRAFT PARKING APRONS

The aircraft parking apron is an expanse of paved area intended for aircraft parking and circulation. Typically, a main apron is centrally located near the airside entry point, such as a terminal building. Ideally, the apron should be large enough to accommodate transient airport users as well as a portion of locally based aircraft. Smaller aprons are also commonly available adjacent to other hangars around the airport. The apron layout at Mid-Way Regional Airport follows this typical pattern.

The total general aviation apron area at Mid-Way Regional Airport is approximately 20,100 square yards and includes 42 marked tiedowns for smaller general aviation aircraft. FAA AC 150/5300-13, *Airport Design*, suggests a methodology by which transient apron requirements can be determined from knowledge of busy-day operations. At Mid-Way Regional Airport, the number of itinerant spaces required was estimated at 13 percent of the busy-day itinerant operations. A planning criterion of 800 square yards was used for single and multi-engine itinerant aircraft, while a planning criterion of 1,600 square yards was used to determine the area for transient jet aircraft. Locally based tiedowns typically will be utilized by smaller single engine aircraft; thus, a planning standard of 360 square yards per position is utilized. As shown in **Table 2K**, additional apron space may be needed during the planning period of this study, especially in the form of dedicated aircraft parking for larger turboprop and jet aircraft. **Exhibit 2F** further details landside facility recommendations previously discussed.

TABLE 2K
Aircraft Parking Apron Requirements
Mid-Way Regional Airport

	Currently Available	Short Term Need
Single, Multi-engine Transient Aircraft Positions		20
Apron Area (s.y.)		15,800
Transient Business Jet Positions		5
Apron Area (s.y.)		7,900
Locally-Based Aircraft Positions		5
Apron Area (s.y.)		1,800
Total Positions	42	30
Total Apron Area (s.y.)	20,100	25,500

Source: Coffman Associates analysis

MID-WAY REGIONAL AIRPORT

	AVAILABLE	SHORT TERM NEED
AIRCRAFT STORAGE HANGAR REQUIREMENTS		
T-Hangar Positions	48	63
Box Hangar Positions	27	34
Conventional Hangar Positions	10	10
T-Hangar Area (s.f.)	54,700	75,100
Box Hangar Area (s.f.)	54,300	68,800
Conventional Hangar Area (s.f.)	23,500	24,500
Maintenance Area (s.f.)		16,500
TOTAL HANGAR AREA (s.f.)	***132,500***	***184,900***
AIRCRAFT PARKING APRON REQUIREMENTS		
Single, Multi-Engine Transient Aircraft Positions		20
Apron Area (s.y.)		15,800
Transient Business Jet Positions		5
Apron Area (s.y.)		7,900
Locally-Based Aircraft Positions		5
Apron Area (s.y.)		1,800
Total Positions	**42**	**30**
TOTAL APRON AREA (s.y.)	***20,100***	***25,500***
GENERAL AVIATION TERMINAL AREA FACILITIES		
General Aviation Building Space	4,000*	4,000
VEHICLE PARKING REQUIREMENTS		
General Aviation Parking Spaces	38**	125
General Aviation Parking Area (s.f.)	13,800	43,800
SUPPORT FACILITIES		
Fuel Storage		
100LL (gallons)	13,700	5,800
Jet A (gallons)	14,000	6,300

*Upon completion of building renovation, approximately 8,000 square feet of space will be provided for terminal and FBO operations.
**Additional unmarked parking spaces are provided.

Exhibit 2F: LANDSIDE FACILITY RECOMMENDATIONS

SUPPORT FACILITIES

Various facilities that do not logically fall within the classifications of airside and landside facilities have also been identified. These other areas provide certain functions related to the overall operation of the airport and include:

- Aviation Fuel Storage
- Utilities
- Perimeter Fencing
- Security

Aviation Fuel Storage

The airport owns the fuel farm which is located west of the T-hangar facilities. There are two 12,000-gallon capacity aboveground tanks, one for Jet A fuel and one for 100LL. The airport also owns a 1,200-gallon 100LL truck and leases it to the FBO. The FBO owns a 2,000-gallon Jet A delivery truck. In addition, the FBO owns a 500-gallon capacity 100LL storage tank located adjacent to the north side of the aircraft parking apron which is dedicated to self-service fueling operations.

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

Table 2L presents an estimate of the possible fuel consumption for Mid-Way Regional Airport. The estimate is based on consumption rates experienced at general aviation airports similar in size and level of service to Mid-Way Regional Airport. This table shows that the current fuel capacity is adequate to meet a two-week reserve through the short term planning period.

TABLE 2L
Fuel Storage Requirements
Mid-Way Regional Airport

	Available	Current Need	Short Term Need
100LL (gallons)	13,700	4,800	5,800
Jet A (gallons)	14,000	4,700	6,300

Source: Coffman Associates analysis

Utilities

Electricity, water, and sanitary sewer services are provided at Mid-Way Regional Airport. As development at the airport progresses, additional utility infrastructure may be needed. This study includes a utility schematic analysis in which the capacity of the existing utility system will be examined to determine future utility infrastructure needs.

Perimeter Fencing

Perimeter fencing is used at airports primarily to secure the aircraft operational area. The physical barrier of perimeter fencing provides the following functions:

- Gives notice of the legal boundary of the outermost limits of a facility or security-sensitive area.

- Assists in controlling and screening authorized entries into a secured area by deterring entry elsewhere along the boundary.

- Supports surveillance, detection, assessment, and other security functions by providing a zone for installing in-

trusion-detection equipment and closed-circuit television (CCTV).

- Deters casual intruders from penetrating a secured area by presenting a barrier that requires an overt action to enter.

- Demonstrates the intent of an intruder by their overt action of gaining entry.

- Causes a delay to obtain access to a facility, thereby increasing the possibility of detection.

- Creates a psychological deterrent.

- Optimizes the use of security personnel, while enhancing the capabilities for detection and apprehension of unauthorized individuals.

- Demonstrates a corporate concern for facilities.

- Limits inadvertent access to the aircraft operations area by wildlife.

The majority of Mid-Way Regional Airport is enclosed with four-strand barbed wire fencing. Limited chain link fence is also provided in the terminal area adjacent to the terminal building. Facility planning should include strategically installing fencing around the entire airport property/aircraft operations area to limit inadvertent access to the airport, increase security, and limit wildlife access.

Security

In cooperation with representatives of the general aviation community, the Transportation Security Administration (TSA) published security guidelines for general aviation airports. These guidelines are contained in the publication entitled, *Security Guidelines for General Aviation Airports*, published in May 2004. Within this publication, the TSA recognized that general aviation is not a specific threat to national security. However, the TSA does believe that general aviation may be vulnerable to misuse by terrorists as security is enhanced in the commercial portions of aviation and at other transportation links.

To assist in defining which security methods are most appropriate for a general aviation airport, the TSA defined a series of airport characteristics that potentially affect an airport's security posture. These include:

1. **Airport Location** – An airport's proximity to areas with over 100,000 residents or sensitive sites can affect its security posture. Greater security emphasis should be given to airports within 30 miles of mass population centers (areas with over 100,000 residents) or sensitive areas such as military installations, nuclear and chemical plants, centers of government, national monuments, and/or international ports.

2. **Based Aircraft** – A smaller number of based aircraft increases the likelihood that illegal activities will be identified more quickly. Airports with based aircraft over 12,500 pounds warrant greater security.

3. **Runways** – Airports with longer paved runways are able to serve larger aircraft. Shorter runways are less attractive as they cannot accommodate the larger aircraft which have more potential for damage.

4. **Operations** – The number and type of operations should be considered in the security assessment.

Table 2M summarizes the recommended airport characteristics and ranking criterion. The TSA suggests that an airport rank its security posture according to this scale to determine the types of security enhancements that may be appropriate.

Table 2M also ranks Mid-Way Regional Airport according to this scale. As shown in the table, the airport ranking on this scale is 32. Points are assessed for the airport being located in a mass population area and near sensitive areas, including military installations and the greater Dallas/Fort Worth Metroplex, being located in the outer perimeter of Class B airspace, having between 26 and 100 based aircraft (many of which are over 12,500 pounds), and Runway 18-36 is longer than 5,001 feet and made of asphalt/concrete. The airport does accommodate Part 135 (air taxi) and 137 (agricultural) operations and flight training.

TABLE 2M
Airport Characteristics Measurement Tool
Mid-Way Regional Airport

Security Characteristics	Assessment Scale: Public Use Airport	Assessment Scale: Mid-Way Regional Airport
Location		
Within 30 nm of mass population areas[1]	5	5
Within 30 nm of a sensitive site[2]	4	4
Falls within outer perimeter of Class B airspace	3	3
Falls within boundaries of restricted airspace	3	0
Based Aircraft		
Greater than 101 based aircraft	3	0
26-100 based aircraft	2	2
11-25 based aircraft	1	0
10 or fewer based aircraft	0	0
Based aircraft over 12,500 pounds	3	3
Runways		
Runway length greater than 5,001 feet	5	5
Runway length less than 5,000 feet, greater than 2,001 feet	4	0
Runway length 2,000 feet or less	2	0
Asphalt or concrete runway	1	1
Operations		
Over 50,000 annual operations	4	0
Part 135 operations	3	3
Part 137 operations	3	3
Part 125 operations	3	0
Flight training	3	3
Flight training in aircraft over 12,500 pounds	4	0
Rental aircraft	4	0
Maintenance, repair, and overhaul facilities conducting long-term storage of aircraft over 12,500 pounds	4	0
Totals		**32**

Source: *Security Guidelines for General Aviation Airports*
[1] An area with a total population over 100,000
[2] Sensitive sites include military installations, nuclear and chemical plants, centers of government, national monuments, and/or international ports

As shown in **Table 2N**, a rating of 32 points places Mid-Way Regional Airport in the third tier ranking of security measures by the TSA. This tier includes 13 security enhancements recommended by the TSA, as shown in the table. A review of each recommended security procedure is described in the following sections.

TABLE 2N
Recommended Security Enhancements Based on Airport Characteristics Assessment Results

	Points Determined Through Airport Characteristics Assessment			
Security Enhancements	**> 45**	**25-44**	**15-24**	**0-14**
Fencing	✓	--	--	--
Hangars	✓	--	--	--
Closed-Circuit Television (CCTV)	✓	--	--	--
Intrusion Detection System	✓	--	--	--
Access Controls	✓	✓	--	--
Lighting System	✓	✓	--	--
Personal ID System	✓	✓	--	--
Challenge Procedures	✓	✓	--	--
Law Enforcement Support	✓	✓	✓	--
Security Committee	✓	✓	✓	--
Transient Pilot Sign-in/Sign-Out Procedures	✓	✓	✓	--
Signs	✓	✓	✓	✓
Documented Security Procedures	✓	✓	✓	✓
Positive/Passenger/Cargo/Baggage ID	✓	✓	✓	✓
Aircraft Security	✓	✓	✓	✓
Community Watch Program	✓	✓	✓	✓
Contact List	✓	✓	✓	✓

Source: *Security Guidelines for General Aviation Airports*

Access Controls: To delineate and adequately protect security areas from unauthorized access, it is important to consider boundary measures such as fencing, walls, or other physical barriers, electronic boundaries (e.g., sensor lines, alarms), and/or natural barriers. Physical barriers can be used to deter and delay the access of unauthorized persons onto sensitive areas of airports. Such structures are usually permanent and are designed to be a visual and psychological deterrent as well as a physical barrier.

Lighting System: Protective lighting provides a means of continuing a degree of protection from theft, vandalism, or other illegal activity at night. Security lighting systems should be connected to an emergency power source, if available.

Personal ID System: This refers to a method of identifying airport employees or authorized tenant access to various areas of the airport through badges or biometric controls.

Vehicle ID System: This refers to an identification system which can assist airport personnel and law enforcement in identifying authorized vehicles. Vehicles can be identified through the use of decals, stickers, or hang tags.

Challenge Procedures: This involves an airport watch program which is imple-

mented in cooperation with airport users and tenants to be on guard for unauthorized and potentially illegal activities at Mid-Way Regional Airport.

Law Enforcement Support: This involves establishing and maintaining a liaison with appropriate law enforcement agencies at the local, state, and federal levels. These organizations can better serve the airport when they are familiar with airport operating procedures, facilities, and normal activities. Procedures may be developed to have local law enforcement personnel regularly or randomly patrol ramps and aircraft hangar areas, with increased patrols during periods of heightened security.

Security Committee: This committee should be composed of airport tenants and users drawn from all segments of the airport community. The main goal of this group is to involve airport stakeholders in developing effective and reasonable security measures and disseminating timely security information.

Transient Pilot Sign-in/Sign-Out Procedures: This involves establishing procedures to identify non-based pilots and aircraft using their facilities, and implementing sign-in/sign-out procedures for all transient operators and associating them with their parked aircraft. Having assigned spots for transient parking areas can help to easily identify transient aircraft on an apron.

Signs: The use of signs provides a deterrent by warning of facility boundaries as well as notifying of the consequences for violation.

Documented Security Procedures: This refers to having a written security plan. This plan would include documenting the security initiatives already in place at Mid-Way Regional Airport, as well as any new enhancements. This document could consist of, but not be limited to, airport and local law enforcement contact information, including alternates when available, and utilization of a program to increase airport user awareness of security precautions such as an airport watch program.

Positive/Passenger/Cargo/Baggage ID: A key point to remember regarding general aviation passengers is that the persons on board these flights are generally better known to airport personnel and aircraft operators than the typical passenger on a commercial airliner. Recreational general aviation passengers are typically friends, family, or acquaintances of the pilot in command. Charter/sightseeing passengers typically will meet with the pilot or other flight department personnel well in advance of any flights. Suspicious activities, such as use of cash for flights or probing or inappropriate questions, are more likely to be quickly noted and authorities could be alerted. For corporate operations, typically all parties onboard the aircraft are known to the pilots. Airport operators should develop methods by which individuals visiting the airport can be escorted into and out of aircraft movement and parking areas.

Aircraft Security: The main goal of this security enhancement is to prevent the intentional misuse of general aviation aircraft for terrorist purposes. Proper securing of aircraft is the most basic method of enhancing general aviation airport security. Pilots should employ multiple methods of securing their aircraft to make it as difficult as possible for an unauthorized person to gain access to it. Some basic methods of securing a general aviation aircraft

include: ensuring that door locks are consistently used to prevent unauthorized access or tampering with the aircraft; using keyed ignitions where appropriate; storing the aircraft in a hangar, if available; locking hangar doors, using an auxiliary lock to further protect aircraft from unauthorized use (i.e., propeller, throttle, and/or tiedown locks); and ensuring that aircraft ignition keys are not stored inside the aircraft.

Community Watch Program: The vigilance of airport users is one of the most prevalent methods of enhancing security at general aviation airports. Typically, the user population is familiar with those individuals who have a valid purpose for being on airport property. Consequently, new faces are quickly noticed. A watch program should include elements similar to those listed below. These recommendations are not all-inclusive. Additional measures that are specific to each airport should be added as appropriate, including:

- Coordinate the program with all appropriate stakeholders, including airport officials, pilots, businesses and/or other airport users.

- Hold periodic meetings with the airport community.

- Develop and circulate reporting procedures to all who have a regular presence on the airport.

- Encourage proactive participation in aircraft and facility security and heightened awareness measures. This should include encouraging airport and line staff to "query" unknowns on ramps, near aircraft, etc.

- Post signs promoting the program, warning that the airport is watched. Include appropriate emergency phone numbers on the signs.

- Install a bulletin board for posting security information and meeting notices.

- Provide training to all involved for recognizing suspicious activity and appropriate response tactics.

Contact List: This involves the development of a comprehensive list of responsible personnel/agencies to be contacted in the event of an emergency procedure. The list should be distributed to all appropriate individuals. Additionally, in the event of a security incident, it is essential that first responders and airport management have the capability to communicate. Where possible, coordinate radio communication and establish common frequencies and procedures to establish a radio communications network with local law enforcement.

SUMMARY

The intent of this chapter has been to outline the facilities needed to meet potential aviation demand projected for Mid-Way Regional Airport through the short term planning horizon, which roughly corresponds to a five-year timeframe.

The next chapter, Development Alternatives, will examine potential improvements to the airside and landside systems previously discussed through a series of airfield layouts that could accommodate future demand at Mid-Way Regional Airport. Ultimately, an overall airport layout vision that serves as a guide for future development will be established.

Chapter Three

DEVELOPMENT ALTERNATIVES

Chapter Three
DEVELOPMENT ALTERNATIVES

In the previous chapter, airside and landside facilities required to satisfy the demand through the next five years were identified. The next step in the planning process is to evaluate ways these facilities can be provided. The purpose of this chapter is to formulate and examine rational and reasonable airport development alternatives that can address the short term planning horizon and, in some cases, beyond. Because there are a multitude of possibilities and combinations, intuitive judgment is necessary to focus on those opportunities which have the greatest potential for success.

The goal of this planning process is to identify a viable facility development concept for meeting the projected aviation demand. However, no plan of action should be proposed which may be inconsistent with the future goals and objectives of the Cities of Midlothian and Waxahachie and their citizens, who have a vested interest in the development and operation of Mid-Way Regional Airport. Any development being proposed 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 development alternatives for Mid-Way Regional Airport can be categorized into two functional areas: airside (runways, taxiways, navigational aids, etc.) and landside (general aviation hangars, aircraft parking aprons, terminal area, etc.). 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.

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

AIRPORT DEVELOPMENT OBJECTIVES

It is the overall objective of this planning effort to produce a balanced airside and landside complex to serve forecast aviation demands. However, before defining and evaluating specific alternatives, airport development objectives should be considered. The primary goal for this Airport Development Plan is to define a development concept which allows for the airport to be marketed, developed, and safely operated for the betterment of the surrounding region and its users. The following development objectives have been defined for this planning effort.

- Conform to Federal Aviation Administration (FAA) and Texas Department of Transportation – Aviation Division (TxDOT) design and safety standards for the mix of aircraft that could potentially use the airport during the five-year planning period of this study;

- Develop facilities to safely and efficiently serve general aviation users and encourage increased use of the airport;

- Preserve and protect public and private investments in existing airport facilities;

- Develop a facility with focus on self-sufficiency for both capital and operational cost recovery;

- Identify any future land acquisition needs;

- Consider utility infrastructure improvements; and

- Ensure that any future development is environmentally compatible.

ANALYSIS OF AIRSIDE CONSIDERATIONS

The purpose of this section is to identify and evaluate the various viable airside development considerations at Mid-Way Regional Airport to meet the requirements set forth in Chapter Three. Generally, airside facilities relate to those elements that contribute to the safe and efficient transition of aircraft and passengers from air transportation to the landside facilities at the airport. These facilities are, by nature, the focal point of an airport complex because of their primary role and the fact that they physically dominate airport land use.

In particular, the runway system requires the greatest commitment of land area to meet the physical layout of the system as well as the required FAA and TxDOT safety and design standards. Moreover, the design of the airfield system defines building set-back distances from the runway and object clearance standards. These criteria should be defined first to ensure that the fundamental needs of the airport are met. **Exhibit 3A** presents the airside planning considerations that will be specifically addressed.

AIRSIDE CONSIDERATIONS

- Analyze the installation of an approach lighting system on Runway 18 that would support the existing instrument approach providing for visibility minimums down to ¾-mile.
- Improve visual approach aids to include the installation of runway end identification lights (REILs) on Runway 36.
- Consider the potential for a 3,000-foot turf runway on the east side of Runway 18-36.
- Identify land acquisition needed to accommodate the construction of a turf runway and its associated safety areas.

LANDSIDE CONSIDERATIONS

- Identify locations for additional hangar development to meet projected demand.
- Maximize revenue production of land on airport property.
- Analyze current utility infrastructure and potential improvements to help further development of the airport.
- Examine options for improved airfield security including automobile access control and airport operations area fencing and gates.
- Research areas for additional aircraft parking apron space to include transient business jet positions.
- Identify the need for and placement of airport support facilities to include fueling equipment, aircraft wash rack, and automobile parking.
- Develop a strategy to improve roadway access to the airport.



Exhibit 3A: ALTERNATIVE CONSIDERATIONS

AIRPORT DESIGN STANDARDS

The design of airfield facilities is primarily based on the physical and operational characteristics of aircraft using the airport. The Airport Reference Code (ARC) system is utilized to relate airport design requirements to the physical (wingspan and tail height) and operational (approach speed) characteristics of the largest and fastest aircraft conducting 250 or more operations annually at the airport as defined by TxDOT.

As discussed in the previous chapter, the *Texas Airport System Plan: Update 2010* (TASP) defines the current critical aircraft at Mid-Way Regional Airport within ARC C-II design standards. The future critical aircraft will continue to be driven by the types of business jets that utilize the airport. Runway 18-36 has been designed and constructed to ARC C-II standards. Through the short term planning horizon, the runway should be planned to accommodate aircraft in ARC C/D-II.

While Runway 18-36 should be planned to ARC C/D-II design standards with ¾-mile visibility minimums, other airfield elements such as taxiways and apron areas should be designed according to the wingspan requirements of the most demanding aircraft which operates on each. Chapter Two also introduced the potential for a turf runway, which should be designed to ARC B-I design standards for aircraft weighing less than 12,500 pounds. The alternatives to follow later in this chapter will further outline the potential construction of a turf runway at Mid-Way Regional Airport.

SAFETY AREAS

The design of airfield facilities includes both the pavement areas to accommodate landing and ground operations of aircraft, as well as imaginary safety areas to protect aircraft operational areas and keep them free of obstructions that could affect the safe operation of aircraft at the airport and people on the ground. The imaginary safety areas include the runway safety area (RSA), object free area (OFA), obstacle free zone (OFZ), and runway protection zone (RPZ), as previously discussed in Chapter Two.

Analysis of safety areas has determined that the existing and ultimate RSA, OFA, OFZ, and RPZ corresponding to Runway 18-36 are under direct control of the airport and remain free of obstacle penetrations. In the event that approach visibility minimums to Runway 36 are lowered to ¾-mile, the Runway 36 RPZ would increase in size similar to the existing Runway 18 RPZ dimensions. The larger RPZ would extend south beyond existing airport property by 9.6 acres.

The FAA does not necessarily require the fee simple property acquisition of the RPZ area, but highly recommends that the airport have positive control over development within the RPZ. Positive control can be obtained through fee simple property acquisition or through an avigation easement that should control airspace and land uses within the property parcels under the RPZ in order to prevent incompatible development. While the alternatives to follow do not show improved approach

visibility minimums to Runway 36 through the short term planning period, airport management should be aware of the effects of improved instrument approach considerations on Runway 36.

Table 3A presents the design and safety requirements for Runway 18-36 and a potential turf runway at Mid-Way Regional Airport through the short term planning period.

TABLE 3A
Airfield Safety and Facility Dimensions
Mid-Way Regional Airport

	Runway 18-36		Proposed Turf Runway
Airport Reference Code	C/D-II		B-I*
Approach Visibility Minimums	3/4-mile - Runway 18 1 mile - Runway 36		VFR
Runway Length (feet)	6,500		3,000
Runway Width (feet)	100		120
Runway Safety Area			
Width (feet)	500		120
Length Beyond Runway End (feet)	1,000		0
Object Free Area			
Width (feet)	800		250
Length Beyond Runway End (feet)	1,000		0
Obstacle Free Zone			
Width (feet)	400		250
Length Beyond Runway End (feet)	200		0
Runway Protection Zone	Runway 18	Runway 36	Both Ends
Inner Width (feet)	1,000	500	250
Outer Width (feet)	1,510	1,010	450
Length (feet)	1,700	1,700	1,000
Runway Centerline to:			
Parallel Runway Centerline (feet)	700		700
Parallel Taxiway Centerline (feet)	400		150
Edge of Aircraft Parking Apron (feet)	400		125

*Airplanes weighing less than 12,500 pounds
VFR - Visual Flight Rules

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

APPROACH LIGHTING SYSTEM

As previously discussed, the airport is served with global positioning system (GPS) localizer performance with vertical guidance (LPV) approaches that provide instrument approach capabilities to both ends of Runway 18-36. The published GPS LPV approach serving Runway 18 allows for 200-foot cloud ceilings and ¾-mile visibility minimums.

Although not a requirement, Appendix 16 in FAA Advisory Circular (AC) 150/5300-13, *Airport Design*, recommends that an approach lighting system be installed on runway ends that are served by instrument landing system (ILS) and LPV approaches with visibility minimums down to ¾-mile. Examples of approach lighting systems for approaches with not lower than ¾-mile visibility minimums include a medium intensity approach lighting sys-

tem (MALS), omnidirectional approach lighting system (ODALS), or a lead-in light system (LDIN). As such, the alternatives to follow present the implementation of a MALS on Runway 18. Even though ¾-mile visibility minimums are established on the GPS LPV approach to Runway 18, the inclusion of an approach lighting system to this runway would enhance the safety of the approach and make the airport more attractive for use during poor weather and/or low visibility minimums.

RUNWAY END IDENTIFICATION LIGHTS

The FAA indicates that runway end identification lights (REILs) should be considered for all lighted runway ends not planned for a more sophisticated approach lighting system, such as those mentioned above. Furthermore, TxDOT-Aviation Division *Policies and Standards* indicate that REILs should be programmed for Business/Corporate airports as identified in the TASP, which includes Mid-Way Regional Airport. As a result, the alternatives to follow include the implementation of REILs on Runway 36, similar to those already serving Runway 18.

HOLD POSITION MARKINGS

The current hold positions associated with Runway 18-36 are marked 250 feet from the runway centerline. This location meets the design standards for ARC C-II design aircraft currently associated with the runway. As previously discussed in Chapter Two, the standard for hold lines associated with approach category D aircraft is 250 feet plus one foot for each additional 100 feet above sea level. If the airport transitions to ARC D-II design, the hold lines would need to be shifted to be 258 feet from the runway centerline, as the airport is located at 727 feet above mean sea level (MSL).

TURF RUNWAY 18-36

As previously outlined in Chapter Two, this study is tasked with assessing the need and demand for the potential construction of a 3,000-foot turf runway at the airport. Most new runways at an airport are typically justified for airfield capacity and/or wind coverage reasons; however, the justification for a turf runway at Mid-Way Regional Airport would be related to safety and efficiency associated with better segregation of small aircraft and glider operations from other local and itinerant aircraft operations including larger business jets. In particular, the concept of a turf runway is being considered as a means to potentially shift glider operations from the paved runway to the turf runway. As explained in the previous chapter, glider operations require a tow vehicle to and from the runway which can effectively shut down the runway during these operations. As a result, the runway can be effectively closed for periods of a few minutes or longer.

Wind coverage analysis in Chapter Two indicated that it is desirable for a runway to be orientated as closely as possible to the direction of the prevailing winds. This helps to reduce the impact of crosswind components, which are particularly of interest to small aircraft. Previous analysis indicated that a north/south runway alignment at Mid-Way Regional Airport, similar to what currently exists with Runway 18-36, provides for over 97 percent wind coverage for crosswind conditions not exceeding 10.5 knots for small aircraft weighing less than 12,500

pounds. As a result, the existing runway orientation exceeds the 95 percent wind coverage requirements as outlined in FAA Advisory Circular (AC) 150/5300-13, *Airport Design*. The prevailing wind conditions and physical constraints including current airport property, adjacent property land uses, and difficult topographic conditions on and adjacent to the airport, all support the development of a potential turf runway parallel to existing Runway 18-36.

In order to allow for simultaneous visual flight rule (VFR) aircraft operations utilizing Runway 18-36 and the proposed turf runway, FAA AC 150/5300-13, *Airport Design*, requires a minimum separation of 700 feet between centerlines of the parallel runways. It should be noted that this minimum separation applies to aircraft operating in VFR conditions only. Since the turf runway would only be in use during VFR conditions, 700 feet of separation would be adequate and it would minimize property requirements.

Implementation of the turf runway alternatives would require new property interests to be acquired into the property of Mid-Way Regional Airport. A suitable area of undeveloped property between the airport and Long Branch Road could serve the development of a turf runway. The southern portions of this area presents physical constraints in the form of steep terrain and wooded areas and would be very costly to develop, whereas the property in the northern portion of the area is re-latively flat and without significant mitigation requirements. As such, it was determined that the most practical, reasonable, and cost-effective alternatives for a turf runway would be on the privately owned parcels encompassing approximately 37 acres, 32 acres, and 22 acres, moving south to north, respectively, as defined on the exhibits to follow. In order to construct the turf runway and satisfy its associated safety design standards, the airport would need to acquire portions or all of the 91 acres being studied.

Consideration should also be given to how ultimate land use adjacent the airport will be influenced by the proposed turf runway. This property is currently used for agricultural purposes in the form of cultivated farmland and grazing pastures. While existing airport property on the southwest side of the airport should be able to accommodate short term aviation demand as forecasted in Chapter Two, the 91-acre area being analyzed could be capable of meeting the needs of long term landside development as warranted. Utilizing the majority of this property for a turf runway, which typically provides limited airport revenue potential, would hinder additional landside development opportunities. As a result, future landside growth, required beyond the scope of this study, could be limited as areas immediately north of the existing terminal would be challenging to develop.

The following describes three alternatives for the potential construction of a turf runway at Mid-Way Regional Airport. In all three alternatives, the turf runway is located east of the runway and west of Long Branch Road. Each alternative will require differing property acquisition needs and will relate to the existing airport differently.

Alternative I

As shown on the top half of **Exhibit 3B**, Alternative I depicts a 3,000-foot long by 120-foot wide turf runway located 700 feet east of Runway 18-36. The turf runway is situated so that its northern RPZ

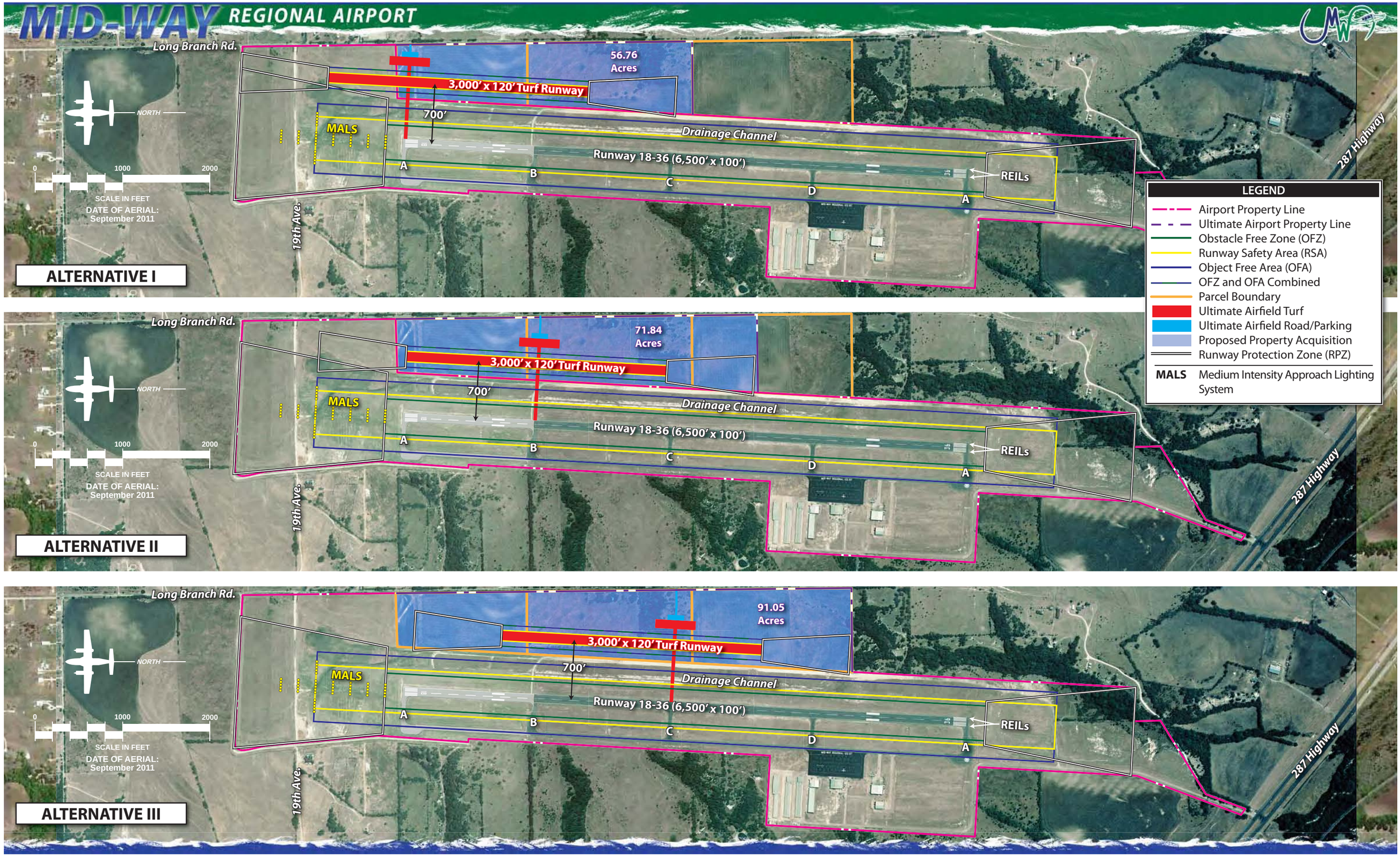


Exhibit 3B: AIRSIDE ALTERNATIVES

extends to the northern property limit. In doing so, a portion of the turf runway's RPZ overlaps the RPZ associated with existing Runway 18-36.

