General Aviation System Development Recommendations

A technical report detailing the assumptions and results of the Recommended Plan

March 2012

SYSTEM DEVELOPMENT RECOMMENDATIONS

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EXHIBITS

APPENDIX A – Recommended Plan Summary

A. GLOSSARY

This section defines acronyms and abbreviations used throughout the document.

Term	Description
AOSA	Air Operations Safety Area
ASV	Annual Service Volume
FAA	Federal Aviation Administration
GA	General Aviation
MALSR	Medium Intensity Approach Lighting System With Runway Alignment Indicator Lights
NCTCOG	North Central Texas Council of Governments
NPIAS	National Plan of Integrated Airport Systems
PAPI	Precision Approach Path Indicator
RDP	Recommended Development Plan
RPZ	Runway Protection Zone
SF	Square Feet
SY	Square Yards
System Plan	North Central Texas General Aviation and Heliport System Plan
TXDOT	Texas Department of Transportation
VASI	Visual Approach Slope Indicator
VGSI	Visual Glide Slope Indicator

B. INTRODUCTION

The Recommended Development Plan (RDP) for the General Aviation (GA) component of the North Central Texas General Aviation and Heliport System Plan (System Plan) is the culmination of a five-year study sponsored by the Federal Aviation Administration (FAA) and conducted by the North Central Texas Council of Governments (NCTCOG). The plan revolves around scenarios that were created by analyzing a series of assumptions for capacity measures. Scenarios were developed to explore all feasible options for the purpose of determining airport system capacity. Considerations included current airport capacity, expansion and associated facility costs, projected demands in subregions, and the benefits and risks of public and private airports.

C. SCENARIOS

Three scenarios were considered as part of the Needs Assessment Study. Scenarios 1(a) and 1(b) were selected to form the basis of the recommendations for GA development in future years. While many privately-owned airports maintain a strong presence and play a vital role in serving capacity needs in the region, they have proven to be historically susceptible to closure throughout the nation, including North Central Texas. Factors such as urban development, tax increases, and maintenance and facility costs can cause a privately-owned facility to close. Not federally-obligated to remain open to the public, they may cease operations at any time, leaving aircraft owners looking for a new airport. As such, this study analyzed impacts of such facility losses on system capacity through 2035.

Assumptions for Scenario 1(a)

- Since one cannot be certain that the nine privately-owned airports in the region will remain open throughout the forecasted period, all privately-owned, public-use airports in the existing system are assumed to close by 2035. This assumption tests the ability of the publicly-owned airports to accommodate the forecasted demand system wide through 2035.

- Landside capacity will be constrained to existing airport property; no additional property will be acquired. This assumption tests the ability of the existing publicly-owned airports to absorb the entire forecasted demand on existing airport property. This scenario is more restrictive than Scenario 1(b).

- This scenario represents the *lowest system capacity* and is meant to act as a threshold for “worst case” planning.

Assumptions for Scenario 1(b)

- Since there is no guarantee that the nine privately-owned airports in the region will remain open throughout the forecasted period, all privately-owned, public-use airports in the existing system are assumed to close by 2035. This assumption tests the ability of the publicly-owned airports to accommodate the forecasted demand system wide through 2035.

- In contrast to Scenario 1(a), landside capacity is unconstrained, thus allowing the public airports to accommodate all additional demand. Scenario 1(b) assumes that any necessary land is acquired and additional aircraft storage is constructed.

- This scenario represents the *average system capacity* when compared to the other two thresholds.

Assumptions for Scenario 2

- All privately-owned, public-use airports in the existing system are assumed to stay open. This assumption provides a basis to consider the value of privately-owned facilities to the public-use system when the costs for this scenario are compared to the costs for Scenario 1(b).

- No landside capacity constraints to the airports are apparent. This scenario assumes that any necessary land is acquired and additional aircraft storage is constructed for both privately-owned and publicly-owned airports.

- This scenario represents the highest system capacity and is meant to act as a threshold for "best case" planning.

Basis for Recommended Plan

By analyzing the three scenarios, a Recommended Plan was developed to detail an appropriate scenario for ensuring adequate and strategic capacity to meet future demand requirements. Some loss of private-airport capacity within the region is assumed by 2035 due to urban development pressures, lack of land-use controls, absence of federal grant assurances, and other monetary and environmental factors.

If an airport cannot support the forecasted demand and is unable to purchase additional land, the excess demand is relocated to a nearby comparable airport with excess capacity. This limits spending on land when a second airport in the 30-mile service area can accommodate additional aircraft.

Throughout the rest of this report, the Recommended Plan will be shown next to the three other scenarios for comparison. However, the Recommended Plan will serve as the final scenario for which all funding, capacity, and other recommendations will be derived.

D. SCENARIO COMPARISONS

To compare the merits of the various approaches to solving the region's aviation facility needs over the long term, a series of comparisons were developed that quantify differences in terms of capacity and costs.

Landside Capacity

Exhibit 1 illustrates the number of based aircraft in each subregion, for each scenario, for the year 2035. Throughout all scenarios, the Central and North subregions have the most based aircraft and use the most available airport capacity. Scenario 2 is the only situation in which the North subregion has more based aircraft than the Central subregion, based on the assumption that all privately-owned airports stay open. In the other scenarios, some or all of the privately-owned airports are closed and their aircraft are relocated to other airports.

Exhibit 1 - 2035 Based Aircraft by Subregion					
Subregion	**Landside Capacity Utilized**	**Scenario 1(a)**	**Scenario 1(b)**	**Scenario 2**	**Recommended Plan**
North	49%	2,688	2,650	2,877	2,645
South	57%	1,089	1,087	1,039	1,049
East	34%	486	531	570	506
West	60%	437	465	540	504
Central	65%	2,843	2,810	2,517	2,839
Total	**52%**	**7,543**	**7,543**	**7,543**	**7,543**

As part of the Airport Community Value (ACV) of this study, the maximum landside capacity of the region was calculated. **Exhibit 1** displays the landside capacity utilized within each subregion. North Central Texas is currently utilizing 52 percent of the property available for items such as existing structures, runways and taxiways, and safety areas. Several factors were assessed to determine the amount of developable land, including environmental concerns, vehicle accessibility, topography, airfield access, and site work (i.e., drainage, grading, utilities, etc). The additional hangar storage space required, as shown in **Exhibit 2**, was based on the amount of developable land available and the square footage of space required to store individual aircraft.

The acres of developable land and existing storage space were compared in each subregion to the forecasted demand of based aircraft thru 2035. Depending on the scenario, land may or may not have been acquired to accommodate future based aircraft if there was not enough existing hangar space. With the exception of Scenario 1(a), each subregion required the acquisition of additional land to accommodate the forecasted demand.

Exhibit 2 - 2035 Additional Hangar Space Required					
Subregion	**Existing**	**Scenario 1(a)**	**Scenario 1(b)**	**Scenario 2**	**Recommended Plan**
North	5,774,000	1,000,000	935,000	94,000	860,000
South	2,161,000	76,000	2,137,000	115,000	77,000
East	1,170,000	72,000	79,000	90,000	53,000
West	568,000	32,400	65,000	57,000	38,000
Central	3,073,000	1,275,000	1,320,000	1,020,000	1,206,000
Total	**12,746,000**	**2,455,400**	**4,536,000**	**1,376,000**	**2,234,000**

Note: This exhibit does not include tiedowns on aprons. All units are in square footage.

