Fort Worth Spinks Airport

Airport Master Plan Update

SEPTEMBER 2024

FORT WORTH SPINKS AIRPORT MASTER PLAN UPDATE

FINAL REPORT

September 2024

PREPARED FOR:

City of Fort Worth Aviation Department and Fort Worth Spinks Airport

Fort Worth, Texas

This document was funded by the Texas Department of Transportation Aviation Division and the City of Fort Worth Aviation Department. It was prepared in accordance with Federal Aviation Administration Advisory Circular (AC) 150/5070-6B, Airport Master Plans. The contents do not necessarily reflect the official views or policies of TxDOT or the Federal Aviation Administration. Acceptance of this report by these agencies does not constitute a funding commitment for any development depicted therein, nor does it indicate that the proposed development is environmentally acceptable or would have justification in accordance with applicable public laws.

TABLE OF CONTENTS

1 INVENTORY

OF EXISTING CONDITIONS

2023 FORT WORTH SPINKS AIRPORT MASTER PLAN

KSA

SPINKS AIRPORT

1. INVENTORY OF EXISTING CONDITIONS

1.1. OVERVIEW

The following Airport Master Plan (AMP) will define a concept for development at Fort Worth Spinks Airport (FWS or the Airport) to facilitate the region's growing aviation demands. This AMP will feature a 20-year planning period and has been prepared in collaboration with airport management, federal and state agencies, local officials, businesses, and key stakeholders. The primary goal of this study is to identify needs and evaluate development alternatives to guide the future development of the Airport. This AMP recommends improvements in accordance with Federal Aviation Administration (FAA) criteria, taking into consideration anticipated changes in aviation activity and development opportunities at the local, regional, and national levels.

The primary objective of this planning effort is to produce a comprehensive guide for the continued development of a safe, efficient, and successful aviation facility that meets the goals of the City of Fort Worth (CFW), airport users, tenants, and the surrounding market area. This AMP will also satisfy FAA guidelines for developing airport plans and facilities while incorporating characteristics unique to the area. This study focuses on aeronautical forecasts, economic development opportunities, need and justification improvements, and a staged plan for recommended development. This study will include the following elements:

- Inventory of Existing Conditions
- Forecasts of Aviation Activity
- Facility Requirements
- Airport Development Alternatives
- Recommended Development Plan
- Capital Improvement Plan
- Environmental Overview
- Airport Plans

Typically, the staged plan looks at planning horizons of 0-5, 6-10, and 11-20 years, with the first phase addressing existing facility deficiencies or non-compliance to airport design standards as outlined in FAA Advisory Circular (AC) 150/5300-13B, *Airport Design*.

The first step in the planning process includes collecting data about the Airport and its environment. The information gathered during this phase provides the foundation for subsequent phases. The inventory of existing conditions will include the following:

- Existing facilities such as runways, taxiways, parking aprons, navigational aids, and facility areas associated with general and corporate aviation.
- The Airport's role, including development history, location, access, and relationship to other transportation methods.
- Socioeconomic and business trends within the Airport's service area.
- A review of existing Airport, community, and regional plans and studies that contain information pertinent to the development and implementation of the recommendations of the master plan.

The data collected for this phase was obtained from various sources, including airport management, tenants, users, the City of Fort Worth, area businesses, community organizations, and airport service providers. The data collected is current as of May 2023 and will serve as a baseline for the remainder of the study. Additional sources of information referenced include:

- Fort Worth Spinks Master Plan, 2004
- City of Fort Worth Comprehensive Plan, 2022
- NCTCOG General Aviation and Heliport System Plan, 2012
- FAA Form 5010-1, *Airport Master Record*
- FAA Operational Data

1.2. CITY OF FORT WORTH

One of just eight forts, Fort Worth quickly became the center of the Texas ranching industry, supported by the arrival of the Texas & Pacific Railway in 1876. Oil and aviation industries soon followed and continued to bolster the city's economic importance. Fort Worth capitalized on these strengths to become an economic foundation for the state of Texas in the transportation, business, and military industries.[1]

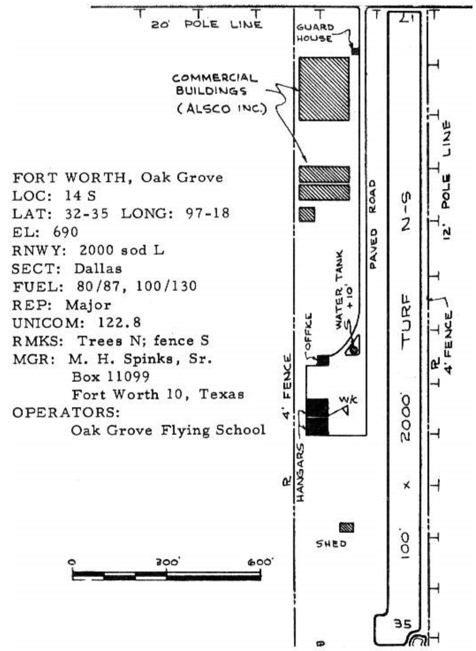
The rapid increase in livestock trade earned the city its nickname, "Cowtown," and the famous Fort Worth Stockyards were born. By 1900, Fort Worth had become one of the world's largest cattle markets, resulting in a boom that would see population numbers triple by 1910. Accelerating the growth were the numerous multimillion-dollar industries, including aircraft production.[2]

Headquartered in Fort Worth since 1979, American Airlines' largest hub is located at nearby Dallas Fort Worth International Airport (DFW), the world's 5th busiest airport in terms of passenger enplanements in 2022. Bell Helicopter also calls Cowtown home, with headquarters and assembly facilities a few miles from downtown. Commissioned in 1942 as Carswell Air Force Base, Naval Air Station JRB Fort Worth has become one of the area's top employers. The facility served as the birthplace of the Lockheed Martin F-16 and currently produces the F-35 Lightning II.[3]

Fort Worth also hosts one of the nation's premier air shows at Perot Field Fort Worth Alliance Airport. Presented by Bell, the Alliance Texas Aviation Expo was originally founded in 1991. After 32 years, the airshow continues to emphasize the regional aviation industry through public involvement with local aviation industries. [4]

[1] Visit Fort Worth, *Fort Worth History*, February 2023
[2] Fort Worth Historical, *How Fort Worth Began*, February 2023
[3] Visit Fort Worth, *Aviation History*, February 2023
[4] AllianceTexas Aviation Expo, *Our History*, February 2023

1.3. AIRPORT HISTORY



Originally known as Oak Grove Airport, the field accommodated modest general aviation facilities, including hangars, flight school, aircraft sales and maintenance, and airport administration. In 1966, the flight school relocated to a renovated barracks on the field. Soon after, a rotorcraft school and charter operation joined the existing businesses on the field. Bell Helicopter sent pilots from around the world to Oak Grove for training. From 1967 to 1971, the Airport was home to the National Aerobatic Championships. In 1989, Oak Grove would be closed, and Spinks Airport was activated, named in honor of Pappy Spinks.[5]

Maurice Hunter "Pappy" Spinks was an accomplished aerobatic pilot who lived in a residence on airport property while overseeing the facility's day-to-day operation. Spinks had previously made his living as a supplier to Fort Worth-based Bell Helicopter, manufacturing skids for their Huey helicopters. Oak Grove featured a 2,000' turf runway, two hangars, and an office facility. In 1970, Pappy provided the financial backing to construct a new general aviation terminal, administration building, and several new aircraft storage hangars. Several hangars from the original airport are still in use today and provide access to the Fort Worth Spinks Airport.[6]

[5] City of Fort Worth, *Spinks Airport History*, February 2023

[6] Abandoned & Little-Known Airfields, *Oak Grove History*, Paul Freeman, November 2022

1.4. CITY OF FORT WORTH AVIATION SYSTEM

The City of Fort Worth Aviation System comprises three world-class aviation facilities serving the local, regional, and national aviation demand. Fort Worth Spinks Airport (FWS) and Fort Worth Meacham International Airport (FTW) provide general aviation facilities featuring full-service FBOs, aircraft and avionics maintenance, flight schools, and on-site rental car facilities. Perot Field Fort Worth Alliance Airport (AFW) provides a state-of-the-art aviation facility to meet the growing demands of the industrial aviation industry in the DFW Metroplex and North Texas.

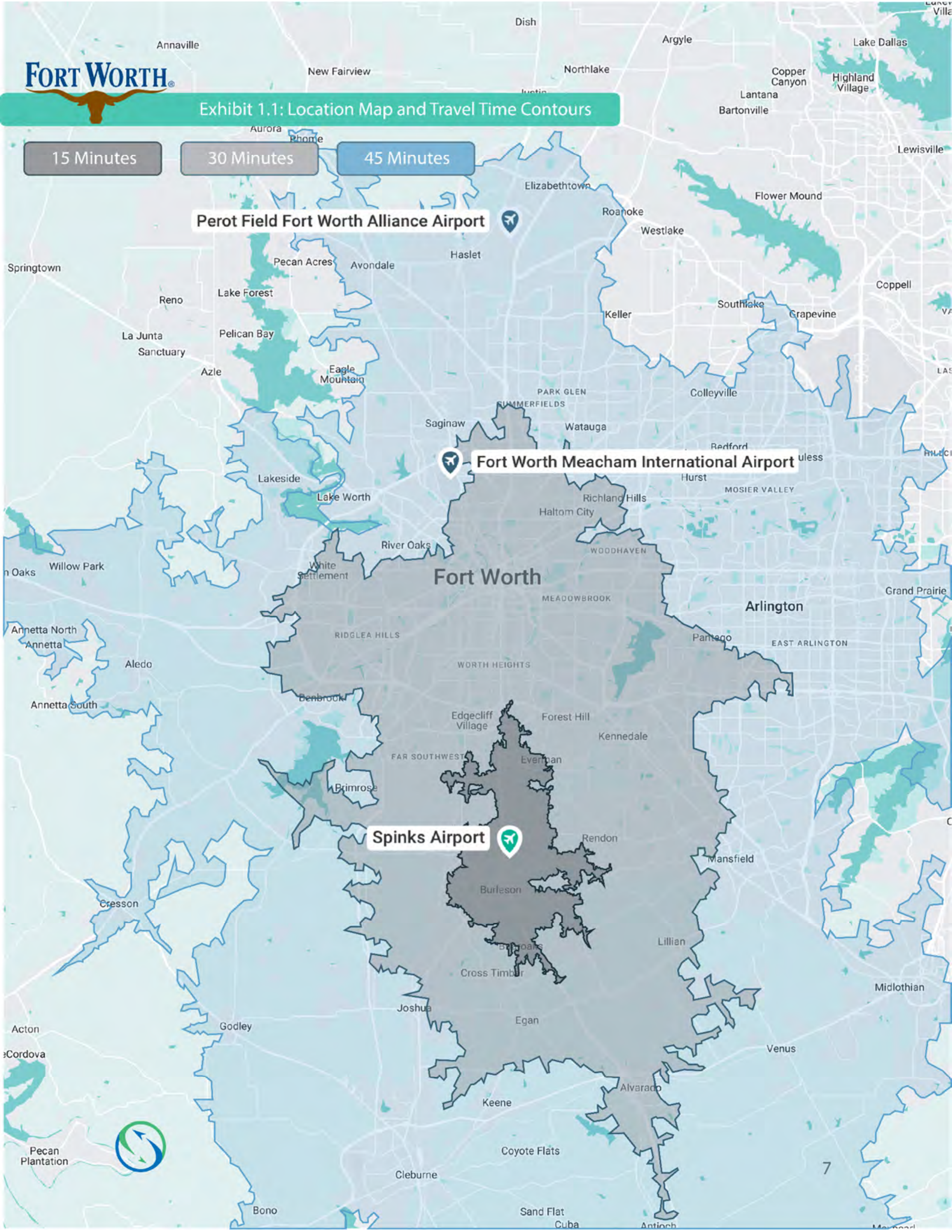


Exhibit 1.1: Location Map and Travel Time Contours

1.5. AIRPORT LOCATION AND ACCESS

A critical element of the Dallas-Fort Worth regional aviation system, the Fort Worth Spinks Airport is located in the City of Fort Worth, in Tarrant County, Texas. The Airport is positioned on the southernmost edge of the Fort Worth city limits, adjacent to Interstate 35W and neighbored by the City of Burleson to the southeast. Located approximately 13 miles south of downtown Fort Worth, direct vehicular access is provided by Interstate 35W, with East Alsbury Boulevard providing direct arterial access to the west side of the Airport. East Rendon Crowley Road and North Wildcat Way provide access to the Airport's eastside facilities. Wing Way Road provides access to the southwest T-Hangars. Wing Way Road also provides access to the Air Traffic Control Tower (ATCT) and Fort Worth Fire Station No. 42 via a secure access gate.

1.6. AIRPORT IMPROVEMENT PROGRAM (AIP) PROJECT HISTORY

Originally established in 1946 following the passage of the Federal Airport Act, the Federal-Aid Airport Program (FAAP), funded by the Department of Treasury, provided grants to airports to complete basic improvements.[7] Today, the Airport Improvement Program (AIP) provides grants to public agencies for the planning and development of public-use airports included in the National Plan of Integrated Airport Systems (NPIAS). The program covers 90-95 percent of eligible costs for reliever airports like Fort Worth Spinks, based on requirements outlined in FAA Order 5100.38D, *Airport Improvement Program Handbook.*[8] Table 1.1 provides a historical detail of Capital Improvement projects completed at Fort Worth Spinks since 2003 that have been received through the FAA's AIP. Airports that apply for and accept grants under this program must adhere to various grant assurances, including maintaining a safe and efficient aviation facility per FAA standards for the anticipated useful life of the improvement. Typically, an airport development project's useful life is at least 20 years. The project history at Fort Worth Spinks, totaling approximately $13.6 million, highlights the importance of the Airport to the DFW, regional, and national airspace systems, as well as continued support from the FAA and Texas Department of Transportation (TxDOT) Aviation Division.

[7] Federal Aviation Administration, *AIP Program History*, November 14, 2017

[8] Federal Aviation Administration, Airport Improvement Program (AIP), February 2, 2023

TABLE 1.1: Airport Improvement Program History (2003 - 2023)

Year	Project Description	Project Cost
2003	Apron Design, Taxiway "B" MITL, Runway/Taxiway Overlay	$215,842
2003	Design and Construct Air Traffic Control Tower (ATCT)	$1,527,778
2004	Apron Expansion	$922,348
2005	Markings, Taxiway/Runway Overlay, RSA Design	$2,389,559
2006	RAMP, AWOS Road, Drainage, AWOS Repairs/Upgrades	$58,792
2006	Apron Expansion, Signage, Taxiway Reconstruction	$204,128
2007	Runway Markings, RSA Grading, Lighting Adjustments	$798,132
2007	Taxiway Reconstruction, Signage, Apron Expansion	$2,761,457
2007	RAMP, AWOS Repairs, Fencing Improvements	$63,624
2008	RAMP, Taxiway Seal Coat, Parking Markings, ATCT Road	$69,764
2009	RAMP, Parking Improvements, Security Improvements	$35,748
2010	RAMP, AWOS Maintenance, Security Gate, Signage	$20,504
2011	Apron Design, Drainage Improvements	$75,130
2011	RAMP, AWOS Maintenance	$92,716
2012	RAMP, AWOS Maintenance	$90,404
2013	Drainage Improvements, Apron Expansion	$794,569
2013	RAMP, AWOS Maintenance	$99,008
2014	Drainage Study, East Taxiway Design	$2,925,913
2014	RAMP, AWOS Maintenance	$99,008
2016	Wildlife Hazard Assessment	$68,000
2016	RAMP	$100,000
2017	RAMP	$100,000
2018	RAMP	$100,000
2019	RAMP	$85,072
'03 – 23'	Total Project Amount	$13,697,496

Source: TASP Airport Development Worksheet, *Airport Project History*, February 2020

RAMP = Routine Airport Maintenance Program

1.7. SYSTEM ROLE

Fort Worth Spinks Airport (FWS) is a general aviation reliever airport serving the needs of the City of Fort Worth, Tarrant County, and the surrounding DFW market area. All airports play various functional roles and contribute at varying levels to meet national, state, and local transportation and economic needs. Identifying and understanding an airport's various roles is essential for any airport in a system so it can continue developing facilities and services that appropriately fulfill its respective role.

TABLE 1.2: Existing Airport Conditions

Airport Name	Fort Worth Spinks Airport
FAA Designation	FWS
Associated City	Fort Worth, Texas
Airport Owner/Sponsor	City of Fort Worth, Texas
Airport Management	Full-time administration and support staff, on-site
Date Established	Oak Grove Airport, 1962 / Fort Worth Spinks Airport, 1989
2023-2027 FAA NPIAS Role	Regional Reliever
2010 TxDOT System Plan Role	Reliever
NCTCOG System Plan Role	General Aviation Reliever
Commercial Air Service	No
Airport Acreage	822
Airport Reference Point (ARP)	32-33-54.481N, 97-18-30.382W
Airport Elevations	700.4 Surveyed
Area Mean Max Temperature	91.8°, July

Source: Fort Worth Spinks Airport Administration, FAA Form 5010-1, *Airport Master Record*, Weather Underground

1.7.1. ECONOMIC IMPACT

In 2018, TxDOT updated its Texas Aviation Economic Impact Study. This study aimed to highlight and quantify the relationship of airports in Texas to the local and statewide economies. Data presented in the study showed that Texas general aviation airports provide more than 48,000 jobs, $2.5 billion in payroll, and $9.3 billion in total economic output. At the time of the study, Fort Worth Spinks' direct economic impact included 105 jobs and $17 million in output. In comparison, the total economic impacts of the airport resulted in 388 jobs, $13.4 million in payroll, and $39.1 million in total output, which includes the impact resulting from capital improvements and visitors to the Airport and surrounding communities.[9]

1.7.2. NATIONAL PLAN OF INTEGRATED AIRPORT SYSTEMS (NPIAS)

The federal government initially constructed many of the nation's existing airports, or their development and maintenance were partially funded through various federal grant programs for local communities. The system of airports that exists today is due in part to a federal policy promoting the development of civil aviation. As part of the ongoing effort

[9] TxDOT, *Texas Aviation Economic Impact Study*, August 2018

to develop a national airport system (NAS), U.S. Congress maintains a national plan for the development and upkeep of airports.

The National Plan of Integrated Airport Systems (NPIAS) is a repository of airports that are eligible for AIP funding and used by the FAA to administer the AIP, which is the source of federal funds for airport improvement projects nationwide. The AIP is funded exclusively by user fees and taxes, such as aviation fuel and airline ticket taxes. An airport must be included in the NPIAS to qualify for federal assistance through the AIP.

The most current plan available is the NPIAS 2023-2027, which identified 3,287 public-use airports important and necessary to the national air transportation system. The plan estimates that approximately $62.4 billion in AIP-eligible airport projects will require financial assistance between 2023 and 2027. This is an almost $19 billion increase from the NPIAS issued two years ago. The NPIAS categorizes airports by the type of activities that occur at an airport – commercial service, air cargo, reliever operations, and general aviation. FWS is currently classified as a regional reliever general aviation airport in the 2023-2027 NPIAS.

According to the NPIAS, regional airports are located in metropolitan areas and serve relatively large populations. These airports support regional economies with interstate and some long-distance flying and have high activity levels, including jets and multi-engine propeller aircraft. About 45 percent of these airports have limited air carrier service. Regional airports average about 90 total based aircraft, including three jets. Regional airports account for nine percent ($5.6 billion) of the development identified in the NPIAS. These airports have identified projects that focus on reconstructing airfield pavement, bringing airports up to design standards, and improving terminals.[10]

1.7.3. TEXAS AIRPORT SYSTEM PLAN

Updated in 2010, the goal of the Texas Airport System Plan (TASP) was to identify public-use aviation facilities that perform an essential role in the economic and social development of Texas by providing adequate air access. The 2010 TASP classified 292 airports.

The TASP classifies Fort Worth Spinks Airport as one of 24 reliever airports in Texas and one of nine reliever facilities serving the Dallas-Fort Worth metropolitan area.

According to the TASP, reliever airports are located within a major metropolitan area and provide alternate airport facilities for general aviation users to relieve congestion at the larger Commercial Service airports. Reliever airports accommodate various classes of aircraft, from large business jets to smaller piston aircraft, to divert general aviation

[10] Federal Aviation Administration, National Plan of Integrated Airport Systems (NPIAS) 2023-2027, September 30, 2022

traffic from Commercial Service airports. Reliever airports have or must be forecast to have 100-based aircraft or 25,000 annual itinerant operations. Reliever airports generally serve population centers of 250,000 or more. These airports relieve Commercial Service airports operating at 60 percent capacity, all with at least 250,000 enplanements. Since 1982, the FAA has emphasized the development of reliever airports to increase the national system capacity.[11]

1.7.4. NCTCOG REGIONAL GENERAL AVIATION AND HELIPORT SYSTEM PLAN

The *North Central Texas Aviation and Heliport System Plan* (System Plan), published by the North Central Texas Council of Governments (NCTCOG) in May 2012, provides a detailed analysis of the regional aviation system. With a specific emphasis on general aviation facilities, the study focuses on long-term sustainability through 2035. At the time of the study, the analysis included 19 counties and 35 general aviation facilities. The plan is divided into five subregions, each featuring airports classified into four categories based on several characteristics, including size and type of operations.

FWS is located in the south subregion, consisting of Johnson, Ellis, Hill, Navarro, and the southernmost portions of Tarrant and Dallas counties. According to the study, facilities in this region will require a capital investment of approximately $14.5 million to meet the forecast aviation demand in 2035.[12]

1.8. AIRPORT ACTIVITY

Fort Worth Spinks Airport supports general aviation activities, including business aviation, flight training, medical transport, and recreational flying. Reviewing historical operations activity helps provide a barometer of the operational conditions for the Airport and provides a necessary baseline for future demand activity. Table 1.3 summarizes Airport activity for calendar years 2020-2022. Activity is segregated into the following categories:

- General Aviation – all other activities not classified as air carrier, air taxi, or military.
- Local – operations within 20 nautical miles (nm) of the airfield. Consists primarily of flight training and touch-and-go activities.
- Itinerant – operations that are not local and have an origin and destination.
- Military – operations conducted by aircraft or helicopters with a military designation.

[11] TxDOT, *Texas Airport System Plan (TASP),* 2010

[12] NCTCOG, *North Central Texas Aviation and Heliport System Plan*, May 2012

TABLE 1.3: 2020-2022 Summary of Aviation Activity

Year	Itinerant General Aviation	Local General Aviation	Military	Total
2020	27,848	40,816	56	68,720
2021	25,295	40,104	36	65,435
2022	24,269	37,026	30	61,325

Source: FAA, Air Traffic Activity System (ATADS) 2020-2022

1.8.1. SOCIOECONOMIC CHARACTERISTICS

The various demographic and socioeconomic characteristics of the local area that an airport serves will impact its demand for aviation services and is collected to derive and assess growth dynamics within the study area. Typically, the demographic characteristics of an airport's service area can influence the level, type, and growth of aircraft operations. Whereas population activity (positive or negative) has been a simple and important measure of the potential demand for air services, income levels are a standard predictor of the propensity for the population to travel, the level of use of existing general aviation aircraft, and services at the Airport. Additionally, this type of information is essential in generating forecasting activity at the Airport and helps examine the ability of the region to sustain a strong economic base over an extended period. Given the location of the Airport and its relationship to the greater DFW Metroplex, it is necessary to examine multiple areas to produce a clear socioeconomic picture. Tables 1.4, 1.5, and 1.6 provide a historical summary of the socioeconomic indicators for the Dallas-Fort Worth Combined Statistical Area (CSA), Fort Worth – Arlington – Grapevine Metropolitan Division (MDIV), and Tarrant County.

THIS SECTION LEFT BLANK INTENTIONALLY

TABLE 1.4: Dallas-Fort Worth Combined Statistical Area (CSA) Summary

Historical						Projected				
1982	1992	2002	2012	2022	CAGR (1982-2022)	2028	2033	2038	2043	CAGR (2023-2043)
POPULATION										
3,535,021	4,536,630	5,842,948	7,081,621	8,372,691	2.18%	9,089,625	9,703,219	10,324,010	10,957,000	0.94%
PER CAPITA INCOME (in 2012 dollars)										
$28,334	$32,135	$41,556	$46,781	$56,698	1.75%	$64,073	$70,967	$78,505	$86,697	1.52%
MEDIAN HOUSEHOLD INCOME (in 2012 dollars)										
$76,440	$85,126	$109,933	$126,079	$155,319	1.79%	$173,021	$191,564	$212,748	$235,890	1.56%
EMPLOYMENT										
2,044,740	2,690,106	3,616,079	4,409,294	5,752,844	2.62%	6,601,499	7,320,144	8,083,768	8,897,100	1.50%

Source: Woods and Poole Complete Economic and Demographic Data, 2022; Dallas-Fort Worth Combined Statistical Area

TABLE 1.5: Fort Worth, Arlington, Grapevine Metropolitan Division (MDIV) Summary

Historical						Projected				
1982	1992	2002	2012	2022	CAGR (1982-2022)	2028	2033	2038	2043	CAGR (2023-2043)
POPULATION										
1,082,842	1,429,618	1,804,121	2,214,552	2,575,179	2.19%	2,770,829	2,931,146	3,085,784	3,235,642	0.78%
PER CAPITA INCOME (in 2012 dollars)										
$26,637	$30,495	$38,697	$44,026	$51,002	1.64%	$56,962	$62,390	$68,260	$74,544	1.35%
MEDIAN HOUSEHOLD INCOME (in 2012 dollars)										
$72,885	$81,377	$102,641	$118,840	$139,688	1.64%	$153,741	$168,278	$184,774	$202,518	1.39%
EMPLOYMENT										
549,666	759,044	1,005,197	1,248,834	1,584,787	2.68%	1,794,054	1,963,320	2,137,199	2,315,496	1.28%

Source: Woods and Poole Complete Economic and Demographic Data, 2022; Fort Worth, Arlington, Grapevine Metropolitan Division (MDIV)

TABLE 1.6: Tarrant County Summary

Historical						Projected				
1982	1992	2002	2012	2022	CAGR (1982-2022)	2028	2033	2038	2043	CAGR (2023-2043)
POPULATION										
933,822	1,225,543	1,524,249	1,881,222	2,153,700	2.11%	2,314,837	2,446,142	2,571,974	2,693,096	0.76%
PER CAPITA INCOME (in 2012 dollars)										
$27,133	$31,367	$39,488	$44,641	$51,930	1.64%	$57,938	$63,376	$69,236	$75,483	1.33%
MEDIAN HOUSEHOLD INCOME (in 2012 dollars)										
$73,789	$82,985	$103,980	$120,404	$141,782	1.65%	$155,934	$170,502	$186,994	$204,664	1.37%
EMPLOYMENT										
498,958	687,316	893,874	1,093,735	1,389,867	2.59%	1,570,576	1,714,771	1,861,229	2,009,361	1.24%

Source: Woods and Poole Complete Economic and Demographic Data, 2022; Tarrant County

THIS SECTION LEFT BLANK INTENTIONALLY

1.9. AIRSIDE FACILITIES

Fort Worth Spinks operates with a dual-runway system comprised of the primary paved runway 18R/36L and a secondary turf runway 18L/36R. The runway environment is served by dual full-length parallel and connector taxiways providing access to the east and west terminal areas and associated support facilities. Exhibits 1.2, 1.3, and 1.4 provide a graphical representation of the existing airfield environment at Fort Worth Spinks.

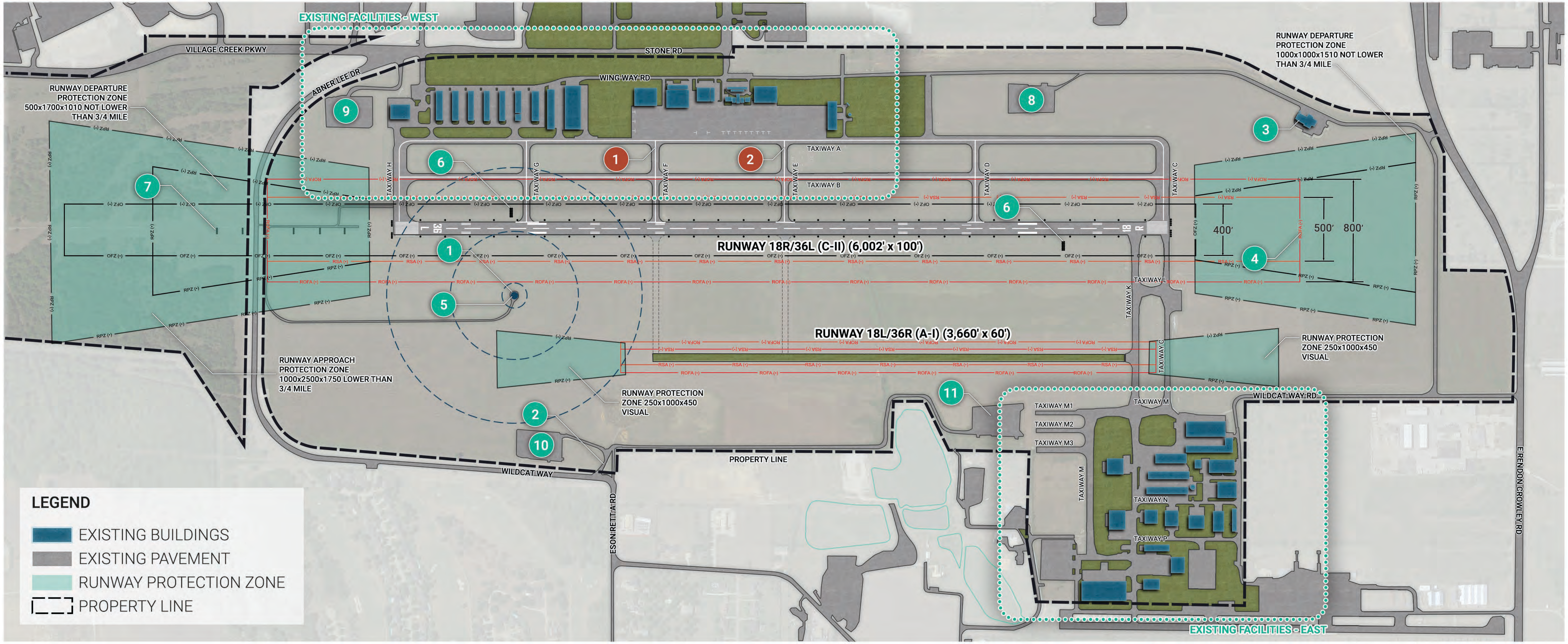
1.9.1. RUNWAYS

The primary runway at the Airport carries a designation of 18R/36L and is 6,002 feet long and 100 feet wide. It is constructed of asphalt and has a gross weight-bearing capacity of 60,000 lbs. single-wheel, 70,000 lbs. dual-wheel, and 100,000 lbs. dual-tandem. The runway is equipped with Medium Intensity Runway Lights (MIRL) and a four-light Precision Approach Slope Indicator (PAPI-4L) serving each runway end. The runway features precision approach runway markings (PIR). The Runway 36L end is served by an Instrument Landing System (ILS) approved for Category I ILS approaches and comprises a localizer, glideslope, and Medium Intensity Approach Light System (MALSR). Both runway ends are served by an RNAV (GPS) approach procedure.

According to the FAA's *Aeronautical Information Manual*, an Instrument Landing System (ILS) "is designed to provide an approach path for exact alignment and descent of an aircraft on final approach to a runway."[13] This system allows aircraft to land in weather conditions with lower cloud ceilings and visibility. There are three categories of ILS approaches. Category I approaches allow aircraft to descend as low as 200 feet above the ground before making visual contact with the runway environment. Any instrument-rated pilot with an appropriately equipped aircraft can fly a Category I ILS approach. Category II approaches allow aircraft to descend as low as 100 feet above the ground before making visual contact with the runway environment in visibility as low as 1,200 feet. The most advanced Category III approaches allow an aircraft to land on the runway without requiring the pilots to ever make visual contact with the runway. Category II and III approaches require specially trained pilots and advanced autopilot systems.

The secondary turf runway carries a designation of 18L/36R and is 3,660 feet long and 60 feet wide. Table 1.7 outlines the existing runway data for the Airport.

[13] FAA Aeronautical Information Manual, *Air Traffic Procedures*, Change 3, November 2022



EXISTING FACILITIES

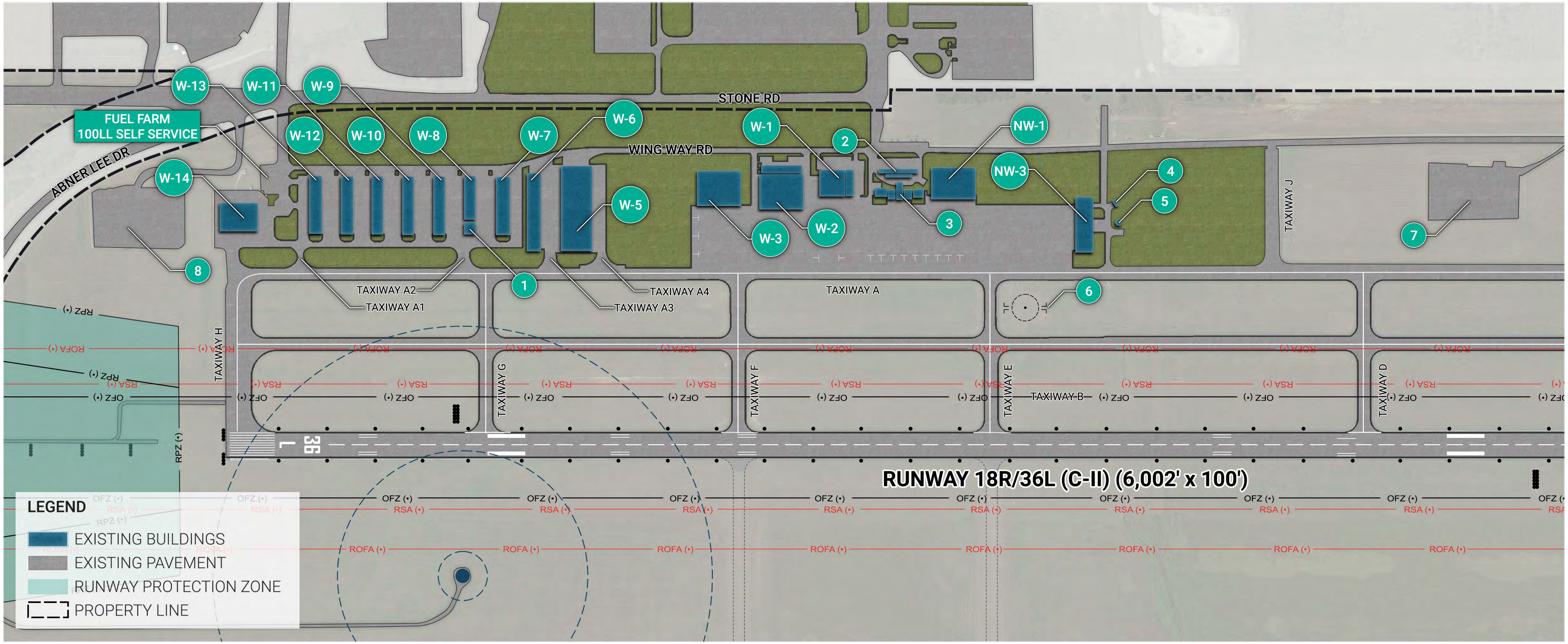
1. AWOS | TOP ELEV. 720.0'
2. ROTATING BEACON | TOP ELEV. 738.6'
3. CITY OF FORT WORTH FIRE STATION N° 42
4. LOCALIZER
5. GLIDESLOPE ANTENNA
6. PAPI-4L
7. MALSR
8. GAS WELL
9. GAS WELL
10. GAS WELL
11. GAS WELL

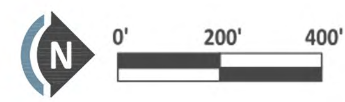
DEFICIENCIES

1. DIRECT ACCESS FROM APRON TO RUNWAY: TAXIWAY FOXTROT
2. DIRECT ACCESS FROM APRON TO RUNWAY: TAXIWAY ECHO

SPINKS AIRPORT

EXHIBIT 1.2 - EXISTING FACILITIES - OVERVIEW





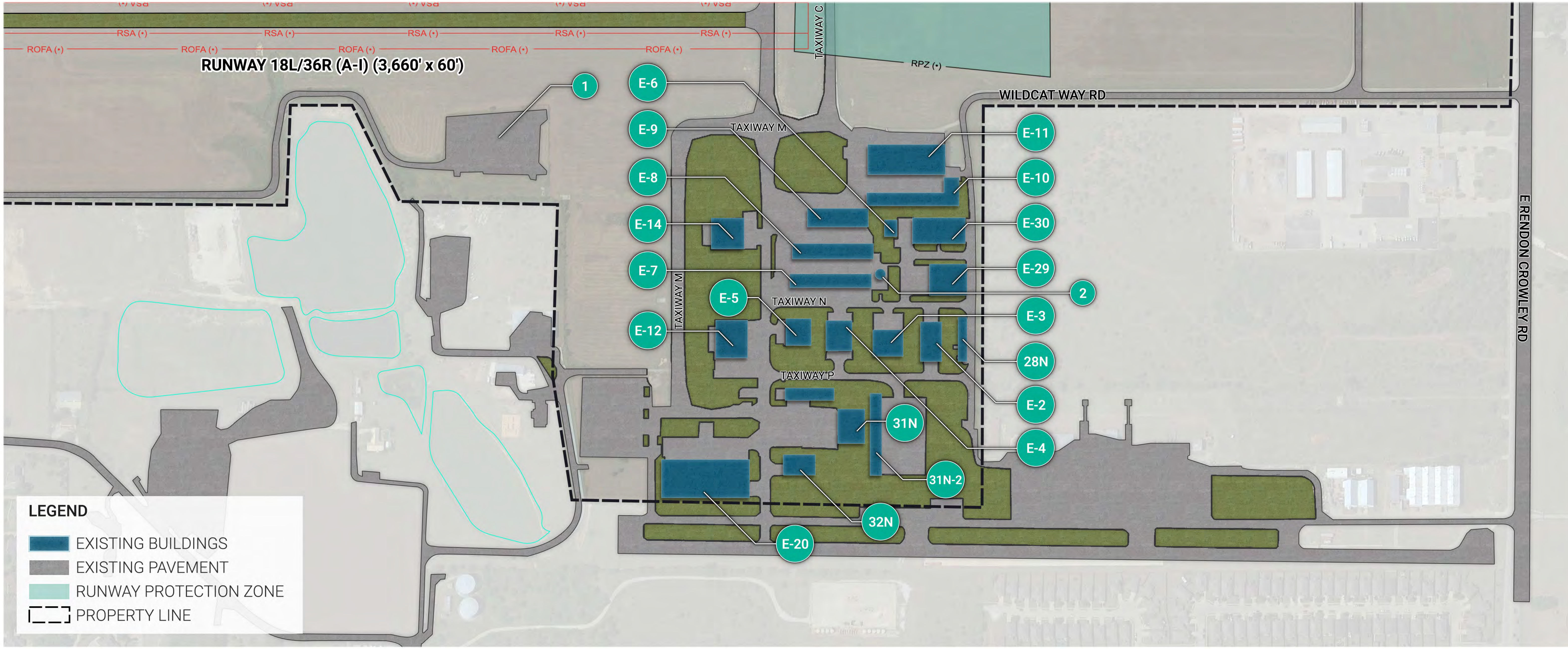
EXISTING FACILITIES

- W-1 CITY OF FORT WORTH ADMIN BOX HANGAR
- W-2 HARRISON AVIATION BOX HANGAR
- W-3 PRIVATE BOX HANGAR | TOP ELEV. 725.2'
- W-5 CITY OF FORT WORTH BOX HANGAR | TOP ELEV. 721.6'
- W-6 CITY OF FORT WORTH BOX HANGAR | TOP ELEV. 714.2'
- W-7 PRIVATE T-HANGAR | TOP ELEV. 714.2'
- W-8 PRIVATE T-HANGAR | TOP ELEV. 714.2'
- W-9 PRIVATE T-HANGAR | TOP ELEV. 714.2'
- W-10 PRIVATE T-HANGAR | TOP ELEV. 714.2'
- W-11 PRIVATE T-HANGAR | TOP ELEV. 714.2'
- W-12 PRIVATE T-HANGAR | TOP ELEV. 714.2'
- W-13 PRIVATE T-HANGAR | TOP ELEV. 714.2'
- W-14 PRIVATE BOX HANGAR | TOP ELEV. 723.0'
- NW-1 HARRISON AVIATION BOX HANGAR
- NW-2 HARRISON AVIATION BOX HANGAR
- 1 WASH BAY CITY OF FORT WORTH | TOP ELEV. 714.2'
- 2 FBO
- 3 FBO
- 4 LIGHTING VAULT
- 5 AIR TRAFFIC CONTROL TOWER (ATCT)
- 6 SEGMENTED CIRCLE/WINDCONE
- 7 GAS WELL
- 8 GAS WELL

SPINKS AIRPORT

EXHIBIT 1.3 - EXISTING FACILITIES - WEST

KSA



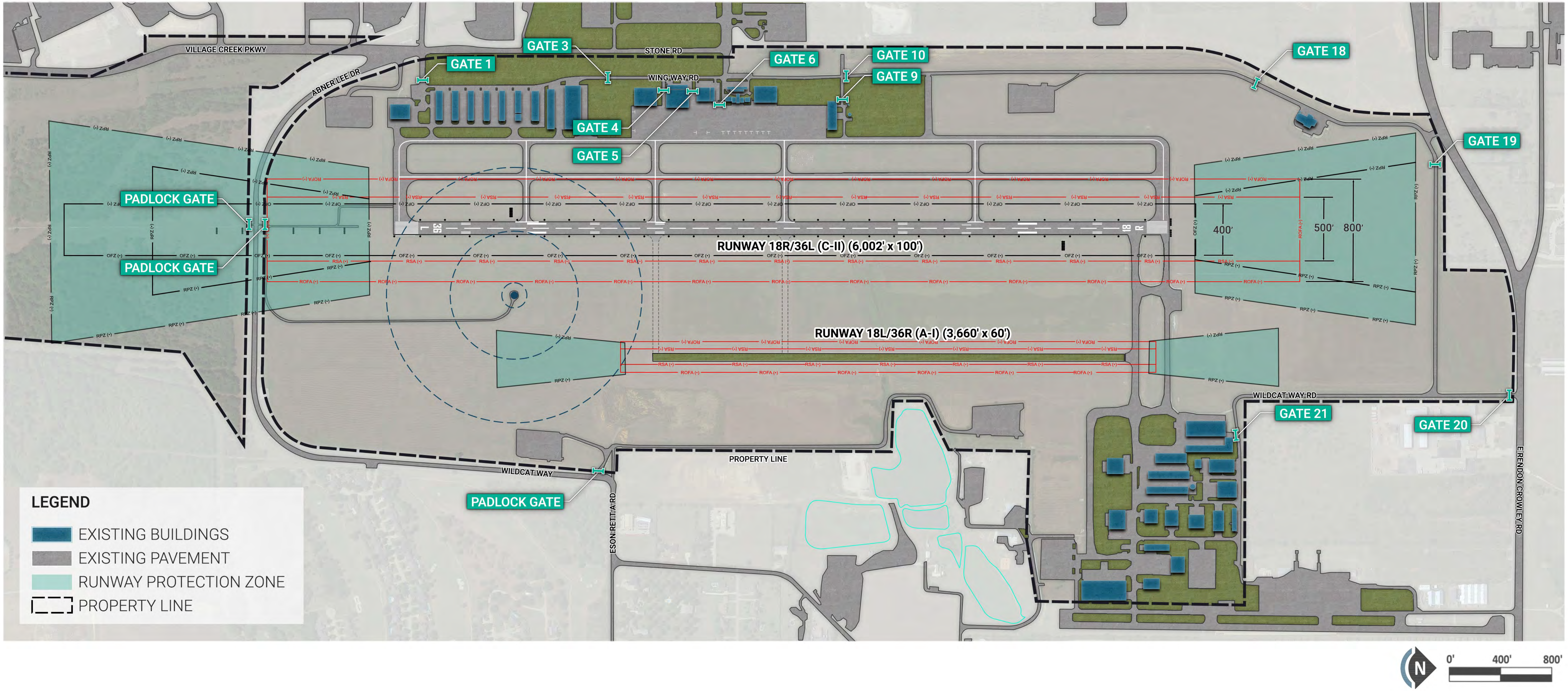
N 0' 200' 400'

EXISTING FACILITIES

- E-2 CITY OF FORT WORTH ADMIN BOX HANGAR
- E-3 PRIVATE BOX HANGAR
- E-4 PRIVATE BOX HANGAR
- E-5 PRIVATE BOX HANGAR
- E-6 FLIGHT SCHOOL BOX HANGAR
- E-7 CITY OF FORT WORTH T-HANGAR
- E-8 CITY OF FORT WORTH T-HANGAR
- E-9 CITY OF FORT WORTH T-HANGAR
- E-10 CITY OF FORT WORTH BOX HANGAR
- E-11 CITY OF FORT WORTH BOX HANGAR
- E-12 PRIVATE BOX HANGAR
- E-14 PRIVATE BOX HANGAR
- E-20 PRIVATE BOX HANGAR
- E-29 PRIVATE BOX HANGAR
- E-30 PRIVATE BOX HANGAR
- 28N PRIVATE BOX HANGAR
- 29N PRIVATE BOX HANGAR
- 31N PRIVATE BOX HANGAR
- 31N-2 PRIVATE BOX HANGAR
- 32N PRIVATE BOX HANGAR
- 1 GAS WELL
- 2 NATIONAL WEATHER SERVICE FTW/DALLAS

SPINKS AIRPORT

EXHIBIT 1.4 - EXISTING FACILITIES - EAST



SPINKS AIRPORT

EXHIBIT 1.5 - EXISTING FACILITIES - GATE LOCATIONS


D
18R-36L

TABLE 1.7: Existing Runway Data

Category	Runway		Runway	
	18R	36L	18L	36R
Length	6,002'		3,660'	
Width	100'		60'	
Surface Composition (Condition)	ASPH (G)		TURF (G)	
Runway Bearing (True)	180	360	180	000
Runway End Elevations	700.4'	689.1'	694.2'	695.0'
Runway Lighting	MIRL	MIRL, MALSR	None	None
Runway Marking	PIR-G	PIR-G	None	None
Navigational Aids	RNAV (GPS)	ILS or LOC, RNAV (GPS)	None	None
Visual Aids (Lighting)	PAPI-4L	PAPI-4L	None	None

Source: FAA Form 5010-1, *Airport Master Record*

1.9.2. TAXIWAYS

The taxiway system at FWS consists of both parallel and connector taxiways. Table 1.8 provides details of each taxiway and its characteristics. The primary runway 18R/36L is served by two (2) full-length parallel taxiways (A & B). Taxiway "A" is situated approximately 675' west of Runway 18R/36L. Taxiway "B" is situated approximately 400' west of Runway 18R/36L. The primary runway is served by six (6) connector taxiways (C, D, E, F, G, & H). Taxiways "C" and "K" provide access to the east terminal area and associated facilities, which are further serviced by taxiways "M," "N," and "P." Connector taxiways "A1", "A2", and "A3" provide access from parallel taxiway "A" to the southwest T-hangar facilities.

THIS SECTION LEFT BLANK INTENTIONALLY

TABLE 1.8: Existing Taxiway Data

Name	Width	Type	Lights/Reflectors	Pavement
A	50’	Full-Length Parallel	No lighting	Asphalt
A1	50’	Connector	No lighting	Concrete
A2	50’	Connector	No lighting	Concrete
A3	50’	Connector	No lighting	Concrete
A4	50’	Connector	No lighting	Concrete
B	50’	Full-Length Parallel	MITL	Asphalt
C	100’/35’	Connector	MITL	Asphalt
D	50’	Connector	MITL	Asphalt
E	50’	Connector	MITL	Asphalt
F	50’	Connector	MITL	Asphalt
G	50’	Connector	MITL	Asphalt
H	100’	Connector	MITL	Asphalt
J	50’	Connector	MITL	Concrete
K	50’	Connector	MITL	Concrete
L	50’	Connector	No lighting	Concrete
M	50’	Connector	MITL	Concrete
N	35’	Connector	No lighting	Concrete
P	25’	Connector	No lighting	Concrete

Source: FAA Form 5010-1, *Airport Master Record*

1.9.3. WEATHER REPORTING SYSTEM

The Airport is served by an Automated Weather Observing System (AWOS-3PT) accessible on frequency 120.025 and via phone at 817.426.4172. An AWOS unit is a suite of automated sensors that measure, collect, and disseminate minute-by-minute data to help aircrews and flight dispatchers monitor weather conditions and plan routes for navigation to or from the Airport. The AWOS system is located approximately 500 feet east of Runway 36L abeam the touchdown zone markings. Based on information contained in FAA Order JO 6560.20C, *Siting Criteria for Automated Weather Observing Systems (AWOS)*, an AWOS for precision instrument runways without RVR instrumentation should be located between 1,000 and 3,000 feet down the runway from the threshold with a minimum perpendicular distance of 500 feet from the runway centerline. Based on these criteria, the existing AWOS equipment at FWS meets the standard criteria.

1.9.4. AIRFIELD LIGHTING AND VISUAL AIDS

Beacon – Operating from sunset to sunrise, the beacon is a visual navigation aid displaying white and green flashes to indicate a lighted airport or white flashes for an unlighted airport. The airport beacon is located approximately 800 feet east of the Runway 18L/36R (turf) threshold.

Approach Lighting System (ALS) – An ALS provides the basic means for aircraft to identify runways in poor weather conditions and under Instrument Flight Rules (IFR). An ALS is a configuration of signal lights at the landing threshold extending from the runway a distance of 2,400 feet to 3,000 feet for precision instrument runways and 1,400 feet to 1,500 feet for non-precision instrument runways. Runway 36L is equipped with a Medium Intensity Approach Lighting System with Runway Alignment Indicator Lights (MALSR).

Visual Approach Aids – Visual Approach Aids assist aircraft on final approach by providing vertical situational awareness in relation to the runway threshold. Both Runway 18R/36L ends are equipped with a four-light Precision Approach Path Indicator (PAPI-4L) situated on the left side of each runway end. PAPIs primarily assist by providing visual glideslope guidance in non-precision approach environments. These systems have an effective visual range of at least three miles during the day and up to 20 miles at night. The row of light units is normally installed on the left side of the runway, and the glide path indications are two red and two white when on the proper glide path angle (••••). Light combinations indicate when slightly high (three white ••••), significantly high (four white ••••), slightly low (three red ••••), and significantly low (four red ••••).

1.10. LANDSIDE FACILITIES

1.10.1. AIRPORT ADMINISTRATION

Located at 450 Alsbury Ct. Fort Worth, TX 76028, on the west side of the field and directly south of Harrison Aviation, the airport administration offices accommodate the Fort Worth Spinks Airport Director, Operations Manager, and various support staff. The facility is equipped with conference facilities and shares adjoining office space with various businesses, including the Spinks Flight Center.