In order to accommodate the 3,000-foot turf runway and its associated safety areas, Alternative I would require the acquisition of approximately 57 acres east of the airport. As such, the airport would maintain complete control over the proposed RPZ extending south of the turf runway. Furthermore, the acquisition of this property would allow for landside development east of the turf runway that could be accessed from Long Branch Road. At a minimum, it would be desirable to have a small dedicated aircraft parking area adjacent to the east side of the turf runway and an area designated for automobile parking that extends west from Long Branch Road.

This alternative calls for the extension of a turf taxiway directly east from the existing Runway 18 threshold. As a result, aircraft access to/from the turf runway and facilities on the west side of the airport could be achieved via entrance/exit Taxiway A west of Runway 18-36. It should be noted that a drain-age channel runs parallel to paved Runway 18-36 and is located approximately 250 feet east of its centerline. The drainage channel becomes deeper and more pronounced as it moves from north to south. A northern access point to the turf runway from the west, as proposed in Alternative I, could require less site preparation and other associated improvement costs when compared to the other taxiway access alternatives to follow.

Other airside considerations depicted on Alternative I include the installation of a MALS leading to Runway 18. The MALS lights begin 200 feet from the runway threshold and are spaced to a maximum distance of 1,400 feet. It should be noted that a MALS is depicted on all three airside alternatives to provide a general layout of what the system may look like. Further engineering analysis, separate from this Master Plan, would determine the exact location of the approach lighting system should one be implemented.

Also proposed on all three alternatives is the installation of REILs serving Runway 36. In the event that a MALS or other type of approach lighting system was to be implemented on Runway 18, the REILs currently installed on this runway end could be relocated to Runway 36 since there would no longer be a need for REILs on Runway 18.

The cost to implement Alternative I has been estimated at approximately $2.58 million. This includes $1.28 million for site preparation, construction, and engineering fees associated with the turf runway and $879,800 for land acquisition. The approach lighting aids to include the MALS and REILs cost $425,250.

Advantages: The least expensive alternative of the three, given the fact that less property acquisition would be required as the northern portion of the turf runway would be located on existing airport property. Adequate space is available to the south of the proposed turf runway for future property acquisition. This area could accommodate airport landside facilities and help bolster airport revenue support as aviation demand dictates.

Disadvantages: This alternative presents the longest distance between the turf runway and landside facilities to the west.

Alternative II

Alternative II shifts the proposed turf runway approximately 900 feet south of that proposed in Alternative I. As depicted in the middle of **Exhibit 3B**, the entire turf runway would be located on property currently not owned by the airport. As such, this alternative proposes the acquisition of approximately 72 acres of land taking into account the turf runway and its associated safety areas, including the RPZ.

Access to the turf runway from facilities on the west side of the airport is proposed by a turf taxiway that connects at the intersection of Runway 18-36 and Taxiway B. Similar to Alternative I, an area for landside development associated with the turf runway is proposed and consists of a designated aircraft parking area with automobile parking and access provided directly from Long Branch Road. Alternative II also considers other airside improvements including the implementation of a MALS on Runway 18 and REILs on Runway 36.

Alternative II is estimated to have a total associated cost of approximately $2.81 million. This includes $1.28 million related to site preparation, actual construction, and engineering analysis for the turf runway and $1.11 million for land acquisition. The approach aids cost an additional $425,250.

Advantages: In contrast with Alternative I, the distance to the turf runway from existing landside development west of Runway 18-36 is decreased.

Disadvantages: The amount of developable property to the south of the proposed turf taxiway is decreased in the event that the airport would need to purchase it to satisfy aviation demand. Substantial site preparation and associated drainage improvements would be needed for the construction of the turf taxiway connecting Runway 18-36 to the turf runway.

Alternative III

Alternative III, as depicted at the bottom of **Exhibit 3B**, considers acquiring the 91-acre development area in full. Under this alternative, the turf runway would be located farther south so as to position its associated southern RPZ adjacent to the south side of the acquired property line.

As proposed, access to the turf runway from the west side of the airport would be provided by extending a turf taxiway east of Runway 18-36 from Taxiway C. The extension of the turf taxiway east of the turf runway would lead to landside development in the form of aircraft parking space and automobile access connected to Long Branch Road. As with the previous alternatives, approach aid improvements on Runway 18-36 are shown.

This alternative is estimated to cost approximately $3.11 million when all improvements are considered. This includes $1.27 million for site preparation, construction, and engineering analysis on the turf runway, $1.41 million for land acquisition, and $425,250 for the installation of the MALS and REILs.

Advantages: Distance to the turf runway from existing development on the southwest side of the airport is the least of all three alternatives, improving its accessibility, especially for glider operators.

Disadvantages: This alternative is the most expensive of the three due to the

large amount of property acquisition proposed on the east side of the airport. Furthermore, this alternative would provide very limited future development opportunities on the east side of the airport as the majority of land would be dedicated to the turf runway and its safety areas. Similar to Alternative II, higher costs would be associated with improvements that would bridge a turf taxiway across the drainage channel that runs parallel to the east side of Runway 18-36.

TURF RUNWAY SUMMARY

The alternatives presented above considered three methods for constructing a 3,000-foot turf runway for small aircraft and glider operations at Mid-Way Regional Airport. The goal of developing a turf runway would be to enhance the operational safety and efficiency of the airfield. In each of the alternatives, the proposed turf runway is aligned parallel to Runway 18-36 and is located 700 feet from centerline (runway to runway).

In Alternative I, the turf runway is situated in a manner that would extend the RPZ serving Runway 18 to the northern airport property line. Access to the turf runway would be provided by extending a turf taxiway east of the Runway 18 threshold. Approximately 57 acres of land would need to be acquired.

Alternative II shifts the turf runway to the south, thereby aligning the northern thresholds of the turf and paved runways. As proposed, the turf runway would be accessed by a turf taxiway extending east of Taxiway B. With this alternative, approximately 72 acres of land would need to be acquired.

Alternative III requires the acquisition of approximately 91 acres of land adjacent to the east side of the airport. This would allow the turf runway to be located farther south than the first two alternatives, closer to existing landside development on the southwest side of the airport. As proposed, access to the turf runway would be provided by a turf taxiway extending east from Runway 18-36 and Taxiway C.

Table 3B provides a more detailed breakdown of costs associated with the three proposed airside alternatives previously discussed. The cost estimates were prepared by the airport's engineer (KSA Engineers, Inc.). The largest difference in each alternative's cost estimate is for property acquisition. The construction costs specifically associated with constructing the turf runway are very similar for all three alternatives. Furthermore, the cost of implementing the MALS and REILs is the same for each alternative. The investment required to purchase property and construct a turf runway would be relatively high for all three alternatives. At a minimum, a ten percent local share would be needed to match any federal and/or state grants deemed eligible to fund this project. Moreover, the construction of a turf runway would remove the opportunity for other revenue uses for the land to the east, such as aviation businesses and hangars, if demand warrants.

As previously discussed, primary justification for the proposed turf runway is to enhance the operational safety and efficiency of the airfield. While the turf runway could improve segregation between smaller piston-powered aircraft and glider operations from other aircraft opera-

tions, including business jets utilizing the airport, it is important to note that there is no obligation for an aircraft operator to utilize the turf runway. As a result, the incurred costs and then availability of the turf runway does not guarantee that the stated goal would be met.

TABLE 3B
Airside Alternative Cost Projections
Mid-Way Regional Airport

Project	Alternative I	Alternative II	Alternative III
Turf Runway			
Site Preparation and Construction	$946,250	$944,915	$939,760
Construction and Engineering Contingencies	$331,188	$330,720	$328,916
Subtotal	**$1,277,438**	**$1,275,635**	**$1,268,676**
Property Acquisition	**$879,780**	**$1,113,520**	**$1,411,300**
Turf Runway and Property Acquisition Costs	***$2,157,218***	***$2,389,155***	***$2,679,976***
Approach Lighting Aids			
Medium Intensity Approach Lighting System	$405,000	$405,000	$405,000
Runway End Identification Lights	$20,250	$20,250	$20,250
Subtotal	**$425,250**	**$425,250**	**$425,250**
Total Costs	***$2,582,468***	***$2,814,405***	***$3,105,226***

Turf runway cost projections determined by following FAA Advisory Circular 150/5320-6E and Technical Specification P-217 in FAA Advisory Circular 150/5370-10E.

Source: KSA Engineers, Inc.

The proposed property acquisition as shown in each alternative would accommodate the turf runway and allow for some additional landside development between it and Long Branch Road; however, those facilities would most likely be associated with small piston-powered aircraft and gliders utilizing the turf runway. The development potential for aviation activities such as FBOs or specialty aviation operators east of the existing paved runway would be lost. Alternatives I and II provide for limited development south of the proposed turf runway if the airport were to purchase additional property. In Alternative III, the turf runway would separate any potential development on the east side from existing facilities farther west. As a result, this alternative would not readily accommodate any development on the east side of the airport other than those facilities related to small aircraft and glider activities.

The short term aviation demand forecasts conducted in Chapter Two indicate that there is adequate space on the southwest side of the airport to accommodate potential aviation demand through the five-year planning period of this study. When considering long term planning for the airport, however, the land to the east of the airport as highlighted could be better suited to handle future landside growth needs due to difficult terrain and access issues north of the existing terminal area. These factors should be considered as the implementation of a turf runway would limit future landside development opportunities on the east side of the airport.

ANALYSIS OF LANDSIDE CONSIDERATIONS

Generally, landside issues are related to those airport facilities necessary, or de-

sired, for the safe and efficient parking and storage of aircraft, movement of passengers and pilots to and from aircraft, airport land use, and overall revenue support functions. Landside planning considerations, summarized on **Exhibit 3A**, focus on facility locating strategies following a philosophy of separating activity levels. To maximize airport efficiency, it is important to locate facilities intended to serve similar functions. This is especially true at Mid-Way Regional Airport given the limited amount of property currently available for future development.

AVIATION ACTIVITY LEVELS

The aviation development areas should be divided into high, medium, and low activity levels at the airport. The high activity area should be planned and developed to provide aviation services on the airport. An example of a high activity area is the airport terminal building and adjoining aircraft parking apron, which provides tiedown locations and circulation for aircraft. In addition, large conventional hangars used for fixed base operators (FBOs), corporate aviation departments, or storing a large number of aircraft would be considered a high activity use area. The best location for high activity areas is along the flight line near midfield, for ease of access to all areas on the airfield. All major utility infrastructure would need to be provided to these areas.

The medium activity use category defines the next level of airport use and primarily includes smaller corporate aircraft that may desire their own executive hangar storage on the airport. The best location for medium activity use is off the immediate flight line, but still readily accessible to aircraft including corporate jets. Due to an airport's layout and other existing conditions, if this area is to be located along the flight line, it is best to keep it out of the midfield area of the airport, so as to not cause congestion with transient aircraft utilizing the airport. 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 multi-engine aircraft. Low activity users are personal or small business aircraft owners who prefer individual space in T-hangars. Low activity areas should be located in less conspicuous areas. This use category will require electricity, but generally does not require water or sewer utilities.

Ideally, terminal area facilities at airports should follow a linear configuration parallel to the primary runway system. The linear configuration allows for maximizing available space, while providing ease of access to terminal facilities from the airfield. Landside alternatives will address development in specific areas on the airport. Separation of activity levels and efficiency of layout will be discussed as well.

In addition to the functional compatibility of the aviation development areas, the proposed development concept should provide a first-class appearance for Mid-Way Regional Airport. As previously mentioned, the airport serves as a very important link to the entire region whether it is for business or pleasure. Consideration to aesthetics should be given high priority in all public areas, as the airport can serve as the first impression a visitor may have of the community.

Mid-Way Regional Airport is located on approximately 320 acres. In order to al-

low for maximum development of the airport while keeping with FAA mandated safety design standards, it is very important to devise a plan that allows for the orderly development of airport facilities. Typically, airports will reserve property adjacent to the runway system for aviation-related activity exclusively. This will allow for the location of taxiways, aprons, and hangars. In those circumstances where long term demand levels fall short of ultimate build-out need, some airports will encourage non-aviation commercial or industrial development. As evidenced in Chapter Two, aviation-related growth is forecast to increase throughout the planning period of this development plan. Due to the limited amount of developable property within existing airport property boundaries, it is recommended that existing property be dedicated for airfield operations and aviation use.

AIRCRAFT HANGAR DEVELOPMENT

Landside alternatives to follow will consider the construction of additional aircraft hangars at Mid-Way Regional Airport. Hangar development will vary based on the specific users of the facilities.

Commercial general aviation activities are essential to providing the necessary services needed on an airport. This includes businesses involved with, but not limited to, aircraft rental and flight training, aircraft charters, aircraft maintenance, line service, and aircraft fueling. These types of operations are commonly referred to as FBOs. The facilities associated with businesses such as these include large conventional type hangars that hold several aircraft. High levels of activity often characterize these operations, with a need for apron space for the storage and circulation of aircraft. These facilities are best placed along ample apron frontage with good visibility from the runway system for transient aircraft. Utility services are needed for these types of facilities, as well as automobile parking areas.

The mix of aircraft using Mid-Way Regional Airport is expected to continue to include business class aircraft which have larger wingspans. These larger aircraft require greater separation distances between facilities, larger apron areas for parking and circulation, and larger hangar facilities.

Aircraft hangars used for the storage of smaller aircraft primarily involve T-hangars or linear box hangars. Since storage hangars often have lower levels of activity, these types of facilities can be located away from the primary apron areas in more remote locations of the airport. Limited utility services are needed for these areas.

Other types of hangar development can include executive and box hangars for accommodating several aircraft simultaneously. Typically, these types of hangars are used by locally owned corporate aircraft or by an individual or group of individuals with multiple aircraft. Executive hangar areas typically require all utilities and segregated roadway access. Currently, there is approximately 132,500 square feet of hangar space provided at Mid-Way Regional Airport made up of a combination of the hangar types previously discussed.

VEHICULAR ACCESS AND PARKING

A consideration for any airport planning study is the segregation of vehicles and

aircraft operational areas. This is both a safety and security consideration for the airport. Aircraft safety is reduced and accident potential is increased when vehicles and aircraft share the same pavement surfaces. Vehicles contribute to the accumulation of debris on aircraft operational surfaces, which increases the potential for foreign object debris (FOD) damage. The potential for runway incursions is increased, as vehicles may inadvertently access active runway or taxiway areas.

Airfield security may be compromised as there is loss of control over the vehicles as they enter active aircraft operational areas. The greatest concern is for public vehicles, such as delivery trucks and visitors, which may not fully understand the operational characteristics of aircraft and the markings in place to control vehicle access. The best solution is to provide dedicated vehicle access roads to each landside facility that is separated from the aircraft operational areas with security fencing.

The segregation of vehicle and aircraft operational areas is supported by FAA AC 150/5210-20, *Ground Vehicle Operations on Airports*, states, "The control of vehicular activity on the airside of an airport is of the highest importance." The AC further states, "An airport operator should limit vehicle operations on the movement areas of the airport to only those vehicles necessary to support the operational activity of the airport."

The landside alternatives for Mid-Way Regional Airport have been developed to reduce the need for vehicles to cross apron or taxiway areas. Dedicated vehicle parking areas, which are outside the airport fence line, are considered for all potential hangars.

BUILDING RESTRICTION LINE

The building restriction line (BRL) identifies suitable areas on the airport to locate structures so as not to compromise airfield safety and/or create an airspace flight obstruction. The BRL should be established in a manner that accounts for runway safety areas, RPZs, navigational aid critical areas, areas required for terminal instrument procedures, and other areas necessary for meeting airport line-of-sight requirements.

The BRL is primarily a product of Code of Federal Regulation (CFR) Part 77 transitional surface clearance requirements. Two primary factors contribute to the determination of the BRL: type of runway as defined by Part 77 (utility or other-than-utility) and the capability of the instrument approaches (visual, non-precision, or precision). Runway 18-36 is considered an other-than-utility runway given that it supports business jet operations and is served by non-precision instrument approaches.

CFR Part 77 stipulates that any object not fixed by navigational function should not be located in the primary surface. The primary surface extends 250 feet to each side of runway centerline for a visual runway and 500 feet to each side for a runway served by a precision or non-precision instrument approach. From the primary surface, the transitional surface extends outward at a slope of one vertical foot to every seven horizontal feet. Typically, the BRL is set at a point where the transitional surface is 35 feet above the runway elevation. For a visual runway, this distance is 495 feet from the runway centerline. For a precision or non-precision instrument runway, this dimension is 745 feet from the runway centerline. It should be noted that structures

can be located between the BRL and the primary surface as long as the highest point of the structure is not a penetration to the 7:1 transitional surface.

At Mid-Way Regional Airport, there is approximately 730 feet of space between the closest facility and the Runway 18-36 centerline. This facility, however, is lower than 35 feet in height and, as such, does not penetrate the transitional surface. Careful consideration should be given to potential development on the southwest side of the airport as it relates to the BRL.

LANDSIDE ALTERNATIVES

Two landside alternatives have been examined for areas of developable property on the southwest side of the airport. The alternatives to be presented 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 final recommended plan only serves as a guide for future development based on demand requirements and FAA and TxDOT design standards. Many times, airport operators change their plan to meet the needs of specific users. The alternatives present an overall vision for the layout of facilities that will guide development in specific ways, as an example, by activity levels presented above. The goal in analyzing landside development alternatives, then, should be to focus future development so that airport property can be maximized while ensuring all design standards are met.

Landside Alternative A

Landside Alternative A, as depicted on **Exhibit 3C**, proposes expanding the aircraft parking apron directly to the north. As shown, the expansion could accommodate additional aircraft parking and circulation needs as outlined in Chapter Two. In order to maximize utilization in the expanded apron area, it is recommended that aircraft accessing the existing hangar facilities farther west use a designated and marked taxiway route on the new apron. This approach will allow for additional aircraft parking positions to be added to the expanded apron area. An aircraft wash rack is depicted on the north side of the proposed apron expansion that could allow for the proper disposal of aircraft cleaning fluids. Currently, there is no approved wash rack facility available at the airport.

Analysis in Chapter Two also indicated a need for dedicated aircraft parking for larger turboprop and jet aircraft. Landside Alternative A would address this need by remarking approximately 3,800 square yards of pavement immediately east of the terminal building and FBO for large aircraft parking. In doing so, the remarked apron area adjacent the terminal could better function as a high activity area which is ideal for accommodating large transient aircraft passenger transfer.

A taxiway is proposed immediately north of the airport terminal building that would extend west from the existing aircraft parking apron. This taxiway would provide access to additional landside development in the form of a linear box hangar and two conventional hangars that could support multiple aircraft storage and specialized aviation activities. Likewise, adjacent to the south side of the airport terminal is a proposed taxiway and apron area that extends west along Airport Drive. Five executive-style hangars are proposed in this area that could be

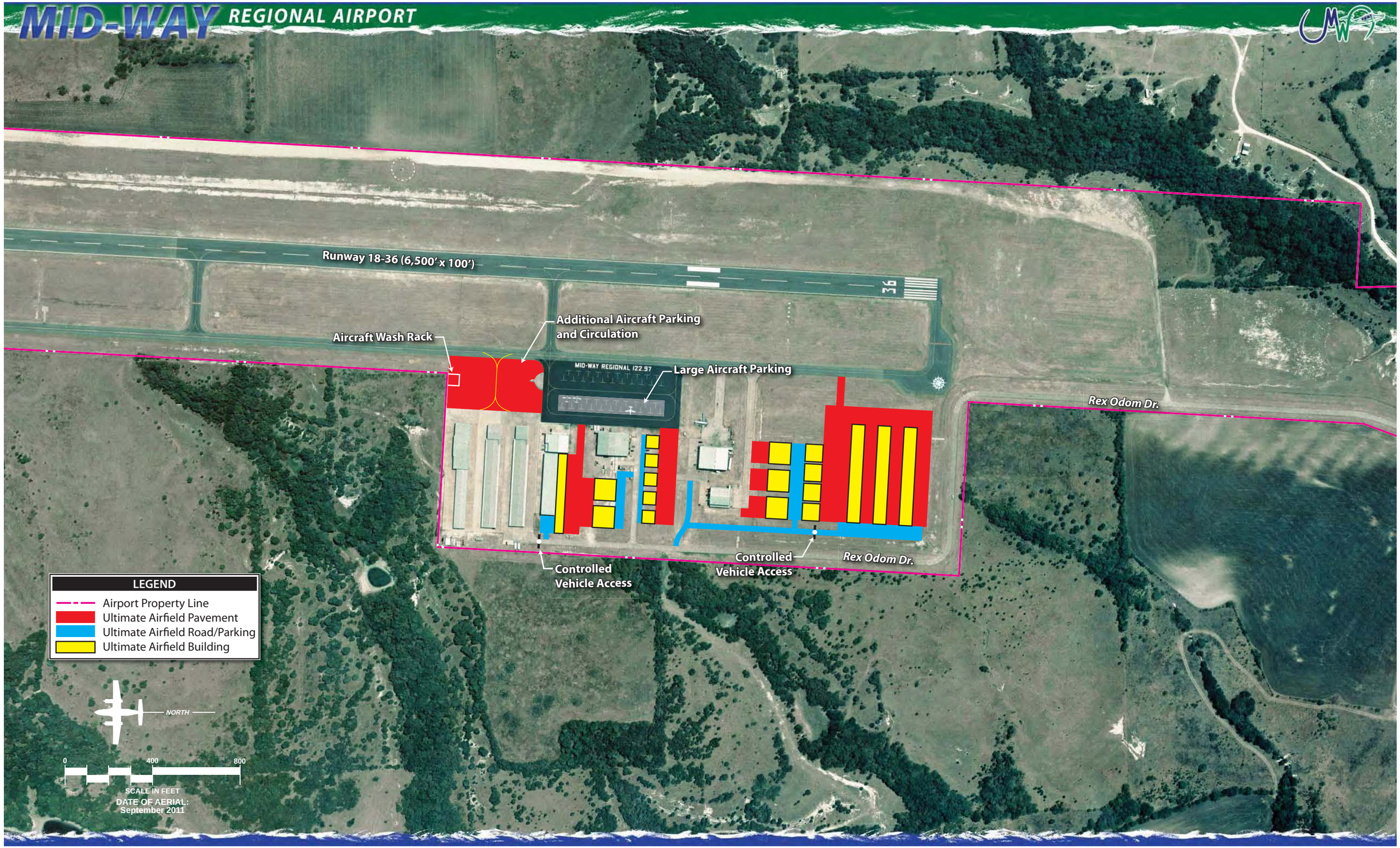


Exhibit 3C: LANDSIDE ALTERNATIVE A

utilized by corporate flight departments or specialty aviation businesses.

The proposed taxiway and hangar development immediately south of the airport terminal would require the modification of existing roadway access to existing and future facilities south of the terminal building. Closure of Juan's Way leading to existing hangar development farther south would be required. Instead, a roadway is proposed extending east from Rex Odom Drive that would lead to the existing hangars as well as providing access to future development farther south. Due to the abrupt elevation change between Rex Odom Drive and property directly to the east, it would be difficult and costly to provide for additional roadway access extending east from Rex Odom Drive. The location of the proposed access road is directly north of the abrupt elevation change, therefore, making this entrance/exit point less costly and easier to implement.

Proposed landside development on the south side of the airport consists of a mix of conventional, executive, and T-hangars that follow the principal philosophy of grouping similar activity levels together. As such, three large conventional hangars are proposed immediately south of the existing taxiway that extends west of the parallel taxiway serving Runway 18-36. To the south, a proposed taxiway extending west of the parallel taxiway would lead to four executive hangars and three T-hangar complexes.

As previously discussed, it is important to consider airfield safety and security by segregating aircraft and vehicles to the highest extent possible. This alternative attempts to do so by providing dedicated vehicle roadway access and parking to all proposed hangar facilities. Furthermore, two controlled access gates are proposed at various locations on the airfield to better separate automobile access to aircraft operational areas.

Landside Alternative B

Exhibit 3D depicts Landside Alternative B. This alternative proposes additional aircraft apron development to the south of the existing parking apron. Two separate areas totaling approximately 4,300 square yards would be dedicated to large aircraft parking. One area is immediately east of the existing terminal building, with the other being farther south adjacent to proposed conventional hangar development.

Similar to the previous alternative, a taxiway immediately north of the airport terminal building is shown extending west of the existing aircraft parking apron leading to a linear box hangar and smaller executive hangars. This area could accommodate aircraft storage ranging in size from small single engine piston aircraft to larger turboprops and business jets, as well as small aviation business operations.

To the south of Airport Drive, four executive hangars open up to a taxiway and apron area extending west of the existing terminal apron. These facilities could support an array of general aviation services. Vehicle access to these hangars as well as existing and proposed facilities farther south would be provided by extending a roadway east from Rex Odom Drive, similar to what was proposed by Landside Alternative A.

Remaining landside development to the south is comprised of conventional, executive, and T-hangar development that are

all provided roadway access and dedicated vehicle parking lots. An aircraft wash rack is proposed on the south side of the apron expansion. This alternative includes three controlled access points to better segregate aircraft and vehicle movements.

LANDSIDE ALTERNATIVES SUMMARY

Landside facility layout should follow basic industry standards, such as locating high activity hangars on or near main apron areas with desirable access to the runway and taxiway system. Medium activity box/executive hangars should then be set back from the flight line, and low activity T-hangars/linear box hangars should be farthest from the flight line. Sustainability in planning should also be considered by such means as maximizing available land area and limiting the need to extend utilities.

It should be noted that several locations were examined for the potential relocation of the airport fuel farm. Its current location is directly west of the T-hangar facilities on the north side of the airport. After further review, it was determined the current location was most appropriate, given that it is provided ideal access to/from Rex Odom Drive for large tanker trucks and is located away from high and medium activity areas.

Each of the landside alternatives follows these basic airport planning principles primarily by utilizing vacant airport property located immediately west and south of the developed terminal area. These parcels provide adequate space to easily accommodate forecast growth in based aircraft at the airport during the short term planning horizon and beyond. Only under some unpredictable circumstance, such as the addition of a very large commercial aviation operator to the field, would this full build-out be necessary within the next five years. Nonetheless, it is beneficial to provide a vision for the airport that extends well beyond the short term.

As discussed in Chapter Two, the airport is forecast to need approximately 52,400 square feet of new hangar space in the next five years. **Table 3C** presents a summary of the total hangar area proposed for each alternative. While the long term vision far exceeds the short term forecast need, the potential layouts presented allow hangar development to follow a phased approach for each hangar type.

TABLE 3C
Landside Summary
Mid-Way Regional Airport

	Alternative I	Alternative II
T-Hangar/Linear Box Hangar (s.f.)	95,600	68,600
Box/Executive Hangar (s.f.)	43,600	40,000
Conventional Hangar (s.f.)	50,000	20,800
Total Square Feet	**189,200**	**129,400**

Source: Coffman Associates analysis

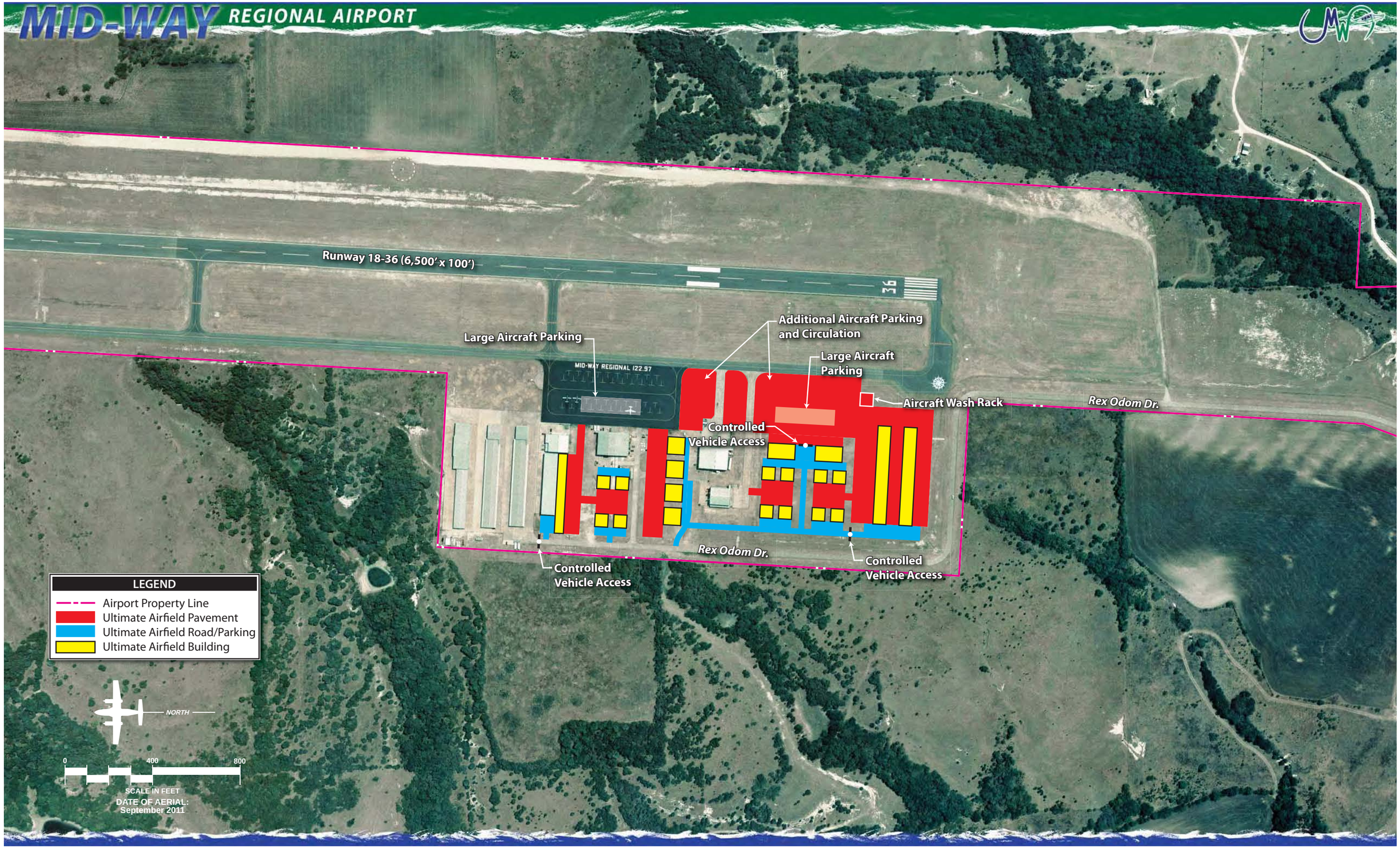


Exhibit 3D: LANDSIDE ALTERNATIVE B

LONG TERM LANDSIDE IMPLEMENTATION

The previous landside alternatives focused on facility development in the southwest portion of the airport, as this area should be capable of accommodating forecast aviation demand through at least the next five years. Once this area is developed, however, existing airport property does not provide for additional space for landside development opportunities. As such, prudent short term planning should include a vision of long term growth needs. The vision should include additional property acquisition that could support aviation demand beyond the short term horizon, further increasing revenue support for the airport. The current property line presents the airport's greatest constraint and, at some point, the airport will be unable to support further growth unless additional property is acquired. Furthermore, strategic acquisition of property adjacent to the airport can prevent incompatible land uses from infringing upon aviation activities.

Given the existing layout of landside facilities in the southwest area of the airport, it would be most beneficial to acquire property immediately to the north of these facilities and extend future development opportunities into this area as needed. Unfortunately, the topography of land to the north yields several areas of rugged terrain, wooded areas, and water features that would necessitate costly improvements in order to accommodate infrastructure development in the form of hangars or other revenue-producing facilities. Landside planning must factor the costs of acquiring land as well as the costs for improving land to make it suitable for development. These facilities should be planned so as to be revenue producers for airport operations as well as profitable for airport businesses. If initial development costs are high, the development typically will not occur, especially for private investments.

As detailed earlier in this chapter, 91 acres of property located on the east side of the airport are suitable for development if acquired. When compared to the west side of the airport, this area is better suited for development given the large amount of relatively flat and vacant land it encompasses. Furthermore, the proposed extension of Long Branch Road to the south (to be detailed in the next section), would make this property much more accessible as it would provide a more direct point of access to U.S. Highway 287. At a minimum, the airport should consider the future acquisition of this property to prevent incompatible land use to include residential development, which is currently located adjacent to the east side of Long Branch Road. In the event that a turf runway is not implemented, the use of this property could be dedicated to meeting future aviation demand needs.

AIRPORT ACCESS

Currently, airport access is granted by Rex Odom Drive which extends north from U.S. Highway 287. While this allows desirable access to the airport for those coming to/from the Cities of Midlothian and Waxahachie and points to the south, areas to the north of the airport are not provided direct access. Currently, airport users and tenants coming from the north must utilize Long Branch Road and a series of other rural roadways in order to access U.S. Highway 287.

