To properly plan for improvements at Dallas Executive Airport, it is necessary to translate forecast aviation demand into the specific types and quantities of facilities that can adequately serve the demand. In this chapter, existing components of the airport are evaluated so that the capacities of the overall system are identified. Once identified, the existing capacity is compared to the forecast activity levels to determine where deficiencies currently exist or may be expected to materialize in the future. Once deficiencies in a component are identified, a more specific determination of the appropriate sizing and timing of the new facilities can be made.

As indicated previously in Chapter One, airport facilities include both airside and landside components. Airside facilities include those that are related to the arrival, departure, and ground movement of aircraft. The components include:

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

Landside facilities are needed for the interface between air and ground transportation modes. This includes components for general aviation needs such as:

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

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. Once the facility requirements have been established, alternatives for providing these facilities will be evaluated in Chapter Four to determine the most practical, cost-effective, and efficient direction for future development.

An updated set of aviation demand forecasts for Dallas Executive Airport has been established as presented in the previous chapter. The activity forecasts include based aircraft, fleet mix, annual operations, peaking characteristics, and annual instrument approaches (AIAs). With this information, specific components of the airside and landside system can be evaluated to determine their capacity to accommodate future demand.

Cost-effective, safe, efficient, and orderly development of an airport should rely more upon actual demand at an airport than a time-based forecast figure. In order to develop a Master Plan that is demand-based rather than time-based, a series of planning horizon milestones has *been established for Dallas Executive Airport that takes into consideration the reasonable range of aviation demand projections prepared in Chapter Two. It is important to consider that the actual activity at any given time at the airport may be higher or lower than projected activity levels. By planning according to activity milestones, the resulting plan can accommodate unexpected shifts or changes in the area's aviation demand.*

The most important reason for utilizing milestones is that they allow the airport to develop facilities according to need generated by actual demand levels. The demand-based schedule provides flexibility in development, as schedules can be slowed or expedited according to actual demand at any given time over the planning period. The resultant plan provides airport officials with a financially responsible, needs-based program.

Table 3A *presents the planning horizon milestones of short, intermediate, and long term for each aircraft activity category. These milestones generally correlate to five, ten, and 20-year periods used in the previous chapter.*

AIRFIELD DESIGN AND PLANNING STANDARDS

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 500 annual operations at the airport.

CRITICAL DESIGN AIRCRAFT

The ARC, as described in Federal Aviation Administration (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 3B** *presents the ARC criteria.*

As an example, a Beech King Air 200 with an approach speed of 103 knots and wingspan of 54.5 feet is categorized in ARC B-II, while a larger corporate jet, such as a Gulfstream V, with an approach speed of 145 knots and a wingspan of 93.5 feet, is included in ARC D-III. **Exhibit 3A** *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 first be determined, and then appropriate airport design criteria can be applied. This process begins with a review of aircraft currently using the airport and a projection of those expected to use the airport through the long term planning period.

CURRENT CRITICAL AIRCRAFT

As previously discussed, TxDOT standards defines the critical design aircraft as the most demanding category or family of aircraft which conducts at least 500 annual operations at the airport. In some cases, more than one specific make and model of aircraft comprises the airport's critical design aircraft. For example, one category of aircraft may be the most critical in terms of approach speed, while another is most critical in terms of wingspan.

Smaller general aviation aircraft within approach categories A and B and ADG I and II conduct the majority of operations at Dallas Executive Airport. Turboprop and jet aircraft with longer wingspans and higher approach speeds also utilize the airport, but less frequently. While the airport is utilized by helicopters, they are not included in this determination as they are not assigned an ARC.

According to records, there are 185 based aircraft at Dallas Executive Airport. The majority of these are single and multi-engine piston-powered aircraft which fall within approach categories A and B and ADG I. There are several larger turboprops and jets also based at the airport. The turboprops consist of multi-engine aircraft that fall within approach categories A and B and ADGs I and II. The based jets include a variety of aircraft ranging from different models of Cessna Citations, which are designated in ARCs B-I and B-II, to the Gulfstream II and IV, which are classified in ARC D-II. Thus, the airport's critical based aircraft is the Gulfstream II and IV models, thereby, ARC D-II. Before making a final determination of the critical aircraft family, an examination of the itinerant business jet aircraft using the airport should be considered.

Itinerant Jet Aircraft

Jet aircraft operations are typically those that will influence required airport facilities as the critical design aircraft. In order to discern the number and type of jet aircraft operations at Dallas Executive Airport, data was obtained from Enhanced Traffic Management System Counts (ETMSC) provided by the FAA. Data available through this program is created when pilots file flight plans and/or when flights are detected by the National Airspace System, usually via radar. It includes documentation of commercial traffic (air carrier and air taxi), general aviation, and military aircraft. Due to factors such as incomplete flight plans and limited radar coverage, ETMSC data cannot account for all aircraft activity at an airport. Therefore, it is likely that there are more jet operations at the airport that are not captured by this methodology. It is believed, however, that this information is sufficient to provide an adequate understanding of the airport's critical aircraft. The following analysis of the itinerant jet aircraft usage at the airport will aid in determining the actual design standards for the airport.