Exhibit 2 demonstrates that there is significant need for additional hangar space throughout North Central Texas to accommodate the forecasted demand of based aircraft through 2035.

It should be noted that in this assessment of available land was utilized for the construction of aircraft storage facilities only and does not consider the property needed for support facilities such as operations and maintenance buildings, terminals, fuel tanks and pumps, fire stations, or

deicing pads. Thus, to accommodate the forecasted demand, even more land may need to be purchased or more aircraft allocated to alternate facilities.

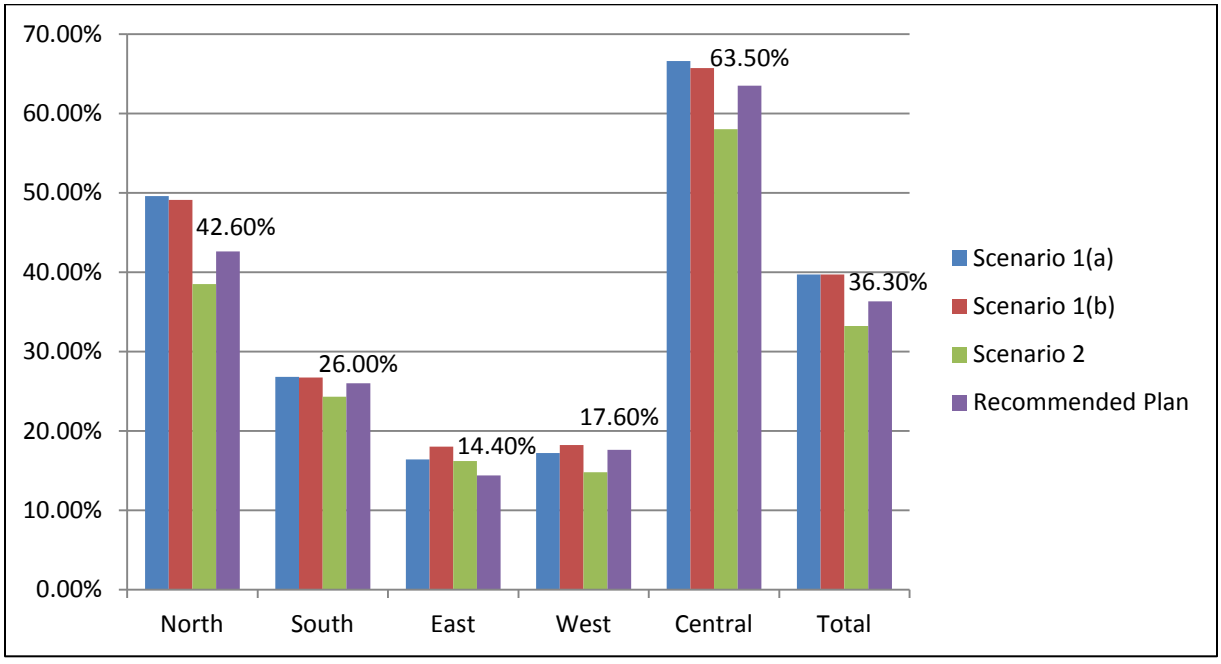
The RDP includes the cost of constructing new aircraft storage units, T-hangars, conventional hangars, and parking aprons, to accommodate the future demand.

Airside Capacity

Exhibit 3 and **Exhibit 4** show the percent of airside capacity used in each subregion by scenario. Scenarios 1(b) and 1(a) have the same total capacity due to the assumption that all of the privately-owned airports will close. Scenario 2 has the most available capacity because it assumes that all existing public and private airports will remain open. The RDP has the second most capacity because of the assumption that privately-owned, residential airports are likely to survive because the homes that surround the runways have aircraft hangars built on their property. These land uses are not likely to change due to their specific function of residential airport access.

Exhibit 3 - 2035 Percent of Airside Capacity Used				
Subregion	**Scenario 1(a)**	**Scenario 1(b)**	**Scenario 2**	**Recommended Plan**
North	49.60%	49.10%	38.50%	42.60%
South	26.80%	26.70%	24.30%	26.00%
East	16.40%	18.00%	16.20%	14.40%
West	17.20%	18.20%	14.80%	17.60%
Central	66.60%	65.70%	58.00%	63.50%
Total	**39.70%**	**39.70%**	**33.20%**	**36.30%**

Exhibit 4 – Percent of Airside Capacity Used, by Scenario



System Costs

Capital development costs for the RDP are estimated to total $25,622,800 for privately-owned airports and $274,811,400 for publicly-owned airports; totaling $300,434,200. Sources of public and private funding are shown in **Exhibit 11**. Scenario 2 and the RDP are the only situations in which privately-owned public-use airports are assigned costs.

Exhibit 5 describes all three scenarios as well as the Recommended Plan. Shown are system measures such as based-aircraft types, operations, total capacity, and public and private airport costs. The costs for publicly-owned airports in each scenario differ in four areas: landside purchases for development, apron pavement areas, conventional hangars, and the number of T-hangar units. **Exhibit 8**, shown later in this document, illustrates costs.