1.10.2. AIR TRAFFIC CONTROL TOWER (ATCT)

The Air Traffic Control Tower (ATCT) at FWS is located midfield on the west side of the field, adjacent to Taxiway "A." The facility operates daily from 7:00 AM to 8:00 PM and is operated by Robinson Aviation (RVA) under the FAA's Contract Tower Program.

1.10.3. AIRCRAFT RESCUE AND FIRE FIGHTING (ARFF) FACILITY

Fort Worth Spinks Airport is served by Fort Worth Fire Station No. 42. Located less than 400 feet from the north security access gate along Wing Way Rd., the station provides a brush truck rated to ARFF Index A.

1.10.4. FIXED BASE OPERATORS

As defined by the National Air Transportation Association (NATA), Fixed Base Operators (FBOs) "are the primary service providers to general aviation aircraft operators." Today, over 3,000 FBOs provide services at airports around the country. FBOs are businesses operating under a lease agreement with an airport that provide access to aviation fuel and may include other businesses providing a wide array of services to aviation customers.[14] As indicated in the following sections, FWS is home to one FBO (Harrison Aviation) providing services to aircraft, adding to the ability of the Airport to serve the general aviation community.

1.10.4.1. AIR CENTER HELICOPTERS

Established in 1986, Air Center Helicopters provides a diverse portfolio of airlift support capabilities to government, institutional, and commercial clients. FWS serves as the corporate headquarters and provides flight operations, maintenance, and training on the field. Services include expeditionary airlift, contingency support, tactical training, ship-based services, research operations, personnel recovery and search and rescue, medevac, fire and utility, and technical training. Air Center Helicopters holds numerous credentials, including FAR Part 133 (external loads), FAR Part 137 (aerial firefighting), FAR Part 145 (MRO repair facility), and U.S. Navy day/night deck landing qualification (DLQ), among others. To date, they have transported over 93,000 passengers and 20 million pounds of cargo, conducted 18,000 ship deck landings, and moved 11,100 external loads. Air Center operates a wide range of aircraft, including the Airbus H225LP Super Puma, Airbus AS350, Bell 412EP, Bell 206, and Dassault Falcon 900EX.[15]

1.10.4.2. CAM CERTIFIED AIRCRAFT MAINTENANCE

Located at 12925 Wildcat Way N, CAM provides various aircraft maintenance services, including engine, airframe, and avionics maintenance. CAM is a licensed dealer for notable avionics brands, including Garmin, Free Flight, Appareo, Avidyne, and Aspen Avionics. Engine and airframe maintenance services include STCs, engine removal/installation, cylinder swaps, fuel system troubleshooting, rigging, inspections, repairs, cleaning, and interiors. CAM has a robust staff with multiple full-time IAs, A&Ps, and specialist technicians.[16]

1.10.4.3. HARRISON AVIATION

Located directly north of the Administration Building at 13451 Wing Way, Harrison Aviation provides full FBO services to a wide range of general aviation and corporate operations. The 7,400 square foot facility features a range of amenities, including a private passenger lounge, pilots lounge and shower facilities, flight planning center,

[14] National Air Transportation Association (NATA), *Get to Know FBOs*, Accessed March 23, 2023

[15] Air Center Helicopters, *About Us*, Accessed March 29, 2023 https://air.center

[16] Certified Aircraft Maintenance, Capabilities, Accessed March 29, 2023 https://www.camaircraft.com/maintenance-1

two conference rooms, catering room, reading and snooze rooms, wireless internet, business center, complimentary ice, coffee, and newspapers, and covered parking.

Harrison Aviation also provides a 22,500 square foot executive hangar, capable of accommodating aircraft up to a Gulfstream V. The FBO provides Titan-branded fuel, enterprise rental cars, crew/courtesy cars, concierge service, catering, transient hangar space, lavatory and ground power unit (GPU) services, and operates two (2) 100LL self-serve fuel units at FWS.[17]

1.10.4.4. HUFFMAN AVIATION

Huffman Aviation provides unique flight training services to pilots at FWS. Operating as both a Part 61 and Part 141 flight school, students have flexibility with their training and the option to take advantage of restricted ATP minimums (1,000 hours) as a result of the Part 141 flight training curriculum. Huffman Aviation provides an on-site Designated Pilot Examiner (DPE) and offers a training portfolio of private, instrument, commercial, multi-engine, tail wheel, high performance, complex, CFI, CFII, MEI, flight reviews, and instrument proficiency checks. Huffman operates a fleet of Cessna 150, 152, 175, 182 RG, and 310 aircraft, as well as Piper PA-28 and PA-28R aircraft.[18]

1.10.4.5. SPINKS FLIGHT CENTER

Located at 450 Alsbury Court, Spinks Flight Center shares a facility with Airport Administration and offers a wide range of flight training services and aircraft rental, including single and multi-engine training. With a fleet of Cessna 172, 182, and Piper Archer aircraft, online scheduling, and a full staff, Spinks Flight Center serves as a Cessna Pilot Center, providing the ability for students to progress through certification from Private, to Commercial, to Certified Flight Instructor (CFI).

1.10.5. FUEL STORAGE

FWS is served by one (1) primary fuel storage facility and two (2) 100LL self-serve units. Located on the southwest corner of the field adjacent to Taxiway “A1,” Harrison Aviation owns and operates the primary fuel farm. It features one (1) aboveground 100LL storage tank and one (1) aboveground Jet-A storage tank, each with a capacity of 12,000 gallons. There is one (1) 1,000-gallon 100LL self-serve unit on the west side of the field directly east of the primary fuel farm along Taxiway “A1.” An additional 1,000-gallon 100LL self-serve unit is located on the east side of the field along Taxiway “M.” Table 1.9 details fuel sales (in gallons) from 2018 through 2022. Harrison Aviation provides mobile fuel service via two (2) 3,000-gallon Jet-A trucks and one (1) 1,000-gallon 100LL truck. In 2022, 100LL

[17] Harrison Aviation, *Fort Worth FWS*, Accessed March 29, 2023 https://www.harrisonaviation.com/fortworth_fws/

[18] Huffman Aviation, What We Do, Accessed March 30, 2023 http://www.flyhuffman.com/what-we-do

accounted for approximately 24% of total fuel flowage, with Jet-A making up the remaining 76%.

TABLE 1.9: Annual Fuel Sales (In Gallons)

Year	100LL	Jet-A	Total
2018	115,528	325,066	440,594
2019	128,853	357,767	486,620
2020	108,461	291,458	399,919
2021	105,763	287,477	393,240
2022	131,704	325,181	456,885
Average	118,062	317,390	435,452

Source: FWS Airport Administration

THIS SECTION LEFT BLANK INTENTIONALLY

1.10.6. SECURITY AND FENCING

The Airport features an 8' security fence surrounding the facility in good condition. Secure access gates are located in multiple locations providing access to the Airport Operations Area (AOA). These secure access gate locations are depicted in Exhibit 1.5.

1.10.7. CIVIL AIR PATROL

The South Fort Worth Diamondback Composite Squadron of the Civil Air Patrol (CAP), an auxiliary of the U.S. Air Force, provides emergency services education and cadet programs. The squadron is located at 12625 Wildcat Way N on the east side of FWS. Weekly meetings are held Tuesday evenings at 6:30 PM.

1.11. AIRSPACE AND COMMUNICATIONS

Fort Worth Spinks Airport operates within the larger National Airspace System (NAS), which comprises a wide array of services, systems, and requirements for airports and the pilots that function within it. The following sections provide an overview of the Airport's key considerations with respect to navigating and operating within the NAS.

- Air Traffic Service Areas and Aviation Communications
- National Airspace System
- Navigational Aids
- Part 77 Airspace Surfaces

1.11.1. AIR TRAFFIC SERVICE AREA AND COMMUNICATIONS

FAA Order 7110.65Y established that the mission of ATC is safety by stating the "primary purpose of the ATC system is to prevent a collision between aircraft operating in the system and to organize and expedite the flow of traffic." ATC is the means by which aircraft are directed and separated within controlled airspace.

In the United States, 22 geographic areas are under ATC jurisdiction. Air traffic services within each area are provided by air traffic controllers in Air Route Traffic Control Centers (ARTCCs). The ARTCCs provide air traffic service to aircraft operating on Instrument Flight Rules (IFR) flight plans within controlled airspace, primarily during the en route phase of flight. Those aircraft operating under Visual Flight Rules (VFR) that depend primarily on the "see and avoid" principle for separation may also contact the ARTCC or other ATC services to request traffic advisory services. Traffic advisory service is used to alert pilots of other known aircraft in the vicinity of or within the aircraft's flight path. The airspace overlying FWS is contained within the Fort Worth (ZFW) ARTCC jurisdiction, which has a coverage area of airspace in portions of Texas, Southern Oklahoma, Northwest Louisiana, Southwest Arkansas, and Southeast New Mexico.

Aircraft operating on instrument flight plans approaching or departing an airport are also subject to airspace and air traffic control. At FWS, clearance delivery, approach, and departure services are provided by Fort Worth Regional Approach. Air traffic controllers' primary means of controlling aircraft is computerized radar, supplemented with two-way radio communications. Altitude assignments, speed adjustments, and radar vectors are examples of techniques controllers use to ensure that aircraft maintain proper separation. The specified lateral and vertical separation criterion for aircraft used by controllers is as follows:

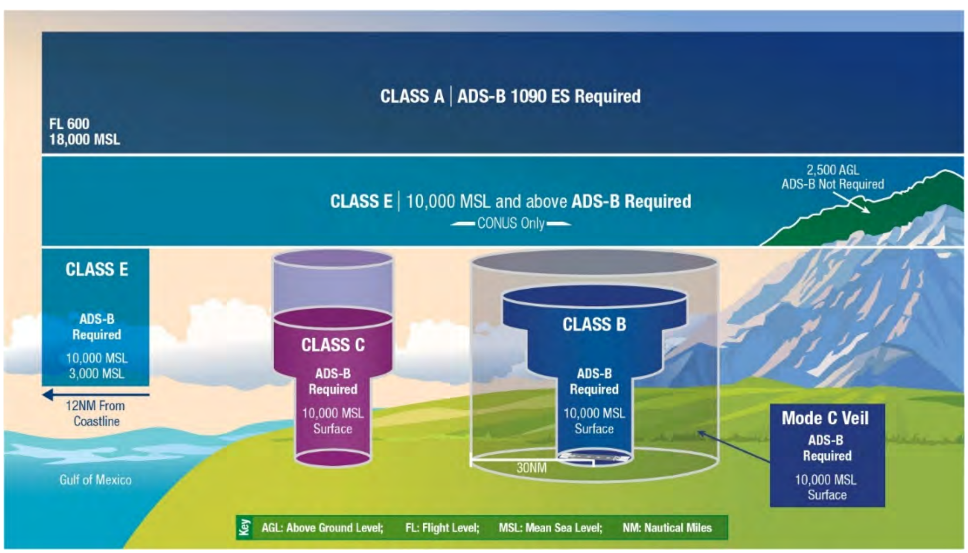
- Lateral Aircraft Separation: three (3) miles (radar environment)
- Lateral Aircraft Separation: five (5) miles (non-radar environment)
- Vertical Aircraft Separation: 1,000 feet (below 29,000 feet) and 2,000 feet (above 29,000 feet)

1.11.2. NATIONAL AIRSPACE SYSTEM

To ensure a safe and efficient airspace environment for all aspects of aviation, the FAA has established an airspace structure through the Federal Aviation Regulations (FAR) that regulates and establishes procedures for aircraft that use the NAS. This structure provides two basic categories of airspace: controlled (classified as A, B, C, D, and E) and uncontrolled (classified as G).

Further, FAR Part 71[19] and Part 73[20] established these airspace classifications with the following characteristics. Exhibit 1.6 provides a graphical representation of the NAS, comprised of the airspace categories described in this section.

EXHIBIT 1.6: FAA Airspace Classification

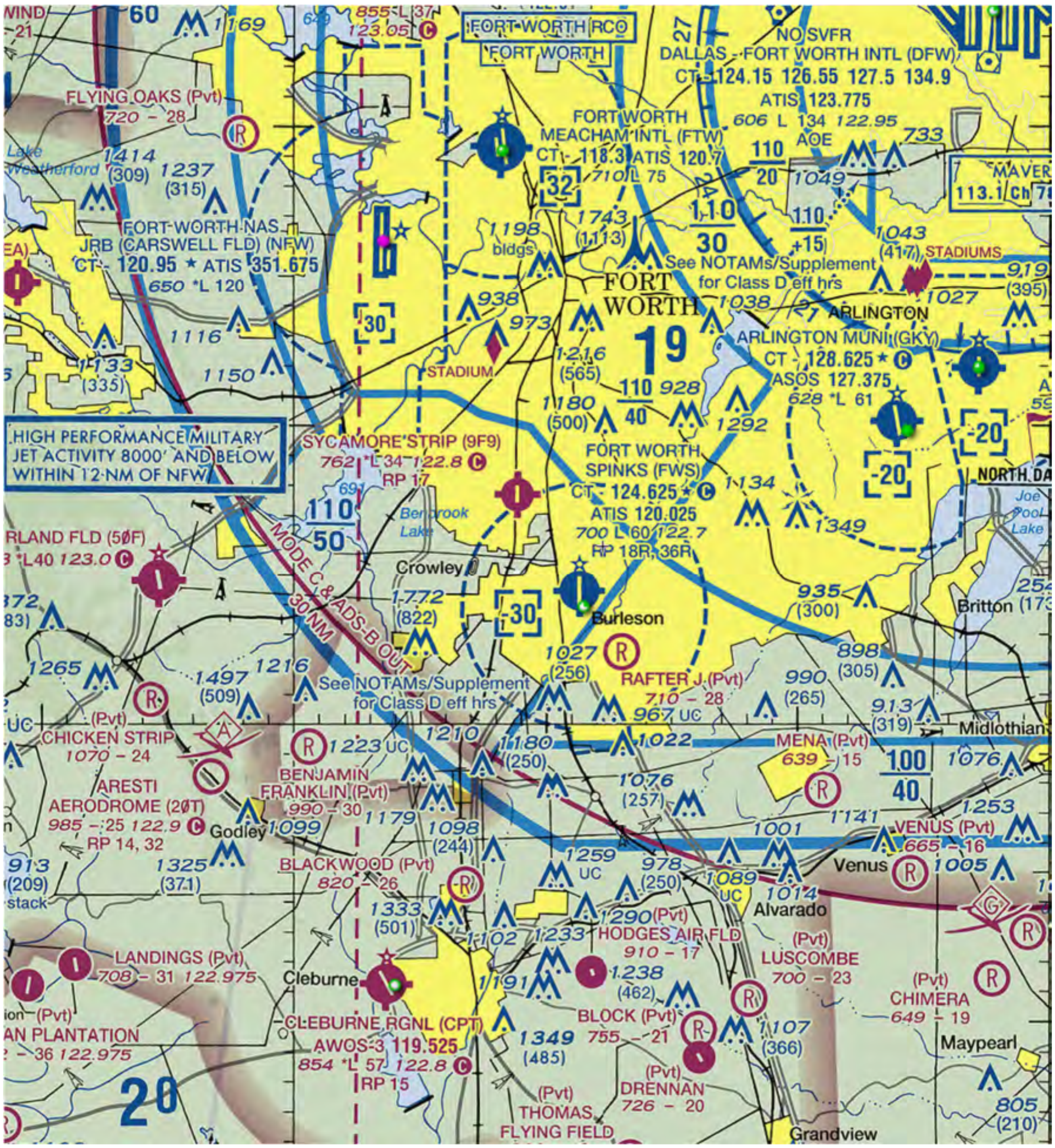


[19] National Archives, Code of Federal Regulations, *Title 14 Chapter 1 Subchapter E Part 71*, December 17, 1991
[20] National Archives, Code of Federal Regulations, *Title 14 Chapter 1 Subchapter E Part 73*, January 2, 1981

- Class A airspace is from 18,000 feet mean sea level (MSL) up to Flight Level 600 (or 60,000 feet MSL). Unless otherwise authorized, all operations in Class A airspace are conducted under instrument flight rules (IFR).
- Class B airspace is generally from the surface to 10,000 feet MSL surrounding the nation's busiest airports in terms of operations or passenger enplanements. An ATC clearance is required for all aircraft to operate within Class B airspace, and all aircraft that are issued clearance receive separation services. Clearance into Class B airspace can only be received when the controller specifically calls the aircraft's tail number and grants explicit clearance to enter the airspace. (e.g., "N1234, you are cleared to enter the Class B airspace.")
- Class C airspace extends from the surface up to 4,000 feet above the airport elevation (charted in MSL). Class C surrounds airports with an operational control tower, are serviced by radar approach control, and have a certain number of IFR operations or passenger enplanements. Each aircraft must establish two-way radio communications with ATC before entering the airspace and maintain those communications while in the airspace.
- Class D airspace extends from the surface up to 2,500 feet above the airport elevation (MSL) surrounding airports with an operational control tower. Unless otherwise authorized, each aircraft must establish two-way radio communications with the ATC before entering the airspace and maintain those communications while in the airspace.
- If the airspace is not classified as A, B, C, or D, and is controlled, then it is designated Class E airspace. Class E airspace extends upward from the surface or designated altitude to the overlying or adjacent controlled airspace. Only aircraft operating under IFR must be in contact with ATC when operating in Class E airspace.
- Class G, or uncontrolled airspace, is the portion of airspace that has not been designated with any of the above classifications. It extends from the surface to the base of the overlying Class E airspace. Although ATC has no authority or responsibility to control air traffic, pilots must still abide by visual flight rules (VFR) minimums in Class G airspace.

Fort Worth Spinks Airport lies within Class D airspace and is situated primarily under the outer shelf of the Dallas-Fort Worth Class B airspace, which begins at 5,000 feet and extends up to 11,000 feet. Class D airspace consists of the immediate airspace within a horizontal radius of five statute miles from the geographic center of airports served by an air traffic control tower. Class D at FWS ranges from the surface to 3,000 feet above mean sea level (MSL). The FWS Class D airspace is in effect whenever the ATCT is operational, between 7:00 AM and 8:00 PM local time. When the ATCT is closed, the Airport's airspace reverts to Class G. To operate on the Airport or within Class D airspace, pilots must establish two-way radio communications with ATCT personnel. Exhibit 1.7 shows a portion of the sectional chart published by the FAA's National Aeronautical Charting Office for immediate regional airspace around FWS.

EXHIBIT 1.7: FWS Sectional Chart



Source: SkyVector Aeronautical Charts

1.11.3. NAVAIDS AND INSTRUMENT APPROACH PROCEDURES

In 2003, the FAA implemented Wide Area Augmentation System (WAAS) availability to public airports. Pilots are now benefiting from the large number of Area Navigation (RNAV) Global Positioning System (GPS) approaches and lower minimums provided by WAAS-enabled systems. These systems are much more abundant than Instrument Landing Systems (ILS) and ground-based systems. As of April 1, 2023, there are 4,088 WAAS Localizer Performance with Vertical Guidance (LPV) approach procedures serving 1,965 airports; 1,195 of these airports are non-ILS facilities. Currently, there are also 731 Localizer Performance (LP) approach procedures serving 535 airports, 432 of which are non-ILS facilities.

The increase in popularity and availability of GPS technology has allowed the creation of RNAV Standard Instrument Departures (SIDs) and Standard Terminal Arrival Routes (STARs) at more airports. SIDs are preplanned instrument flight rule procedures that provide obstruction clearance and standardized routing for an aircraft between the airport and its pre-determined route at higher altitudes. STARs are preplanned instrument flight rule procedures that simplify air traffic control procedures and facilitate the transition between an aircraft's route at cruise altitude and its assigned instrument approach procedure. The FAA currently has nine (9) SIDs and seven (7) STARs published for Fort Worth Spinks Airport.

A benefit of being located in the DFW Metroplex is a variety of navigational facilities are currently available to pilots around FWS. Many of these navigational aids (NAVAIDs) are also available to en-route air traffic. The NAVAIDs available for pilots in the vicinity of FWS are VORTAC and VOR/DME facilities.

A VORTAC is a Very High-Frequency Omnidirectional Range/Tactical Air Navigation station. These stations transmit very high-frequency signals, 360 degrees in azimuth oriented from magnetic north, using equipment measuring the slant range distance (in miles) of an aircraft from the navigational aid. A VORTAC provides VOR azimuth, TACAN azimuth, and TACAN distance measuring equipment (DME) at one site. The VORTAC nearest FWS is the RANGER VORTAC (FUZ, 115.70), located 20.5 miles southwest of the field. A VOR with DME (VOR/DME) provides pilots with the same navigational information as a VORTAC. The MAVERICK VOR/DME (TTT, 113.10) is located 22.7 southwest of FWS.

Three (3) published instrument approach procedures serve FWS. Table 1.10 summarizes each IAP and associated visibility minimums.

TABLE 1.10: Instrument Approach Procedures

	Lowest Straight-In Minimums		Lowest Circling Minimums	
Instrument Approach	Ceiling	Visibility	Ceiling	Visibility
ILS or LOC Runway 36L	897’	1/2-Mile	1,320’	1 Mile
RNAV (GPS) Runway 18R	950’	3/4-Mile	1,030’	1 Mile
RNAV (GPS) Runway 36L	897’	1/2-Mile	1,200’	1 Mile

Source: FAA Terminal Procedures, 23 March 2023 – 20 April 2023

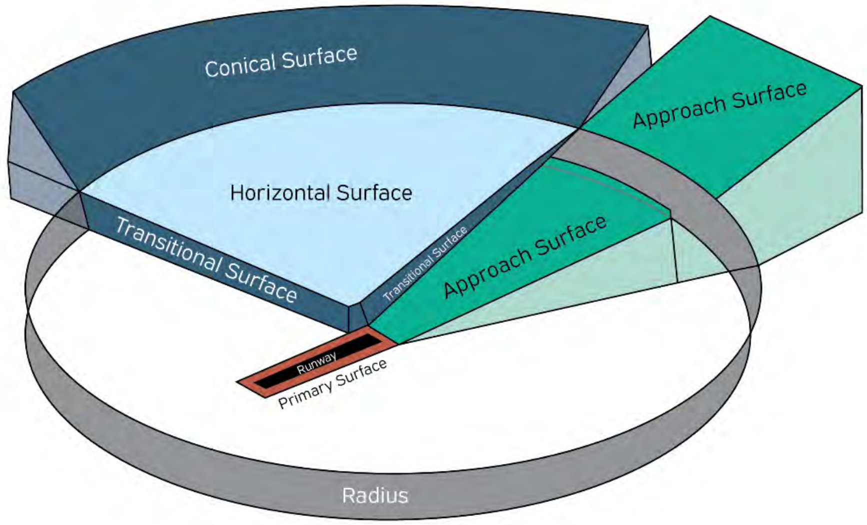
1.11.4. FAR PART 77

Federal Aviation Regulation (FAR) Part 77[21], *Objects Affecting Navigable Airspace*, is a tool used to protect the airspace over and around a given airport and each approach from potential obstructions to air navigation. It is important to note that as a federal regulation, all airports included in the NAS are subject to the requirements of Part 77. To determine whether an object obstructs air navigation, Part 77 establishes several imaginary surfaces in relation to an airport and each runway end. The dimensions and slopes of these surfaces depend on the configuration and approach categories of each airport’s runway system. The size of the imaginary surface depends largely on the type of instrument approach serving the airport. The principal imaginary surfaces are described in Exhibit 1.8.

- Primary Surface: Longitudinally centered on the runway at the same elevation as the nearest point on the runway centerline.
- Horizontal Surface: Located 150 feet above the established airport elevation, the perimeter of which is established by swinging arcs or specified radii from the center of each primary surface end and connected via tangent lines.
- Conical Surface: Extends outward and upward from the periphery of the horizontal surface at a slope of 20:1 for a horizontal distance of 4,000 feet.
- Approach Surface: Longitudinally centered on the extended centerline and extending outward and upward from each runway end at a designated slope (e.g., 20:1, 34:1, 40:1, and 50:1) based on the instrument approach serving the applicable runway.
- Transitional Surface: Extends outward and upward at a right angle to the runway centerline at a slope of 7:1 up to the horizontal surface.

[21] National Archives, Code of Federal Regulations, *Title 14 Chapter 1 Subchapter E Part 77*, July 21, 2010

EXHIBIT 1.8: Part 77 / Imaginary Surfaces



Known obstructions to the Part 77 surfaces described above will be illustrated on the ALP set prepared alongside this planning effort. It is important to note that updated obstruction information for the Airport and its surroundings should be collected through an aerial photogrammetry/survey effort prior to any physical changes to the runway or modifications to instrument approaches.

1.12. AIRPORT ENVIRONS

This section addresses and examines the regional setting of the airport and the land uses surrounding it. This task is critical to the future development of the airport because local land-use patterns will ultimately affect the potential for expansion and capital improvements. Due to encroachment nationwide, it is imperative that airport sponsors be proactive in preserving potential future development areas and protecting the airport's overlying airspace and imaginary surfaces.

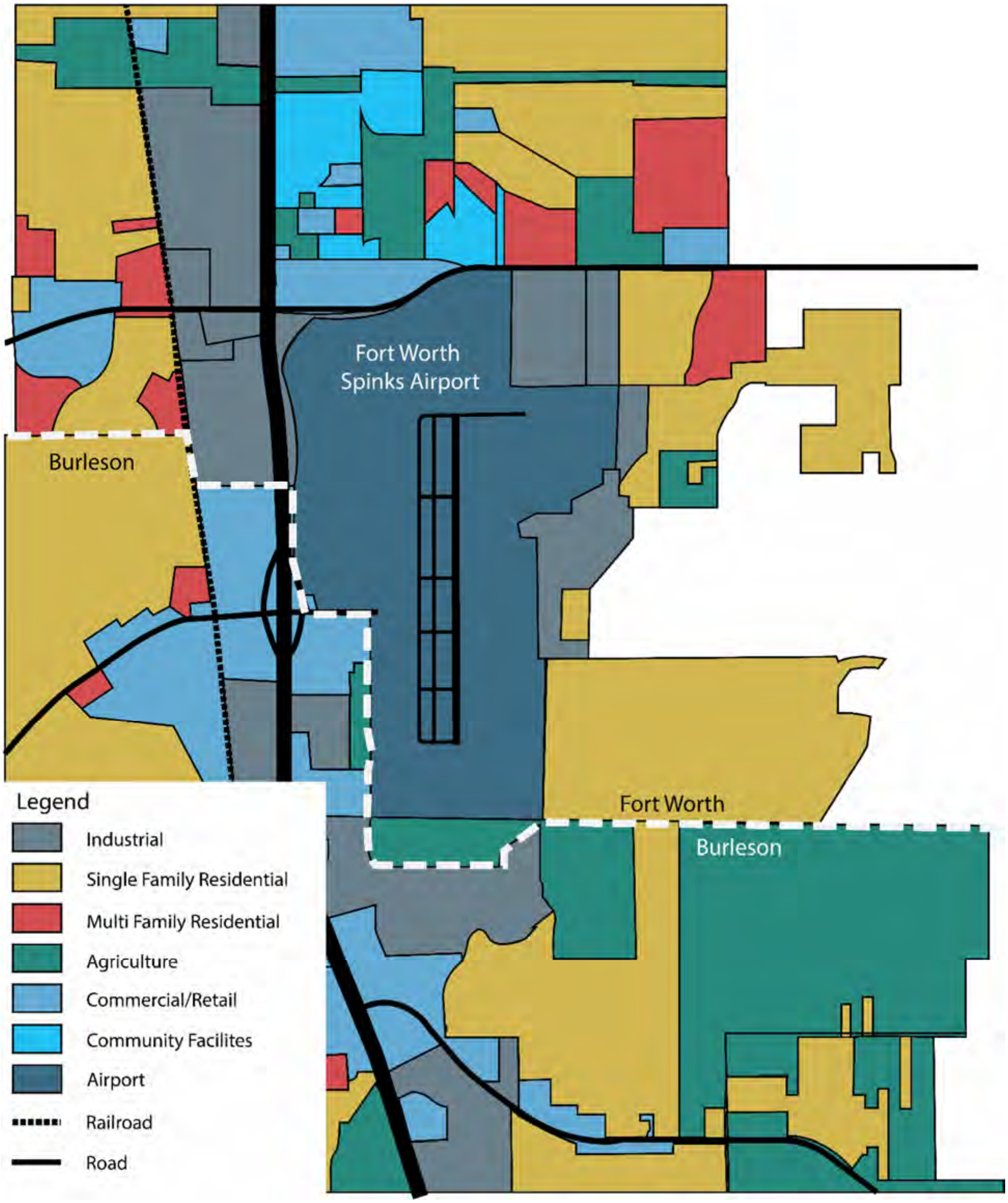
1.12.1. CITY OF FORT WORTH ZONING

The City of Fort Worth has established zoning codes that help guide future development. The City’s zoning code pertains to the area within its corporate limits. It is intended to enable to City to uniformly and consistently evaluate, improve, and approve development, changes to existing uses, and future uses and activities to promote the health, safety, and general welfare of the citizens and residents of the city.

CFW maintains a Geographic Information Database (GIS) that provides high-quality land use and zoning data. This general reference database offers access to base maps, aerial imagery, and other pertinent information about the community, including the Airport.

Currently, the Airport is categorized as Medium Industrial (J). Exhibit 1.9 graphically depicts the existing zoning surrounding Fort Worth Spinks Airport.

EXHIBIT 1.9: Fort Worth & Burleson Existing Zoning

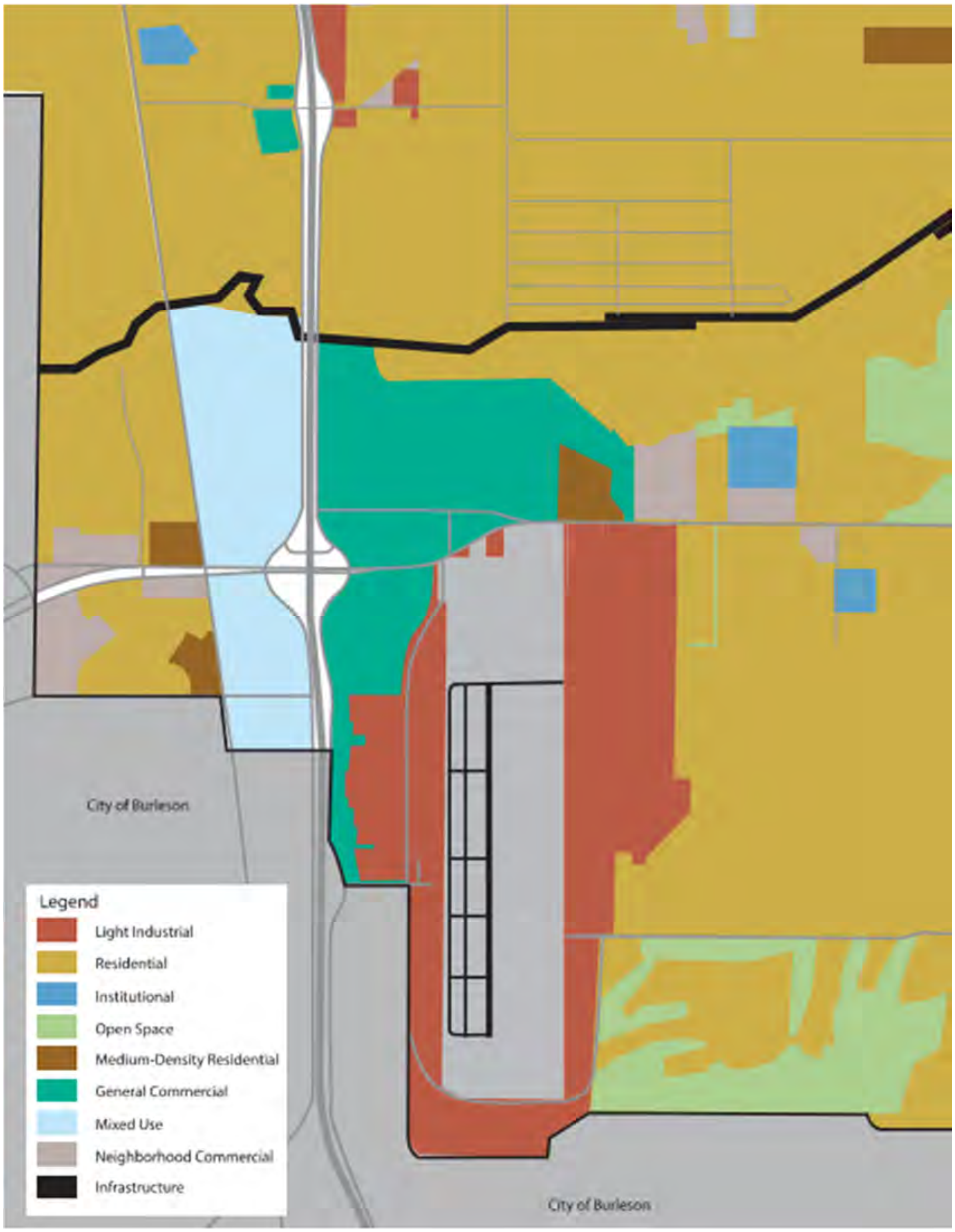


Source: City of Fort Worth and Burleson, Zoning (GIS) Database, March 2023

1.12.2. CITY OF FORT WORTH LAND USE

The City of Fort Worth maintains a web-based GIS Land Use Plan coinciding with the recently adopted *2022 Comprehensive Plan*. The Airport is immediately surrounded by a mix of light industrial, mixed-use, and general commercial, as depicted in Exhibit 1.10.

EXHIBIT 1.10: Existing Land Use Plan



Source: City of Fort Worth, Land Use Plan (GIS) Database, March 2023

1.12.3. CITY OF FORT WORTH COMPREHENSIVE PLAN

In March 2022, Fort Worth City Council voted to adopt an updated Comprehensive Plan. This plan was coordinated by the City's Planning and Data Analytics Department. As described in the plan's executive summary, "The Comprehensive Plan is the City's official guide for making decisions about growth and development. It sets forth the City's vision for the future and describes the policies, programs, and projects by which we seek to realize that vision. The Comprehensive Plan thus helps the city fulfill its mission of focusing on the future and working together to build strong neighborhoods, develop a sound economy, and provide a clean, safe community."

Chapter 11 of the Comprehensive Plan outlines the City's transportation system, including aviation activity and facilities. The plan outlines goals to create a "balanced, comprehensive, context-sensitive transportation system to move people and goods safely and efficiently." The Comprehensive Plan proposes several policies and strategies applicable to the City of Fort Worth Aviation System, including the following:

- Integrate the City's airport system as part of the overall transportation system.
- Encourage appropriate development through the planning and implementation of a multimodal transportation system.
- Seek input from other entities, including schools, cities, counties, Trinity Metro, NCTCOG, and TxDOT when making land use and transportation decisions.

1.12.4. HEIGHT HAZARD ZONING AND OVERLAY DISTRICT

Although the FAA has the authority to regulate the flight of aircraft, it has only limited authority to ensure that areas surrounding airports are free of hazards. Without regulatory authority at the federal level of government, the responsibility for ensuring that areas surrounding an airport are free of hazards is left to the local government. To assist local municipalities in regulating the height of structures and land use near an airport, the Texas Legislature created the *Texas Airport Zoning Act* (AZA), codified in Chapter 241 of the *Texas Local Government Code*. The AZA permits political subdivisions, municipalities, or counties to adopt, administer, and enforce airport zoning regulations to protect the safety of airport users and public investment in the airport. While the AZA does not identify specific standards that must be used in determining what constitutes incompatible land uses or airport hazards, it is generally accepted that contours based on varying levels of noise generated by an airport and the various imaginary surfaces established in the Federal Aviation Regulations (FAR) Part 77 are the preferred standards to be used in airport zoning.

The need to regulate the construction of tall structures in various critical areas surrounding the airport is critical to protect the safety of airport users, persons, and property on the ground. The requirement to do so is contained in the Texas

Administrative Code (TAC), Title 43, Chapter 30, Subchapter C, *Aviation Facilities Development and Financial Assistance Rules*. These are the rules under which the Aviation Division's airport grant program is operated. Zoning is addressed in several sections, including Section 30.120(d)(13) and 30.215. These sections allow the Aviation Division to review and approve airport zoning prior to considering additional projects for grants or loans under the program.

Additionally, implementing Avigation Easements may give the airport further control over future land uses that might be hazardous to flight operations. An avigation easement protects the surrounding airspace, above a specific height, from future obstructions by retaining the rights to a property from a landowner to limit the use of the land subject to the easement.

CFW maintains height hazard zoning and airport/airfield overlay district ordinances, as included in Appendix C, *City of Fort Worth Height Hazard Zoning*.

THIS SECTION LEFT BLANK INTENTIONALLY

1.13. ENVIRONMENTAL INVENTORY

1.13.1. BIOLOGICAL RESOURCES

Section 7 of the Endangered Species Act (ESA), as amended, applies to federal agency actions, and sets forth requirements for consultation to determine if the Proposed Action "may affect" a federally protected species. If an agency determines that an action "may affect" a federally protected species, then Section 7(a)(2) requires each agency to consult with the U.S. Fish and Wildlife Service (USFWS) or the National Marine Fisheries Service (NMFS), as appropriate, to ensure that any action the agency authorizes, funds, or carries out is not likely to jeopardize the continued existence of any federally listed endangered or threatened species, or result in the destruction or adverse modification of critical habitat.

The USFWS Information for Planning and Consultation (IPaC)[22] was consulted regarding the potential for habitat within the airport's immediate vicinity. According to the query, the study area does not contain suitable habitat for the listed species. The following species have been determined to have the potential to occur near the Airport:

- Alligator Snapping Turtle
- Monarch Butterfly
- Piping Plover
- Red Knot
- Tricolored Bat
- Whooping Crane

The Migratory Bird Treaty Act (MBTA) prohibits parties and federal agencies from intentionally taking a migratory bird, its eggs, or nests. The MBTA prohibits activities that would harm migratory birds, their eggs, or nests unless the Secretary of the Interior

[22] U.S. Fish and Wildlife Service, *Information for Planning and Consultation*, February 20, 2023

authorizes such activities under a special permit. Migratory birds with the potential to occur in the study area include the following:

- Chimney Swift
- Little Blue Heron
- Red-headed Woodpecker

1.13.2. CLIMATE

Understanding the local climate is important from a planning and operational perspective. Weather conditions can impose significant impacts on the operation and development of the Airport.

According to 2022 data from the National Oceanic & Atmospheric Administration (NOAA), July experienced the highest average temperature of 91.8 degrees. The highest temperature recorded in 2022 was 109 degrees in July. Data reported January as the coolest month, with an average temperature of 45.8 degrees. The lowest temperature recorded in 2022 was 11 degrees in December. Total rainfall for 2022 amounted to 36.64 inches, with August reporting the highest monthly accumulation of 10.68 inches. The highest monthly snowfall total for the 2021-2022 season was 1.7 inches in February.[23]

1.13.3. DEPARTMENT OF TRANSPORTATION ACT, SECTION 4(F)

Section 4(f) of the U.S. Department of Transportation (DOT) Act of 1966 protects significant publicly owned parks, recreational areas, wildlife and waterfowl refuges, and public and private historic sites. Section 4(f) uses require all possible planning to minimize harm.

The following are the nearest properties protected under Section 4(f) of the DOT Act:

- Recreation Area – Numerous in the immediate vicinity of the Airport
- Wilderness Area – OW Fannin Natural Area – 20 miles northeast of the Airport
- Wildlife Refuge – Fort Worth Nature Center & Refuge – 30 miles northwest of the Airport

1.13.4. FARMLANDS

As specified in FAA Order 1050.1F, Appendix A, a significant impact to farmland occurs when the Farmland Conversion Impact Rating Form (AD-1006) score ranges from between 200 and 260 points. Impact severity increases as the total combined score approaches 260 points. The Farmland Protection Policy Act (FPPA) requires federal agencies to conduct an inventory of farmlands and analyze adverse impacts.

[23] National Oceanic and Atmospheric Administration, *NOWData – NOAA Online Weather Data*, February 20, 2023

Analysis from the National Resource Conservation Service's (NRCS) Web Soil Survey indicates the presence of farmland classified as prime or of statewide importance. Approximately 675 acres of airport property are considered prime farmland.[24]

1.13.5. HAZARDOUS MATERIALS, SOLID WASTE, AND POLLUTION PREVENTION

As defined in FAA Order 1050.1F, hazardous materials, solid waste, and pollution prevention includes evaluation of the following:

- Waste streams generated by a project, the potential for the waste to impact environmental resources, and the impacts on waste handling and disposal facilities that would likely receive the wastes.
- Potential hazardous materials that could be used during the construction and operation of a project, applicable pollution prevention procedures.
- Potential to encounter existing hazardous materials at contaminated sites during project construction, operation, and decommissioning.
- Potential to interfere with any ongoing remediation of existing contaminated sites at the proposed project site or in the immediate vicinity of a project.

Coordination using the EPA's EJSCREEN indicated no areas of hazardous contamination within the vicinity of the Airport.[25]

1.13.6. HISTORICAL, ARCHITECTURAL, ARCHAEOLOGICAL, AND CULTURAL RESOURCES

Historical, architectural, archeological, and cultural resources encompass a range of sites, properties, and physical resources relating to human activities, society, and cultural institutions. Such resources include past and present expressions of human culture and history in the physical environment, such as prehistoric and historic archeological sites, structures, objects, and districts, which are considered important to a culture or community. Impacts have the potential to occur when a proposed project results in an adverse effect on a property that has been classified as having historical, architectural, archeological, or cultural significance.

According to the National Register of Historic Places (NRHP), no properties are classified as historic within 5 miles of the Airport.[26]

1.13.7. LAND USE

Land uses surrounding the Airport are graphically depicted in Exhibit 1.9. and Exhibit 1.10

[24] USDA Natural Resources Conservation Service, *Web Soil Survey*, February 20, 2023
[25] EPA, *EJScreen: Environmental Justice Screening and Mapping Tool*, February 20, 2023
[26] National Park Service, *National Register of Historic Places (NRHP),* February 20, 2023

1.13.8. NOISE AND COMPATIBLE LAND USE

Aviation noise primarily results from the operation of fixed and rotary-wing aircraft, such as departures, arrivals, overflights, taxiing, and engine run-ups. Noise is often the predominant aviation environmental concern of the public. 14 CFR 150 notes that residential land uses and schools are not considered compatible with a 65-decibel (dB) Day-Night Average Sound Level (DNL). Religious facilities, hospitals, etc., are generally compatible when a noise level reduction is incorporated into the facility's design. Noise-sensitive land uses in the vicinity of the Airport include residential and religious facilities.

1.13.9. SOCIOECONOMIC, ENVIRONMENTAL JUSTICE, AND CHILDREN'S ENVIRONMENTAL HEALTH AND SAFETY RISKS

FAA Order 1050.1F requires that any federal action that could cause a disproportionate impact on a protected population be considered while developing reasonable alternatives and that proper mitigation measures be conducted. Using the EPA's EJSCREEN tool, it was determined that 28 percent of the population within 3 miles is considered low-income while 48 percent are considered a minority population.[27]

1.13.10. WATER RESOURCES

Water resources are surface water and groundwater which are vital to society. Surface water, groundwater, floodplains, and wetlands are not separate and isolated components of the watershed but rather a single, integrated natural system. Disruption of any one part of this system can have consequences for the functioning of the entire system. The environmental analysis for any project should include disruption of the resources and potential impacts on the quality of water resources.

Wetlands are defined by Executive Order 119900, *Protection of Wetlands*, as those areas that are inundated by surface or groundwater with a frequency to support and under normal circumstances does or would support a prevalence of vegetation or aquatic life that requires saturated or seasonally saturated soil conditions for growth and reproduction. Categories of wetlands include swamps, marshes, bogs, sloughs, potholes, wet meadows, river outflows, mud flats, natural ponds, estuarine areas, tidal overflows, and shallow lakes and ponds with emergent vegetation. Wetlands exhibit three characteristics: hydrology, hydrophytes (plants able to tolerate various degrees of flooding or frequent saturation), and poorly drained soils. The U.S. Army Corp of Engineers (USACE) regulates the discharge of dredged or filled materials into waters of the United States, including adjacent wetlands, under Section 404 of the Clean Water Act. Exhibit 1.11 graphically depicts the wetlands present within the vicinity of Fort Worth Spinks Airport.[28]

[27] EPA, *EJScreen: Environmental Justice Screening and Mapping Tool*, February 20, 2023

[28] U.S. Fish and Wildlife Service, *National Wetlands Inventory*, February 20, 2023

Floodplains are lowland areas adjoining inland and coastal waters periodically inundated by flood waters. Executive Order 11988 requires federal agencies to minimize potential impacts associated with floodplains. A review of the Federal Emergency Management Agency (FEMA) flood maps dated December 2021 shows portions of the Airport, primarily the east side of the field, including the Runway 18L/36R (turf), are located within areas identified as Special Flood Hazard Areas as depicted in Exhibit 1.12.[29]

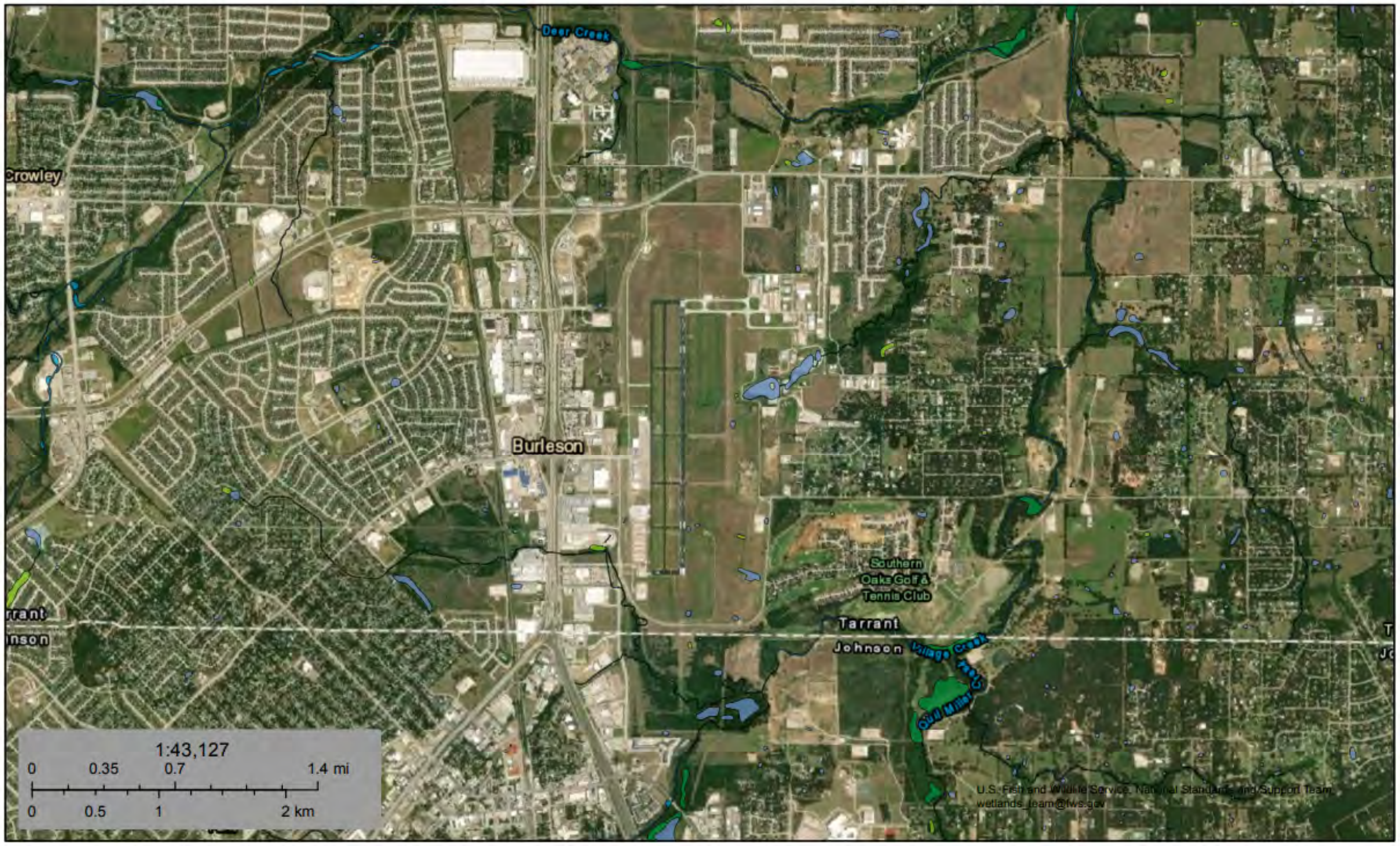
THIS SECTION LEFT BLANK INTENTIONALLY

[29] Federal Emergency Management Agency, *Flood Map Service Center*, February 20, 2023

EXHIBIT 1.11: Fort Worth Spinks Airport Wetland Map

U.S. Fish and Wildlife Service
National Wetlands Inventory

Fort Worth Spinks Airport Wetland Map



February 20, 2023

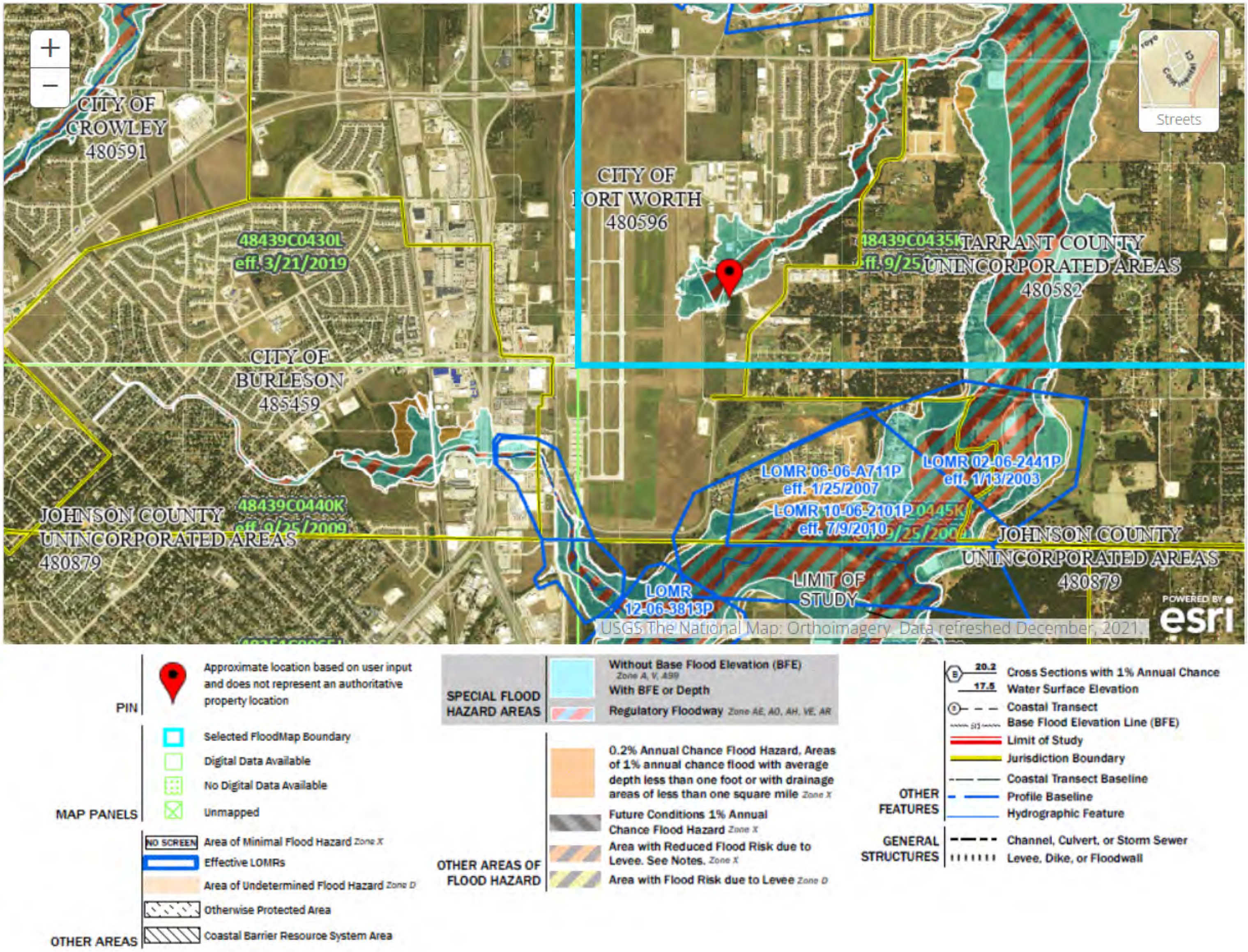
Wetlands

- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine

This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.