Table 3C *presents jet aircraft operations at Dallas Executive Airport from June 1, 2010, to May 31, 2011 (12-month operational count). As detailed in the table, itinerant aircraft utilizing the airport include a wide variety of jets including several different makes and models of Cessna Citations, Falcons, Learjets, Challengers, and Gulfstreams, among others. There were a total of 2,171 jet aircraft operations logged by ETMSC during the one-year timeframe. The greatest number of operations in any single ARC family was 677 in ARC B-II, while ARC B-I registered 426 operations. These accounted for approximately 31 percent and 20 percent of logged jet activity, respectively. Aircraft in approach categories C and D also constituted a significant number of jet operations at Dallas Executive Airport during the one-year period. Of the logged operations, approximately 48 percent of jet activity at the airport was conducted by aircraft in ARC C-I or greater.*

The table also presents the number of operations by specific aircraft type. The Cessna 525 model performed the most operations (250) of any jet aircraft at the airport. Other aircraft that recorded a significant number of operations included the Cessna 550 (211), Cessna 650 (180), Cessna 525B (172), Cessna 560 (157), and Hawker Siddeley HS 125-800 (156).

The most demanding business jet, in terms of ARC design standards, to operate at the airport during the time period was the Gulfstream V. The Gulfstream V is classified by the FAA as an ARC D-III aircraft. Aircraft such as the Gulfstream G150, II, and IV also utilized the airport and fall in the ARC D-II category. There were also operations conducted by the Global Express (ARC C-III), but these operations constituted a very small percentage of overall jet activity.

***Table 3D** presents the minimum number of jet operations broken down by approach category and ADG for the one-year timeframe. A significant number of operations were conducted by aircraft in approach categories B, C, and D and ADGs I and II. As previously mentioned, critical aircraft design does not require one specific aircraft model to make up the 500 annual operations. Based upon these figures, annual operations by jet aircraft in approach categories C and D and ADG II have combined to exceed the critical aircraft threshold of 500 operations per year to be designated as the current critical design aircraft. Thus, the current critical aircraft for Dallas Executive Airport is ARC C/D-II.*

FUTURE CRITICAL AIRCRAFT

The aviation demand forecasts indicate the potential for growth in business jet aircraft activity at the airport. This includes the potential addition of 14 based jets through the long term planning period. Itinerant business jet activity is projected to also follow this moderate growth trend, rebounding from current economic conditions. Therefore, business jet aircraft will continue to define the critical aircraft parameters for Dallas Executive Airport through the planning period.

Increased business aircraft utilization is typical at general aviation reliever airports surrounded by growing or established population and employment centers, such as the case for Dallas Executive Airport. Over the past several years, corporate jet aircraft have been increasingly utilized by a wider variety of companies. Although recent trends have indicated a decline in business jet operations due to the recent economic recession, the FAA forecasts a return to positive growth in business aircraft utilization in the future. National factors, coupled with socioeconomic conditions in the surrounding area, will influence additional corporate aircraft demand. The growing demand will elect to utilize those airports that provide facilities that meet their needs.

The area surrounding Dallas Executive Airport is expected to support positive population and employment growth in the future. These trends will position the airport well for serving the growing aviation demand. In addition, Dallas Executive Airport has significantly improved its facilities in recent years to accommodate the business aviation segment and now has a reputation in the general aviation community of being an attractive airport providing an array of aviation services. Amenities such as the airport traffic control tower (ATCT) and an instrument landing system (ILS) will certainly continue to attract business jet activity. Thus, future facility planning should include the potential for the airport to be utilized by the majority of business jets on the market.

Another segment of corporate aircraft users operate under Federal Aviation Regulation (F.A.R.) Part 135 (air taxi) rules for hire through fractional ownership programs. Since these aircraft *operate at the airport on a frequent basis, planning should consider meeting the needs of highly utilized air taxi and fractional ownership aircraft. Although these aircraft can range up to ARC D-III, most fall in ARCs B-I to C-II.*

The Gulfstream V and Global Express represent the largest commonly used business jets in the fleet today. According to records, these aircraft have operated at Dallas Executive Airport during the past year but on an infrequent basis. Operations by these aircraft do not currently meet the threshold for critical aircraft design. If at any point in time a larger business jet such as the Gulfstream V, Global Express, or Boeing Business Jet were to be based at the airport and/or the number of operations by these aircraft increase significantly, the airport's ARC could transition to D-III. While this transition is possible, the planning process will expect that the airport will remain as ARC C/D-II; however, analyses in this and the following chapters will provide information about facility changes which could be needed to meet C/D-III.

While the airport in general will be planned to meet ARC D-II standards, the runways will be individually analyzed based upon function. Runway 13-31 provides 6,451 feet of usable runway length at the airport and serves as the primary runway for large aircraft. As a result, this runway should ultimately conform to ARC D-II standards.

Runway 17-35 is the crosswind runway serving Dallas Executive Airport and currently provides a length of 3,800 feet and meets the needs of aircraft up to ARC B-II. While this runway length limits the use of business jets, it can accommodate the majority of smaller general aviation aircraft. Furthermore, according to ATCT personnel, prevailing winds at the airport generally favor the use of Runway 17-35. This runway can also provide a vital role of serving aircraft operations when Runway 13-31 is closed for maintenance or emergencies. As such, Runway 17-35 should be designed to ultimately conform to ARC C/D-II standards, if possible. A detailed evaluation will be conducted in Chapter Four further exploring a potential extension on Runway 17-35 to better accommodate larger aircraft in the future.

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, and Heliport. Dallas Executive Airport is classified as a reliever airport in the TASP.

As defined by the TASP, a reliever airport is located within a major metropolitan area and provides alternative airport facilities for general aviation users to relieve congestion at the larger commercial service airports. Furthermore, a reliever airport is capable of accommodating various classes of aircraft from large business jets to smaller piston aircraft. A *reliever airport has or must be forecast to have 100 based aircraft or 25,000 annual itinerant operations.*

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 include: Commercial, Reliever, Regional, Multipurpose, Industrial, Special Use, Agricultural, Remote, and Access. **Table 3E** *presents the definition of the airport functional categories including the reliever classification for Dallas Executive Airport highlighted in bold text.*

TASP Airport Design Standards

The TASP presents the following minimum design criteria for each defined role of general aviation airports in Texas. As already mentioned, Dallas Executive Airport is currently classified as a reliever airport. **Table 3F** *presents the TASP design standards for each airport service role. The minimum design standards for Dallas Executive Airport are highlighted in bold text.*

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. The airport's ASV was examined utilizing FAA AC 150/5060-5, Airport Capacity and Delay.