The development of a strategy to improve roadway access to/from Mid-Way Re-

gional Airport is considered in this study and utilizes a combined network of roadways proposed in the Ellis County and City of Midlothian Thoroughfare Plans. These studies call for a series of future thoroughfares, parkways, and arterials in close proximity to Mid-Way Regional Airport. **Exhibit 3E** depicts these proposed roadways and parcel boundaries in relationship to the airport.

Two proposed roadway alignments on the thoroughfare plans could be appealing options for airport users. One proposed roadway would extend north from U.S. Highway 287 and run parallel to the west side of the airport before turning east, connecting to Long Branch Road, which leads to FM Road 1387 and points farther north. A second proposed roadway would extend south from Long Branch Road, which would provide a more direct route to the outer roads associated with U.S. Highway 287.

As depicted on **Exhibit 3E**, four options are proposed that could yield improved access to landside facility development on the southwest side of the airport. Of the four options, the first three depend on future construction of the thoroughfare running parallel to the west side of the airport, while the fourth is independent of this development.

In Option 1, a 300-foot access road is proposed that extends southwest of Rex Odom Drive and would provide access to the proposed thoroughfare. In doing so, this proposed access point would extend through one private parcel. Option 2 calls for airport access via a roadway extending 600 feet west of Rex Odom Drive. This proposed road is located atop a parcel boundary and, in doing so, could be desirable as it would not split individual parcels. With Option 3, an airport access road would be extended north from Rex Odom Drive, connecting to the pro-posed thoroughfare approximately 2,000 feet west of the Runway 18 threshold. This option calls for approximately 4,800 feet of roadway development. Finally, Option 4 would consider Option 3 minus the connection to the proposed thoroughfare. As depicted, this option would extend farther north and connect to the existing road adjacent to the north side of airport property leading to Long Branch Road. Approximately 6,600 feet of roadway would be needed before connecting to the existing access road on the north side of airport property.

While Options 3 and 4 would be more expensive, given the amount of construction and land acquisition costs associated with the development of the access road, they could provide the option for acquiring approximately 75 acres of land between the proposed access road and existing airport property. The acquisition of this property could provide future opportunities for airport development; however, as previously stated, the majority of this land is not suited for development given physical constraints that would prevent large portions of this property from being fully utilized, resulting in segregated development areas. While these options provide potential improvements to airport access, further analysis outside this study should be completed as it relates to proposed roadway improvements in relation to the Mid-Way Regional Airport.

UTILITY INFRASTRUCTURE ANALYSIS

This section provides a summary of the basis for design improvements related to the existing water distribution system and sanitary sewer collection system for

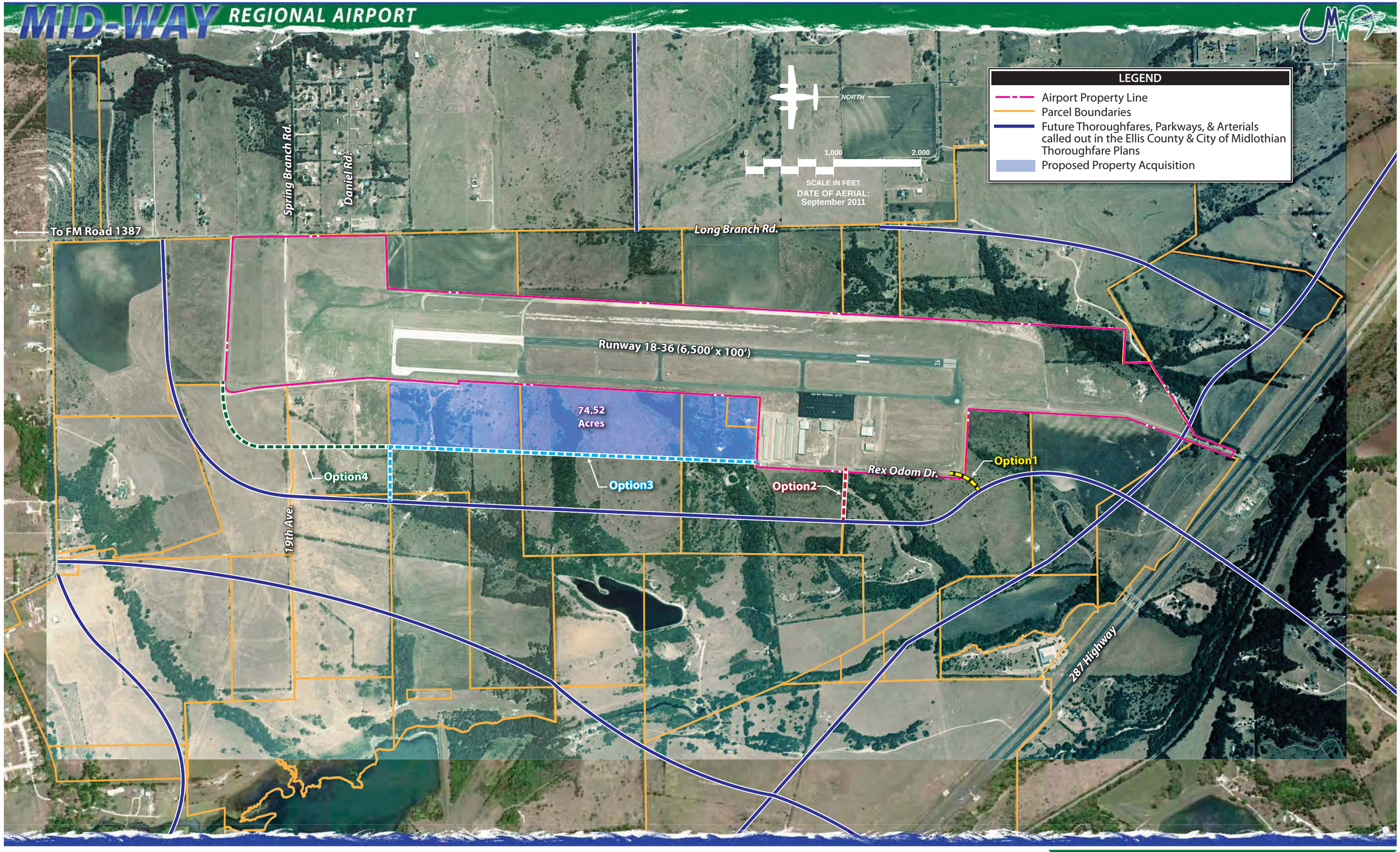


Exhibit 3E: AIRPORT ROADWAY ACCESS OPTIONS

potential expansion of landside development areas at Mid-Way Regional Airport. The airport is connected to the municipal water distribution system and sewage collection system for the City of Midlothian.

As a part of this study, a full utility schematic including easements and restrictions depicting the placement of water, wastewater, and gas utility lines to accommodate existing and future improvements will be developed by the airport's engineer. This schematic will be further analyzed once a recommended development plan is selected. Furthermore, analysis is being made regarding the potential need for improved fire suppression in existing hangar facilities located north of the terminal area. This evaluation will be discussed in detail in the following section.

Utility Infrastructure Evaluations

Currently, the airport is serviced by the City of Midlothian with a 12-inch water line that is located along the western boundary of the airport near the terminal entrance road (Airport Drive). There are two elevated storage tanks located approximately 26,000 feet and 30,000 feet northwest and west of the airport, respectively, that supply the water line leading to the airport. The City of Midlothian also has a 12-inch gravity sewer line servicing the airport that flows to a lift station located near U.S. Highway 287 west of the airport.

During the recent terminal renovation project at the airport, a fire flow test revealed that 1,244 gallons per minute were available with a residual pressure of 60 pounds per square inch (psi). These results were adequate to accommodate the fire suppression system installed during the terminal renovation project. Based on conversations with airport staff, all but the three northernmost T-hangar facilities have fire suppression systems. The City of Midlothian will not allow maintenance of aircraft to be conducted in hangars on the airfield that do not have a fire suppression system. This restriction limits the airport's ability to market these hangars to potential tenants and has become inconvenient to the existing tenants of these hangars. Based on the previously reported fire flow data, a fire flow suppression system could be installed in the three northernmost T-hangar facilities by extending and connecting an eight-inch water line to the existing 12-inch water line. **Table 3D** shows the cost estimate for supplying a water sprinkler system for the three northernmost T-hangar facilities at Mid-Way Regional Airport.

TABLE 3D
Sprinkler System for T-Hangar Facilities
Mid-Way Regional Airport

Project	Projected Cost
Infrastructure Needs	$178,750
Construction and Engineering Contingencies	$56,013
Total Costs	**$234,763**

Source: KSA Engineers analysis

Typically, fire suppression systems are evaluated on a case-by-case basis for existing and proposed facilities. For the potential hangar development layouts depicted in Landside Alternatives I and II, these facilities could be serviced by extending the existing 12-inch water line. It is important to note that conditions within a water system change periodically and that the fire flow must be reevaluated with each new development installed along the system.

As the City of Midlothian expands to the east toward the airport, additional water facilities may be required to meet the increased demands on the system. It is strongly encouraged that a looped water system be evaluated to continue to provide adequate water supply to the airport.

Appendix B provides additional information on the utility analysis that was evaluated during this study to include a schematic of existing and ultimate utility infrastructure that could be needed in the southwest area of the airport as future development dictates.

SUMMARY

The process utilized in assessing the airside and landside development alternatives involved a detailed analysis of short term requirements, as well as future growth potential that extends beyond the next five years. Current and future airport design standards were considered at every stage in the analysis.

After review and input from the Planning Advisory Committee (PAC), a recommended development concept will be put forth by the consultant. The development plan must represent a means by which the airport can evolve in a balanced manner, both on the airside and landside, to accommodate future demand. The remainder of this study will be dedicated to ensuring proper implementation and timing for a demand-based program that considers financial planning in support of future development.

Chapter Four

DEVELOPMENT PROGRAM & FINANCIAL ANALYSIS

Chapter Four

DEVELOPMENT PROGRAM & FINANCIAL ANALYSIS

The process for the preparation of this Airport Development Plan and supporting Airport Layout Plan (ALP) update has included technical efforts in the previous chapters intended to establish the role of the airport, project potential aviation demand, and establish airside and landside facility needs. The purpose of this chapter is to describe, in narrative and graphic form, the plan for the future use and development of Mid-Way Regional Airport. The airport's short term capital needs, based on the projected capital improvement program (CIP), are also presented. Potential funding sources for the capital needs on the federal, state, and local levels are then identified and discussed. Finally, basic economic, financial, and management rationale is applied to Mid-Way Regional Airport's operational activities to assess the overall workings of the facility that includes an analysis of the operating budgets, rates and fees structures, and development strategies.

This study has been developed according to a demand-based schedule. Demand-based planning establishes guidelines for the airport based upon aircraft activity levels,

instead of guidelines based upon subjective factors such as points in time. By doing so, the levels of activity derived from the demand forecasts can be related to the actual capital investments needed to safely and efficiently accommodate the level of demand being experienced at the airport. More specifically, the intention of this study is that the facility improvements needed to serve new levels of demand should only be implemented when the levels of demand experienced at the airport justify their development.

DEVELOPMENT CONCEPT

Exhibit 4A depicts the overall development concept for Mid-Way Regional Airport. It is important to note that the con-

cept provides for anticipated facility needs over the next five years, as well as establishing a vision and direction for meeting facility needs beyond the planning period of this study.

AIRSIDE DEVELOPMENT PLAN

Airside components include the runway, parallel and connecting taxiways, lighting and marking aids, navigational aids, and imaginary safety and obstruction clearance surfaces which help provide a safe operating environment for aircraft. Airside improvements that have been implemented at Mid-Way Regional Airport in the past include the following:

- Extension of Runway 18-36 to 6,500 feet;
- Extension of the parallel taxiway and construction of additional taxiway entrance/exits;
- Implementation of localizer performance with vertical guidance (LPV) approaches to each runway end that provide for minimums as low as ¾-mile on Runway 18;
- Four-box precision approach path indicators (PAPI-4) serving each runway end; and
- Runway end identification lights (REILs) serving Runway 18.

These improvements position Mid-Way Regional Airport very favorably through the short term planning period. The following discussion addresses the primary airside issues considered on the recommended development concept, as highlighted on **Exhibit 4A**.

Maintain/Implement Safety Design Standards

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

Most design standards criterion are based upon the design aircraft's Airport Reference Code (ARC), which is a function of the aircraft's approach speed, wingspan, and tail height. The critical design aircraft is defined by TxDOT as the highest rated ARC aircraft or grouping of similar aircraft expected to operate at the airport on a regular basis. Regular basis is further defined as a minimum of 250 annual operations (takeoffs and landings).

Mid-Way Regional Airport is currently used by a wide range of aircraft. These aircraft include gliders, single and multi-engine piston aircraft, turboprop aircraft, and jets ranging from ARC A-I through D-II. Future critical aircraft will be driven by the types of business jets that utilize the airport. Runway 18-36 has been designed and constructed to ARC C-II standards. Through the short term planning period of this study, the runway should be planned to meet ARC C/D-II standards. It should be noted that the only design standard difference between ARC C-II and D-II aircraft at Mid-Way Regional Airport

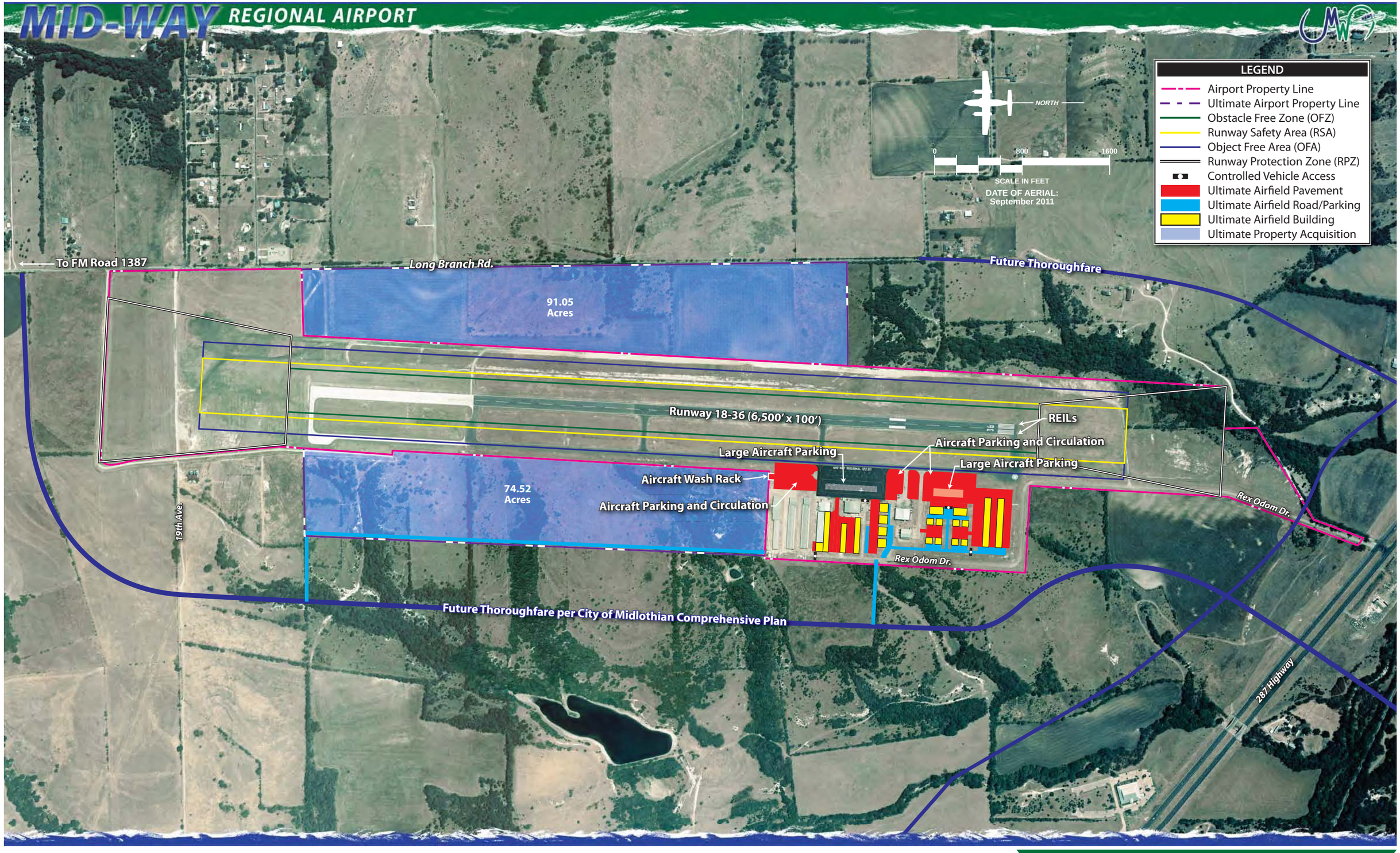


Exhibit 4A: RECOMMENDED DEVELOPMENT CONCEPT

deals with the location of the hold lines associated with the runway. In the event that the airport were to transition to ARC D-II, hold lines associated with Runway 18-36 should be relocated from 250 feet to 258 feet from the runway centerline. This shift would account for the FAA standard 250-foot hold lines plus adding one foot for each additional 100 feet above mean sea level (MSL).

Maintaining ARC C/D-II design standards on Runway 18-36 will allow the airport to accommodate the majority of general aviation aircraft on the market, while also providing for FAA safety standards of these operations. Moreover, meeting these design requirements will ensure that the airport is well positioned to remain competitive in attracting aviation-related development and those businesses which have aviation needs.

The design of taxiway and apron areas should consider the wingspan requirements of the most demanding aircraft to operate within the specific area. All taxiways associated with Runway 18-36 are planned for aircraft up to and including airplane design group (ADG) II. In addition, transient apron and conventional hangar areas are planned to ADG II requirements to accommodate business jets. Other general aviation areas primarily utilized for the storage of smaller aircraft, including T-hangars and linear box hangars, consider ADG I requirements.

Install REILs on Runway 36

REILs are proposed on the end of Runway 36. The REIL is a basic approach lighting aid which provides pilots with the improved ability to distinguish the runway end during nighttime and/or poor visibility conditions. A REIL system is currently serving Runway 18.

Turf Runway Determination

A detailed evaluation for the placement and construction of a turf runway at Mid-Way Regional Airport was made in Chapter Three. As discussed, the primary justification for a proposed turf runway would be to enhance the operational safety and efficiency of the airfield, namely improving segregation between smaller piston-powered aircraft and glider operations from larger turboprop and business jet aircraft.

Three alternatives were analyzed, each placing the proposed 3,000-foot turf runway 700 feet east of Runway 18-36. The costs associated with required land acquisition, site preparation, and construction ranged between $2.15 million and $2.68 million. While the intended goal would be to segregate aircraft, there would be no obligation for an aircraft operator to utilize the turf runway in the event it would be constructed.

In conclusion, it was determined that these considerations, in addition to the lost potential for future revenue-generating development on the east side of the airport, outweigh the benefits associated with the existence of a turf runway. As a result, the development concept does not include the construction of a turf runway during the planning period.

LANDSIDE DEVELOPMENT PLAN

Landside components include general aviation terminal areas, aircraft storage hangars, aircraft parking aprons, hangar and apron access taxilanes, fuel storage

facilities, security enhancements, and vehicle parking areas which help provide the interface between air and ground transportation modes. The landside plan for Mid-Way Regional Airport has been devised to efficiently accommodate potential aviation demand and provide revenue enhancement possibilities designating the use of certain portions of airport property for aviation-related development. Future construction of landside facilities is anticipated to be done through a combination of public and private investments.

The primary goal of landside facility planning is to provide adequate area to accommodate future general aviation needs while also maximizing operational efficiencies and land uses. The development of landside facilities will be demand-based. As such, the facilities will only be constructed if required by actual demand. For example, aircraft storage hangars will be constructed only if new based aircraft owners desire enclosed aircraft storage. The landside plan is based on projected needs that can change over time and is developed with flexibility in mind to ensure the orderly development of the airport should this demand materialize. **Exhibit 4A** includes the major considerations for landside improvements at Mid-Way Regional Airport. Specific attention is given to the southwest area of the airport, which should be capable of accommodating projected aviation demand through the short term planning period.

Hangars

The recommended development concept shows the location for potential hangar development at the airport. **Table 4A** presents the existing and ultimate aircraft hangar storage area as determined previously in Chapter Two.

TABLE 4A
Hangar Space Planned
Mid-Way Regional Airport

	Current Supply Estimate	5-Year Supply Forecast	Total 5-Year Need	Provided in Development Plan
Based Aircraft	87	110	23	
Hangar Area Requirements (s.f.)				
T-hangar Area	54,700	75,100	20,400	102,500
Box Hangar Area	54,300	68,800	14,500	56,000
Conventional Hangar Area	23,500	24,500	1,000	16,800
Maintenance Area Reserve		16,500	16,500	Hangar Reserve
Total Hangar Storage Area (s.f.)	132,500	184,900	52,400	175,300

Source: Coffman Associates analysis

As presented in the table, the development concept provides approximately 175,300 square feet of hangar space. The need over the next five years is estimated at 52,400 square feet should demand for based aircraft and annual aircraft operations grow according to the airport forecasts presented at the beginning of Chapter Two. Therefore, the proposed hangar layout represents a vision for the airport that extends beyond the scope of this study.

Following the philosophy of separation of activity levels, low activity T-hangars and linear box hangars are proposed immedi-

ately west of the terminal area. In order to provide aircraft access to this development area, a taxiway must be extended west of the main parking apron. As proposed, three hangar storage facilities could be constructed that would allow for individual storage space for single engine and smaller multi-engine aircraft. The airport currently has a hangar waiting list of approximately 20 aircraft. It should be noted that a small box hangar is also proposed immediately north of this development area that would include an additional 4,800 square feet of storage space.

Moving farther south, a series of box hangars are proposed extending west off the southern edge of the main aircraft parking apron. Similar to the proposed development previously discussed, a taxiway would need to be extended west of the parking apron to allow aircraft access to this area. Upon completion, it is conceivable that private entities could construct hangars to fit the needs of their operations. The road (Juan's Way) leading to existing hangar development farther south would be impacted if the hangars are constructed as proposed. As a result, the development plan proposes a roadway extending east from Rex Odom Drive that would provide vehicle access to existing and future hangar development south of the terminal area.

The development concept includes a combination of conventional, box, and T-hangars that would essentially "build-out" the remaining areas in the southwest portion of the airport. Infrastructure improvements will be needed for the utilization of this area to include roadway access and utility extensions. While the plan dedicates property for ultimate build-out, actual demand will dictate the timeline for future development.

Aircraft Parking Apron Space

Analysis in Chapter Two indicated that additional aircraft parking apron space is needed to accommodate general aviation activities through the short term planning period of this study. As a result, the development concept includes additional aircraft parking apron space dedicated to large and small aircraft while improving the efficiency of operations adjacent to the terminal building.

It should be noted that the airport is currently working with TxDOT on the design of a 20,000-square yard apron expansion that considers areas north and south of the existing parking apron. Upon completion, approximately 3,800 square yards of pavement immediately east of the terminal building and fixed base operator (FBO) would be dedicated specifically for large aircraft parking. In doing so, the remarked apron area adjacent to the terminal could better function as a high activity area, which is ideal for accommodating larger transient aircraft. Small aircraft parking would then be designated on portions of the proposed apron north of the self-service fuel facility.

Ultimate build-out within the southwest development area proposes additional aircraft parking apron space further south. The proposed south apron area would accommodate aircraft parking and circulation associated with hangar development that could serve FBO and other specialty aviation operators and activities.

Airport Support Facilities

The airport does not currently have a facility that would allow for the proper disposal of aircraft cleaning fluids. As a result, the development concept includes

the construction of an aircraft wash rack on the north side of the terminal area. As proposed, a wash rack could be constructed adjacent to the expanded aircraft parking apron north of the self-service fuel facility.

Four controlled access gates are also proposed on the development concept that would allow for secured access to and from active airfield operational areas. It is recommended that two gates be installed during the short term planning period: one immediately south of the terminal building leading to the main aircraft parking apron, and another on the north side of Rex Odom Drive that provides access to the T-hangar storage area. The other gates proposed would be dependent on future development farther south.

The implementation of improved perimeter fencing could also be warranted. The majority of Mid-Way Regional Airport is currently enclosed with four-strand barbed wire fencing. Limited chain link fence is also provided in the terminal area. These fences do not currently prohibit wildlife or other inadvertent access onto airport property, in particular, active aircraft operations areas. The development plan includes the phased implementation of improved fencing to better secure Mid-Way Regional Airport.

Additional vehicle parking is also considered to meet the needs of based and transient aircraft operators, as well as aviation businesses on the airport. Approximately 10,000 square feet of space is planned adjacent to the south side of Airport Drive that could support terminal, FBO, and aircraft storage functions. Furthermore, areas for vehicle parking and circulation are included adjacent to proposed hangar construction farther south.

Ultimate Land Acquisition

While the southwest portion of the airport should be capable of accommodating forecast aviation demand through the short term planning period, long term planning includes a vision for future growth needs. Two areas on the development concept are highlighted for proposed acquisition, as depicted on **Exhibit 4A**.

Adjacent to the west side of the airport, approximately 74.52 acres are considered for ultimate acquisition. Given the existing layout of landside facilities in the southwest area of the airport, it would be most beneficial to continue future landside development on the west side of Runway 18-36. However, some of this property consists of rugged terrain, wooded areas, and water that would be extremely costly to improve for future infrastructure needs. The development of this property would also be dependent upon the construction of a vehicle roadway extending access to this area.

A second area of property acquisition encompasses approximately 91.05 acres of land adjacent to the east side of the airport. When compared to the west side of the airport, this area is better suited for development, especially in the near term, given that the land is relatively flat and free of rugged terrain features. The existence of Long Branch Road adjacent to the east could provide direct vehicle access to support aviation development of the airport's east side.

In addition to meeting future aviation demand needs, the acquisition of these properties could prevent future incompatible land use from encroaching upon the airport, especially residential development. It should be noted that the most

recently approved ALP does include the ultimate acquisition of land on the east and west sides of the airport.

Ultimate Airport Access

The previous chapter outlined several alternatives for improving roadway access to/from Mid-Way Regional Airport, especially serving areas to the north. Airport users and tenants coming from the north must utilize Long Branch Road and a series of rural roadways in order to access U.S. Highway 287, which leads to Rex Odom Drive and eventually the airport.

The development concept presents future roadway alignments based upon the Ellis County and City of Midlothian Thoroughfare Plans. As can be seen from **Exhibit 4A**, the construction of a proposed north/south thoroughfare west of the airport could allow for an entrance/exit roadway extending to the east and connecting to Rex Odom Drive. The construction of this thoroughfare would also make the 74-acre parcel on the west side of the airport more attractive for acquisition, as additional access to this area could be gained farther north by extending another roadway east of the thoroughfare. On the east side of the airport, the proposed extension of Long Branch Road to the south would provide a more direct access route to U.S. Highway 287, making the 91-acre parcel more appealing as well.

The construction of these thoroughfares will be at the discretion of Ellis County and the Cities of Midlothian and Waxahachie. The entrance/exit access roads as proposed adjacent to the west side of the airport would be the responsibility of Mid-Way Regional Airport. Although any proposed construction of the thoroughfares will likely take place beyond the short term planning period of this study, airport staff should be engaged in these discussions in order to better position the airport for access needs as well as to protect safety design standards associated with the runway system.

CAPITAL PROGRAM

Now that the recommended concept has been developed and specific needs and improvements for the airport have been established, the next step is to determine a realistic schedule for project implementation as well as the associated costs for the plan. This section will examine the overall cost of each project identified in the CIP and present a development schedule. The program outlined in the following pages has been evaluated from a variety of perspectives and represents the culmination of a comparative analysis of basic budget factors, demand, and priority assignments.

The recommended improvements consider the short term planning period and are divided into yearly increments. The CIP provided in this study presents current and projected needs at this point in time. The very nature of the aviation industry is always changing, and as such, so too could the needs of Mid-Way Regional Airport. Each year, airport staff will need to re-examine the priorities for funding, adding or removing projects on the capital programming list.

While some projects will be demand-based, others will be dictated by design standards, safety, or rehabilitation needs. In putting together a listing of projects, an attempt has been made to plan for anticipated rehabilitation needs for the next five years.

Cost estimates were developed once the list of projects was identified and refined. The cost estimates include design, engineering, construction administration, and contingencies that may arise on the project. KSA Engineers, the airport's current consulting engineering firm, developed cost estimates for several of the projects. The detail on these estimates is provided in Appendix C. Cost estimates for each of the development projects in the CIP are in current (2012) dollars. **Exhibit 4B** summarizes the CIP for Mid-Way Regional Airport through the short term planning period of this study. **Exhibit 4C** graphically depicts development staging. Implementation of these capital projects should only be undertaken after further refinement of their design and costs through engineering analysis.

The FAA and TxDOT utilize a national priority ranking system to help objectively evaluate potential airport projects. Projects are weighted toward safety, infrastructure preservation, standards, and capacity enhancement. These entities will participate in the highest priority projects before considering lower priority projects, even if a lower priority project is considered a more urgent need by the local sponsor. Nonetheless, the project should remain a priority for the airport, and funding support should continue to be requested in subsequent years. More information related to the priority of projects will be outlined later in this study.

SHORT TERM IMPROVEMENTS

The short term CIP considers 21 projects for the five-year planning period, as presented on **Exhibit 4B** and illustrated on **Exhibit 4C**. Prior to detailing the projects, it should be noted that some projects identified in the CIP will require environmental documentation. The level of documentation necessary for each project must be determined in consultation with the FAA and TxDOT. There are three major levels of environmental review to be considered under the *National Environmental Policy Act* (NEPA) that include categorical exclusions (CATEX), environmental assessments (EA), or environmental impact statements (EIS). Each level requires more time and detailed information to be completed. Guidance on what level of documentation is required for a specific project is provided in FAA Order 1050.1E, *Environmental Impacts: Policies and Procedures*.

2013 Projects

The first year of the CIP considers projects that may be accomplished in the 2013 grant funding cycle (October 2012 to September 2013). The first project considers the expansion of the airport parking apron currently serving high activity functions adjacent to the terminal building, FBO, and self-service fuel facility. As previously discussed, the airport is currently working with TxDOT on the design of this apron expansion. Once design is completed, the construction of approximately 20,000 square yards of pavement can be undertaken that would satisfy large and small aircraft parking needs alike.

The CIP includes the acquisition of 91.05 acres of land on the east side of the airport between the existing airport boundary and Long Branch Road. As previously discussed, although the southwest side of the airport should be capable of accommodating aviation demand through the next several years, it can be advantageous for the airport to pursue additional property to meet unanticipated demand as

MID-WAY REGIONAL AIRPORT

		Development Category	Total Project Cost	FAA/TxDOT Eligible	Local Share
	SHORT TERM PROGRAM				
	2013				
1	Expand Aircraft Parking Apron	EF/DM	$2,051,600	$1,846,440	$205,160
2	Acquire Land Adjacent to East Side of Airport for Future Development and Buffer (Includes Environmental Assessment)	DM/OP/EN	1,561,300	1,405,170*	156,130
3	Engineer/Design for Taxiway Construction and Automobile Parking (Project #5 & #6)	DM	250,600	225,540	$25,060
4	Miscellaneous Annual RAMP Projects	MN	100,000	50,000	50,000
	2013 Total		**$3,963,500**	**$3,527,150**	**$436,350**
	2014				
5	Construct Hangar Access Taxiway Extending West of Main Aircraft Parking Apron	DM	$813,100	$731,790	$81,310
6	Construct Covered Automobile Parking Adjacent to Airport Drive	DM	934,400	467,200	467,200
7	Construct Aircraft Wash Rack	EN	139,600	125,640	13,960
8	Install REILs on Runway 36	SS	20,300	18,270	2,030
9	Miscellaneous Annual RAMP Projects	MN	100,000	50,000	50,000
	2014 Total		**$2,007,400**	**$1,392,900**	**$614,500**
	2015				
10	Construct T-Hangar Complex West of Terminal Building	DM	$977,400	$600,000**	$377,400
11	Install Controlled Vehicle Access Gates	SS	66,000	59,400	6,600
12	Engineer/Design for Taxiway Construction (Project #16)	DM	112,000	100,800	11,200
13	Miscellaneous Annual RAMP Projects	MN	100,000	50,000	50,000
	2015 Total		**$1,255,400**	**$810,200**	**$445,200**
	2016				
14	Construct/Upgrade Airport Perimeter Fencing - Phase I (12,350 lf)	SS	$645,600	$581,040	$64,560
15	Improve Roadway Access and Utility Infrastructure to Support Airport Development	DM/OP	265,500	73,500	192,000
16	Construct Hangar Access Taxiway Leading to Aviation Development	DM	508,100	457,290	50,810
17	Miscellaneous Annual RAMP Projects	MN	100,000	50,000	50,000
	2016 Total		**$1,519,200**	**$1,161,830**	**$357,370**
	2017				
18	Construct/Upgrade Airport Perimeter Fencing - Phase II (13,900 lf)	SS	$720,000	$648,000	$72,000
19	Pavement Rehabilitation As Needed	MN	1,961,700	1,765,530	196,170
20	Construct Linear Box Hangar Complex West of Terminal Building	DM	989,200	600,000**	389,200
21	Miscellaneous Annual RAMP Projects	MN	100,000	50,000	50,000
	2017 Total		**$3,770,900**	**$3,063,530**	**$707,370**
	TOTAL SHORT TERM PROGRAM		**$12,516,400**	**$9,955,610**	**$2,560,790**

KEY

SS - Safety/Security
EN - Environmental
EF - Efficiency
DM - Demand
MN - Maintenance
OP - Opportunity

* Funding eligibility dependent upon land needed for aviation-related development at time of grant request.