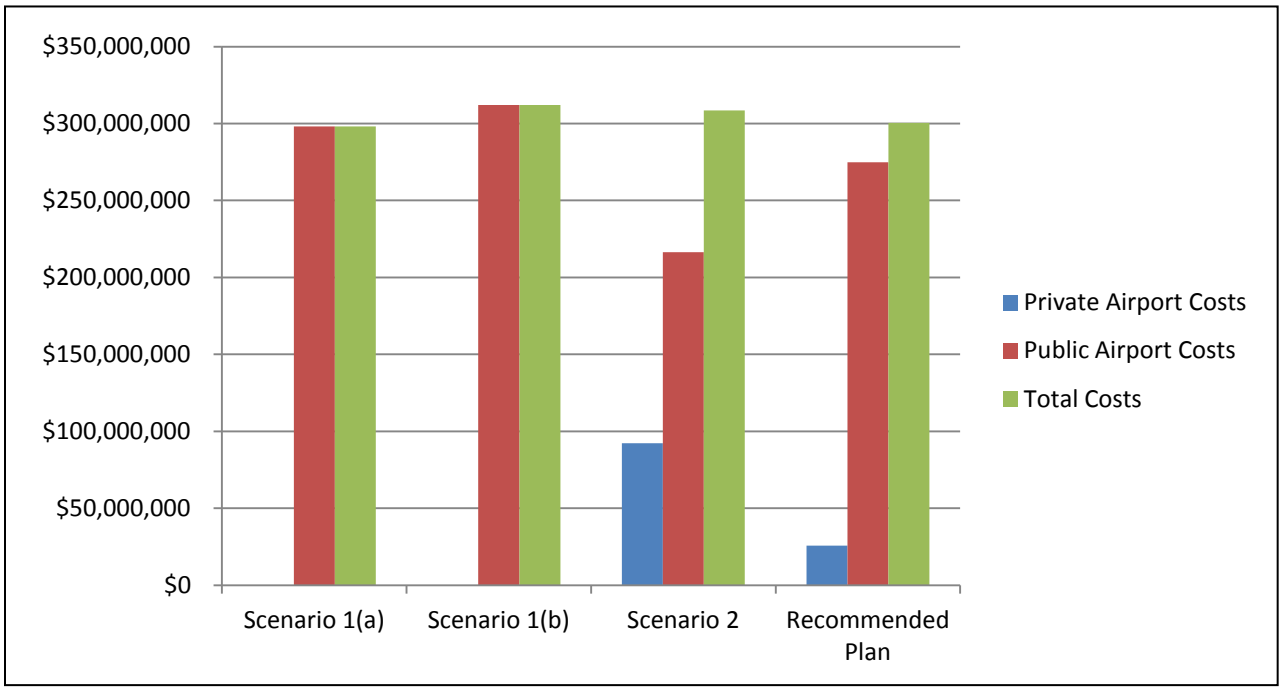
Exhibit 5 - 2035 Scenario Totals: All Subregions				
Scenarios	**Scenario 1(a)**	**Scenario 1(b)**	**Scenario 2**	**Recommended Plan**
Based Aircraft				
Non-Jet	6,757	6,757	6,757	6,757
Jet	787	787	787	787
Total Based Aircraft	7,544	7,544	7,544	7,544
Operations				
Itinerant Operations	978,700	978,700	978,700	978,700
Local Operations	1,341,000	1,341,000	1,341,000	1,341,000
Total Annual Operations	2,319,700	2,319,700	2,319,700	2,319,700
Capacity Measures				
Available Airside Capacity	3,522,100	3,522,100	4,673,900	4,066,700
Adjusted Annual Service Volume (ASV)	5,841,800	5,841,800	6,993,600	6,386,400
Percent of Airside Capacity Used	39.70%	39.70%	33.20%	36.30%
Development Costs				
Private Airport Costs	$0	$0	$92,153,482	$25,622,780
Public Airport Costs	$298,141,495	$312,035,398	$216,391,018	$274,811,402
Total Costs	$298,141,495	$312,035,398	$308,544,500	$300,434,182

Exhibit 6 shows the breakdown of costs by facility type.

Exhibit 6 - 2035 Aggregate Publicly-Owned Airport Costs				
Public Airport Costs	**Scenario 1(a)**	**Scenario 1(b)**	**Scenario 2**	**Recommended Plan**
AOSA (acres)	$7,750,197	$7,750,197	$7,750,197	$7,750,197
RPZ (acres)	$35,128,843	$35,128,843	$35,128,843	$35,128,843
Runway Pavement Area (sy)	$4,684,485	$4,684,485	$4,684,485	$4,684,485
Taxiway Pavement Area (sy)	$7,039,890	$7,039,890	$7,039,890	$7,039,890
Terminal (sf)	$71,300	$71,300	$71,300	$71,300
Instrument Approach Procedure	$1,500,000	$1,500,000	$1,500,000	$1,500,000
Runway Lighting Intensity	$2,414,480	$2,414,480	$2,414,480	$2,414,480
Runway End Identifier Lights	$2,175,000	$2,175,000	$2,175,000	$2,175,000
VGSI (VASI / PAPI)	$1,125,000	$1,125,000	$1,125,000	$1,125,000
MALSR	$3,000,000	$3,000,000	$3,000,000	$3,000,000
Segmented Circle	$40,000	$40,000	$40,000	$40,000
Rotating Beacon	$15,000	$15,000	$15,000	$15,000
Jet fuel	$75,000	$75,000	$75,000	$75,000
Weather Station	$375,000	$375,000	$375,000	$375,000
Parallel Runway	$7,610,500	$7,610,500	$7,610,500	$7,610,500
Subtotal	***$73,004,695***	***$73,004,695***	***$73,004,695***	***$73,004,695***
Landside (acres)	$0	$5,960,402	$5,921,523	$278,407
Apron Pavement Area (sy)	$15,324,750	$16,823,250	$7,047,750	$13,781,250
Conventional Hangars (sf)	$96,112,050	$106,372,050	$105,067,050	$94,672,050
T-Hangar Units	$113,700,000	$109,875,000	$25,350,000	$93,075,000
Subtotal	***$225,136,800***	***$239,030,702***	***$143,386,323***	***$201,806,707***
Total	$298,141,495	$312,035,398	$216,391,018	$274,811,402

Exhibit 7 shows the comparative investment in facility types. These differences are directly related to allocation of aircraft and the expandability of all airports in each scenario. In Scenario 2, the large assignment of costs to privately-owned airports reduces the public costs well below other options, including the RDP.

Exhibit 7 – Scenario Costs



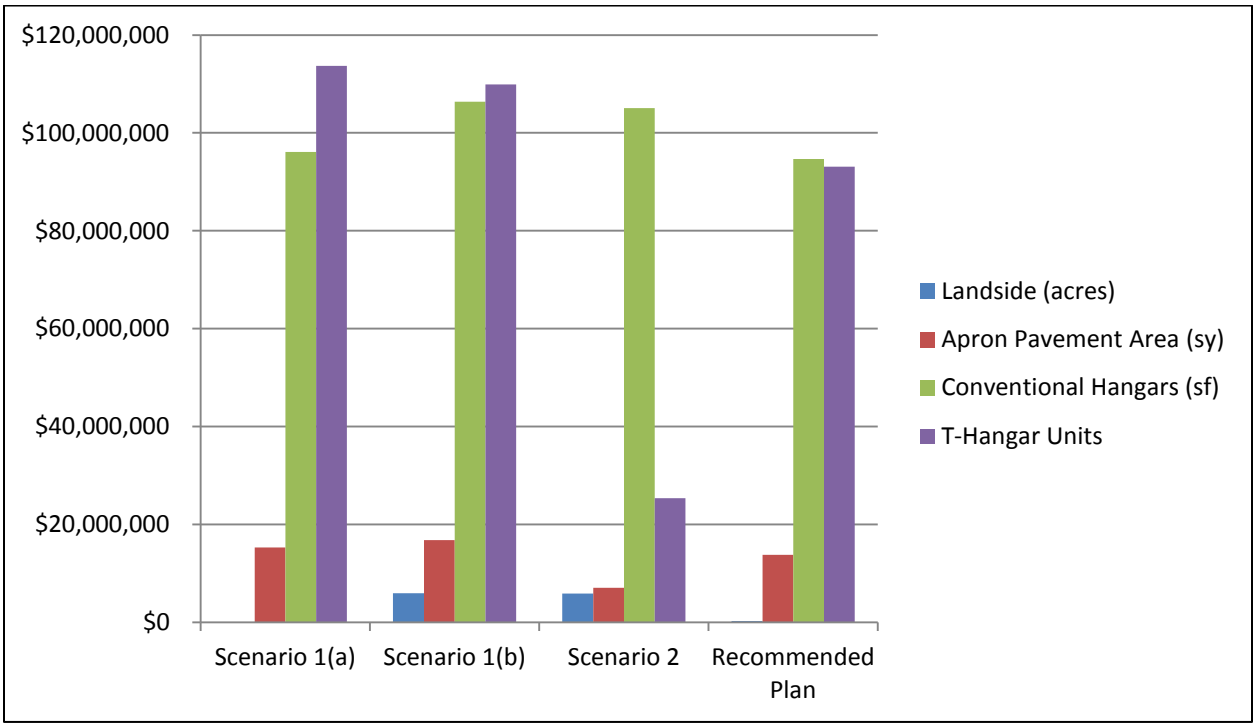
Scenario 1(b) shows the highest cost for demand-related facilities; over $312 million. With some capacity lost by the privately-owned airports, the system must accommodate demand at publicly-owned facilities. In this scenario, 2,052 based aircraft from privately-owned airports would be reallocated to publicly-owned airports by 2035. Without privately-owned airports to supplement the publicly-owned system, a significantly higher public cost is incurred. Additional aircraft storage units and property would need to be purchased in order to accommodate the aircraft currently based at the privately-owned airports and the forecasted demand.