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 in **Exhibit 3B.** *The following describes the input factors as they relate to Dallas Executive Airport and include airfield layout, weather conditions, aircraft mix, and operations.*

- **Runway Configuration** – ***The existing airfield configuration consists of a crosswind runway system with parallel taxiways serving both runways. Runway 13-31 is 6,451 feet long by 150 feet wide, while Runway 17-35 is 3,800 feet long by 150 feet wide.***

- **Runway Use** – ***Runway use in capacity conditions will be controlled by wind and/or airspace conditions. For Dallas Executive Airport, the direction of take-offs and landings are generally determined by the speed and direction of the wind. It is generally safest for aircraft to take-off and land into the wind, avoiding a crosswind (wind that is blowing perpendicular to the travel of the aircraft) or tailwind components during these operations. Based upon information received from the ATCT, Runway 17-35 is more favorably oriented for predominant winds and is utilized approximately 75 percent of the time. The existing length on Runway 17-35 currently limits it to smaller general aviation aircraft. Runway 13-31 is primarily utilized by larger aircraft and during times when wind conditions dictate.***

- **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 feet and 4,000 feet from the landing threshold count in the exit rating. Runway 13-31 is credited for two exits in each direction under this analysis. Runway 17-35 is credited for one exit taxiway in each direction.***

- **Weather Conditions** – ***The airport operates under visual meteorological conditions (VMC) approximately 91 percent of the time. Instrument meteorological conditions (IMC) occur when cloud ceilings are between 500 and 1,000 feet and visibility minimums are between one and three miles, approximately five percent of the year. Poor visibility conditions (PVC) apply for minimums below 500 feet and one mile. PVC conditions occur approximately four percent of the year.***

- **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 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 about ten percent of total annual operations. The remainder is operations by Classes A and B aircraft.***

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

- **Touch-and-Go Activity** – ***Current and projected local operations account for approximately 60 percent of total annual operations.***

- **Peak Period Operations** – ***For the airfield capacity analysis, average 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 CONCLUSIONS

Given the factors outlined above, the airfield ASV will range between 150,000 and 200,000 annual operations. The ASV does not indicate a point of absolute gridlock for the airfield; however, it does represent the point at which operational delay for each aircraft operation will increase exponentially. The current operational level for the airport represents 36 percent of the airfield's ASV, if the ASV is considered at the low end of the typical range of 150,000 annual operations. By the end of the planning period, total annual operations are expected to represent 67 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 purposes should begin to be considered once operations reach 60 to 75 percent of the annual service volume. This is an approximate level to begin the detailed planning of capacity improvements. At the 80 percent level, the planned improvements should be made. While no significant capacity improvements will be necessary, options to improve airfield efficiency will still be considered and evaluated in the next chapter.

It should be mentioned that aircraft mix can play a significant role in determining an airport's overall capacity. As previously discussed, the current aircraft mix factors in an overall high percentage of Classes A and B aircraft and a smaller percentage of Class C aircraft. In the event that larger general aviation business jets began utilizing Dallas Executive Airport on a more frequent basis, the airfield's ASV could decrease significantly and, thus, capacity enhancements may need to be planned for accordingly. Improvements such as additional exit taxiways serving each runway could enhance and improve airfield capacity under this scenario.

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 Dallas Executive Airport, Runway 13-31 should currently meet design standards for ARC C/D-II and ¾-mile visibility minimums. Runway 17-35 should presently meet ARC B-II standards. As previously discussed, ultimate planning should consider similar types of aircraft utilizing the airport. As a result, Runway 13-31 should conform to standards for ARC D-II, while Runway 17-35 will be designed to meet ARC C/D-II standards.

RUNWAY SAFETY AREA

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

The FAA has placed a higher significance on maintaining adequate RSAs at all airports due to previous aircraft accidents. Under Order 5200.8, effective October 1, 1999, the FAA established a Runway Safety Area Program. The Order states, "The objective of the Runway Safety Area Program is that all RSAs at federally-obligated airports … shall conform to the standards contained in AC 150/5300-13, Airport Design, to the extent practicable." Each Regional Airports Division of the FAA is obligated to collect and maintain data on the RSA for each runway at the airport and perform airport inspections.

For ARC C/D-II aircraft, the FAA calls for the RSA to be 500 feet wide and extend 1,000 feet beyond the runway ends. Analysis in the previous section indicated that Runway 13-31 should *also be analyzed to accommodate aircraft in ARC D-III. The RSA for this ARC is also 500 feet wide and extends 1,000 feet beyond each runway end.*

Runway 17-35 is currently ARC B-II with visibility minimums not lower than one mile. The applicable RSA is 150 feet wide, extending 300 feet beyond each runway end. For ARC C/D-II design, the RSA increases to be 500 feet wide, extending 1,000 feet beyond each runway end.