** Requires setting aside four years of NPE funds at $150,000 per year.

Exhibit 4B: CAPITAL IMPROVEMENT PROGRAM

MID-WAY REGIONAL AIRPORT

2013

1. Expand Aircraft Parking Apron
2. Acquire Land Adjacent to East Side of Airport for Future Development and Buffer (includes Environmental Assessment)
3. Engineer/Design for Taxiway Construction and Automobile Parking (*NP*)
4. Miscellaneous Annual RAMP Projects (*NP*)

2014

5. Construct Hangar Access Taxiway Extending West of Main Aircraft Parking Apron
6. Construct Covered Automobile Parking Adjacent to Airport Drive
7. Construct Aircraft Wash Rack
8. Install REILs on Runway 36
9. Miscellaneous Annual RAMP Projects (*NP*)

2015

10. Construct T-Hangar Complex West of Terminal Building
11. Install Controlled Vehicle Access Gates
12. Engineer/Design for Taxiway Construction (*NP*)
13. Miscellaneous Annual RAMP Projects (*NP*)

2016

14. Construct/Upgrade Airport Perimeter Fencing - Phase I
15. Improve Roadway Access and Utility Infrastructure to Support Airport Development
16. Construct Hangar Access Taxiway Leading to Aviation Development
17. Miscellaneous Annual RAMP Projects (*NP*)

2017

18. Construct/Upgrade Airport Perimeter Fencing (Phase II)
19. Pavement Rehabilitation as Needed
20. Construct Linear Box Hangar Complex West of Terminal Building
21. Miscellaneous Annual RAMP Projects (*NP*)

(*NP*) - Not Pictured

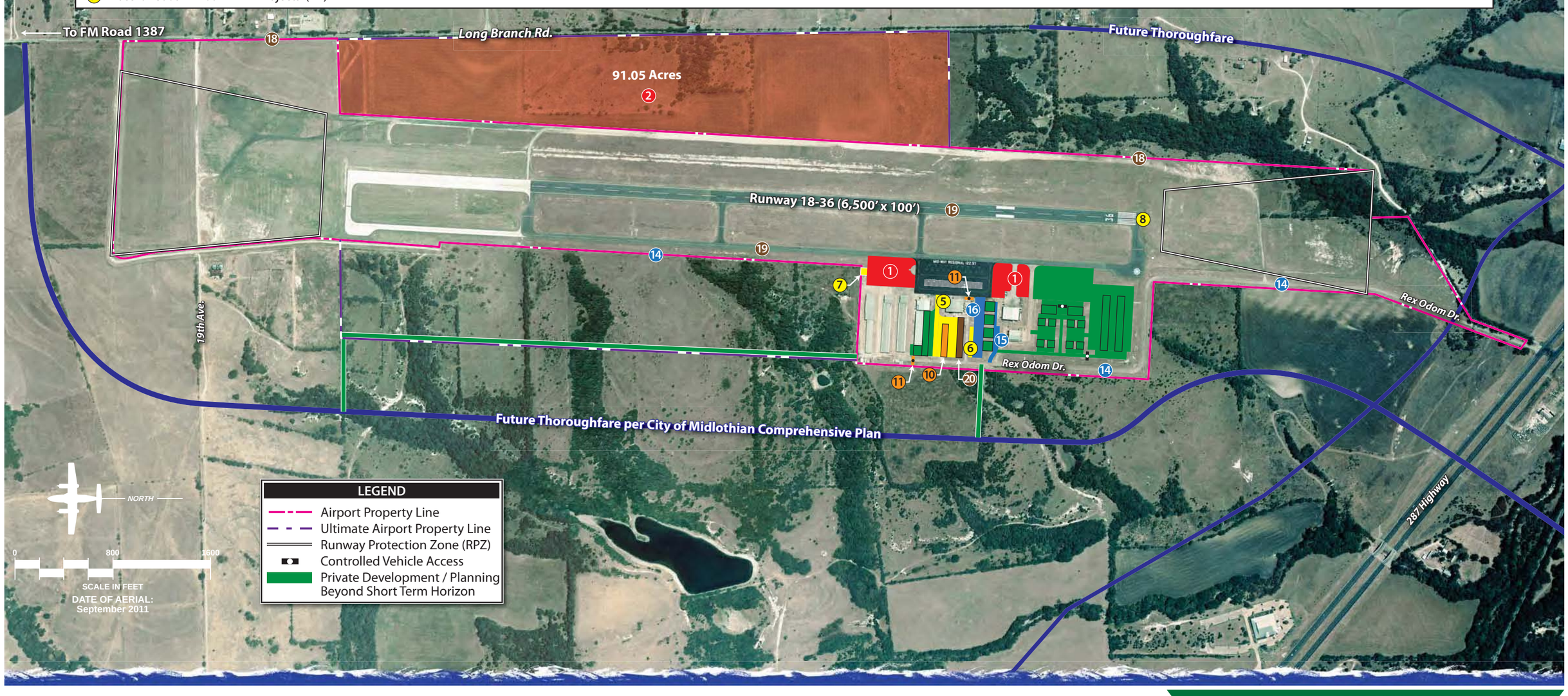


Exhibit 4C: SHORT TERM DEVELOPMENT STAGING

well as to prevent incompatible land uses encroachment. Furthermore, the costs associated with securing this property in the short term will likely be less expensive when compared to pursuing the land 10 to 20 years from this time.

Although the purchase of this property is grant eligible, Mid-Way Regional Airport would need to front the approximate $1.41 million costs associated with the acquisition. Federal and state funding is only available if the land is needed at the time of a grant request. As future demand would dictate portions of the land needed for aviation-related development, the airport could be reimbursed through a series of grants associated with other improvement projects up to the 90 percent amount that is grant eligible for the purchase of the property. In any event, prior to purchasing this property, prudent planning must factor the cost of acquiring the land as well as the costs associated with improving the land to make it suitable for development. The end goal would be for the property to be a revenue producer for airport operations as well as profitable for airport businesses who would build on the land.

Environmental analysis related to potential land acquisition on the east side of Mid-Way Regional Airport is also programmed. The level of effort necessary to meet the environmental documentation requirement for this land acquisition could be satisfied through an EA.

The need exists for additional aircraft storage hangars based upon the hangar waiting list discussed earlier in this chapter. Prior to physically constructing hangar facilities, engineering and design work associated with taxiway development extending west of the aircraft parking apron is planned. The design for additional vehicle parking is also programmed in conjunction with this project.

The final project listed in the 2013 funding cycle includes miscellaneous projects which could be funded through TxDOT's Routine Airport Maintenance Program (RAMP). Each year, TxDOT offers RAMP funds of up to $50,000, providing the airport sponsor furnishes a 50 percent match ($50,000). Thus, the airport can have up to $100,000 available for pavement maintenance or other general or routine maintenance projects that may arise during the term. The CIP considers Mid-Way Regional Airport utilizing this source of funding to the maximum extent possible each year.

2014 Projects

Once engineering and design work proposed in fiscal year 2013 is complete for the additional taxiway and vehicle parking development, actual construction of the infrastructure is proposed in 2014. The construction of a wash rack is also planned during this time, adjacent to the north side of the expanded aircraft parking apron. The CIP also calls for the implementation of REILs on Runway 36 to complement the REILs already serving Runway 18.

2015 Projects

The construction of a 10-unit T-hangar complex adjacent to the west of the terminal building is the first project programmed in fiscal year 2015. The construction of this hangar would be demand-driven, and according to airport staff, is needed in the short term to satisfy an existing hangar waiting list of 20 aircraft. It should be noted that TxDOT can

help fund hangar construction on a 75 percent/25 percent cost share basis if pavement is presently in place, which is what the plan calls for. In the case at Mid-Way Regional Airport, in order to be eligible for this funding, the airport must set aside four years' worth of non-primary entitlement (NPE) funds (to be discussed later) totaling $600,000. The remaining portion would need to be funded through local mechanisms. The installation of two electric access gates are also proposed during this time, one adjacent to the terminal building and the other leading to the hangar storage area on the north side of the airport.

In an effort to provide additional opportunities for hangar development, the next project involves the engineering and design of a taxiway adjacent to the west side of the southern portion of the aircraft parking apron that would provide access to box hangar development. This area could accommodate an array of general aviation activities, including corporate flight departments, aircraft maintenance, and aircraft storage.

2016 Projects

The first project for fiscal year 2016 is the installation of airport security fencing. In order to provide better overall security and manage the potential intrusion by wildlife into the runway environment, the fence should be planned to a height of eight feet with barbed wire strands across the top. The fencing project is divided into two phases. Phase I includes installing fencing on the south and west sides of the airport.

In order to accommodate development farther south of the terminal area, additional roadways and the extension of utilities is required. The next project addresses this demand-driven need. The main focus will be on the area between Airport Drive and the private hangars farther south. Following up the engineering and design analysis performed in fiscal year 2015, the construction of a taxiway is proposed that would allow aircraft access to future hangar development. While it is assumed that Mid-Way Regional Airport will continue to seek funding to build hangars as outlined in the short term CIP, it can also be advantageous for the airport to seek private entities to construct these facilities. In doing so, the airport can secure rental income through a ground lease and increase aviation activity on the airfield without having to incur the upfront infrastructure costs of building a hangar.

2017 Projects

The Phase II implementation of perimeter security fencing in the north and east areas of the airport is planned during fiscal year 2017. The ultimate configuration of security fencing on the east side of the airport should consider proposed property acquisition in this area. If the airport is to purchase the 91 acres previously discussed, the fencing should encompass this property and extend to Long Branch Road. Once complete, the airport would be provided with eight-foot security fencing totally enclosing all airfield operations areas.

The next project considers pavement rehabilitation. Many of the pavements associated with Runway 18-36 and associated active taxiways have recently been reconstructed or rehabilitated. While there is not an immediate need for major pavement maintenance on the runway and taxiway system, the CIP does provide

a placeholder for pavement maintenance that may arise in the coming years. It should be noted that utilization of the RAMP could also satisfy minor pavement maintenance that may be needed over the next five years.

The CIP also calls for the construction of a linear box hangar west of the terminal building at this time. This facility would be capable of accommodating private aircraft storage, similar to the T-hangars being proposed directly to the north. Similar funding eligibility would apply to these hangars, as previously discussed with proposed T-hangar construction.

Airport CIP Summary

The short term CIP includes projects that will position the airport to readily accept an increasing number of based aircraft and aviation-related activities. The plan takes advantage of development potential that currently exists on the southwest side of the airport. Furthermore, it also positions the facility for demand-driven, long term growth by securing additional property on the east side of the airport for revenue-generating enhancement.

The total investment necessary for the airport CIP is approximately $12.52 million. Of this total, approximately $9.96 million is eligible for FAA/TxDOT grant funding. The remaining $2.56 million would be the responsibility of the airport sponsor through local funding outlets.

By providing a reasonable schedule for undertaking projects over the course of the next five years, the resultant plan represents an airfield facility that fulfills aviation needs and preserves long range viability while conforming to safety and design standards. It also maintains a landside complex that can be developed as demand dictates. The planning process requires airport management to consistently monitor the progress of the airport in terms of based aircraft and operations. Analysis of aircraft demand is critical to the timing and need for several of the projects noted in the CIP.

DEVELOPMENT NEEDS

In an effort to further identify the capital needs previously discussed for the airport, the proposed projects can be categorized as follows:

1) **Safety/Security (SS)** – these are capital needs considered necessary for operational safety and protection of aircraft and/or people and property on the ground near the airport.

2) **Environmental (EN)** – these are capital needs which are identified to enable the airport to operate in an environmentally acceptable manner.
3) **Maintenance (MN)** – these are capital needs required to maintain the existing infrastructure at the airport.

4) **Efficiency (EF)** – these are capital needs intended to optimize aircraft ground operations or passengers' use of the terminal building.

5) **Demand (DM)** – these are capital needs required to accommodate levels of aviation demand. The implementation of these projects should only occur when demand for these needs is verified.

6) **Opportunities (OP)** – these are capital needs intended to take advantage of opportunities afforded by the airport setting. Typically, this will in-

volve improvements to property intended for lease to aviation-related commercial and industrial developments.

Each capital need is categorized according to this schedule. The applicable category (or categories) included are presented on **Exhibit 4B**.

CAPITAL IMPROVEMENT FUNDING SOURCES

There are generally four sources of funds used to finance airport development: airport cash flow, revenue and general obligation bonds, federal/state/local grants, and passenger facility charges (PFCs), which are reserved for commercial service airports. Access to these sources of financing varies widely among airports, with some large airports maintaining substantial cash reserves and the small commercial service and general aviation airports often requiring subsidies from local and state governments to fund operating expenses and finance modest improvements.

Financing capital improvements at the airport will not rely solely on the financial resources of the airport or the Cities of Midlothian and Waxahachie. Capital improvement funding is available through various grant-in-aid programs on both the state and federal levels. Historically, Mid-Way Regional Airport has received federal and state grants. The following discussion outlines key sources of funding potentially available for capital improvements at Mid-Way Regional 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-use 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 federal funding was enacted on February 17, 2012 and is titled the *FAA Modernization and Reform Act of 2012*.

The law authorizes the Federal Aviation Administration's (FAA) Airport Improvement Program (AIP) at $3.35 billion for fiscal years 2012 through 2015. Eligible airports, which included those in the *National Plan of Integrated Airports Systems* (NPIAS), such as Mid-Way Regional Airport, can apply for airport improvement grants. **Table 4B** presents the approximate distribution of the AIP funds. Mid-Way Regional Airport is eligible to apply for grants which may be funded through state apportionments, the small airport fund, and/or discretionary categories.

TABLE 4B Federal Airport Improvement Program Funding Distribution		
Funding Category	**Percent of Total**	**Funds***
Apportionment/Entitlement		
Passenger Entitlements	29.19%	$977,865,000
Cargo Entitlements	3.00%	$100,500,000
Alaska Supplemental	0.65%	$21,775,000
State Apportionment for Non-Primary Entitlements	10.35%	$346,725,000
State Apportionment Based on Area and Population	9.65%	$323,275,000
Carryover	10.77%	$360,795,000
Small Airport Fund		
Small Hubs	1.67%	$55,945,000
Nonhubs	6.68%	$223,780,000
Non-Primary (GA and Reliever)	3.34%	$111,890,000
Discretionary		
Capacity/Safety/Security/Noise	11.36%	$380,560,000
Pure Discretionary	3.79%	$126,965,000
Set Asides		
Noise	8.40%	$281,400,000
Military Airports Program	0.99%	$33,165,000
Reliever	0.16%	$5,360,000
Totals	100.00%	$3,350,000,000
**FAA Modernization and Reform Act of 2012*		
Source: FAA Order 5100.38C, *Airport Improvement Program Handbook*		

Funding for AIP-eligible projects is undertaken through a cost-sharing arrangement in which FAA provides up to 90 percent of the cost and the airport sponsor invests the remaining 10 percent. In exchange for this level of funding, the airport sponsor is required to meet various grant assurances, including maintaining the improvement for its useful life, usually 20 years.

The source for AIP 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, including taxes on airline tickets, aviation fuel, and various aircraft parts.

Apportionment (Entitlement) Funds

Federal AIP 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 minimum enplanement levels of at least 10,000 passengers annually. Mid-Way Regional Airport does not support commercial passenger service and as such is not eligible for these entitlement funds. General aviation airports included in the NPIAS, however, can receive up to $150,000 each year in NPE funds. These funds can be carried over and combined for up to four years, thereby allowing for completion of a more ex-

pensive project. In the past, Mid-Way Regional Airport has received NPE funding.

Other entitlement funds are distributed to cargo service airports, states and insular areas (state apportionment), and Alaska airports. The states also receive a direct apportionment based on a federal formula that takes into account area and population. The states can then distribute these funds for projects at various airports throughout the state. TxDOT distributes these funds to airports throughout the state.

Small Airport Fund

If a large or medium hub commercial service airport chooses to institute a passenger facility charge (PFC), which is a fee of up to $4.50 on each airline ticket, for funding of capital improvement projects, then their apportionment is reduced. A portion of the reduced apportionment goes to fund the small airport fund. The small airport fund is reserved for small-hub primary commercial service airports, non-hub commercial service airports, and general aviation airports.

Discretionary Funds

The remaining AIP funds are distributed by the FAA based on 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 from airports across the country are given preference in funding. High priority projects include those related to meeting design standards, capacity improvements, and other safety enhancements.

Under the AIP program, examples of eligible development projects include the airfield, public aprons, and access roads. Additional buildings and structures may be eligible if the function of the structure is to serve airport operations in a non-revenue generating capacity, such as maintenance facilities. Some revenue-enhancing structures, such as T-hangars, may be eligible if all airfield improvements have been made, but the priority ranking of these facilities is very low.

Whereas entitlement monies are guaranteed on an annual basis, discretionary funds are not assured. If the combination of entitlement, discretionary, and airport sponsor match does not provide enough capital for planned development, projects may need to be delayed.

Set-Aside Funds

Portions of AIP funds are "set-aside," designed to achieve specific funding minimums for noise compatibility planning/implementation, former military airfields (Military Airport Program), and reliever airports. Mid-Way Regional Airport does not qualify for set-aside funding.

FAA Facilities and Equipment Program

The Airway Facilities Division of the FAA administers the Facilities and Equipment (F&E) Program. This program provides funding for the installation and maintenance of various navigational aids and equipment of the national airspace system. Under the F&E program, funding is provided for FAA ATCTs, enroute navigational aids, on-airport navigational aids, and approach lighting systems.

While F&E still installs and maintains some navigational aids, on-airport facilities at general aviation airports have not been a priority. Therefore, airports often request funding assistance for navigational aids through AIP and then maintain the equipment on their own.

STATE AID TO AIRPORTS

The State of Texas participates in the federal State Block Grant Program. Under this program, the FAA annually distributes general aviation state apportionment and discretionary funds to TxDOT, which in turn distributes grants to airports within the state. 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 capital improvement program (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 Capital Improvement Program 2012-2014*, assumed that approximately $21 million in annual federal AIP grants, plus $24 million earmarked for non-primary entitlements and $16 million in state funds, would be available.

The TxDOT biennial program sets a project priority system established by the Texas Transportation Commission in order to make the best use of limited state and federal airport development funds. **Table 4C** presents the priority objectives and their associated description in order of importance.

TABLE 4C
TxDOT Project Priorities

Priority Objective	Description
Safety	Projects needed to make the facility safe for aircraft operations.
Preservation	Projects to preserve the functional or structural integrity of the airport.
Standards	Improvements required to bring the airport up to design standards for current user aircraft.
Upgrade	Improvements required to allow the airport to accommodate larger aircraft or longer stage lengths.
Capacity	Expansion required to accommodate more aircraft or higher activity levels.
New Access	A new airport providing new air access to a previously unserved area.
New Capacity	A new airport needed to add capacity or relieve congestion at other area airports.

Source: TxDOT *Aviation Capital Improvement Program 2012-2014*

Each airport project for Mid-Way Regional 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 can 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. The *FAA Modernization and Reform Act of 2012*, however, provides for the allowance of NPE funds to be utilized for hangar or fuel farm construction if all other airfield needs have been addressed.

The availability of grant funds can fluctuate from year to year. Typically, an airport can expect a grant to cover several projects in one grant-cycle. The next grant opportunity may not arise for a couple of years thereafter. This cycle occurs as TxDOT must administer grants for more than 300 airports and has relatively limited resources. As a result, local budgeting for future capital improvements should consider sporadic grant availabilities.

Routine Airport Maintenance Program

TxDOT has established the RAMP to help general aviation airports maintain and, in some instances, construct new facilities. The program was initially designed to help airports maintain airside and landside pavements, but has since 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 $100,000. **Table 4D** outlines the projects that are eligible under RAMP. It should be noted that several of the projects listed in the airport's proposed CIP are also eligible for RAMP funding.

Other State Airport Programs

TxDOT also provides a funding mechanism for terminal building and airport traffic control tower (ATCT) improvements. TxDOT has funded terminal building construction on a 50/50 basis, up to a $1.0 million total project cost. It should be noted that TxDOT can consider upgrading the total cost allowance on a case-by-case basis.

TxDOT also funds the construction of up to two ATCTs statewide each year. TxDOT has improved the program so that ATCT funding could be provided on a 90/10 basis, up to a total construction cost of $1.67 million.

It should be noted that the plan does not include new ATCT or terminal building facilities at Mid-Way Regional Airport. The terminal building was recently renovated and will be sufficient for the planning period, and aircraft activity does not warrant the need for an ATCT.

TABLE 4D Eligible Work Items Routine Airport Maintenance Program
AIRSIDE MAINTENANCE
Pavement crack seal
Pavement slurry seal/Fog seal/Rejuvenator
Pavement markings
Pavement failure repairs
Drainage maintenance
Sweeping
Herbicide application
Replacement bulbs/lamps for airside lights and approach aids
Repair/maintenance of beacon, lighting, and approach aids
AWOS part replacement
LANDSIDE MAINTENANCE (after airside has been addressed)
Repair/maintenance of vehicle parking
Hangar/terminal painting and repairs - airport owned facilities only
Security camera systems
Security fencing and gates
Access roads for AWOS installations
Navigational aids purchase and installation
NADIN Interface charges
Airport entrance signs and landscaping
Repair of fuel systems - airport owned
Storm Water Pollution Prevention Plans and Spill Prevention Control & Countermeasure Plans
CAPITAL IMPROVEMENT PROJECTS
New public vehicle parking areas
New entrance roads and hangar access roads
Aircraft wash racks
Aircraft parking aprons
Small general aviation terminal buildings
Drainage improvements
Extension of runway lighting systems
Beacon/tower replacements
Water wells, sewer lines, and septic systems
Preparation of FAA Form 7460-1 for RAMP projects
Source: TxDOT

LOCAL FUNDING

The balance of project costs, after consideration has been given to grants, must be funded through local resources. Mid-Way Regional Airport is jointly owned and operated by the Cities of Midlothian and Waxahachie and receives assistance from the cities for both operational and capital expenditures. A goal for the airport is to generate enough revenue to cover all operating and capital expenditures. As with many general aviation airports, however, this is not always possible and other financial methods are needed.

There are several alternatives for local financing options for future development at the airport, including airport revenues, direct funding (subsidizing) from the

county, issuing bonds, and leasehold financing. These strategies could be used to fund the local matching share or complete the project if grant funding cannot be arranged.

There are several municipal bonding options available, including general obligation bonds, limited obligation bonds, and revenue bonds. General obligation bonds are a common form of municipal bond which is issued by voter approval and secured by the full faith and credit of the county, and future tax revenues are pledged to retire the debt. As instruments of credit and because the community secures the bonds, general obligation bonds reduce the available debt level of the community. Due to the community pledge to secure and pay general obligation bonds, they are the most secure type of municipal bond and are generally issued at lower interest rates and carry lower costs of issuance. The primary disadvantage of general obligation bonds is that they require voter approval and are subject to statutory debt limits. This requires that they be used for projects that have broad support among the voters, and that they are reserved for projects that have the highest public priorities.

In contrast to general obligation bonds, limited obligation bonds (sometimes referred to as self-liquidating bonds) are secured by revenues from a local source. While neither general fund revenues nor the taxing power of the local community is pledged to pay the debt service, these sources may be required to retire the debt if pledged revenues are insufficient to make interest and principal payments on the bonds. These bonds still carry the full faith and credit pledge of the local community and are considered, for the purpose of financial analysis, as part of the debt burden of the local community. The overall debt burden of the local community is a factor in determining interest rates on municipal bonds.

There are several types of revenue bonds, but in general, they are a form of municipal bond which is payable solely from the revenue derived from the operation of a facility that was constructed or acquired with the proceeds of the bonds. For example, a lease revenue bond is secured with the income from a lease assigned to the repayment of the bonds. Revenue bonds have become a common form of financing airport improvements. Revenue bonds present the opportunity to provide those improvements without direct burden to the taxpayer. Revenue bonds normally carry a higher interest rate because they lack the guarantees of general and limited obligation bonds.

Leasehold financing refers to a developer or tenant financing improvements under a long term ground lease. The obvious advantage of such an arrangement is that it relieves the community of all responsibility for raising the capital funds for improvements. However, the private development of facilities on a ground lease, particularly on property owned by a government agency, produces a unique set of concerns.

In particular, it is more difficult to obtain private financing as only the improvements and the right to continue the lease can be claimed in the event of a default. Ground leases normally provide for the reversion of improvements to the lessor at the end of the lease term, which reduces their potential value to a lender taking possession. Also, companies that want to own their property as a matter of financial policy may not locate where land is only available for lease.

In addition to leasehold financing, it is acceptable for the airport to enter into some form of public/private partnership for various airport projects. Typically, this would be limited to hangar construction, but there are some examples where a private developer constructs, for example, a taxilane, then deeds it to the airport for ongoing maintenance. When entering any such arrangement, the airport must be sure that the private developer does not gain an economic advantage over other airport tenants.

FUNDING AIRPORT OPERATIONS

The FAA places several stipulations on rates and charges establishment and collection; however, two primary considerations need to be addressed. First, the rates and charges must be fair, equally applied, and resemble fair market value. Second, the rates and charges collected must be returned to and used only by and/or for the airport. In other words, the revenues generated by airport operations cannot be diverted to the general use of the Cities of Midlothian and Waxahachie. The FAA requires funds to be used at airports as these funds are many times needed to either support the day-to-day operational costs or offset capital improvement costs.

Mid-Way Regional Airport is currently supported by a rates and charges structure. Facilities and services that currently support revenue collection include fuel flowage fees, rental income from hangars and ground leases, aircraft parking fees, and agricultural leases. The purpose of this analysis is to gather comparable rates and charges so that the airport can determine the appropriateness of the existing rate structure and further generate the opportunity to establish other means of revenue collection or establish future rates and charges.

Given its location to other airports, the rates and charges structure at Mid-Way Regional Airport needs to be somewhat competitive with other airports in the region. If the costs are too high, some users may choose other airports. On the other hand, if rates and charges are set too low, some facilities will not be capable of being amortized, thus requiring a subsidy from the city. The following sections provide typical revenue generators for an airport, some of which are currently being practiced at Mid-Way Regional Airport.

AIRPORT RATES AND CHARGES ANALYSIS

As part of this study, a rates and charges survey of other airports was conducted. All airports included in the survey are general aviation airports that maintain certain similarities to Mid-Way Regional Airport, whether it be size (acreage), number of operations, number of based aircraft, etc. Many of the airports (Arlington Municipal, Dallas Executive, Lancaster Regional, Grand Prairie Municipal, Fort Worth Spinks, Collin County Regional, Mesquite Metro, Addison, Lone Star Executive, and Texas Gulf Coast Regional) are classified as reliever airports by the FAA in either the Dallas/Fort Worth or Houston metropolitan areas and serve to provide pilots with an alternative to using commercial service airports. Of the 20 airports surveyed, 15 are located within the State of Texas. Furthermore, eight are located within approximately 50 miles of Mid-Way Regional Airport. The other five were selected to represent specific regions within the United States.

The surveys include information regarding rates and charges structures for categories including tiedown fees, hangar rates, ground lease rates, non-aviation lease rates, and fuel flowage fees. The results of the analysis are presented on **Exhibit 4D**. Due to either unavailable information or the facility/service/fee not being provided at the airport, some rates and charges were not obtained and, therefore, were unable to be compared.

Aircraft Parking/Tiedowns

Aircraft parking fees, also referred to as tiedown fees, are typically assessed to those aircraft utilizing a portion of an aircraft parking area that is owned by the airport. These fees are most generally assessed on a daily or monthly basis, depending upon the specific activity of a particular aircraft.

Aircraft parking fees can be established in several different ways. Typically, airports assess aircraft parking fees in accordance with an established schedule in which an aircraft within a designated weight and/or size pays a similar fee (i.e., small aircraft, single engine aircraft). Aircraft parking fees may also be charged according to a "cents per 1,000 pounds" basis in which larger aircraft with increased weights would obviously pay more for utilizing the aircraft parking apron. There are also instances in which aircraft parking fees are not assessed on an airport.

An airport sponsor may also include in a lease agreement with an aviation-related commercial operator at the airport to collect aircraft parking fees on portions of an aircraft parking apron in which the airport does not own or is leasing to a commercial operator, such as an FBO. As a result, the airport could directly collect parking fees from an aircraft utilizing this space or allow the commercial operator to collect the parking fee, in which the agreement may allow the commercial operator to retain a portion of the parking fee as an administrative or service fee.

Aircraft parking fees can be assessed on a daily or monthly basis. Daily aircraft parking fees are typically assessed to transient aircraft utilizing the airport on a short-term basis, while monthly fees are charged to aircraft that utilize a particular parking area for the permanent storage of their aircraft. Monthly aircraft parking fees are often assessed at airports that contain a waiting list for aircraft hangar storage space. It is also common practice at many airports to waive a daily aircraft parking fee in the event the aircraft purchases fuel prior to departing the airport.

The rates and charges analysis conducted by the consultant has indicated that overnight parking fees can vary from $1 to $30 depending on the type of aircraft, while monthly aircraft parking fees can range between $25 to $280 depending on the type and size of aircraft.

At Mid-Way Regional Airport, aircraft tiedown fees are currently managed by the FBO. Through its lease agreement with the FBO, the airport collects 35 percent of revenues that the FBO levies on monthly parking fees. According to the survey, the FBO charges $45 for monthly tiedowns, making it one of the lowest tiedown fees in the market area. The FBO does not charge for an overnight parking fee. This is not uncommon, as most general aviation airports either collect a small overnight fee or waive the fee for transient aircraft that purchase fuel.

Typically, airports that are located in close proximity to large metropolitan ar-

Airport	Location	Based Aircraft	Number of Operations	Airport Size (Acreages)	Tiedowns	Hangars (Monthly)	Ground Leases (per square foot per year)	Non-Aviation Leases	Fuel Flowage (per gallon)
Mid-Way Regional Airport	Midlothian/Waxahachie, TX	87	37,300	320	$45 per month	T-Hangars: $186 - $219 Box Hangars: $730 - $1,500	Land: $0.13 Terminal: $11.00	Agricultural: $5 per acre per year	$0.05
Arlington Municipal Airport	Arlington, TX	235	75,200	500	$8 per night $45 per month	T-Hangars: $215 - $315 Conventional Hangars: $1,442	Land: $0.20 - $0.25 Office: $19.00 - $22.00 Hangar: $1.83	N/A	$0.10 Fuel rights license fee: $22,195
Dallas Executive Airport	Dallas, TX	185	55,900	1,070	$150 per month	T-Hangars: $100 - $450	Land: $0.13 - $0.17 Terminal: $4.17 Hangar: $2.00	N/A	$0.07
Lancaster Regional Airport	Lancaster, TX	142	67,100	548	$25 - $50 per month	T-Hangars: $150 - $275 Box Hangars: $800 - $950 Conventional Hangars: $1,200 - $1,395	Land: $0.13	N/A	$0.06
Grand Prairie Municipal Airport	Grand Prairie, TX	186	63,600	162	$4 per night $30 per month	T-Hangars: $170 - $512 Conventional Hangars: $475 - $950	Land: $0.12 - $0.15 Office: $1.38 - $5.50 Hangar: $2.50	N/A	$0.20
Fort Worth Spinks Airport	Fort Worth, TX	170	55,200	822	$5 - $15 per night $46 - $90 per month	T-Hangars: $180 - $450 Conventional Hangars: $639 - $742	Land: $0.16 - $0.22	$1,000 annual flat fee	$0.12
Collin County Regional Airport	McKinney, TX	200	82,900	660	$15 per night $75 per month	T-Hangars: $400 Box Hangars: $585 - $650	Land: $0.30	Counter Space: $150 per square foot per year	$0.12
Mesquite Metro Airport	Mesquite, TX	183	100,000	400	$10 per night $65 per month	T-Hangars: $210 - $250 Box Hangars: $1,200	Land: $0.21 Office/Hangar: $1.32 - $4.50	N/A	None - City is FBO
Addison Airport	Addison, TX	588	91,100	368	$15 - $30 per night $105 - $280 per month	T-Hangars: $290 - $380 Box Hangars: $550 - $650	Land: $0.36 - $0.48	N/A	$0.12
North Texas Regional Airport	Sherman/Denison, TX	150	53,300	1,410	$40 - $150 per month	T-Hangars: $185 - $235	Land: $0.21 Office: $1.58	Land: $0.07 - $0.21 per square foot per year	$0.10
Lone Star Executive Airport	Conroe, TX	268	57,000	1,277	N/A	T-Hangars: $250 - $350	Land: $0.26 - $0.31	N/A	$0.04
Majors Airport	Greenville, TX	31	35,600	1,525	$5 per night $40 per month	T-Hangars: $180 - $250	Land: $0.23 - $0.68 Office: $5.00	N/A	$0.05
Mineral Wells Municipal Airport	Mineral Wells, TX	75	22,800	505	$25 per month	T-Hangars: $175-$200	Land: $0.15 Office: $1.50	Industrial: $1.25 per square foot per year	None - City is FBO
Gainesville Municipal Airport	Gainesville, TX	59	17,800	1,336	$1 per night	T-Hangars: $100 - $195 Conventional Hangar: $1,500	Land: $0.13 - $0.17	N/A	None - City is FBO
Texas Gulf Coast Regional Airport	Angleton, TX	70	78,000	674	$10 per night $50 per month	T-Hangars: $180 - $260	Land: $0.05 - $0.32	Restaurant: $0.36 per square foot per year Rental car lease: $250 per month plus 10% commission	None - City is FBO
Kerrville Municipal Airport	Kerrville, TX	140	59,800	528	$7 per night $50 per month	T-Hangars: $250 - $275	Land: $0.30	N/A	$0.09
Payson Airport	Payson, AZ	60	41,900	80	$5 per night $40 per month	T-Hangars: $250 - $300 Box Hangars: $600	N/A	N/A	$0.03
Sierra Vista Municipal Airport	Sierra Vista, AZ	66	147,600	72	$4 per night $45 per month	T-Hangars: $244 - $315 Box Hangar: $1,500	Land: $0.09 - $0.43 Terminal: $21.00	N/A	None - City is FBO
Coolidge Municipal Airport	Coolidge, AZ	38	20,800	1,268	$25 - $35 per month	Private Hangars - rental amount unknown	Land: $0.05 - $0.15	Land: $0.10 per square foot per year	$0.05
Plant City Airport	Plant City, FL	88	48,000	199	$40 per month	T-Hangars: $246	N/A	N/A	$0.05
Wellington Municipal Airport	Wellington, KS	34	18,100	190	N/A	T-Hangars: $135	Land: $0.09 - $0.16	N/A	None - City is FBO

Source: Airport Records; TxDOT Aviation; Airport 5010 Records; North Central Texas Council of Governments; Coffman Associates analysis

eas, have limited parking space and/or a long hangar waiting list, and that encourage based aircraft owners to use hangars for aircraft storage will charge higher monthly tiedown fees. Due to the high temperatures in the area, especially during the summer months, there is limited demand for tiedown space since aircraft are directly exposed to the heat and could be damaged during severe thunderstorm activity.