In Scenario 2, the forecasted 2,052 based aircraft at the privately-owned facilities would require an investment of more than $92 million by the private sector to bring facilities to standards and provide services as demanded by more aircraft.

Scenario 1(a) has the second highest publicly-owned airport costs, but the lowest overall total cost when privately-owned airport costs are added to all scenarios. Just as in Scenario 1(b), some capacity is lost by privately-owned public use airports. Unlike Scenario 1(b), in which land is purchased for public airport expansion, Scenario 1(a) does not assume land purchases.

In this situation, the RDP has the second lowest costs of all scenarios. Publicly-owned airport costs are reduced by allocating aircraft to airports that have available land for development, and by keeping some privately-owned airport capacity.

Exhibit 8 – Facility Costs by Type



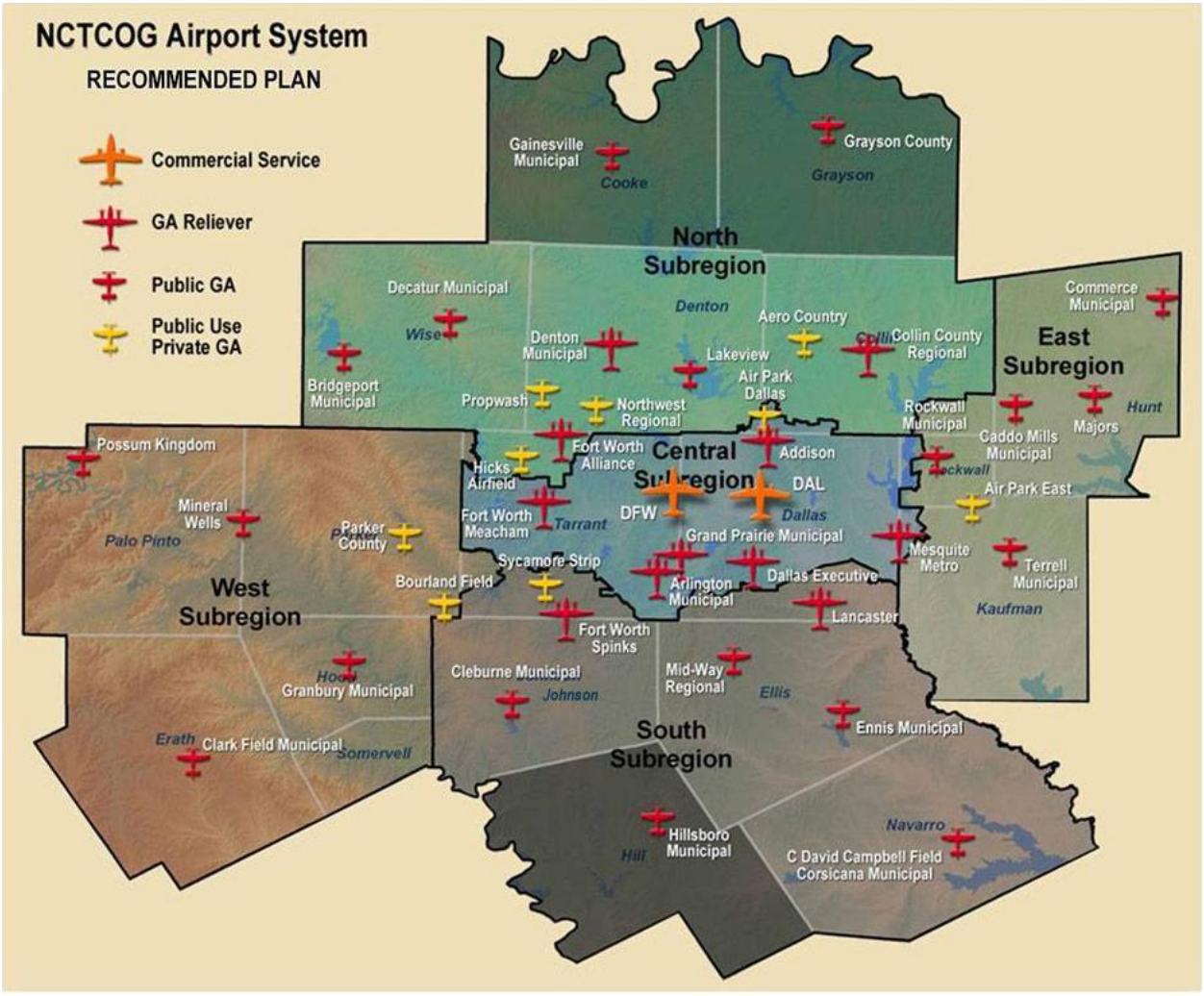
E. DESCRIPTION OF RECOMMENDED DEVELOPMENT PLAN

The RDP describes the types of aviation facilities, their location within North Central Texas, and the costs to develop them through the year 2035.

Recommended Development Plan Airport Facilities

Of the 39 public-use airports considered in the scenario analysis, 35 are included in the RDP (See **Exhibit 9**). Five of the 35 airports in the Recommended Plan are privately-owned, public-use, residential airports and 30 are publicly-owned, public-use airports.

Exhibit 9 - Recommended Plan Airport Locations



The North subregion has the most airports (10), while the West subregion has the least (5). The South and Central subregions each have 7 airports, followed by the East subregion with 6. The North subregion also has the most residential airports (2), while the South subregion has none. The other four subregions each have 1 residential airport.

As part of the System Plan, the airports are assigned to one of four categories based on their anticipated roles and sizes.

- ***Category 1*** - Small turf or paved airports have a 3,499 feet runway length maximum.
- ***Category 2*** - Smaller GA facilities have 3,500 - 4,999 feet of runway.
- ***Category 3*** - Airports with 5,000 - 5,999 feet of runway and accommodate most propeller and small business jet aircraft.
- ***Category 4*** - Large business and corporate airports, with jet-capable runway systems, have a 6,000 feet runway length minimum.