As depicted on **Exhibit 3C***, the southeastern-most portion of the RSA associated with Runway 13-31 does not conform to existing and ultimate design standards. In this area, perimeter fencing, U.S. Highway 67, and local roadways obstruct the RSA. Furthermore, the obstructions outside airport property are difficult for the airport to control and mitigate. The airport appears to meet the current RSA design requirements for Runway 17-35; however, in the event this runway would be extended and transition to ARC C/D-II, significant improvements would be needed to meet applicable RSA standards. Analysis in the next chapter will further examine the existing and future RSAs associated with both runways at Dallas Executive Airport, with particular attention being given to providing alternatives to mitigate the RSA deficiency on the southeast side of Runway 13-31.*

OBJECT FREE AREA

The FAA defines the runway OFA as an area centered on the runway extending laterally and beyond each runway end, in accordance with the critical aircraft design category utilizing the runway. The OFA must provide clearance of all ground-based objects protruding above the RSA edge elevation, unless the object is fixed by function (i.e., airfield lighting) serving air or ground navigation.

For ARC C/D-II, the FAA calls for the OFA to be 800 feet wide, extending 1,000 feet beyond each runway end. The standard for ARC D-III aircraft would also require the OFA to be a cleared area 800 feet wide and 1,000 feet beyond each runway end. The existing OFA for Runway 17-35 is smaller, encompassing an area 500 feet wide and 300 feet beyond each runway end.

Exhibit 3C *also depicts the OFA for both runways at Dallas Executive Airport. According to aerial photography, it appears that large areas of trees protruding above the RSA elevation obstruct the OFA adjacent to the northwest side of Runway 13-31. Similar to the RSA, the OFA is obstructed by perimeter fencing in addition to U.S. Highway 67 and its associated outer roadways on the southeast side of Runway 13-31.*

No obstructions are present within the existing OFA for Runway 17-35. In the event this runway were to transition to ARC C/D-II standards, several areas of trees would penetrate the enlarged OFA. Further examination of these obstructed areas will be conducted in the next *chapter.*

OBSTACLE FREE ZONE

The OFZ is an imaginary surface which precludes object penetrations, including taxiing and parked aircraft. The only allowance for OFZ obstructions is navigational aids mounted on frangible bases which are fixed in their location by function, such as airfield signs. The OFZ is established to ensure the safety of aircraft operations. If the OFZ is obstructed, the airport's approaches could be removed or approach minimums could be increased.

The FAA's criterion for runways utilized by aircraft weighing more than 12,500 pounds requires a clear OFZ to extend 200 feet beyond the runway ends and 400 feet wide (200 feet on either side of the runway centerline). Currently, Runways 13-31 and 17-35 meet these standards.

It should be noted that for runways providing a vertically guided approach, a precision obstacle free zone (POFZ) is required. The POFZ is defined as "a volume of airspace above an area beginning at the runway threshold, at the threshold elevation, and centered on the extended runway centerline, 200 feet long by 800 feet wide." The POFZ is only in effect when the following conditions are met:

- *Vertically guided approach.*
- *Reported ceiling below 250 feet and/or visibility less than ¾-mile.*
- *An aircraft on final approach within two miles of the runway threshold.*

Currently at Dallas Executive Airport, the precision ILS approach serving Runway 31 provides access to the runway when cloud ceilings are down to 200 feet. As a result, when this cloud ceiling is being reported and an aircraft is conducting the ILS approach to Runway 31, the POFZ would apply.

RUNWAY PROTECTION ZONE

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

As previously discussed, the lowest existing instrument approach visibility minimums for Dallas Executive Airport are ¾-mile with 200-foot cloud ceilings on Runway 31. 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 13, 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 RPZs associated with Runway 17-35 call for a 500-foot inner width, extending outward 1,000 feet to an outer width of 700 feet. The existing RPZs corresponding to each runway end at Dallas Executive Airport are depicted on* **Exhibit 3C**.

Currently, only the RPZs serving Runway 17-35 are fully contained on airport property. Approximately 2.6 acres of the RPZ associated with Runway 13 extend beyond the airport property line to the northwest over industrial and commercial development adjacent to Westmoreland Road and West Ledbetter Drive. On the southeast side of the airport, 16.3 acres of the southeastern portion of the RPZ associated with Runway 31 extends beyond airport property and encompasses portions of Red Bird Lane in addition to residential and commercial development.

Whenever possible, the airport should maintain positive control over the RPZs through fee simple acquisition; however, avigation easements can be pursued if fee simple acquisition is not feasible. There are currently no avigation easements in place within portions of the RPZs that extend beyond the existing airport property line. **Table 3G** *summarizes the design requirements for each runway at Dallas Executive Airport according to associated ARC and approach minimums (where applicable).*

AIRSIDE FACILITIES

Airside facilities include the need for those facilities related to the arrival and departure of aircraft. The adequacy of existing airside facilities at Dallas Executive Airport has been analyzed from a number of perspectives, including:

- *Runways*
- *Taxiways*
- *Navigational approach aids*
- *Airfield lighting, marking, and signage*

RUNWAYS

Runway conditions such as orientation, length, pavement strength, and width at Dallas Executive 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 Dallas Executive Airport was obtained from the airport's automated surface observation system (ASOS) and is depicted on **Exhibit 3D**.

Based upon historical wind data, both runways exceed 95 percent for all crosswind components. Furthermore, both runway alignments combined provide 99 percent wind coverage 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 Dallas Executive Airport. Runway length requirements are based upon five primary elements: airport elevation, the mean daily maximum temperature of the hottest month, runway gradient, critical aircraft expected to use the runway, and the stage length of the longest nonstop trip destination.

Aircraft performance declines as elevation, temperature, and runway gradient factors increase. For calculating runway length requirements, the airport is at an elevation of 660 feet above mean sea level (MSL), and the mean daily maximum temperature of the hottest month is 96 degrees Fahrenheit (F). Runway 13-31 has a maximum effective gradient of 0.1 percent and the gradient on Runway 17-35 is 0.2 percent.