Aircraft Storage Hangars

There are several types of aircraft storage hangars that can accommodate aircraft on an airport. In order to establish hangar fees, an airport typically factors in such qualities as hangar size, location, and utilities. Aircraft hangar fees are most often charged on a monthly basis.

Common aircraft storage hangars are typically categorized as T-hangars, box (executive) hangars, and conventional hangars. T-hangars provide for separate, single aircraft storage areas typically "nested" together into a singular structure. Conventional hangars provide a larger enclosed space that can accommodate larger multi-engine piston or turbine aircraft and/or multiple aircraft storage. Conventional hangars can also be utilized by aviation-related commercial operators for their business activities on an airport.

Location can also play a role in determining hangar rates. Aircraft storage hangars with direct access to improved taxiways/taxilanes and adjacent to aviation services being offered at an airport can oftentimes be more expensive to rent. In addition, the type of utility infrastructure being offered to the hangar can also help determine storage fees. Smaller aircraft storage hangars, such as a T-hangar or small box hangar, can either be granted access through a manual sliding door or electric door. It is common for hangars that provide electric doors to have higher rental fees as the cost associated with constructing these hangars exceed the cost associated with simpler structures.

At some airports, hangar facilities are constructed by the airport sponsor, while at other airports, hangars are built by private entities. In some cases, airports have both public and private hangar facilities available. Hangars can be expensive to construct and offer minimal, if any, return on investment in the short term. In order to amortize the cost of constructing hangars, lease rates should be developed at a minimum to recover development and finance costs.

According to the survey, T-hangars range from $100 to approximately $500 per month, depending on several factors previously listed. Larger conventional-style hangars can be leased per aircraft space or for the entire hangar. Monthly rates similar to those for individual T-hangar units often apply to leased aircraft space in a conventional hangar. As such, box and conventional hangar rates average between approximately $500 to as much as $1,500 per month.

It was determined that hangar rates at Mid-Way Regional Airport fall in line with the average T-hangar and box/conventional hangar rental rates as those at the surveyed airports. Many factors can determine hangar storage rental rates, including the size of hangar, type of hangar, utilities provided, aircraft access, airport service area, etc. Given its close proximity to the Dallas/Fort Worth Metroplex and the desirable condition of the hangar facilities at the airport, hangar

rental rates should remain competitive with the regional market value.

Ground Lease/Office Rental

Ground leases can be applied to aviation and non-aviation development on an airport. Also known as a land lease, a ground lease can be structured to meet the particular needs of an airport operator in terms of location, terrain features, amount of land needed, and type of facility and utility infrastructure available on-site.

One of the single-most valuable assets available to an airport is the leasable land with access to the runway/taxiway system. For aviation-related businesses, a location on the airport is critical and high visibility locations preferred. Airport property is available for long term lease but, in most cases, it cannot be sold. At the expiration of the lease, and any extensions, the improvements on the leased land typically revert back to the airport sponsor. In order for this arrangement to make financial sense to the private developer or financer, typical ground lease arrangements are for 20 to 30 years in length and include optional extension provisions. Those who lease land on an airport are typically interested in constructing a hangar for their own private use, for sub-lease, or for operation of an airport business. Therefore, the long term lease arrangement is important in order to obtain capital funding for the construction of a hangar or other type of facility. It should also be noted that ground leases, as with any airport lease arrangement, should include the opportunity to periodically review the lease and adjust the rate according to the CPI.

Ground leases are typically established on a yearly fee schedule based upon the amount of square feet leased. The amount charged can vary greatly depending on the level of improvements to the land. For example, undeveloped land with readily accessible utilities and taxiway/apron access can generate more revenue than unimproved property. Previous surveys at other airports across the country conducted by the consultant have determined ground lease rates to range from $0.08 per square foot per year to approximately $1.00 per square foot per year. In some instances, lease rates were well over $1.00 per square foot per year. Typically, airports in larger metropolitan areas set land lease rates at approximately $0.25 cents per square foot per year. According to the rates and charges analysis done for this study, the airports in the Dallas/Fort Worth Metroplex have land rental rates ranging from $0.12 per square foot per year up to $0.48 per square foot per year. From the survey, it appears that Mid-Way Regional Airport's rates fall within the lower range of other airports in the market area. Currently, the airport has only one land lease on the field, set at $0.13 per square foot per year.

Some airports will have other leasable space available. For example, airports with a terminal building may have office or counter space available for aviation and non-aviation related businesses. Some example businesses could include commercial airlines, aircraft sales, flight instruction, aircraft insurance, and a restaurant. The airport has recently negotiated a lease with a flight training/simulator company to lease space in the upstairs of the newly renovated terminal building. The rate structure on this terminal lease is set at $11 per square foot per year.

As previously mentioned, under certain circumstances, an airport sponsor may utilize portions of the airport for non-aviation purposes such as commercial and/or industrial development if certain areas are not needed to satisfy aviation demand or are not accessible to aviation activity. Prior to an airport pursuing a ground lease with a commercial operator for non-aviation purposes, the sponsor must work with TxDOT and formally request a land use release from the FAA. The release does not allow for the sale of the property but provides the airport approval to utilize the land for non-aviation purposes.

It should be noted that the airport currently leases land on the north side of the airport for agricultural-related purposes (hay crop) at a rate of $5 per acre per year. No other airports included in the survey indicated that they have current agricultural leases in effect. Previous surveys conducted by the consultant have determined these types of leases can range between $20 and $35 per acre per year. Other agreements call for the airport sponsor to collect a percentage of gross sales that the lessee makes from the crop production. Although not a major revenue source, other benefits provided to the airport must be considered with such leases. It can supplement revenue for vacant land that is otherwise undeveloped. In the case of Mid-Way Regional Airport, a local farmer mows and maintains property on the north side of the airport, which provides an aesthetically pleasing appearance and limits vegetative growth, which can limit wildlife hazards to the airfield.

Fuel Sales and Flowage

Fuel sales are typically managed at an airport in one of two ways: the airport sponsor acts as the fuel distributor or fueling operations are sub-contracted to an FBO. If the airport sponsor acts as the fuel distributor, then the airport would receive revenues equal to the difference between wholesale and retail prices. Of course, there are added expenses, such as employing people to fuel the aircraft and the cost of acquiring and maintaining fuel storage and vending mechanisms.

When these services are undertaken by an FBO, the airport sponsor typically receives a fuel flowage fee per gallon of fuel sold by or delivered to the FBO. This is the case at Mid-Way Regional Airport. By way of agreement with the airport sponsor, the FBO is required to pay a fuel flowage fee for each gallon of fuel sold. In the case of self-fueling entities, a fuel flowage fee could apply for each gallon of fuel dispensed. Fuel flowage fees are typically paid on a "cents per gallon" basis. In some instances, fuel flowage fees will be established based upon the type of aviation activity. For example, commercial airline service operators may be assessed a higher fuel flowage fee than general aviation aircraft or no fuel flowage fee at all if being assessed a landing fee (to be discussed in the next section). Fuel flowage fees can also be distinguished by type of fuel (100LL or Jet A). The owner of the fuel farm can also be the airport sponsor or an FBO operator. If the airport sponsor owns the fuel farm and the FBO operator undertakes the fueling activities, then a separate fuel storage fee can be charged or a higher fuel flowage fee may be assessed.

Fuel flowage fees range from $0.03 cents per gallon to $0.20 cents per gallon based upon the airports studied in the survey. Mid-Way Regional Airport is at the low end of this range, currently collecting $0.05 per gallon of fuel sold by the FBO. Fuel flowage fees have historically accounted for a very small percentage of overall airport revenues (averaging less than three percent since 2007). Fuel flowage fees at other airports typically represent a much larger share of their revenue (over 10 percent). Obviously, the volume of fuel sales will dictate overall revenues moreso than the rate; however, the rate should be set to be in line with the regional market value. It is expected that the airport could experience an increase in fuel flowage fees as a result of the recently completed runway extension providing 6,500 feet of usable length.

Alternative Sources for Revenue Generation

Landing Fees: Landing fees typically only apply to larger aircraft, such as those over 60,000 pounds, for example, and only those involved in commercial airline or air taxi operations. Landing fees are not common on general aviation airports and are generally discouraged due to collection difficulty. Moreover, landing fees are somewhat discouraging to aircraft operators, who will many times elect to utilize a nearby airport that does not collect a landing fee.

When landing fees are assessed, they are most commonly based upon aircraft weight and a "cents per 1,000 pounds" approach. In addition, some airport sponsors may use a flat fee approach wherein aircraft within a specified weight range are charged the same fee.

Landing fees may be collected directly by the airport sponsor or an airport may have an agreement with a commercial operator to collect landing fees. Similar to what was discussed with aircraft parking fees, under this scenario, the agreement may allow the commercial operator, such as an FBO, to retain a portion of the landing fee as an administrative or service fee.

Temporary Uses/Special Events: A variety of temporary uses can generate additional revenues based upon an airport's supply of land, parking, and building facilities. Governmental entities can use airports as staging areas to fight fires, respond to emergencies, test equipment and aircraft, and carry out training exercises. Airports can also lease land for temporary storage of vehicles and equipment or event parking. Open houses, air shows, and other special events can also take place at airports.

Mid-Way Regional Airport has historically hosted open house/air show events that generate revenue for the facility. The recent completion of the terminal building renovation also provides a new conference center that can accommodate meeting venues for companies and organizations. It is important to note that airfield operations and safety for aviation purposes are first priority and all special events and other temporary uses should be properly planned with the FAA and TxDOT.

Mineral Extraction: Airport sponsors have the ability to lease land to companies that can extract natural mineral resources that lie underneath airport property. Based on negotiated terms, mineral, oil, natural gas, and water extraction can pay significant royalties to an airport sponsor. Several airports in the Dallas/Fort Worth Metroplex are currently

experiencing revenue enhancement as a result of mineral extraction.

HISTORICAL OPERATING REVENUES AND EXPENSES

The previous sections of this chapter have presented a CIP and identified the primary sources of funding for continued airport development. Approximately 22 percent of the total development cost over the next five years is anticipated to be the responsibility of Mid-Way Regional Airport. This section is intended to discuss the on-going financial operation of the airport and to identify revenue sources as well as expenses. For purposes of this discussion, grant funded capital improvements are not included.

While the operating revenues and expenses for an airport are an important factor, these analyses should be included in context with the overall benefit that a fully functional airport brings to a community. While some general aviation airports earn enough to be self-sufficient, most do not. Therefore, communities which support general aviation airports are relying on the overall community benefit the airport brings such as on and off-airport economic development, enhanced education and training opportunities, enhanced medical services, and improved recreation and tourism opportunities.

At the outset, it must be emphasized that feasibility analyses such as these must be based on many assumptions. In practice, projects will be undertaken when demand actually warrants, thus changing the 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 sufficient to meet project costs). As a result, the assumptions and analyses prepared for this study must be viewed in the context of their primary purpose: to examine whether the airport can operate profitably with a goal to generate sufficient revenues to offset capital investment requirements.

Table 4E presents historical operating revenues and expenses for Mid-Way Regional Airport over the past four years. The largest revenue source by far for the airport is the rental of airport facilities (hangars and terminal space), accounting for approximately 70 percent of overall revenues during the past four years. Fuel flowage fees collected from the FBO and miscellaneous revenues have also served as revenue generators. The airport also collects land lease revenues and a percentage of aircraft parking fees levied by the FBO, although these items have made up a small percentage of overall revenue production in recent years. As can be seen from the table, there was a significant increase in hangar rental income beginning in fiscal year 2009-2010 as a result of additional box hangar development on the field.

Generalized operating expenses for the airport include salaries and benefits, professional services, utilities, maintenance, insurance, advertising and special events, supplies and equipment, memberships and fees, and miscellaneous expenses. Salaries and benefits are the largest expense category, which includes personnel costs associated with those individuals who help maintain Mid-Way Regional Airport. Beginning in fiscal year 2009-

2010, significant miscellaneous expenses were realized that carried over into the next year. The costs associated with hangar construction in fiscal year 2009-2010 were fronted by the Cities of Midlothian and Waxahachie (primarily Waxahachie due to the location of the hangars on the airport). As a result, the airport has an agreement to remit the hangar rental payments on these hangars to the cities until the loans on these hangars are retired.

TABLE 4E
Historical Operating Revenues and Expenses
Mid-Way Regional Airport

CATEGORY	FY 2007-2008	FY 2008-2009	FY 2009-2010	FY 2010-2011
Operating Revenues				
Fuel Flowage Fees	$8,773	$6,803	$6,213	$4,961
Rental Income - Land & Aircraft Parking	707	280	2,812	1,697
Rental Income - Hangars	171,920	191,492	305,030	304,508
Miscellaneous Revenues	11,490	9,467	25,534	28,514
Total Operating Revenues	***$192,889***	***$208,043***	***$339,589***	***$339,680***
Operating Expenses				
Salaries and Benefits	$124,658	$147,522	$172,936	$179,829
Professional Services	3,963	2,304	2,761	2,000
Utilities	37,004	32,092	24,856	25,953
Maintenance	89,489	88,113	39,569	29,800
Insurance	16,255	16,898	16,062	15,031
Advertising and Special Events	7,123	7,170	6,480	10,083
Supplies and Equipment - Office and Personnel	25,884	15,944	13,319	15,152
Memberships and Fees	1,734	2,089	1,801	1,945
Miscellaneous	0	0	135,185	140,430
Total Operating Expenses	***$306,110***	***$312,133***	***$412,969***	***$420,225***
Operating Income / (Loss)	***($113,221)***	***($104,090)***	***($73,380)***	***($80,545)***

Source: Airport Records

While the revenues generated at Mid-Way Regional Airport are significant, they are oftentimes not enough to fund both airport operating expenditures and capital improvement requirements. Most general aviation airports in this country do not generate enough revenues to cover operating expenses, which has historically been the case at Mid-Way Regional Airport. Nearly all need some level of community tax or bonding support to fund capital expenditures.

Although not included in the table, the Cities of Midlothian and Waxahachie have historically contributed $40,000 each ($80,000 total) to the airport fund each year to help offset expenditures. With this contribution, the airport's total operating budget has hovered around the "break even" point the past two years.

FUTURE OPERATING REVENUES AND EXPENSES

Operating revenues and expenditures have been forecast and were averaged to present an annual cash flow figure for the short term (1-5 years) and long term (11-20 years). The projections were made utilizing several basic assumptions. Any cash flow projection should be taken for what it is, a point-in-time analysis that is dependent upon the specific assumptions made. Obviously, if any of the assump-

tions change, this analysis would no longer be applicable. However, the analysis is done to present methods for improving the airport's financial position over time. The basic assumptions utilized include:

Revenues

- Additional rent storage will become available once new hangars are constructed.
- The construction of a 10-unit T-hangar complex and linear box hangar complex was assumed in the short term planning period, and additional T-hangar and box/executive hangar complexes were considered through the long term. T-hangar rents were assumed at $300 per month, while linear box hangar rents were averaged at $1,000 per month.
- Land leases for private aviation development were assumed during the short term planning horizon at a rate of $0.13 per square foot per year. Through the long term, additional aviation development is considered on the southwest side of the airport. Rental rates are assumed to increase to $0.17 per square foot per year through the long term.
- Fuel flowage fee rates were assumed to increase to $0.08 per gallon by the long term. It is also expected that fuel flowage will increase at an annual rate of four percent based on increased aircraft activity as projected.
- Non-aviation development was assumed to occur by the long term planning horizon, but only in the event that the airport purchases property on the east side of the airport. Land rental rates for non-aviation development were averaged at $0.17 per square foot per year through the long term.
- A line item entitled "Terminal Revenue" has been added that includes a recently negotiated lease with a flight training/simulator company on the second floor of the terminal building. A conservative amount was also applied to this line item through the long term that would assume the airport collecting revenue for the use of the conference center as well as leasing space for a restaurant.

Expenses

- Current airport management structure will continue.
- Similar FBO lease structure will remain in effect.
- Hangar loans will be secured to build additional T-hangars and linear box hangars (included in "Miscellaneous" expense).
- Remaining expenses projected using average growth rates of one percent to three percent annually.

Future Cash Flow Analysis

Revenues are anticipated to continue to grow with aviation activity and an overall positive economic outlook, as presented in **Table 4F**. As more aircraft base at the airport, additional revenues from hangar rentals, land leases, and fuel sales will increase proportionately. Revenue enhancement opportunities should also be recognized as a result of the newly renovated terminal building.

Rates and fees should be increased based upon the consumer price index (CPI) or other similar economic index. Where airport fees are considered too low, additional increases should be undertaken to bring the fees up to current market standards. The current land lease rates and fees are considered on the lower end of the market rate in the Dallas/Fort

Worth Metroplex. As such, an increase is recommended through the long term. The airport should have in place adjustment terms in its land leases. Some leases may be increased annually, while others are renegotiated at specified intervals. The cash flow analysis did consider future market corrections which assumed land lease rates increasing from $0.13 per square foot per year to $0.17 per square foot per year.

TABLE 4F
Projection of Average Annual Operating Revenues and Expenses
Mid-Way Regional Airport

CATEGORY	Short Term	Long Term
Operating Revenues		
Fuel Flowage Fees	$10,230	$21,270
Rental Income - Land & Aircraft Parking	5,780	61,730
Rental Income - Hangars	370,170	595,390
Miscellaneous Revenues	30,270	38,820
Terminal Revenue	14,670	21,300
Total Operating Revenues	***$431,120***	***$738,510***
Operating Expenses		
Salaries and Benefits	$190,910	$244,830
Professional Services	2,060	2,330
Utilities	26,740	41,180
Maintenance	30,710	34,780
Insurance	15,490	17,540
Advertising and Special Events	10,700	13,730
Supplies and Equipment - Office and Personnel	15,610	17,690
Memberships and Fees	2,000	2,270
Miscellaneous	172,910	304,740
Total Operating Expenses	***$468,770***	***$679,090***
Operating Income / (Loss)	***($37,650)***	***$59,420***

Source: Coffman Associates analysis

The development concept calls for the future acquisition of property adjacent to the east side of the airport which, in doing so, would open up additional land for aviation and non-aviation development. The analysis considers additional development not only in the southwest area of the airport, but also on the east side of the airport should this property be purchased.

Privately financed and constructed T-hangar and box hangars could occur at the airport; however, those revenues would be included in the land lease rental category. The cash flow analysis assumed that the airport would construct a 10-unit T-hangar complex and linear box hangar complex during the short term. These facilities are not high-priority grant eligible items, so the analysis here considered that the Cities of Midlothian and Waxahachie would help finance construction. Additional hangar construction, both private and by the airport, is assumed through the long term.

Revenue from fuel sales is also forecast to increase, as future fuel contracts were assumed to include a higher fuel flowage fee coupled with increased fuel flowage as a result of additional runway length recently being provided on Runway 18-36. The current rate of $0.05 per gallon was assumed to increase to $0.08 per gallon by the long term.

Cash flow projections indicate future revenues should rise at a greater rate than expenses, and that the airport could become financially self-sufficient in the long term. If this projection holds true, the annual contributions made by the Cities of Midlothian and Waxahachie would not be needed to offset operating expenses. If the contributions continued under this scenario, the airport could utilize these funds to match capital improvements grants to improve airside and landside facilities on the airfield.

Obviously, the greatest revenue would continue to be through the construction of T-hangars and box hangars; however, expenses would also grow in relation to the loans accrued with this development. Significant growth in land lease rental could be realized. Without this projected revenue stream, the airport would likely continue to operate at a deficit. As a result, it should be considered a high priority for the airport to encourage private aviation development as it would require less investment to develop.

AIRPORT DEVELOPMENT STRATEGIES

As previously discussed, Mid-Way Regional Airport has opportunities for future development. Given the airport's proximity to the Dallas/Fort Worth Metroplex and major highway infrastructure, the airport is positioned to continue to meet the needs of aviation activities through the long term. The following highlights development strategies that the airport should continue to monitor in the coming years.

AIRPORT MANAGEMENT AND FIXED BASE OPERATIONS

Daily management, maintenance, and operation of Mid-Way Regional Airport are the responsibility of a full-time airport manager. A full-time administrative assistant provides additional administrative support for the airport. Additional airport staff includes one full-time maintenance employee that helps maintain airport grounds and infrastructure. Airport management is available from 8:00 a.m. to 5:00 p.m., Monday through Friday.

The airport has recently entered into an 18-month lease agreement with Southern Star Aviation to provide FBO-related services on the airport. It should be noted that Southern Star Aviation has served as the airport's FBO in the past. Southern Star Aviation provides the following functions and services as a result of its lease with Mid-Way Regional Airport:

- 100LL and Jet A fueling;
- Use of courtesy cars;
- Aircraft maintenance;
- Flight planning;
- Operate and maintain the lower level of the airport terminal building and hangar facility;
- Operate and maintain the aircraft parking apron;
- Maintain the terminal area grounds;
- Monitor the UNICOM frequency;

Southern Star Aviation conducts its FBO activities from the lower level of the air-

port terminal building and the adjacent hangar facility. It is open from 8:00 a.m. to 7:00 p.m., Monday through Saturday and from 9:00 a.m. to 7:00 p.m. on Sunday. FBO personnel also provide on-call after-hours service when requested. Under the lease agreement, Mid-Way Regional Airport receives a $0.05 per gallon fuel flowage fee and 35 percent of aircraft parking fees that are collected by the FBO.

FBO management methods vary for general aviation airports across the country. Some airport sponsors employ management staff that can handle not only the daily management of the airport, but also provide the FBO-related functions, including fueling services. As presented in the rates and charges analysis earlier on, certain airports in the region currently operate under this arrangement. Other airports, similar to Mid-Way Regional Airport, enter into a lease agreement with a private entity that, in turn, provides FBO services to the flying public.

There are several advantages that the current FBO management structure being implemented at Mid-Way Regional Airport provides. Daily personnel service is offered without the expense of additional airport personnel to the cities. It is ideal that an airport offers full service fueling operations a minimum of eight hours per days, seven days per week. In the case of Mid-Way Regional Airport, full service fueling is available on average ten hours per day, seven days per week through Southern Star Aviation. A minimum of two additional employees would need to be added to the airport's payroll to sustain the fueling services currently being offered through the FBO. Moreover, the airport's FBO provides stability as it is also an airport business that provides aircraft maintenance services, which generates additional activity on the airfield.

After having discussed the current FBO lease agreement with airport staff and reviewing the airport's financial position, there are recommendations the airport should consider in future lease agreements with an FBO entity that include:

- Receive compensation for the use of the terminal building to house FBO offices, flight planning, counter space, etc.;
- Receive compensation for the use of the adjacent hangar facility that houses FBO aircraft maintenance and storage activities;
- Preparation of monthly and annual reports related to fueling operations, number of aircraft serviced, etc.

Considering all factors, the current arrangement is likely the best option for Mid-Way Regional Airport and the Cities of Midlothian and Waxahachie. Future changes in FBO or other industry practices as well as aviation activity at the airport could result in re-evaluating this position.

TAX INCREMENT REINVESTMENT ZONE

As part of this study, an evaluation is to be made on the potential development and implementation of a tax increment reinvestment zone (TIRZ) that could potentially encompass Mid-Way Regional Airport. A TIRZ is a political subdivision of a municipality or county created to implement tax increment financing. TIRZs help finance the cost of redevelopment and encourage development in an area that would otherwise not attract sufficient market development in a timely manner. Taxes attributable to new improvements are set aside in a fund to help

finance public improvements within the boundaries of the zone.

With federal and state sources for redevelopment generally less available, local governments have turned to tax increment financing (TIF) to help fund improvement projects in their localities. The State of Texas utilized TIF by creating the TIRZ which may be initiated by a city, county, or by petition of owners whose total holdings in the zone consist of a majority of the appraised property value. Once a base year is established for tax generation in the TIRZ, the taxes collected each subsequent year within the zone are dedicated to a capital project in that zone as determined by a board of directors. It is assumed that property values will increase over the lifetime of the TIRZ, and the property taxes collected on this increase will constitute the "increment" collected in the TIF fund that would be eligible for project costs within the TIRZ.

There are two ways that TIF can be initiated. First, it can be started by petition of the affected property owners. The petition must be submitted by owners of property that constitutes at least 50 percent of the appraised property value within the proposed zone. Secondly, it may be initiated by a municipality without the need for a petition, and only if it meets at least one of the following three criteria:

1) The area's present condition must substantially impair the municipality or county designating the TIRZ, slow the provision of housing accommodations, or constitute an economic or social liability to the public health, safety, and welfare. This condition must exist because of the presence of one or more conditions such as substantial or deteriorating structures, inadequate sidewalks or street layout, faulty lot layouts, unsanitary or unsafe conditions, a tax or special assessment delinquency that exceeds fair market value of the land, or conditions that endanger life or property by fire or other cause.
2) The area is predominately open, and because of obsolete platting, deteriorating structures or other factors, it substantially impairs the growth of the area.
3) The area is in or adjacent to a federally assisted new community as defined under the State of Texas Tax Code Chapter 311.

Other restrictions on the creation of a TIRZ include the following:

- No more than 10 percent of the property within the zone (excluding publicly owned property) may be used for residential purposes. This requirement only applies if the TIRZ was not created pursuant to a petition of the landowners.
- A zone may not contain property that cumulatively would exceed 15 percent of the total appraised property value within a municipality and its industrial districts.

If an area qualifies for TIF, there are several steps that must be followed prior to implementing a TIRZ, including the preparation of a preliminary reinvestment zone plan that outlines the proposed improvements, public hearings, formal presentations to governing bodies, establishment of zone boundaries, and creation of a board of directors.

When considering the establishment of a TIRZ for the area encompassing Mid-Way Regional Airport, it would likely entail both the Cities of Midlothian and Waxahachie to initiate the creation of a TIF on

the basis of predominately open land adjacent to the airport boundary. In the event that the cities were to pursue the implementation of a TIRZ for areas on and adjacent to Mid-Way Regional Airport, the following initiatives should be proposed to include:

- Land adjacent to the airport should be zoned as industrial and/or commercial to support those business activities that the tax increments could help fund.
- At a minimum, the airport acquisition of approximately 91 acres of land adjacent to the east side of the airport.
- Focus on business aviation and non-aviation activity.
- Assess the improved roadway access to/from the airport.

The key to several of the proposed improvements will be the investment in the roadway infrastructure necessary to accommodate future business growth in this area. As previously outlined in this study, several options for future roadway access in the vicinity of the airport have been analyzed that could improve access along the east and west sides of the airport leading to U.S. Highway 287. Projects associated with constructing these proposed roads would be eligible for TIF funding should a TIRZ be established.

BUSINESS MARKET

Airport staff should continue to work with local economic development agencies to attract specialty aviation operators to Mid-Way Regional Airport. As previously discussed, there is adequate property on the southwest side of the airport to accommodate aviation demand, especially through the short term planning horizon. As such, this land is available for lease and should be marketed to aviation-related businesses, such as aircraft maintenance and avionics providers and corporate flight departments.

Due to the southwest area of the airport being the only land available for immediate development, additional property acquisition should be pursued in order to support long term growth potential for aviation activities. Furthermore, land acquisition would be needed to support future non-aviation development that could support industrial and commercial activity, adding to the airport's revenue stream. Of particular interest should be the 91-acre parcel adjacent to the east side of the airport that has been outlined in previous discussion during this study. As staff continues its efforts to attract aviation markets to the facility, the following benefits of Mid-Way Regional Airport should be addressed:

Airport Facilities: Many general aviation airports consist of older facilities that are in need of repair. After conducting inventory of the facility, Mid-Way Regional Airport fares well in this category as its existing facilities are attractive and clean. The airport has a newly renovated terminal building that accommodates an array of aviation services. In addition, the airport has recently extended Runway 18-36 to 6,500 feet, and the runway and taxiway pavements have been rehabilitated and reconstructed. In addition, a self-service fuel facility provides 100LL fueling capabilities at the airport 24 hours per day, seven days per week.

Competitive Pricing: Price sensitivity will always play a role in an aircraft or business owner's decision when choosing where to base their operations from. Lease rates, fuel prices, hangar rental fees, and other charges must be competi-

tive with competing airports in the region. As determined from the rates and charges analysis, Mid-Way Regional Airport tends to be on the lower end of many of the fee structures in place at airports across the area, making the facility an attractive location in terms of pricing. It is important to note, however, that lease rates and fee structures should be set at levels that ensure the vitality and health of the airport's financial status while reasonably maintaining existing and future tenant bases.

Services: Mid-Way Regional Airport offers an array of services including a 6,500-foot runway, global positioning system (GPS) approaches with very desirable approach minimums, a full-service FBO, aircraft maintenance, aircraft painting, and other aviation support services. These services must be highlighted to potential tenants who may be considering other airports in the region. Airport staff and local economic development personnel may wish to utilize flyers, promotional brochures, tours, and visits to educate potential tenants of the improvements, capabilities, and future plans of the facility.

Location: The proximity and location of Mid-Way Regional Airport to the Dallas/Fort Worth Metroplex should be reinforced. Socioeconomic and demographic factors should also be highlighted to include the growing population and employment base within the Cities of Midlothian and Waxahachie as well as Ellis County. In addition, the airport is located outside the congested Class B airspace associated with Dallas/Fort Worth International Airport and Dallas Love Field, further enhancing the ease of operations for aircraft utilizing the airport.

PLAN IMPLEMENTATION

The best means to begin implementation of the recommendations in this Airport Development 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 primary goal is for the airport to best serve the air transportation needs of the region in a sound business manner.

The actual need for facilities is most appropriately established by airport activity levels rather than specified dates in time. For example, projections have been made as to when additional hangar facilities 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, thus pushing some of the projects included in the short term CIP into the intermediate or long term planning horizons that extend beyond the scope of this study. On the other hand, high levels of demand may establish the need to accelerate development. Although every effort has been made 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 study of this nature is in keeping the issues and objectives in the minds of the managers and policymakers so as to better recognize changes and the associated effects. In addition to adjustments in aviation demand, decisions made as to when to undertake the improvements recommended in this Devel-

opment 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. As a result, updating can be done by airport management, thereby improving the plan's effectiveness.

Appendix A

GLOSSARY OF TERMS

Glossary of Terms

A

ABOVE GROUND LEVEL: The elevation of a point or surface above the ground.

ACCELERATE-STOP DISTANCE AVAILABLE (ASDA): See declared distances.

ADVISORY CIRCULAR: External publications issued by the FAA consisting of nonregulatory material providing for the recommendations relative to a policy, guidance and information relative to a specific aviation subject.