Exhibit 10 lists the airports included in the RDP. There are six Category 1 airports, nine Category 2 airports, ten Category 3 airports, and ten Category 4 airports.

Exhibit 10 – Recommended Plan Airports			
Airport Name	**Subregion**	**Ownership**	**Category**
Addison	Central	Public	4
Aero Country	North	Private	2
Air Park-Dallas	Central	Private	1
Airpark East	East	Private	1
Arlington Municipal	Central	Public	4
Bourland Field	West	Private	2
Bridgeport Municipal	North	Public	3
C David Campbell Field-Corsicana Municipal	South	Public	3
Caddo Mills Municipal	East	Public	2
Clark Field Municipal	West	Public	2
Cleburne Municipal	South	Public	3
Collin County Regional At Mc Kinney	North	Public	4
Commerce Municipal	East	Public	2
Dallas Executive	Central	Public	4
Decatur Municipal	North	Public	2
Denton Municipal	North	Public	3
Ennis Municipal	South	Public	2
Fort Worth Alliance	North	Public	4
Fort Worth Meacham International	Central	Public	4
Fort Worth Spinks	South	Public	4
Gainesville	North	Public	4
Granbury Municipal	West	Public	2
Grand Prairie Municipal	Central	Public	2
Grayson County - North Texas Regional	North	Public	4
Greenville - Majors	East	Public	4
Hicks Airfield	North	Private	2
Hillsboro	South	Public	3
Lakeview	North	Public	1
Lancaster	South	Public	3
Mesquite Metro	Central	Public	3
Mid-Way Regional	South	Public	3
Mineral Wells	West	Public	3
Northwest Regional	North	Private	2
Parker County	West	Private	1
Possum Kingdom	West	Public	1
Propwash	North	Private	1
Rockwall Municipal	East	Public	1
Sycamore Strip	South	Private	2
Terrell Municipal	East	Public	3

Recommended Development Plan Funding Assumptions

Potential sources of funding for the RDP are identified by using eligibility guidelines for airport improvement projects (AIP). Specific project eligibility and associated funding rates are shown in **Exhibit 10**. The overall funding assumptions include the following:

- ***Block Grant State:*** Texas is a Block Grant State, meaning that the Texas Department of Transportation (TxDOT) administers the federal funding program for its eligible airports. In Texas, the National Plan of Integrated Airport Systems (NPIAS) GA airports are eligible for 90 percent funding for eligible projects. A local funding match of 10 percent is required. It should be noted that Possum Kingdom Airport is a non-NPIAS facility that receives State funding of 90/10 percent for eligible capital projects.

- ***Privately-Owned Airports:*** Privately-owned airports are not eligible for Block Grant (federal or state) funding and are assumed to finance their own projects with private enterprise dollars.

- ***Non-Eligible Projects:*** Although they are eligible, typically, hangars and fueling systems are funded by private enterprise due to the fact that they are not a high priority for FAA funding. For this study, these projects are shown in the private-funding category. However, in some cases, projects may be eligible for FAA, NPIAS, non-primary airport entitlement funding. By showing these projects in the private-funding category, the differences between the local matching funds needed for State Block Grants and the funding needed for hangars and fuel facilities are more apparent.

Sponsors of GA airports need to find methods beyond traditional incentives to entice development. The formation of public/private partnerships is an emerging trend for GA airports to assist in the financing of non-eligible capital development, such as hangars. Public/private partnerships are created as a means to provide a mutually beneficial financial relationship between a private entity and a local government. Many state and local governments across the country offer corporate incentives in an effort to attract businesses and promote economic development within their communities. Whether they are companies just starting their business or are well-established enterprises looking to relocate, these incentives provide excellent opportunities to evaluate and compare multiple sites and seek out the locations that offer the most benefits.

There are numerous benefits to such an arrangement. It typically allows a company to receive public funds or property to which they would not normally have access, while the local government benefits by profit-sharing, cost reduction, or some combination thereof for the overall development and operation of the enterprise. The community wins by gaining the positive (and often substantial) economic impact generated by the business. For many airports, this can lead to the construction of aircraft storage space that they would not otherwise be able to afford.

These partnerships vary from simple to complex and are usually specifically tailored to a company's individual needs. These needs can include government-provided infrastructure, bonding, grant funding, development assistance, and even joint marketing and advertising campaigns. They can apply to one particular structure or facility or for a large, privately-managed, government-owned development.

Exhibit 11 – Specific Project Funding Assumptions				
Public Airports Components	**Federal-State**	**State**	**Local**	**Non-Grant**
Runway Paving	90%		10%	
Taxiway Paving	90%		10%	
Apron Paving	90%		10%	
Terminal Building		50%	50%	
Conventional Hangar				100%
T-Hangars				100%
Runway Lighting	90%		10%	
Taxiway Lighting	90%		10%	
Approach Lighting	90%		10%	
Instrument Approach Procedure (non F&E)	90%		10%	
Fuel Storage/Distribution				100%
Airport Rotating Beacon	90%		10%	
Segmented Circle & Wind Sock	90%		10%	
Wind Indicator	90%		10%	
Weather Station	90%		10%	

Note: These shares are guidelines and general standards for planning purposes only.

Exhibit 12 presents a summary of the RDP cost breakdown for publicly-owned airports by federal/state, state, local, and private sources for the planning period ending in 2035. One of the highest costs is for the construction of aircraft storage facilities, followed by land purchased for airport safety areas and aircraft parking aprons. **Exhibit 13** illustrates the RDP incremental costs for each phase of the planning period.

Exhibit 12 - Recommended Plan Costs - Publicly-Owned Airports					
	Federal/State	**State Only**	**Local**	**Non-Grant**	**Total**
Costs					
AOSA (acres)	$6,510,970	$19,562	$725,615	$494,051	$7,750,197
RPZ (acres)	$28,700,339	$13,041	$3,190,376	$3,225,088	$35,128,843
Landside (acres)	$250,566	$0	$27,841	$0	$278,407
Paving (sy)					
Runway Pavement Area (sy)	$4,216,037	$0	$468,449	$0	$4,684,485
Taxiway Pavement Area (sy)	$6,335,901	$0	$703,989	$0	$7,039,890
Apron Pavement Area (sy)	$11,832,075	$0	$1,314,675	$634,500	$13,781,250
Parallel Runway	$6,849,450	$0	$761,050	$0	$7,610,500
Buildings	$0	$0	$0	$0	$0
Terminal (sf)	$0	$35,650	$35,650	$0	$71,300
Conventional Hangars (sf)	$0	$0	$0	$94,672,050	$94,672,050
T-Hangar Units	$0	$0	$0	$93,075,000	$93,075,000
Lighting and Navaids					
Instrument Approach Procedure	$1,350,000	$0	$150,000	$0	$1,500,000
Runway Lighting Intensity	$2,079,432	$0	$231,048	$104,000	$2,414,480
Runway End Identifier Lights	$1,687,500	$135,000	$202,500	$150,000	$2,175,000
VGSI (VASI / PAPI)	$877,500	$0	$97,500	$150,000	$1,125,000
MALSR	$2,700,000	$0	$300,000	$0	$3,000,000
Wind Indicator	$0	$0	$0	$0	$0
Segmented Circle	$0	$0	$0	$40,000	$40,000
Rotating Beacon	$0	$0	$0	$15,000	$15,000
Fuel Type					
Av-gas	$0	$0	$0	$0	$0
Jet fuel	$0	$0	$0	$75,000	$75,000
Miscellaneous					
Weather Station	$337,500	$0	$37,500	$0	$375,000
Total	**$73,727,269**	**$203,253**	**$8,246,191**	**$192,634,689**	**$274,811,402**