Airport Classification

Table 3H *outlines the runway length requirements for various classifications of aircraft that utilize Dallas Executive Airport. These standards were derived using FAA AC 150/5325-4B,* *Runway Length Requirements for Airport Design.*

The AC segregates business jets into two categories: aircraft that make up 75 percent of the national fleet and aircraft that make up 100 percent of the national fleet. For example, the "75 percent fleet at 60 percent useful load" provides a runway length sufficient to satisfy the operational requirements of approximately 75 percent of the fleet at 60 percent useful load. The FAA and TxDOT accept planning for runway length at 60 percent useful load unless specific justification can be made for a need to plan for 90 percent useful load.

The top half of **Table 3J** ***presents the list of those aircraft which make up 75 percent of the active business jet fleet category that were used in calculating the lengths required in*** **Table 3H**. ***Aircraft listed in the bottom half of*** **Table 3J** ***represent those aircraft used for the 100 percent category.***

Since it is known that most of the aircraft listed in the 100 percent of the business jet category utilize Dallas Executive Airport, consideration should be given to providing adequate runway length for their safe and efficient operation. In the case at the airport, Runway 13-31 provides 6,451 feet of usable length, thus exceeding the runway requirement of 6,000 feet for this category of aircraft.

Further analysis was conducted on runway lengths for aircraft weighing more than 60,000 pounds. This group includes the Gulfstream family of aircraft and some other long-range corporate jets. According to aircraft planning manuals, these aircraft (in particular, the Gulfstream V) require a runway length of up to 7,000 feet to operate at Dallas Executive Airport given the existing conditions that dictate runway length requirements. Both runways at the airport fall short of the 7,000-foot requirement for these large aircraft.

Aircraft Stage Length

Another important consideration when analyzing runway length requirements is the stage length, or flying distance, an aircraft will complete to or from the airport. Longer stage lengths will require aircraft to carry more fuel, thus, making the aircraft heavier on takeoff. This results in the need for longer takeoff roll, especially on hot days.

The airport was utilized by a wide variety of corporate users with varying originations and destinations. While most of the business jet operations originated from or were destined to airports within 1,000 miles of Dallas Executive Airport, there were several nonstop flights to and from the east and west coasts. Since it is known that, when conditions allow, large business jet operators are opting for longer haul lengths, consideration should be given to accommodate these demands.

Specific Aircraft Requirements

An additional consideration for runway length is to analyze the requirements of specific aircraft utilizing or planning to utilize Dallas Executive Airport. **Table 3K** *presents the runway length needs for a wide variety of business jets, as obtained from their respective operating manuals. Figures in the table consider maximum takeoff and landing weights. It should be noted that landing length requirements during contaminated (wet) runway conditions increase significantly for aircraft with single wheel landing gear configurations due to hydroplaning potential.*

Planning should conform to providing a runway length capable of accommodating the majority of aircraft most of the year. An airport's primary runway should be capable of handling business jets with typical weight loading during moderate heat conditions. As presented in the table, several aircraft which currently utilize the airport require runway lengths of at least 7,000 feet when very warm temperatures occur.

Runway Length Summary

Many factors are considered when determining appropriate runway length for the safe and efficient operation of aircraft at Dallas Executive Airport. The starting point for analysis begins with utilizing FAA AC 150/5325-4B, Runway Length Requirements for Airport Design. The output from the AC shows a number of different runway lengths based on aircraft characteristics such as useful load and percent of active business jets. The results show that, at a minimum, 6,000 feet of runway length should be provided in order to accommodate 100 percent of the business jet fleet at 60 percent useful load.

The stage length of aircraft utilizing Dallas Executive Airport was also considered in this analysis. As discussed, certain operators do fly nonstop to and from the east and west coasts. Under these long haul conditions, additional runway length up to 7,000 feet would allow them to increase their useful load to accommodate these cross-country flights.

It should be noted that corporate aviation departments and fractional ownership (air taxi) programs often restrict what airports they can use based on runway length. Often, these groups will restrict operations to those runways that have adequate runway length, plus a buffer. Obviously, the longer the runway, the more opportunity these aircraft operators will have to use the airport. According to F.A.R. Part 135 rules, fractional aircraft and charter operators must increase their landing runway length requirements under certain conditions. This increase can equate to requiring up to an additional 60 percent of runway length for landing operations. Additional length provided on Runway 13-31 could help provide the extra *runway length required for many of these operators.*

An additional consideration is for aircraft weighing over 60,000 pounds. For Dallas Executive Airport, this includes business jets such as those in the Gulfstream family. According to the operating manuals for these aircraft, a runway length of approximately 7,000 feet is needed to satisfy most of these aircraft operating under the weather and runway conditions prescribed in **Table 3H**.

Forecast future demand at Dallas Executive Airport indicates that the airport should strive to accommodate all business jet operations up to and including those in ARC D-II. Thus, alternative analysis in the next chapter should consider the possibility of lengthening Runway 13-31 to provide optimal runway length of up to 7,000 feet.

As previously discussed, Runway 17-35 is more favorably aligned for prevailing winds at Dallas Executive Airport. While the existing length does allow for the operation of most small single and multi-engine piston aircraft, it does severely limit the utilization of larger turboprop and jet aircraft. Alternative analysis should consider the possibility of lengthening Runway 17-35 so it can be capable of accommodating a larger majority of general aviation aircraft up to and including turboprops and smaller business jets. Analysis in the next chapter will examine potential runway extensions that could be achieved on Runway 17-35.

Runway Width

Both runways at Dallas Executive Airport are 150 feet wide. FAA design standards call for a runway width of 100 feet to serve aircraft from C-II up to D-II, regardless of instrument approach visibility minimums. In addition, TxDOT standards call for a 100-foot-wide runway for reliever category airports. As such, the runways exceed the criteria for runway width.