National Wetlands Inventory (NWI)
This page was produced by the NWI mapper

EXHIBIT 1.12: Fort Worth Spinks Floodplain Map



1.14. SUMMARY OF INVENTORY CONDITIONS

This inventory chapter represents a consolidated resource containing the Airport's data that will be referenced during the completion of the Fort Worth Spinks Airport Master Plan Update. When required, the data presented in this chapter will be expanded upon for the completion of specific planning tasks. In addition, as the master plan progresses, new and updated data related to facilities and infrastructure examined in this chapter may become available. When appropriate, new data will be incorporated into the narrative report.

The inventory data presented in this chapter provides a framework for further analysis of the Airport. Some data, such as the Airport's history, provides general background knowledge. In contrast, other types of data, such as airport roles and existing facilities, are used to help determine future facility requirements. Subsequent chapters, especially the *Forecast of Aviation Demand*, will also be key components for the development of facility requirements.

Much of the data presented in this chapter is used to conduct numerous analyses as the master planning process works towards identifying a recommended development plan for FWS. The next step in the planning process is to formulate aviation demand forecasts to quantify the future aviation activity expected to occur at the Airport during the 20-year planning period.

THIS SECTION LEFT BLANK INTENTIONALLY

2 FORECAST OF AVIATION DEMAND

2023 FORT WORTH SPINKS AIRPORT MASTER PLAN

KSA

SPINKS AIRPORT

2. AVIATION DEMAND FORECAST

2.1. OVERVIEW

The aviation demand forecast element of the airport master plan is used to analyze the existing operations occurring at the facility and develop a 20-year growth outlook for the Airport. Once complete, this analysis is the foundation for determining future capital improvement needs and is the first step in crafting justification and identifying funding sources. Demand forecasts determine the type, extent, size, location, timing, and financial feasibility of future capital improvements.

Forecasting aviation activity requires more than an extrapolation of past trends; it involves the application of statistical measures to correlate future demand with population projections, economic performance, and demographic data. Because demand forecasting is not an exact science, it requires the application of professional judgment and experience rooted in an understanding of the market that promotes or limits aviation growth.

Demand forecasts have been prepared and presented in this chapter to assist the sponsor in evaluating the performance-based needs of the Airport during the next 20 years. Additionally, the FAA will review and accept the forecasts to ensure they are reasonable compared to current FAA forecasting projections. The forecasts are organized to include a range of activities, including based aircraft, operational fleet mix, annual operations (itinerant and local), and ultimate critical aircraft.

2.2. DATA SOURCES

The forecasting process begins by obtaining recorded data pertinent to the operation and administration of Fort Worth Spinks Airport. Generally, aviation activity forecasting commences by utilizing the present time as an initial point, supplemented with historical trends from previous years' activity. This data has evolved from a comprehensive examination of historical airport records provided by department of aviation staff, FAA Form 5010-1, *Airport Master Record*, *FAA Terminal Area Forecasts*, and the *FAA Aerospace Forecasts Fiscal Years 2022-2042*. Supplemental publications providing trends and conditions of the aviation industry include the *General Aviation Statistical Databook Industry Outlook and Business Aviation Fact Book, 2018*. These documents were assembled in different years, making the base year data quite variable and emphasizing the need to establish a well-documented set of historical information to project future aviation activity trends.

2.3. FACTORS AFFECTING FUTURE AVIATION DEMAND

Before examining future activity, several assumptions and conditions that help form the basis or foundation for the development of forecasts should be noted. These statements cover various physical, operational, industry, and socioeconomic considerations.

2.3.1. DEMOGRAPHICS

The existing socioeconomic condition of a particular region historically impacts aviation within an area and is often analyzed in the forecasts of aviation activity. Provided by

Woods and Poole, the most current demographic data for Tarrant County shows average annual increases through the year 2043 for the population at 0.76 percent, employment at 1.24 percent, and per capita income at 1.33 percent. This compares to the DFW Combined Statistical Area (CSA), which reflects average annual growth rates of 0.94 for population, 1.5 percent for employment, and 1.5 percent for per capita income.

2.3.2. COMMUNITY SUPPORT

Fort Worth Spinks Airport benefits from the support of the surrounding community and government, local industry, strategic partnerships, and citizens. The Airport is recognized as a vital asset to the City of Fort Worth Aviation System, the City of Fort Worth, Tarrant County, and the greater DFW Metroplex, contributing to the stability and future of the area's economy. Additionally, much of the region benefits from the proximity of a regional aviation facility. In turn, the region provides an economic base that can attract additional based aircraft and industrial/business development to the airport.

2.3.3. COVID-19

Nothing has impacted the global or national aviation industry since the 2008/09 recession as much as the existing COVID-19 pandemic. This virus outbreak led to major declines in demand for air carrier and general aviation activity and led those in the industry to announce severe cost-cutting measures, request government funding assistance, and ground fleets. The spread of the virus created a concern for both short- and long-term effects within the aviation industry nationally and globally.

Similar to the well-known and stated declines with airlines, the general aviation sector has not been immune to similar impacts. General Aviation (GA) provides more than one (1) percent of the $247 billion GDP in the U.S. and accounts for over 1.3 million jobs. Typically, the GA sector's strength is based on sales and aircraft deliveries to various purchasers across the globe. When analyzing details provided by the General Aviation Manufacturers Association (GAMA), 2020 started strong and was on par to replicate or exceed 2019; however, when health and safety restrictions were put into place to respond to COVID-19, supply chains and deliveries were shut down and negatively impacted. However, as depicted in Table 2.1, recent trends show healthy increases across the board for aircraft and helicopter sales.

TABLE 2.1: GAMA Sales Comparison 2021-2022

Aircraft Type	2021	2022	% Change
Piston Airplanes	1,409	1,524	8.2%
Turboprop Airplanes	527	582	10.4%
Business Jets	710	712	0.3%
Total Airplanes	2,646	2,818	6.5%
Total Airplane Billings	$21.6B	$22.9B	5.8%
Piston Helicopters	181	194	7.2%
Turbine Helicopters	631	682	7.6%
Total Helicopters	812	876	7.5%
Total Helicopter Billings	$3.7B	$4.0B	6.8%

Source: General Aviation Manufacturers Association (GAMA)

2.4. GENERAL AVIATION TRENDS

At the national level, fluctuating trends related to GA usage and economic uncertainty resulting from the national and international business cycles significantly impact GA demand levels. GA aircraft are classified as all aircraft not flown by commercial airlines or the military. This includes an incredibly diverse array of flying, ranging from a personal vacation getaway in a small single-engine plane, to overnight package delivery, to an emergency medical evaluation, to a morning sightseeing flight, to flight instruction training new pilots, to helicopter traffic reports keeping drivers informed of rush-hour delays. Simply stated, GA encapsulates all those individual unscheduled aviation activities that enrich, enhance, preserve, and protect our lives.

As defined by the FAA, GA activities are divided into six use categories:

- Personal – About one-third of all private flying in the U.S. is for personal reasons, including practicing flight skills, personal or family travel, personal enjoyment, or personal business.
- Instructional – All flight instruction from private to airline transport pilot is conducted through GA.
- Corporate – About 12 percent of the total private flying in the U.S. is done in aircraft owned by a business and piloted by a professional. Many of these flights are in jets and cover long distances, with some flying to intercontinental and international destinations. Businesses elect to fly these trips to save time and expand their geographic and operational networks.
- Business – About 11 percent of the total private flying in the U.S. is done by business individuals flying themselves to meetings or other events, primarily in piston or turboprop aircraft. Most pilots own or work for relatively small businesses and use the aircraft to accomplish missions that would otherwise take more time or be infeasible.

- Air Taxi – When scheduled air service is unavailable or inconvenient, businesses and individuals use charter aircraft from air taxi service providers. These flights save time and make it possible to fly directly to places that cannot be reached by scheduled service. (Note that "air taxi" is also utilized as a charter or on-demand commercial air service classification).
- Other – All other activities are classified as being "other." Given the diverse nature of general aviation, this includes disaster relief, search and rescue, police operations, news reporting, border patrol, forest firefighting, aerial photography and surveying, crop dusting, and tourism activities.

2.4.1. BUSINESS USE OF GENERAL AVIATION

Business and corporate aviation are the fastest-growing facets of GA. Companies and individuals use aircraft to improve their businesses and personnel's efficiency and productivity. The use of GA aircraft affords businesses direct control of their travel itineraries and destinations and significantly reduces travel times and inconveniences often associated with scheduled airline service.

According to the National Business Aviation Association's (NBAA) *Business Aviation Fact Book*, only 3 percent of the approximately 15,000 business aircraft registered in the U.S. are flown by large Fortune 500 companies. The remaining 97 percent are operated by a broad cross-section of organizations, including government, universities, charitable organizations, and businesses of all sizes. Most U.S. companies utilizing business aircraft (85 percent) are small and mid-size businesses, many of which are based in the dozens of communities across the country where airlines have reduced or eliminated services. The benefits of corporate GA are evidenced by the significant growth that business/corporate GA has recently experienced.

Business use of GA ranges from small, single-engine aircraft rentals to corporate aircraft fleets supported by dedicated flight crews and mechanics. Business aircraft usage by smaller companies has also escalated dramatically as various chartering, leasing, fractional ownership, interchange agreements, partnerships, and management contracts have emerged.

Of particular note is the immense popularity of fractional ownership operations, which began in 1986 with the creation of a program that offered aircraft owners increased flexibility in the ownership and operation of aircraft. The program uses current aircraft acquisition concepts, including shared or joint aircraft ownership, and provides for the management of the aircraft by an aircraft management company. The aircraft owners participating in the program agree to share their aircraft with others with a shared interest and lease their aircraft to others in the program. The aircraft owners use a common management company to provide aviation management services, including aircraft maintenance, crew training and assignment, and leasing management.

Even in an unsteady economy, fractional operators say business has continued to improve as existing customers re-enter the market or increase their fractional aircraft usage. In addition, they say an increasing number of new prospects are moving to fractional ownership as an alternative to flying commercially or owning a business jet outright. Fractional-share ownership makes up 15 percent of business aviation flights.

Growing segments of the business aircraft fleet mix include business liners and very light jets (VLJ). Business liners are reconfigured versions of passenger aircraft typically flown by large commercial airlines. Aircraft in this category include the Boeing Business Jet (BBJ) and Airbus Corporate Jet (ACJ). Labeled as “personal jets,” VLJs are small, six-seat jets costing substantially less than typical business jet aircraft. Popular aircraft models in this category include the Eclipse 500 and 550, Embraer Phenom 100, Cessna Mustang, HondaJet, and the Cirrus Vision Jet.

2.4.2. ADVANCED AND URBAN AIR MOBILITY

Emerging technologies are rapidly shaping the horizon of public and private transportation. As these new methods of transportation become reality, so will their impact on our aviation infrastructure and the airspace system surrounding them. The FAA defines Urban Air Mobility (UAM) as “a safe and efficient aviation transportation system that will use highly automated aircraft that will operate and transport passengers or cargo at lower altitudes within urban and suburban areas.” Very similar to UAM, Advanced Air Mobility (AAM) “builds upon the UAM concept by incorporating use cases not specific to operations in urban environments including commercial inter-city, cargo delivery, public services, and private/recreational vehicles.”[30]

Source: Deloitte analysis.

Airports will play a pivotal role in the implementation of AAM/UAM in the DFW Metroplex. Early impacts to airports will be witnessed in two primary categories: airside and landside operational facilities, and electrification infrastructure. As airports craft capital improvement plans for future development, it

[30] Federal Aviation Administration, *Urban Air Mobility and Advanced Air Mobility*, June 1, 2022

will be important to include the adaptation of the facility to accommodate the impending demand of AAM and UAM activities. These specialized operations require a very different set of infrastructure demands than those required by traditional aviation operations. Facilities accommodating these operations are further divided into three categories. Vertiports are designed specifically for the accommodation of vertical takeoff and landing (VTOL) aircraft and can easily be implemented into existing airport layouts due to their small footprint. Vertistops, often located off-airport in urban areas, serve as the primary point of pickup for passengers as they enter the UAM transportation system. Finally, vertihubs are the largest facilities serving AAM/UAM. These facilities accommodate long-range flights by connecting vertiports and vertistops. These facilities can be co-located at an airport or constructed as a standalone facility.[31]

According to the FAA, the passenger market cap is currently estimated to be approximately $500 billion in the United States. AAM is estimated to make up more than $2.5 billion of this market in the near term.[32] Aerospace Industries Association (AIA) estimates the market for AAM could reach $115 billion annually by 2035, while creating nearly 300,000 jobs.[33] While forecasting the future demand of AAM/UAM is difficult given the implementation timeline and limited access to operational data, the following chapters of the master plan will analyze the ability of FWS to meet the anticipated demand with state-of-the-art facilities aimed at accommodating these operations. Chapter 3, *Facility Requirements*, will provide a detailed analysis of the facilities required to realize this goal including landing, passenger, charging, and maintenance facilities. As airports look to expand their ability to generate revenue, AAM/UAM offers a unique opportunity for airports to capture landing fees, parking fees, and maintenance fees for these operations. This planning effort will ensure that FWS is well positioned to capitalize on this growing industry by providing facilities capable of fostering a partnership between the City of Fort Worth, FWS, and AAM/UAM operators, manufacturers, and investors.

Vertiplace

- Common functions include charging, instrument approach procedures, and weather monitoring capabilities
- Most vertiplaces will have quick battery swap and recharging facilities designed for quick passenger disembarkation while others will be designed as multimodal hubs
- Based on their function, most vertiplaces can be characterized as vertihubs, vertiports, or vertistops:

Vertihubs	Vertiports	Vertistops
The largest category facility; will likely exist on the periphery of urban areas due to the large physical footprint and demands on the power grid and other physical infrastructure	Facilities in the heart of urban cores that serve as major sites for both passenger and cargo boarding and disembarkation	These facilities will be the smallest element of the vertiport network and contain one TLOF area with one or two pads.

Source: Deloitte analysis.

[31] NCTCOG, *The Role of Texas Airports in Advanced Air Mobility and Regional Air Mobility*, April 13, 2023
[32] Federal Aviation Administration, FAA Aerospace Forecast Fiscal Years 2022-2042, March 6, 2023
[33] AIA, Deloitte Study: *US Advanced Air Mobility Market Could Reach $115B by 2023*, January 26, 2021

2.4.3. ELECTRIC AIRCRAFT AND THE ELECTRIFICATION OF AIRPORTS

Similar to the infrastructure demands presented by the AAM/UAM sector, the introduction of electric aircraft will change the way we approach the development of airports. Pipistrel, a Slovenian company recently acquired by Textron, a name synonymous with producing world-renowned flight training platforms, is on the cutting edge of electric aircraft development. It is expected that the pilot training sector will be the first testbed for the implementation of electric aircraft in the U.S. Pipistrel has seen tremendous success in 30 countries with the operation of the Velis Electro, the first ever type-certified electric aircraft providing an all-electric, VFR day, training platform. With a total flight duration of approximately 50 minutes, the Electro requires no warm-up time upon engine start, offers low cost of maintenance due to the nature of its electric systems, and provides a zero-fuel cost approach to flight training.[34] With the increasing cost entry barrier to aviation careers highlighted by rising flight training and fuel costs, implementation of this technology will provide increased availability for those seeking careers in aviation. The following chapters analyze potential alternatives to prepare FWS to accommodate the anticipated demand of electric aircraft including charging facilities, maintenance, and electrification through improvement to airport infrastructure, including solar production. In 2016, KSA led the environmental clearance effort for the installation of a solar array at Monterey Regional Airport in California. It is anticipated that the system will provide a net savings of $5.5 million over the 25-year program life, generate an estimated output of 1.5MW annually equating to the amount of energy required to power 111 homes for one year, and create 42 local jobs as a direct result of the project. [35]

[34] Pipistrel, *Electric Pioneer*, 2023

[35] MRY Airport District Business, *Monterey Regional Airport The Big Switch*, September 2017

LI-ION
PIPISTREL
VELIS
ELECTRO

2.4.4. GENERAL AVIATION OUTLOOK

National GA activity trends are monitored and forecasted by the FAA on an annual basis in the FAA Aerospace Forecasts publication. The most current edition covers Fiscal Years 2022-2042.

According to the FAA, the active GA fleet is estimated at 204,140 as of 2020. This represents a 3.2 percent decline from 2019; however, in 2021, deliveries of GA aircraft in the U.S. increased by 7.4 percent over 2020.

2.4.5. SUMMARY

The aviation industry has navigated significant challenges (9/11 and 2008 global financial crisis), after which passenger numbers flatlined for 2-3 years before continuing the upward trajectory. Following these crises, many companies and their supply chains emerged and restructured to thrive. While there is no crystal ball for predicting when the turnaround will be realized, the International Air Transport Association (IATA) postulates full recovery not occurring until at least 2023, with the worst-case scenario being 2025.

Additionally, GA is anticipated to witness the same rebound as the airlines, with a more expedited time frame. Increases in GA activity have already shown signs of starting to rebound and are expected to hit pre-COVID levels sooner than anticipated. Based on this information, the forecasting outcomes for FWS in the following sections will be based on a combination of industry trends pre- and post-COVID. Ultimately, the forecasts will be based on lower baseline numbers or reflect slower demand in the short term, while the long term will be unaffected.

THIS SECTION LEFT BLANK INTENTIONALLY


PILATUS

2.5. AVIATION FORECAST METHODOLOGY

2.5.1. DEMAND FORECAST APPROACH

To garner FAA approval and acceptance of aviation forecasts, certain methods of forecast development are necessary for evaluation. Choosing the appropriate forecasting methodology is important for developing scenarios that account for the future. Forecast scenarios developed for FWS will consider historical operational data but rely heavily upon expert judgment. It is important to emphasize that aviation forecasting is not an exact science. Therefore, experienced aviation judgment and practical considerations will influence the level of detail and effort required to establish a reasonable forecast and the development of decisions that result from them.

A qualitative forecast will explain, understand, or interpret current airport conditions and explain why future development scenarios are justifiable. Forecasting scenarios for FWS will be developed by examining the meaningful and symbolic content of qualitative data and coupling it with available historical data. Sources and methods for forecasting are provided by several FAA documents, including FAA AC 150/5070-6B, *Airport Master Plans*, FAA Office of Aviation Policy and Plans, *Forecasting Aviation Activity by Airport, Review, and Approval of Aviation Forecasts, 2008*.

Projections of aviation demand incorporate local and national industry trends in assessing current and future demand. Therefore, socioeconomic factors such as local population, income, and employment are also analyzed for their effect on historical and future levels of activity. Comparing relationships among these various indicators provides the initial step in developing realistic forecasts of aviation demand. Methodologies used to develop forecasts described in the section include:

- Time-Series Methodologies
- Market Share Methodologies
- Socioeconomic Methodologies

2.5.2. TIME-SERIES METHODOLOGY

Historical trend lines and linear extrapolation are widely used forecasting methods. These techniques utilize time-series data types and are most useful for a pattern of demand demonstrating a historical relationship with time. Linear extrapolation establishes a linear trend by fitting a straight line using the least-squares methods compared to known historical data. Historical trend lines used in this chapter examine historical compounded annual growth rates (CAGR) and extrapolate future data values by assuming a similar compounded annual growth rate.

2.5.3. MARKET SHARE METHODOLOGY

Market share, ratio, or top-down models compare local activity levels with larger entities. Such methodologies imply that the proportion of activity that can be assigned to the local level is a regular and predictable quantity. This method has been used extensively in the aviation industry to develop forecasts for the local level. It is most commonly used to determine the share of total national traffic activity a particular region or airport will capture. Historical data is examined to determine the ratio of local traffic to total national traffic. The FAA develops national forecasts annually in its FAA Aerospace Forecasts document. This data source is compared with historical levels of activity reported by Fort Worth Spinks Airport.

2.5.4. SOCIOECONOMIC METHODOLOGY

Though trend line extrapolation and market share analysis may provide mathematical and formulaic justification for demand projections, there are many factors beyond historical levels of activity that may identify trends in aviation and impact aviation demand locally. Socioeconomic or correlation analysis examines the direct relationship between two or more historical data sets. Local conditions examined in this chapter include population, per capita income, and total retail sales. Future aviation activity projects are developed based on the observed and projected correlation between historical aviation activity and socioeconomic data sets.

2.6. GENERAL AVIATION ACTIVITY FORECASTS

2.6.1. BASED AIRCRAFT

Based aircraft are defined as those aircraft permanently stored at an airport, either in a hangar or on an aircraft parking apron. Estimating the number and types of aircraft expected to be based at FWS over the 20-year study period will impact the planning for its future facility and infrastructure requirements. As the number of aircraft based at an airport increase, so do the aircraft storage requirements at the facility.

Many factors determine the number of GA aircraft that can be expected to be based at an airport, such as available facilities and services, proximity and access to the airport, amenities, and facilities at nearby airports. GA aircraft owners and operators are particularly sensitive to the quality and location of their base facilities. Owners typically prefer to be close to their house and place of work, which is important when they consider aircraft storage needs. The FAA database reflects 236 validated based aircraft stored at FWS.

According to *FAA Aerospace Forecasts Fiscal Years 2022-2042*, Active General Aviation Aircraft, between 2019 and 2020, the active GA aircraft in the U.S. decreased by 3.2 percent; however, the GA fleet is expected to increase from its 2021 level of 204,405 aircraft to 208,905 by 2042.[36]

[36] Federal Aviation Administration, *Aerospace Forecast Fiscal Years 2022-2042*, June 28, 2022

2.6.2. MARKET SHARE METHODOLOGY

Fort Worth Spinks Airport's market share of the total U.S. GA fleet between 2012 and 2022 has averaged 0.1035%. For the constant market share, the 2023 value of 0.1155% will be utilized for the 20-year planning period. Based on these percentages, based aircraft growth using a constant market share provides a CAGR of 0.1%, and the increasing market share reflects a CAGR value of 1.5%. Table 2.2 details both market share scenarios.

TABLE 2.2: Market Share Based Aircraft Forecasts

Year	FWS Based Aircraft	Total U.S. Active Aircraft	FWS Market Share
2012	172	220,453	0.0780%
2013	198	209,034	0.0947%
2014	198	199,927	0.0990%
2015	266	204,408	0.1301%
2016	261	210,031	0.1243%
2017	241	211,794	0.1138%
2018	241	211,757	0.1138%
2019	161	211,749	0.0760%
2020	169	210,981	0.0801%
2021	232	204,140	0.1136%
2022	236	204,405	0.1155%
Constant Market Share Projection			
2028	237	204,925	0.1155%
2033	237	205,195	0.1155%
2038	238	206,280	0.1155%
2043	241	208,905	0.1155%
CAGR (2021-2041) = 0.1%			
Increasing Market Share Projection			
2028	256	204,925	0.1250%
2033	277	205,195	0.1350%
2038	299	206,280	0.1450%
2043	324	208,905	0.1550%
CAGR (2021-2041) = 1.5%			

Source: KSA, FAA Aerospace Forecasts, 2022-2042

2.6.3. SOCIOECONOMIC – INCOME METHODOLOGY

Income can often be a strong indicator of one's propensity to own an aircraft. The socioeconomic income variable methodology compares historical based aircraft at FWS to per capita income in Tarrant County. According to data obtained from Woods and Poole, per capita income in Tarrant County has increased steadily from 2012 to 2022 and is anticipated to increase to $75,483 by 2043. The 2023 figure of 0.0045 based aircraft per $100 income is applied to per capita income projections and shown in Table 2.3. This forecast posits a CAGR of 1.8 percent for a total of 343 based aircraft by the end of the planning period.

TABLE 2.3: Socioeconomic – Income Variable Based Aircraft Projections

Year	FWS Based Aircraft	Tarrant County Per Capita Income	Based A/C per $100 Income
2012	172	$44,485	0.0039
2013	198	$47,214	0.0042
2014	198	$46,885	0.0042
2015	266	$45,540	0.0058
2016	261	$47,292	0.0055
2017	241	$48,364	0.0050
2018	241	$48,737	0.0049
2019	161	$50,207	0.0032
2020	169	$50,986	0.0033
2021	232	$51,930	0.0045
2022	236	$52,869	0.0045
Socioeconomic – Income Variable			
2028	263	$58,995	0.0045
2033	288	$64,511	0.0045
2038	315	$70,459	0.0045
2043	343	$76,768	0.0045

CAGR (2021-2041) = 1.8%

Source: KSA, Woods and Poole

2.6.4. SOCIOECONOMIC – POPULATION METHODOLOGY

The socioeconomic population variable methodology compares historical based aircraft at the Airport with the population of Tarrant County. Between 2012 and 2022, the population of Tarrant County increased from 1,881,222 to 2,153,700. The 2022 figure of 0.0001 is applied to the population projections of Tarrant County and reflected in Table 2.4.

TABLE 2.4: Socioeconomic – Population Variable Based Aircraft Forecasts

Year	FWS Based Aircraft	Tarrant County Population	Based A/C per capita
2012	172	1,910,950	0.0001
2013	198	1,943,542	0.0001
2014	198	1,981,345	0.0001
2015	266	2,018,759	0.0001
2016	261	2,050,150	0.0001
2017	241	2,074,088	0.0001
2018	241	2,093,508	0.0001
2019	161	2,114,709	0.0001
2020	169	2,126,477	0.0001
2021	232	2,153,700	0.0001
2022	236	2,180,615	0.0001
Socioeconomic – Population Variable			
2028	253	2,341,351	0.0001
2033	268	2,471,870	0.0001
2038	281	2,596,384	0.0001
2043	294	2,717,244	0.0001
CAGR (2021-2041) = 1.1%			

Source: KSA, Woods and Poole

2.6.5. PREFERRED BASED AIRCRAFT FORECAST

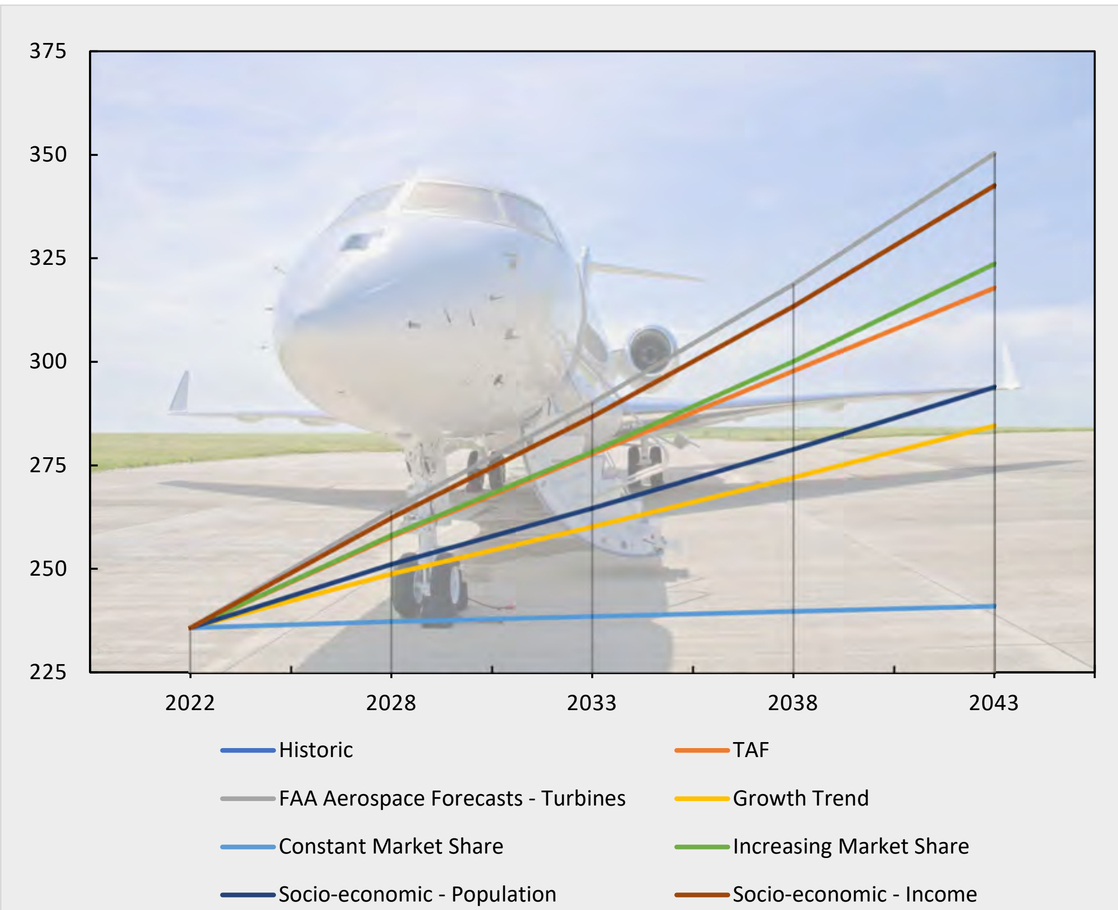
A comparative analysis of projected based aircraft using the methodologies described in previous sections is shown below in Table 2.5 and Exhibit 2.1. All the methodologies anticipate either retention of the existing or an increase in based aircraft demand over the next 20 years. With the airport maintaining a healthy hangar waitlist of nearly 200 aircraft and new construction hangars expected to fill quickly, the preferred based aircraft forecast follows course with the *FAA Aerospace Forecast* – Turbine Methodology. This scenario increases based aircraft from the current level of 236 to 350 by 2043, equivalent to a CAGR of 1.9 percent.

TABLE 2.5: Preferred Based Aircraft Forecast, 2023-2043

Year	FAA TAF Summary	FAA Aerospace Forecasts	Constant Market Share	Increasing Market Share	Population	Income	Growth Trend
2023	236	236	236	236	236	236	236
2028	258	264	237	258	251	263	260
2033	278	290	239	279	265	287	260
2038	298	319	240	300	279	314	272
2043	318	350	241	324	294	343	285
CAGR	1.4%	1.9%	0.1%	1.5%	1.1%	1.8%	0.9%

Source: KSA, FAA Aerospace Forecasts, 2022-2042

EXHIBIT 2.1: Preferred Based Aircraft Forecast, 2022-2043



2.7. BASED AIRCRAFT FLEET MIX

The current based aircraft fleet mix at FWS consists of 181 single-engine aircraft, 21 multi-engine aircraft, 12 jets, and 22 helicopters. The FAA's anticipated average annual growth rates for various components of the national general aviation fleet were considered when determining a projected based aircraft fleet mix for the airport. As reflected in Table 2.6, the number of single- and multi-engine aircraft based at the airport is anticipated to increase over the 20-year forecast period. This is contrary to national trends for piston aircraft and can be attributed to the high level of flight training operations conducted at FWS. Additionally, it is expected that based jet aircraft will continue to increase during the planning period.

TABLE 2.6: General Aviation Based Aircraft Fleet Mix, 2023-2043

Aircraft Type	2023	2028	2033	2038	2043
Single-Engine	179	195	213	220	232
Multi-Engine	18	21	22	24	26
Turboprop (SE)	2	5	6	11	14
Turboprop (ME)	3	5	6	13	18
Jet	12	14	17	22	28
Helicopter	22	24	26	29	32
Total	236	264	290	319	350

Source: KSA, FAA Form 5010-1, *Airport Master Record*

2.8. GENERAL AVIATION OPERATIONS FORECASTS

GA operations are those which are not categorized as commercial or military. Several forecast scenarios were developed to appropriately reflect current GA operational activity and provide realistic projections for the 20-year planning period. The forecast scenarios generated assume straight-line growth. While it is recognized that straight-line (consistent) growth never occurs year after year, average annual growth methodologies often serve to illustrate intermediate- and long-range planning. It should be noted that it is not actual numbers that are most important but the reasoning, assumptions, and trends the numbers represent. The following methodologies were considered in determining projections of general aviation demand.

- FAA Terminal Area Forecasts (TAF) – Data from the *2022 FAA Terminal Area Forecast (TAF)* shows an average annual rate of 0.7 percent.
- FAA Aerospace Forecasts – As indicated in this projection and according to the *FAA Aerospace Forecasts, Fiscal Years, 2022-2042, Table 29 – Active General Aviation and Air Taxi Hours Flown,* GA operations nationwide are expected to increase at an average annual rate of 1.0 percent.

- FAA Aerospace Forecasts (turbine growth) – As reflected in the *FAA Aerospace Forecasts, Fiscal Years, 2022-2042, Table 29 – Active General Aviation and Air Taxi Hours Flown*, turbine-type aircraft are anticipated to grow at an average annual growth rate of 2.5 percent. This growth is reflected in increased flying by business and corporate aircraft.
- Operations Per Based Aircraft (OPBA) – Generally, there is a relationship between aviation activity and based aircraft, stated in terms of OPBA. The national trend has evolved, with more aircraft being used for business purposes and fewer for leisure. This impacts the OPBA because business aircraft are usually flown more often than recreational or leisure aircraft. It is anticipated that the OPBA will provide a CAGR of 1.9 percent.
- Demographics (Population and Income) – As previously mentioned, socioeconomic conditions for a particular area or region can impact aviation activity. This methodology utilizes the combined average annual population and income growth for Tarrant County of 1.4 percent.
- Growth Trend – Due to fluctuations in operations over the past decade, the growth trend shows a lower growth rate of 0.8 percent through the end of the planning period, with an outcome of 72,920. Given the conservative nature of this methodology and the document growth at FWS, this method will not be considered and is included for comparison.

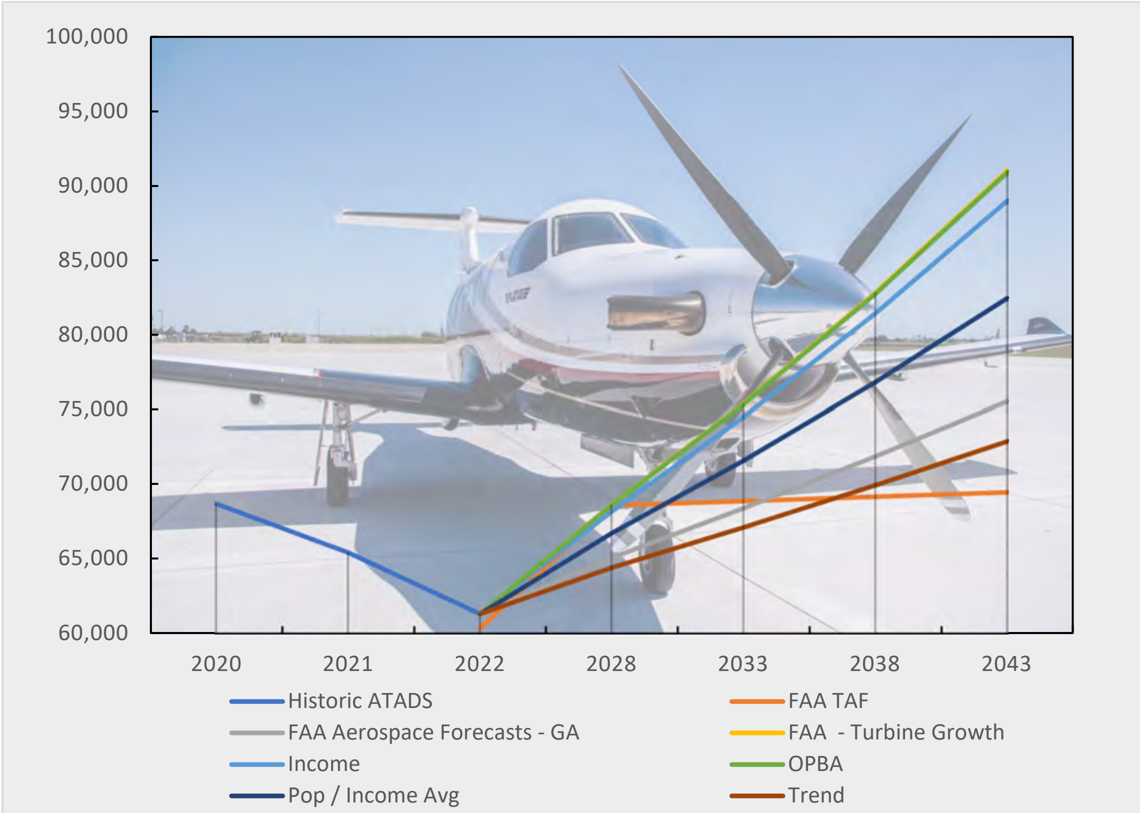
Table 2.7 and Exhibit 2.2 show the results of the various GA operations forecasts. Based on the long-term trends previously mentioned for the GA industry, it is anticipated that FWS can achieve operations growth similar to the national trends presented in the *FAA Aerospace Forecast, 2022-2042.* Data shows that operations are increasing significantly for turbine aircraft. Therefore, this methodology best describes and closely mirrors the recent growth experienced by FWS and will provide the foundation for the analysis of forecast aviation demand.

TABLE 2.7: Preferred General Aviation Forecasts, 2022-2043

Year	FAA TAF Summary	FAA Aerospace Forecasts	FAA Aerospace Forecasts (Turbine Growth)	OPBA	Tarrant County Population / Income Avg.	Growth Trend
2022	60,368	61,325	61,325	61,325	61,325	61,325
2028	68,624	65,098	68,657	68,634	66,749	64,435
2033	68,902	68,418	75,432	75,386	71,634	67,148
2038	69,191	71,908	82,875	82,802	76,876	69,974
2043	69,490	75,576	91,053	90,948	82,502	72,920
CAGR	0.7%	1.0%	1.9%	1.9%	1.4%	0.8%

Source: KSA, FAA Aerospace Forecasts, Fiscal Years, 2022-2042

EXHIBIT 2.2: Preferred General Aviation Forecasts, 2022-2043



2.9. OPERATIONS FORECAST BY AIRCRAFT TYPE

As indicated in the following Table 2.8, total aircraft operations are expected to increase at a CAGR of 1.9 percent annually from the current level of 61,325 to 91,053 by 2043. GA operations will represent the majority percentage of activity through 2043.

TABLE 2.8: Summary of Operations by Aircraft Type, 2022-2043

Aircraft Type	2022	2028	2033	2038	2043
Air Taxi	1,226	1,372	1,506	1,652	1,816
Single-Engine Piston	33,729	35,702	39,225	41,438	45,527
Multi-Engine Piston	9,199	9,612	10,560	10,774	10,926
Turboprop (SE)	4,906	6,179	6,789	8,288	10,016
Turboprop (ME)	4,293	5,493	6,035	7,459	8,650
Business Jet	4,906	6,179	6,789	8,246	8,605
Helicopter	3,036	4,085	4,488	4,973	5,463
Military	30	35	40	45	50
Total	61,325	68,657	75,432	82,875	91,053

2.10. LOCAL / ITINERANT OPERATIONS FORECAST

The FAA defines a local operation as any operation performed by an aircraft operating in the local traffic pattern or within sight of the tower, aircraft known to be operating in local practice areas, or aircraft executing practice instrument approaches. According to airport records, itinerant operations constituted approximately 40 percent of total operations, with local operations making up the remaining 60 percent. Due to the significant flight training activity, it is anticipated that the airport will continue to facilitate these operations and serve as a center for business aviation operations. Table 2.9 details the total local and itinerant operations for the planning period.

TABLE 2.9: Local and Itinerant Operations, 2022-2043

Year	Itinerant Operations	Local Operations	Total Operations
2022	24,295	37,030	61,325
2028	27,463	41,194	68,657
2033	30,173	45,259	75,432
2038	33,150	49,725	82,875
2043	36,421	54,632	91,053

Source: KSA, FAA Form 5010-1, *Airport Master Record*

2.11. INSTRUMENT OPERATIONS FORECAST

Typically, instrument operations are conducted by aircraft operating during periods of inclement weather. The FAA defines an instrument approach as an approach to an airport with the intent to land an aircraft in accordance with an IFR flight plan when visibility is less than three miles or when the ceiling is at or below the minimum initial approach altitude. Between 2012 and 2022, instrument operations at FWS fluctuated between 4.7 percent to 6.7 percent of total operations, equating to a CAGR of 5.5 percent. Applying this same percentage to the total number of projected operations through 2043 results in a CAGR of 1.85 percent, with the total number of IFR operations increasing to 5,008 in 2043.

TABLE 2.10: Instrument Operations Forecast, 2022-2043

Year	Total Operations	Instrument Operations		Visual Operations	
		Operations	%	Operations	%
2022	61,325	3,406	5.5%	57,919	94.5%
2028	68,657	3,776	5.5%	64,881	94.5%
2033	75,432	4,149	5.5%	71,283	94.5%
2038	82,875	4,558	5.5%	78,317	94.5%
2043	91,053	5,008	5.5%	86,045	94.5%

Source: KSA, FAA Form 5010-1, *Airport Master Record*

2.12. DESIGN AIRCRAFT

The development of airport facilities is impacted by the demand for those facilities, typically represented by total based aircraft and operations at an airport and the type of aircraft that will use those facilities. In general, airport infrastructure components are designed to accommodate the most demanding aircraft, referred to as the critical aircraft, which will utilize the infrastructure regularly. The factors used to determine an airport's design aircraft are the approach speed and wingspan/tail height of the most demanding class of aircraft that is anticipated to perform at least 500 annual operations during the planning period. These 500 operations can be conducted by a single aircraft type or composite aircraft representing a collection of aircraft with similar qualities. Typical aircraft characteristics for Fort Worth Spinks are graphically illustrated in Exhibit 2.3.

2.13. RUNWAY DESIGN CODE (RDC)

The Runway Design Code (RDC) is a three-component code that defines the design standards that apply to a specific runway. The first component, depicted by a letter (A-E), is the Aircraft Approach Category (AAC) and is determined by the approach speed of the design aircraft. Generally, the AAC applies to runways and related surfaces, including runway width, runway safety area (RSA), runway object-free area (ROFA), runway protection zone (RPZ), and separation standards. The second component, Airplane Design Group (ADG), depicted by a Roman numeral (I-VI), is determined by the wingspan or tail height of the design aircraft, whichever is most restrictive. The third component relates to runway visibility minimums as expressed in Runway Visual Range (RVR) equipment measurements. RVR-derived values represent the amount of forward visibility (in feet) and have statute mile equivalents (e.g., 2400 RVR = 1/2-mile). RDC classifications are summarized in Table 2.11.

THIS SECTION LEFT BLANK INTENTIONALLY

Exhibit 2.3: Fort Worth Spinks Aircraft Characteristics

A-I

CESSNA 182 - SINGLE ENGINE AIRCRAFT (2 - 6 SEATS)

Maximum Take-off Weight (MTOW): 3,100 lbs. Length: 29' Wingspan: 36'

Similar Aircraft: Beechcraft Bonanza, Cessna 172, Cirrus SR-22

B-I

BEECH KING AIR C90 - SMALL CABIN AIRCRAFT (4 - 10 SEATS)

Maximum Take-off Weight (MTOW): 10,100 lbs. Length: 35' 6" Wingspan: 50' 3" Tail Height: 14' 3"

Similar Aircraft: Citation Mustang, Eclipse 500, HondaJet

B-II

CITATION XLS - SMALL CABIN AIRCRAFT (6 -12 SEATS)

Maximum Take-off Weight (MTOW): 20,200 lbs. Length: 52' 6" Wingspan: 56' 4" Tail Height: 17' 2"

C-II

CHALLENGER 350 (8-19 SEATS)

Maximum Take-off Weight (MTOW): 40,600 lbs. Length: 68' 6" Wingspan: 69' 0" Tail Height: 20' 0"

C-III

GULFSTREAM V (15-19 SEATS)

Maximum Take-off Weight (MTOW): 90,500 lbs. Length: 96' 5" Wingspan: 93' 4" Tail Height: 26' 8"

TABLE 2.11: Runway Design Code

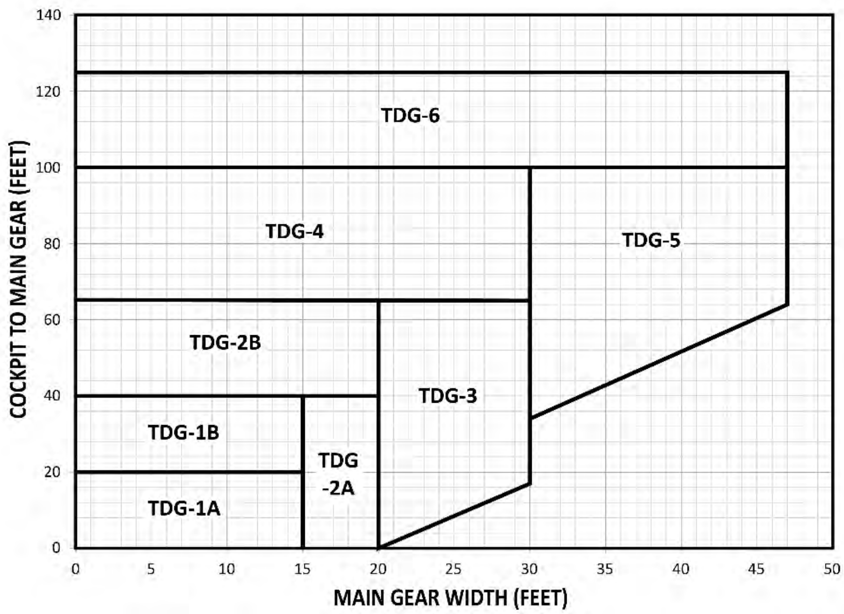
Aircraft Approach Category (AAC)		
AAC	Approach Speed	
A	Less than 91 knots	
B	91 knots or more but less than 121 knots	
C	121 knots or more but less than 141 knots	
D	141 knots or more but less than 166 knots	
E	166 knots or more	
Airplane Design Group (ADG)		
Group	Tail Height (ft)	Wingspan (ft)
I	< 20’	< 49’
II	20’ - < 30’	49 ‘ - < 79’
III	30’ - < 45’	79’ - < 118’
IV	45’ - < 60’	118’ - < 171’
V	60’ - < 66’	171’ - < 214’
VI	66’ - < 80’	214’ - < 262’
Approach Visibility Minimums		
RVR (ft)	Flight Visibility Category (statute mile)	
5000	Not lower than 1-mile	
4000	Lower than 1-mile but not lower than ¾-mile	
2400	Lower than ¾-mile but not lower than ½-mile (CAT-I)	
1600	Lower than ½-mile but not lower than ¼-mile CAT-II)	
1200	Lower than ¼-mile (CAT-III)	

RVR – Runway Visual Range. The approximate visibility (in feet) as measured by the RVR light transmission/reception equipment or equivalent weather observer report.

2.14. TAXIWAY DESIGN GROUP (TDG)

The separation between runways, taxiways, taxilanes, and objects is related to the aircraft characteristics encompassed by the ADG wingspan or tail height restriction. The Taxiway Design Group (TDG) considers the aircraft undercarriage or landing gear dimensions to determine taxiway widths and pavement fillets to be provided at taxiway intersections. Other taxiway elements, such as taxiway safety and object-free areas (TSA and TOFA), taxiway and taxilane separation standards, and wingtip clearances, are based solely on ADG. Exhibit 2.4 details the characteristics of each TDG category.

EXHIBIT 2.4: Runway Design Code



Source: FAA AC 150/5300-13B, *Airport Design*

2.15. AIRPORT REFERENCE CODE (ARC)

The Airport Reference Code (ARC) is a coding system used to compare airport design criteria to the operational and physical characteristics of the aircraft operating at the airport. Based on the examination of the operations data and existing airport plans, it has been determined the Airport will maintain the C-II designation for Runway 18R/36L and B-I for Runway 18L/36R with the option to increase to a C-III designation once dictated by demand. FWS currently meets all geometric standards for ARC C-III and no major improvements will be required to reach this designation. Table 2.12 summarizes the critical aircraft and design aircraft components for the runways at Fort Worth Spinks Airport.

TABLE 2.12: Critical Aircraft Parameters

Existing				
Runway	Critical Design Aircraft	RDC	ARC	TDG
18R / 36L	Challenger 300/350	C-II-2400	C-II	1B
18L / 36R	Cessna 172	A-I-VIS	A-I	1A
Ultimate				
Runway	Critical Design Aircraft	RDC	ARC	TDG
18R / 36L	Gulfstream V	C-III-2400	C-III	2B
18L / 36R	Cessna 172	A-I-VIS	A-I	1A

Source: KSA, FAA AC 150/5300-13B, *Airport Design*

2.16. SUMMARY OF AVIATION DEMAND FORECAST

Aircraft activity at Fort Worth Spinks Airport has fluctuated in recent history. This is not an uncommon theme at many U.S. airports, as economic uncertainty and increased travel costs have impacted travel behavior. Despite rapid volatility in fuel cost, airline bankruptcies, system-wide route restructuring, aircraft fleet overhauls, and impacts and uncertainty associated with COVID-19, the forecasts developed for this Airport Master Plan update suggest growth in the number of based aircraft and total aircraft operations at the Airport over the next 20 years.

The following tables summarize the forecasts of aviation activity presented in this chapter. This information will be utilized in the next chapter, *Facility Requirements*, to document, analyze, and quantify airside and landside needs. Therefore, the forecasts of aviation activity are an important part of the information base, which will be used to develop ultimate plans for the airport and facilitate implementation decisions relating to airport development.

To secure approval for these projections, the FAA requires a comparison of forecasts to the annually produced TAF, which is completed for each airport in the NPIAS and updated yearly. The FAA prefers that airport planning forecasts not vary significantly from the TAF and looks for forecasts to be within 10 percent of their five-year forecasts and 15 percent of their ten-year forecasts. The FAA templates for summarizing and documenting airport planning forecasts and comparing projections with the FAA TAF Forecasts are presented in Tables 2.13 and 2.14. A final summary of the forecast aviation demand is provided in Table 2.15.