Exhibit 13 - Recommended Plan Costs By Year - Publicly-Owned Airports					
Year	**Federal/State**	**State Only**	**Local**	**Local/Private Partnerships**	**Total**
Current	$53,959,331	$203,253	$6,049,754	$44,876,139	$105,088,476
2015	$1,061,775	$0	$117,975	$12,525,000	$13,704,750
2020	$8,088,750	$0	$898,750	$13,635,000	$22,622,500
2025	$1,239,300	$0	$137,700	$21,990,000	$23,367,000
2030	$1,202,850	$0	$133,650	$51,818,550	$53,155,050
2035	$8,175,263	$0	$908,363	$47,790,000	$56,873,626
Total	**$73,727,269**	**$203,253**	**$8,246,191**	**$192,634,689**	**$274,811,402**
Percentage	**26.8%**	**0.1%**	**3.0%**	**70.1%**	**100.0%**

F. CAPACITY THRESHOLD PLANNING

Capacity threshold planning for airports is an important concept because of a time gap between the initiation of capacity enhancement projects and their actual completion. This gap creates a need to begin the planning and construction process much earlier than the predicted timeframe of the capacity shortfall, for both airside and landside capacity. In years past, the FAA recommended that planning for capacity expansion begin when the airport reached 60 percent of its capacity. By the time that the airport reaches 80 percent, the project should be in its design and construction phases.

The most important aspect of using capacity planning thresholds involves their relationship to the time that it takes to implement a project. For example, if forecasts show an airport moving from 60 percent capacity to 80 percent capacity within five years, and from 80 percent to 100 percent in the following five years, it should be assumed that planning and funding agencies have approximately 10 years to complete the capacity-enhancing project. This timeline can differ due to environmental requirements or public controversy over the proposed project. Some projects such as runway extensions can be accomplished in five years or less, while larger projects such as a new airport may take 10 years or longer to implement.

For North Central Texas, the System Plan, various master plans, and follow-on system planning efforts constitute the on-going planning function. Thus, the 60 percent capacity threshold planning is covered by actions occurring now and into the future by NCTCOG and the various airport sponsors within the region. Of significance to this analysis is the 80 percent threshold, which indicates the immediate need for implementation actions.

The significance of the 80 percent capacity threshold is demonstrated in North Central Texas by the number of airports in the System Plan that exceed that amount of their Annual Service Volume (ASV) by 2035.

Were it not for the inclusion of some privately-owned airport capacity in the System Plan, additional airports would also exceed 80 percent of ASV capacity. Additionally, airports can be expected to exceed their landside development capacity by 2035. Some airports are constrained from expanding by their existing property lines. Thus, capacity expansion needed for these facilities must occur at other airports.

This implies that while several airports can function within their capacity limits until 2035, these facilities can be expected to have exhausted their ability to accommodate new based aircraft and operations in the years following. Thus, planning for capacity expansions or new airports should begin well enough in advance to assure that they are on-line when needed.

One alternative to resolve airport capacity shortfalls would be to expand existing neighboring airports that have land available. Another option is to develop new airports to accommodate future demand.

G. POTENTIAL FOR NEW AIRPORTS

The FAA's airport system planning philosophy is stated in Advisory Circular 150/5070-7, *The Airport System Planning Process.* "The main purpose of the airport system planning process is to determine the type, extent, location, timing, and cost of the airport development

needed in a state or metropolitan area to establish a viable system of airports." An aviation system plan would not be complete without considering the location or need for new airports within a region to support system capacity within the planning horizon.

Two primary options exist to expand capacity. They are: (1) expand existing airports; or (2) build new facilities where demand shows the most need. In this report, the expansion of the existing system and recommended actions to provide for capacity needs, landside and airside, through the year 2035 are examined. However, circumstances may occur that clearly demonstrate the need for a new airport or a set of new airports within the region prior to 2035, based on an update of forecasts and regional trends. Also, a new airport or set of airports may be needed after 2035 to supplement the region's airport capacity.

Even though measures of airport capacity are made on a regional or subregional basis, the need for airport capacity may actually be based on more local circumstances. The System Plan uses a goal of 30 minutes driving time, or a maximum of 30 miles, for the unrestricted transfer of based aircraft from one airport to another in order to relieve capacity at constrained airports. In some portions of North Central Texas, 30 minutes driving time can be 15 miles, depending upon time of day, traffic congestion, etc., while in other areas, it can encompass up to 35 miles. For this report, it is assumed that a new airport is needed within 20 miles of an airport with a capacity shortfall. A new airport search area is also warranted in high demand corridors where a large privately-owned airport is assumed to close.

Exhibit 14 presents a graphic depiction of the capacity of the System Plan airports by 2035. Airfield demand saturation is concentrated in the convergence of Wise, Denton, and Tarrant counties. This is the location where two privately-owned facilities are currently located. Without these two private airports in the future, a capacity shortfall in this area is anticipated. Another potential growth area is shown between Dallas and Collin counties where forecasted demand is anticipated to push airfield capacity limits.