It should be noted that FAA runway width for ARC C/D-III aircraft, with maximum certified takeoff weights greater than 150,000 pounds, is 150 feet. This standard was specifically tailored for the Boeing 727 due to its wide wheel base. This group now also includes the Boeing Business Jet with newer models certified for up to 170,000 pounds.

Runway Strength

The most important feature of airfield pavement is its ability to withstand repeated use by aircraft of significant weight. As a reliever airport in the TASP, the minimum pavement strength should be at least 30,000 pounds single wheel loading (SWL). Runways 13-31 and 17-35 currently provide pavement strengths of 35,000 pounds SWL, 60,000 pounds dual wheel

loading (DWL), and 110,000 pounds dual tandem wheel loading (DTWL).

The current strength rating on Runway 13-31 is adequate to serve the majority of aircraft operations at the airport; however, the G-IV can weigh up to 75,000 pounds DWL. In order to support ~~full D-III~~ operations in the future, the runway should be planned for a SWL and DWL rating of at least 60,000 pounds and 95,000 pounds, respectively. This will better accommodate aircraft which could operate at the airport on a more frequent basis up to and including the Gulfstream V. It should be noted that the airport has conducted an airfield pavement evaluation which has determined existing pavement conditions and provides recommendations for future pavement reconstruction and rehabilitation projects.

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.

Runways 13-31 and 17-35 are both served by parallel taxiways. Taxiway B serves as the partial parallel taxiway serving Runway 13-31 from the Runway 13 threshold to its intersection with Runway 17-35. Taxiway A serves as the partial parallel taxiway for the southern portion of Runway 13-31 and the northern portion of Runway 17-35. Taxiway D serves as the partial parallel taxiway for the southern portion of Runway 17-35. There are several entrance/exit taxiways serving both runways at the airport.

Taxiway width is determined by the ADG of the most demanding aircraft to use the taxiway. For ADG II standards, which currently exist on all taxiways located on the airfield, taxiways should be at least 35 feet wide. ADG III design standards call for a taxiway width of 50 feet. All respective taxiways exceed existing and future width requirements and should be maintained as such through the planning period.

Hold aprons can also improve the efficiency of the taxiway system by allowing aircraft to prepare for departure off the taxiway surface. This allows aircraft ready to depart to by-pass the aircraft on the hold apron. Currently, there are two hold aprons on the airfield serving each end of Runway 13-31. The location of these existing hold aprons and the potential for additional hold aprons serving Runway 17-35 will be discussed further in the next chapter.

FAA AC 150/5300-13, *Airport Design*, ***also discusses separation distances between aircraft and various areas on the airport. The separation distances are a function of the approaches approved for the airport and the runway's designated ARC. Under current conditions, parallel***

taxiways should be at least 300 feet from the Runway 13-31 centerline to meet ARC D-II design with not lower than ¾-mile visibility minimums. Aircraft parking areas are required to be at least 500 feet from the runway centerline.

Currently, partial parallel Taxiway B serving Runway 13-31 is located 300 feet northeast of the runway (centerline to centerline) and partial parallel Taxiway A is situated 530 feet from Runway 13-31. Aircraft parking aprons are located at least 600 feet from the runway centerline. Taxiway B meets the appropriate separation standard for ultimate critical aircraft design. ~~Analysis in the next chapter will address the Taxiway B separation standard which should be 400 feet for ARC D-III aircraft design.~~

Partial parallel Taxiways A and D serving Runway 17-35 are both located 300 feet east of the runway centerline while aircraft parking apron areas are set further back at 400 feet from the runway. These distances meet the appropriate FAA standards for ultimate critical aircraft design. Taxiway requirements are summarized in **Table 3L**.

NAVIGATIONAL 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

Instrument approaches are categorized as either precision or non-precision. Precision instrument approach aids provide an exact course alignment and vertical descent path for an aircraft on final approach to a runway, while non-precision instrument approach aids provide only course alignment information. In the past, most existing precision instrument approaches in the United States have been ILS, similar to what is currently in place at Dallas Executive Airport on Runway 31. It should be noted, the global positioning system (GPS) is now used to provide both vertical and lateral navigation for pilots. In fact, the area navigation (RNAV) GPS approach serving Runway 31 provides localizer performance with vertical guidance (LPV) minimums.

At Dallas Executive Airport, there are six published approaches. Runway 31 is served by ILS, RNAV (GPS), and very high frequency omnidirectional range (VOR) approaches. Runway 17 is served by RNAV (GPS) and VOR with distance measuring equipment (DME) approaches. Finally, *an RNAV (GPS) approach is available on Runway 35. The ILS approach to Runway 31 provides for the lowest minimums with ¾-mile visibility minimums and 200-foot cloud ceilings.*

A GPS modernization effort is underway by the FAA and focuses on augmenting the GPS signal to satisfy requirements for accuracy, coverage, availability, and integrity. For civil aviation use, this includes the continued development of the Wide Area Augmentation System (WAAS), which was initially launched in 2003. The WAAS uses a system of reference stations to correct signals from the GPS satellites for improved navigation and approach capabilities. Where the non-WAAS GPS signal provides for enroute navigation and limited instrument approach (lateral navigation) capabilities, WAAS provides for approaches with both course and vertical navigation. This capability was historically only provided by an ILS, which requires extensive on-airport facilities. After 2015, the WAAS upgrades are expected to allow for the development of approaches to most airports with cloud ceilings as low as 200 feet above the ground and visibilities down to ½-mile.