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) transports 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.

AIRCRAFT: A transportation vehicle that is used or intended for use for flight.

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.

AIRCRAFT OPERATION: The landing, takeoff, or touch-and-go procedure by an aircraft on a runway at an airport.

AIRCRAFT OPERATIONS AREA (AOA): A restricted and secure area on the airport property designed to protect all aspects related to aircraft operations.

AIRCRAFT OWNERS AND PILOTS ASSOCIATION: A private organization serving the interests and needs of general aviation pilots and aircraft owners.

AIRCRAFT RESCUE AND FIRE FIGHTING: A facility located at an airport that provides emergency vehicles, extinguishing agents, and personnel responsible for minimizing the impacts of an aircraft accident or incident.

AIRFIELD: The portion of an airport which contains the facilities necessary for the operation of aircraft.

AIRLINE HUB: An airport at which an airline concentrates a significant portion of its activity and which often has a significant amount of connecting traffic.

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.

AIRPORT AUTHORITY: A quasi-governmental public organization responsible for setting the policies governing the management and operation of an airport or system of airports under its jurisdiction.

AIRPORT BEACON: A navigational aid located at an airport which displays a rotating light beam to identify whether an airport is lighted.

AIRPORT CAPITAL IMPROVEMENT PLAN: The planning program used by the Federal Aviation Administration to identify, prioritize, and distribute funds for airport development and the needs of the National Airspace System to meet specified national goals and objectives.

AIRPORT ELEVATION: The highest point on the runway system at an airport expressed in feet above mean sea level (MSL).

AIRPORT IMPROVEMENT PROGRAM: A program authorized by the Airport and Airway

Improvement Act of 1982 that provides funding for airport planning and development.

AIRPORT LAYOUT DRAWING (ALD): The drawing of the airport showing the layout of existing and proposed airport facilities.

AIRPORT LAYOUT PLAN (ALP): A scaled drawing of the existing and planned land and facilities necessary for the operation and development of the airport.

AIRPORT LAYOUT PLAN DRAWING SET: A set of technical drawings depicting the current and future airport conditions. The individual sheets comprising the set can vary with the complexities of the airport, but the FAA-required drawings include the Airport Layout Plan (sometimes referred to as the Airport Layout Drawing (ALD), the Airport Airspace Drawing, and the Inner Portion of the Approach Surface Drawing, On-Airport Land Use Drawing, and Property Map.

AIRPORT MASTER PLAN: The planner's concept of the long-term development of an airport.

AIRPORT MOVEMENT AREA SAFETY SYSTEM: A system that provides automated alerts and warnings of potential runway incursions or other hazardous aircraft movement events.

AIRPORT OBSTRUCTION CHART: A scaled drawing depicting the Federal Aviation Regulation (FAR) Part 77 surfaces, a representation of objects that penetrate these surfaces, runway, taxiway, and ramp areas, navigational aids, buildings, roads and other detail in the vicinity of an airport.

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 SPONSOR: The entity that is legally responsible for the management and operation of an airport, including the fulfillment of the requirements of laws and regulations related thereto.

AIRPORT SURFACE DETECTION EQUIPMENT: A radar system that provides air traffic controllers with a visual representation of the movement of aircraft and other vehicles on the ground on the airfield at an airport.

AIRPORT SURVEILLANCE RADAR: The primary radar located at an airport or in an air traffic control terminal area that receives a signal at an antenna and transmits the signal to air traffic control display equipment defining the location of aircraft in the air. The signal provides only the azimuth and range of aircraft from the location of the antenna.

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: A facility which provides en route air traffic control service to aircraft operating on an IFR flight plan within controlled airspace over a large, multi-state region.

AIRSIDE: The portion of an airport that contains the facilities necessary for the operation of aircraft.

AIRSPACE: The volume of space above the surface of the ground that is provided for the operation of aircraft.

AIR TAXI: An air carrier certificated in accordance with FAR Part 121 and 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.

AIR TRAFFIC CONTROL: A service operated by an appropriate organization for the purpose of providing for the safe, orderly, and expeditious flow of 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 en route phase of flight.

AIR TRAFFIC CONTROL SYSTEM COMMAND CENTER: A facility operated by the FAA which is responsible for the central flow control, the central altitude reservation system, the airport reservation position system, and the air traffic service contingency command for the air traffic control system.

AIR TRAFFIC HUB: A categorization of commercial service airports or group of commercial service airports in a metropolitan or urban area based upon the proportion of annual national enplanements existing at the airport or airports. The categories are large hub, medium hub, small hub, or non-hub. It forms the basis for the apportionment of entitlement funds.

AIR TRANSPORT ASSOCIATION OF AMERICA: An organization consisting of the principal U.S. airlines that represents the interests of the airline industry on major aviation issues before federal, state, and local government bodies. It promotes air transportation safety by coordinating industry and governmental safety programs and it serves as a focal point for industry efforts to standardize practices and enhance the efficiency of the air transportation system.

ALERT AREA: See special-use airspace.

ALTITUDE: The vertical distance measured in feet above mean sea level.

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.

APPROACH SURFACE: An imaginary obstruction limiting surface defined in FAR Part 77 which is longitudinally centered on an extended runway centerline and extends outward and upward from the primary surface at each end of a runway at a designated slope and distance based upon the type of available or planned approach by aircraft to a runway.

APRON: A specified portion of the airfield used for passenger, cargo or freight loading and unloading, aircraft parking, and the refueling, maintenance and servicing of aircraft.

AREA NAVIGATION: The air navigation procedure that provides the capability to establish and maintain a flight path on an arbitrary course that remains within the coverage area of navigational sources being used.

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.

AUTOMATED SURFACE OBSERVATION SYSTEM (ASOS): A reporting system that provides frequent airport ground surface weather observation data through digitized voice broadcasts and printed reports.

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.)

AUTOMATIC DIRECTION FINDER (ADF): An aircraft radio navigation system which senses and indicates the direction to a non-directional radio beacon (NDB) ground transmitter.

AVIGATION EASEMENT: A contractual right or a property interest in land over which a right of unobstructed flight in the airspace is established.

AZIMUTH: Horizontal direction expressed as the angular distance between true north and the direction of a fixed point (as the observer's heading).

B

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."

BASED AIRCRAFT: The general aviation aircraft that use a specific airport as a home base.

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.

BLAST PAD: A prepared surface adjacent to the end of a runway for the purpose of eliminating the erosion of the ground surface by the wind forces produced by airplanes at the initiation of takeoff operations.

BUILDING RESTRICTION LINE (BRL): A line which identifies suitable building area locations on the airport.

C

CAPITAL IMPROVEMENT PLAN: The planning program used by the Federal Aviation Administration to identify, prioritize, and distribute Airport Improvement Program funds for airport development and the needs of the National Airspace System to meet specified national goals and objectives.

CARGO SERVICE AIRPORT: An airport served by aircraft providing air transportation of property only, including mail, with an annual aggregate landed weight of at least 100,000,000 pounds.

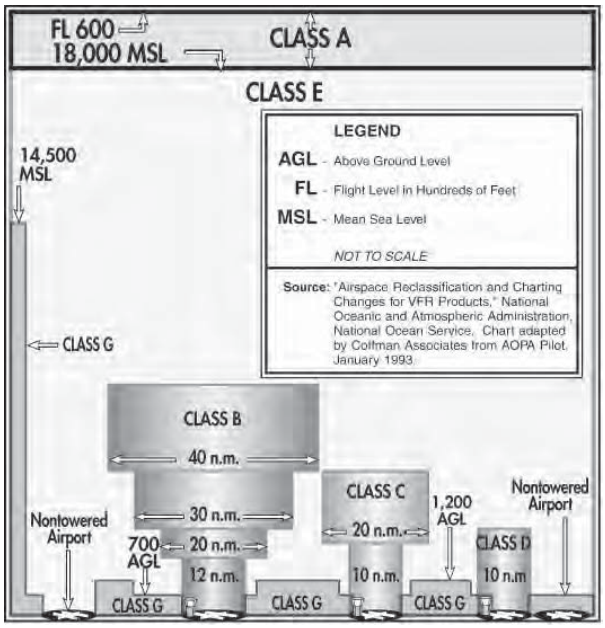
CATEGORY I: An Instrument Landing System (ILS) that provides acceptable guidance information to an aircraft from the coverage limits of the ILS to the point at which the localizer course line intersects the glide path at a decision height of 100 feet above the horizontal plane containing the runway threshold.

CATEGORY II: An ILS that provides acceptable guidance information to an aircraft from the coverage limits of the ILS to the point at which the localizer course line intersects the glide path at a decision height of 50 feet above the horizontal plane containing the runway threshold.

CATEGORY III: An ILS that provides acceptable guidance information to a pilot from the coverage limits of the ILS with no decision height specified above the horizontal plane containing the runway threshold.

CEILING: The height above the ground surface to the location of the lowest layer of clouds which is reported as either broken or overcast.

CIRCLING APPROACH: A maneuver initiated by the pilot to align the aircraft with the runway for landing when flying 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.

COMMERCIAL SERVICE AIRPORT: A public airport providing scheduled passenger service that enplanes at least 2,500 annual passengers.

COMMON TRAFFIC ADVISORY FREQUENCY: A radio frequency identified in the appropriate aeronautical chart which is designated for the purpose of transmitting airport advisory information and procedures while operating to or from an uncontrolled airport.

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.

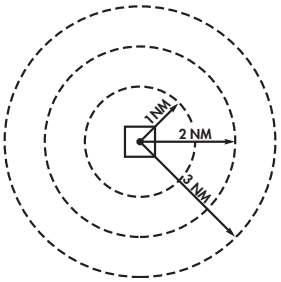
CONICAL SURFACE: An imaginary obstruction-limiting surface defined in FAR Part 77 that extends from the edge of the horizontal surface outward and upward at a slope of 20 to 1 for a horizontal distance of 4,000 feet.

CONTROLLED AIRPORT: An airport that has an operating airport traffic control tower.

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 air port elevation (charted as MSL) surrounding those airports that have an operational control tower. Class D airspace is individually tailored and configured to encompass published instrument approach procedure . 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: A wind that is not parallel to a runway centerline or to the intended flight path of an aircraft.

CROSSWIND COMPONENT: The component of wind that is at a right angle to the runway centerline or the intended flight path of an aircraft.

CROSSWIND LEG: A flight path at right angles to the landing runway off its upwind end. See "traffic pattern."

D

DECIBEL: A unit of noise representing a level relative to a reference of a sound pressure 20 micro newtons per square meter.

DECISION HEIGHT: The height above the end of the runway surface at which a decision must be made by a pilot during the ILS or Precision Approach Radar approach to either continue the approach or to execute a missed approach.

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.
- **LANDING DISTANCE AVAILABLE (LDA)**: The runway length declared available and suitable for landing.

DEPARTMENT OF TRANSPORTATION: The cabinet level federal government organization consisting of modal operating agencies, such as the Federal Aviation Administration, which was established to promote the coordination of federal transportation programs and to act as a focal point for research and development efforts in transportation.

DISCRETIONARY FUNDS: Federal grant funds that may be appropriated to an airport based upon designation by the Secretary of Transportation or Congress to meet a specified national priority such as enhancing capacity, safety, and security, or mitigating noise.

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 Aweighted 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."

E

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.

ELEVATION: The vertical distance measured in feet above mean sea level.

ENPLANED PASSENGERS: The total number of revenue passengers boarding aircraft, including originating, stop-over, and transfer passengers, in scheduled and nonscheduled services.

ENPLANEMENT: The boarding of a passenger, cargo, freight, or mail on an aircraft at an airport.

ENTITLEMENT: Federal funds for which a commercial service airport may be eligible based upon its annual passenger enplanements.

ENVIRONMENTAL ASSESSMENT (EA): An environmental analysis performed pursuant to the National Environmental Policy Act to determine whether an action would significantly affect the environment and thus require a more detailed environmental impact statement.

ENVIRONMENTAL AUDIT: An assessment of the current status of a party's compliance with applicable

environmental requirements of a party's environmental compliance policies, practices, and controls.

ENVIRONMENTAL IMPACT STATEMENT (EIS): A document required of federal agencies by the National Environmental Policy Act for major projects are legislative proposals affecting the environment. It is a tool for decision-making describing the positive and negative effects of a proposed action and citing alternative actions.

ESSENTIAL AIR SERVICE: A federal program which guarantees air carrier service to selected small cities by providing subsidies as needed to prevent these cities from such service.

F

FEDERAL AVIATION REGULATIONS: The general and permanent rules established by the executive departments and agencies of the Federal Government for aviation, which are published in the Federal Register. These are the aviation subset of the Code of Federal Regulations.

FEDERAL INSPECTION SERVICES: The provision of customs and immigration services including passport inspection, inspection of baggage, the collection of duties on certain imported items, and the inspections for agricultural products, illegal drugs, or other restricted items.

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."

FINAL APPROACH AND TAKEOFF AREA (FATO). A defined area over which the final phase of the helicopter approach to a hover, or a landing is completed and from which the takeoff is initiated.

FINAL APPROACH FIX: The designated point at which the final approach segment for an aircraft landing on a runway begins for a non-precision approach.

FINDING OF NO SIGNIFICANT IMPACT (FONSI): A public document prepared by a Federal agency that presents the rationale why a proposed action will not have a significant effect on the environment and for which an environmental impact statement will not be prepared.

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.

FLIGHT LEVEL: A designation for altitude within controlled airspace.

FLIGHT SERVICE STATION: An operations facility in the national flight advisory system which utilizes data interchange facilities for the collection and dissemination of Notices to Airmen, weather, and administrative data and which provides pre-flight and in-flight advisory services to pilots through air and ground based communication facilities.

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.

G

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.

GENERAL AVIATION AIRPORT: An airport that provides air service to only general aviation.

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 (GPS): A system of 24 satellites used as reference points to enable navigators equipped with GPS receivers to determine their latitude, longitude, and altitude.

GROUND ACCESS: The transportation system on and around the airport that provides access to and

from the airport by ground transportation vehicles for passengers, employees, cargo, freight, and airport services.

H

HELIPAD: A designated area for the takeoff, landing, and parking of helicopters.

HIGH INTENSITY RUNWAY LIGHTS: The highest classification in terms of intensity or brightness for lights designated for use in delineating the sides of a runway.

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.

HORIZONTAL SURFACE: An imaginary obstruction- limiting surface defined in FAR Part 77 that is specified as a portion of a horizontal plane surrounding a runway located 150 feet above the established airport elevation. The specific horizontal dimensions of this surface are a function of the types of approaches existing or planned for the runway.

I

INITIAL APPROACH FIX: The designated point at which the initial approach segment begins for an instrument approach to a runway.

INSTRUMENT APPROACH PROCEDURE: 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): Procedures for the conduct of flight in weather conditions below Visual Flight Rules weather minimums. The term IFR is often also used to define weather conditions and the type of flight plan under which an aircraft is operating.

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.

INSTRUMENT METEOROLOGICAL CONDITIONS: Meteorological conditions expressed in terms of specific visibility and ceiling conditions that are less than the minimums specified for visual meteorological conditions.

ITINERANT OPERATIONS: Operations by aircraft that are not based at a specified airport.

K

KNOTS: A unit of speed length used in navigation that is equivalent to the number of nautical miles traveled in one hour.

L

LANDSIDE: The portion of an airport that provides the facilities necessary for the processing of passengers, cargo, freight, and ground transportation vehicles.

LANDING DISTANCE AVAILABLE (LDA): See declared distances.

LARGE AIRPLANE: An airplane that has a maximum certified takeoff weight in excess of 12,500 pounds.

LOCAL AREA AUGMENTATION SYSTEM: A differential GPS system that provides localized measurement correction signals to the basic GPS signals to improve navigational accuracy integrity, continuity, and availability.

LOCAL OPERATIONS: Aircraft operations performed by aircraft that are based at the airport and that operate in the local traffic pattern or within sight of the airport, that are known to be departing for or arriving from flights in local practice areas within a prescribed distance from the airport, or that execute simulated instrument approaches at the airport.

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.

LONG RANGE NAVIGATION SYSTEM (LORAN): Long range navigation is 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 en route navigation.

LOW INTENSITY RUNWAY LIGHTS: The lowest clas- sification in terms of intensity or brightness for lights designated for use in delineating the sides of a runway.

M

MEDIUM INTENSITY RUNWAY LIGHTS: The middle classification in terms of intensity or brightness for lights designated for use in delineating the sides of a runway.

MICROWAVE LANDING SYSTEM (MLS): An instrument approach and landing system that provides precision guidance in azimuth, elevation, and distance measurement.

MILITARY OPERATIONS: Aircraft operations that are performed in military aircraft.

MILITARY OPERATIONS AREA (MOA): See special-use airspace

MILITARY TRAINING ROUTE: An air route depicted on aeronautical charts for the conduct of military flight training at speeds above 250 knots.

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.

N

NATIONAL AIRSPACE SYSTEM: The network of air traffic control facilities, air traffic control areas, and navigational facilities through the U.S.

NATIONAL PLAN OF INTEGRATED AIRPORT SYSTEMS: The national airport system plan developed by the Secretary of Transportation on a biannual basis for the development of public use airports to meet national air transportation needs.

NATIONAL TRANSPORTATION SAFETY BOARD: A federal government organization established to investigate and determine the probable cause of transportation accidents, to recommend equipment and procedures to enhance transportation safety, and to review on appeal the suspension or revocation of any certificates or licenses issued by the Secretary of Transportation.

NAUTICAL MILE: A unit of length used in navigation which is equivalent to the distance spanned by one minute of arc in latitude, that is, 1,852 meters or 6,076 feet. It is equivalent to approximately 1.15 statute mile.

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.)

NAVIGATIONAL AID: A facility used as, available for use as, or designed for use as an aid to air navigation.

NOISE CONTOUR: A continuous line on a map of the airport vicinity connecting all points of the same noise exposure level.

NON-DIRECTIONAL 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.

NON-PRECISION APPROACH PROCEDURE: A standard instrument approach procedure in which no electronic glide slope is provided, such as VOR, TACAN, NDB, or LOC.

NOTICE TO AIRMEN: A notice containing information concerning the establishment, condition, or change in any component of or hazard in the National Airspace System, the
timely knowledge of which is considered essential to personnel concerned with flight operations.

O

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.

ONE-ENGINE INOPERABLE SURFACE: A surface emanating from the runway end at a slope ratio of 62.5:1. Air carrier airports are required to maintain a technical drawing of this surface depicting any object penetrations by January 1, 2010.

OPERATION: The take-off, landing, or touch-and-go procedure by an aircraft on a runway at an airport.

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.

P

PILOT CONTROLLED LIGHTING: Runway lighting systems at an airport that are controlled by activating the microphone of a pilot on a specified radio frequency.

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.

- **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 APPROACH RADAR: A radar facility in the terminal air traffic control system used to detect and display with a high degree of accuracy the direction, range, and elevation of an aircraft on the final approach to a runway.

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.

PRIMARY AIRPORT: A commercial service airport that enplanes at least 10,000 annual passengers.

PRIMARY SURFACE: An imaginary obstruction limiting surface defined in FAR Part 77 that is specified as a rectangular surface longitudinally centered about a runway. The specific dimensions of this surface are a function of the types of approaches existing or planned for the runway.

PROHIBITED AREA: See special-use airspace.

PVC: Poor visibility and ceiling. Used in determining Annual Service Volume. PVC conditions exist when the cloud ceiling is less than 500 feet and visibility is less than one mile.

R

RADIAL: A navigational signal generated by a Very High Frequency Omni-directional Range or VORTAC station that is measured as an azimuth from the station.

REGRESSION ANALYSIS: A statistical technique that seeks to identify and quantify the relationships between factors associated with a forecast.

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 en route 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 en route 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 ALIGNMENT INDICATOR LIGHT: A series of high intensity sequentially flashing lights installed on the extended centerline of the runway usually in conjunction with an approach lighting system.

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 VISIBILITY ZONE (RVZ): An area on the airport to be kept clear of permanent objects so that there is an unobstructed line of- site from any point five feet above the runway centerline to

any point five feet above an intersecting runway centerline.

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.

S

SCOPE: The document that identifies and defines the tasks, emphasis, and level of effort associated with a project or study.

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.

SMALL AIRPLANE: An airplane that has a maximum certified takeoff weight of up to 12,500 pounds.

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 INSTRUMENT DEPARTURE PROCEDURES: A published standard flight procedure to be utilized following takeoff to provide a transition between the airport and the terminal area or en route airspace.

STANDARD TERMINAL ARRIVAL ROUTE (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.

STOPWAY: An area beyond the end of a takeoff runway that is designed to support an aircraft during an aborted takeoff without causing structural damage to the aircraft. It is not to be used for takeoff, landing, or taxiing by aircraft.

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.

T

TACTICAL AIR NAVIGATION (TACAN): An ultrahigh 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.

TERMINAL INSTRUMENT PROCEDURES: Published flight procedures for conducting instrument approaches to runways under instrument meteorological conditions.

TERMINAL RADAR APPROACH CONTROL: An element of the air traffic control system responsible for monitoring the en-route and terminal segment of air traffic in the airspace surrounding airports with moderate to high levels of air traffic.

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: The point at which a landing aircraft makes contact with the runway surface.

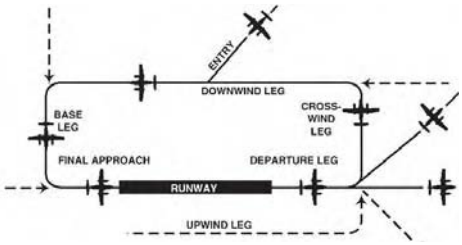
TOUCHDOWN AND LIFT-OFF AREA (TLOF): A load bearing, generally paved area, normally centered in the FATO, on which the helicopter lands or takes off.

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.



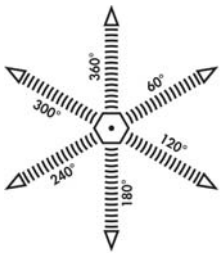
U

UNCONTROLLED AIRPORT: An airport without an air traffic control tower at which the control of Visual Flight Rules traffic is not exercised.

UNCONTROLLED AIRSPACE: Airspace within which aircraft are not subject to air traffic control.

UNIVERSAL COMMUNICATION (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."



V

VECTOR: A heading issued to an aircraft to provide navigational guidance by radar.

VERY HIGH FREQUENCY/ OMNIDIRECTIONAL RANGE (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 OMNI-DIRECTIONAL RANGE/ 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.

VISUAL METEOROLOGICAL CONDITIONS: Meteorological conditions expressed in terms of specific visibility and ceiling conditions which are equal to or greater than the threshold values for instrument meteorological conditions.

VOR: See "Very High Frequency Omnidirectional Range Station."

VORTAC: See "Very High Frequency Omnidirectional Range Station/Tactical Air Navigation."

W

WARNING AREA: See special-use airspace.

WIDE AREA AUGMENTATION SYSTEM: An enhancement of the Global Positioning System that includes integrity broadcasts, differential corrections, and additional ranging signals for the purpose of providing the accuracy, integrity, availability, and continuity required to support all phases of flight.

AC: advisory circular

ADF: automatic direction finder

ADG: airplane design group

AFSS: automated flight service station

AGL: above ground level

AIA: annual instrument approach

AIP: Airport Improvement Program

AIR-21: Wendell H. Ford Aviation Investment and Reform Act for the 21st Century

ALS: approach lighting system

ALSF-1: standard 2,400-foot high intensity approach lighting system with sequenced flashers (CAT I configuration)

ALSF-2: standard 2,400-foot high intensity approach lighting system with sequenced flashers (CAT II configuration)

AOA: Aircraft Operation Area

APV: instrument approach procedure with vertical guidance

ARC: airport reference code

ARFF: aircraft rescue and fire fighting

ARP: airport reference point

ARTCC: air route traffic control center

ASDA: accelerate-stop distance available

ASR: airport surveillance radar

ASOS: automated surface observation station

ATCT: airport traffic control tower

ATIS: automated terminal information service

AVGAS: aviation gasoline - typically 100 low lead (100L)

AWOS: automated weather observation station

BRL: building restriction line

CFR: Code of Federal Regulation

CIP: capital improvement program

DME: distance measuring equipment

DNL: day-night noise level

DWL: runway weight bearing capacity of aircraft with dual-wheel type landing gear

DTWL: runway weight bearing capacity of 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 ILS outer marker

LORAN: long range navigation

MALS: midium intensity approach lighting system with 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

PVC: poor visibility and ceiling

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 runway alignment indicator lights

STAR: standard terminal arrival route

SWL: runway weight bearing capacity for aircraft with single-wheel tandem type landing gear

TACAN: tactical air navigational aid

TAF: Federal Aviation Administration (FAA) Terminal Area Forecast

TLOF: Touchdown and lift-off

TDZ: touchdown zone

TDZE: touchdown zone elevation

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 omni-directional range

VORTAC: VOR and TACAN collocated

Appendix B

UTILITY INFRASTRUCTURE ANALYSIS

Knowledge • Service • Answers

KSA ENGINEERS

Memo

To: Coffman and Associates

From: Steve M. Creamer, P.E.

Date: June 28, 2012

Re: Mid-Way Regional Airport Site Infrastructure Evaluation

Currently, the Airport is serviced by the City of Midlothian with a 12" water line located along the western boundary of the Airport near the terminal entrance drive. There are two elevated storage tanks located approximately 26,000' and 30,000' northwest and west of the Airport, respectively. The City of Midlothian also has a 12" gravity sewer line servicing the Airport that flows to a lift station at Highway 287 located west of the Airport.

During the recent terminal renovation project at the Airport, a fire flow test revealed that 1,244 gallons per minute were available with a residual pressure of 60 psi. These results were adequate to accommodate the fire suppression system installed during the terminal renovation project. Based on our conversations with Andy Biery and the City of Midlothian, all but the three northern most T-hangars have fire suppression systems. The City of Midlothian Fire Chief will not allow maintenance of aircraft to be conducted in hangars on the airfield that do not have a fire suppression system. This restriction limits the Airport's ability to market these T-hangars to potential tenants and has become inconvenient to the existing tenants of these T-hangars. Based on the previously reported fire flow data, a fire flow suppression system could be installed in the three northern most T-hangars by extending the existing 12" water line ending at the northeast fire hydrant. The water line would be extended approximately 350' on the border between the proposed apron and existing T-hangar foundation.

In addition, an aircraft wash rack has been proposed to the northeast of the T-hangars. This would require the proposed water lines to be extended an additional 200' to service this facility. Along with water lines, sewer lines would be required. To avoid the costly expense of excavating existing concrete, the sewer lines would extend along the north western perimeter approximately 1300'. The size and location of both pipes is dependent upon final grades and confirmation of existing pipe depths and locations.

As depicted in Exhibit 4A Development Concept, the airport has long term plans of creating a hangar community to the south. To avoid the current situation, of a hangar without a fire suppression system, a preliminary layout has been developed consisting of both water and sewer lines. The layout consists of a main run extending approximately 800' to the south with a 400' branch extending to the east at the midpoint.

It is imperative to remember that conditions within a water system change periodically and that the fire flow must be reevaluated with each new development installed along the system. As the City of Midlothian expands to the east, toward the Airport, additional water facilities may be required to meet the increased demands on the system.

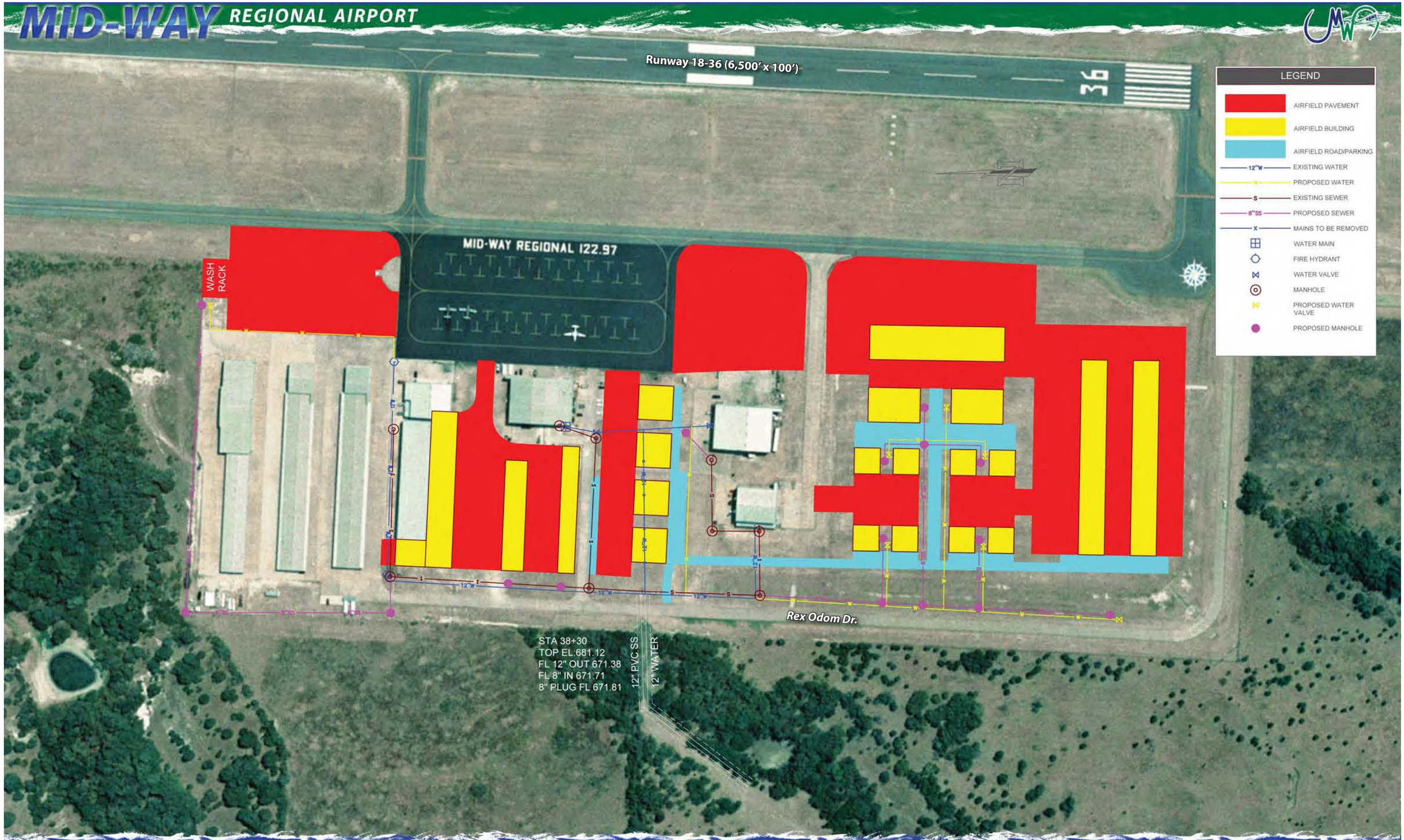


Exhibit B1: UTILITY SCHEMATIC

Appendix C

CIP COST ESTIMATES

Mid-Way Regional Airport
Capital Imporvement Plan
June 25, 2012

Item No.	Spec. No.	Description	Estimated Quantity	Units	Est. Unit Cost	Opinion of Const. Cost
		2013 Projects				
Base Bid: Expand Apron (PCC) 70,000 lb. SWL / 99,900 lb. DWL						
1.01	P-152-4.1	Unclassified Excavation	15,000	C.Y.	$5.00	$75,000
1.02	P-152-4.4	Onsite Borrow Embankment In Place	1,500	C.Y.	$6.00	$9,000
1.03	P-152-4.5	Undercut and Replace Unsuitable Subgrade Material with Suitable Material as Directed by the Engineer	560	C.Y.	$25.00	$14,000
1.04	P-501-8.	Sawcut, Remove, and Replace Partial Cracked or Damaged Panels in Existing PCC Pavement	36	S.Y.	$60.00	$2,164
1.05	P-101-5.	Concrete Pavement Removal	2,000	S.Y.	$5.00	$10,000
1.06	P-156-5.1	Stabilized Construction Entrance/Exit	2	EA	$2,000.00	$4,000
1.07	P-156-5.2	Storm Water Pollution Prevention Plan	1	LS	$5,000.00	$5,000
1.08	P-155-8.1	8" Lime Stabilized Subgrade	21,900	S.Y.	$2.50	$54,750
1.09	P-155-8.3	Hydrated Lime for Lime Stabilized Subgrade (6%)	450	Ton	$150.00	$67,500
1.10	P-501-8.	12" PCC Pavement	21,700	S.Y.	$50.00	$1,085,000
1.11	P-620-5.1	Yellow Markings (Reflective)	2,700	S.F.	$1.00	$2,700
1.12	T-901-5.1	Hydromulch, Seed, Lime, and Fertilizer	450	S.Y.	$1.50	$675
1.13	S-17-5.1	Aircraft Tie-Down Anchor	43	EA	$300.00	$12,900
1.14	D-751-5.	5' x 5' Grate Inlet	4	EA.	$6,000.00	$24,000
1.15	D-701-5.	36" ASTM C-76, Class III RCP	750	L.F.	$80.00	$60,000
1.16	D-752-5.	Furnish and Install 8:1 Single Barrel Sloped End Treatment for 36" RCP	2	EA	$3,500.00	$7,000
1.17	TxDOT 432.5	Stone Rip Rap	10	S.Y.	$40.00	$400
1.18	S-3-3.	Barricades and Markings for Pavement Closures	1	LS	$5,000.00	$5,000
1.19	S-5-5.	Proofrolling	30	Hrs.	$50.00	$1,500
1.20	S-1-3.1	Mobilization (Base Bid)	1	LS	$145,000.00	$145,000
					Subtotal	**$1,585,589**
					15% Contingencies	**$237,838**
					Total Construction Cost with Contingencies	**$1,823,428**
					Design Engineering	**$130,000**
					Construction Survey	**$3,600**
					Geotechnical Investigation	**$20,000**
					Construction Materials Testing	**$35,000**
					RPR Services	**$39,600**
					Subtotal	**$228,200**
					Total Project Cost (Base Bid)	**$2,051,628**
Sprinkler System						
3.01		8" Waterline	425	L.F.	$50.00	$21,250
3.02		6" Waterline	125	L.F.	$40.00	$5,000
3.03		Sprinkler System	85,000	S.F.	$1.60	$136,000
3.04	S-1-3.1	Mobilization	1	LS	$16,500.00	$16,500
					Subtotal	**$178,750**
					15% Contingencies	**$26,813**
					Total Construction Cost with Contingencies	**$205,563**
					Construction Phase Engineering	**$21,000**
					Construction Survey	**$1,200**
					RPR Services	**$7,000**
					Subtotal	**$29,200**
					Total Project Cost (Base Bid)	**$234,763**