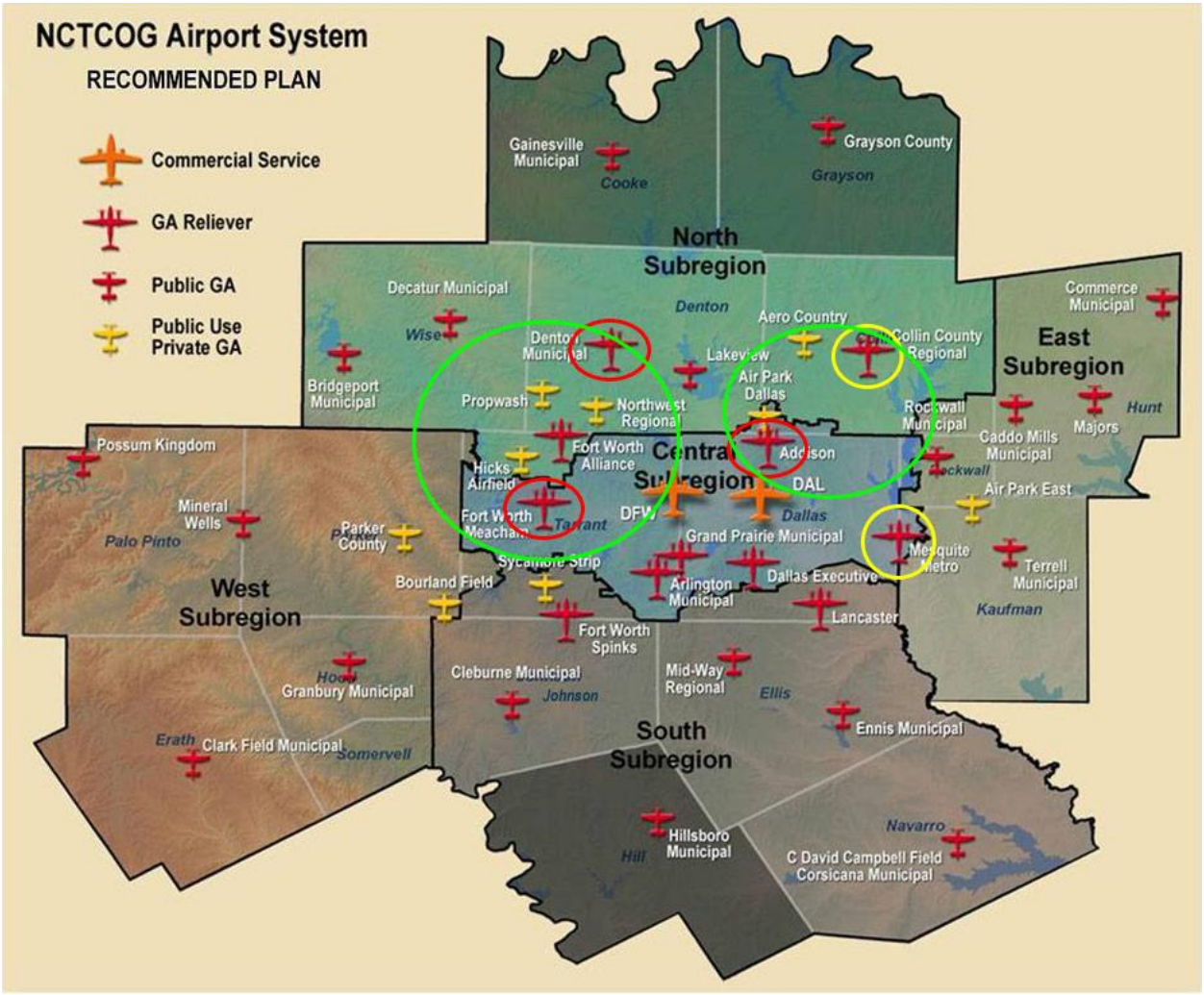
If new airports are to be considered in North Central Texas, they should be developed near their respective demand centers. For this reason, the two general areas shown on **Exhibit 14** (green circles) are located in the vicinity of capacity-short areas.

The discussion of new airport facilities should include preserving select privately-owned airports, in order to significantly reduce capacity congestion at publicly-owned facilities. The potential loss of a privately-owned facility indicates that strategic planning should examine the municipal acquisition of one or more of these airports. To make such a decision, an airport site-selection study should be conducted, in which existing airfields are compared to "green field" sites to determine which are more feasible to develop as well as discuss options with willing participants at privately-owned airports. Even if existing layouts and infrastructure of private facilities require reworking and expansion to meet FAA design standards, it may be more feasible to accomplish this than to construct a new airport in a new location. An example of this occurred in Delaware, when the State purchased a privately-owned airport (Delaware Airpark) in the year 2000 and then proceeded to completely rebuild the airport. None of the existing facilities, including the runway and taxiway system were untouched. In actuality, the State had purchased an airport "land use" that was valuable, apart from the facilities on that land.

If a privately-owned airport is purchased and then remodeled to fit FAA design standards for associated grant assurances, the result may be the expansion of capacity in a location where it is actually needed. Potential locations for new airports in North Central Texas should be studied

by NCTCOG through a continuous aviation system planning process. The results of these independent studies should be provided to communities and potential sponsors of new airports.

Exhibit 14 - Potential New Airport Demand Locations



Appendix A

RECOMMENDED PLAN SUMMARY

This Appendix presents a summary of the facilities, costs, and activity associated with the Recommended Plan, by subregion.

Table A-1 Recommended Plan Activity & Associated Costs						
Item	North	South	East	West	Central	Total
Based Aircraft						
Non-Jet	2,457	1,000	498	497	2,304	6,757
Jet	188	49	8	6	535	787
Total Based Aircraft	2,645	1,049	506	503	2,839	7,544
Operations						
Itinerant Operations	299,607	121,093	48,857	42,165	466,978	978,700
Local Operations	506,181	199,123	114,635	82,394	438,668	1,341,000
Total Annual Operations	805,788	320,216	163,492	124,558	905,646	2,319,700
Capacity Measures						
Adjusted ASV	1,890,600	1,230,100	1,131,600	707,900	1,426,200	6,386,400
Available Airside Capacity	1,084,812	909,884	968,108	583,342	520,554	4,066,700
Percent of Airside Capacity Used	42.6%	26.0%	14.4%	17.6%	63.5%	36.3%
Development Costs						
Private Airport Costs	$20,510,000	$0	$2,162,200	$546,680	$2,403,900	$25,622,780
Public Airport Costs	$81,308,229	$14,473,564	$9,291,757	$7,954,872	$161,782,980	$274,811,402
Total Costs	$101,818,229	$14,473,564	$11,453,957	$8,501,552	$164,186,880	$300,434,182

Observations from **Appendix A** include the following:

- The North subregion has 1,084,800 operations available in 2035, which is the most unused airside capacity of all the subregions.
- The Central subregion has the least available capacity in 2035, with 520,554 operations available.
- The Central subregion has the largest hangar need by 2035, with 511 T-hangars and 592,800 s.f. of conventional hangar space at a cost of $127,252,000.
- The Central subregion has the largest apron need with over 75,500 s.y. at a cost of over $10 million.
- The highest future development costs are in the Central subregion with over $164 million and the lowest costs are in the West subregion with $8.5 million.

Based on the RDP analysis, there are three major outcomes that become apparent:

1. Airside system capacity will be sufficient in 2035 however:
    a. Capacity improvements planned to accommodate demand are assumed to take place.
    b. Localized congestion will exist at certain metro airports, assuming some loss of privately-owned airport capacity.
    c. Geographic coverage in the Western part of the region suggests a potential need for additional public-use aviation infrastructure.
2. Nearly 70% of the anticipated aviation system costs, or approximately $211 million, are landside development and primarily for aircraft storage.
3. Continuous capacity monitoring and demand tracking will be critical to ensuring the RDP assumptions are valid moving forward.

Tables A-2 through A-7 present a summary of facility needs and costs for each of the subregions in North Central Texas.