Ultimately, it would be preferable to implement a straight-in instrument approach procedure to Runway 13. Due to the congested airspace and proximity of Dallas/Fort Worth International Airport and Dallas Love Field, the FAA has not allowed for an approach procedure to Runway 13. Improving approach minimums down to ½-mile on Runway 31 would better accommodate corporate aircraft. Lower visibility minimums may only be achieved with additional lighting aids to be described in the next section. Analysis in the next chapter will consider improvements necessary for improved instrument approaches to the runway system at Dallas Executive Airport.

Weather Reporting Aids

Dallas Executive Airport has a lighted wind cone and segmented circle located on the airfield. The wind cone provides information to pilots regarding wind conditions, such as direction and speed. The segmented circle consists of a system of visual indicators designed to provide traffic pattern information to pilots. These should be maintained throughout the planning period.

The airport is equipped with an ASOS which provides weather observations 24 hours per day. The system updates weather observations every minute, continuously reporting significant weather changes as they occur. This information is then transmitted at regular intervals on the automated terminal information service (ATIS), which is broadcast on radio frequency 126.35 MHz. These systems should be maintained through the planning period.

Communication Facilities

Dallas Executive Airport also has an operational ATCT that is located approximately 1,000 feet *southwest of the intersection of Runways 13-31 and 17-35. The ATCT is staffed with personnel from 7:00 a.m. to 9:00 p.m. daily. The ATCT enhances safety at the airport and should be maintained through the planning period.*

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 is located atop the terminal building and 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. Runways 13-31 and 17-35 are served by medium intensity runway lighting (MIRL). These systems should be maintained through the planning period.

Medium intensity taxiway lighting (MITL) is provided on all active taxiways at the airport. This system is vital for safe and efficient ground movements and should be maintained in the future.

Visual Approach Lighting

In most instances, the landing phase of any flight must be conducted in visual conditions. To provide pilots with visual guidance information during landings to the runway, electronic visual approach aids are commonly provided at airports. Currently, all runway ends except Runway 35 are served by a form of visual approach lighting. Four-box visual approach slope indicators (VASI-4) serve each end of Runway 13-31 and a four-box precision approach path indicator (PAPI-4) serves Runway 17.

The existing VASI and PAPI units should be maintained through the long term planning period.

In addition, a PAPI-4 should be planned for implementation on Runway 35.

Approach and Runway End Identification Lighting

Runway 31 currently is equipped with a lead-in lighting (LDIN) system. The LDIN is an approach lighting system that provides the basic means to transition from instrument flight to visual flight for landing. In order to obtain approach visibility minimums as low as ½-mile on Runway 31, a more sophisticated approach lighting system such as a medium intensity approach lighting system with runway alignment indicator lights (MALSR) would be needed. Further analysis later in this study will determine the likelihood of implementing an improved approach lighting system on Runway 31.

Runway end identification lights (REILs) are flashing lights located at each runway end that facilitate identification of the runway end at night and during poor visibility conditions. REILs provide pilots with the ability to identify the runway ends and distinguish the runway end lighting from other lighting on the airport and in the approach areas. The FAA indicates that REILs should be considered for all lighted runway ends not planned for a more sophisticated approach lighting system. A REIL system has been installed on Runway 13 and each end of Runway 17-35.

Pilot-Controlled Lighting

Dallas Executive Airport is equipped with pilot-controlled lighting (PCL). With PCL, a pilot can control the intensity of airfield lights and visual approach aids from their aircraft through a series of clicks of their radio transmitter. This system should be maintained through the planning period.

Airfield Signs

Airfield identification signs assist pilots in identifying their location on the airfield and directing them to their desired location. Lighted signs are installed on all runways and taxiways at Dallas Executive Airport. All of these signs should be maintained throughout the planning period.

Pavement Markings

Runway markings are designed according to the type of instrument approach available on the *runway. FAA AC 150/5340-1J, Marking of Paved Areas on Airports, provides guidance necessary to design airport markings. Runway 31 is served by precision markings to accommodate the ILS approach. Runways 13 and 17-35 currently have non-precision markings.*

The hold position markings associated with Runway 13-31 at Dallas Executive Airport are currently set at 250 feet from the runway centerline, which meet FAA standards. ~~Since the runway is served by approach category D aircraft, the 250-foot separation must be increased by one foot for each 100 feet above sea level. As a result, the hold lines should be set at 256 feet from the Runway 13-31 centerline.~~ The hold lines serving Runway 17-35 are located 200 feet from the runway centerline which also meet existing FAA standards for this runway. In the event that the runway transitions to ARC C/D-II, the hold lines would need to be relocated to 250 feet from the runway centerline. A summary of the airside facilities previously discussed is presented on **Exhibit 3E**.

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*
- *Airport 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 for these functions and services. At Dallas Executive Airport, general aviation terminal services are provided by a dedicated general *aviation terminal building (approximately 8,000 square feet) as well as spaces allotted by separate FBOs and specialty aviation operators.*

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 3M** *outlines the space requirements for general aviation terminal services at Dallas Executive Airport through the long term planning horizon. As shown in the table, up to 8,200 square feet of space could be needed in the long term for general aviation passengers. Given the size of the existing terminal building in addition to space provided by existing FBOs and other specialty aviation operators on the airfield, there should be adequate terminal facility area provided at the airport through the long term planning period.*

General aviation vehicular parking demands have also been determined for Dallas Executive Airport. Space determinations were based on an evaluation of existing airport use, as well as industry standards. Terminal automobile parking spaces required to meet general aviation itinerant and FBO operator demands were calculated by multiplying design hour itinerant passengers by 2.0 in the short term, increasing to 2.4 for the long term as corporate operations can be expected to increase.

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 174 spaces in the short term planning horizon, 205 spaces in the intermediate term planning horizon, and 250 spaces in the long term planning horizon. It is estimated that there are 550 marked automobile parking spaces at Dallas Executive Airport currently serving airport users. Automobile parking requirements are summarized in **Table 3M**.