THIS SECTION LEFT BLANK INTENTIONALLY

TABLE 2.13: Summary of Operations by Aircraft Type, 2022-2043

Operations	2022	2028	2033	2038	2043
Air Taxi	1,226	1,372	1,506	1,652	1,816
Single-Engine Piston	33,729	35,702	39,225	41,438	45,527
Multi-Engine Piston	9,199	9,612	10,560	9,945	9,105
Turboprop (SE)	4,906	6,179	6,789	8,288	10,016
Turboprop (ME)	4,293	5,493	6,035	7,459	8,650
Business Jet	4,906	6,179	6,789	8,288	9,561
Helicopter	3,036	4,085	4,488	5,760	6,328
Military	30	35	40	45	50
Total Operations	61,325	68,657	75,432	82,875	91,053
Local Operations	36,795	41,194	45,259	49,725	54,632
Itinerant Operations	24,530	27,463	30,173	33,150	36,421
Based Aircraft					
Single-Engine	179	195	213	220	232
Multi-Engine	18	21	22	24	26
Turboprop (SE)	2	5	6	11	14
Turboprop (ME)	3	5	6	13	18
Jet	12	14	17	22	28
Helicopter	22	24	26	29	32
Total	236	264	290	319	350

Source: KSA

TABLE 2.14: Comparison of Airport and TAF Forecasts, 2022-2043

Year	FWS Forecast	TAF Forecast	% Difference
Base Year (2022)	61,325	60,368	1.6%
2028	68,657	65,098	5.3%
2033	75,432	68,902	9.0%
2038	82,875	69,191	17.9%
2043	91,053	75,576	18.5%

Source: KSA

TABLE 2.15: Summary of Aircraft Planning Forecasts, 2022-2043

						Compound Annual Growth Rate (CAGR)			
	2022	2028	2033	2038	2043	2028	2033	2038	2043
Operations – Itinerant									
General Aviation	24,530	27,463	30,173	33,150	36,421	1.9%	1.9%	1.9%	1.9%
Operations – Local									
General Aviation	36,795	41,194	45,259	49,725	54,632	1.9%	1.9%	1.9%	1.9%
Total Operations	61,325	68,657	75,432	82,875	91,053	1.9%	1.9%	1.9%	1.9%
Instrument Operations	3,406	3,776	4,149	4,558	5,008	1.7%	1.9%	1.9%	1.9%
Peak Hour Operations	12	14	15	17	18	2.6%	1.4%	2.5%	1.1%
Based Aircraft									
Single-Engine	179	195	213	220	232	1.4%	1.7%	0.6%	1.0%
Multi-Engine	18	21	22	24	26	2.6%	0.9%	1.7%	1.6%
Turboprop	5	10	12	24	32	12.2%	3.7%	14.8%	5.9%
Jet	12	14	17	22	28	2.6%	3.9%	5.2%	4.9%
Helicopter	22	24	26	29	32	1.4%	1.6%	2.2%	1.9%
Total Based Aircraft	236	264	290	319	350	1.8%	1.8%	1.9%	1.8%

Source: KSA

3 FACILITY REQUIREMENTS

2023 FORT WORTH SPINKS AIRPORT MASTER PLAN

KSA

SPINKS AIRPORT

3. FACILITY REQUIREMENTS

3.1. OVERVIEW

A key step in the AMP is developing requirements for airport facilities, allowing the evolution of airside and landside improvements throughout the planning period. By comparing the existing conditions of the airport to forecast aviation activity, requirements for runways, taxiways, aprons, terminals, and other related facilities can be determined to ensure the Airport can facilitate the forecast demand over the short-, intermediate-, and long-term planning periods.

The following sections analyze the ability of the current facilities at FWS to meet the forecast planning activity shown in Chapter 2, *Forecast of Aviation Demand.* The aviation demand projections are converted into facility requirements spanning the 20-year planning horizons.

An essential step in the process of estimating airport needs is determining its current capacity to accommodate anticipated demand. Demand-capacity analyses yield information used to create the Airport Layout Plan (ALP). This chapter will examine the ability of FWS to accommodate the anticipated aviation demand and outline specific facility requirements necessary to address identified deficiencies in the existing airport system. Specifically, this analysis will look at the following areas:

- Airfield capacity, runway orientation, and design standards
- Approach and navigational aids
- Airfield lighting, signage, and pavement markings
- Aircraft parking aprons
- Aircraft storage hangars
- Aviation fuel storage
- Automobile parking
- Ground access
- Security and fencing

3.2. AIRFIELD DEMAND AND CAPACITY

The airfield components determining capacity include runway orientation, configuration, length, and exit locations. The capacity of an airfield system is affected by several operational characteristics including fleet mix, climatology, and ATC procedures. Runway orientation and wind coverage requirements influence how the runway system is utilized. FAA design standards set geometric guidelines for airfield components. The following chapter will analyze each component and determine improvements necessary to meet the forecast demand.

3.2.1. AIRFIELD CAPACITY

FAA methodology and guidance for airfield capacity are contained in FAA AC 150/5060-5, *Airport Capacity and Delay*. Airfield capacity is defined “as the number of aircraft operations that can safely be accommodated on both the runway and taxiway system at a given point in time before an unacceptable level of delay is experienced." Measurement of airfield capacity as described in the AC is as follows:

- Hourly Capacity – the maximum number of aircraft that can be accommodated under conditions of continuous demand during a one-hour period.
- Annual Service Volume (ASV) – the estimate of an airport's annual capacity in terms of annual aircraft operations resulting in an average annual aircraft delay, which is the total delay incurred by aircraft using the airfield at a given time.

Several factors determine the capacity of an airport, and the relationship between these factors has a cumulative impact on airfield capacity. The factors pertaining to FWS are assessed in the following sections.

3.2.2. METEOROLOGICAL CONDITIONS

Climatological conditions at an airport not only influence the layout of the airfield but also affect the runway system. Runways should be oriented to take advantage of prevailing and surface winds. Taking off and landing into the wind provides the safest operating environment for aircraft and helps avoid the need to operate in excessive crosswind or tailwind components.

3.2.2.1. CEILING AND VISIBILITY

The FAA classifies ceiling and visibility conditions using three categories:

- Visual Flight Rules (VFR) – occurs whenever the cloud ceiling is at least 1,000 feet above ground level, and visibility is at least three statute miles.
- Instrument Flight Rules (IFR) – occurs whenever the cloud ceiling is at least 500 feet but less than 1,000 feet and visibility is at least one statute mile but less than three statute miles.
- Poor Visibility and Ceiling (PVC) – occurs whenever the cloud ceiling is less than 500 feet and visibility is less than one statute mile.

3.2.2.2. WIND COVERAGE

Surface wind conditions can critically impact airport operations. Runways not oriented to take advantage of prevailing winds restrict the airport's capacity. When landing and taking off, aircraft can safely operate when the wind velocity perpendicular to the direction of flight (i.e., crosswind) does not exceed the published limitations of the aircraft. Wind coverage analyses translate crosswind velocity and direction into a "crosswind component." Crosswinds have a greater impact on smaller aircraft; therefore, these aircraft have a more restrictive crosswind component.

The appropriate crosswind component determination depends on the RDC, which is C-II for Runway 18R/36L and B-I for Runway 18L/36R. According to FAA AC 150/5300-13B, *Airport Design*, the maximum crosswind component used for RDC's A-I and B-I is 10.5 knots, a 13-knot crosswind component is used for RDC A-II and B-II, and a 16-knot crosswind component is used for A-III, B-III, C-I through C-III, and D-I through D-III. A maximum crosswind component of 20-knots is used for A-IV, B-IV, C-IV through C-VI, and D-IV through D-VI.

The desirable wind coverage for an airport is 95%, meaning the runway system should be oriented so that the maximum crosswind component is not exceeded more than 5% of the time annually. Weather data specific to the airport was obtained from the National Oceanic and Atmospheric Administration (NOAA) National Climatic Data Center (NCDC). This data was collected from the ground-based AWOS weather reporting system for the 10-year period beginning January 2014 through December 2023. Based on the all-weather wind analysis for FWS, the existing runway system provides 97.95% for the 10.5-knot crosswind component, 99.08% for the 13-knot crosswind component, and 99.74% for the 16-knot crosswind component. Table 3.1 quantifies the wind coverage provided by the combined and individual runway ends during all weather conditions, while Table 3.2 provides data for wind coverage during IFR conditions. From this analysis, the existing runway infrastructure at FWS will provide sufficient crosswind coverage throughout the planning period.

TABLE 3.1: All-Weather Wind Coverage

	10.5-Knot	13-Knot	16-Knot
Runway 18R	93.22%	94.06%	94.57%
Runway 36L	88.27%	89.19%	89.80%
Runway 18R / 36L	97.95%	99.08%	99.74%

Source: National Climate Data Center, Station 722593, Fort Worth Spinks Airport, Period 2014-2023

TABLE 3.2: IFR Wind Coverage

	10.5-Knot	13-Knot	16-Knot
Runway 18R	89.90%	90.84%	91.37%
Runway 36L	93.43%	94.59%	95.23%
Runway 18R / 36L	97.84%	99.15%	99.82%

Source: National Climate Data Center, Station 722593, Fort Worth Spinks Airport, Period 2014-2023

3.2.3. AIRFIELD LAYOUT

The arrangement and interaction of airfield components (runways and taxiways) refers to the layout or design of the airfield. The existing runway configuration consists of two (2) runways – Runway 18R/36L (primary) and Runway 18L/36R (turf).

3.2.4. AIRCRAFT MIX

A runway's capacity depends on the type and size of aircraft using the facility. AC 150/5060-5 places aircraft into four (4) classes dictated by maximum takeoff weight (MTOW). This structure differs from the previously discussed RDC/ARC, classifying aircraft based on approach category and wingspan. For aircraft weight, Classes A and B consist of single- and twin-engine aircraft weighing 12,500 pounds or less, Class C consists of jet and propeller aircraft weighing 12,500 and 300,000 pounds (business jets and commuter/narrow-body air carrier aircraft), and Class D aircraft are those weighing greater than 300,000 pounds (air cargo, wide-body air carrier, and military aircraft). Aircraft mix is defined as the relative percentage of operations conducted by each of these aircraft classes.

3.2.5. EXIT TAXIWAYS

A runway's capacity is also influenced by an aircraft's ability to exit the runway quickly and safely. Therefore, the quantity and geometry of exit taxiways can affect runway occupancy times and further impact the capacity of the airfield system. Exit taxiways should permit free flow to the parallel taxiway or allow aircraft to clear the hold line completely. Recent FAA guidance promotes standard right-angled taxiways at GA facilities, which provide bi-directional flow and greater visibility than acute-angled taxiways. Acute-angled taxiways are commonly considered high-speed exits and allow aircraft to vacate the runway at greater speeds than right-angle taxiways.

AC 150/5300-13B guides the placement of exit taxiways from runway thresholds. Dependent on the aircraft category, exit taxiways are spaced between 2,000 and 4,000 feet from the threshold, no less than 750 feet apart. Each 100-foot reduction in distance reduces runway occupancy time by approximately 0.75 seconds for each aircraft using the exit.

3.2.6. PERCENT ARRIVALS

Runway capacity is also significantly influenced by the percentage of arrival operations. Because aircraft on final approach are given priority over departing aircraft, a higher percentage of arrivals occurring during peak periods impacts the airport's Annual Service Volume (ASV). At FWS, the percentage of arrivals and departures is balanced; therefore, a 50/50 split was assumed for capacity calculations during the peak period.

3.2.7. TOUCH-AND-GO ACTIVITY

Touch-and-go operations refer to aircraft performing a normal landing, followed by an immediate takeoff without stopping or clearing the runway. These operations are typically affiliated with flight training activities and are calculated as a local operation. As reflected in the *Aviation Demand Forecast,* local operations account for approximately 60 percent of the total and are anticipated to maintain that level throughout the planning period.

3.2.8. CAPACITY ANAYLSIS

Capacity can be calculated using Annual Service Volume (ASV) to compare current and projected annual operations. FAA AC 150/5060-5, *Airport Capacity and Delay*, provides guidance for the computation of airport capacity and aircraft delays. Although only sometimes viable for hourly capacity or delay peak periods, this guideline helps determine the timeframe for capacity projects. According to FAA Order 5090.3B, *Field Formulation of the National Plan of Integrated Airport Systems (NPIAS*), improvements for airfield capacity should be considered once operations reach 60 to 75 percent of ASV. Once operations reach the 80 percent capacity threshold, construction for those improvements should begin. If 100 percent capacity is reached, serious impacts on airport operations may result in increased delays. Analysis shows that the Airport will adequately support the forecast demand in the planning period for all runway configurations, with the highest demand being 33 percent in 2043. For the base year 2022, the recorded operations at FWS were calculated at 61,325 (22 percent capacity) with a forecast of 91,053 by 2043. Table 3.3 provides the ASV demand calculations for each phase of the AMP.

TABLE 3.3: FWS Capacity Analysis

Year	Operations	ASV Capacity	Demand Percentage
2022	61,324	275,000	22%
2028	68,657	275,000	25%
2033	75,432	275,000	27%
2038	82,875	275,000	30%
2043	91,053	275,000	33%

Source: FAA AC 150/5060-5, *Airport Capacity and Delay*

THIS SECTION LEFT BLANK INTENTIONALLY

3.3. AIRFIELD REQUIREMENTS

This section addresses the physical facilities and improvements required to safely and efficiently accommodate the projected demand that will be placed on the Airport. The analysis of airfield requirements will be separated into two elements – airside and landside. The analysis of airfield requirements focuses on determining required facilities and spatial considerations related to aircraft operations on the field. This evaluation will highlight and detail airfield dimensional (design standards) criteria, design parameters of the runway and taxiway system, lighting, and NAVAIDs.

3.3.1. RUNWAY DESIGN CODE (RDC)

The RDC is a coding system developed by the FAA to relate airport design criteria to the physical characteristics of aircraft operating at the airport. The RDC has two components relating to the airport's design aircraft. The first component, depicted by a letter, is aircraft approach category and relates to aircraft wingspan. The second component considers the designated or planned visibility minimums expressed by runway visual range (RVR) values in feet.

Generally, aircraft approach speed applies to runways and associated length. Airplane wingspan primarily relates to separation criteria and width-related features. Airports expected to accommodate single-engine airplanes normally fall into Airport Reference Code A-I or B-I. Airports serving larger general aviation and commuter-type planes are usually ARC B-II or B-III. Small to medium-sized airports serving air carriers are usually ARC C-III, while larger airports are usually ARC D-IV or D-V. As previously established, the RDC at FWS is C-II for the primary runway (18R/36L) and A-I for the parallel turf runway (18L/36R). Table 3.4 presents FAA standards for runway design.

3.3.2. TAXIWAY DESIGN GROUP (TDG)

Taxiway infrastructure is also designed to a specific set of standards referred to as Taxiway Design Group (TDG). TDG is determined using the Main Gear Width (MGW) and Cockpit to Main Gear Distance (CMG) for aircraft operating on the field. These criteria help establish design standards for fillets and edge safety margins, limiting pilot error and implementing a consistent taxiway system. Table 3.5 presents FAA standards for taxiway design.

TABLE 3.4: FAA Runway Design Standards

Aircraft Approach Category (AAC)		
AAC	Approach Speed	
A	Less than 91 knots	
B	91 knots or more but less than 121 knots	
C	121 knots or more but less than 141 knots	
D	141 knots or more but less than 166 knots	
E	166 knots or more	
Airplane Design Group (ADG)		
Group	Tail Height (ft)	Wingspan (ft)
I	< 20’	< 49’
II	20’ - < 30’	49 ‘ - < 79’
III	30’ - < 45’	79’ - < 118’
IV	45’ - < 60’	118’ - < 171’
V	60’ - < 66’	171’ - < 214’
VI	66’ - < 80’	214’ - < 262’
Approach Visibility Minimums		
RVR (ft)	Flight Visibility Category (statute mile)	
5000	Not lower than 1-mile	
4000	Lower than 1-mile but not lower than ¾-mile	
2400	Lower than ¾-mile but not lower than ½-mile (CAT-I)	
1600	Lower than ½-mile but not lower than ¼-mile CAT-II)	
1200	Lower than ¼-mile (CAT-III)	

RVR – Runway Visual Range. The approximate visibility (in feet).
Source: FAA AC 150/5300-13B, *Airport Design*

TABLE 3.5: FAA Taxiway Design Standards

Item	Taxiway Design Group							
	1A	1B	2A	2B	3	4	5	6
Taxiway Width	25’	25’	35’	35’	50’	50’	75’	75’
Taxiway Edge Margin	5’	5’	7.5’	7.5’	10’	10’	14’	14’
Taxiway Shoulder Width	10’	10’	15’	15’	20’	20’	30’	30’

Source: FAA AC 150/5300-13B, *Airport Design*

3.3.3. RUNWAY LENGTH

Outlined in FAA AC 150/5325-4B, *Runway Length Requirements for Airport Design*, the runway length necessary for an airport is dependent on several factors, including airport elevation, temperature, wind velocity, aircraft operating weight, runway surface condition, obstructions, and departure/arrival procedures.

The primary runway (18R/36L) at FWS is 6,002 feet long and well-positioned to serve various general aviation and business aircraft.

The method for determining recommended runway length requires the examination of the design aircraft (Challenger 300) and the characteristics of the design category (ARC C-II). Several elements must be considered when determining runway length, including aircraft characteristics, stage length, MTOW, outside air temperature (OAT), and density altitude.

FAA runway length requirements are based on specific categories of aircraft, including small aircraft with weights of 12,500 pounds or less, large aircraft between 12,500 and 60,000 pounds, and large aircraft weighing more than 60,000 pounds.

Reflected in Table 3.6, the runway length analysis shows a length of 4,800 feet is required to accommodate 75 percent of large aircraft (less than 60,000 pounds) when operating at 60 percent of their useful load. An approximate length of 5,900 feet is required to accommodate 100 percent of these aircraft at 60 percent useful load. When evaluating the same fleet at 90 percent useful load, the required runway length increases to 7,000 feet for 75 percent of the fleet and 8,700 feet for 100 percent of the fleet.

It is important to note that aircraft greater than 60,000 pounds can safety operate at FWS with its current runway length; however, some aircraft may be required to operate at less than 100 percent of their useful load and may not be able to fly the maximum range of the aircraft when high temperatures prevail.

THIS SECTION LEFT BLANK INTENTIONALLY

TABLE 3.6: Runway Length Analysis

Airport and Runway Data	
Airport Elevation (MSL)	700.4’
Mean daily maximum temperature of the hottest month	91.8°
Maximum difference in runway centerline elevation	11.3’
Existing Runway Condition Runway 18R/36L Runway 18L/36R	 6,002’ 3,660’
Small aircraft ≤ 12,500 pounds with fewer than 10 seats	
95% of the fleet	3,350’
100% of the fleet	3,900’
Small aircraft with more than 10 seats	4,350’
Aircraft between 12,500 pounds and 60,000 pounds	
75% of Fleet – 60% useful load	4,800’
75% of Fleet – 90% useful load	7,000’
100% of Fleet – 60% useful load	5,900’
100% of Fleet – 90% useful load	8,700’
Large Aircraft > 60,000 pounds	Refer to individual aircraft manufacturer’s planning manual

Source: FAA AC 150/5325-4B, Runway Length Requirements for Airport Design. Lengths based on 700.4’ MSL, 91.8° F Mean Max Temperature, 500 NM stage length, and maximum difference in runway centerline elevation of 11.3’

As indicated in the analysis, the existing runway length at FWS is sufficient to accommodate a significant portion of the active general aviation fleet. While even the largest business jets can safely operate on the existing runway system, they are weight-limited at certain times of the year. As the number of corporate general aviation jets in the national fleet increases, a runway extension should be considered and will be evaluated during the Alternatives portion of this AMP.

3.3.4. BALANCED FIELD LENGTH

While the runway length analysis provides an overview of each aircraft category, balanced field length is a more precise method for calculating runway length requirements for individual aircraft types. Unique to each aircraft, balanced field length is defined by the FAA as “the accelerate-go performance required is exactly equal to (or “balances”) the accelerate-stop performance required.”[37] Balanced field length requirements are calculated using airport elevation, OAT, MTOW, and stage length. Table 3.7 provides a cross-section of common business jets operating at FWS or within the national GA fleet. The runway lengths identified below provide an overview of the requirements for aircraft to operate at FWS. Justification for any proposed runway extension must meet the “regular use” threshold defined by the FAA as 500 itinerant operations annually to qualify for funding assistance.

TABLE 3.7: Balanced Field Length Analysis

Aircraft	MTOW	Approximate Length	
		Standard Day (59°)	Mean Max Temp (91.8°)
Beechcraft King Air 350	15,000 lbs.	3,500’	4,400‘
Embraer Phenom 300	17,968 lbs.	3,425’	4,350‘
Cessna Citation 550	15,100 lbs.	3,700’	4,700‘
Cessna Citation CJ3+	13,870 lbs.	3,400’	4,300‘
Cessna Citation Sovereign	30,775 lbs.	3,775’	4,800‘
Challenger 350	40,600 lbs.	4,835’	6,082‘
Gulfstream G-IV	73,200 lbs.	5,700’	7,150‘
Gulfstream G-V	90,500 lbs.	5,150’	6,500‘
Global Express 5500	92,500 lbs.	6,300’	7,900’
Global Express 6500	99,500 lbs.	7,250’	9,050’
Global Express 7500	106,250 lbs.	6,800’	8,500’

Source: FAA Flight Planning Guides, Manufacturer Airport Manual Manuals and Data Sheets

3.3.5. RUNWAY WIDTH

The required runway width is determined by the critical aircraft and the instrumentation available at the airport. Based on FAA design criteria and existing instrument approach procedures at FWS, the existing width of Runway 18R/36L (100’) is adequate to meet the existing and proposed operations during the 20-year planning period.

3.3.6. RUNWAY PAVEMENT STRENGTH

Runway pavement strength is expressed by categorizing common landing gear configurations. Example aircraft for each type of gear configuration is provided below:

- Single-wheel (SW): each landing gear unit has a single tire; examples include light aircraft and some business jet aircraft.

[37] FAA, *Pilot Guide to Takeoff Safety*, December 8, 2021

- Dual-wheel (DW): each landing gear unit has two tires; example aircraft are the King Air 350, Citation Longitude, and Gulfstream V.
- Dual-tandem (DTW): main landing gear unit has four tires arranged in the shape of a square; example aircraft include the Boeing 757 and Airbus A330.

The aircraft gear type and configuration dictate how aircraft weight is distributed to the pavement and determines the pavement response to loading. As previously mentioned in the Inventory of Existing Conditions, Runway 18R/36L supports a single-wheel (SW) rating of 60,000 pounds, a dual-wheel (DW) rating of 70,000 pounds, and a dual-tandem (DTW) rating of 100,000 pounds.

The strength rating of a runway does not preclude aircraft weighing more than the published strength rating from operating at the airport. It provides the ability to support a high volume of aircraft at or below the published weight. While aircraft weighing more than the published weight could damage the runway in severe cases, it more commonly reduces the pavement's lifecycle. As part of this AMP update, a Pavement Classification Number/Rating (PCN/PCR) analysis will be conducted to satisfy the FAA requirement that all airports assign gross weight and PCR data to airport pavements as part of projects funded with federal grant monies that include pavement management, rehabilitation, or reconstruction. This analysis will result in conceptual structural rehabilitation requirements based on the existing or proposed operations.

3.3.7. TAXIWAYS

The FAA recently updated taxiway design standards to improve the spacing and sizing of taxiways. The primary directive for the updated guidance is the prevention of runway incursions. The FAA defines incursions as "any occurrence at an aerodrome involving the incorrect presence of an aircraft, vehicle or person on the protected area of a surface designation for the landing and takeoff of aircraft."[38] Incursions are broken down into four (4) categories by severity:

- Category A is a serious incident in which a collision was narrowly avoided.
- Category B is an incident in which separation decreases, and there is a specific significant potential for collision, which may result in a time-critical corrective/evasive response to avoid a collision.
- Category C is an incident characterized by ample time and distance to avoid a collision.
- Category D is an incident that meets the definition of runway incursions as incorrect presence of a single vehicle/person/aircraft on the protected area of a

[38] FAA Runway Safety Resources, *Runway Incursions*, October 13, 2022

surface designated for the landing and takeoff of aircraft but with no immediate safety consequences.

The FAA identifies seven (7) best practices for airport design that reduce the potential for incursions:

- Increase pilot situational awareness by keeping taxiway layouts simple.
- Avoid wide expanses of pavement and provide accurate signage.
- Limit the need for runway crossings for taxiing aircraft.
- Avoid “high-energy” intersections in the middle third of the runway, which create the potential for a high-energy collision.
- Increase visibility using right-angle intersections, providing the best visibility for pilots.
- Avoid “dual purpose” pavements.
- Avoid providing direct access from an apron to a runway without requiring a turn.

Currently, FWS has two (2) taxiways (Foxtrot “F” and Echo “E”) featuring direct access from the primary apron to Runway 18R/36L. While not identified as “hot spots” by the FAA, these taxiways should be reconfigured when the pavement is subject to reconstruction, rehabilitation, or other improvements. Subsequent chapters will analyze alternatives for satisfying FAA design standards regarding direct-access taxiways.

FAA AC 150/5300-13B notes that a full-length parallel taxiway is required for runways configured with instrument approach procedures featuring minimums below one mile and is recommended for all other conditions. The existing taxiway infrastructure at FWS exceeds these criteria. The airport features two (2) full-length parallel taxiways serving Runway 18R/36L. Table 3.8 presents FAA taxiway design standards.

THIS SECTION LEFT BLANK INTENTIONALLY

TABLE 3.8: FAA Taxiway Design Standards

Airplane Design Group (ADG)	II	III	IV
Taxiway Protection:			
Taxiway Safety Area Width	79’	118’	171’
Taxiway Object Free Area Width	124’	171’	243’
Taxilane Object Free Area Width	110’	158’	224’
Taxiway Separation:			
Taxiway Centerline to:			
Parallel taxiway / taxilane centerline	101.5’	144.5’	207’
Fixed or movable object	62’	85.5’	121.5’
Taxilane Centerline to:			
Parallel taxilane centerline	94.5’	138’	197.5’
Fixed or movable object	55’	79’	112’
Wingtip Clearance:			
Taxiway wingtip clearance	22.5’	26.5’	36’
Taxilane wingtip clearance	15.5’	20’	26.5’
Taxiway Design Group (TDG)	**2A/2B**	**3**	**4**
Taxiway Width	35’	50’	50’
Taxiway Edge Safety Margin	7.5’	10’	10’
Taxiway Shoulder Width	15’	20’	20’

Source: FAA AC 150/5300-13B, *Airport Design*

3.4. DIMENISIONAL CRITERIA

Aircraft operating or projected to operate at FWS impact the planning and design of facilities. FAA AC 150/5300-13B provides the requirements for dimensional design criteria for the critical or design aircraft that currently utilize the airport or are projected to use the airport in the future. Table 3.9 provides each runway’s dimensional criteria based on Runway Design Code (RDC).

THIS SECTION LEFT BLANK INTENTIONALLY

TABLE 3.9: FAA Design Criteria Summary

Design Item	Runway 18R/36L (C-II & C-III) Not lower than ½ - mile vis. minimums	Runway 18L/36R (A-I) Visual Minimums
Runway		
Width	100’	60’
Safety Areas (SA)		
Width	500’	120’
Length Beyond Departure End	1,000’ / 1,000’	240’ / 240’
Length Prior to Threshold	600’ / 600’	240’ / 240’
Object Free Areas (OFA)		
Width	800’	250’
Length Beyond Departure End	1,000’ / 1,000’	240’ / 240’
Length Prior to Threshold	600’ / 600’	240’ / 240’
Obstacle Free Zone (OFZ)		
Width	400’	250’
Length Beyond Departure End	200’ / 200’	200’ / 200’
Taxiway		
Width	35’	35’
Safety Area	79’	79’
Object Free Area	124’	124’
Centerline to Fixed or Movable Object	62’	62’
Runway Centerline to:		
Holdline	250’	200’
Taxiway Centerline	400’	225’
A/C Parking Area	500’	300’

Source: FAA AC 150/5300-13B, *Airport Design*

THIS SECTION LEFT BLANK INTENTIONALLY

3.4.1. RUNWAY SAFETY AREA

The Runway Safety Area (RSA) is a defined surface surrounding the runway prepared or suitable for reducing the risk of damage to aircraft in the event of an undershoot, overshoot, or excursion from the runway. According to the FAA's definition and dimensional standards, the RSA should be cleared, graded, and have no potentially hazardous ruts or surface variations.

For Runway 18R/36L, design standards (ARC C-II) dictate the RSA is required to be 500 feet wide and extend 1,000 feet beyond the departure end of the runway. Runway 18L/36R features an RSA 120 feet wide and extending 240 feet beyond the departure end of the runway. Both runways currently meet design standards for their respective ARC categories.

3.4.2. RUNWAY OBJECT-FREE AREA

The Runway Object Free Area (OFA) is a two-dimensional ground area centered on a runway, taxiway, or taxilane centerline provided to enhance the safety of aircraft operations by remaining clear of objects that need to be located in the OFA for air navigation or aircraft ground maneuvering purposes. The OFA prohibits parked aircraft and other objects, except NAVAIDs and objects with locations fixed by function. According to FAA guidelines, OFA for ARC C-II and C-II runways should extend 1,000 feet beyond each end of the runway and have a width of 800 feet. The OFA for ARC A-I should extend 240 feet beyond each end of the runway and have a width of 240 feet. Similar to the RSA, both runways meet the requisite OFA requirements.

3.4.3. OBSTACLE FREE ZONES

The Obstacle Free Zone (OFZ) is a three-dimensional volume of airspace that surrounds the transition of ground-to-airborne operations. The OFZ clearing standards prohibit taxiing, parked aircraft, and other objects, except for frangible NAVAIDs or fixed-function objects, from penetrating this zone. The OFZ consists of a volume of airspace below 150 feet above the established airport elevation and is centered on the extended runway centerline. The OFZ extends 200 feet beyond the end of each runway and has a width that varies with approach visibility minimums and the size of aircraft utilizing the runway.

3.4.4. RUNWAY PROTECTION ZONES

A Runway Protection Zone (RPZ) is an area off the runway end intended to enhance the protection of people and property on the ground. This is achieved through airport control of the RPZ areas. The RPZ is trapezoidal in shape, centered on the extended runway centerline, and begins 200 feet beyond the end of the area usable for takeoff or landing. RPZ dimensions are a function of the RDC, aircraft size, and the lowest visibility minimums associated with a runway end.

Because RPZs often extend beyond airport property and overlap with property specifically owned and operated by the airport, the FAA has produced a memorandum to provide policy guidance on compatible land uses within an RPZ, entitled *Interim Guidance on Land Uses within a Runway Protection Zone*. While "it is desirable to clear all objects from the RPZ, some uses are permitted with conditions and other land uses prohibited." Airport control of the RPZ is emphasized to protect people and property on the ground. Although the FAA recognizes that in certain situations, the airport sponsor may not fully control land within the RPZ, the FAA expects airport sponsors to take all possible measures to protect against and remove or mitigate incompatible land uses.

While the following land uses are permissible within an RPZ without further scrutiny or evaluation:

- Farming activities that meet airport design standards.
- Irrigation channels that do not attract wildlife.
- Airport service roads.
- Underground facilities that meet airport design standards.
- Unstaffed NAVIADs and facilities, such as equipment for airport facilities that are considered fixed-by-function.

There are certain trigger points or actions that could alter the compatibility of land uses within an RPZ as a result of:

- An airfield project (e.g., runway extension, runway shift).
- A change in the critical design aircraft that increases RPZ dimensions.
- A new or revised instrument approach procedure that increases RPZ dimensions.
- A local development proposal in the RPZ.

Should such trigger points revise the limits of an RPZ that include the following land uses, then additional evaluation and approval from the FAA would be necessary and mandatory.

- Buildings and structures (Residences, schools, churches, hospitals, commercial and industrial buildings, etc.).
- Recreational land use (Golf courses, sports facilities, amusement parks, places of public assembly, etc.).
- Transportation facilities (Rail facilities, public roads and highways, and parking facilities).
- Fuel storage facilities.

- Wastewater treatment facilities.
- Above-ground utility infrastructure.

It should be noted that these new criteria do not apply to existing RPZs but rather to those which are new or modified. While it is still incumbent of the airport sponsor to take all reasonable action to meet RPZ design standards, FAA funding priority for certain actions will be addressed and determined on a case-by-case basis. Table 3.10 presents the RPZ dimensions for each runway end and notes current airport control of those areas.

TABLE 3.10: Runway Protection Zone (RPZ) Dimensions

	Width at Inner Edge	Length	Width at Outer Edge	Airport Control
Existing RPZ Dimensions				
Runway 18R	1,000’	1,510’	1,700’	Yes
Runway 36L	1,000’	2,500’	1,750’	Yes
Runway 18L	250’	1,000’	450’	Yes
Runway 36R	250’	1,000’	450’	Yes

Source: FAA AC 150/5300-13B, *Airport Design*

3.4.5. BUILDING RESTRICTION LINE

The Building Restriction Line (BRL) identifies suitable building locations based on visibility and Part 77 airspace surfaces. The BRL considers RPZs, OFAs, OFZs, NAVAID critical areas, areas designated for Terminal Instrument Procedures (TERPS), and ATCT line-of-sight. The BRL setback at FWS should be 675 feet for a 25-foot-high structure and 745 feet for a 35-foot-high structure.

3.5. NAVIGATIONAL AIDS

NAVAIDs are any visual or electronic device, airborne or on the ground, that provide point-to-point guidance information or position data to aircraft in flight. Airport NAVAIDs provide guidance to a specific runway end or an airport. An airport is equipped with precision, non-precision, or visual capabilities in accordance with design standards based on safety considerations and operational needs. The type, mission, volume of activity, climate, airspace, and capacity considerations determine an airport’s eligibility and need for specific NAVAIDs.

3.5.1. INSTRUMENT NAVIGATIONAL AIDS

This category of NAVAID assists aircraft performing instrument approach procedures (IAP) to an airport. A predetermined set of maneuvers, IAPs guide aircraft from the initial approach fix (IAF) to landing. The current IAPs outlined in Chapter 1, *Inventory of Existing Conditions* are sufficient to meet the current and forecast demand at FWS.

3.5.2. AUTOMATED WEATHER

FWS is served by an on-site Automated Weather Observation System (AWOS-3) accessible via frequency 120.025 and phone at 817.426.4172. FAA Order JO 6560.20C, *Siting Criteria for Automated Weather Observing Systems (AWOS),* outlines the siting criteria for airports equipped with a Precision Instrument Runway (PIR) with or without RVR instrumentation. “The cloud height, visibility, and wind sensors must be located adjacent to the primary instrument runway 1,000 feet (300 meters) to 3,000 feet (900 meters) down the runway from the threshold. The minimum distance perpendicular to the runway centerline must be 750 feet (230 meters). The maximum distance perpendicular to the runway centerline must not exceed 1,000 feet (300 meters). The minimum distance of 750 feet assumes flat terrain. If the elevation of the wind sensor site is above or below the runway elevation, the minimum distance is adjusted by 7 feet for every foot of elevation difference.”[39] The existing AWOS at FWS is located approximately 500 feet east of the Runway 36L touchdown markers (1,000-foot markers). While the equipment meets the parallel distance requirements, the system should be sited approximately 250 east of its current location to satisfy the perpendicular requirement of 750 feet. The following chapter, *Alternatives*, will analyze the current location, equipment age, and relationship to the turf runway (18L/36R) to determine appropriate steps for satisfying FAA design standards.

3.5.3. AIRFIELD MARKINGS

FAA AC 150/5340-1M, *Standards for Airport Markings* provides guidance for uniform airfield markings including runways, taxiways, and aprons. Runway markings coincide with the level of instrument approach capability provided by the runway. Runway 18R/36L should continue to maintain precision approach markings and all markings should be maintained in accordance with AC 150/5340-1M.

3.5.4. AIRFIELD LIGHTING AND SIGNAGE

It is recommended that Runway 18R/36L retain the equipped Medium Intensity Runway Lights (MIRL) and MALSR. It is recommended lighting be implemented across the airfield. These features enhance safety along maneuvering areas and maintain consistency across the airfield, enhancing pilot awareness.

[39] FAA Order JO 6560.20C, *Siting Criteria for Automated Weather Observing Systems*, September 6, 2017


FORT WORTH
SPINKS AIRPORT
Certified Aircraft Maintenance, Inc.
CAM
AIR CENTER HELICOPTERS
FORTWORTH JETCLUB

3.6. LANDSIDE REQUIREMENTS

This section describes landside facility requirements needed to accommodate the forecast activity at FWS. Areas of focus include hangars, aircraft parking apron, GA terminal and FBO facilities, AAM/UAM facilities, electrification, and solar.

3.6.1. GENERAL AVIATION TERMINAL BUILDING

GA terminal facilities range from basic waiting rooms, restrooms, and telephones to multi-story buildings with amenities, including pilot lounges, briefing rooms, restaurants, conference and training rooms, and administration offices. For most airports, the GA terminal is the focal point of the airport and should be easy to locate for both pilots and visitors. At FWS, GA services are provided by Harrison Aviation.

The methodology to estimate GA terminal facility requirements is based on the number of users anticipated to use the facility during the design hour. A general planning guideline of 125 square feet of space per person and 2.5 automobile parking spaces is recommended to determine overall GA terminal needs. Table 3.11 provides proposed terminal space requirements throughout the planning period. As indicated below, the existing 7,400 square feet of terminal space provided by Harrison Aviation will adequately serve demand through 2038, with the potential need for a small expansion by 2043. Additionally, the 63 automobile parking positions offered by Harrison Aviation will accommodate demand through 2028, when the number of positions required will increase to as many as 160 by 2043. The administration building, located directly south of Harrison Aviation, offers 43 existing parking positions, supplementing the accommodations of Harrison Aviation.

TABLE 3.11: Summary of General Aviation Terminal Requirements

	2022	2028	2033	2038	2043
Peak Hour Passengers	18	27	38	50	64
GA Terminal Requirement (sq. ft.)	2,300	3,400	4,700	6,200	8,000
Auto Parking Spaces	45	70	95	125	160

Source: KSA

3.6.2. GENERAL AVIATION AIRCRAFT PARKING APRONS

FWS currently provides approximately 42,000 square yards of primary apron space for itinerant and local GA operations. The following aircraft parking requirements were developed using guidance from AC 150/5300-13B, Appendix 5, and Airport Cooperative Research Program (ACRP) Report 113, *Guidebook on General Aviation Facility Planning*.

3.6.2.1. BASED AIRCRAFT APRON

Based aircraft tie-downs are provided for aircraft owners who do not require long-term hangar storage or tenants who cannot be accommodated due to hangar availability. According to ACRP Report 113, Guidelines for General Aviation Facility

Planning, space calculations for these areas range from 400 and 800 square yards depending on the aircraft category. For planning purposes, 500 square yards will be used to determine requirements for based aircraft. This space allotment provides adequate room for aircraft parking and efficient circulation. As recent trends indicate, hangar storage capacity is often reached before additional space is provided. This increases the demand for apron aircraft storage at GA facilities.

3.6.2.2. ITINERANT AIRCRAFT APRON

Itinerant apron storage is provided for transient aircraft owners and operators requiring short-term or temporary storage. These aprons provide easy access to the FBO and fueling facilities and are configured to allow for the safe and efficient aircraft movement. Similar to based aircraft aprons, calculations for this storage requirement are outlined in ACRP Report 113. The recommendations state that 500 square yards should be provided for ADG-I aircraft, 1,000 square yards for ADG-II aircraft, and 2,000 square yards for ADG-III aircraft.

3.6.3. AIRCRAFT HANGAR STORAGE

Aircraft storage demand is a critical element when considering facility requirements for GA based aircraft. Several variables, including the number of based aircraft, fleet mix, local weather conditions, and user preference, drive the quantity and type of hangar space required at FWS. The following section outlines requirements for T-hangars and corporate/executive hangars.

3.6.3.1. T-HANGARS

Available in two styles, standard and nested, T-hangars are the most common method of aircraft storage at GA airports. Nested T-hangars optimize developable space and reduce the required taxilane pavements. T-Hangars are typically constructed for single-engine and light twin-engine aircraft. Standard planning assumptions for T-hangars are based on 1,200 square feet of storage for single-engine aircraft and 1,500 square feet of storage space for multi-engine aircraft.

3.6.3.2. CORPORATE / EXECUTIVE HANGARS

A corporate hangar is usually a standard box hangar with dedicated space such as an office, restroom, conference room, break room, and lobby area. Aircraft stored in these facilities typically reflect those aircraft within the medium to large turbine category.

Executive hangars are constructed when conventional or T-hangar facilities are too small. These facilities commonly feature several leases and accommodate small to medium piston, turboprop, and small jet aircraft. They provide flexibility for airports and offer easier expansion capabilities.

Calculations for corporate/executive hangars are based on 2,500 square feet of storage for turboprop aircraft, 10,000 square feet for business jets, and 1,500 square feet for helicopters.

Table 3.12 presents the type of facilities required to meet the forecast demand for each development phase. It is expected that most based aircraft at FWS will desire hangar storage facilities. It should be noted that the actual number, size, type, and location of future hangar facilities will depend on user needs, market conditions, and financial feasibility. The *Alternatives* chapter will outline locations capable of supporting the expansion of hangar facilities.

TABLE 3.12: Summary of Apron and Hangar Requirements

	2022	2028	2033	2038	2043
Itinerant (sq. yds.)					
ADG-I	--	19,000	21,000	23,000	25,250
ADG-II	--	39,000	42,750	47,000	51,600
ADG-III	--	8,400	9,200	10,100	11,100
Based Aircraft					
Apron (sq. yds.)	--	5,250	5,800	6,400	7,000
Tie-Down parking spots	38	13	15	16	18
TOTAL APRON (sq. yds.)	71,000[1]	71,650	78,750	86,500	94,950
Hangar Area Requirements					
Existing T-Hangars (sq. ft.)	179,500	-	-	-	-
Future T-Hangars (sq. ft.)	175,000	191,250	208,000	216,000	228,500
Existing Corporate/Executive Hangars (sq. ft.)	415,500	-	-	-	-
Future Corporate/Existing Hangars (sq. ft.)	255,000	300,000	350,000	440,000	526,500
Total Hangar Need (sq. ft.)	430,000	491,250	558,000	656,000	755,000
ADDITIONAL HANGAR REQUIREMENT (sq. ft.)	--	--	--	61,000	160,000

Source: KSA
[1]Existing apron does not differentiate between itinerant and based.

3.6.4. SUPPORT FACILITIES REQUIREMENTS

In addition to the aviation and airport access facilities, there are other airport support facilities vital to the safe and efficient operation of the Airport. The support facilities at FWS that require further evaluation include fuel storage and perimeter fencing.

3.6.5. FUEL STORAGE FACILITY

At FWS, fuel storage and sales are provided by Harrison Aviation. Fuel storage includes one (1) 12,000-gallon Jet-A tank and one (1) 12,000-gallon 100LL tank. Self-service 100LL is available via two (2) 1,000-gallon tanks located on the east and west sides of FWS. Additionally, Harrison Aviation supplies one (1) 3,000-gallon Jet-A truck and two (2) 1,000 100LL trucks providing mobile fueling.

According to fuel sales data provided by FWS, fuel flowage for 2022 equated to 131,704 gallons of 100LL and 325,181 gallons of Jet-A, equating to approximately 3 gallons per piston and 17.5 gallons per turbine operation. As operations continue to increase, fuel storage requirements can be expected to increase proportionately. By increasing the ratio of gallons sold per operation, an estimate of fuel storage needs can be calculated considering a 14-day supply during the peak month of operation. As reflected in Table 3.13, the airport's fuel storage capacity exceeds the forecast demand for 100LL; however, Jet-A storage is anticipated to increase through each phase of the planning period.

TABLE 3.13: Summary of Aircraft Fuel Storage

Operational Activity	2021	2026	2031	2036	2041
100LL					
Average Day of Peak Month, Operations	143	151	166	171	182
14-days of Operations	2,003	2,115	2,323	2,398	2,549
Gallons per operation	3.0	3.3	3.6	4.0	4.4
Fuel Storage (gallons)	6,010	6,978	8,434	9,575	11,198
Jet-A					
Average Day of Peak Month Ops	61	78	85	105	121
14-days of Operations	859	1,089	1,197	1,470	1,700
Gallons per operation	17.5	19.3	21.2	23.3	25.6
Fuel Storage (gallons)	15,000	21,000	25,350	34,250	43,550

Source: Airport Records, KSA

3.6.6. SECURITY AND FENCING

Airport security and wildlife fencing are important elements of the airport system. Tenants, users, and businesses count on airport management to provide secure and safe facilities to protect their investments. Various types of fencing are used for security and prevention of wildlife, varying in style and height depending on airport needs. These low-maintenance fences provide clear visibility for security and may include chain link, barbed wire, or razor wire. The airport currently provides 8' security/wildlife fencing and controlled access across the airfield. FWS currently has CIP projects on file to update the original west side fencing and fencing surrounding the southern RPZ and approach lighting. These improvements will be further reflected in the *Alternatives* chapter.

3.7. ADVANCED AND URBAN AIR MOBILITY FACILITY REQUIREMENTS

AAM and UAM are reshaping our approach to airport planning. As the industry makes a final push toward certification, our planning initiative must lead with the same level of innovation. As technology advances, the FAA anticipates that commercial UAM/AAM operations will increase substantially at GA airports, especially those operating within a large metropolitan area. As the FAA continues to analyze the growth of AAM/UAM, new forecasting models are expected to be developed that will specifically track network expansion resulting from the growth of new technologies.[40] KSA is leading the charge as a founding member of the NCTCOG's North Texas UAS Task Force.

"The Task Force is a group of industry experts that provide recommendations to safely integrate unmanned aircraft systems (UAS) implementation within the Dallas-Fort Worth (DFW) area. This is a multifaceted task force designed to mitigate reckless UAS operation and promote the safe integration of UAS technology into the DFW regional airspace.

The DFW region is a leader in both the Aerospace and Air Transportation Industries with over 900 companies, accounting for one of every six jobs in North Texas, generating approximately $10.5 billion annually. Unmanned aircraft systems represent the next wave of innovation in aviation, and our region's resources position the DFW area in prime position to usher in this new era of aviation."

Source: NCTCOG

---

[40] FAA Center of Excellence for UAS Research, *A66_A11L.UAS.106 Develop Models to Inform the Integration of Advanced Air Mobility (AAM) Into the NAS*, Accessed May 8, 2023

3.7.1. MARKET ASSESSMENT AND USE CASES

Airport Cooperative Research Program (ACRP) Report 243, Urban Air Mobility: An Airport Perspective, identifies three primary uses cases driving market demand for AAM/UAM operations. Air cargo, air medical, and passenger service encompass primary development of the market sector.[41] **Table 3.14** details specific use cases for AAM.

TABLE 3.14: Advanced Air Mobility Use Cases Summary

Use Cases		Description	Aerial Vehicles	Facility Needs
Commercial Passenger Services	Air Taxi	• On-demand transportation within the city, similar to conventional ride sharing. This includes transport to and from the airport from STOLports/vertiports in the city.	STOL/VTOL	• Fast charging stations or hydrogen fueling facilities. • Terminal facilities with amenities to accommodate passengers.
	Air Metro	• Scheduled intra-urban flights within selected locations.		
	Commuter/Regional Flights	• Inter-city connections and air services between smaller communities		
Air Cargo Delivery	Goods and Last-Mile Delivery (<250 lb.)	• Fast delivery of light freight (e.g., food, pharmaceuticals, parcels) in urban areas to private residences (light freight). • Goods delivery in urban areas to a hub along a predefined route. • Delivery of time-critical medical supplies (blood, organs, vaccines) to hospitals.	Small VTOL UAS	• Charging stations and hydrogen fueling facilities. • Warehouses/small storage facilities. • Unmanned aircraft system traffic management (UTM).
	Heavier Air Freight (>250 lb.)	• Delivery of freight to final destination by larger VTOL or STOL UAS. Regional air freight and road feeder services with manned or unmanned STOL or CTOL aircraft. • Forwarding of containers or bulk goods over a route with little infrastructure. • Transport of time-sensitive, high-value industrial supplies.	Small UAS (VTOL/STOL) Large UAS (VTOL/STOL) STOL/CTOL feeder aircraft	• Charging stations and hydrogen fueling facilities. • Warehouses and storage facilities. • Cargo loading areas and equipment. • UTM.

[41] ACRP Report 243, *Urban Air Mobility: An Airport Perspective*, p. 31, 2023

Medical/Emergency Services	Medevac	Transport of medical emergency personnel to site of accidents. Medical evaluation of injured or sick patients to closest hospitals.	STOL/CTOL feeder aircraft Large UAS (VTOL/STOL)	Fast charging stations or hydrogen fueling facilities. Dedicated direct access from landside to tarmac (medevac). UTM.
	Emergency Management	Transport of firefighting personnel. Rescues from hard to reach/emergency areas.		
	Medical/Emergency Supplies	Dropping lifebuoys or helicopter emergency supplies to site.	Small UAS (VTOL/STOL)	

Source: ACRP Report 243, *Urban Air Mobility: An Airport Perspective*, 2023

The primary challenge presented by the AAM/UAM sector is the amount of infrastructure that will be required to accommodate the forecast demand. As noted in ACRP Report 243, "The size of the OEM market is expected to grow substantially in all cases between 2025 and 2035, with a 2025 base-level air passenger (air taxi and metro) market size of $110 million, which is expected to swell to nearly $18 billion by 2035. By contrast, the Air Cargo market is expected to be more substantial in the near term (2025) but grow at a more moderate pace as it assumes a greater share of the parcel delivery market."[42]

3.7.2. INTEGRATION OF AAM & UAM

Advancements in AAM and UAM are some of the most fundamental changes in our industry since the jet age. This segment will provide opportunities for new connectivity of services, including food and package delivery, transportation to urban hubs from airports, and even rural applications. Providing a safe location for AAM aircraft to operate is a top priority as the industry continues to develop and accept more AAM aircraft into the fleet.

The focus of TxDOT and the Urban Air Mobility Advisory Committee has been "to provide consistency across Texas law by creating statutory uniformity and standard definitions pertaining to unmanned aircraft operations and urban air mobility/advanced air mobility." FWS is well positioned with a unique opportunity to align itself as a frontrunner during the technological advancement of the UAM industry. Using guidance from the FAA Engineering Brief 105, *Vertiport Design*, the following sections will examine how these aircraft can safely and efficiently integrate into the airport system and local community.

The interim guidance of EB 105 was established to provide an acceptable level of safety, performance, and operation, guiding the planning and design of new vertiports and modifications to existing rotorcraft and aircraft facilities to accommodate VTOL operations. Specifically outlined in Section 5, *On-Airport Vertiports*, guidance is presented to help airports develop vertiport facilities and modify existing facilities.

Integrating VTOL facilities at airports presents two primary challenges while determining facility design; implementation of safety areas, traffic management procedures, and

[42] ACRP Report 243, *Urban Air Mobility: An Airport Perspective*, p.15, 2023

utility infrastructure required to support ongoing operations and maintenance. Similar to heliports, vertiports must be designed with a touchdown and liftoff area (TLOF) and a final approach and takeoff area (FATO)[43]

The FAA anticipates that separate facilities will be required for VTOL operations, especially in situations where the volume of operations adversely impacts the facilities' level of service. EB 105 outlines the design standards for siting the TLOF and FATO. Table 3.15 details the separation standards from existing runway infrastructure and approach procedures.