Table A-2 Recommended Plan North Subregion

Facility Descriptor	2035 Additional Facility Needs	Private Airport Costs	Public Airport Costs	Total Costs
AOSA (acres)	29	$0	$1,042,170	$1,042,170
RPZ (acres)	245	$0	$10,819,127	$10,819,127
Developable Acres Available	1	$0	$278,407	$278,407
Runway Pavement Area (sy)	24,540	$1,119,300	$1,751,880	$2,871,180
Taxiway Pavement Area (sy)	26,934	$0	$3,151,265	$3,151,265
Parallel Runway	1	$0	$7,610,500	$7,610,500
Apron Pavement Area (sy)	23,278	$931,500	$2,211,000	$3,142,500
Conventional Hangars (sf)	149,900	$16,920,000	$5,565,000	$22,485,000
T-Hangar Units	591	$0	$44,325,000	$44,325,000
Instrument Approach Procedure	2	$500,000	$1,500,000	$2,000,000
Runway Lighting Intensity	5	$172,200	$1,023,880	$1,196,080
Runway End Identifier Lights	11	$300,000	$525,000	$825,000
VGSI (VASI / PAPI)	9	$300,000	$375,000	$675,000
MALSR	1	$0	$1,000,000	$1,000,000
Wind Indicator	1	$12,000	$0	$12,000
Segmented Circle	2	$40,000	$40,000	$80,000
Rotating Beacon	2	$15,000	$15,000	$30,000
Fuel Type				
AV gas	1	$75,000	$0	$75,000
Jet fuel	1	$0	$75,000	$75,000
Weather Station	1	$125,000	$0	$125,000
Total		**$20,510,000**	**$81,308,229**	**$101,818,229**

Table A-3 Recommended Plan South Subregion				
Facility Descriptor	**2035 Additional Facility Needs**	**Private Airport Costs**	**Public Airport Costs**	**Total Costs**
Land	0			
AOSA (acres)	79	$0	$2,404,421	$2,404,421
RPZ (acres)	148	$0	$1,255,443	$1,255,443
Runway Pavement Area (sy)	19,443	$0	$2,274,870	$2,274,870
Taxiway Pavement Area (sy)	22,083	$0	$2,583,750	$2,583,750
T-Hangar Units	64	$0	$4,800,000	$4,800,000
Runway Lighting Intensity	1	$0	$280,080	$280,080
Runway End Identifier Lights	8	$0	$600,000	$600,000
VGSI (VASI / PAPI)	2	$0	$150,000	$150,000
Weather Station	1	$0	$125,000	$125,000
Total		**$0**	**$14,473,564**	**$14,473,564**

Table A-4 Recommended Plan East Subregion				
Facility Descriptor	**2035 Additional Facility Needs**	**Private Airport Costs**	**Public Airport Costs**	**Total Costs**
RPZ (acres)	172	$0	$1,080,897	$1,080,897
Runway Pavement Area (sy)	14,388	$1,025,700	$657,735	$1,683,435
Taxiway Pavement Area (sy)	11,153	$0	$1,304,875	$1,304,875
Apron Pavement Area (sy)	16,483	$796,500	$1,428,750	$2,225,250
Terminal (sf)	210	$0	$48,300	$48,300
T-Hangar Units	44	$0	$3,300,000	$3,300,000
Runway Lighting Intensity	1	$0	$321,200	$321,200
Runway End Identifier Lights	8	$150,000	$450,000	$600,000
VGSI (VASI / PAPI)	8	$150,000	$450,000	$600,000
Segmented Circle	1	$40,000	$0	$40,000
Weather Station	2	$0	$250,000	$250,000
Total		**$2,162,200**	**$9,291,757**	**$11,453,957**

Table A-5 Recommended Plan West Subregion				
Facility Descriptor	**2035 Additional Facility Needs**	**Private Airport Costs**	**Public Airport Costs**	**Total Costs**
AOSA (acres)	80	$0	$1,488,982	$1,488,982
RPZ (acres)	89	$0	$1,743,890	$1,743,890
Apron Pavement Area (sy)	5,200	$33,000	$669,000	$702,000
Terminal (sf)	100	$0	$23,000	$23,000
Conventional Hangars (sf)	1,200	$0	$180,000	$180,000
T-Hangar Units	31	$0	$2,325,000	$2,325,000
Runway Lighting Intensity	1	$163,680	$0	$163,680
Runway End Identifier Lights	9	$150,000	$525,000	$675,000
VGSI (VASI / PAPI)	1	$75,000	$0	$75,000
MALSR	1	$0	$1,000,000	$1,000,000
Weather Station	1	$125,000	$0	$125,000
Total		**$546,680**	**$7,954,872**	**$8,501,552**

Table A-6 Recommended Plan Central Subregion				
Facility Descriptor	**2035 Additional Facility Needs**	**Private Airport Costs**	**Public Airport Costs**	**Total Costs**
AOSA (acres)	28	$0	$2,814,625	$2,814,625
RPZ (acres)	202	$0	$20,229,486	$20,229,486
Runway Pavement Area (sy)	10,267	$1,201,200	$0	$1,201,200
Apron Pavement Area (sy)	75,533	$724,500	$9,472,500	$10,197,000
Conventional Hangars (sf)	592,847	$0	$88,927,050	$88,927,050
T-Hangar Units	511	$0	$38,325,000	$38,325,000
Runway Lighting Intensity	4	$123,200	$789,320	$912,520
Runway End Identifier Lights	3	$150,000	$75,000	$225,000
VGSI (VASI / PAPI)	4	$150,000	$150,000	$300,000
MALSR	1	$0	$1,000,000	$1,000,000
Segmented Circle	1	$40,000	$0	$40,000
Rotating Beacon	1	$15,000	$0	$15,000
Total		**$2,403,900**	**$161,782,980**	**$164,186,880**

Table A-7 Recommended Plan Summary				
Facility Descriptor	**2035 Additional Facility Needs**	**Private Airport Costs**	**Public Airport Costs**	**Total Costs**
Land				
AOSA (acres)	215	$0	$7,750,197	$7,750,197
RPZ (acres)	855	$0	$35,128,843	$35,128,843
Landside (acres)	1	$0	$278,407	$278,407
Paving				
Runway Pavement Area (sy)	68,638	$3,346,200	$4,684,485	$8,030,685
Taxiway Pavement Area (sy)	60,170	$0	$7,039,890	$7,039,890
Apron Pavement Area (sy)	120,494	$2,485,500	$13,781,250	$16,266,750
Parallel Runway	1	$0	$7,610,500	$7,610,500
Buildings				
Terminal (sf)	310	$0	$71,300	$71,300
Conventional Hangars (sf)	743,947	$16,920,000	$94,672,050	$111,592,050
T-Hangar Units	1,241	$0	$93,075,000	$93,075,000
T-Hangar (sf)	1,489,200	$0	$0	$0
Lighting and Navaids				
Instrument Approach Procedure	2	$500,000	$1,500,000	$2,000,000
Runway Lighting Intensity	12	$459,080	$2,414,480	$2,873,560
Runway End Identifier Lights	39	$750,000	$2,175,000	$2,925,000
VGSI (VASI / PAPI)	24	$675,000	$1,125,000	$1,800,000
MALSR	3	$0	$3,000,000	$3,000,000
Wind Indicator	1	$12,000	$0	$12,000
Segmented Circle	4	$120,000	$40,000	$160,000
Rotating Beacon	3	$30,000	$15,000	$45,000
Fuel Type				
AV gas	1	$75,000	$0	$75,000
Jet fuel	1	$0	$75,000	$75,000
Miscellaneous	0	$0	$0	$0
Weather Station	5	$250,000	$375,000	$625,000
Total		**$25,622,780**	**$274,811,402**	**$300,434,182**