DOCUMENT FOR INTERIM REVIEW
NOT INTENDED FOR CONSTRUCTION,
BIDDING, OR PERMIT PURPOSES.
STEVE M. CREAMER, P.E. 90382
DATE June 25, 2012

Mid-Way Regional Airport
Capital Imporvement Plan
June 25, 2012

Item No.	Spec. No.	Description	Estimated Quantity	Units	Est. Unit Cost	Opinion of Const. Cost
		2014 Projects				
Construct Hangar Access Taxiway						
5.01	P-152-4.1	Unclassified Excavation	6,800	C.Y.	$5.00	$34,000
5.02	P-152-4.4	Onsite Borrow Embankment In Place	700	C.Y.	$6.50	$4,550
5.03	P-152-4.3	Undercut and Replace Unsuitable Subgrade Material with Suitable Material as Directed by the Engineer	80	C.Y.	$25.00	$2,000
5.04	P-101-5.	Concrete Pavement Removal	900	S.Y.	$5.00	$4,500
5.04	P-156-5.1	Stabilized Construction Entrance/Exit	1	EA	$2,000.00	$2,000
5.05	P-156-5.2	Storm Water Pollution Prevention Plan	1	LS	$2,500.00	$2,500
5.06	P-155-8.1	8" Lime Stabilized Subgrade	10,000	S.Y.	$3.00	$30,000
5.07	P-155-8.3	Hydrated Lime for Lime Stabilized Subgrade (6%)	200	Ton	$135.00	$27,000
5.08	P-501-8.	10" PCC Pavement	3,600	S.Y.	$35.00	$126,000
5.09	P-501-8.	12" PCC Pavement	6,400	S.Y.	$50.00	$320,000
5.10	P-620-5.1	Yellow Markings (Reflective)	475	S.F.	$1.00	$475
5.11	D-702-5.	Trench Drain	425	L.F.	$175.00	$74,375
5.12	D-701-5.	36" ASTM C-76, Class III RCP	120	L.F.	$65.00	$7,800
5.13	D-752-5.	Furnish and Install 8:1 Single Barrel Sloped End Treatment for 36" RCP	1	EA	$3,500.00	$3,500
5.14	TxDOT 432.5	Stone Rip Rap	10	S.Y.	$40.00	$400
5.15	T-901-5.	Hydromulch, Seed, Lime, and Fertilizer (Slopes < 5%)	2,400	S.Y.	$0.60	$1,440
5.16	S-3-3.	Barricades and Markings for Pavement Closures	1	LS	$2,000.00	$2,000
5.17	S-5-5.	Proofrolling	10	Hrs.	$50.00	$500
5.18	S-1-3.1	Mobilization (Base Bid)	1	LS	$64,000.00	$64,000
					Subtotal	**$707,040**
					15% Contingencies	**$106,056**
					Total Construction Cost with Contingencies	**$813,096**
					Design Engineering	**$70,000**
					Construction Survey	**$3,600**
					Geotechnical Investigation	**$15,000**
					Construction Materials Testing	**$30,000**
					RPR Services	**$39,600**
					Subtotal	**$158,200**
					Total Project Cost (Base Bid)	**$971,296**
Construct Covered Automobile Parking Adjacent to Airport Drive						
6.01	P-152-4.1	Unclassified Excavation	850	C.Y.	$5.00	$4,250
6.02	P-101-5.	Compacted Select Fill for Foundation Pad Construction	165	C.Y.	$15.00	$2,475
6.03	P-501-8.	Sawcut, Remove, and Replace Partial Cracked or Damaged Panels in Existing PCC Pavement	10	S.Y.	$60.00	$600
6.04		Covered Parking Structure	11,200	S.F.	$65.00	$728,000
6.05	S-3-3.	Barricades and Markings for Pavement Closures	1	LS	$2,000.00	$2,000
6.06	S-5-5.	Proofrolling	4	Hrs.	$50.00	$200
6.07	S-1-3.1	Mobilization (Base Bid)	1	LS	$75,000.00	$75,000
					Subtotal	**$812,525**
					15% Contingencies	**$121,879**
					Total Construction Cost with Contingencies	**$934,404**
					Design Engineering	**$75,000**
					Construction Survey	**$1,200**
					Geotechnical Investigation	**$3,000**
					RPR Services	**$13,200**
					Subtotal	**$92,400**
					Total Project Cost (Base Bid)	**$1,026,804**

Mid-Way Regional Airport
Capital Imporvement Plan
June 25, 2012

Item No.	Spec. No.	Description	Estimated Quantity	Units	Est. Unit Cost	Opinion of Const. Cost
		2014 Projects				
Aircraft Wash Rack						
7.01	P-152-4.1	Unclassified Excavation	350	C.Y.	$6.00	$2,100
7.02	P-501-8.	6" PCC Pavement	530	S.Y.	$45.00	$23,850
7.03	D-751-5.	2' x 2.5' Junction Box	1	EA	$1,500.00	$1,500
7.04	S-35-5.	Tie Into Manhole	1	LS	$3,000.00	$3,000
7.05		6" PVC Pipe	300	LF	$45.00	$13,500
7.06		6" Manual Plug Valve w/ Position Indicator	1	EA	$2,500.00	$2,500
7.07		Water Meter, Wand, Hose, and Reel	1	LS	$2,000.00	$2,000
7.08	P-501-8.	Sawcut Existing Pavement	80	LF	$10.00	$800
7.09		Concrete for 6" Curb & 3" Berm	190	LF	$30.00	$5,700
7.10	T-905-5.	Sodding & Topsoil	200	SY	$20.00	$4,000
7.11		Oil/Water Separator	1	EA	$20,000.00	$20,000
7.12	P-501-8.	Utilities	1	L.S.	$15,000.00	$15,000
7.13	S-1-3.1	Mobilization (Base Bid)	1	LS	$8,000.00	$8,500
					Subtotal	**$102,450**
					15% Contingencies	**$15,368**
					Total Construction Cost with Contingencies	**$117,818**
					Design Engineering	**$14,000**
					Construction Survey	**$1,200**
					RPR Services	**$6,600**
					Subtotal	**$21,800**
					Total Project Cost (Base Bid)	**$139,618**

Mid-Way Regional Airport
Capital Imporvement Plan
June 25, 2012

Item No.	Spec. No.	Description	Estimated Quantity	Units	Est. Unit Cost	Opinion of Const. Cost
		2015 Projects				
Construct T-Hangar Complex						
10.01	P-152-4.1	Unclassified Excavation	1,300	C.Y.	$5.00	$6,500
10.02	P-152-4.4	Offsite Material Embankment In Place	900	C.Y.	$10.00	$9,000
10.03	P-152-4.6	Compacted Select Fill for Foundation Pad Construction	300	C.Y.	$15.00	$4,500
10.04	P-156-5.2	8 Standard T-Hangar Building	13,000	S.F.	$50.00	$650,000
10.05	P-155-8.1	Utilities	1	LS	$20,000.00	$20,000
10.06	S-1-3.1	Mobilization (Base Bid)	1	LS	$70,000.00	$70,000
					Subtotal	**$760,000**
					15% Contingencies	**$114,000**
					Total Construction Cost with Contingencies	**$874,000**
					Design Engineering	**$70,000**
					Construction Survey	**$1,000**
					Geotechnical Investigation	**$3,000**
					Construction Materials Testing	**$3,000**
					RPR Services	**$26,400**
					Subtotal	**$103,400**
					Total Project Cost (Base Bid)	**$977,400**
Install Controlled Vehicle Access Gate						
11.01	F-162-5.	Furnish and Install 16' Hydraulically Operated Automatic Sliding Security Gate	2	EA	$20,000.00	$40,000
11.02	P-155-8.1	Utilities - Power	1	LS	$5,500.00	$5,500
11.02	S-1-3.1	Mobilization (Base Bid)	1	LS	$4,500.00	$4,500
					Subtotal	**$50,000**
					15% Contingencies	**$7,500**
					Total Construction Cost with Contingencies	**$57,500**
					Design Engineering	**$5,500**
					RPR Services	**$3,000**
					Subtotal	**$8,500**
					Total Project Cost (Base Bid)	**$66,000**

Mid-Way Regional Airport
Capital Imporvement Plan
June 25, 2012

Item No.	Spec. No.	Description	Estimated Quantity	Units	Est. Unit Cost	Opinion of Const. Cost
		2016 Projects				
Upgrade Airport Perimeter Fencing						
14.01	F-161-5.	Remove Existing Wire Fence	12,400	L.F.	$1.25	$15,500
14.02	F-162-5.	Furnish and Install 6' Chain-Link Security Fence w/ Mow Strip	12,400	L.F.	$35.00	$434,000
14.03	S-1-3.1	Mobilization (Base Bid)	1	LS	$45,000.00	$45,000
					Subtotal	**$494,500**
					15% Contingencies	**$74,175**
					Total Construction Cost with Contingencies	**$568,675**
					Design Engineering	**$48,000**
					Construction Survey	**$2,500**
					RPR Services	**$26,400**
					Subtotal	**$76,900**
					Total Project Cost (Base Bid)	**$645,575**
Improve Roadway Access and Utility Infrastructure						
15.01	P-152-4.1	Unclassified Excavation	1,600	C.Y.	$5.00	$8,000
15.02	P-152-4.3	Undercut and Replace Unsuitable Subgrade Material with Suitable Material as Directed by the Engineer	175	C.Y.	$25.00	$4,375
15.03	P-101-5.	Concrete Pavement Removal	110	S.Y.	$7.00	$770
15.04	P-156-5.1	Stabilized Construction Entrance/Exit	1	EA	$2,000.00	$2,000
15.05	P-156-5.2	Storm Water Pollution Prevention Plan	1	LS	$2,500.00	$2,500
15.06	P-155-8.1	6" Lime Stabilized Subgrade	2,400	S.Y.	$3.00	$7,200
15.07	P-155-8.3	Hydrated Lime for Lime Stabilized Subgrade (6%)	50	TON	$135.00	$6,750
15.08	P-501-8.	6" PCC Pavement	2,150	S.Y.	$35.00	$75,250
15.09	P-620-5.1	Yellow Markings (Reflective)	500	S.F.	$1.00	$500
15.10	P-155-8.1	Utilities	1	LS	$40,000.00	$40,000
15.11	S-5-5.	Proofrolling	6	Hrs.	$50.00	$300
15.12	S-1-3.1	Mobilization (Base Bid)	1	LS	$15,000.00	$15,000
					Subtotal	**$162,645**
					15% Contingencies	**$24,397**
					Total Construction Cost with Contingencies	**$187,042**
					Design Engineering	**$19,500**
					Construction Survey	**$2,600**
					Geotechnical Investigation	**$10,000**
					Construction Materials Testing	**$20,000**
					RPR Services	**$26,400**
					Subtotal	**$78,500**
					Total Project Cost (Base Bid)	**$265,542**

Mid-Way Regional Airport
Capital Imporvement Plan
June 25, 2012

Item No.	Spec. No.	Description	Estimated Quantity	Units	Est. Unit Cost	Opinion of Const. Cost
		2016 Projects				
Construct Hangar Access Taxiway						
16.01	P-152-4.1	Unclassified Excavation	3,100	C.Y.	$5.00	$15,500
16.02	P-152-4.3	Undercut and Replace Unsuitable Subgrade Material with Suitable Material as Directed by the Engineer	350	C.Y.	$75.00	$26,250
16.03	P-101-5.	Concrete Pavement Removal	560	S.Y.	$6.00	$3,360
16.04	P-155-8.1	8" Lime Stabilized Subgrade	4,800	S.Y.	$3.00	$14,400
16.05	P-155-8.3	Hydrated Lime for Lime Stabilized Subgrade (6%)	100	Ton	$135.00	$13,500
16.06	P-501-8.	12" PCC Pavement	4,700	S.Y.	$50.00	$235,000
16.07	D-702-5.	Trench Drain	350	L.F.	$200.00	$70,000
16.08	D-701-5.	36" ASTM C-76, Class III RCP	120	L.F.	$65.00	$7,800
16.09	D-752-5.	Furnish and Install 8:1 Single Barrel Sloped End Treatment for 36" RCP	1	EA	$3,500.00	$3,500
16.10	P-620-5.1	Yellow Markings (Reflective)	250	S.F.	$1.00	$250
16.11	TxDOT 432.5	Stone Rip Rap	10	S.Y.	$40.00	$400
16.12	T-901-5.	Hydromulch, Seed, Lime, and Fertilizer (Slopes < 5%)	2,400	S.Y.	$1.00	$2,400
16.13	S-3-3.	Barricades and Markings for Pavement Closures	1	LS	$2,000.00	$2,000
16.14	S-5-5.	Proofrolling	10	Hrs.	$50.00	$500
16.15	P-156-5.1	Stabilized Construction Entrance/Exit	1	EA	$2,000.00	$2,000
16.16	P-156-5.2	Storm Water Pollution Prevention Plan	1	LS	$5,000.00	$5,000
16.17	S-1-3.1	Mobilization (Base Bid)	1	LS	$40,000.00	$40,000
					Subtotal	**$441,860**
					15% Contingencies	**$66,279**
					Total Construction Cost with Contingencies	**$508,139**
					Design Engineering	**$43,000**
					Construction Survey	**$2,600**
					Geotechnical Investigation.	**$20,000**
					Construction Materials Testing	**$20,000**
					RPR Services	**$26,400**
					Subtotal	**$112,000**
					Total Project Cost (Base Bid)	**$620,139**

Mid-Way Regional Airport
Capital Imporvement Plan
June 25, 2012

Item No.	Spec. No.	Description	Estimated Quantity	Units	Est. Unit Cost	Opinion of Const. Cost
		2017 Projects				
Upgrade Airport Perimeter Fencing						
19.01	F-161-5.	Remove Existing Wire Fence	13,900	L.F.	$1.25	$17,375
19.02	F-162-5.	Furnish and Install 6' Chain-Link Security Fence w/ Mow Strip	13,900	L.F.	$35.00	$486,500
19.03	S-1-3.1	Mobilization (Base Bid)	1	LS	$50,000.00	$50,000
					Subtotal	**$553,875**
					15% Contingencies	**$83,081**
					Total Construction Cost with Contingencies	**$636,956**
					Design Engineering	**$54,000**
					Construction Survey	**$2,600**
					RPR Services	**$26,400**
					Subtotal	**$83,000**
					Total Project Cost (Base Bid)	**$719,956**
Runway Pavement Rehabilitation						
20.01	P-605-5.	Route and Seal Cracks in PCC Pavement	75,000	L.F.	$1.25	$93,750
20.02	P-501-8.	Sawcut, Remove, and Replace Partial Cracked or Damaged Panels in Existing PCC Pavement	1,500	S.Y.	$62.00	$93,000
20.03	P-605-5.1	Joint or Crack Sealing Filler	800	GAL	$25.00	$20,000
20.04	P-605-5.2	Joint Replacement in Existing PCC Pavement	10,000	L.F.	$1.50	$15,000
20.05	P-605-5.3	Crack Sealant via Epoxy Injection	100	L.F.	$100.00	$10,000
20.06	S-19-4.1	Pavement Marking Obliteration	63,275	S.F.	$1.00	$63,275
20.07	S-3-3.1	Barricades and Markings for Pavement Closures and Displaced Thresholds	1	L.S.	$5,000.00	$5,000
20.08	P-401-8.1	2" Bituminous Overlay Surface Course	6,380	Ton	$110.00	$701,800
20.09	P-401-8.3	HMAC Base Course for Full Depth Pavement Repair	938	Ton	$110.00	$103,180
20.10	P-401-8.4	Grooving	73,667	S.Y.	$2.25	$165,751
20.11	P-602-5.2	Bituminous Prime Coat (Full Depth Pavement Repair)	1,389	Gal.	$4.00	$5,556
20.12	P-603-5.2	Bituminous Tack Coat (Overlay)	8,334	Gal.	$3.00	$25,002
20.08	P-156-5.2	Stabilized Construction Exit	1	EA	$2,500.00	$2,500
20.09	P-620-5.2	Yellow Taxiway Markings (Reflective)	7,820	S.F.	$1.00	$7,820
20.10	P-620-5.2	White Runway Painting (Reflective)	53,215	S.F.	$1.00	$53,215
20.11	P-620-5.3	Black Taxiway Markings (Non-Reflective)	2,240	S.F.	$0.75	$1,680
20.12	S-5-5.1	Proofrolling	20	Hrs.	$60.00	$1,200
20.13	S-1-3.1	Mobilization (Base Bid)	1	L.S.	$140,000.00	$140,000
					Subtotal:	**$1,507,729**
					15% Contingencies:	**$226,159**
					Total w/ Contingencies:	**$1,733,888**
					Design Engineering	**$121,000**
					Construction Survey	**$4,000**
					Geotechnical Investigation	**$15,000**
					Construction Materials Testing	**$35,000**
					RPR Services	**$52,800**
					Subtotal	**$227,800**
					Total Project Cost (Base Bid)	**$1,961,688**

Mid-Way Regional Airport
Capital Imporvement Plan
June 25, 2012

Item No.	Spec. No.	Description	Estimated Quantity	Units	Est. Unit Cost	Opinion of Const. Cost
		2017 Projects				
Construct Linear Box Hangar Complex						
21.01	P-152-4.1	Unclassified Excavation	1,900	C.Y.	$5.00	$9,500
21.02	P-152-4.4	Offsite Material Embankment In Place	1,400	C.Y.	$10.00	$14,000
21.03	P-152-4.6	Compacted Select Fill for Foundation Pad Construction	190	C.Y.	$15.00	$2,850
21.04	P-501-8.	Sawcut, Remove, and Replace Partial Cracked or Damaged Panels in Existing PCC Pavement	10	S.Y.	$60.00	$367
21.05	P-156-5.2	8 40x40 Box Hangars Compledted-in-place	12,800	S.F.	$50.00	$640,000
21.06	P-155-8.1	Utilities	1	LS	$20,000.00	$20,000
21.07	S-1-3.1	Mobilization (Base Bid)	1	LS	$70,000.00	$70,000
					Subtotal	**$756,717**
					15% Contingencies	**$113,508**
					Total Construction Cost with Contingencies	**$870,224**
					Design Engineering	**$65,000**
					Construction Survey	**$2,600**
					Geotechnical investigation	**$10,000**
					Construction Materials Testing	**$15,000**
					RPR Services	**$26,400**
					Subtotal	**$119,000**
					Total Project Cost (Base Bid)	**$989,224**

Mid-Way Regional Airport
Development Plan Estimates
December 2011

Item No.	Description	Estimated Quantity	Units	Est. Unit Cost	Opinion of Const. Cost
Turf Runway - Alternate 1					
1.01	Clearing & Grubbing	10	ACRE	$1,500.00	$15,000.00
1.02	Unclassified Excavation	16,400	CY	$4.00	$65,600.00
1.03	Embankment In Place	7,500	CY	$6.00	$45,000.00
1.04	6" Soil Aggregate Base Course	48,350	SY	$12.00	$580,200.00
1.05	6" Concrete Surface Course	1,495	SY	$40.00	$59,800.00
1.06	36" RCP	60	LF	$100.00	$6,000.00
1.07	SET for 36" RCP	2	EA	$2,000.00	$4,000.00
1.08	Hydromulch, Seed, Lime, and Fertilizer	136,750	SY	$0.30	$41,025.00
1.09	Mobilization	1	LS	$94,625.00	$94,625.00
1.10	Barricades and Markings for Pavement Closures	1	LS	$2,500.00	$2,500.00
1.11	Proofrolling	100	HR	$75.00	$7,500.00
1.12	Remove and Replace Unsuitable Subgrade Material with Foundation Material as Directed by the Engineer	250	CY	$100.00	$25,000.00
				Subtotal Alternative 1	**$946,250**
				15% Construction Contingencies	**$141,938**
				20% Engineering Services	**$189,250**
				Property Acquisition ($15,500/ACRE)	**$514,910**
				Total Alternative 1	**$1,792,348**
Turf Runway - Alternate 2					
2.01	Clearing & Grubbing	10	ACRE	$1,500.00	$15,000.00
2.02	Unclassified Excavation	14,400	CY	$4.00	$57,600.00
2.03	Embankment In Place	6,500	CY	$6.00	$39,000.00
2.04	6" Soil Aggregate Base Course	48,350	SY	$12.00	$580,200.00
2.05	6" Concrete Surface Course	1,815	SY	$40.00	$72,600.00
2.06	36" RCP	60	LF	$100.00	$6,000.00
2.07	SET for 36" RCP	2	EA	$2,000.00	$4,000.00
2.08	Hydromulch, Seed, Lime, and Fertilizer	136,750	SY	$0.30	$41,025.00
2.09	Mobilization	1	LS	$94,490.00	$94,490.00
2.10	Barricades and Markings for Pavement Closures	1	LS	$2,500.00	$2,500.00
2.11	Proofrolling	100	HR	$75.00	$7,500.00
2.12	Remove and Replace Unsuitable Subgrade Material with Foundation	250	CY	$100.00	$25,000.00
				Subtotal Alternative 2	**$944,915**
				15% Construction Contingencies	**$141,737**
				20% Engineering Services	**$188,983**
				Property Acquisition ($15,500/ACRE)	**$879,780**
				Total Alternative 2	**$2,155,415**

Mid-Way Regional Airport
Development Plan Estimates
December 2011

Item No.	Description	Estimated Quantity	Units	Est. Unit Cost	Opinion of Const. Cost
Turf Runway - Alternate 3					
3.01	Clearing & Grubbing	15	ACRE	$1,500.00	$22,500.00
3.02	Unclassified Excavation	8,500	CY	$4.00	$34,000.00
3.03	Embankment In Place	5,500	CY	$6.00	$33,000.00
3.04	6" Soil Aggregate Base Course	48,350	SY	$12.00	$580,200.00
3.05	6" Concrete Surface Course	2,070	SY	$40.00	$82,800.00
3.06	36" RCP	60	LF	$100.00	$6,000.00
3.07	SET for 36" RCP	2	EA	$2,000.00	$4,000.00
3.08	Hydromulch, Seed, Lime, and Fertilizer	160,950	SY	$0.30	$48,285.00
3.09	Mobilization	1	LS	$93,975.00	$93,975.00
3.10	Barricades and Markings for Pavement Closures	1	LS	$2,500.00	$2,500.00
3.11	Proofrolling	100	HR	$75.00	$7,500.00
3.12	Remove and Replace Unsuitable Subgrade Material with Foundation	250	CY	$100.00	$25,000.00
				Subtotal Alternative 3	**$939,760**
				15% Construction Contingencies	**$140,964**
				20% Engineering Services	**$187,952**
				Property Acquisition ($15,500/ACRE)	**$1,470,020**
				Total Alternative 3	**$2,738,696**
MALS on Runway 18					
4.01	MALS	1	LS	$300,000.00	$300,000.00
				Subtotal	**$300,000**
				15% Construction Contingencies	**$45,000**
				20% Engineering Services	**$60,000**
				Total	**$405,000**
REILs on Runway 36					
5.01	REIL System	1	LS	$15,000.00	$15,000.00
				Subtotal	**$15,000**
				15% Construction Contingencies	**$2,250**
				20% Engineering Services	**$3,000**
				Total	**$20,250**
Sprinkler System for 3 North T-Hangars					
6.01	8" Waterline	425	LF	$50.00	$21,250.00
6.02	6" Waterline	125	LF	$40.00	$5,000.00
6.03	Sprinkler System	91,695	SF	$1.60	$146,712.00
6.04	Mobilization	1	LS	$19,220.00	$19,220.00
				Subtotal	**$192,182**
				15% Construction Contingencies	**$28,827**
				20% Engineering Services	**$38,436**
				Total	**$259,446**

Engineering Services include design, bidding, construction administration, close-out, inspection, and materials testing

Appendix D

AIRPORT PLANS

Appendix D
AIRPORT PLANS

The Federal Aviation Administration (FAA) and Texas Department of Transportation – Aviation Division (TxDOT) require the development of Airport Layout Plan (ALP) drawings detailing specific parts of the airport and its environs. These drawings were created on a computer-aided drafting (CAD) system and serve as the official depiction of the current and planned condition of the airport. These drawings will be delivered to TxDOT for their review and be critiqued from a technical perspective to make sure all applicable federal regulations are met. TxDOT will use the ALP drawings as the basis for justification for funding decisions.

It should be noted that FAA and TxDOT require that any changes to the airfield (i.e., runway and taxiway system, navigational aids, etc.) be presented on the drawings. The landside configuration developed during the development planning process is also depicted on the drawings, but TxDOT recognizes that landside development is much more fluid and dependent upon developer needs. Thus, an updated drawing set is typically not necessary for future landside development.

AIRPORT LAYOUT DRAWING

An Airport Layout Drawing (ALD) graphically presents the existing and ultimate airport layout. The ALD includes such elements as the physical airport features, wind data tabulation, location of airfield facilities, and existing general aviation development. Also presented on the ALD are the runway safety areas, airport property boundary, and revenue support areas.

The computerized plan provides detailed information on existing and future facility layouts on multiple layers that permit the user to focus 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.

INNER PORTION OF THE APPROACH SURFACE DRAWINGS

The Inner Portion of the Approach Surface Drawings contain the plan and profile view of the inner portion of the approach surface to the runway and a tabular listing of all surface violations. The drawings also contain other approach surfaces, such as the threshold siting surface. Detailed obstruction and facility data is provided to identify planned improvements and the disposition of the obstructions. A drawing of each runway end is provided.

TERMINAL AREA PLAN

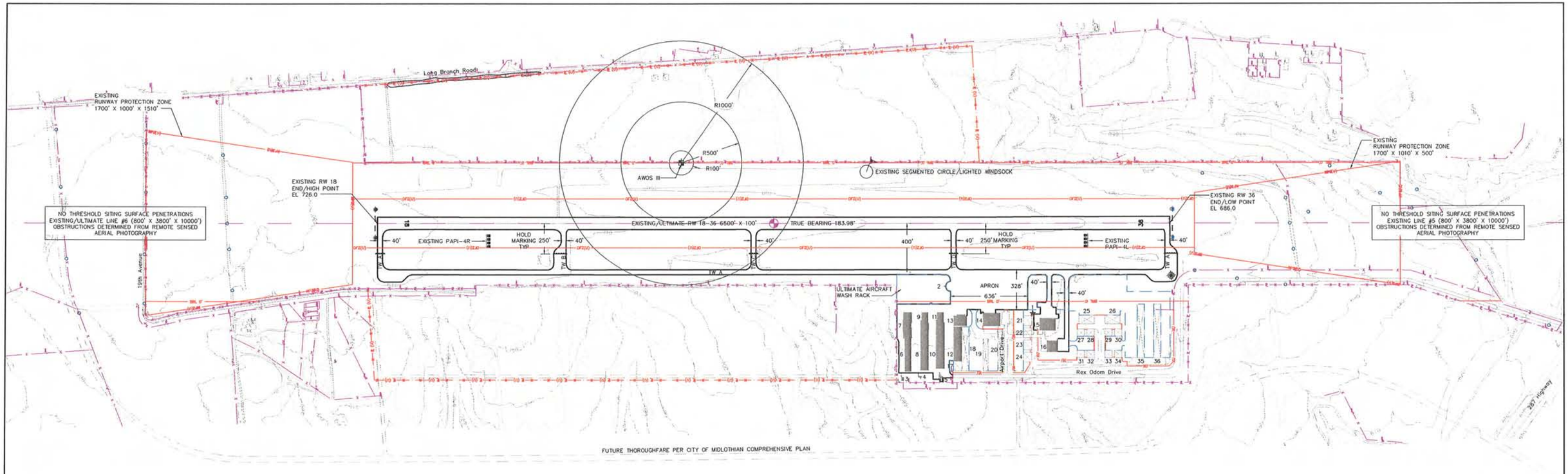
The Terminal Area Plan is a larger scale plan view drawing of existing and planned aprons, buildings, hangars, parking lots, and other landside facilities focused on airport terminal area development.

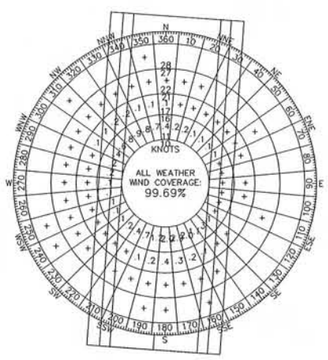
AIRPORT PROPERTY MAP

The Airport Property Map provides information on the acquisition and identification of all land tracts under the control of the airport. Easement interests in areas outside the fee simple property line are also included in present. The primary purpose of the drawing is to provide information for analyzing the current and future use of land acquired with federal funds.

DRAFT ALP DISCLAIMER

The ALP drawing set has been developed in accordance with accepted FAA and TxDOT standards. The ALP has not been approved by TxDOT and is subject to further airspace review. Land use and other changes may result. The airport sponsor and TxDOT have access to the most recently approved ALP.





ALD LEGEND

FEATURE	PHASE I	ULTIMATE
RUNWAY/TAXIWAY OUTLINE		
RUNWAY/TAXIWAY TO BE REMOVED		
BUILDINGS/FACILITIES		
AIRPORT PROPERTY LINE		
AIRPORT PROPERTY LINE w/FENCE		
FENCE LINE		
BUILDING RESTRICTION LINE (BRL)		
AIRPORT REFERENCE POINT		
WIND CONE & SEGMENTED CIRCLE		
THRESHOLD LIGHTS		
RW END IDENTIFIER LIGHTS (REILS)		
C&G BEACON		
VGSI		
HOLD POSITION AND SIGN		
AWOS		
SURVEY MARKERS		
GROUND CONTOURS		
SIGNIFICANT OBJECT LOCATION		
TREES/BRUSH		
NONDIRECTIONAL BEACON (NDB)		

BUILDING TABLE

BUILDING NUMBER	DESCRIPTION EXISTING	DESCRIPTION ULTIMATE	TOP ELEVATION
1	ROTATING BEACON		744.2'
2	SELF-SERVICE FUEL FACILITY		698.9'
3	AIRPORT MAINTENANCE FACILITY		697.5'
4	CIVIL AIR PATROL		698.3'
5	FUEL FARM		695.8'
6	T-HANGARS		705.0'
7	BOX HANGARS		717.0'
8	T-HANGARS		705.0'
9	BOX HANGAR		716.6'
10	T-HANGARS		705.0'
11	BOX HANGAR		713.8'
12	BOX HANGARS		722.8'
13	BOX HANGAR		720.4'
14	TERMNINAL BUILDING/ CONVENTIONAL HANGAR		722.6'
15	CONVENTIONAL HANGAR		728.1'
16	BOX HANGAR		721.5'
17		BOX HANGARS	727.0'
18		BOX HANGARS	722.8'
19		T-HANGARS	722.8'
20		BOX HANGARS	722.8'
21		EXECUTIVE HANGAR	709.0'
22		EXECUTIVE HANGAR	708.0'
23		EXECUTIVE HANGAR	705.0'
24		EXECUTIVE HANGAR	703.0'
25		CONVENTIONAL HANGAR	724.0'
26		CONVENTIONAL HANGAR	723.0'
27		EXECUTIVE HANGAR	705.0'
28		EXECUTIVE HANGAR	705.0'
29		EXECUTIVE HANGAR	703.5'
30		EXECUTIVE HANGAR	703.0'
31		EXECUTIVE HANGAR	703.0'
32		EXECUTIVE HANGAR	703.0'
33		EXECUTIVE HANGAR	702.5'
34		EXECUTIVE HANGAR	702.5'
35		T-HANGARS	705.0'
36		T-HANGARS	704.0'

AIRPORT DATA TABLE

	EXISTING	ULTIMATE
AIRPORT ELEVATION (MSL)	727.0'	727.0'
AIRPORT NAVIGATION AIDS	GPS	GPS
MEAN MAX TEMP (Hottest Month °F)	97°F	97°F
AIRPORT REFERENCE CODE (ARC)	C-II	C-II
TAXIWAY MARKING	STD W/℄REF	STD W/℄REF
TAXIWAY LIGHTING	NONE	NONE
AIRPORT REFERENCE POINT COORDINATES	32°27'29.9" N	32°27'29.9" N
	96°54'45.1" W	96°54'45.1" W

NOTES

DATUM COORDINATE SYSTEMS – HORIZONTAL DATUM NAD 1983 State Plane Texas North Central Zone 4202 Feet, VERTICAL DATUM NAVD88.