ACRP Report 243 also provides a list of minimum infrastructure requirements that will serve specific elements of UAM operations, including the following:

- Vertiports, from which passengers will arrive and depart;
- Cargo loading facilities designed for automated missions;
- Terminal buildings for passenger screening and pre-processing; and
- Facilities for dedicated traffic monitoring, communications, and navigation equipment.[44]

TABLE 3.15: FATO Separation Standards

VTOL MTOW	Aircraft Size	FATO Center to Runway Centerline
12,500 lbs. or less	12,500 lbs. or less	300 feet
12,500 lbs. or less	12,500 – 300,000 lbs.	500 feet
12,500 lbs. or less	Over 300,000 lbs.	700 feet

Source: FAA, EB No. 105, *Vertiport Design*

THIS SECTION LEFT BLANK INTENTIONALLY

[43] FAA, Engineering Brief No. 105, *Vertiport Design*, September 21, 2022
[44] ACRP Report 243, *Urban Air Mobility: An Airport Perspective*, p. 15. 2023

3.7.3. CHARGING INFRASTRUCTURE AND ELECTRIFICATION

At the time of publication, EB 105 notes that electrification standards surrounding the implementation of vertiport facilities have yet to be established. However, it can be assumed from recent trends that most VTOL aircraft will utilize electric propulsion methods, with charging needs varying by design and manufacturer. As the GA industry moves quickly toward the electrification of aircraft, it is anticipated that light-sport and training aircraft will be the first platforms to achieve certification. The following Table 3.16, published by the National Renewable Energy Laboratory (NREL), provides a timeline for the development of electric aircraft.

TABLE 3.16: Development Trajectory of Aircraft Electrification

Timing	Use Case	Description	Companies
2020-2025	Pilot Training	• 1 pilot and 1 passenger • Cruise speed: 125 mph	• Pipistrel • Bye Aerospace • Rolls-Royce
	General Aviation/Personal and Business	• 1-6 passengers • Average flight time: 43 minutes	• Pipistrel • Bye Aerospace
2025-2040	Regional Commuter (<5 passengers)	• Air taxi under 20 miles • Up to 4 passengers and 1 pilot • Closer to 50-mile range (eVTOL)	• Joby • Bell • Hyundai • Jaunt • Archer • Lillium • Elios • Beta Technologies • Many others (Blain 2020)
	Light Air Cargo	• Maximum payload: 7,500 pounds • Cruise speed: 200 mph • Custom cargo deliveries (e.g., United Parcel Service, medical products, and military)	• Ampaire • magniX • Beta Technologies
	Regional (<15 passengers)	• Up to 15 passengers for scheduled and/or unscheduled operations/Federal Aviation Administration (FAA) Part 121 Commuter air service	• Ampaire • Eviation (Reid 2019); Siemens/magniX (2022) • magniX
2040-2050	Commercial Aircraft	• 186-seat electric aircraft	• Wright/Easy Jet (2030)

Source: NREL, *Electrification of Aircraft: Challenges, Barriers, and Potential Impacts*, October 2021

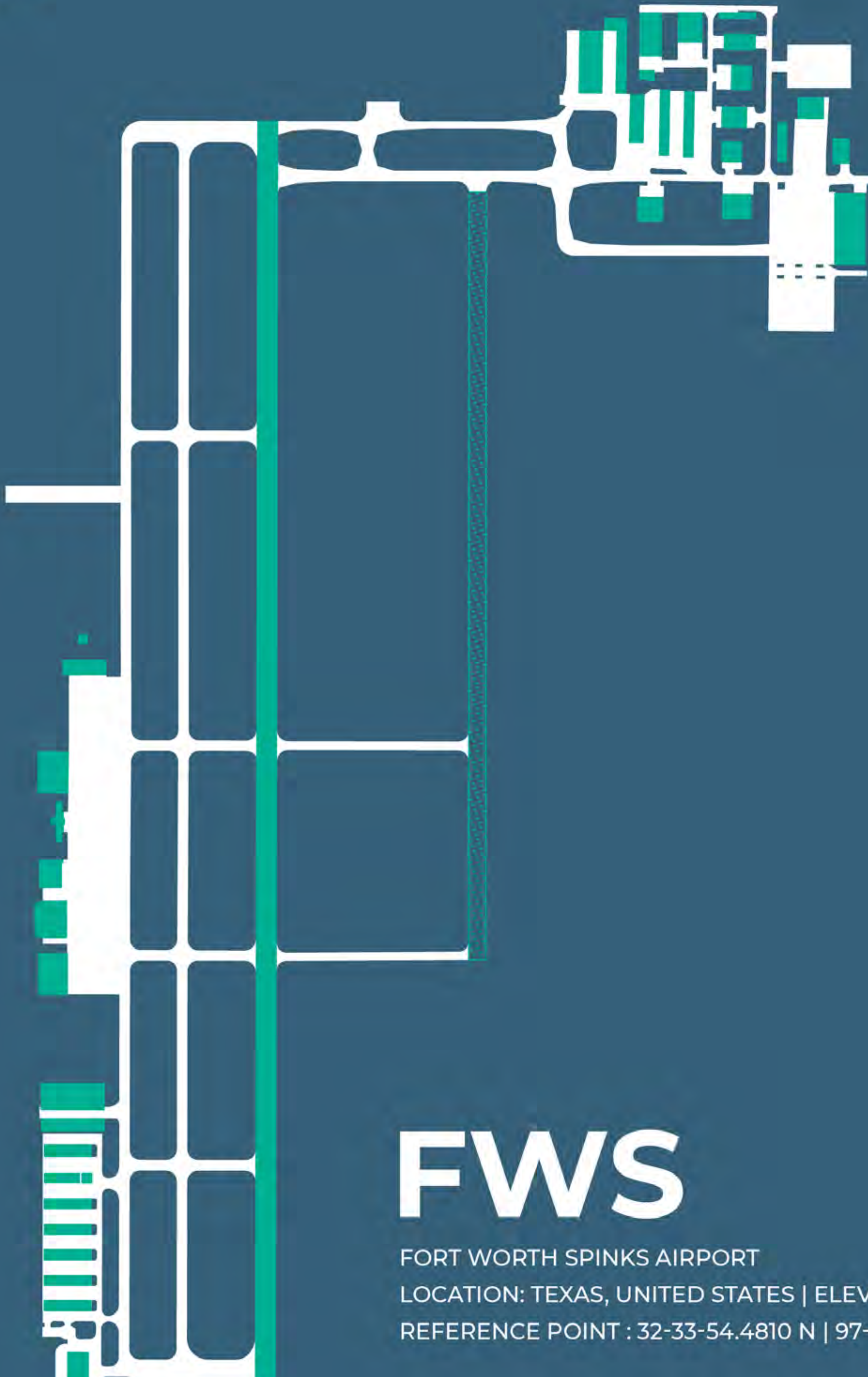
The implementation of electric aircraft will have a significant impact on airport infrastructure needs. As noted in the NREL study, "…airports need to begin considering the electrical needs and long-term power demand required to meet the needs of future all-electric aircraft. Near-term efforts need to consider both electric aircraft and growing electrification of other airside and landside vehicles."[45] Given the scope of the AMP horizon, it will be important to explore electric infrastructure improvements, including size, current power capabilities, and density as we craft the long-term needs of FWS.

Given the size of FWS and the availability of developable land, a primary focus of the Alternatives analysis will center on implementing solar power production at the Airport. Several case studies prove the effectiveness of photovoltaic arrays in support of airport sustainability. As we ramp up to accommodate the electrification of aircraft, ensuring the sustainability and resiliency of the airport is vital for success. As detailed in Chapter 1, *Inventory of Existing Conditions*, KSA provided environmental support for a successful photovoltaic installation at the Monterey Regional Airport in California. Now complete, it is estimated that the system will provide a net savings of $5.5 million over the 25-year program life and generate an estimated output of 1.5MW annually, equating to the amount of energy required to power 111 homes for one year.[46]

The International Civil Aviation Organization (ICAO) publishes a yearly environmental review of the aviation industry. The *2022 ICAO Environmental Report* details several case studies surrounding the implementation of photovoltaic arrays at airports and the resulting benefits. Similar to the FAA, the Austrian government is making a big push to reach carbon neutrality across its transportation systems. Since 2016, Vienna Airport has installed more than seven (7) photovoltaic arrays comprising over 24 acres and 55,000 panels. The site is expected to generate approximately 30 million kilowatt hours per year resulting in a 30 percent reduction in energy costs for the airport.[47]

[45] NREL, *Electrification of Aircraft: Challenges, Barriers, and Potential Impacts*, p. 13, October 2021
[46] MRY Airport District Business, *Monterey Regional Airport: The Big Switch*, September 2017.
[47] ICAO, *2022 Environmental Report*, p. 163, 2022

KSA



FWS

FORT WORTH SPINKS AIRPORT

LOCATION: TEXAS, UNITED STATES | ELEVATION: 700.4

REFERENCE POINT : 32-33-54.4810 N | 97-18-30.3820 W

3.8. SUMMARY OF FACILITY REQUIREMENTS

As FWS continues to grow, it is important to understand which facility improvement will be required to facilitate future demand and promote the continued development of a safe and efficient GA facility. The following elements will be the primary roadmap as the planning process moves toward the development of alternatives:

- Analyze runway length to ensure alignment with the future fleet mix.
- Provide apron expansion alternatives in support of anticipated demand.
- Mitigate FAA design standard deficiencies relating to direct-access taxiways “F” and “E.”
- Identify compatible areas for hangar development with emphasis on T-hangars and small, medium, and large corporate hangars.
- Determine suitable locations and size requirements for a new administration and GA terminal facility.
- Expand security/wildlife fencing improvements to portions of the airfield still served by original fencing.
- Identify airside and landside areas suitable for accommodating the anticipated demand of AAM/UAM integration.
- Identify areas suitable for the installation of a solar array to help FWS advance sustainability and prepare the Airport for the rising demand for electric aircraft.
- Conduct PCR analysis to determine structural rehabilitation requirements.

The following chapter, Alternatives, will further examine the facility needs identified in this section with a focus on airside and landside layouts and concepts for consideration for a final recommended development plan.

THIS SECTION LEFT BLANK INTENTIONALLY

4 ALTERNATIVES
FOR CONCEPTUAL DEVELOPMENT

2023 FORT WORTH SPINKS AIRPORT MASTER PLAN

KSA

SPINKS AIRPORT

4. DEVELOPMENT ALTERNATIVES

4.1. OVERVIEW

The previous chapter identified airside and landside requirements anticipated to satisfy the forecast demand at FWS throughout the 20-year planning horizon. The following recommendations will guide the study of conceptual alternatives, consider their benefits and challenges, and apply evaluation criteria resulting in the selection of a preferred airport development plan. Once selected, the recommended plan will be depicted on the ALP and submitted to TxDOT for consideration and approval.

The objective of this effort is to develop a holistic game plan for future development at FWS. Evaluation of each alternative is rooted in local, state, and federal design standards. However, technical judgment must also be applied to determine the appropriate course of action, identify factors with the potential to impact development and evaluate financial feasibility. The following principles guide the analysis of conceptual alternatives:

- Develop a safety-oriented and efficient aviation facility through compliance with FAA airport design standards and airspace criteria defined in FAA AC 150/5300-13B, *Airport Design*.
- Identify the short-, mid- and long-term development costs of each alternative.
- Analyze compatibility with existing and proposed land uses and zoning ordinances.
- Identify design and safety criteria for airport facility layouts based on the size and type of aircraft forecast to use the facility.

4.2. FACILITY REQUIREMENTS SUMMARY

Facility requirements are intended to compare existing facilities with current safety standards and the demand for new or expanded facilities. The facilities outlined in Chapter 3, *Facility Requirements*, have provided a baseline to determine the feasibility of accommodating various alternatives. In addition, airfield demand/capacity, airside facility requirements, and landside capacity have all been evaluated during the selection of alternatives. Two primary standards are considered when evaluating facility requirements. First, alternatives must meet the design requirements established by the current and future Airport Reference Code (ARC). Second, standards identified in the FAA Advisory Circular 150/5300-13B, *Airport Design*, must be met.

To meet future requirements, Fort Worth Spinks Airport must make provisions to accommodate future operations. The demand for additional facilities was calculated in the previous chapter and can be summarized by examining forecast-based aircraft and operations.

1. Based Aircraft: FWS currently accommodates 236 based aircraft; this number is expected to increase to as much as 350 by 2043. (Table 4.1)

2. **Operations**: In 2022, FWS had 61,325 operations, expected to rise to 91,053 by 2043 **(Table 4.1)**

TABLE 4.1: Summary of Operations by Aircraft Type

Operations	2022	2028	2033	2038	2043
Air Taxi	1,226	1,372	1,506	1,652	1,816
Single-Engine Piston	33,729	35,702	39,225	41,438	45,527
Multi-Engine Piston	9,199	9,612	10,560	9,945	9,105
Turboprop (SE)	4,906	6,179	6,789	8,288	10,016
Turboprop (ME)	4,293	5,493	6,035	7,459	8,650
Business Jet	4,906	6,179	6,789	8,288	9,561
Helicopter	3,036	4,085	4,488	5,760	6,328
Military	30	35	40	45	50
Total Operations	61,325	68,657	75,432	82,875	91,053
Local Operations	36,795	41,194	45,259	49,725	54,632
Itinerant Operations	24,530	27,463	30,173	33,150	36,421
Based Aircraft					
Single-Engine	179	195	213	220	232
Multi-Engine	18	21	22	24	26
Turboprop (SE)	2	5	6	11	14
Turboprop (ME)	3	5	6	13	18
Jet	12	14	17	22	28
Helicopter	22	24	26	29	32
Total	236	264	290	319	350

Source: KSA

4.2.1. AIRSIDE REQUIREMENTS

Airside facilities include infrastructure that interacts with the arrival and departure of aircraft and their subsequent movement around the airfield to parking and storage areas. Areas of focus include runway/taxiway dimensions, aprons, navigational aids (NAVAIDS), landing aids, and dimensional standards. These criteria are considered during the development of airside alternatives.

The following airside improvements outlined in **Table 4.2** were recommended in the previous chapter and are intended to meet future design requirements and enhance the airfield's efficiency. Each proposed alternative will incorporate these improvements while ensuring compliance with FAA Airport Design standards.

TABLE 4.2: Summary of Facility Requirements

Facility	Planning Considerations	Justification
Airport Reference Code	C-II changes to a C-III for existing based on Critical Aircraft Operations for Runway 18R / 36L. A-I existing based on Critical Aircraft Operations for Runway 18L / 36R.	Safety and Capacity
Runway 18R / 36L	Extend Runway 18R / 36L 500' to the North to 6,502' Extend Runway 18R / 36L 800' to the South to 7,302' X 100'.	Safety and Capacity
Runway 18L / 36R	Shorten Runway 18L / 35R 1,200' from the North end with the option to pave to 2,460' X 60'.	Capacity
Parallel Taxiways	Extend Parallel Taxiway "B" to correspond to Runway 18R / 36L extension of 500' to the North. Extend Parallel Taxiway "B" to correspond to Runway 18R / 36L extension of 800' to the South. Construct East side parallel taxiway between Runway 18R and 18L.	Safety and Capacity
Pavement Strength	Maintain 100,000 lbs. Dual Tandem, 70,000 lbs. Dual Wheel, 60,000lbs. Single Wheel for Runway 18R / 36L.	Capacity
Runway / Taxiway Lighting	Maintain existing MIRL.	Safety
NAVAIDS	Relocate localizer and MALSR with the extension of Runway 18R / 36L.	Safety
Hangar Space	Various hangars will be necessary during the planning period and vary depending on size and market needs.	Airport Revenue Enhancement and Capacity
Aircraft Parking Area / Apron	Aircraft parking expansion on the main apron. Long-term need of 94,950 sq yds.	Capacity
Terminal Building Space	Maintain existing 7,400 sq. ft.	Capacity
Parking	Maintain existing auto parking except for parking associated with hangar development.	Access
Fuel	Maintain existing fuel infrastructure.	Capacity
Security Fencing	Maintain existing 8' security/wildlife fence	Safety/Security

Source: KSA


H

4.2.2. LANDSIDE REQUIREMENTS

Various landside improvements are recommended to accommodate current and forecasted aviation activity throughout the planning period at Fort Worth Spinks. As stated in Chapter 3, *Facility Requirements*, areas of particular focus include:

- Provide additional aircraft storage hangars of various sizes;
    - Conventional hangars
    - Box hangars
    - T-hangars
- Identify location for Helipads
- Proposed Vertiport Locations
- Proposed Solar Farm Locations

These facility requirements are developed from the analysis of the demand capacity and capacity requirements and are based on standards established by FAA Advisory Circular 150/5300-13B, *Airport Design* and the ACRP Repot 113, *Guidebook on General Aviation Facility Planning.* Each proposed alternative will incorporate these improvements while following compliance with FAA Airport Design Standards with regard to the subsequent landside development.

4.3. DEVELOPMENT ALTERNATIVES EVALUATION

The following section will evaluate 12 development alternatives representing a variety of airside and landside options. As outlined in the Inventory chapter, Fort Worth Spinks Airport is based on a two (2) runway system. Runway 18R / 36L serves as the primary runway and is 6,002' by 100' and is served by two full-length parallel taxiways. Runway 18L / 36R is a turf runway measuring 3,660' by 60'.

To help determine terminal support area facilities for future planning periods, landside capacity and future demand were evaluated for itinerant and based aircraft parking aprons, aircraft storage facilities, automobile parking, fuel storage, and support area requirements. Both conventional and T-hangars are needed during all phases of the planning period.

Development strategies were explored at Fort Worth Spinks based on the following criteria:

- Regional economic development opportunities
- SWOT analysis results from stakeholders
- Increased yearly operations
- Growing helicopter traffic
- Emergency of UAS/AAM and the exploration of electrification opportunities, including solar

According to the forecasted based-aircraft counts, expected increases in local and itinerant operations are anticipated. Alternative development options have been established to accommodate the project demand for the 20-year planning period. It should be noted that future development of aircraft storage facilities is demand-based, and market driven.

The number, size, and location of these facilities will vary depending on the demand for the specific type and flexibility to accommodate a variety of users. Additionally, there are important development guidelines that the airport sponsor should consider when making hangar placement determinations at the airport, which include:

- Each executive hangar should be supplied with taxiway access that is separated from automobile access and adjacent automobile parking. This is most efficiently accomplished when a row of hangars is developed and provides taxiway access on one side and automobile access and parking on the other.
- Each T-hangar should be nested and developed with taxiway access to both sides of the hangar. Controlled automobile access should be provided to the taxiway/apron area near the T-hangars. A public parking area should be provided near the T-hangar facilities to accommodate users and visitors.

The following alternatives have been assembled to provide a full range of design options. These alternatives are based on the forecasts of aviation activity, facility requirement needs, and potential expansions at the airport. These alternatives include hangar, apron, and access taxiway development improvements based on input from airport personnel and stakeholders and the projected aircraft storage improvements needed to serve the aviation user. It is important to recognize that the ultimate build-out of various aviation development areas presented far exceeds that which is projected for the 20-year planning period of this study.

4.3.1. AIRSIDE ALTERNATIVE ONE

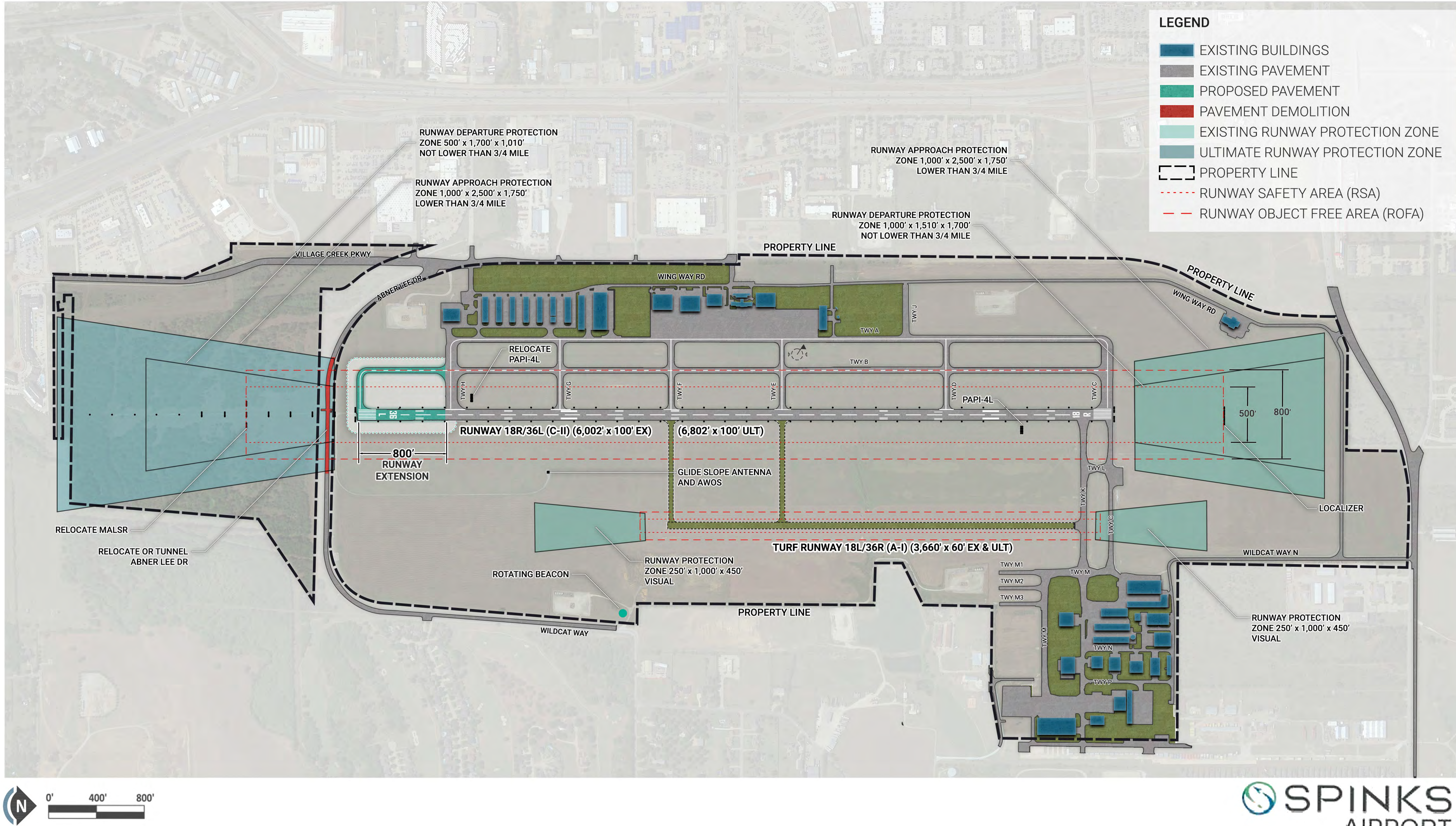
Graphically depicted in Exhibit 4.1, Alternative One aims to provide a runway extension for Runway 18R / 36L. The Airport frequently sees business jet aircraft that need to utilize a longer runway. The primary focus of Alternative One is providing an 800-foot extension to the Runway 36L approach end, bringing the ultimate length of Runway 18R / 36L to 6,802 feet.

<u>Airside Design Considerations Summary</u>

- Extend Runway 18R / 36L 800’ to the south, for a total length of 6,802’
- Extend parallel Taxiway “B” and connector to coincide with the 800-foot runway extension.
- Relocate MALSR to correspond with the runway extension.
- Relocate PAPI-4L on Runway 36L to correspond with the runway extension.

- The Runway Protection Zone (RPZ) serving the end of Runway 36L would need to be evaluated due to the existing location of Abner Lee Drive and the need to relocate the road to protect people and property from being in the approach and departure end of Runway 36L.

THIS SECTION LEFT BLANK INTENTIONALLY



SPINKS AIRPORT

EXHIBIT 4.1 - AIRSIDE ALTERNATIVE ONE - 800' EXTENSION (RUNWAY 36L AND PARALLEL TAXIWAY B)

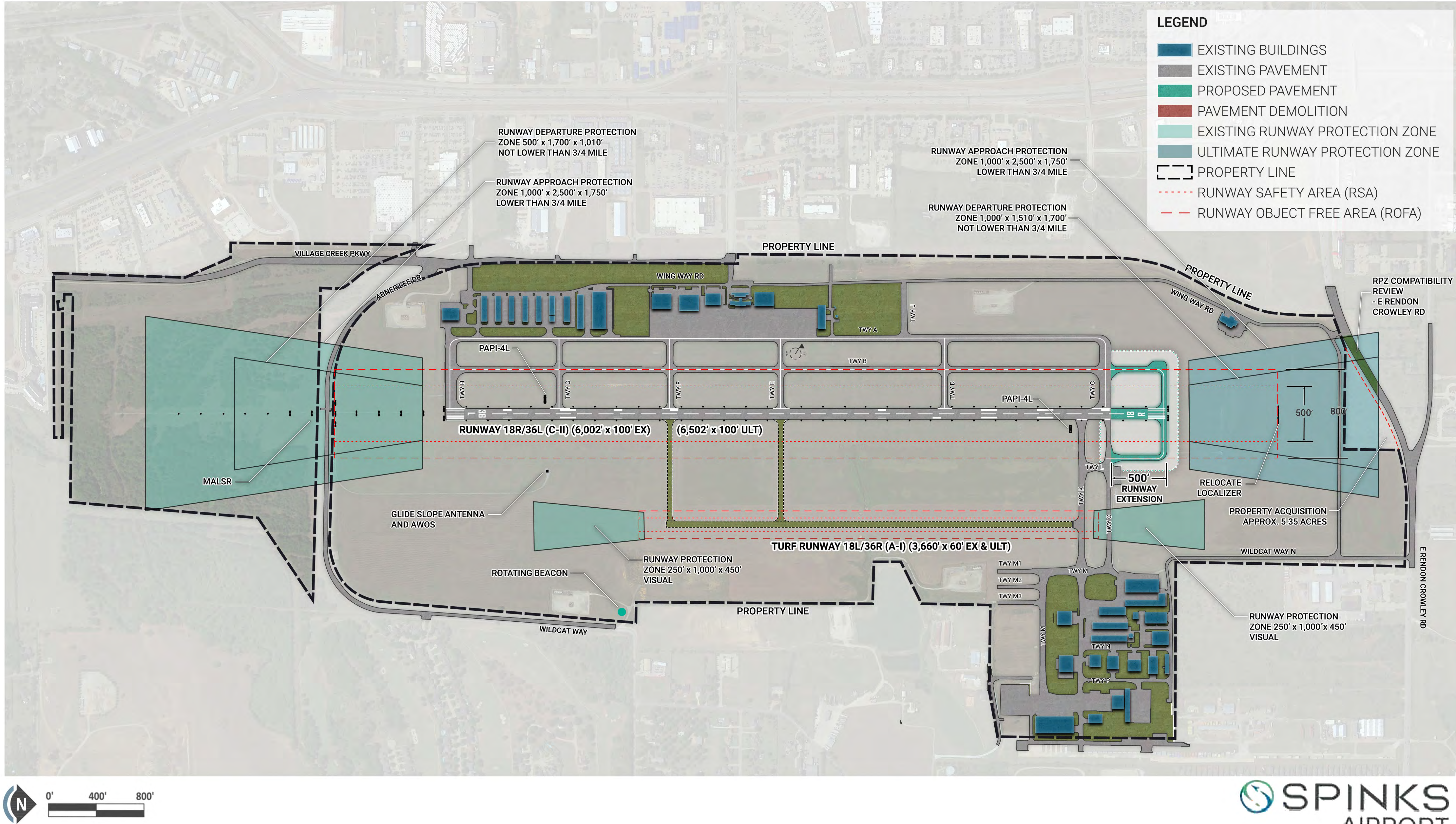
4.3.2. AIRSIDE ALTERNATIVE TWO

Airside Alternative Two, Exhibit 4.2, considers the extension of Runway 18R / 36L to the north instead of the south. This alternative attempt to identify an extension possibility for the runway without providing any major infrastructure changes to the roads on either end of the runway. The primary focus of Airside Alternative Two is to provide a 500-foot extension to the Runway 18R approach end, bringing the ultimate length of Runway 18R / 36L to 6,502.

Airside Design Considerations Summary

- Extend Runway 18R / 36L 500’ to the north, for a total length of 6,502’.
- Extend parallel Taxiway “B” and connector to coincide with the 500-foot runway extension.
- Construct an aircraft runup area on the north end of Taxiway “B”.
- Relocate localizer to correspond with the runway extension.
- The Runway Protection Zone (RPZ) serving the end of Runway 18R would need to be evaluated due to the existing location of E Rendon Crowley Road. However, since the road is located on the outer edge of the RPZ it is projected that the airport will be able to receive a waiver for this portion of the RPZ.
- The Runway Protection Zones (RPZ) serving the end of Runway 18R will not be owned by the City of Fort Worth in its entirety if the runway extension occurred on the north end. It is recommended the Airport pursues an avigation easement or fee-simple acquisitions of the property.

THIS SECTION LEFT BLANK INTENTIONALLY



SPINKS AIRPORT

EXHIBIT 4.2 - AIRSIDE ALTERNATIVE TWO - 500' EXTENSION (RUNWAY 18R AND PARALLEL TAXIWAY B)

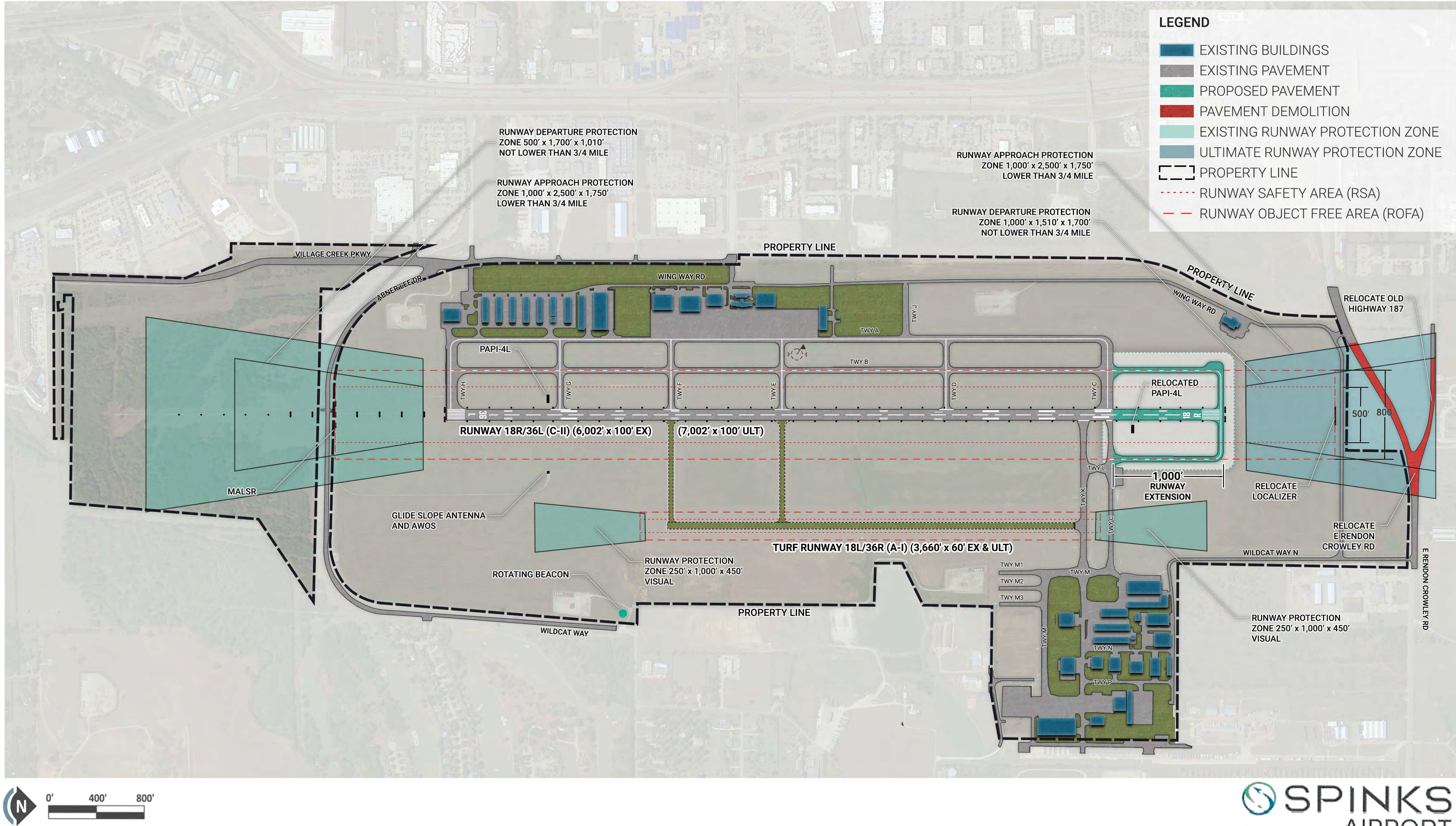
4.3.3. AIRSIDE ALTERNATIVE THREE

As shown in Exhibit 4.3, Airside Alternative Three showcases the maximum potential length of Runway 18R / 36L on the north end. This alternative highlights the lack of feasibility for a full runway extension on the Runway 18R approach end. E Rendon Crowley Road would have to be relocated, as shown in the exhibit, due to the RPZ of Runway 18R. Relocating E Rendon Crowley Road would not be feasible due to the amount of traffic and impractical alternatives for a new road realignment.

Airside Design Considerations Summary

- Extend Runway 18R / 36L 1,000’ to the north, for a total length of 7,002’.
- Extend parallel Taxiway “B” and connector to coincide with the 1,000-foot runway extension.
- Construct an aircraft runup area on the north end of Taxiway “B”.
- Relocate localizer to correspond with the runway extension.
- The Runway Protection Zone (RPZ) serving the end of Runway 18R would need to be evaluated due to the existing location of E Rendon Crowley Road. However, due to the economic impact of relocating this road it is not a viable option for the Airport to pursue.
- The Runway Protection Zones (RPZ) serving the end of Runway 18R will not be owned by the City of Fort Worth in its entirety if the runway extension occurred on the north end. It is recommended the Airport pursues an avigation easement or fee-simple acquisitions of the property.

THIS SECTION LEFT BLANK INTENTIONALLY



SPINKS AIRPORT

EXHIBIT 4.3 - AIRSIDE ALTERNATIVE THREE - 1,000' EXTENSION (RUNWAY 18R AND PARALLEL TAXIWAY B)

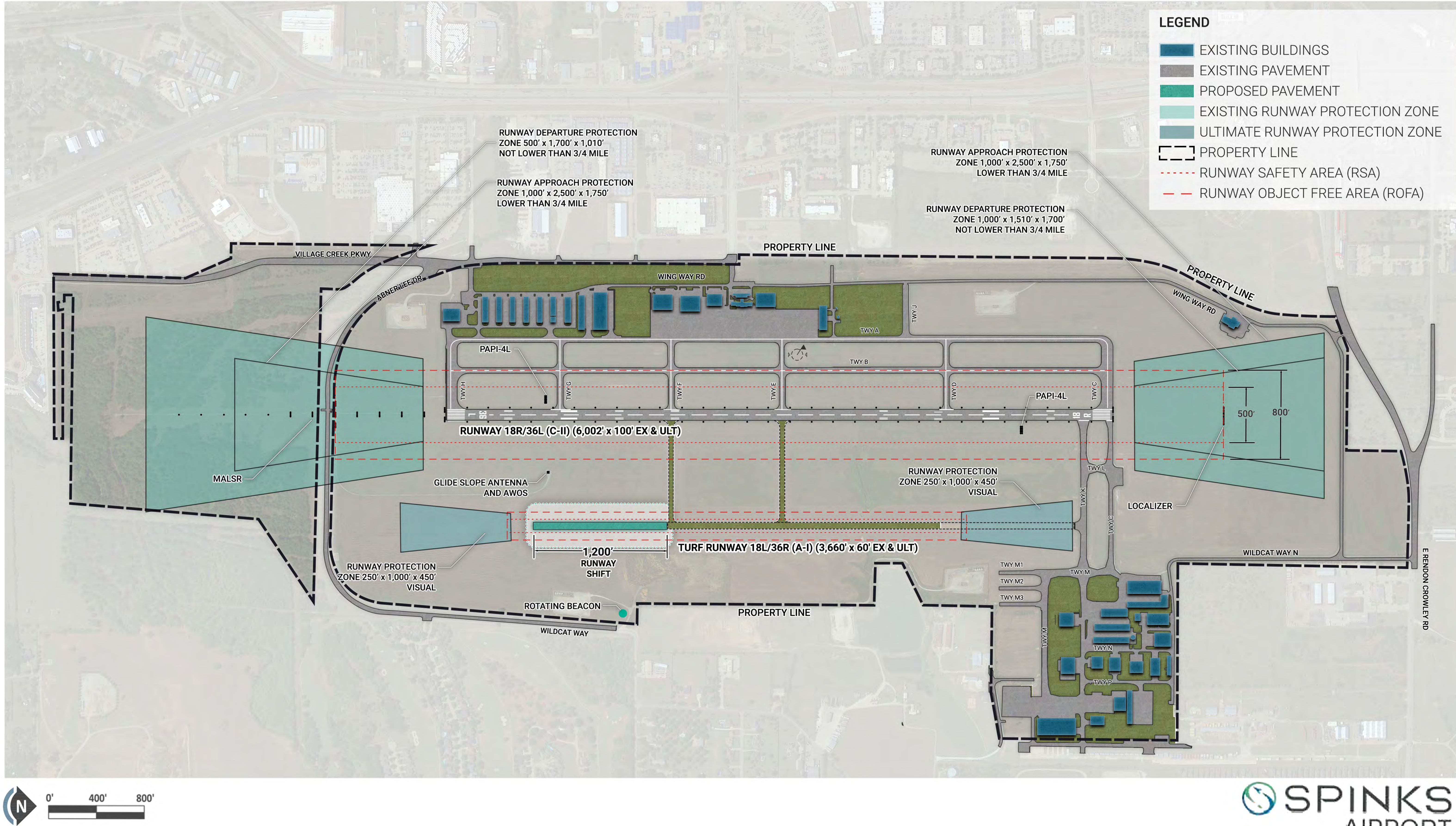
4.3.4. AIRSIDE ALTERNATIVE FOUR

Airside Alternative Four, Exhibit 4.4, focuses on the turf runway, Runway 18L / 36R. As identified in previous exhibits the end of Runway 18L connects to Taxiway "K" as well as Taxiway "C" impacting the RPZ of the same runway end. This alternative attempts to mitigate design deficiencies and promote safety by shifting the turf runway south of its existing location. Runway 18R / 36L would maintain its existing length of 3,660'.

Airside Design Considerations Summary

- Shift Runway 18L / 36R to the south but maintain the length and width of 3,660' x 60'.
- The RPZ of Runway 18L would shift south as well and no longer impact Taxiway "K" or Taxiway "C".

THIS SECTION LEFT BLANK INTENTIONALLY



SPINKS AIRPORT

EXHIBIT 4.4 - AIRSIDE ALTERNATIVE FOUR - SHIFT TURF RUNWAY (18L/36R) 1,200' SOUTH

4.3.5. AIRSIDE ALTERNATIVE FIVE

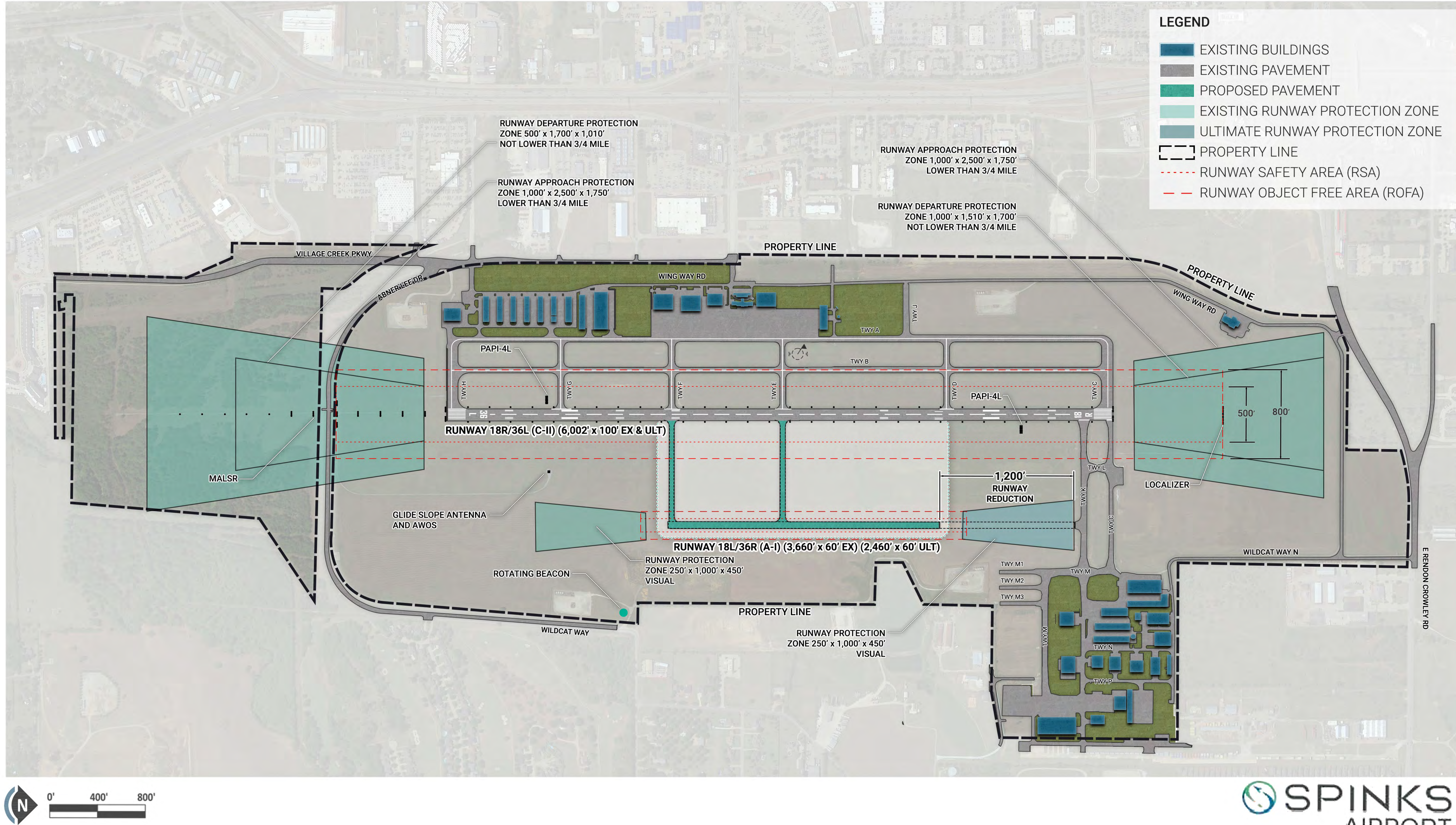
Similarly, to Airside Alternative Four, Airside Alternative Five, Exhibit 4.5, addresses the turf Runway, Runway 18L / 36R. Airside Alternative Five focuses on shortening Runway 18L / 36R to address the design deficiencies of the runway in correspondence with Taxiway “K” and Taxiway “C”. Runway 18L would shorten by 1,200’, making it 2,460’ x 60’. Given that Runway 18L / 36R is a turf runway this length would be sufficient to accommodate current aircraft utilizing this runway.

Airside Design Considerations Summary

- Shorten Runway 18L / 36R on the north end by 1,200’ making it 2,460’ x 60’.
- The RPZ of Runway 18L would shift south as well and no longer impact Taxiway “K” or Taxiway “C”.

THIS SECTION LEFT BLANK INTENTIONALLY

KSA



SPINKS AIRPORT

EXHIBIT 4.5 - AIRSIDE ALTERNATIVE FIVE - SHORTEN TURF RUNWAY BY 1,200' AND PAVE

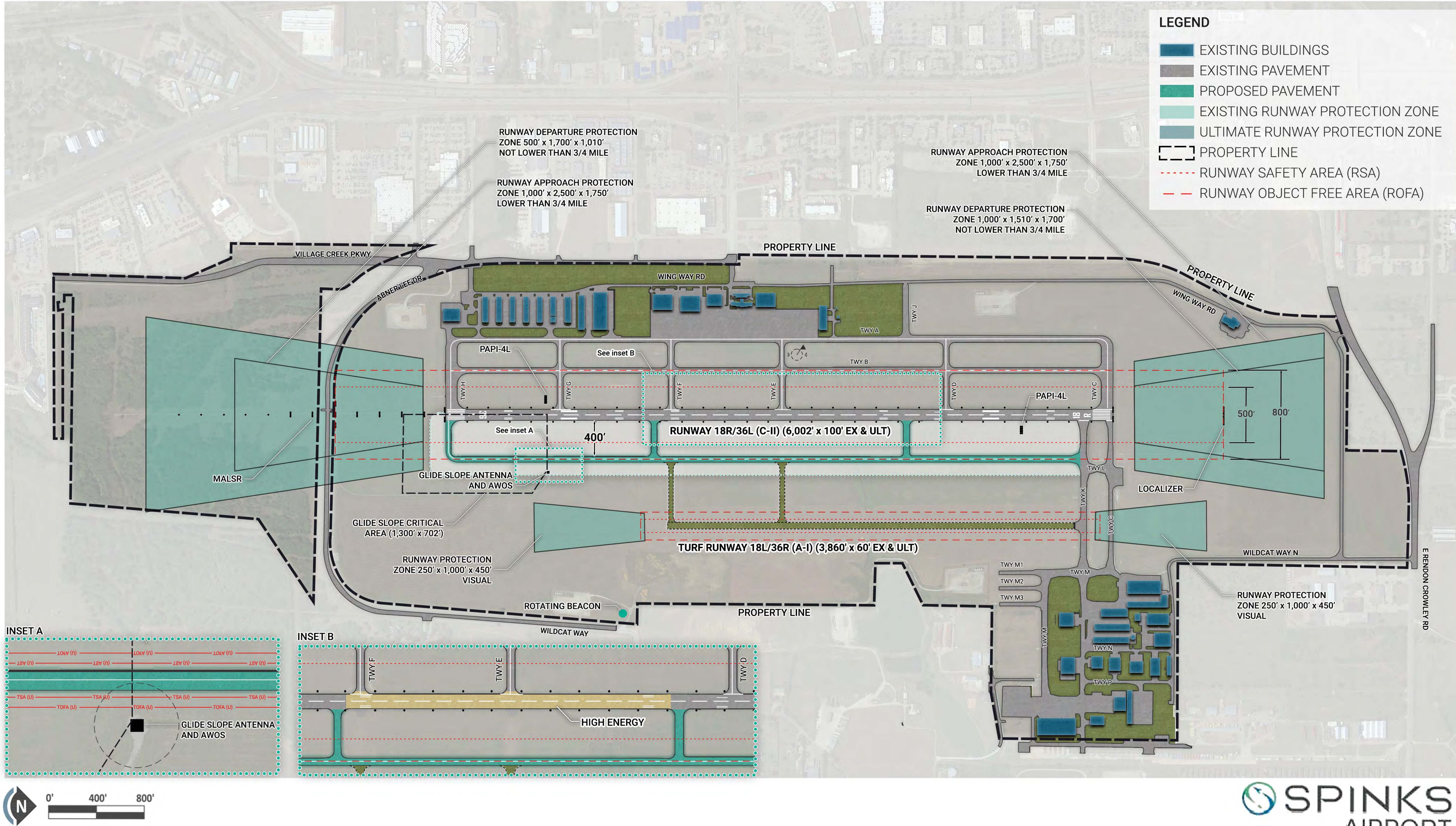
4.3.6. AIRSIDE ALTERNATIVE SIX

Graphically depicted in Exhibit 4.6, Airside Alternative Six, demonstrates implementing a full-length parallel taxiway on the east side of the field. Through implementing a full-length east side parallel taxiway, the existing hangars on the east side of the field have easier access to Runway 36L and Runway 36R. This alternative demonstrates an airfield with easier access and can potentially provide a more efficient flow of traffic.

Airside Design Considerations Summary

- Construct full-length parallel taxiway on the east side of the airfield, 6,002'.
- Construct three connector taxiways from the full-length parallel taxiway leading to Runway 18R / 36L.

THIS SECTION LEFT BLANK INTENTIONALLY



SPINKS AIRPORT

EXHIBIT 4.6 - AIRSIDE ALTERNATIVE SIX - EAST SIDE PARALLEL TAXIWAY

4.3.7. AIRSIDE ALTERNATIVE SEVEN

Graphically depicted in Exhibit 4.7, Airside Alternative Seven aims to maximize the potential length of Runway 18R / 36L. Fort Worth Spinks experiences a high mean-max temperature of 91.8 degrees. During high temperatures, aircraft takeoff performance can be limited based on factors like takeoff weight, stage length, and required fuel. For this reason, it is important for the Airport to maximize available runway length. As mentioned above, due to the location of E. Rendon Crowley Road to the north of Runway 18R it is not feasible for the runway extension to be more than 500 feet on the north end of the runway. The primary focus on Airside Alternative Seven is providing an 800-foot extension to the Runway 36L end, and a 500-foot extension to the Runway 18R end, with a combined 1,300-foot extension overall. This extension would bring the ultimate length of Runway 18R / 36L to 7,302 feet.

Airside Design Considerations Summary

- Extend Runway 18R / 36L 800’ to the south.
- Extend Runway 18R / 36L 500’ to the north.
- Extend parallel Taxiway “B” and connector to coincide with the 1,300-foot runway extension.
- Relocate MALSR to correspond with the runway extension.
- Relocate localizer to correspond with the runway extension.
- Relocate PAPI-4L on Runway 18R / 36L to correspond with the runway extension.
- The Runway Protection Zone (RPZ) serving the end of Runway 36L would need to be evaluated due to the existing location of Abner Lee Drive and the need to relocate the road to protect people and property from being in the approach and departure end of Runway 36L.
- The Runway Protection Zone (RPZ) serving the end of Runway 18R would need to be evaluated due to the existing location of E Rendon Crowley Road. However, since the road is located on the outer edge of the RPZ it is projected that the airport will be able to receive a waiver for this portion of the RPZ.
- The Runway Protection Zones (RPZ) serving the end of Runway 18R will not be owned by the City of Fort Worth in its entirety if the runway extension occurred on the north end. It is recommended the Airport pursues an avigation easement or fee-simple acquisitions of the property.