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 to 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 development should be based upon actual demand trends and financial investment conditions.*

While a majority of aircraft owners prefer enclosed aircraft storage, a number of based aircraft will still 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. At Dallas Executive Airport, four aircraft currently base on the aircraft parking apron with the remainder housed in hangar spaces.

Hangar types vary in size and function. T-hangars and linear box 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. Executive hangars are typically utilized by owners of larger aircraft or multiple aircraft. These are usually smaller than 10,000 square feet and offer the same open space storage area as conventional hangars. Future hangar use has been determined based on current usage and industry standards.

Currently, there are 120 T-hangar/linear box 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 more conventional and executive hangars. For executive and conventional hangars, a planning standard of 2,500 square feet per aircraft was utilized.

Since portions of executive 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 3N**.

The analysis shows that there is currently a need for approximately 316,100 square feet of hangar storage space. This is based on the number and type of aircraft currently hangared at the airport. Existing hangar space at the airport should meet this need. Future hangar requirements indicate that there is a potential need for 443,400 square feet of storage space through the long term planning period. This includes a mixture of hangar and maintenance areas. Due to the projected increase in based aircraft and aircraft operations at the airport, facility planning will consider additional hangars in the form of T-hangars, executive hangars, and conventional hangars. It is expected that the aircraft storage hangar requirements will *continue to be met through a combination of hangar types.*

AIRCRAFT PARKING APRONS

A parking apron should be provided for based aircraft, as well as some daytime apron space to hold transient aircraft. At the present time, four based aircraft are stored on parking apron space at Dallas Executive Airport. Although many aircraft are stored in hangars, they are regularly moved to the ramp during the day to provide space for aircraft maintenance operations.

The total general aviation apron area at Dallas Executive Airport is approximately 50,000 square yards. FAA Advisory Circular 150/5300-13, Airport Design, suggests a methodology by which transient apron requirements can be determined from knowledge of busy-day operations. At Dallas Executive 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 3P***, additional apron space may be needed during the planning period of this study.* **Exhibit 3F** *further details landside facility requirements previously discussed.*

AIRPORT SUPPORT FACILITIES

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

- *Aviation Fuel Storage*
- *Perimeter Fencing/Gates*
- *Aircraft Rescue and Firefighting*
- *Airport Maintenance Building*
- *Utilities*
- *Security*

Aviation Fuel Storage

As previously discussed in Chapter One, there are currently three fuel farms located on the airport that store aviation fuel. The fuel farms provide a total storage capacity of 66,000 *gallons. Of this total, 34,000 gallons is dedicated to Jet A fuel and 32,000 gallons is dedicated to 100LL.*

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 requirement. 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.

Given the existing operational level estimates, the current fuel storage capacity should be adequate to meet demand. Future operational levels could tax the existing storage capacities, especially during peak period times. As a result, ultimate planning will consider additional fuel storage capacity, especially for Jet A fuel.

Perimeter Fencing/Gates

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 intrusion-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.***

Dallas Executive Airport's operations areas are currently enclosed with chain link fence. The fence does not always follow the legal airport boundary due to the layout of physical features and infrastructure development. Several functioning automated access and manually controlled gates are also located at the airport.

Aircraft Rescue and Firefighting

Dallas Executive Airport is currently served by a dedicated aircraft rescue and firefighting facility (ARFF). The facility, known as Station #49, operates a variety of equipment that is capable of handling fire and rescue operations specific to aircraft emergencies. Personnel are present at the facility 24 hours per day, seven days per week, and provide emergency and rescue services to the surrounding area as well.

Federal regulations do not require ARFF services to be located on the airport. ARFF services are required only at FAA-certified airports providing scheduled passenger service with greater than nine passenger seats. Unless federal regulations change, there will not be a regulatory requirement for ARFF facilities on the airport. Emergency services will continue to be met with personnel and equipment stationed at the fire station on the east side of the airport. Therefore, no additional requirements for ARFF services are currently needed at Dallas Executive Airport.

Airport Maintenance Building

Dallas Executive Airport has a dedicated airport maintenance building located on the west side of the airport. This facility is adequate for the storage of equipment that is used for various purposes on the airport.

Utilities

Electrical, water, natural gas, and sanitary sewer services are available at the airport. The availability and capacity of the utilities serving the airport are factors in determining the development potential of the airport. Utility extensions to new development areas may be needed through the planning period and will be analyzed in more detail later in the study.

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 3Q ***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 3Q ***also ranks Dallas Executive Airport according to this scale. As shown in the table, the airport ranking on this scale is 42. Points are assessed for the airport being located in a mass population area and near sensitive areas including military installations and downtown Dallas, being located in Class B airspace, having greater than 101 based aircraft, many of which are over 12,500 pounds, and Runway 13-31 is longer than 5,001 feet and***

made of asphalt/concrete. The ATCT has historically reported more than 50,000 annual operations, and the airport does accommodate Part 135 operations, flight training, rental aircraft, and maintenance on larger aircraft.

As shown in **Table 3R***, a rating of 42 points places Dallas Executive 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.*

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 use of decals, stickers, or hang tags.*
Challenge Procedures*: This involves an airport watch program which is implemented in cooperation with airport users and tenants to be on guard for unauthorized and potentially illegal activities at Dallas Executive 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 Dallas Executive 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 required to meet potential aviation demands projected at Dallas Executive Airport through the 20-year planning horizon. Following the facility requirements determination, the next step is to determine a direction of development which best meets these projected needs through a series of airport development

alternatives. The remainder of the Master Plan will be devoted to outlining this direction, its schedule, and its costs.