EXISTING RUNWAY COORDINATES AND END ELEVATIONS FROM AVIATION STANDARD INFORMATION SYSTEM (ASIS), http://avnwww.jccbi.gov/datasheet/

THERE ARE NO PRIMARY OR SECONDARY AIRPORT CONTROL STATIONS FOR MID-WAY REGIONAL AIRPORT.

THE EXISTING HEIGHT HAZARD ZONING ORDINANCE FOR MID-WAY REGIONAL AIRPORT: RUNWAY 18-36 IS 6500', NO CIRCLE ZONING, AS OF 9 APRIL 2009, AS PROVIDED BY TEXAS DEPARTMENT OF TRANSPORTATION.

CAUTION ZONE LIGHTS ARE PRESENT AT MID-WAY REGIONAL AIRPORT.

NO OFZ OBJECT PENETRATIONS

ULTIMATE SECURITY FENCING SHALL BE INSTALLED AS A PHYSICAL ACCESS BARRIER TO TERMINAL AREAS.

RUNWAY END COORDINATES AND ELEVATIONS

RUNWAY END	LATITUDE	LONGITUDE	ELEVATION
EXISTING END OF RWY 18	32°28'01.93" N	96°54'42.46" W	726.0'
EXISTING END OF RWY 36	32°26'57.77" N	96°54'47.73" W	686.0'
ULTIMATE END OF RWY 18	32°28'01.93" N	96°54'42.46" W	726.0'
ULTIMATE END OF RWY 36	32°26'57.77" N	96°54'47.73" W	686.0'

RUNWAY DATA TABLE

	RW 18-36			
	EXISTING		ULTIMATE	
RUNWAY ARC	C-II		C-II	
DESIGN AIRCRAFT & ARC	Challenger 604		Challenger 604	
BALANCED FIELD LENGTH	5702'		5702'	
RUNWAY LENGTH & WIDTH (ft.)	6500' X 100'		6500' X 100'	
PAVEMENT DESIGN STRENGTH (1000 lbs.)	90 DW		90 DW	
RUNWAY LIGHTING	MIRL		MIRL	
PERCENT EFFECTIVE GRADIENT	0.6%		0.6%	
PERCENT WIND COVERAGE	99.69% 16 kts		99.69% 16 kts	
MAXIMUM ELEVATION ABOVE MSL	726.0'		726.0'	
RW SURFACE TYPE	ASPH/CONCRETE		ASPH/CONCRETE	
RSA – LENGTH BEYOND RW END	1000'		1000'	
RSA – WIDTH	500'		500'	
OFA – LENGTH BEYOND RW END	1000'		1000'	
OFA WIDTH	800'		800'	
OFZ – LENGTH BEYOND RW END	200'		200'	
OFZ WIDTH	400'		400'	
RUNWAY END	**18**	**36**	**18**	**36**
APPROACH TYPE	GPS LPV	GPS LPV	GPS LPV	GPS LPV
APPROACH VISIBILITY MINIMA	3/4 MILE	1 MILE	3/4 MILE	1 MILE
THRESHOLD SITING SURFACE & SLOPE	#6 20:1	#6 20:1	#5 20:1	#6 20:1
RUNWAY MARKING	NPI	NPI	PIR	NPI
RUNWAY VISUAL AIDS	PAPI-4 REILS	PAPI-4	PAPI-4 REILS	PAPI-4 REILS
TOUCHDOWN ZONE ELEVATION	726.0'	702.6'	726.0'	702.6'
FAR PART 77 APPROACH CATEGORY	D	C	D	C
FAR PART 77 APPROACH SURFACE SLOPE	34:1	34:1	34:1	34:1
TAKE-OFF RUN AVAILABLE (TORA)	6500'	6500'	6500'	6500'
TAKE-OFF DISTANCE AVAILABLE (TODA)	6500'	6500'	6500'	6500'
ACCELERATE STOP DISTANCE AVAIL. (ASDA)	6500'	6500'	6500'	6500'
LANDING DISTANCE AVAILABLE (LDA)	6500'	6500'	6500'	6500'

MAGNETIC DECLINATION
3° 54' 53" E (JULY 2012)
ANNUAL RATE OF CHANGE
0° 7.9' W (JULY 2012)

0 400 800 1200
SCALE IN FEET

TEXAS DEPARTMENT OF TRANSPORTATION AVIATION DIVISION

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DAVID FULTON, DIRECTOR, AVIATION DIVISION — DATE

AIRPORT SPONSOR

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DRAFT

SIGNATURE — DATE

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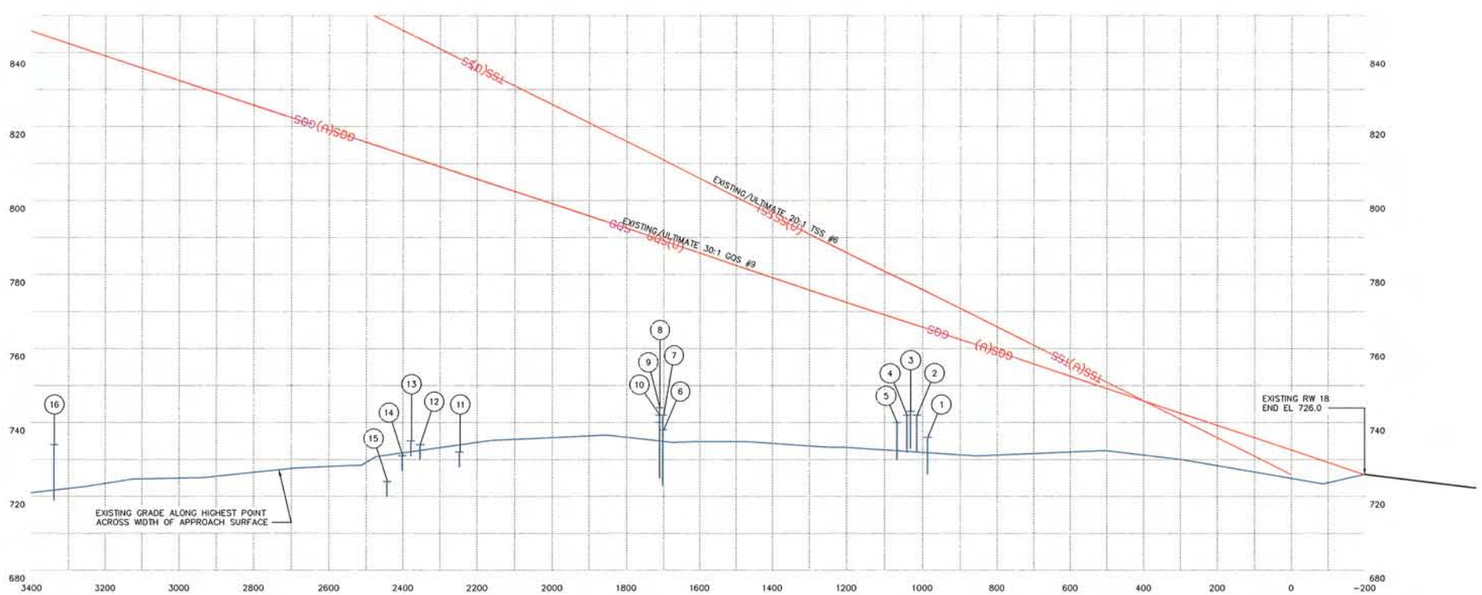
M. QUICK — JULY 30, 2012
DESIGNED BY — DATE

D. HOPKINS — JULY 30, 2012
DRAWN BY — DATE

AIRPORT LAYOUT DRAWING
MID-WAY REGIONAL AIRPORT
MIDLOTHIAN/WAXAHACHIE, TEXAS (JWY)

Texas Department of Transportation
Aviation Division

RW 18 PLAN



RW 18 PROFILE

Penetrations to Threshold Siting Surface

No.	Object Description	Latitude (N)	Longitude (W)	Distance fm RW end	Offset fm RW C/L*	Top Elevation**	Amt of Penetration	REMEDIATION
1	NONE							

GENERAL NOTES

SURVEY MAPPING PERFORMED BY GEODETIX, INC., SAN ANTONIO, TX.

DATUM COORDINATE SYSTEMS – HORIZONTAL DATUM NAD 1983 State Plane Texas North Central Zone 4202 Survey Feet, VERTICAL DATUM NAVD88. DO NOT APPLY CORRECTION FACTOR.

EXISTING RUNWAY END ELEVATIONS FROM AVIATION STANDARD INFORMATION SYSTEM (ASIS), http://avnwww.jccbi.gov/datasheet/

THERE ARE NO PRIMARY OR SECONDARY AIRPORT CONTROL STATIONS FOR MID-WAY REGIONAL AIRPORT.

THE EXISTING HEIGHT HAZARD ZONING ORDINANCE FOR MID-WAY REGIONAL AIRPORT: RUNWAY 18-36 IS 6500', NO CIRCLE ZONING, AS OF 9 APRIL 2009, AS PROVIDED BY TEXAS DEPARTMENT OF TRANSPORTATION.

IPASD LEGEND

FEATURE	PHASE I	ULTIMATE
RUNWAY/TAXIWAY OUTLINE		
RUNWAY/TAXIWAY TO BE REMOVED		
BUILDINGS/FACILITIES		
AIRPORT PROPERTY LINE		
AIRPORT PROPERTY LINE w/FENCE		
THRESHOLD SITING SURFACE	TSS	TSS (U)
FENCE LINE		
THRESHOLD LIGHTS		
RW END IDENTIFIER LIGHTS (REILS)		
GROUND CONTOURS		
SIGNIFICANT OBJECT PLAN VIEW		
SIGNIFICANT OBJECT PROFILE VIEW		
TREES/BRUSH		

MAGNETIC DECLINATION
3° 54' 53" E (JULY 2012)
ANNUAL RATE OF CHANGE
0° 7.9' W (JULY 2012)

0 400 800 1200
HORIZONTAL SCALE IN FEET

0 40 80 120
VERTICAL SCALE IN FEET

TEXAS DEPARTMENT OF TRANSPORTATION AVIATION DIVISION

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M. QUICK — JULY 30, 2012
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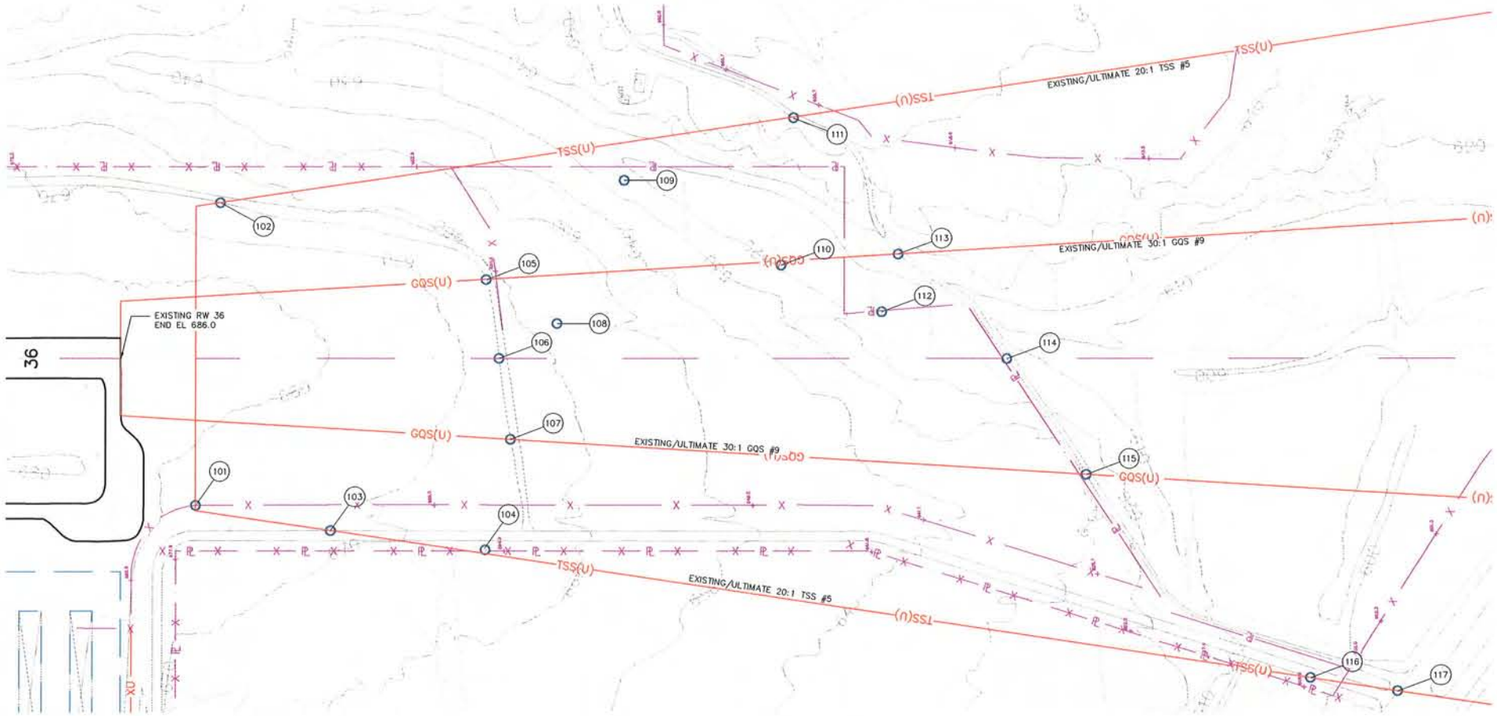
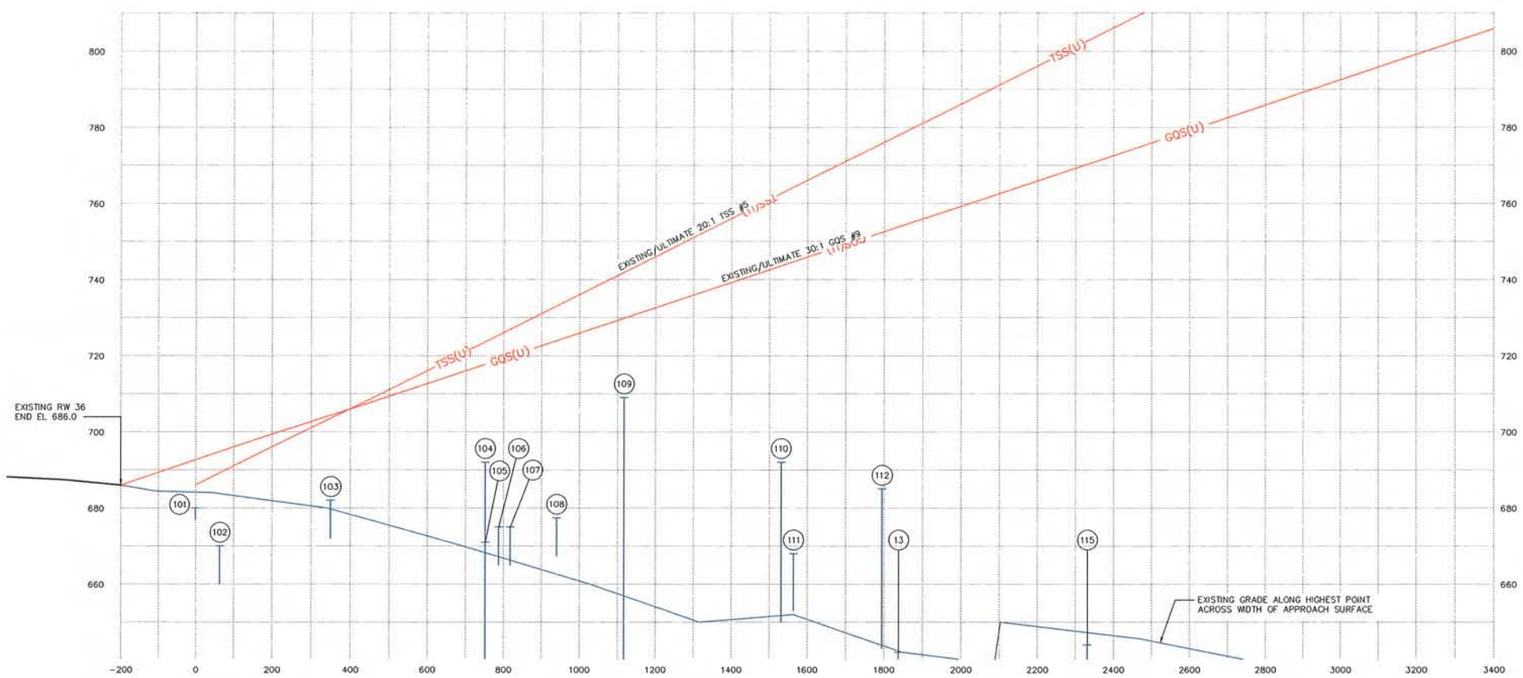
D. HOPKINS — JULY 30, 2012
DRAWN BY — DATE

IPASD RUNWAY 18
MID-WAY REGIONAL AIRPORT
MIDLOTHIAN/WAXAHACHIE, TEXAS (JWY)

Texas Department of Transportation
Aviation Division



RW 36 PLAN



RW 36 PROFILE

Penetrations to Threshold Siting Surface

No.	Object Description	Latitude (N)	Longitude (W)	Distance fm RW end	Offset fm RW C/L*	Top Elevation**	Amt of Penetration	REMEDIATION
1	NONE							

GENERAL NOTES

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IPASD LEGEND

FEATURE	PHASE I	ULTIMATE
RUNWAY/TAXIWAY OUTLINE		
RUNWAY/TAXIWAY TO BE REMOVED		
BUILDINGS/FACILITIES		
AIRPORT PROPERTY LINE		(U)
AIRPORT PROPERTY LINE w/FENCE		(U)
THRESHOLD SITING SURFACE	TSS	TSS (U)
FENCE LINE		
THRESHOLD LIGHTS		
RW END IDENTIFIER LIGHTS (REILS)		
GROUND CONTOURS		
SIGNIFICANT OBJECT PLAN VIEW		
SIGNIFICANT OBJECT PROFILE VIEW	T	
TREES/BRUSH		

MAGNETIC DECLINATION
3° 54' 53" E (JULY 2012)
ANNUAL RATE OF CHANGE
0° 7.9' W (JULY 2012)

0 400 800 1200
HORIZONTAL SCALE IN FEET

0 40 80 120
VERTICAL SCALE IN FEET

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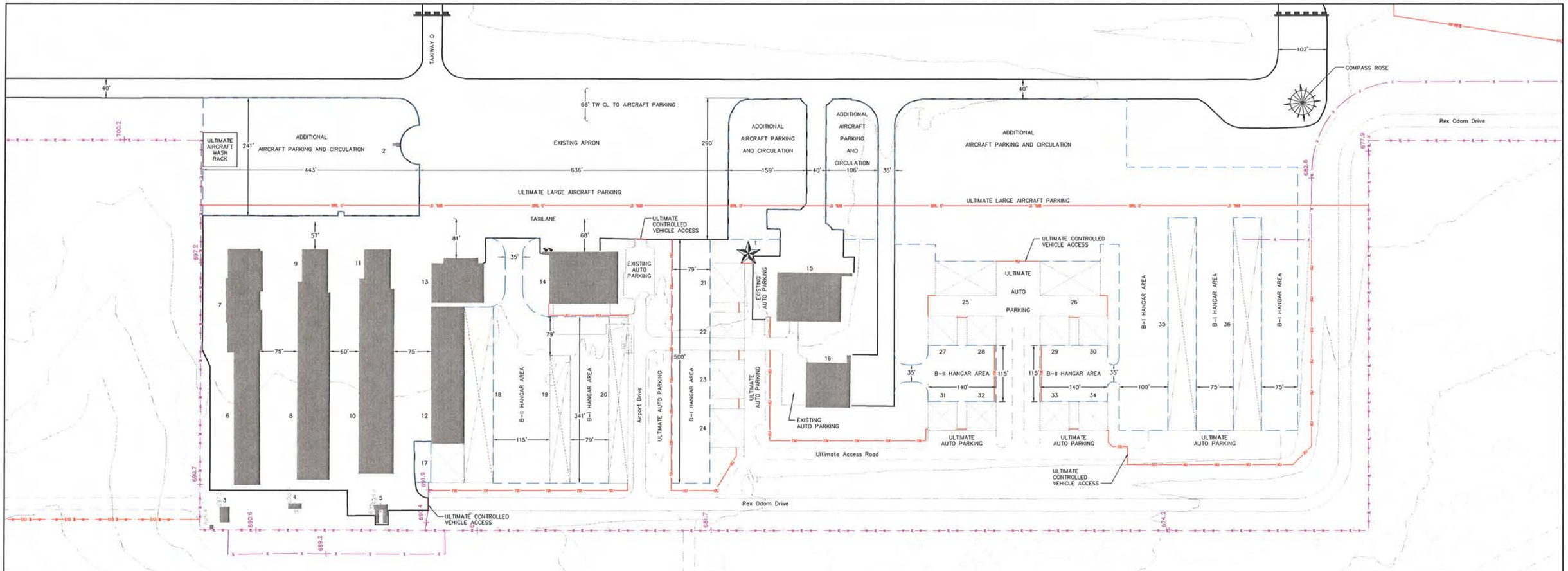
DRAWN BY — DATE

IPASD RUNWAY 36
MID-WAY REGIONAL AIRPORT
MIDLOTHIAN/WAXAHACHIE, TEXAS (JWY)

Texas Department of Transportation
Aviation Division



BUILDING TABLE			
BUILDING NUMBER	DESCRIPTION EXISTING	DESCRIPTION ULTIMATE	TOP ELEVATION
1	ROTATING BEACON		744.2'
2	SELF-SERVICE FUEL FACILITY		698.9'
3	AIRPORT MAINTENANCE FACILITY		697.5'
4	CIVIL AIR PATROL		698.3'
5	FUEL FARM		695.8'
6	T-HANGARS		705.0'
7	BOX HANGARS		717.0'
8	T-HANGARS		705.0'
9	BOX HANGAR		716.6'
10	T-HANGARS		705.0'
11	BOX HANGAR		713.8'
12	BOX HANGARS		722.8'
13	BOX HANGAR		720.4'
14	TERMNINAL BUILDING/CONVENTIONAL HANGAR		722.6'
15	CONVENTIONAL HANGAR		728.1'
16	BOX HANGAR		721.5'
17		BOX HANGARS	727.0'
18		BOX HANGARS	722.8'
19		T-HANGARS	722.8'
20		BOX HANGARS	722.8'
21		EXECUTIVE HANGAR	709.0'
22		EXECUTIVE HANGAR	708.0'
23		EXECUTIVE HANGAR	705.0'
24		EXECUTIVE HANGAR	703.0'
25		CONVENTIONAL HANGAR	724.0'
26		CONVENTIONAL HANGAR	723.0'
27		EXECUTIVE HANGAR	705.0'
28		EXECUTIVE HANGAR	705.0'
29		EXECUTIVE HANGAR	703.5'
30		EXECUTIVE HANGAR	703.0'
31		EXECUTIVE HANGAR	703.0'
32		EXECUTIVE HANGAR	703.0'
33		EXECUTIVE HANGAR	702.5'
34		EXECUTIVE HANGAR	702.5'
35		T-HANGARS	705.0'
36		T-HANGARS	704.0'

ALD LEGEND		
FEATURE	PHASE I	ULTIMATE
RUNWAY/TAXIWAY OUTLINE		
RUNWAY/TAXIWAY TO BE REMOVED		
BUILDINGS/FACILITIES		
AIRPORT PROPERTY LINE		
AIRPORT PROPERTY LINE w/FENCE		
FENCE LINE		
BUILDING RESTRICTION LINE (BRL)		BRL 0'
AIRPORT REFERENCE POINT		
WIND CONE & SEGMENTED CIRCLE		
THRESHOLD LIGHTS		
RW END IDENTIFIER LIGHTS (REILS)		
C&G BEACON		
VGSI		
HOLD POSITION AND SIGN		
AWOS		
SURVEY MARKERS		
GROUND CONTOURS		
SIGNIFICANT OBJECT LOCATION		
TREES/BRUSH		
NONDIRECTIONAL BEACON (NDB)		

GENERAL NOTES

ULTIMATE SECURITY FENCING SHALL BE INSTALLED AS A PHYSICAL ACCESS BARRIER TO TERMINAL AREAS.

MAGNETIC DECLINATION
3° 54' 53" E (JULY 2012)
ANNUAL RATE OF CHANGE
0° 7.9' W (JULY 2012)

0 200 400 600
SCALE IN FEET

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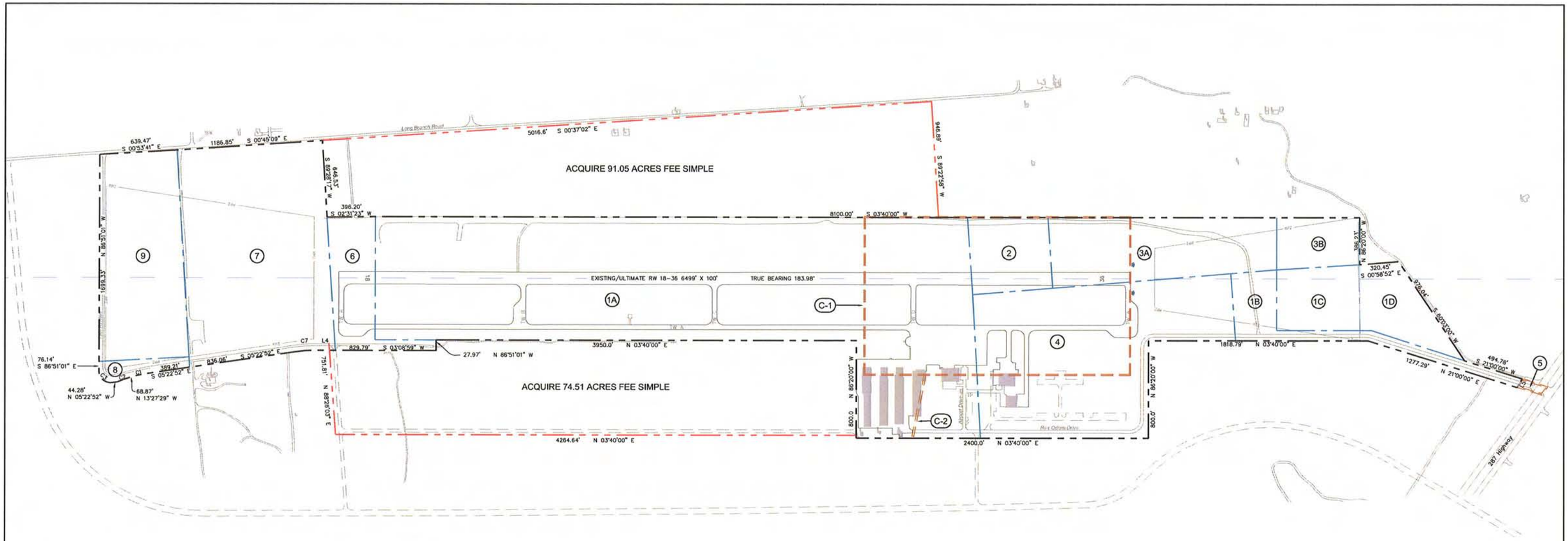
TERMINAL AREA DRAWING
MID-WAY REGIONAL AIRPORT
MIDLOTHIAN/WAXAHACHIE, TEXAS (JWY)

Texas Department of Transportation
Aviation Division



MAGNETIC DECLINATION
3° 54' 53" E (JULY 2012)
ANNUAL RATE OF CHANGE
0° 7.9' W (JULY 2012)

0 400 800 1200

SCALE IN FEET

EXISTING AIRPORT PROPERTY DATA TABLE

TRACT	ACRES	TITLE	GRANTOR	COUNTY RECORD	DATE	FUNDING
1A	131.754	FEE SIMPLE	ALMA ANN & FRANK B. SEALE	ELLIS COUNTY DEED RECORDS VOL. 828/PAGE 86	NOV 11, 1989	AIP, 3-48-0313-03
1B	8.799	FEE SIMPLE	ALMA ANN & FRANK B. SEALE	ELLIS COUNTY DEED RECORDS VOL. 828/PAGE 86	NOV 11, 1989	AIP, 3-48-0313-03
1C	8.278	FEE SIMPLE	ALMA ANN & FRANK B. SEALE	ELLIS COUNTY DEED RECORDS VOL. 828/PAGE 86	NOV 11, 1989	AIP, 3-48-0313-03
1D	8.281	FEE SIMPLE	ALMA ANN & FRANK B. SEALE	ELLIS COUNTY DEED RECORDS VOL. 828/PAGE 86	NOV 11, 1989	AIP, 3-48-0313-03
2	9.320	FEE SIMPLE	CLARK & PROFFITT DEVELOPMENT CO.	ELLIS COUNTY DEED RECORDS VOL. 814/PAGE 458	MAR 23, 1989	AIP, 3-48-0313-03
3A	22.345	FEE SIMPLE	BUFORD C. SMITH, et ux, HELEN L. SMITH	ELLIS COUNTY ABSTRACT OF JUDGEMENT RECORDS VOL 31/PAGE 645	FEB 8, 1991	AIP, 3-48-0313-03
3B	6.667	FEE SIMPLE	BUFORD C. SMITH, et ux, HELEN L. SMITH	ELLIS COUNTY ABSTRACT OF JUDGEMENT RECORDS VOL 31/PAGE 645	FEB 8, 1991	AIP, 3-48-0313-03
4	47.644	FEE SIMPLE	PATRICK F. DEPREZ, TRUSTEE & BEN B. WEST, TRUSTEE, et al	ELLIS COUNTY ABSTRACT OF JUDGEMENT RECORDS VOL 31/PAGE 654	FEB 15, 1991	AIP, 3-48-0313-03
5	0.4049 (17,639 sq ft)	DEED OF RELEASE	USA FEDERAL AVIATION ADMINISTRATION, DEPT OF TRANSPORTATION	ELLIS COUNTY DEED RECORDS VOL 1548/PAGE 970	FEB 23, 1999	--
6	10.098	FEE SIMPLE	ALMA ANN SEALE	ELLIS COUNTY DEED RECORDS VOL 2427/PAGE 1694	DEC 30, 2008	--
7	47.915	FEE SIMPLE	CAROLYN J. HAMAN FAMILY LIMITED PARTNERSHIP	ELLIS COUNTY DEED RECORDS VOL 2427/PAGE 1703	DEC 30, 2008	--
8	2.325	FEE SIMPLE	WILMA HAYES	ELLIS COUNTY DEED RECORDS VOL 2466/PAGE 2074	AUG 11, 2009	--
9	27.117	FEE SIMPLE	SID STREBECK & MAX THOMPSON	ELLIS COUNTY ABSTRACT OF JUDGEMENT RECORDS CAUSE NO. 09-C=2114	DEC 30, 2010	--

CONVEYED AIRPORT PROPERTY DATA TABLE

TRACT	ACRES	TITLE	GRANTOR	COUNTY RECORD	DATE	FUNDING
5	0.4049 (17,639 sq ft)	US 287 HIGHWAY ROW	STATE OF TEXAS, TEXAS TRANSPORTATION COMMISSION	ELLIS COUNTY DEED RECORDS VOL. 1,557/PAGE 727	FEB 3, 1999	--
C-1	1.6125	10' UTILITY EASEMENT	SARDIS & LONE ELM WATER SUPPLY CORPORATION	ELLIS COUNTY DEED RECORDS VOL. 857/PAGE 459	FEB 21, 1991	--
C-2	0.1745	UTILITY EASEMENT	SARDIS & LONE ELM WATER SUPPLY CORPORATION	UNRECORDED	FEB 23, 1999	--

PROPERTY LEGEND

- Existing Property Line
- Ultimate Property Line
- Existing Tract Line
- Conveyed Tract Line

CURVE TABLE

NUMBER	DELTA	RADIUS	LENGTH	CHORD BEARING	CHORD LENGTH
C1	08°04'38"	492.00	69.36	N 09°25'11" W	69.30
C2	08°04'38"	584.00	82.33	N 09°25'11" W	82.26
C3	98°31'51"	96.59	166.11	N 43°53'04" E	146.39

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AIRPORT PROPERTY MAP
MID-WAY REGIONAL AIRPORT
MIDLOTHIAN/WAXAHACHIE, TEXAS (JWY)

Texas Department of Transportation
Aviation Division

SHEET 1 OF 1

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