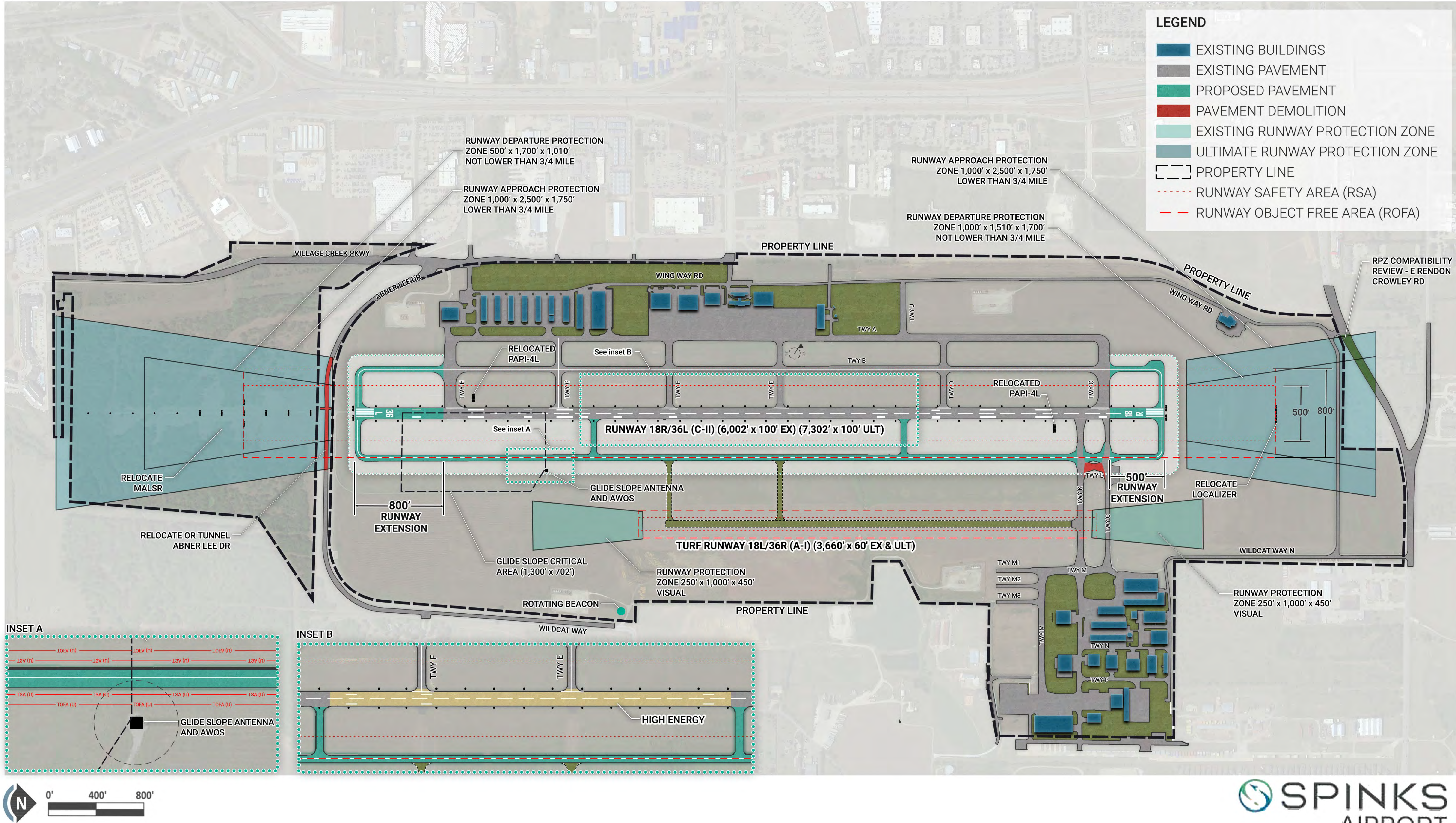


EXHIBIT 4.7 - AIRSIDE ALTERNATIVE SEVEN - 800' EXTENSION (RWY 36L AND PARALLEL TWY B) & 500' EXTENSION (RWY 18R AND PARALLEL TWY B)

4.3.8. WEST LANDSIDE ALTERNATIVE ONE

Exhibit 4.8, West Landside Alternative One, primary objective is to maximize available land for hangar development to promote economic development and available space for future based aircraft. Consideration in this alternative also includes expanding the primary general aviation apron. The Airport frequently sees large numbers of business jet traffic, quickly exhausting available parking positions and creating operational challenges. As part of the proposed apron expansion, the non-standard direct access taxiways from the apron to the runway will be realigned providing additional prevention for the potential of runway incursions. The following alternative proposed various hangar development options to accommodate the forecasted aviation demand at FWS.

Airside Design Considerations Summary

- Relocate the west side of Taxiway “F” and Taxiway “E” to satisfy FAA design standards. The identified taxiways currently provide direct access from the apron area to Runway 18R / 36L, which can increase the probability of runway incursions.

Landside Design Considerations Summary

- Expand primary general aviation apron (27,000 sq. yds.).
- Construct one (150’ x 250’) executive hangar on the main apron area.
- Promote hangar development on the north end of the field.
    - Six box hangars (120’ x 120’)
    - Three executive hangars (200’ x 300’)
- Promote hangar development on the south end of the main apron area.
    - Three box hangars (70’ x 70’)
- Construct additional parking and road access associated with all hangar developments

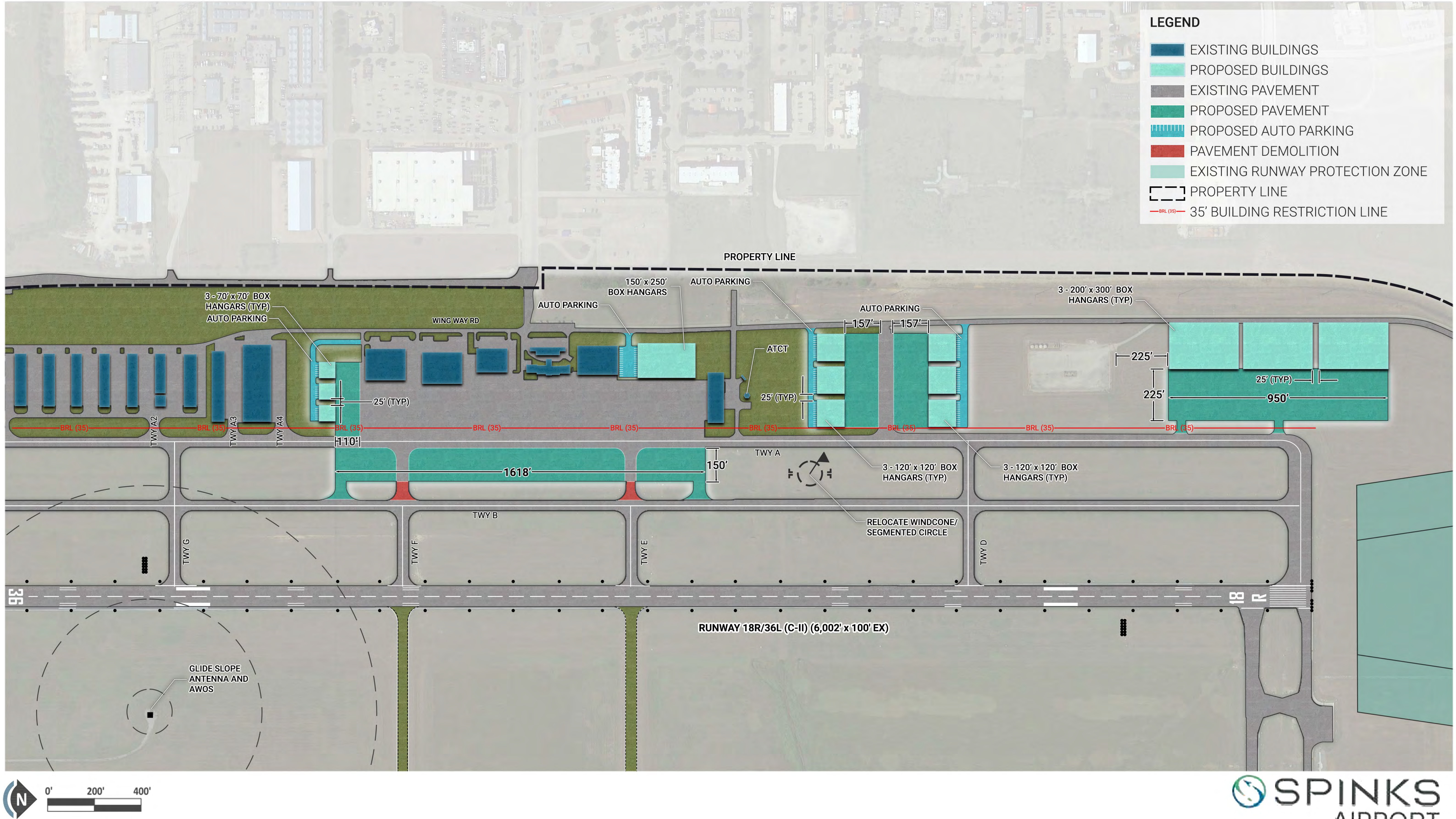


EXHIBIT 4.8 - WEST LANDSIDE ALTERNATIVE ONE

4.3.9. EAST LANDSIDE ALTERNATIVE ONE

Graphically depicted in Exhibit 4.9, East Landside Alternative One, demonstrates the development of the east side of the airfield under current infrastructure development. This alternative exhibit development in space that is currently available on the east side. The Airport is currently constructing three additional taxiways to accommodate the construction of additional T-hangars. Smaller box hangars are also shown in this alternative for more variety in the types of tenants.

Airside Design Considerations Summary

- Construct additional pavement for rotorcraft use.
- Designate and mark existing pavement as helipad for rotorcraft use.

Landside Design Considerations Summary

- Promote hangar development on existing pavement infrastructure.
  - Three executive box hangars (50’ x 100’)
  - Four executive hangars (50’ x 75’)
  - One box hangar (150’ x 200’)
  - 16 box hangars (60’ x 60’)
  - One box hangar (100’ x 150’)
  - One box hangar (125’ x 125’)
  - Two T-hangars (50’ x 280’)
- Construct additional parking and road access associated with all hangar developments.

THIS SECTION LEFT BLANK INTENTIONALLY

KSA

SPINKS AIRPORT

EXHIBIT 4.9 - EAST LANDSIDE ALTERNATIVE ONE

4.3.10. EAST LANDSIDE ALTERNATIVE TWO

East Landside Alternative Two, Exhibit 4.10, showcases the development of the east side of the airfield. Considerations in this alternative include hangar development in existing available space, and the potential for north end development if the turf runway shifts, or shorts, to the south. The Airport is currently constructing three additional taxiways to accommodate additional T-hangars. The end of Runway 18L demonstrates the development of box hangars. This alternative shows multiple hangar development options to accommodate future based aircraft at FWS. Potential helipad sites have been proposed as well due to the increase in rotorcraft operations at the Airport.

Airside Design Considerations Summary

- Construct additional pavement for rotorcraft use.
- Designate and mark existing pavement as helipad for rotorcraft use.

Landside Design Considerations Summary

- Construct 24 (120’ x 120’) box hangars north of Runway 18L.
- Promote hangar development on existing pavement infrastructure.
    - Three executive box hangars (50’ x 100’)
    - Four executive hangars (50’ x 75’)
    - Three box hangars (150’ x 200’)
    - One box hangar (100’ x 150’)
    - One box hangar (125’ x 125’)
    - Two T-hangars (50’ x 280’)
- Construct additional parking and road access associated with all hangar developments.

THIS SECTION LEFT BLANK INTENTIONALLY

SPINKS AIRPORT

EXHIBIT 4.10 - EAST LANDSIDE ALTERNATIVE TWO

4.3.11. EAST LANDSIDE ALTERNATIVE THREE

East Landside Alternative Three, Exhibit 4.11, illustrates a combination of the two prior east landside alternatives. It demonstrates large box hangars at the end of Runway 18L to accommodate corporate or business jets, while the existing infrastructure accommodates a variety of aircraft with smaller box hangars. The goal of this alternative is to show potential development for all types of tenants while keeping them separated to accommodate operational necessities.

Airside Design Considerations Summary

- Construct additional pavement for rotorcraft use.
- Designate and mark existing pavement as helipad for rotorcraft use.

Landside Design Considerations Summary

- Construct five (200' x 300') box hangars north of Runway 18L.
- Promote hangar development on existing pavement infrastructure.
    - Three executive box hangars (50' x 100')
    - Four executive hangars (50' x 75')
    - One box hangar (150' x 200')
    - 16 box hangars (100' x 150')
    - One box hangar (100' x 150')
    - One box hangar (125' x 125')
    - Two T-hangars (50' x 280')
- Construct additional parking and road access associated with all hangar developments.

THIS SECTION LEFT BLANK INTENTIONALLY

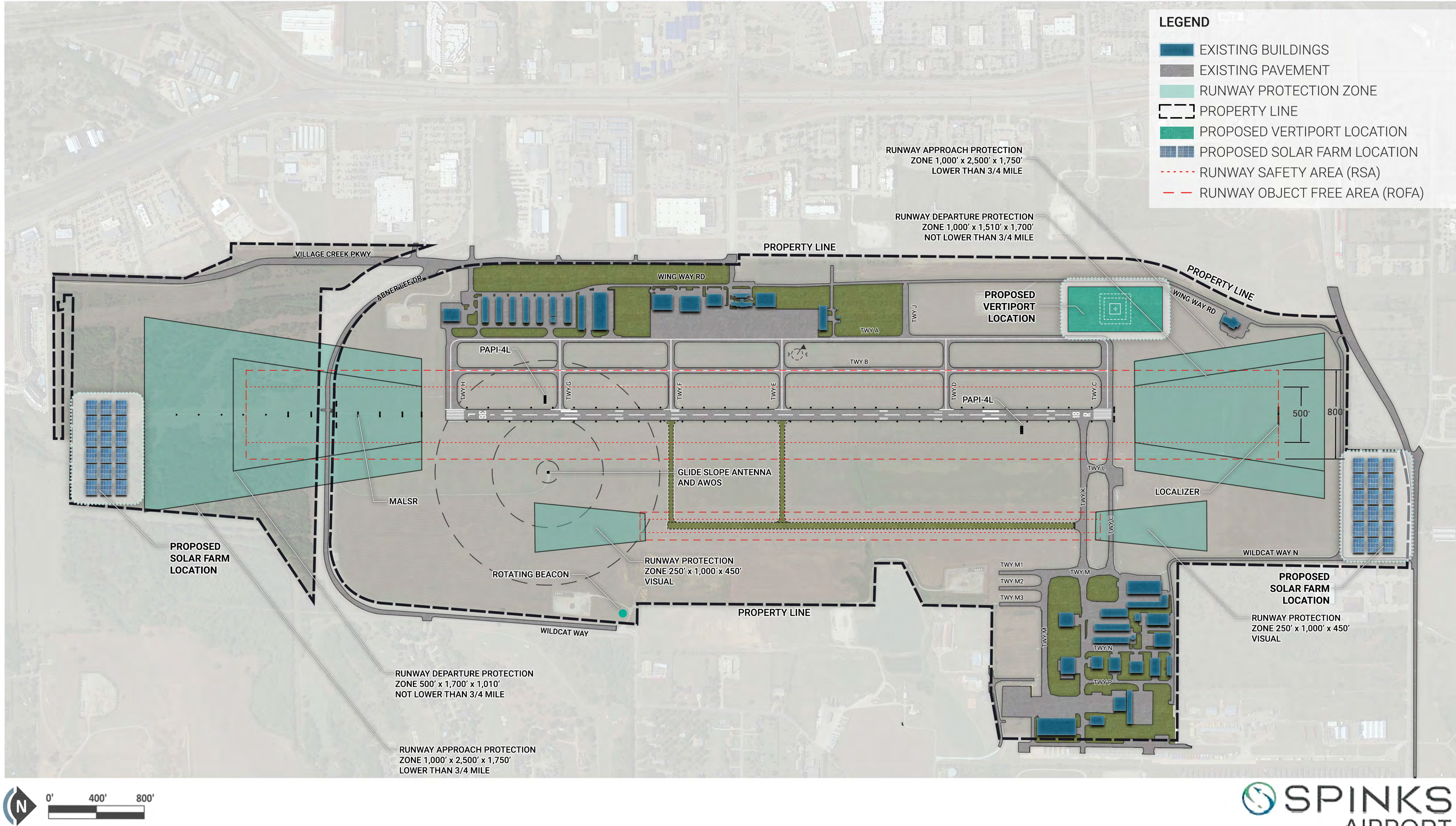
SPINKS AIRPORT

EXHIBIT 4.11 - EAST LANDSIDE ALTERNATIVE THREE

4.3.12. ELECTRIFICATION AND UAM INTEGRATION

Exhibit 4.12, Electrification and UAM Integration, illustrates potential site locations for the development of future airport infrastructure needs in relation to this topic. As mentioned in the Facility Requirements Chapter UAM/AAM aircraft are expected to increase at general aviation facilities and will operate in large metropolitan areas, like the DFW metroplex. The identified locations for integration of UAM and Electrification are in areas where normal aircraft operations or development would be unlikely to occur, or even unusable. Electrification sites have been identified on the east side of the field both on the north and south end of Runway 18L / 36R. Proposed vertiport sites are located on the west side of the field due to increased vehicular access points for easier passenger access.

THIS SECTION LEFT BLANK INTENTIONALLY



SPINKS AIRPORT

EXHIBIT 4.12 - ELECTRIFICATION AND UAM INTEGRATION

4.4. GOALS, OBJECTIVES, AND EVALUATION CRITERIA

Several goals and objectives have been identified to help direct implementation and establish continuity as the airport prepares for future development. These goals and objectives consider several elements with the potential to impact future development, including safety, noise, capital improvements, land use compatibility, financial and economic conditions, public interest and investment, and community recognition and awareness. While all are project-oriented, some represent more tangible action items important for the future of FWS.

The following goals and objectives are intended to guide the preparation of the Master Plan and direct the future expansion of FWS.

- Provide effective direction for the future development of Fort Worth Spinks Airport through the preparation of a rational and reasonable implementation plan.
- Accommodate the forecast aviation activity levels safely and efficiently by providing the necessary airport facilities and services.
- Implement a development plan capable of accommodating the future needs of the City of Fort Worth, City of Burleson, and Tarrant County.
- Identify and complement regional economic development activity.

Detailed in Table 4.3, a set of criteria were established for evaluating each development alternative. The assignment of point values relative to the importance of each criterion should be determined and will assist in making recommendations on the final recommended plan.

TABLE 4.3: Alternative Evaluation Criteria

Criteria	Score (Multiplier)
Safety and efficiency of aviation operations	(x2)
Ability to accommodate expected general aviation demand	
Acceptability to users, FAA, and the community	(x2)
Land availability and ownership	
Environmental Factors	
Airspace / Obstruction requirements	
Political, jurisdiction, and implementation factors	
Economic feasibility	(x2)
Phasing and constructability considerations	
Accessibility	
TOTAL	0 / 39

Source: KSA

Some of this criterion is inherently of higher importance. For instance, safety should always be evaluated as the highest priority, while convenience or efficiency would be a lower priority. Financial feasibility is also a major factor when determining the likelihood that the plans presented in the alternatives will actually be constructed over the master plan study period. However, due to the uncertainty of long-term cost estimates, a higher priority should be placed on funding eligibility. Although cost is important, the applicability to grant shared expense will highly impact the ability for a project to gain support.

To quantify this criterion, a scoring matric will be provided for each of the airside alternatives. A scaling system of 1-3 has been developed with the following scoping in mind:

1 = Negative Impact

2 = No Impact

3 = Positive Impact

In order to weigh the scoring criteria, each individual criterion will be multiplied by a factor of one or two based on its relative importance. This will ensure the most important factors are relative to one another and ensure an accurate scoring method can be presented. Keeping in mind these scores are subjective in nature, they are only intended to help planners evaluate the best option for long-range planning and may not necessarily impact the ability of the airport to implement other elements or projects. Table 4.4 provides a summary of scoring criteria for the conceptual airside development alternatives presented in this analysis. As noted, alternatives five and seven received the highest scores. It was determined that these options would be combined and shown on the final recommended plan.

THIS SECTION LEFT BLANK INTENTIONALLY

TABLE 4.4: Alternative Evaluation Criteria

Criteria	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Safety and efficiency of aviation operations	6	6	4	4	6	6	6
Ability to accommodate expected general aviation demand	3	3	3	2	3	3	3
Acceptability to users, FAA, and the community	6	6	4	4	6	6	6
Land availability and ownership	2	2	1	2	3	3	3
Environmental Factors	2	2	1	2	2	2	3
Airspace / Obstruction requirements	2	2	1	2	2	2	3
Political, jurisdiction, and implementation factors	2	2	1	2	2	2	3
Economic feasibility	4	4	2	6	6	4	4
Phasing and constructability considerations	2	2	1	3	2	2	3
Accessibility	2	2	1	2	2	2	3
TOTAL	31 / 39	31 / 39	16 / 39	29 / 39	34 / 39	30 / 39	37 / 39

THIS SECTION LEFT BLANK INTENTIONALLY

5 IMPLEMENTATION
& CAPITAL IMPROVEMENT PLAN (CIP)

2023 FORT WORTH SPINKS AIRPORT MASTER PLAN

KSA

SPINKS AIRPORT

5. IMPLEMENTATION

5.1. RECOMMENDED DEVELOPMENT PLAN

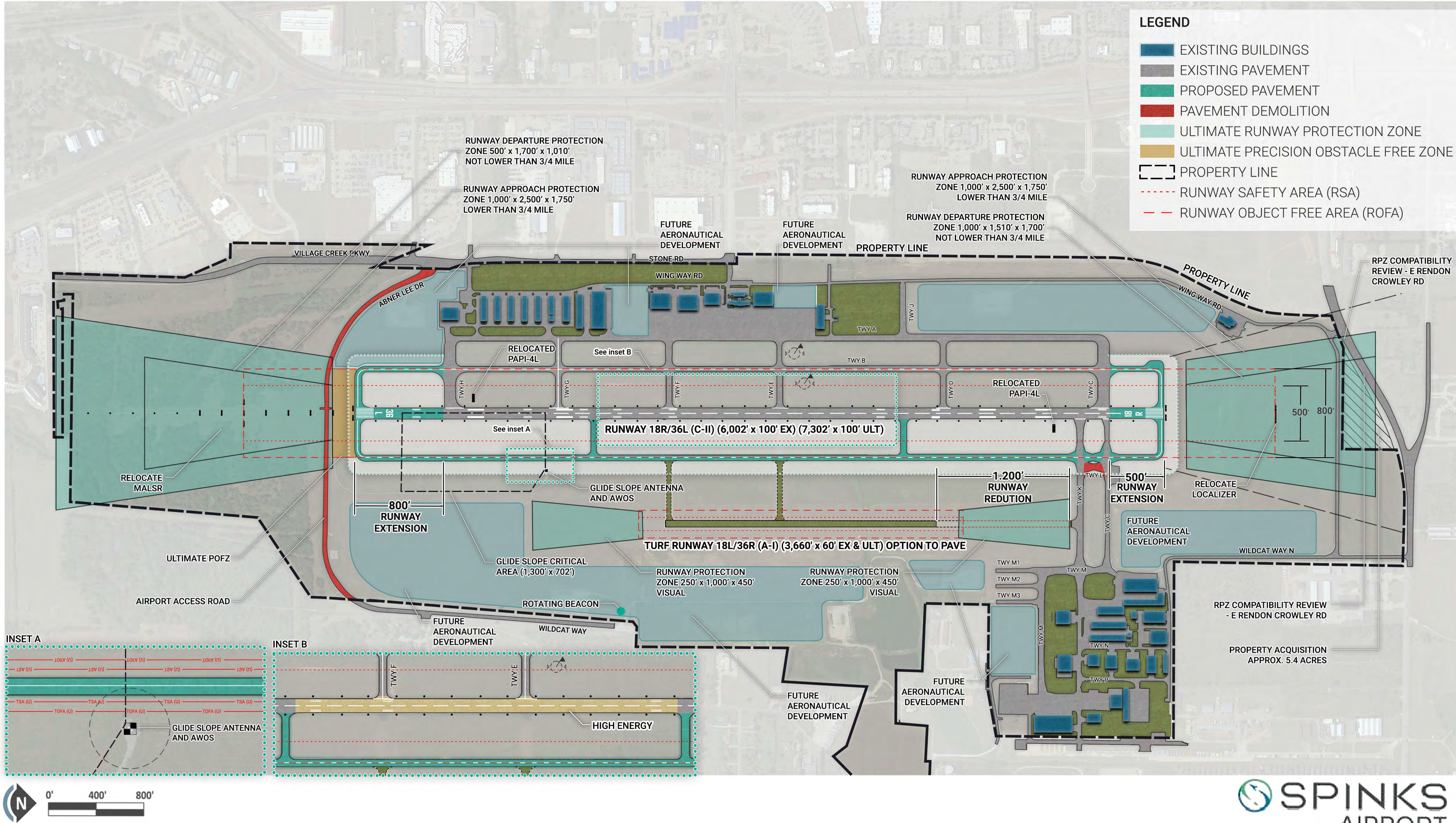
The recommended development plan presented in Exhibits 5.1 through 5.3 combines aspects of each conceptual alternative. Following their evaluation in the previous chapter, Development Alternatives, the selected elements were consolidated, providing a holistic overview for future development at FWS. In order for the Airport to continue providing a high level of service and maintain a positive growth trajectory, a clear understanding of CIP phasing is critical. The shifting landscape of the general aviation industry and increasing funding volatility requires sound project justification, preservation of existing infrastructure, and a focus toward the future as our industry ushers in a new era of technology. The following plan will be included in the ALP for approval and will serve as the foundation of the implementation and CIP moving forward.

5.1.1. AIRSIDE

The airside portion of these recommendations considered improvements to areas including the runway and taxiway infrastructure, focused on safety, planning, design criteria, and capability to accommodate the airport's existing and future operational needs. Operational activity at Fort Worth Spinks Airport is forecasted to increase throughout the 20-year planning timeframe, serving a full range of general and business aviation users. An overview of major airside recommendations is provided in Table 5.1.

TABLE 5.1: Airside Improvement Recommendations

Airside Recommendations	
1	Relocate Taxiways "F" and "E" to satisfy FAA design standards for direct access to 18R-36L.
2	Extend Runway 18R-36L 500' North and 800' South (Ultimate dimensions 7,302' x 100').
3	Extend Parallel Taxiway "B" to coincide with 1,300' runway extension.
4	Relocate MALSR, localizer, and PAPI-4L coinciding with each runway extension.
5	Conduct RPZ Compatibility Analysis for E Rendon Crowley Road due to its projected location relative to the 500' extension of Runway 18R. It is anticipated a waiver can be achieved given the location of the road in the outer portion of the RPZ. A small portion of the 18R RPZ is not currently owned by FWS. It is recommended the city acquire this property in fee simple.
6	Conduct Traffic Impact Analysis for Abner Lee Drive in preparation for the 800' extension of Runway 36L.
7	Construct full-length parallel taxiway and connectors east of the primary runway (18R-36L).
8	Shorten turf runway (18L-36R) by 1,200' (Ultimate dimensions 2,460' x 60'). Maintain future potential to pave 18L-36R.



SPINKS AIRPORT

EXHIBIT 5.1 - RECOMMENDED PLAN (AIRSIDE)

5.1.2. LANDSIDE

The primary goal of these landside recommendations is to provide the Airport with adequate terminal and aircraft storge facilities while maximizing operational efficiencies. Landside components include the aircraft parking apron, hangars, and automobile parking. Major landside issues addressed in this Recommended Plan are provided in Table 5.2.

TABLE 5.2: Landside Improvement Recommendations

West Landside Recommendations	
1	Expand primary general aviation apron. (27,000 sq. yds.)
2	Construct two (150’ x 250’) executive hangars and one (100’ x 100’) administration building on the primary apron.
3	Promote hangar development on the north end of the field and preserve land for future aeronautical use, including UAM/AAM. (6x 120’ x 120’ executive hangars) (3x 200’ x 300’ executive hangars)
4	Promote hangar development south of the main apron. (10x 75’ x 80’ box hangars)
5	Construct additional automobile parking and vehicular access, providing service to all hangar developments.
East Landside Recommendations	
1	Construct four T-hangars. (50’ x 280’)
2	Construct access taxilane serving aeronautical development north of Taxiway “C”.
3	Construct six (200’ x 300’) executive hangars north of Runway 18L.
4	Construct three executive hangars. (50’ x 100’)
5	Construct four executive hangars. (50’ x 75’)
6	Construct one executive hangar. (100’ x 100’)
7	Construct 13 box hangars. (60’ x 60’)
8	Construct two executive hangars. (100’ x 130’)
9	Construct two executive hangars. (125’ x 125’)
10	Construct six executive hangars. (100’ x 120’)
11	Preserve land for future aeronautical use.
12	Construct additional automobile parking and vehicular access, providing service to all hangar developments.

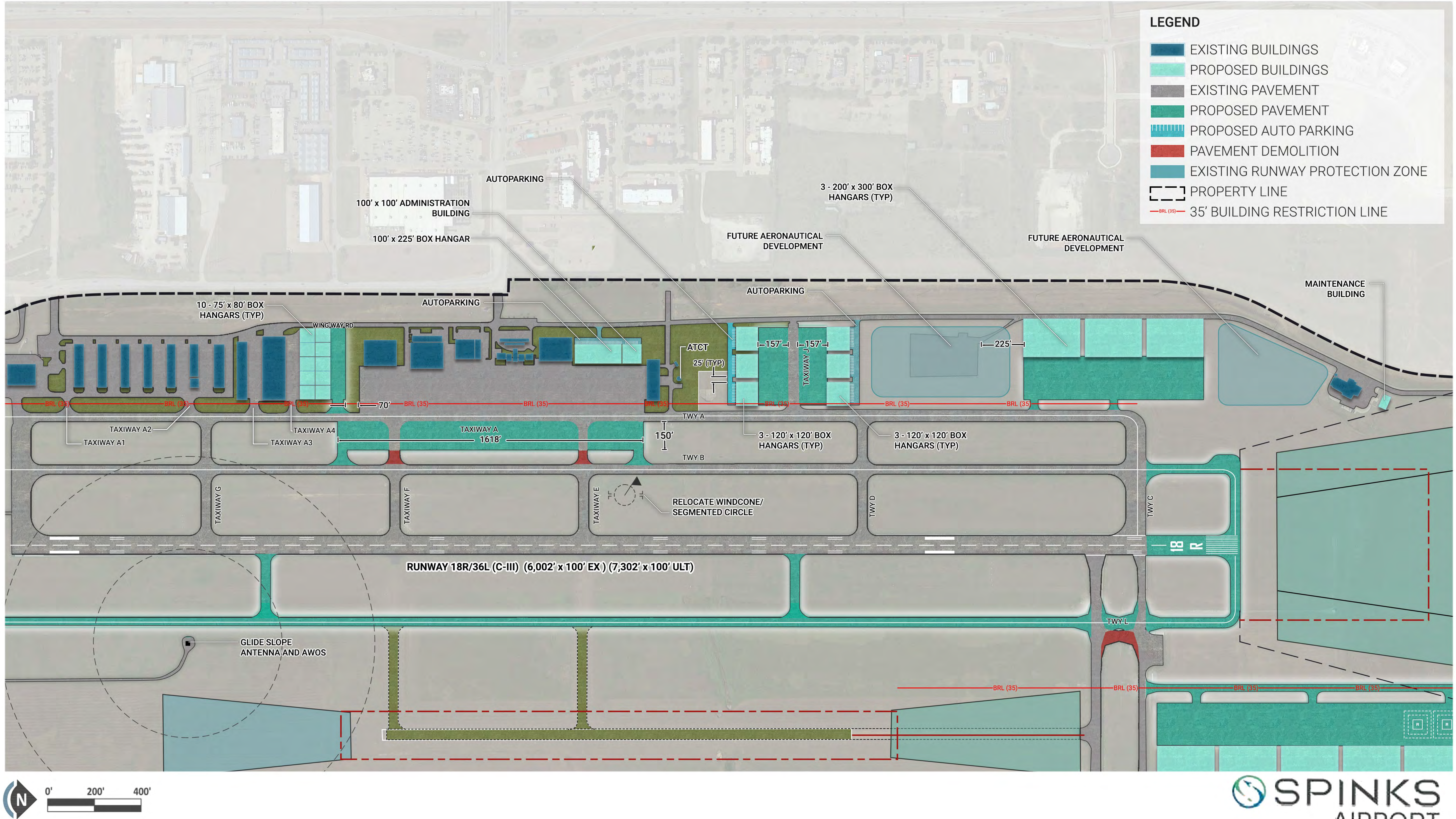


EXHIBIT 5.2 - RECOMMENDED PLAN (LANDSIDE - WEST)

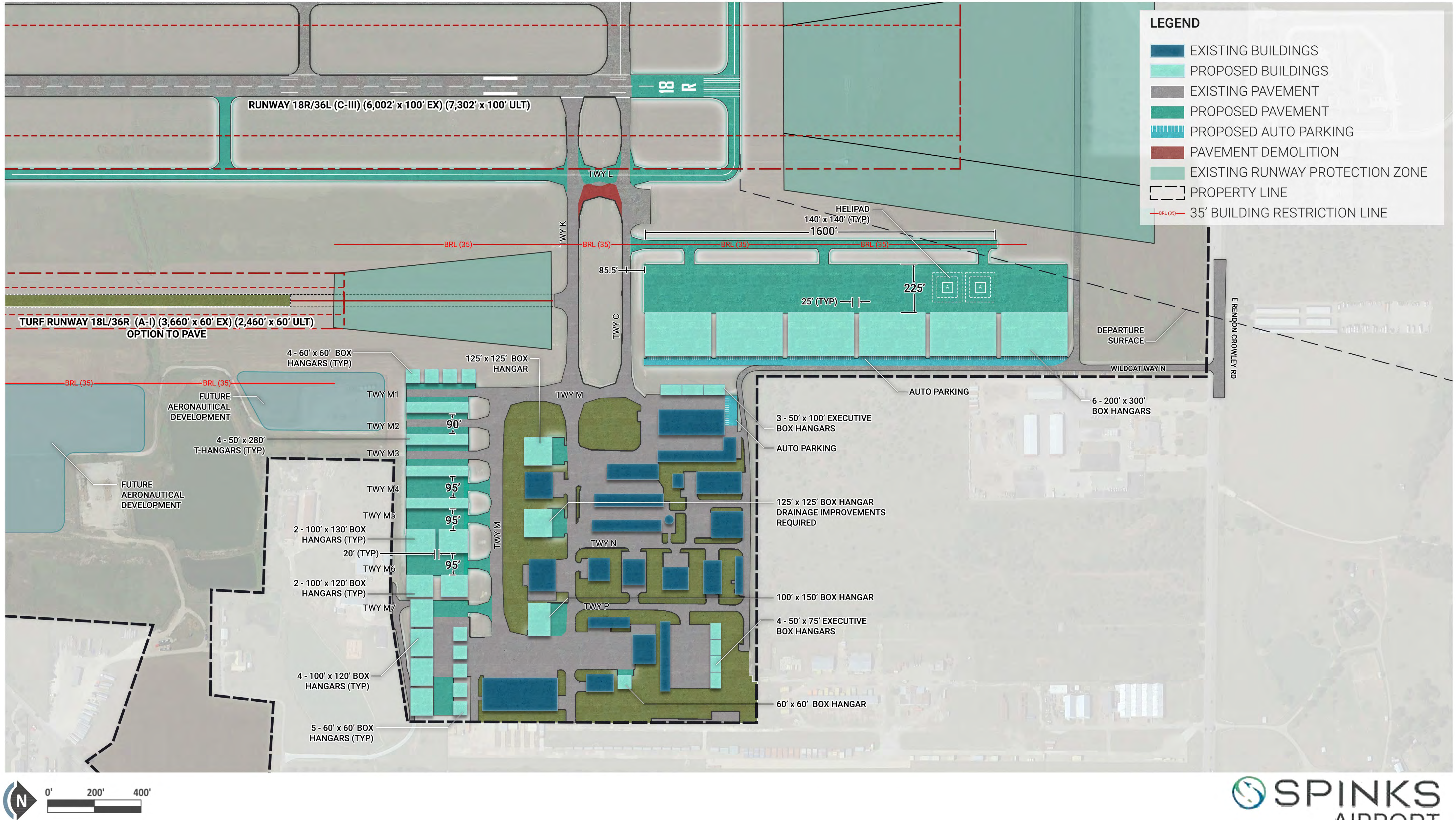


EXHIBIT 5.3 - RECOMMENDED PLAN (LANDSIDE - EAST)

5.2. CAPITAL IMPROVEMENT PLAN OVERVIEW

With the selection of the recommended development plan, the following sections present the Capital Improvement Program (CIP) recommendations identified during the analysis of conceptual alternatives, their anticipated phasing, and preliminary funding mechanisms. The analysis includes estimates for project costs, including local share and total capital investment required from the sponsor over the course of the 20-year planning horizon. These costs and associated funding sources are for planning purposes only and may change at the time of implementation based on fluctuations in construction cost, bidding, and project scope.

The phasing plan and timing for future projects is essential and will be subject to funding availability, sponsor contributions, project justification, and the needs of airport users. Projects may be engaged from this plan and implemented based on dynamic market conditions. This chapter is intended to guide the implementation of the recommended plan and will remain flexible based on real-world market conditions.

The CIP identifies improvements recommended for an airport over a specific period, estimates the order in which the projects may take place, calculates preliminary project costs, and identifies possible funding sources. As the CIP progresses from project planning in the short-term (0-5 years) to the intermediate- and long-terms, it becomes less detailed and more flexible. Additionally, the CIP should be revisited annually and modified as new projects are identified or sponsor priorities change.

5.2.1. PROJECT INTRODUCTION AND SCHEDULE

As detailed below in the *Opinion of Probable Construction Costs* (OPCC), the anticipated funding required to enact the recommended development plan is substantial. This is not expected to be achieved in a singular timeframe and is presented in a phased implementation plan. With over $94 million in identified improvements, projects should be considered incrementally to remain financially feasible. The following sections present the short-, intermediate-, and long-term project phasing and are intended to aid the sponsor in prioritizing projects. Depending on funding priorities and user needs throughout the planning period, projects may be shifted as required.

5.2.1.1. SHORT-TERM (0-5 YEARS) 2025-2029

Projects listed in this phase are considered a high priority and should be addressed following the plan’s adoption. This planning period is primarily focused on hangar access, hangar construction, pavement rehabilitation, perimeter fence improvements, and land acquisition for future expansion.

Table 5.3 presents the projects expected to occur in the short-term planning period and identifies the appropriate justification category for each.

TABLE 5.3: Short-Term Development Summary

SHORT-TERM (0-5 Years) 2025-2029		
FY	Project Description	Justification Category
2025	Eastside Hangar Access Taxilanes Phase II (Construction)	Capacity
2025	MITLs for Taxiways A, D, G (Design)	Safety
2025	East-Side Taxilane Kilo Rehab (Design & Construction)	Rehabilitation
2025	East-Side Utility Improvements	Rehabilitation
2025	Land Acquisition	Capacity
2026	MITLs for Taxiways A, D, G (Construction)	Safety
2026	Rehabilitate Taxiways A & C (West-Side Design)	Rehabilitation
2027	PCI Study Update	Rehabilitation
2027	Rehabilitate Taxiways A & C (West-Side Construction)	Rehabilitation
2028	Rehabilitate Taxiways B & H (Design)	Rehabilitation
2028	Perimeter Fencing Replacement Phase I (Design & Construction)	Safety
2028	Hangar (Construction)	Capacity
2029	Runway 18R-36L Underdrains & Overlay w/ Grooving (Design)	Rehabilitation
2029	Rehabilitate Taxiways B & H (Construction)	Rehabilitation
2029	Perimeter Fencing Replacement Phase II (Design & Construction)	Safety

Source: KSA

5.2.1.2. INTERMEDIATE-TERM (6-10 YEARS) 2030-2034

Usually the most difficult to predict, this phase of implementation can often contain improvements not funded during the short-term period. It is important to keep these projects in mind as development progresses to ensure sequential justification and efficient project implementation. In this period, most of the projects are focused on expanding the existing apron, pavement rehabilitation, FAA safety standards, terminal and administration building construction, and potential expansion of the primary runway.

Table 5.4 presents the projects expected to occur in the intermediate planning period and identifies the appropriate justification category for each.

TABLE 5.4: Intermediate-Term Development Summary

INTERMEDIATE-TERM (6-10 Years) 2030-2034		
FY	Project Description	Justification Category
2030	Taxiway Underdrains and Grading Improvements (Design)	Safety
2030	Runway 18R-36L Underdrains & Overlay w/ Grooving (Construction)	Rehabilitation
2030	Expand Primary Apron (12,500 sq. yds.) Phase I, Demo Taxiway E and Construct New Taxiway E (Design)	Capacity/Standards
2030	Perimeter Fencing Replacement Phase III (Design & Construction)	Safety
2031	Hangar (Construction)	Capacity
2031	Taxiway Underdrains and Grading Improvements (Construction)	Safety
2031	Expand Primary Apron Phase I, Demo Taxiway E and Construct New Taxiway E (Construction)	Capacity/Standards
2031	Expand Primary Apron (12,500 sq. yds.) Phase II, Demo Taxiway F and Construct New Taxiway F (Design)	Capacity/Standards
2031	Rehabilitate Taxiways D & G (Design)	Rehabilitation
2031	PCI Study Update	Rehabilitation
2031	RPZ Compatibility Review – East Rendon Crowley Road	Capacity/Safety
2031	Perimeter Fencing Replacement Phase IV (Design & Construction)	Safety
2032	Expand Primary Apron Phase II, Demo Taxiway F and Construct New Taxiway F (Construction)	Capacity/Standards
2032	Rehabilitate Taxiways D & G (Construction)	Rehabilitation
2032	Environmental Assessment – Runway 18R Extension	Capacity
2032	Runway 18R Extension 500' North; Relocate Localizer & PAPI; Extend Parallel Taxiway A 500' North; Install MIRLs & MITLs (Design)	Capacity
2032	Terminal Building (Design & Construction)	Capacity
2033	Runway 18R Extension 500' North; Relocate Localizer & PAPI; Extend Parallel Taxiway A 500' North; Install MIRLs & MITLs (Construction)	Capacity
2034	Update Airport Master Plan	Planning
2034	Rehabilitate Taxiway J (Design & Construction)	Rehabilitation
2034	Rehabilitate Taxiway C, K, L & M (Design)	Rehabilitation

Source: KSA

5.2.1.3. LONG-TERM (11-20 YEARS) 2035-2044

The following projects are combined into the final, ten-year phase of the planning horizon. These elements provide a high level of flexibility. During this planning period, focus is given to preserving existing infrastructure, preparing the Airport for shifts in technology including AAM/UAM, potential expansion of the primary runway, and implementation of a full-length parallel taxiway serving the east side of FWS.

Table 5.5 presents the projects expected to occur in the long-term planning period and identifies the appropriate justification category for each.

TABLE 5.5: Long-Term Development Summary

LONG-TERM (11-20 Years) 2035-2044		
FY	Project Description	Justification Category
2035	Rehabilitate Primary Apron	Rehabilitation
2035	Rehabilitate Taxiways C, K, L, & M (Design & Construction)	Rehabilitation
2035	Northeast Development Access Taxilane (Design)	Capacity
2036	Rehabilitate Taxiways N & P (Design & Construction)	Rehabilitation
2036	PCI Study Update	Rehabilitation
2036	Northeast Development Access Taxilane (Construction)	Capacity
2037	Rehabilitate Taxilanes A1-A4 (Design & Construction)	Rehabilitation
2037	Conduct Traffic Impact Analysis – Abner Lee Road	Capacity
2038	Rehabilitate Taxilanes M1-M6 (Design & Construction)	Rehabilitation
2039	Conduct Environmental Assessment – Runway 36L Extension	Capacity
2040	Relocate Abner Lee Drive	Capacity/Standards
2041	Runway 36L Extension 800’ South; Relocate MALSR & PAPI; Extend Parallel Taxiway A 800’ South; Install MIRLs & MITLs (Design & Construction)	Capacity
2042	Reduce Runway 18L (Turf) Length to 2,460’ (Option to Pave)	Capacity/Safety
2042	Rehabilitate Taxiways E & F (Seal Coat)	Rehabilitation
2042	Conduct Environmental Assessment – East Parallel Taxiway	Capacity
2043	Construct East Parallel Taxiway & Install MITLs	Capacity
2043	Realign Taxiway L – East Side Parallel Taxiway	Capacity/Standards
2044	Rehabilitate Runway 18R/36L (Design & Construction)	Rehabilitation

Source: KSA

5.2.1.4. AAM/UAM FACILITY

Although there are still many unknowns with the future of AAM/UAM, current studies have been used to establish a plan on how to best implement the AAM/UAM facility into the Airport. While landing vertically, the eVTOL aircraft used in AAM/UAM operations will utilize an on-airport Vertiport as described by FAA Engineering Brief

105, *Vertiport Design.* One of the challenges facing AAM/UAM and its integration into general aviation facilities is the required charging infrastructure. Many eVTOL aircraft utilize their own proprietary charging system, so each manufacturer will be required to provide the specifics of the required charging specifications later. Largely, eVTOL aircraft are utilizing two different charging standards developed for electric vehicle charging, one of which is the more widely used Combined Charging Standard (CCS) that provides power up to 350kW and is the standard infrastructure for electric car charging stations. The second is the Megawatt Charging System (MCS) and is a more recently established standard being widely used for larger vehicles, such as electric busses, trucks, and the possibility of eVTOL aircraft. For published charging and battery specifications, peak DC charging power ranges from 300 to 1,000 kW, meaning large amounts of power infrastructure will be needed for the charging station. The addition of solar power generation at the airport will assist in the addition of the eVTOL charging, as the power generated there will be able to supplement the power from the local grid substation.

5.3. COST ESTIMATES AND PHASING

Projects presented in the recommended development plan involve many variables that impact cost. Costs associated with each project include preliminary engineering, design, construction, and administration oversight. The lifecycle of each project will be determined by their type and associated complexity. For example, runway projects may involve several phases detailed engineering plans. Each will be scoped and estimated during the implementation phase of the project. Due to these variables, most estimates of costs are presented on a scale comparable to airports with similar projects and requirements. It should be noted that these projects are conservative for planning purposes and allow for adequate budgeting for future project implementation.

The costs presented in this section include a 20% contingency and 5% inflation adjustment to help prepare and offset variables in construction costs at the time of implementation. These estimates were prepared using 2024 dollars. It is assumed that actual costs will be subject to yearly inflation and revised costs should be generated at the time of implementation.

As airport infrastructure ages, routine maintenance will be required throughout the 20-year planning period, including ongoing pavement, lighting, NAVAID, and other projects. Runway, taxiway, and apron maintenance include crack seal and structural overlay, PCC pavement repairs, or other rehabilitation projects necessary to maintain a safe environment for aircraft operations. The Airport will need to routinely assess the pavement condition and airside operational requirements, such as marking and lighting, to ensure sound operational conditions.

The following estimates present the suggested phasing for projects during the short-, intermediate-, and long-term periods. The phasing plan is a suggested schedule and deviation will almost certainly occur, particularly during latter periods. Attention has been given to the first five years (2025-2029). These are the most critical projects, and the phasing schedule should be adhered to as practicable. The demand for certain facilities and the economic feasibility of their development are the prime factors influencing project timing. Care must be taken to ensure adequate lead time for detailed planning and construction of facilities to meet aviation demands at FWS.

Tables 5.6, 5.7, and 5.8 present the OPPC and phasing schedule for each phase of the planning horizon.

THIS SECTION LEFT BLANK INTENTIONALLY

TABLE 5.6: Short-Term Cost Estimates

SHORT-TERM (0-5 YEARS) 2025-2029							
FY	Project No.	Funding Source	Project Description	Total Estimated Cost	Estimated Federal Funds (TxDOT)	BIL Funds	Estimated Local Funds (CFW)
2025	1	TxDOT	Eastside Hangar Access Taxilanes Phase II (Construction)	$2,450,000	$2,205,000	--	$245,000
2025	2	TxDOT	MITLs for Taxiways A, D, G (Design)	$105,000	$94,500	--	$10,500
2025	3	BIL	East-Side Taxilane Kilo Rehab (Design & Construction)	$791,516	--	$712,364	$79,152
2025	4	CFW	East-Side Utility Adjustments	$250,000	--	--	$250,000
2025	5	CFW	Land Acquisition	$2,100,000	--	--	$2,100,000
2026	1	TxDOT/BIL	MITLs for Taxiways A, D, G (Construction)	$1,500,000	$1,350,000	$135,000	$15,000
2026	2	TxDOT	Rehabilitate Taxiways A & C (West-Side Design)	$541,000	$486,900	--	$54,100
2027	1	CFW	PCI Study Update	$95,000	--	--	$95,000
2027	2	TxDOT	Rehabilitate Taxiways A & C (West-Side Construction)	$2,055,000	$1,849,500	--	$205,500
2028	1	TxDOT	Rehabilitate Taxiways B & H (Design)	$568,000	$511,200	--	$56,800
2028	2	CFW	Perimeter Fencing Replacement Phase I (Design & Construction)	$200,000	--	--	$200,000
2028	3	CFW	Hangar – Construction	$5,500,000	--	--	$5,500,000
2029	1	TxDOT	Runway 18R-36L Underdrains & Overlay w/ Grooving (Design)	$278,000	$250,200	--	$27,800
2029	2	TxDOT	Rehabilitate Taxiway B & H (Construction)	$2,270,000	$2,043,000	--	$227,000
2029	3	CFW	Perimeter Fencing Replacement Phase II (Design & Construction)	$200,000	--	--	$200,000
SHORT-TERM (0-5 YEARS) 2025-2029 TOTALS				$18,903,516	$8,790,300	$847,364	$9,265,852

Cost Estimates Shown in 2024 Dollars. All costs include a 15% contingency and 5% inflation adjustment.

TABLE 5.7: Intermediate-Term Cost Estimates

INTERMEDIATE-TERM (6-10 YEARS) 2030-2034							
FY	Project No.	Funding Source	Project Description	Total Estimated Cost	Estimated Federal Funds (TxDOT)	BIL Funds	Estimated Local Funds (CFW)
2030	1	TxDOT	Taxiway Underdrains and Grading Improvements (Design)	$181,718	$163,546	--	$18,172
2030	2	TxDOT	Runway 18R-36L Underdrains & Overlay w/ Grooving (Construction)	$5,870,895	$5,283,806	--	$587,090
2030	3	TxDOT	Expand Primary Apron (12,500 sq. yds.) Phase I, Demo Taxiway E and Construct New Taxiway E (Design)	$739,418	$665,476	--	$73,942
2030	4	CFW	Perimeter Fencing Replacement Phase III (Design & Construction)	$200,000	--	--	$200,000
2031	1	CFW	Hangar – Construction	$2,127,500	--	--	$2,127,500
2031	2	TxDOT	Taxiway Underdrains and Grading Improvements (Construction)	$3,801,404	$3,421,264	--	$380,140
2031	3	TxDOT	Expand Primary Apron Phase I, Demo Taxiway E and Construct New Taxiway E (Construction)	$2,957,671	$2,661,904	--	$295,767
2031	4	TxDOT	Expand Primary Apron (12,500 sq. yds.) Phase II, Demo Taxiway F and Construct New Taxiway F (Design)	$739,418	$665,476	--	$73,942
2031	5	TxDOT	Rehabilitate Taxiways D & G (Design)	$159,388	$143,449	--	$15,939
2031	6	CFW	PCI Study Update	$90,563	--	--	$90,563
2031	7	TxDOT	RPZ Compatibility Review – East Rendon Crowley Road	$50,000	$45,000	--	$5,000
2031	8	CFW	Perimeter Fencing Replacement Phase IV (Design & Construction)	$200,000	--	--	$200,000
2032	1	TxDOT	Expand Primary Apron Phase II, Demo Taxiway F and Construct New Taxiway F (Construction)	$2,957,671	$2,661,904	--	$295,767
2032	2	TxDOT	Rehabilitate Taxiways D & G (Construction)	$637,554	$573,799	--	$63,755
2032	3	TxDOT	Environmental Assessment – Runway 18R Extension	$250,000	$225,000	--	$25,000
2032	4	TxDOT	Runway 18R Extension 500’ North; Relocate Localizer & PAPI; Extend Parallel Taxiway A 500’ North; Install MIRLs & MITLs (Design)	$943,735	$849,362	--	$94,374

2032	5	CFW	Terminal Building (Design & Construction)	$5,750,000	--	--	$5,750,000
2033	1	TxDOT	Runway 18R Extension 500' North; Relocate Localizer & PAPI; Extend Parallel Taxiway A 500' North; Install MIRLs & MITLs (Construction)	$3,774,938	$3,397,444	--	$377,494
2034	1	TxDOT	Update Airport Master Plan	$650,000	$585,000	--	$65,000
2034	2	TxDOT	Rehabilitate Taxiway J (Design & Construction)	$189,763	$170,787	--	$18,976
2034	3	TxDOT	Rehabilitate Taxiway C, K, L, & M (Design)	$304,094	$273,685	--	$30,409
INTERMEDIATE-TERM (6-10 YEARS) 2030-2034 TOTALS				$32,575,730	$21,786,900	--	$10,788,830

Cost Estimates Shown in 2024 Dollars. All costs include a 15% contingency and 5% inflation adjustment.

TABLE 5.8: Long-Term Cost Estimates

LONG-TERM (11-20 YEARS) 2035-2044							
FY	Project No.	Funding Source	Project Description	Total Estimated Cost	Estimated Federal Funds (TxDOT)	BIL Funds	Estimated Local Funds (CFW)
2035	1	TxDOT	Rehabilitate Primary Apron	$1,647,264	$1,482,538	--	$164,726
2035	2	TxDOT	Rehabilitate Taxiways C, K, L, & M (Construction)	$1,216,378	$1,094,740	--	$121,638
2035	3	TxDOT	Northeast Development Access Taxilane (Design)	$404,677	$364,209	--	$40,468
2036	1	TxDOT	Rehabilitate Taxiways N & P (Design & Construction)	$670,902	$603,812	--	$67,090
2036	2	CFW	PCI Study Update	$90,563	--	--	$90,563
2036	3	TxDOT	Northeast Development Access Taxilane (Construction)	$1,618,709	$1,456,838	--	$161,871
2037	1	TxDOT	Rehabilitate Taxilanes A1-A4 (Design & Construction)	$207,576	$186,818	--	$20,758
2037	2	TxDOT	Conduct Traffic Impact Analysis – Abner Lee Drive	$50,000	$45,000	--	$5,000
2038	1	TxDOT	Rehabilitate Taxilanes M1-M6 (Design & Construction)	$985,592	$887,033	--	$98,559
2039	1	TxDOT	Conduct Environmental Assessment – Runway 36L Extension	$250,000	$225,000	--	$25,000
2040	1	TxDOT	Relocate Abner Lee Drive	$5,703,331	$5,132,998	--	$570,333

2041	1	TxDOT	Runway 36L Extension 800' South, Relocate MALSR & PAPI; Extend Parallel Taxiway A 800' South; Install MIRLs & MITLs (Design & Construction)	$6,374,136	$5,736,722	--	$637,414
2042	1	CFW	Reduce Runway 18L (Turf) Length to 2,460' (Option to Pave)	$4,000,000	$3,600,000	--	$400,000
2042	2	TxDOT	Rehabilitate Taxiway E & F (Seal Coat)	$291,924	$262,732	--	$29,192
2042	3	TxDOT	Conduct Environmental Assessment – East Parallel Taxiway	$250,000	$225,000	--	$25,000
2043	1	TxDOT	Construct East Parallel Taxiway & Install MITLs	$12,691,229	$11,422,106	--	$1,269,123
2043	2	TxDOT	Realign Taxiway L – East Side Parallel Taxiway	$911,631	$820,468	--	$91,163
2044	1	TxDOT	Rehabilitate Runway 18R/36L (Design & Construction)	$4,835,906	$4,352,315	--	$483,591
LONG-TERM (11-20 YEARS) 2035-2044 TOTALS				$42,199,818	$37,898,330	--	$4,301,489
2025 – 2044 GRAND TOTAL				$93,679,064	$68,475,530	$874,364	$24,356,171

Cost Estimates Shown in 2024 Dollars. All costs include a 15% contingency and 5% inflation adjustment.

**Assumes 15,000 sq. yd. apron, terminal facility, utility/charging infrastructure.

5.3.1. BEYOND THE MASTER PLAN HORIZON

Certain developments have been identified and shown on the Recommended Plan that may be included in subsequent planning efforts. These projects are not expected to be completed in the 20-year planning horizon; however, they have been shown to examine the ultimate build-out of potential hangar/apron facilities on the airfield.

As previously mentioned, it is important to keep these long-range improvements shown on the plan as it may influence how decisions are made in the future about the development of the Airport. Hangar development previously identified in the alternatives chapter and labeled on the Recommended Plan will include box hangars, T-hangars, and other private development. Table 5.9 provides example costs for various hangar facilities. These costs are based on recent bid numbers for actual projects completed at similar, general aviation facilities.

TABLE 5.9: Representative Hangar Cost Estimates

Hangar Size & Type	Cost Estimate
200’ x 300’ Executive Hangar	$9,540,000
150’ x 250’ Executive Hangar	$5,962,500
120’ x 120’ Executive Hangar	$2,289,600
50’ x 280’ T-Hangar	$2,226,000
100’ x 100’ Executive Hangar	$1,590,000
75’ x 80’ Box Hangar	$954,000
50’ x 100’ Executive Box Hangar	$795,000
50’ x 75’ Box Hangar	$596,250
60’ x 60’ Box Hangar	$572,400
50’ x 280’ T-Hangar	$2,226,000

Cost Estimates Shown in 2024 Dollars. All costs include a 15% contingency and 5% inflation adjustment.

$159/sq. ft. estimates include water, sewer, electrical services, grading, and drainage. Apron should be estimated independently.

5.4. CONCLUSION AND FUNDING SOURCES

This section describes sources and eligibility criteria for funding programs that the Airport may use to aid in funding future development projects. It is not guaranteed that all funding sources will be available and used on airports projects; however, it lists the available options and funding criteria. During the financial implementation of projects at the Airport, all funding sources should be evaluated and coordinated with the appropriate funding source for eligibility.

5.4.1. STATE FUNDING

Funding for airport projects falls under the purview of the Texas Department of Transportation (TxDOT) Aviation Division. As a Block Grant state, the State of Texas oversees the eligibility and distribution of grant funding for general aviation and reliever airports. Texas is one of ten Block Grant states that allocate funding on behalf of the FAA. Funding is eligible for airport sponsors to obtain and disburse federal and state funds for these airports included in the 300-airport Texas Aviation System Plan (TASP). Funding availability, continued project justification, and local sponsor cost share are determining factors in the timely implementation of these projects. Projects identified in the current year will go before the Texas Transportation Commission for approval prior to going out for proposals and funding. Most grant items funded through this program involve a 90/10 cost share.

5.4.2. BIPARTISAN INFRASTRUCTURE LAW

At the end of 2021, the federal government passed the Bipartisan Infrastructure Law (BIL), which includes funding for airports over the course of the next five years. Airports can use funds for runways, taxiways, safety, terminal, airport-transit connections, and roadway projects. The funding will be provided at $294,000 for FY24 and $292,000 for FY23. Fiscal years 2025 and 2026 amounts have yet to be determined. These funds will be provided with a 90/10 cost share, similar to the state funding outlined above.

5.4.3. RAMP PROGRAM

TxDOT Aviation Division also administers the Routine Airport Maintenance Program (RAMP), which matches local government grants up to $50,000, for a total of $100,000 annually. For FY2024 and FY2025, the cost sharing will be spit 90/10 between TxDOT and the sponsor, with the possibility of returning to the previous 50/50 split after FY2025. RAMP funds can be used for basic improvements such as parking lots, fencing, and other landside needs. This program is aimed at assisting airports to continue providing quality services and infrastructure on an annual maintenance basis. Projects that may not be eligible under other funding sources may be used hereafter other obligations are met. The local government match is 10% of actual costs plus any excess of $100,000 total costs.

This program includes smaller budget airside and landside airport improvements such as:

- Construction of airport access roads
- Construction of airport public parking lots
- Installation of airport security fencing
- Replacement of rotating beacons
- VirTower aircraft operations counting software

TxDOT determines the eligibility of specific items and insists that airside improvements are secure before requesting assistance with landside maintenance and improvements.

5.4.4. HANGAR PROGRAM

This program allows an airport to utilize a four-year bank of Non-Primary Entitlement (NPE) for the construction of hangars. However, to qualify, all airport airside and safety deficiency needs must be met. Other considerations that must be met include justification for the additional hangar need, a site-specific location based on an approved Airport Layout Plan (ALP), a fair market hangar lease and rate structure in a place, and airport minimum standards are adopted. This program assists airport sponsors with funding these structures with a local share of 10%, with the state contributing 90% up to a state maximum contribution of $600,000. Should the Airport decide to pursue funding under this program, it would be exempt from funding sources other than NPE, such as discretionary and AIP, for the following three (3) years.

5.4.5. TERMINAL PROGRAM

One additional program that TxDOT Aviation provides is specific to general aviation terminal buildings. Many airports across the state need upgraded or new terminal facilities for pilot lounges, FBO facilities, and airport staff administration. This program assists airport sponsors that have not previously been awarded funding for new terminal buildings at a local share of 50% up to a state maximum contribution of $500,000.

5.4.6. SPONSOR FUNDING

Airport funds are typically approved annually through the sponsor's budgeting process, and funds are allocated to the account for airport facilities operations and all activities necessary to provide services. As such, revenues collected by the airport, such as lease rental income and other services, are used to match expenses and grant requirements. It is important to maximize revenues to continue to fund such activities with revenue generated directly from the airport. This fund will be critical to maintain in order to match future large Capital Improvement Projects.

5.4.7. ALTERNATE FUNDING SOURCES

Often when traditional aviation funding sources are not available or have been expended, other local and alternate funding options should be considered. Innovative financial strategies can be evaluated with the support of local elected officials and the general public. In addition to traditional municipal debt services such as general bond elections, other funding sources may be applicable.

Texas Enterprise Fund – The Texas Enterprise Fund (TEF) is the largest fund of its kind in the nation. The fund is used as a final incentive tool for projects that offer significant projected job creation and capital investment and where a single Texas site is competing with another viable out-of-state option. This may be useful in attracting aeronautical companies to the Airport from other states, significantly impacting the local and state economy.

State Financing – Texas is committed to facilitating funding for companies and communities with expansion and relocated projects in the state. Asset-based loans for companies leverage loans to communities, and tax-exempt bond financing are just a few means of obtaining the capital necessary for the successful project.

Tax Incentives – The state also offers a variety of tax incentives and innovative solutions for businesses expanding in or relocating to Texas. Programs include Enterprise Zone sales tax refunds, manufacturing sales tax exemptions, property tax value limitation, and "freeport" inventory tax exemptions.

In addition to the possible funding courses mentioned above, there are federal programs that assist with workforce and job creation along with research and innovation. Partnerships with area universities and junior colleges may be an exciting way to involve education in the Airport's development goals.

THIS SECTION LEFT BLANK INTENTIONALLY

6 EVIRONMENTAL

OVERVIEW

2024 FORT WORTH SPINKS AIRPORT MASTER PLAN

KSA

SPINKS AIRPORT

6. ENVIRONMENTAL OVERVIEW

6.1. OVERVIEW

The following environmental overview was prepared in accordance with Section 102(2)(c) of the National Environmental Policy Act (NEPA) of 1969 (Public Law 91-190, 42 USC 4321 et. Seq.), the Council on Environmental Quality (CEQ) Regulations for Implementing NEPA (40 CFR 1500 through 1508) and other relevant CEQ guidance. The FAA is the lead federal agency for the preparation of the Fort Worth Spinks Airport Master Plan; therefore, guidance within FAA 5050.4B, *National Environmental Policy Act (NEPA) Implementing Instructions for Airport Actions*, and FAA Order 1050.1F, *Environmental Impacts: Policies and Procedures* were followed.

The purpose of this analysis is to evaluate potential impacts to existing environmental resources resulting from the implementation of the recommended development plan. Additional NEPA analysis for individual projects will be identified at the time of implementation. It should be noted that this overview does not serve as a formal environmental clearance and will follow guidance provided in AC 150/5070-4B, *Airport Master Plans*, Section 605.

6.2. SUMMARY OF POTENTIAL ENVIRONMENTAL IMPACTS

The existing environmental conditions at FWS, as detailed in Chapter 1, *Inventory of Existing Conditions*, will serve as the baseline for evaluating the potential impacts to the airport environment resulting from the implementation of the Recommended Development Plan (Exhibits 5.1, 5.2, & 5.3). The resulting analysis will consider impacts to each of the 14 environmental impact categories and applicable subcategories.

For each category, both direct and indirect impacts must be considered. Direct impacts are those which are caused by an action and occur at the same time and place (i.e., extension of a runway in a wetland which results in the loss of the wetland). Indirect impacts are those impacts which are caused by an action or alternative and occur later in time or are farther removed in distance but are still reasonably foreseeable. These may include projects that promote growth in other areas of a community, impacts to air and water quality, and the ecosystem. Major airport development projects may involve the potential for growth-inducing impacts on surrounding communities.

6.2.1. AIR QUALITY

6.2.1.1. SIGNIFICANCE THRESHOLD

The action would cause pollutant concentrations to exceed one or more of the National Ambient Air Quality Standards (NAAQS), as established by the Environmental Protection Agency (EPA) under the Clean Air Act (CAA), for any of the time periods analyzed, or increase the frequency or severity of any such existing violations. Under the CAA, the EPA developed the NAAQS for six common air pollutants, Carbon Monoxide (CO), Nitrogen Dioxide (NO_2), Ozone (O_3), Particulate Matter (PM), Sulfur Dioxide (SO_2), and Lead (Pb).

6.2.1.2. POTENTIAL IMPACTS

The proposed Recommended Development Plan includes several changes to the runway and taxiway environment at FWS. These changes would allow the Airport to continue serving its existing fleet mix during varying weather conditions and increase overall airfield safety. It is not anticipated that the proposed changes would result in increased emissions. According to the EPA Green Book: Non-attainment Areas for Criteria Pollutants, Tarrant County is classified as being in moderate non-attainment for the 8-Hour Ozone pollutants.

6.2.2. BIOLOGICAL RESOURCES

6.2.2.1. SIGNIFICANCE THRESHOLD

The U.S. Fish and Wildlife Service (USFWS) or National Marine Fisheries Service (NMFS) determines that the action would be likely to jeopardize the continued existence of a federally listed threatened or endangered species or would result in the destruction or adverse modification of federally designated critical habitat.

The FAA has not established a significance threshold for non-listed species.

Impacts to consider would include actions which would have the potential for:

- A long-term or permanent loss of unlisted plant or wildlife species, i.e., expiration of the species from a large project area (e.g., a new commercial service airport).
- Adverse impacts to special status species (e.g., state species of concern, species proposed for listing, migratory birds, bald and golden eagles) or their habitats.
- Substantial loss, reduction, degradation, disturbance, or habitat fragmentation of native species or their populations.
- Adverse impacts on a species reproductive success rate, natural mortality rates, non-natural mortality (e.g., road kills and hunting), or ability to sustain the minimum population levels required for population maintenance.

6.2.2.2. POTENTIAL IMPACTS

An initial review of the USFWS Information for Planning and Consultation (IPaC) database was conducted to determine the potential for habitats to exist within the immediate vicinity of the Airport. According to the query result, the study area does not contain suitable habitat for the listed species. This surveyed area includes all existing airport property as well as any property required for implementation of the Recommended Development Plan. The following species have been determined to have the potential to occur within the vicinity of the Airport. The USFWS IPaC review found no designated critical habitats for the above-listed species occur within the boundaries of Fort Worth Spinks Airport.

6.2.3. CLIMATE

6.2.3.1. SIGNIFICANCE THRESHOLD

The FAA has not established a significance threshold for Climate.

6.2.3.2. POTENTIAL IMPACTS

The implementation of the Recommended Development Plan may have the potential to increase greenhouse gas emissions (GHG) on a project-by-project basis. Specific NEPA analysis may be required beyond the scope of the master plan to determine emissions impacts as projects are implemented throughout the planning period.

6.2.4. COASTAL RESOURCES

6.2.4.1. SIGNIFICANCE THRESHOLD

The FAA has not established a significance threshold for Coastal Resources.

Impacts to consider would include actions which would have the potential to:

- Be inconsistent with the relevant state coastal zone management plan(s).
- Impact a coastal barrier resources system unit (and the degree to which the resource would be impacted).
- Post an impact to coral reef ecosystems (and the degree to which the resources would be impacted).
- Cause an unacceptable risk to human safety or property; or
- Cause adverse impacts to the coastal environment that cannot be satisfactory mitigated.

6.2.4.2. POTENTIAL IMPACTS

No impact to coastal resources is expected. FWS is not located in a coastal zone.

6.2.5. DEPARTMENT OF TRANSPORTATION, SECTION 4(F)

6.2.5.1. SIGNIFICANCE THRESHOLD

The action involves more than a minimal physical use of Section 4(f) resources or constitutes a "constructive use" based on an FAA determination that the aviation project would substantially impair the Section 4(f) resource. Resources that are protected by Section 4(f) are publicly owned land from a public park, recreation area, or wildlife and waterfowl refuge or national, state, or local significance. Substantial impairment occurs when the activities, features, or attributes of the resource that contribute to its significance or enjoyment are substantially diminished.

6.2.5.2. POTENTIAL IMPACTS

It is not anticipated the Recommended Development Plan will produce impacts to any resources classified under Section 4(f) of the DOT Act. The property carrying the Section 4(f) designation located nearest the Fort Worth Spinks Airport is the Mistletoe Hill Park, located approximately half a mile west of the Fort Worth Spinks Airport. This City park is located in a developed residential community, therefore there are no projected impacts to this park due to the existing location of the Airport.

6.2.6. FARMLANDS

6.2.6.1. SIGNIFICANCE THRESHOLD

The total combined score on Form AD-1006, "Farmland Conversion Impact Rating," ranges between 200 and 260 points. The action would have the potential to convert important farmlands to non-agricultural uses. Important farmlands include pastureland, cropland, and forecast considered to be prime, unique, or statewide or locally important land.

6.2.6.2. POTENTIAL IMPACTS

Data obtained from the National Resource Conservation Service's (NRCS) Web Soil Survey indicates the presence of farmland classified as prime or of statewide importance. None of the areas immediately surrounding the Airport, identified for the proposed implementation of the Recommended Plan are currently being utilized as farmland. While there are areas designated as farmland as having statewide importance, prime farmland, and not prime farmland it is important to note that Spinks is located in a highly developed area that is not utilizing any of the adjacent land as farmland.

6.2.7. FLOODPLAINS

6.2.7.1. SIGNIFICANCE THRESHOLD

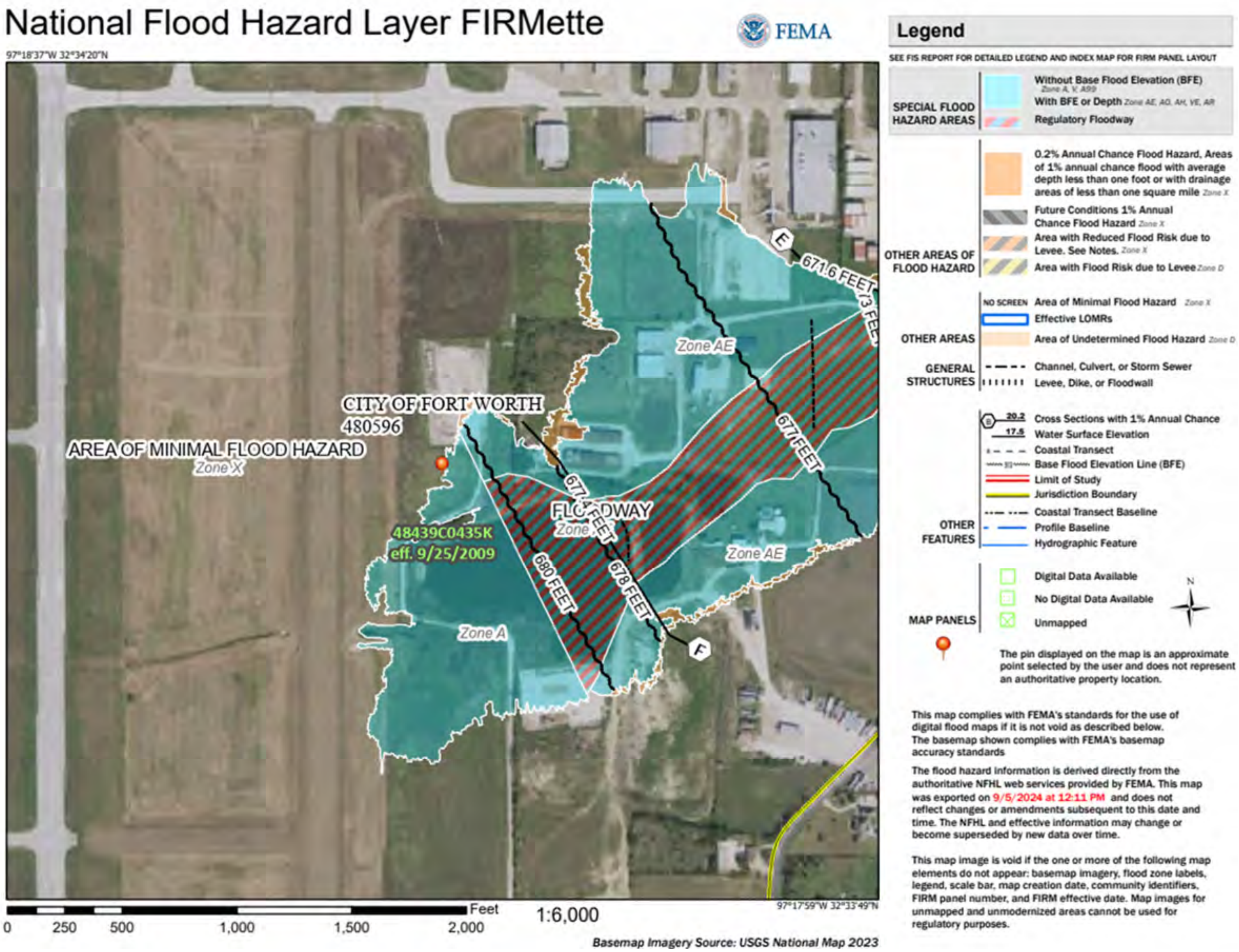
The action would cause notable adverse impacts on natural and beneficial floodplain values. Natural and beneficial floodplain values are defined in Paragraph 4.k of DOT Order 5650.2, Floodplain Management and Protection, as including but not limited to: Natural moderation of floods, water quality maintenance, groundwater recharge, fish, wildlife, plants, open space, natural beauty, scientific study, outdoor recreation, agriculture, aquaculture, and forestry.

6.2.7.2. POTENTIAL IMPACTS

According to the Federal Emergency Management Agency (FEMA) flood maps there are areas on the Airport, to the east, and south off Airport property where the Recommend Development plan will expand areas of the Airport that are identified as Special Flood Hazard Area. The east side of the airport is designated as "Zone AE" which is a Regulatory Floodway without a Base Flood Elevation (BFE). The south end of the Airport, and off Airport property, where the runway extension is expected ha the same designator as the east side of the Airport. This should have no impact on project development since the Airport currently has these floodplains and has not majorly impacted, or been impacted, by these floodplains. Exhibit 6.1 demonstrates a portion of the FEMA digital floodmap that affects a portion of the airfield.

THIS SECTION LEFT BLANK INTENTIONALLY

TABLE 6.1: FEMA Floodplain Map



6.2.8. HAZARDOUS MATERIALS, SOLID WASTE, AND POLLUTION PREVENTION

6.2.8.1. SIGNIFICANCE THRESHOLD

The FAA has not established a significance threshold for Hazardous Materials, Solid Waste, and Pollution Prevention.

Impacts to consider would include actions which would have the potential to:

- Violate applicable Federal, state, tribal, or local laws or regulations regarding hazardous materials and/or solid waste management;
- Involve a contaminated site (including but not limited to a site listed on the National Priorities List). Contaminated sites may encompass relatively large areas. However, not all of the grounds within the boundaries of a contaminated site are contaminated, which leases space for siting a facility on non-contaminated land within the boundaries of a contaminated site. An EIS is not necessarily required. Paragraph 6-2.3a of this Order allows for mitigating impacts below significant levels (e.g., modifying an action to site it on non-contaminated grounds within a contaminated site). Therefore, if appropriately mitigated, actions within the boundaries of a contaminated site would not have significant impacts;
- Produce an appreciably different quantity or type of hazardous waste;
- Generate an appreciably different quantity or type of solid waste or use a different method of collection or disposal and/or would exceed local capacity; or
- Adversely affect human health and the environment.

6.2.8.2. POTENTIAL IMPACTS

Initial review using the EPA's EJSCREEN indicated there are currently no known areas containing hazardous materials or waste contamination within the existing airport property. Airport Operations include the utilization of above-ground fuel storage facilities, which carry the potential to produce hazardous materials associated with fossil fuels. These facilities are governed and regulated by the Environmental Protect Agency (EPA) and the FAA.

6.2.9. HISTORICAL, ARCHITECTURAL, ARCHEOLOGICAL, AND CULTURAL RESOURCES

6.2.9.1. SIGNIFICANCE THRESHOLD

The FAA has not established a significance threshold for Historical, Architectural, Archeological, and Cultural Resources. The action would result in a finding of Adverse Effect through Section 106 process. However, an adverse effect finding does not automatically trigger preparation of an EIS (i.e., significant impact).

6.2.9.2. POTENTIAL IMPACTS

No impact is anticipated for the Airport. There are no properties included in the National Register of Historic Place (NRHP) that are located within a five-mile radius of FWS. Implementation of the Recommended Plan would not produce any negative impacts on these identified resources.

Historical, architectural, archeological, and cultural resources encompass a range of sites, properties, and physical resources relating to human activities, society, and cultural institutions. Such resources include past and present expressions of human culture and history in the physical environment, such as prehistoric and historic archeological sites, structures, objects, districts, which are considered important to a culture of a community. Impacts have the potential to occur when a proposed project results in an adverse effect to a property which has been classified as having historical, architectural, archeological, or cultural significance.

6.2.10. LAND USE

6.2.10.1. SIGNIFICANCE THRESHOLD

The FAA has not established a significance threshold for Land Use. There are no specific independent factors to consider for Land Use. The determination that significant impacts exist in the Land Use impact category is normally dependent on the significance of other impacts.

6.2.10.2. POTENTIAL IMPACTS

The Recommended Plan, as depicted in Exhibit 5.1, proposes one separate acquisition/easement totaling approximately 5.4 acres, respectively, to ensure continued airport control of the Runway Protection Zone (RPZ), and aviation related development. Part of the land acquisition to the north of the field overlaps E Rendon Crowley Road, therefore prior to any property acquisition zoning will need to be considered for the road, as well as the 5.4 acres

6.2.11. NATURAL RESOURCES AND ENERGY SUPPLY

6.2.11.1. SIGNIFICANCE THRESHOLD

The FAA has not established a significance threshold for the Natural Resources and Energy Supply. The action would have the potential to cause demand to exceed available or future supplies of these resources.

6.2.11.2. POTENTIAL IMPACTS

The Airport's Recommended Plan includes improvements at increasing capacity at the Fort Worth Spinks Airport. Therefore, the potential exists for these projects to contribute to the increased demand of natural resources and energy consumption. Executive Order 13514, Federal Leadership in Environmental, Energy, and Economic Performance, provides guidance to the project sponsor on required coordination with applicable local, state, and Federal entities to determine if a permit may be required for a specific project.

6.2.12. NOISE AND COMPATIBLE LAND USE

6.2.12.1. SIGNIFICANCE THRESHOLD

The action would increase noise by DNL 1.5 dB or more for a noise-sensitive area that is exposed to noise at or above the DNL 65 dB noise exposure level, or that will be exposed at or above the DNL 65 dB level due to a DNL 1.5dB or greater increase when compacted to the no-action alternative for the same timeframe. For example, an increase from DNL 65.6 dB to 67 dB is considered a significant impact, as is an increase from 63.5 dB to 65 dB.

6.2.12.2. POTENTIAL IMPACTS

Aviation noise primarily results from the operation of fixed or rotary-wing aircraft, such as departures, arrivals, overflights, taxiing, and engine run-ups. Noise is often the predominant aviation environmental concern of the public. 14 CFR 150, Airport Noise Compatibility Planning, mentions that schools and residential land uses are not considered compatible with a 65 decibel (dB) Day-Night Average Sound Level. Religious facilities, hospitals, etc., are generally compatible when a noise level reduction is incorporated into the design of the facility. Noise contours were a part of the scope for this project and were conducted by ESA and will be attached as an appendix to this document. The current noise levels, with the existing fleet mix and runway utilization, shows that all noise remains on airport property, with the exception of a small portion of Abner Lee Drive, which splits the airport property in half. Should the Airport pursue a runway extension to the north, then the noise will continue to remain on airport property as well, due to the land acquisition that would be required for the RPZ.

6.2.13. SOCIOECONOMICS

6.2.13.1. SIGNIFICANCE THRESHOLD

The FAA has not established a significance threshold for Socioeconomics.

Impacts to consider would include actions which would have the potential to:

- Induce substantial economic growth in an area, either directly or indirectly (e.g., through establishing projects in an undeveloped area;
- Disrupt or divide the physical arrangement of an established community;
- Cause extensive relocation when sufficient replacement house is unavailable;
- Cause extensive relocation of community businesses that would cause severe economic hardship for affected communities; or

- Disrupt local traffic patterns and substantially reduce the levels of service of roads serving an airport and its surrounding communities; or
- Produce a substantial change in the community tax base.

The FAA has not established a significance threshold for Environmental Justice.

Impacts to consider would include actions which would have the potential to lead to a disproportionately high and adverse impact to an environmental justice population, i.e., a low-income or minority population, due to:

- Significant impacts in other environmental impact categories; or
- Impacts on the physical or natural environment that affect an environmental justice population in a way that the FAA determines are unique to the environmental justice population and significant to that population.

6.2.13.2. POTENTIAL IMPACTS

Projects reflected in the Recommended Plan will require the acquisition of property or implementation of aviation easements in order to accomplish the proposed extension to Runway 18R/36L and maintain compatible land uses within the Runway Protection Zone (RPZ). Requirements pertaining to real property acquisition and 49 CFR Part 24 (Implementing the Uniform Relocation Assistance of Real Property Acquisitions Policies Act of 1970) were covered in the “Land Use” portion of this environmental overview. Roadway and service level changes will coincide with the identified projects and will require further NEPA analysis to determine the level of service impact and possible mitigation measures.

6.2.14. ENVIRONMENTAL JUSTICE

6.2.14.1. SIGNIFICANCE THRESHOLD

The FAA has not established a significance threshold for Environmental Justice.

Impacts to consider would include actions which would have the potential to lead to a disproportionately high and adverse impact on an environmental justice population, i.e., a low-income or minority population, due to:

- Significant impacts in the environmental impact categories; or
- Impacts on the physical or natural environmental that affect an environmental justice population in a way that the FAA determines are unique to the environmental justice population and significant to that population.

6.2.14.2. POTENTIAL IMPACTS

As detailed in Chapter 1, *Inventory of Existing Conditions*, low-income, and minority population exists within the vicinity of the Fort Worth Spinks Airport. As governed by Executive Order 12898, *Federal Action to Address Environmental Justice in Minority*

Populations and Low-Income Populations, implementation of associated projects will require meaningful public involvement by these identified populations.

6.2.15. CHILDREN'S ENVIRONMENTAL HEALTH AND SAFETY RISKS

6.2.15.1. SIGNIFICANCE THRESHOLD

The FAA has not established a significance threshold for Children's Environmental Health and Safety Risks. Impacts to be considered include actions which would have the potential to lead to a disproportionate health or safety risk to children.

6.2.15.2. POTENTIAL IMPACTS

Mound, Bransom, and Ann Brock Elementary Schools are the only schools located within two miles of airport property. Execuive Order 13405, Protection of Children from Environmental Health and Safety Risks, directs federal agencies to identify environmental risks associated with project implementation that contain he potential to disproportionately affect children. Care should be given during the construction phase to limit unnecessary access o the project site by unauthorized persons.

6.2.16. VISUAL EFFECTS (LIGHT EMISSIONS)

6.2.16.1. SIGNIFICANCE THRESHOLD

The FAA has not established a significance threshold for Light Emissions or Visual Resources / Visual Character. Impacts to consider would include action which would have the potential to:

- Create annoyance or interfere with normal activities from light emissions; and
- Affect the visual character of the area due to the light emissions, including the importance, uniqueness, and aesthetic value of the affected visual resources;
- Affect the nature of visual character of an area, including the importance, uniqueness, and the aesthetic value of the affected visual resources;
- Contact with the visual resources and/or visual character in the study area; and
- Block or obstruct the views of visual resources, including whether these resources would still be viewable from other locations.

6.2.16.2. POTENTIAL IMPACTS

Projects proposed in the Recommended Plan contain the potential to alter the existing visual characteristics of the Fort Worth Spinks Airport including lighting proposed runway and taxiway extensions, and other on-airport development. Section 13.2.2 or FAA Order 1050.1F outlines the recommended public involvement regarding visual impacts and resources.

6.2.17. WETLANDS

6.2.17.1. SIGNIFICANCE THRESHOLD

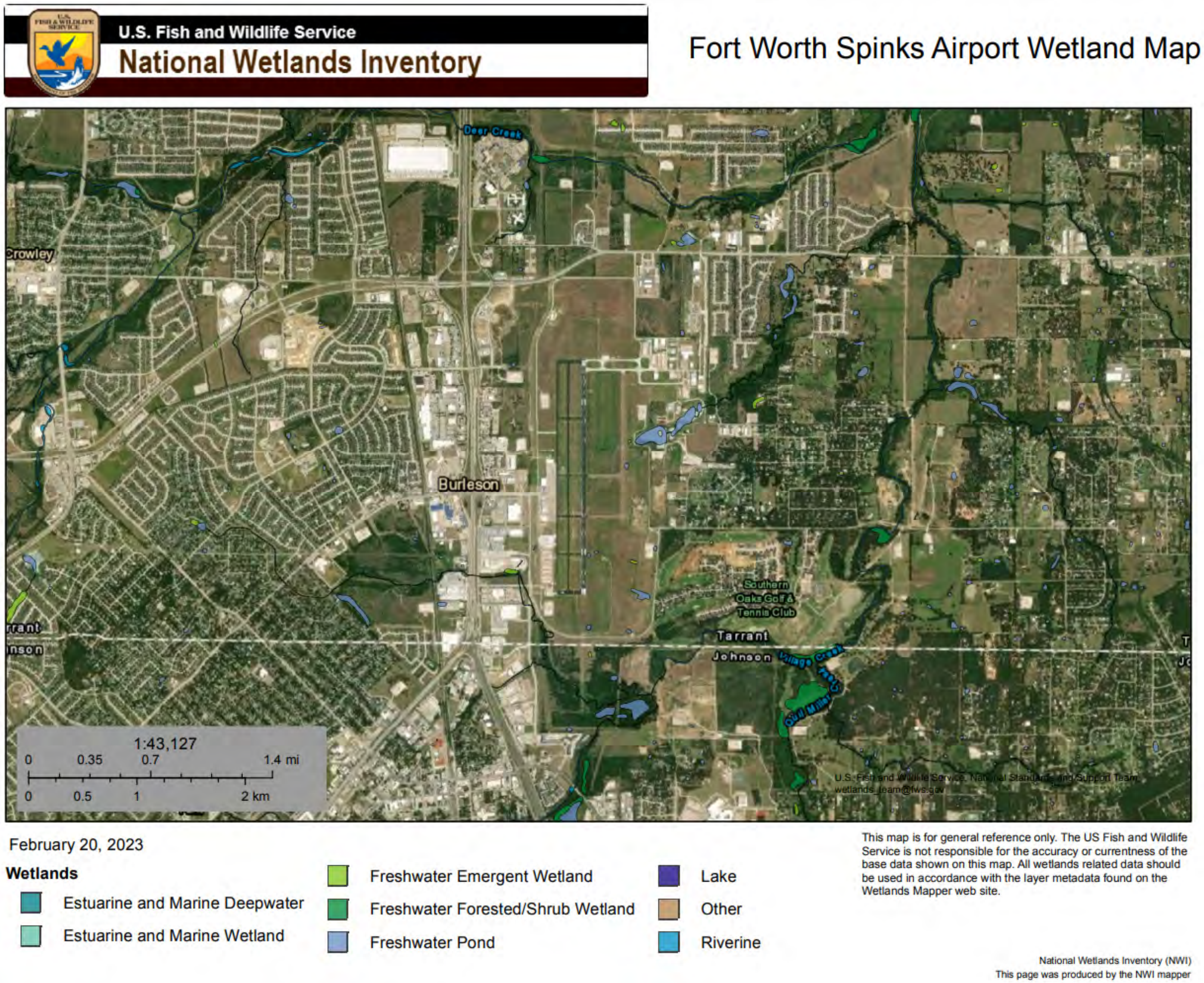
The action would:

- Adversely affect a wetland's function to protect the quality or quantity of municipal water supplies, including surface waters and sole source and other aquifers;
- Substantially alter the hydrology needed to sustain the affected wetland system's values and functions or those of a wetland to which it is connected;
- Substantially reduce the affected wetland's ability to retain floodwaters or storm runoff, thereby threatening public health, safety or welfare (the term welfare includes cultural, recreational, and scientific resources or property important to the public);
- Adversely affect the maintenance of natural systems supporting wildlife and fish habitat or economically important timber, food, or fiber resources of the affected or surrounding wetlands;
- Promote development of secondary activities or services that would cause the circumstances listen above to occur; or
- Be inconsistent with applicable state wetland strategies.

6.2.17.2. POTENTIAL IMPACTS

Wetlands in the vicinity, and on airport property, include several freshwater ponds. It is not projected that the Recommended Development plan will affect any of these wetlands as they are not located in the proximity of the recommended development areas. Any removal, alteration, or fill of jurisdiction wetlands may necessitate the need to apply or a Section 404 permit as determined by the Clean Water Act. This information was gathered using the U.S. Fish and Wildlife Service, National Wetlands Mapper. A graphical depiction of the identified wetlands is located in Exhibit 6.2.

EXHIBIT 6.2: Fort Worth Spinks Airport Wetland Map



6.2.18. SURFACE WATERS

6.2.18.1. SIGNIFICANCE THRESHOLD

This action would:

- Exceed water quality standards established by Federal, state, and local regulatory agencies; or
- Contaminate public drinking water supply such that public health may be adversely affected.

6.2.18.2. POTENTIAL IMPACTS

The Airport currently maintains a Stormwater Pollution Prevention Plan (SWPPP), which was updated in 2021. SWPPP is a plan that offers best management practices for the reduction, prevention, and elimination of runoff associated with airport activities. The Recommended Development plan is not anticipated to have an impact on surface waters, and the Airport will comply with the current SWPPP for best management practices.

6.2.19. GROUNDWATER

6.2.19.1. SIGNIFICANCE THRESHOLD

The action would:

- Exceed groundwater quality standards established by Federal, state, local, and tribal regulatory agencies; or
- Contaminate an aquifer used for public water supply such that public health may be adversely affected.

6.2.19.2. POTENTIAL IMPACTS

Projects identified in the Recommended Plan would not create the potential to cause an adverse impact to groundwater quality or any aquifers utilized for public water supply.

6.2.20. WILD AND SCENIC RIVERS

6.2.20.1. SIGNIFICANCE THRESHOLD

The FAA has not established a significance threshold for Wild and Scenic Rivers.

Impacts to consider would include actions which would have the potential to cause and adverse impact on the values for which a river was designated (or considered for designation) through:

- Destroying or altering a river's free-flowing nature;
- A direct and adverse effect on the values for which a river was designated (or under for designation);

- Introducing a visual, audible, or other type of intrusion that is out of character with the river or would alter outstanding features of the river's setting;
- Causing a river's water quality to deteriorate;
- Allowing the transfer or sale of property interests without restrictions needed to protect the river or the river corridor (which cannot exceed an average 320 acres per mile which, if applied uniformly along the entire designated segment, is one-quarter of a mile on each side of the river); or
- Any of the above impacts preventing a river on the Nationwide Rivers Inventory (NRI) of a Section 5 (d) river that is not included in the NRI from being included in the Wild and Scenic River System or causing a downgrade in its classification (e.g., from wild to recreational).

6.2.20.2. POTENTIAL IMPACTS

There is no potential impact anticipated. A review of the National Wild and Scenic River Inventory identified no designated rivers within the vicinity of the Fort Worth Spinks Airport.

6.3. AIRPORT RECYCLING, REUSE, AND WASTE REDUCTION

The FAA modernization and Reform Act of 2012 (FMRA), which amended Title 49, United States Code (U.S.C) included a number of changes to the Airport Improvement Program (AIP). Two of these changes are related to recycling and waste reduction at airports.

a. Section 132 (b) of the FMRA expanded the definition of airport planning to include "developing a plan for recycling and minimizing the generation of airport solid waste, consistent with applicable State and Local recycling laws, including the cost of a waste audit."
b. Section 133 of the FMRA added a provision requiring airports that have or plan to prepare a master plan that receive AIP funding for an eligible project to ensure that the new or updated master plan addresses issues relating to solid waste recycling at the Airport.
   (1) The feasibility of solid waste at the Airport;
   (2) Minimizing the generation of solid waste at the Airport;
   (3) Operation and maintenance requirements;
   (4) Review of waste management contracts; and
   (5) The potential for cost savings or the generation of revenue.

Airports generate various types of solid waste. The guidance provided in the FMRA addresses the recycling, reduce, and reduction of municipal solid waste (MSW) and other materials that can be legally disposed of in a 42 U.S.C. 6941-6949 landfill or equivalent state-permitted facility. Airport waste is generally separated into eight primary categories.

a. Municipal Solid Waste (MSW) consists of everyday items that are used and then discarded, such as product packaging, furniture, clothing, bottles, food scraps, and newspapers.
b. Construction and Demolition of Waste (C&D) is generally categorized as MSW. However, as it can be a major component of airport waste, it has been separated into its own category. C&D waste is any non-hazardous solid waste from land clearing, excavation, and/or the construction, demolition, renovation or repair of structures, roads, and utilities. C&D waste commonly includes concrete, wood, metals, drywall, carpet, plastic, pipe, land clearing debris, cardboard, and salvaged building components. In some instances, C&D waste may be subject to special requirements (e.g., tar impregnated roofing materials, asbestos- containing building materials, etc.)
c. Green Waste is categorized as MSW and is also referred to as yard waste. Green waste consists of tree, shrub, and grass clippings, leaves, weeds, small branches, seeds, pods, and similar debris generated by landscape maintenance activities.
d. Food Waste is food that is not consumer or is the waste generated and discarded during food preparation activities. Food wastes are also considered part of the MSW waste stream.
e. Lavatory Waste falls under the category of special waste and is generated when the lavatory tanks of the airplanes are emptied via hose and pumped into a lavatory service vehicle, which can either be a self-powered truck or a lavatory cart pulled by a tug. After the aircraft's lavatory tanks are emptied, they are refilled with a mixture of water and disinfecting concentrate, commonly called "blue juice". The lavatory waste removed from the aircraft is transported to a triturator facility, generally located airside, near airline operations, for pretreatment prior to discharge to the sanitary sewer system and publicly owned treatment works (POTW). Lavatory waste, which contains chemicals and potential enteric pathogens, can present risks to the environment and human health if not handled properly. Therefore, caution must be taken to ensure that releases of lavatory waste do not occur during the transfer process which can result from either equipment failure or operational error.
f. Spill cleanup and remediation wastes are another type of special waste. These materials are generated during cleanup of spills and/or the remediation of contamination from various type of sites on an airport (e.g., storage tanks, oils and gas production, vehicular leaks, spills from maintenance activities, etc.). Care must be taken to ensure that these types of waster materials are not co-mingled with other waste streams and that storage and disposal procedures comply with applicable regulatory requirements.
g. Hazardous Waste must be handled in accordance with stringent federal regulations. Wastes designated as "hazardous" are covered by regulations outlining legal handling, treatment, or disposal. Hazardous wastes are either specifically "listed" in the regulation (as defined in 40 CFR 261.33-.33), or are ignitable, corrosive, toxic or reactive (as defined in 40 CFR 261.21-.24). Hazardous wastes most often encountered

at airports include solvents, caustic part wastes, heavy metal paint waste, wastewater sludges, unused epoxies, waste fuels and other ignitable, unusable water conditioning chemicals, illegal dumping of containerized chemicals, contaminated sludge in GA aircraft wash rack oil/water separation, ni-cade batteries, and waste pesticides.

As pilots and passengers interact with the Airport environment, they contribute to the overall waste stream via several methods. Additionally, employees also play an integral part in contributing to the waste stream through daily tasks and responsibilities. There are several key areas that contribute to the waste stream at Spinks, including the following:

a. Terminals are the heart of an airport complex and normally have the biggest concentration of people, which can translate into the biggest concentration of waste. The terminal houses passenger waiting areas, pilot lounges, briefing rooms, a conference room, vending machines, shower facilities, and restrooms.
b. The Airfield, arguable the most important aspect of the Airport, features a runway and taxiways that allow aircraft to takeoff, land, and go to and from the terminal. The character of waste produced on the airfield is limited and consists of mostly rubber from aircraft tires (rubber build-up on the runway) and green waste.
c. Aircraft Maintenance Hangars contain aircraft subjected to repair and maintenance necessary for the safety and operation of such large, complex pieces of machinery. In addition, airlines have aircraft ground service equipment (GSE) that need to be serviced as well. Servicing equipment results in a number of predictable types of waste, such as oil, grease, certain hazardous chemicals, universal waste (batteries, light bulbs), wastewater, plastic, and vehicle waste such as tires and fluids (brake, transmission, etc.). These hangars also typically have office space where office waste is generated.
d. Offices provide space for airport, FBO, and employees of other tenants. These offices yield waste streams typical of all office operations; paper, toner cartridges, universal waste (batteries, electronics, and light bulbs), plastic, aluminum cans, food, and general trash.
e. Airport Construction Projects, whether large or small, can involve demolition, renovation, or new construction. The waste products from construction are different from the normal day-to-day waste streams and thus require special attention. Types of waste that can arise from construction activities are concrete, asphalt, building materials, wood, soil, construction waste, and regular trash.

Below is a list of items from the City of Fort Worth that can and cannot be recycled:

- Cans (rinsed)
- Glass Containers (rinsed)
- Plastic (rinsed, and plastic bags/films are not accepted)

6.3.1. EXISTING WASTE MANAGEMENT SERVICES

Currently, solid waste produced at the Airport is handled by the operator and is contracted through a 3rd party entity, Waste Management. The Airport is responsible for any, and all, operating costs of the waste management service. There are currently no recycling operators at the Airport.

6.3.2. WASTE MANAGEMENT PLAN GOALS

It is recommended that FWS continue to expand the availability of solid waste and recycling throughout the Airport property as tenant/operations numbers increase. This will promote the continued use of proper waste management and recycling streams. It is also recommended that the Airport pursue recycling efforts to minimize their carbon footprint.

THIS SECTION LEFT BLANK INTENTIONALLY

7 AIRPORT PLANS

2024 FORT WORTH SPINKS AIRPORT MASTER PLAN

7. AIRPORT PLANS

7.1. OVERVIEW

As required by the Federal Aviation Administration, an Airport Layout Plan (ALP) set was prepared to graphically depict the airport environs and the subsequent recommendations for development described in this planning effort. Recommendations for airfield geometry, obstructions, and landside development are described in the following:

- Cover Sheet
- Airport Layout Plan Drawing
- Inner Portion of the Approach Surface Drawing (Runways 18R, 36L, 18L, 36R)
- Runway Departure Surface Drawing (Runways 18R, 36L, 18L, 36R)
- Terminal Area Drawing
- Land Use Plan
- Exhibit "A" Property Map

7.2. AIRPORT LAYOUT PLAN DRAWING

The Airport Layout Plan (ALP), which illustrates both airside and landside facilities, depicts the existing and ultimate airport facilities required for the airport to accommodate the forecast future demand adequately. Additionally, the ALP provides detailed information on the airport and runway design criteria, which is necessary to define relationships with applicable standards.

7.3. INNER PORTION OF THE APPROACH SURFACE DRAWINGS

Inner portion drawings provide a more detailed view of the inner portion of the FAR Part 77 imaginary approach surfaces. This drawing offers large-scale plan and profile delineations of the approach surfaces out to a distance where the surface is 100 feet above the runway end elevation. They are intended to facilitate the identification of roads, utility lines, railroads, structures, trees, vegetation, and other possible obstructions that may lie within the confines of the approach surfaces close to the runway ends. Inner portion drawings are based on the ultimate planned runway lengths, the ultimate planned approaches to each runway end, and the ultimate end elevations.

7.4. RUNWAY DEPARTURE SURFACE DRAWINGS

This drawing is a large-scale plan and profile illustration depicting the dimensions and slope of the departure end of the runway (DER) surfaces. This drawing is based on the ultimate planned runway length and the ultimate planned departure surface extending from the runway. No objects should penetrate a surface beginning at the elevation of the DER or the end of the clearway, whichever is greater, that slopes to a 40 to 1 gradient.

7.5. TERMINAL AREA PLAN

The terminal area plan illustrates the projected facilities layout of the airport based on the recommended development plan. This plan specifies the location and size of the hangars, aprons, taxilanes, fuel farms, and other improvements based on the 20-year footprint.

7.6. LAND USE DRAWING

The land use drawing aims to provide the airport with a plan for leasing revenue-producing areas on the airport. All existing and future development within the airport boundary will be compatible with the primary functions of the airport and will generate lease revenue for the airport's operation.

This drawing also guides local authorities in establishing appropriate land-use zoning near the airports. As specified by FAA Grant Assurance 21, Compatible Land Use, the airport sponsor "will take appropriate action, to the extent reasonable, including the adoption of zoning laws, restrict the use of land adjacent to, or in the vicinity of the airport to activities and purposes compatible with normal airport operations, including landing and take-off of aircraft."

7.7. EXHIBIT "A" AIRPORT PROPERTY MAP

This map indicates how various tracts of airport property and easements were acquired and the dates of such acquisitions. Its purpose is to provide documentation of the current and future aeronautical use of land acquired with federal funds or through an FAA Administered Land Transfer Program.

THIS SECTION LEFT BLANK INTENTIONALLY

AIRPORT LAYOUT PLAN

FWS - FORT WORTH SPINKS AIRPORT

FORT WORTH, TEXAS

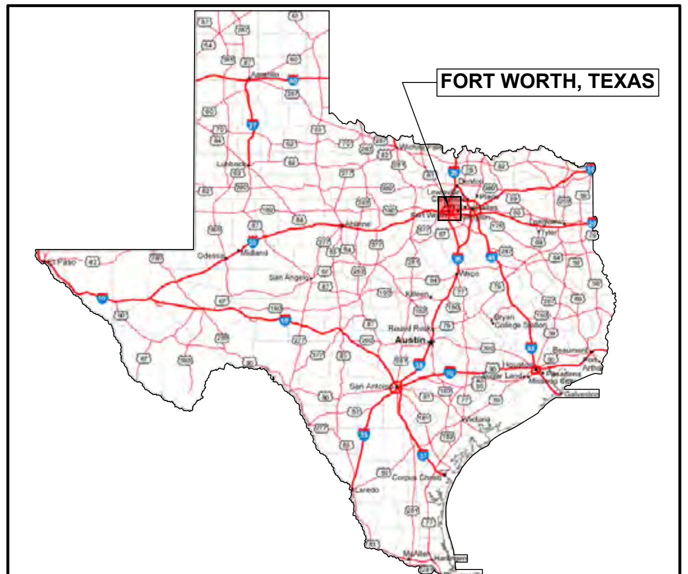
SPONSOR

SPINKS AIRPORT

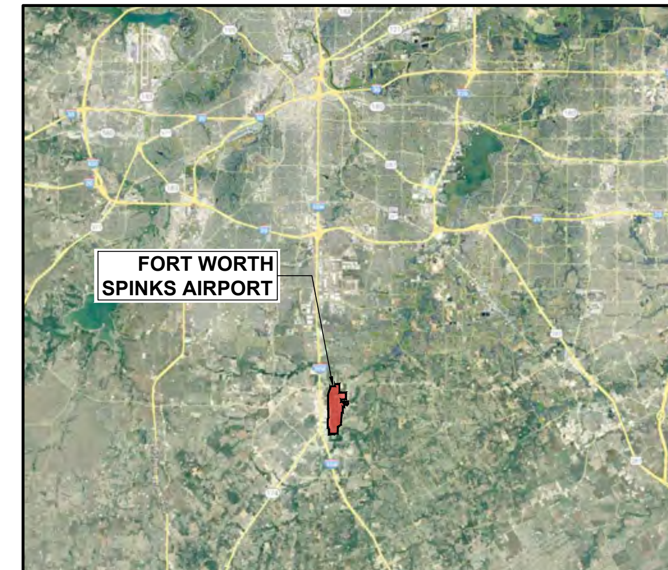
PREPARED BY

KSA

August, 2024



LOCATION MAP



VICINITY MAP

INDEX OF SHEETS

Sheet Number	Sheet Title
01	COVER SHEET
02	AIRPORT DATA SHEET
03	AIRPORT LAYOUT DRAWING - EXISTING
04	AIRPORT LAYOUT DRAWING - ULTIMATE
05	AIRPORT AIRSPACE DRAWING I
06	AIRPORT AIRSPACE DRAWING II
07	AIRSPACE APPROACH PROFILES
08	INNER APPROACH SURFACE DRAWING - RUNWAY 18R
09	INNER APPROACH SURFACE DRAWING - RUNWAY 36L
10	INNER APPROACH SURFACE DRAWING - RUNWAY 18L
11	INNER APPROACH SURFACE DRAWING - RUNWAY 36R
12	RUNWAY DEPARTURE SURFACE DRAWING - RUNWAY 18R-36L
13	AIRPORT TERMINAL AREA DRAWING I
14	AIRPORT TERMINAL AREA DRAWING II
15	AIRPORT TERMINAL AREA DRAWING III
16	AIRPORT TERMINAL AREA DRAWING IV
17	AIRPORT TERMINAL AREA DRAWING V
18	AIRPORT LAND USE DRAWING
19	ZONING RESTRICTIONS
20	EXHIBIT "A" AIRPORT PROPERTY INVENTORY MAP
21	AIRPORT PROPERTY MAP DATA TABLES

AIRPORT SPONSOR

CURRENT AND FUTURE DEVELOPMENT DEPICTED ON THIS ALP IS APPROVED AND SUPPORTED BY AIRPORT SPONSOR

TITLE, AIRPORT SPONSORS REPRESENTATIVE

SIGNATURE DATE

SIGNATURE DATE

FAA APPROVAL DATE

KSA

DES: MM
DR: ED
CH: MM
APP: MM

ISSUE RECORD

NO.	BY	DATE	REVISION

SPINKS AIRPORT

FORT WORTH SPINKS AIRPORT
FORT WORTH, TX

DRAFT

AIRPORT LAYOUT PLAN

COVER SHEET

AIP GRANT NO.	KSA JOB NO.	DATE:
3-48-0215-xx-2019	FWS011	August 23, 2024

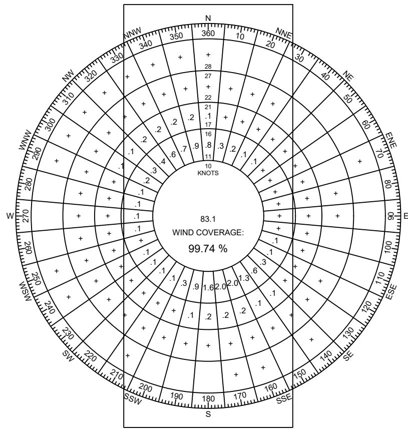
1

SHEET NO.

\\ksa.net\gateway\Projects\FWS011\008 CAD\02 ALP\30 Sheets\FWS011-C-ALP-COVR.dwg : COVER SHEET

ALL-WEATHER WIND COVERAGE DATA

18 R/L



36 L/R

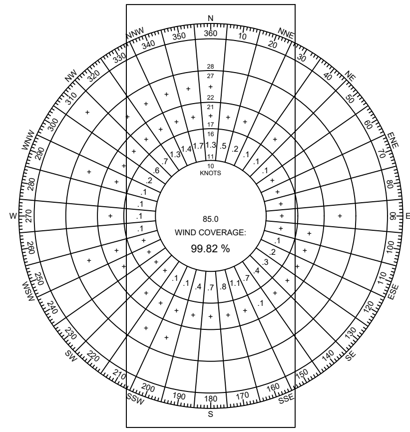
RUNWAY	10.5 KNOTS	13 KNOTS	16 KNOTS
18	93.22%	94.06%	94.57%
36	88.27%	89.19%	89.80%
18 / 36	97.95%	99.08%	99.74%

OBSERVATIONS: PERIOD= 2013-2022 STATION= 722593, FORT WORTH SPINKS AIRPORT

DATA SOURCE: DATA PROCESSING DIVISION, NATIONAL CLIMATIC CENTER, NOAA

IFR WIND COVERAGE DATA

18 R/L



36 L/R

RUNWAY	10.5 KNOTS	13 KNOTS	16 KNOTS
18	89.90%	90.84%	91.37%
36	93.43%	94.59%	95.23%
18 / 36	97.84%	99.15%	99.82%

OBSERVATIONS: PERIOD= 2013-2023 STATION= 722593, FORT WORTH SPINKS AIRPORT

DATA SOURCE: DATA PROCESSING DIVISION, NATIONAL CLIMATIC CENTER, NOAA

Runway Data Table

Runway Data Table	RUNWAY 18R/36L				RUNWAY 18L/36R			
	Existing		Ultimate		Existing		Ultimate	
	18R	36L	18R	36L	18L	36R	18L	36R
Runway Design Code (RDC)	C-II		C-III		A-I (Small Aircraft)		A-I (Small Aircraft)	
Runway Reference Code (RRC)	C-II-2400		C-III-2400		A-I-VIS		A-I-VIS	
Pavement Design Strength (X 1,000 LBS.)	60 SW, 70 DW, 100 DTW		60 SW, 70 DW, 100 DTW		N/A		N/A	
Pavement Type	Asphalt		Asphalt		Turf		Turf	
Strength by PCN	N/A		N/A		N/A		N/A	
Maximum Gradient	0.19%		0.19%		0.03%		0.03%	
Line of Sight	MEETS SIGHT REQUIREMENTS		MEETS SIGHT REQUIREMENTS		MEETS SIGHT REQUIREMENTS		MEETS SIGHT REQUIREMENTS	
Percent Wind Coverage (13-Knots)	99.08%		99.08%		99.15%		99.15%	
Runway Length & Width	6,002'x100'		7,302'x100'		3,660'x60'		2,460'x60'	
Runway Displaced Threshold	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Runway Bearing (True)	0.11°	0.11°	0.11°	0.11°	0.11°	0.11°	0.11°	0.11°
Runway End Coordinates (NAD 83)	N 32° 34' 21.052" W 97° 18' 34.755"	N 32° 33' 21.662" W97° 18' 34.888"	N 32° 33' 213.75" W 97° 18' 34.91"	N 32° 34' 26.00" W97° 18' 34.74"	N 32° 34' 17.71" W 97° 18' 23.1"	N 32° 33' 41.5" W97° 18' 23.1"	N 32° 34' 05.83" W 97° 18' 23.10"	N 32° 33' 41.5" W97° 18' 23.1"
Runway End Elevations (NAD 88)	700.4'	689.1 '	700.00'	689.14 '	694.2'	695.0 '	694.38'	695.0'
Displaced Runway End Coordinates (NAD83)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Displaced Runway End Elevations (NAD88)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Runway High / Low Point Elevation	700.4' / 689.1'	700.4' / 689.1'	700.4' / 689.1'	700.4' / 689.1'	695.0' / 694.2'	695.0' / 694.2'	695.0' / 694.38'	695.0' / 694.38'
Runway Touchdown Zone Elevation (TDZE)	700.4'	696.5'	695.80'	693.34'	694.2'	695.0'	694.56'	695.0'
Runway Lighting	MIRL		MIRL		NONE		NONE	
Runway Marking	PIR		PIR		NONE		NONE	
Runway Protection Zone Dimensions	1,000'x1,700'x1,510'	1,000'x2,500'x1,750'	1,000'x1,700'x1,510'	1,000'x2,500'x1,750'	250'x1,000'x450'	250'x1,000'x450'	250'x1,000'x450'	250'x1,000'x450'
Approach Visibility Minimums	≥ 3/4 Mile	< 3/4 Mile	≥ 3/4 Mile	< 3/4 Mile	Visual	Visual	Visual	Visual
Navigational Aids (Electronic)	RNAV (GPS), ILS, LOC, ATCT, AWOS		RNAV (GPS), ILS, LOC, ATCT, AWOS		NONE		NONE	
Visual Aids (Lighting)	PAPI-4L, ROTATING BEACON, MALSR		PAPI-4L, ROTATING BEACON, MALSR		NONE		NONE	
14 CFR Part 77 Approach Category	C	PIR	C	PIR	A(V)	A(V)	A(V)	A(V)
14 CFR Part 77 Approach Slope	34:1	50:1	34:1	50:1	20:1	20:1	20:1	20:1
Aeronautical Survey Required for Approach	VGS	VGS	VGS	VGS	NVGS	NVGS	NVGS	NVGS
Runway Departure Surface	Yes	Yes	Yes	Yes	No	No	No	No
Runway Safety Area Width	500'		500'		120'		120'	
Runway Safety Area Beyond R/W End	1,000'	1,000'	1,000'	1,000'	240'	240'	240'	240'
Runway Safety Area Length Prior to Threshold	600'	600'	600'	600'	240'	240'	240'	240'
Runway Object Free Area Width	800'		800'		250'		250'	
Runway Object Free Area Beyond R/W End	1,000'	1,000'	1,000'	1,000'	240'	240'	240'	240'
Runway Object Free Area Length Prior to Threshold	600'	600'	600'	600'	240'	240'	240'	240'
Runway Obstacle Free Zone Width	400'		400'		250'		250'	
Runway Obstacle Free Zone Length	200'	2600'	200'	2600'	200'	200'	200'	200'
Approach Surface	C	PIR	C	PIR	A(V)	A(V)	A(V)	A(V)

Survey Control Stations

Designation	Identifier	Latitude	Longitude
FWS D (PACS)	AB2808	N 32° 34' 40.71844"	W 97° 18' 39.76242"
FWS B (SACS)	AB6244	N 32° 33' 23.16623"	W 97° 18' 37.83877"
FWS C (SACS)	AB6245	N 32° 33' 39.27201"	W 97° 18' 30.81825"

Source: National Geodetic Survey Data Explorer; April, 2024

Declared Distances Table

Declared Distances Table	RUNWAY 18R/36L				RUNWAY 18L/36R			
	Existing		Ultimate		Existing		Ultimate	
	18R	36L	18R	36L	18L	36R	18L	36R
Take-Off Run Available (TORA)	6,002'	6,002'	7,302'	7,302'	3,660'	3,660'	2,460'	2,460'
Take-off Distance Available (TODA)	6,002'	6,002'	7,302'	7,302'	3,660'	3,660'	2,460'	2,460'
Accelerate Stop Distance Available (ASDA)	6,002'	6,002'	7,302'	7,302'	3,660'	3,660'	2,460'	2,460'
Landing Distance Available (LDA)	6,002'	6,002'	7,302'	7,302'	3,660'	3,660'	2,460'	2,460'

Airport Data Table

Airport Data Table	Existing	Ultimate	Existing	Ultimate
Airport Reference Code (ARC)	C-II	C-III	A-I	A-I
Mean Max Temp (Hottest Month)	91.8° F JULY	91.8° F JULY	91.8° F JULY	91.8° F JULY
Airport Elevation (AMSL) NAD 88	700.4'	700.4'	700.4'	700.4'
Airport & Terminal NAVAID's	GPS	GPS	GPS	GPS
Miscellaneous Facilities	Awos/ Segmented Circle/ Windcone	Awos/ Segmented Circle/ Windcone	Awos/ Segmented Circle/ Windcone	Awos/ Segmented Circle/ Windcone
Airport Reference Point (ARP) NAD 83	N 32° 33' 54.481" W 97° 18' 30.382"	N 32° 33' 50.83" W 97° 18' 31.87"	N 32° 33' 54.481" W 97° 18' 30.382"	N 32° 33' 50.83" W 97° 18' 31.87"
NPIAS Service Level	RGNL RELIEVER	NATL RELIEVER	RGNL RELIEVER	NATL RELIEVER
State System Role	GA RELIEVER	GA RELIEVER	GA RELIEVER	GA RELIEVER
Critical Aircraft	Challenger 350	Gulfstream V (G-V)	CESSNA C172	CESSNA C172
Wingspan (Feet)	68.90	93.33	36.10	36.10
Tail Height (Feet)	20.00	25.80	8.92	8.92
Undercarriage Width (Feet)	12.80	15.90	8.40	8.40
Approach Speed (knots)	124	145	62	62
Maximum Take-off Weight (LBS)	40,600	90,500	2,550	2,550
Magnetic Variation	2° 57' 52" E		2° 57' 52" E	
	NOAA, April 2024		NOAA, April 2024	

Taxiway Data Table

Taxiway Data Table	Existing		Ultimate	
Taxiway Design Group	3	2B	2B	1A
Taxiway Width	50'	35'	35'	25'
Taxiway Safety Area Width	79'	49'	118'	49'
Taxiway Object Free Area Width	124'	89'	171'	89'
Taxiway to Fixed/Moveable object	62'	44.5'	85.5'	44.5'
Taxiway Markings / Lighting	MITL / Centerline Markings	Centerline Markings	MITL / Centerline Markings	Centerline Markings
Taxiway/Runway Separation	400'	150'	400'	150'

KSA

DES:	MM
DR:	ED
CH:	MM
APP:	MM

ISSUE RECORD

NO.	BY	DATE	REVISION

SPINKS AIRPORT

FORT WORTH SPINKS AIRPORT
FORT WORTH, TX

DRAFT

AIRPORT LAYOUT PLAN

AIRPORT DATA SHEET

AIP GRANT NO.	KSA JOB NO.	DATE:
3-48-0215-xx-2019	FWS011	August 23, 2024

02

SHEET NO.

\\ksa.net\gateway\Projects\FWS011\008 CAD\02 ALP\30 Sheets\FWS011-C-ALP-ALD.dwg : AIRPORT DATA SHEET

DRAWING LEGEND

ITEM	EXISTING
AIRPORT PROPERTY	
AIRPORT PAVEMENT RUNWAY/TAXIWAY	
AIRPORT TURF RUNWAY/TAXIWAY	
ROAD/DRIVE/HIGHWAY	
BUILDING/HANGAR	
WETLANDS	
RUNWAY PROTECTION ZONE (RPZ)	RPZ(e)
PRECISION OBSTACLE FREE ZONE (POFZ)	POFZ
RUNWAY VISIBILITY ZONE	RVZ(e)
BUILDING RESTRICTION LINE (BRL)	BRL(35)
RUNWAY OBJECT FREE AREA (ROFA)	ROFA(e)
RUNWAY SAFETY AREA (RSA)	RSA(e)
RUNWAY OBJECT FREE ZONE (ROFZ)	ROFA(e)

INNER APPROACH OBJECT FREE ZONE (OFZ)	OFZ(e)
TAXIWAY OBJECT FREE AREA (TOFA)	TOFA(e)
TAXIWAY SAFETY AREA (TSA)	TSA(e)
APPROACH SURFACE	
FENCE	x x
RUNWAY END IDENTIFIER LIGHTS (REIL)	●●●●
ROTATING BEACON	
AWOS	
PAPI	
WINDCONE	
SEGMENTED CIRCLE	
AIRPORT REFERENCE POINT (ARP)	
PACS AND SACS MARKERS	▼
TREE LINE	

AIRPORT SPONSOR

CURRENT AND FUTURE DEVELOPMENT DEPICTED ON THIS ALP IS APPROVED AND SUPPORTED BY AIRPORT SPONSOR

TITLE, AIRPORT SPONSORS REPRESENTATIVE

SIGNATURE DATE

SIGNATURE DATE

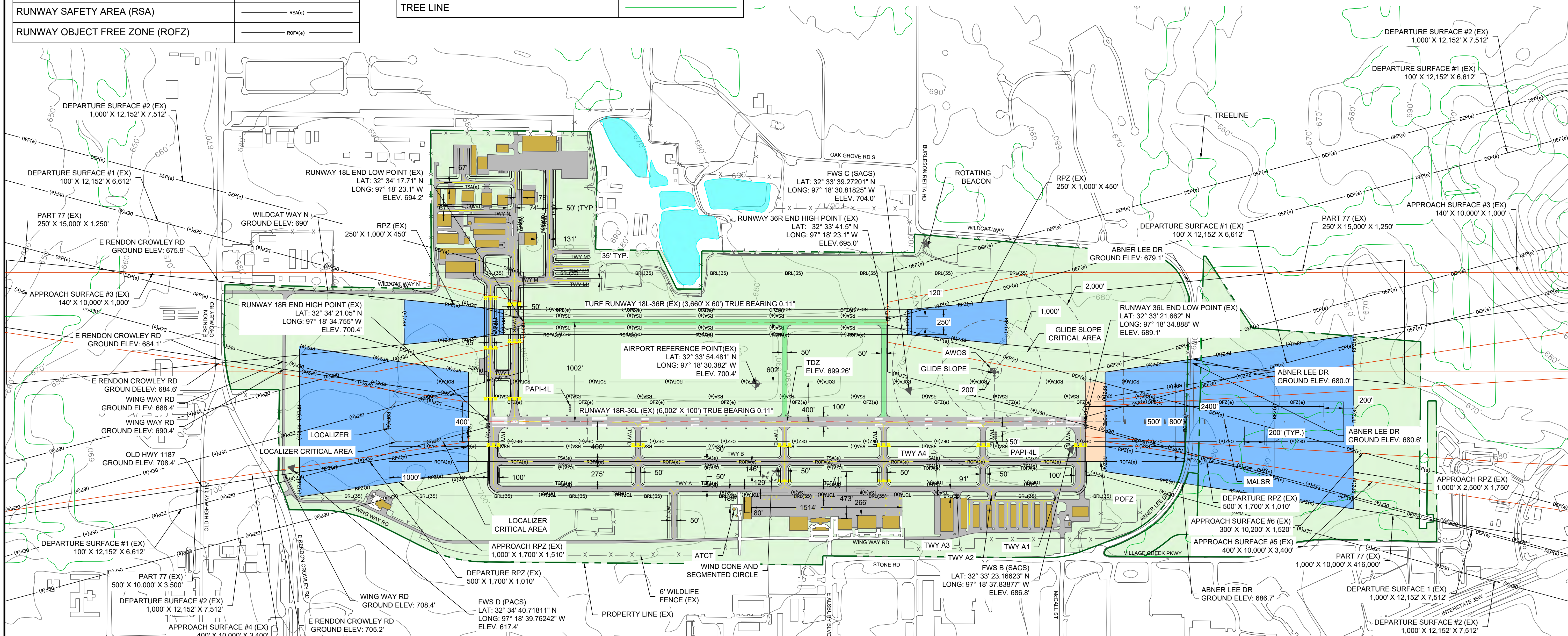
FAA APPROVAL DATE

02°57'52"E
MAGNETIC
TRUE
DATE: APRIL, 2024
ANNUAL RATE OF CHANGE: 0°06'20"W
SOURCE: U.S. NGDC

500' 0 500' 1000'
GRAPHIC SCALE IN FEET

NOTES:

1. ALL HORIZONTAL COORDINATES ARE SHOWN IN TEXAS STATE PLANE NORTH CENTRAL ZONE, US FOOT, NAD 83/2019.
2. ALL VERTICAL COORDINATES ARE SHOWN IN NAD 88.
3. SEE SHEETS 13 - 17 FOR TERMINAL AREA PLAN.



DES: MM	ISSUE RECORD			
DR: ED	NO.	BY	DATE	REVISION
CH: MM				
APP: MM				

KSA

SPINKS AIRPORT

FORT WORTH SPINKS AIRPORT
FORT WORTH, TX

DRAFT

AIRPORT LAYOUT PLAN

AIRPORT LAYOUT DRAWING - EXISTING

AIP GRANT NO.	KSA JOB NO.	DATE:
3-48-0215-xx-2019	FWS011	August 23, 2024

03
SHEET NO.

\\ksa.net\gateway\Projects\FWS011\008 CAD\02 ALP\30 Sheets\FWS011-C-ALP-ALD.dwg : AIRPORT LAYOUT DRAWING - EXISTING

DRAWING LEGEND	
ITEM	ULTIMATE
AIRPORT PROPERTY	
AIRPORT PAVEMENT RUNWAY/TAXIWAY	
ROAD/DRIVE/HIGHWAY	
BUILDING/HANGAR	
WETLANDS	
RUNWAY PROTECTION ZONE (RPZ)	RPZ(u)
PRECISION OBSTACLE FREE ZONE (POFZ)	POFZ
RUNWAY VISIBILITY ZONE	
PAVEMENT TO BE REMOVED	
BUILDING RESTRICTION LINE (BRL)	BRL(35)
RUNWAY OBJECT FREE AREA (ROFA)	ROFA(u)
RUNWAY SAFETY AREA (RSA)	RSA(u)
RUNWAY OBJECT FREE ZONE (ROFZ)	ROFA(u)

INNER APPROACH OBJECT FREE ZONE (OFZ)	OFZ(u)
TAXIWAY OBJECT FREE AREA (TOFA)	TOFA(u)
TAXIWAY SAFETY AREA (TSA)	TSA(u)
APPROACH SURFACE	
FENCE	x x
RUNWAY END IDENTIFIER LIGHTS (REIL)	
ROTATING BEACON	
PROPOSED WELL	
AWOS	
PAPI	
WINDCONE	
SEGMENTED CIRCLE	
AIRPORT REFERENCE POINT (ARP)	
PACS AND SACS MARKERS	
TREE LINE	

AIRPORT SPONSOR

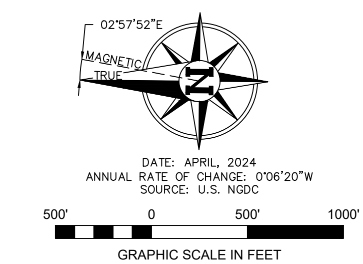
CURRENT AND FUTURE DEVELOPMENT DEPICTED ON THIS ALP IS APPROVED AND SUPPORTED BY AIRPORT SPONSOR

TITLE, AIRPORT SPONSORS REPRESENTATIVE

SIGNATURE DATE

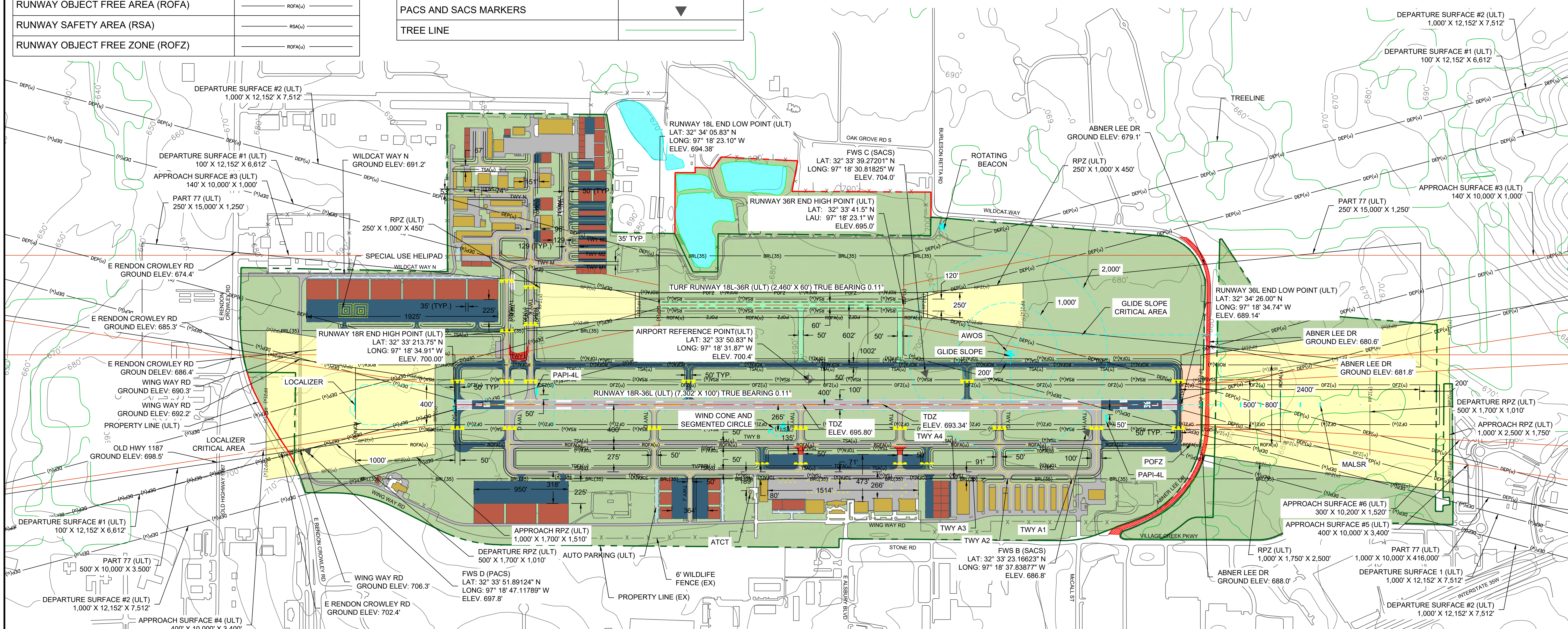
SIGNATURE DATE

FAA APPROVAL DATE



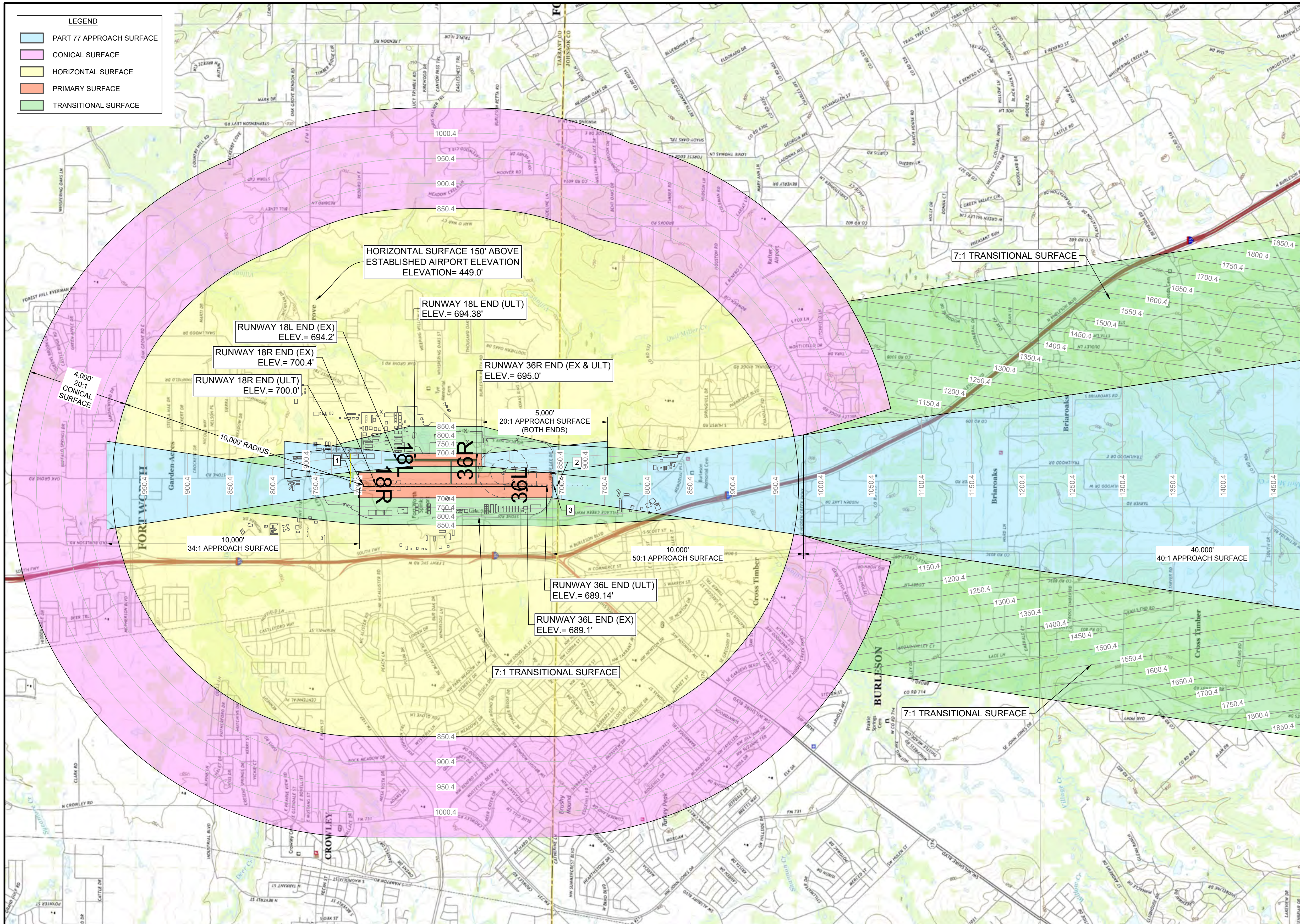
NOTES:

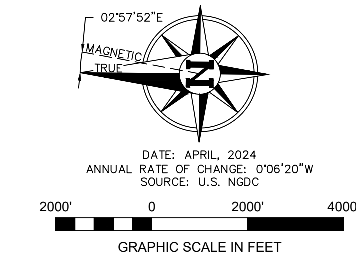
1. ALL HORIZONTAL COORDINATES ARE SHOWN IN TEXAS STATE PLANE NORTH CENTRAL ZONE, US FOOT, NAD 83/2019.
2. ALL VERTICAL COORDINATES ARE SHOWN IN NAD 88.
3. SEE SHEETS 13 - 17 FOR TERMINAL AREA PLAN.



KSA	DES: MM	ISSUE RECORD				SPINKS AIRPORT	DRAFT	AIRPORT LAYOUT DRAWING - ULTIMATE	
	DR: ED	NO.	BY	DATE	REVISION	FORT WORTH SPINKS AIRPORT	AIRPORT LAYOUT PLAN	AIP GRANT NO. 3-48-0215-xx-2019 / KSA JOB NO. FWS011 / DATE: August 23, 2024	04
	CH: MM					FORT WORTH, TX			SHEET NO.
	APP: MM								

\\ksa.net\gateway\Projects\FWS011\008 CAD\02 ALP\30 Sheets\FWS011-C-ALP-ALD.dwg : AIRPORT LAYOUT DRAWING - ULTIMATE





NOTES:

1. OBSTRUCTION ANALYSIS WAS DETERMINED USING PREVIOUS ALP ATTAINED FROM TxDOT. AN OBSTRUCTION SURVEY WAS NOT CONDUCTED FOR THIS PROJECT AS IT WAS NOT PART OF THE CONTRACT SCOPE. THE MOST UP TO DATE INFORMATION PROVIDED IS DEPICTED IN THIS DRAWING.
2. SEE SHEET 06 FOR OBSTRUCTION TABLE. HEIGHT AND LOCATION HAS NOT BEEN VERIFIED BY SURVEY.
3. ALL HORIZONTAL COORDINATES ARE SHOWN IN TEXAS STATE PLANE CENTRAL ZONE, US FOOT, NAD 83/2019.
4. ALL VERTICAL COORDINATES ARE SHOWN IN NAD 88.

KSA

DES: MM
DR: ED
CH: MM
APP: MM

ISSUE RECORD

NO.	BY	DATE	REVISION

SPINKS AIRPORT

FORT WORTH SPINKS AIRPORT
FORT WORTH, TX

DRAFT

AIRPORT LAYOUT PLAN

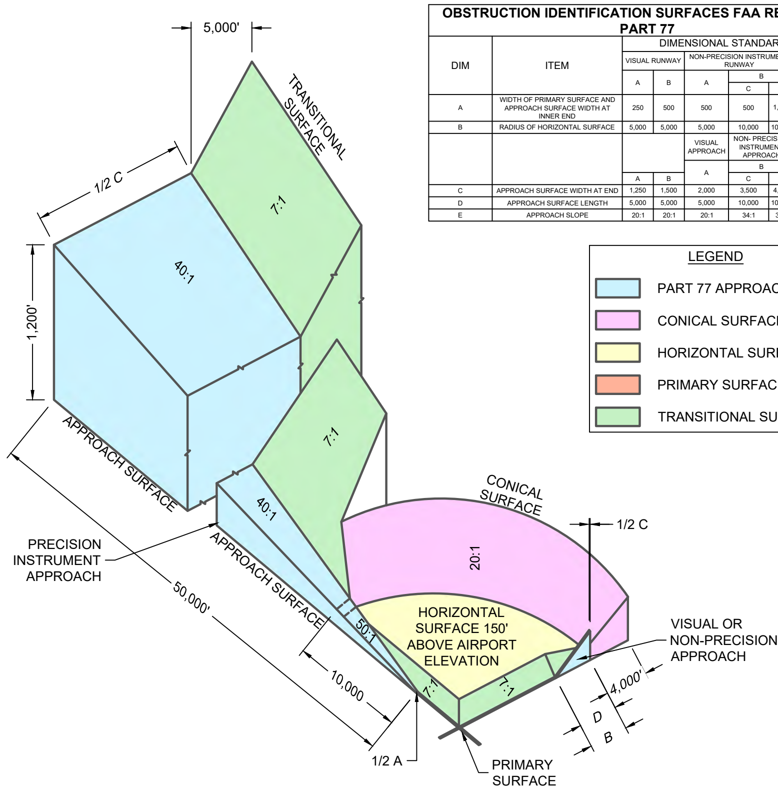
AIRPORT AIRSPACE DRAWING I

AIP GRANT NO.	KSA JOB NO.	DATE:
3-48-0215-xx-2019	FWS011	August 23, 2024

05

SHEET NO.

\\ksa.net\gateway\Projects\FWS011\008 CAD\02 ALP\30 Sheets\FWS011-C-ALP-AAD.dwg : AIRPORT AIRSPACE DRAWING I



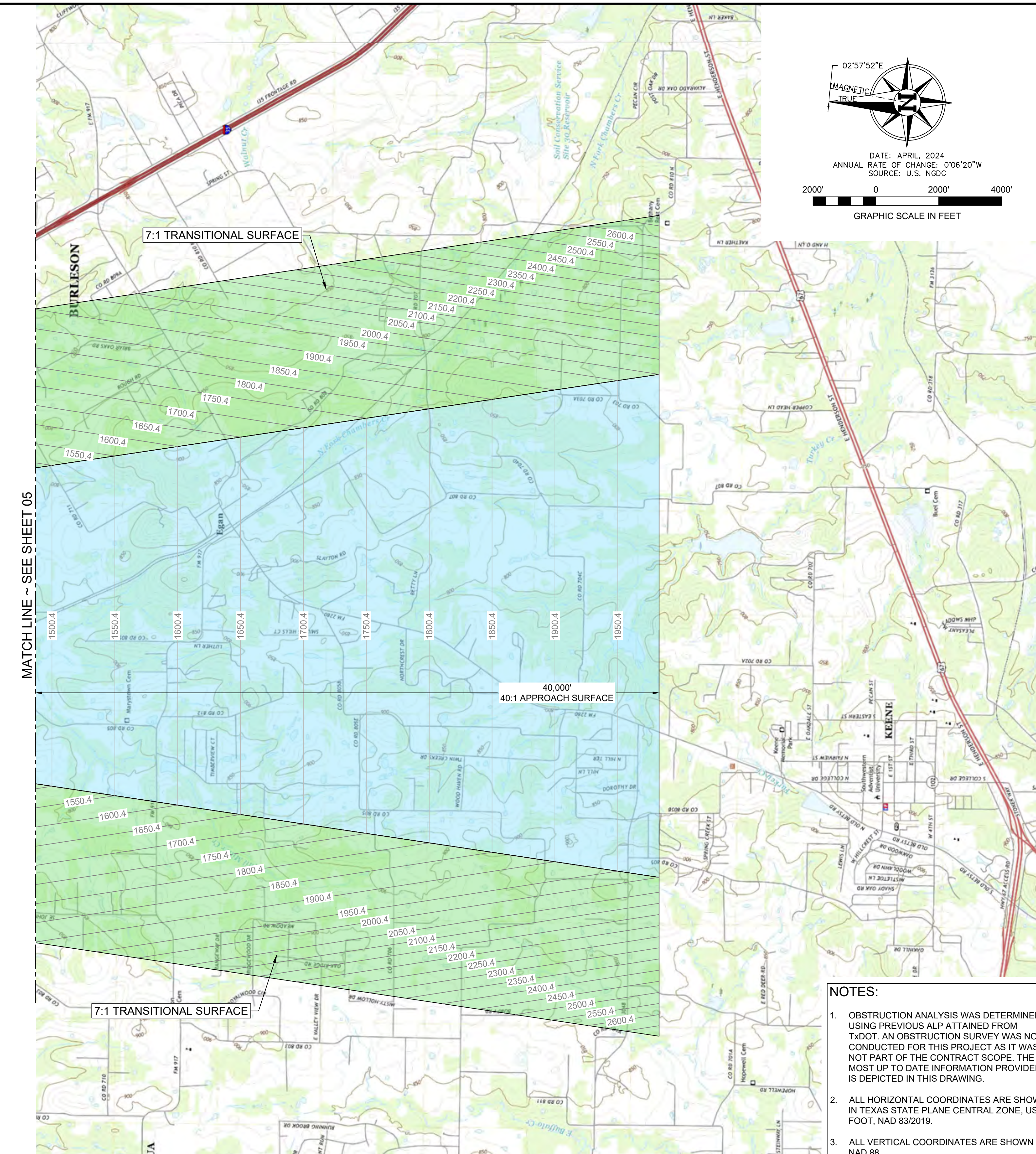
OBSTRUCTION IDENTIFICATION SURFACES FAA REGULATION PART 77							
DIM	ITEM	DIMENSIONAL STANDARDS (FEET)					
		VISUAL RUNWAY		NON-PRECISION INSTRUMENT RUNWAY			PRECISION INSTRUMENT RUNWAY
		A	B	A	B		
					C	D	
A	WIDTH OF PRIMARY SURFACE AND APPROACH SURFACE WIDTH AT INNER END	250	500	500	500	1,000	1,000
B	RADIUS OF HORIZONTAL SURFACE	5,000	5,000	5,000	10,000	10,000	10,000
				VISUAL APPROACH	NON- PRECISION INSTRUMENT APPROACH		PRECISION INSTRUMENT APPROACH
				A	B		
		A	B		C	D	
C	APPROACH SURFACE WIDTH AT END	1,250	1,500	2,000	3,500	4,000	16,000
D	APPROACH SURFACE LENGTH	5,000	5,000	5,000	10,000	10,000	*
E	APPROACH SLOPE	20:1	20:1	20:1	34:1	34:1	*

LEGEND

- PART 77 APPROACH SURFACE
- CONICAL SURFACE
- HORIZONTAL SURFACE
- PRIMARY SURFACE
- TRANSITIONAL SURFACE

RUNWAY 18R-36L OBSTRUCTION TABLE

No.	OBJECT DESCRIPTION	LATITUDE (N)	LONGITUDE (W)	DISTANCE FROM RUNWAY END	OFFSET FROM RWY CL	TOP ELEVATION	AMOUNT OF PART 77 PENETRATION	REMEDIATION
1	LOCALIZER	32° 34' 30.97"	97° 18' 34.74"	1000'	0'	725.0'	1.31'	FIXED BY FUNCTION
2	MALSR STATION	32° 33' 09.79"	97° 18' 35.00"	400'	0'	699.0'	5.86' (ULT)	FIXED BY FUNCTION
3	ABNER LEE RD	32° 33' 11.13"	97° 18' 35.10"	266'	0'	705.0'	1.15' (ULT)	RELOCATE



NOTES:

1. OBSTRUCTION ANALYSIS WAS DETERMINED USING PREVIOUS ALP ATTAINED FROM TxDOT. AN OBSTRUCTION SURVEY WAS NOT CONDUCTED FOR THIS PROJECT AS IT WAS NOT PART OF THE CONTRACT SCOPE. THE MOST UP TO DATE INFORMATION PROVIDED IS DEPICTED IN THIS DRAWING.
2. ALL HORIZONTAL COORDINATES ARE SHOWN IN TEXAS STATE PLANE CENTRAL ZONE, US FOOT, NAD 83/2019.
3. ALL VERTICAL COORDINATES ARE SHOWN IN NAD 88.

KSA

DES: MM
DR: ED
CH: MM
APP: MM

ISSUE RECORD			
NO.	BY	DATE	REVISION

SPINKS AIRPORT
FORT WORTH SPINKS AIRPORT
FORT WORTH, TX

DRAFT
AIRPORT LAYOUT PLAN

AIRPORT AIRSPACE DRAWING II

AIP GRANT NO. 3-48-0215-xx-2019
KSA JOB NO. FWS011
DATE: August 23, 2024

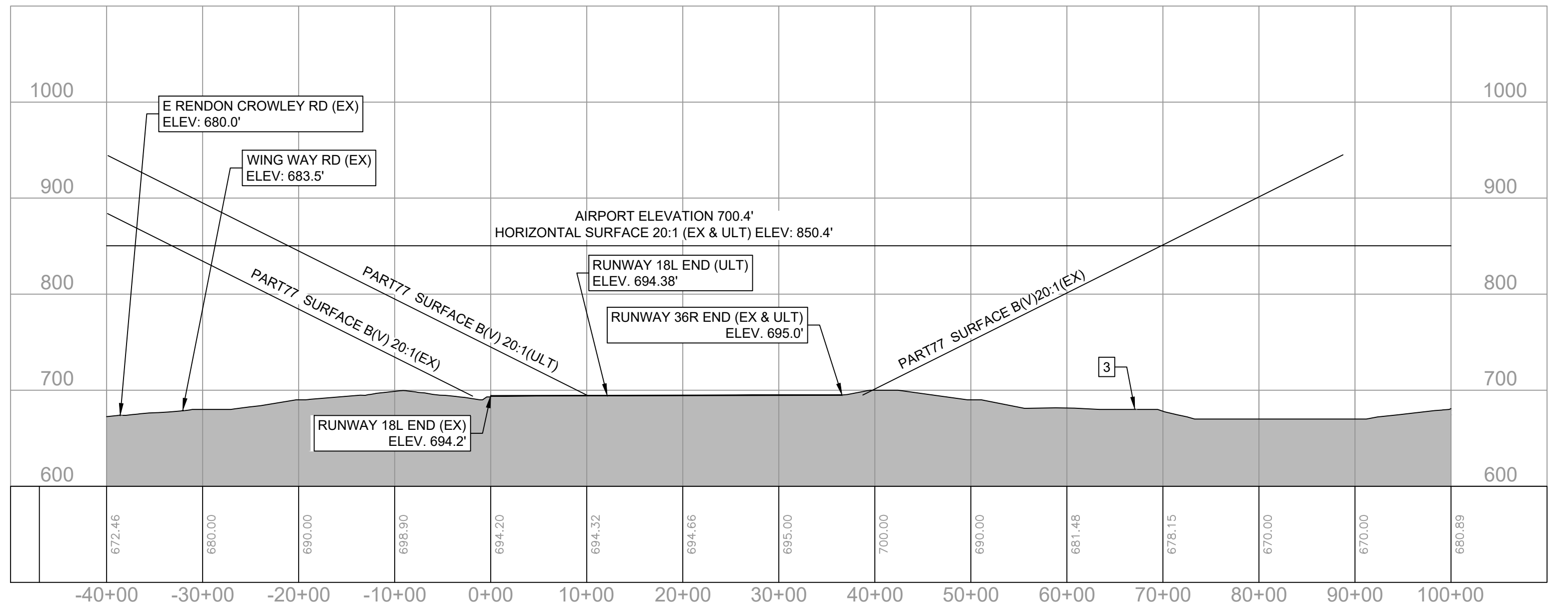
06
SHEET NO.

\\ksa.net\gateway\Projects\FWS011\008 CAD\02 ALP\30 Sheets\FWS011-C-ALP-AAD.dwg : AIRPORT AIRSPACE DRAWING II

RUNWAY 18L-36R OBSTRUCTION TABLE

No.	OBJECT DESCRIPTION	LATITIDE (N)	LONGITUDE (W)	DISTANCE FROM RUNWAY END	OFFSET FROM RWY CL	TOP ELEVATION	AMOUNT OF PART 77 PENETRATION	REMEDIATION
3	ABNER LEE RD	32° 33' 10.96"	97° 18' 23.60"	3070'	0'	717.0'	NONE	NONE

1000' 0 1000' 2000'
HORIZONTAL SCALE IN FEET
100' 0 100' 200'
VERTICAL SCALE IN FEET

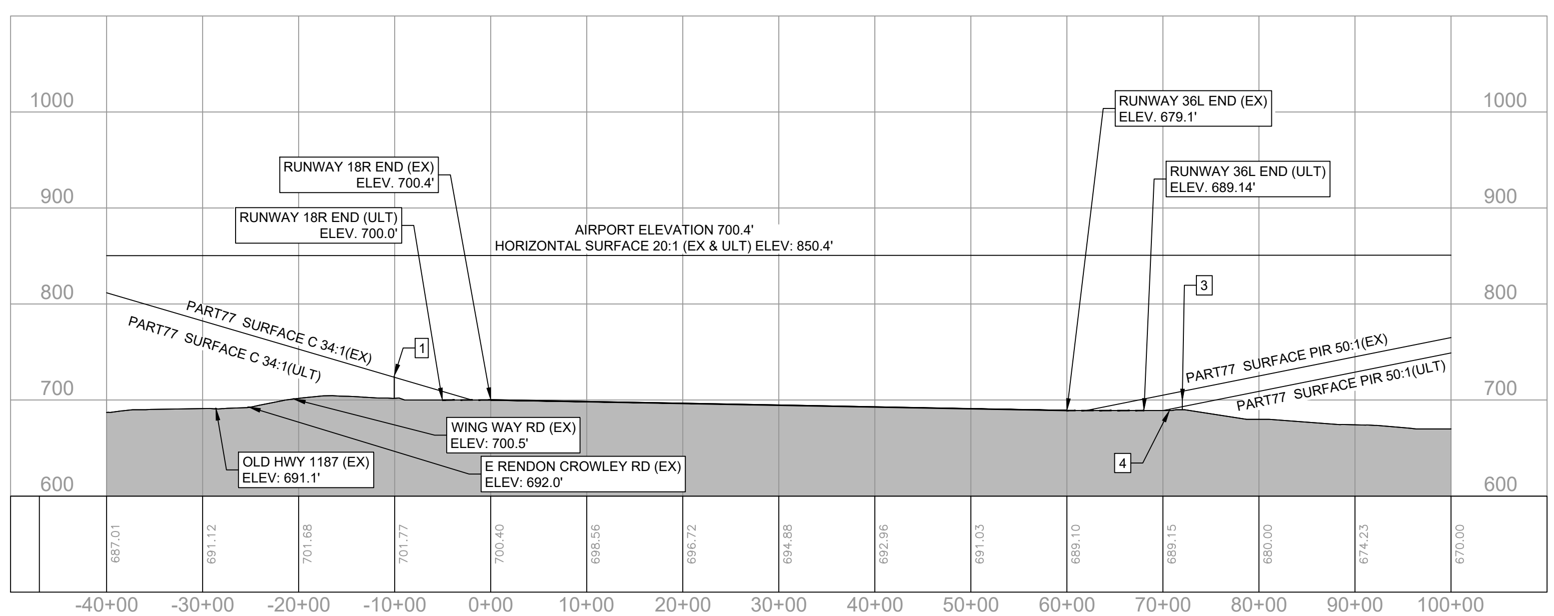


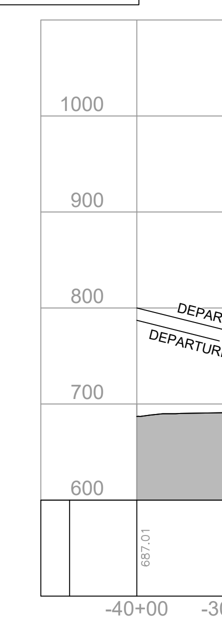
NOTES:

1. OBSTRUCTION ANALYSIS WAS DETERMINED USING PREVIOUS ALP ATTAINED FROM TxDOT. AN OBSTRUCTION SURVEY WAS NOT CONDUCTED FOR THIS PROJECT AS IT WAS NOT PART OF THE CONTRACT SCOPE. THE MOST UP TO DATE INFORMATION PROVIDED IS DEPICTED IN THIS DRAWING.
2. ALL HORIZONTAL COORDINATES ARE SHOWN IN TEXAS STATE PLANE CENTRAL ZONE, US FOOT, NAD 83/2019.
3. ALL VERTICAL COORDINATES ARE SHOWN IN NAD 88.

RUNWAY 18R-36L OBSTRUCTION TABLE

No.	OBJECT DESCRIPTION	LATITIDE (N)	LONGITUDE (W)	DISTANCE FROM RUNWAY END	OFFSET FROM RWY CL	TOP ELEVATION	AMOUNT OF PART 77 PENETRATION	REMEDIATION
1	LOCALIZER	32° 34' 30.97"	97° 18' 34.74"	1000'	0'	725.0'	1.31'	FIXED BY FUNCTION
2	MALSR STATION	32° 33' 09.79"	97° 18' 35.00"	400'	0'	699.0'	5.86' (ULT)	FIXED BY FUNCTION
3	ABNER LEE RD	32° 33' 11.13"	97° 18' 35.10"	266'	0'	705.0'	1.15' (ULT)	RELOCATE

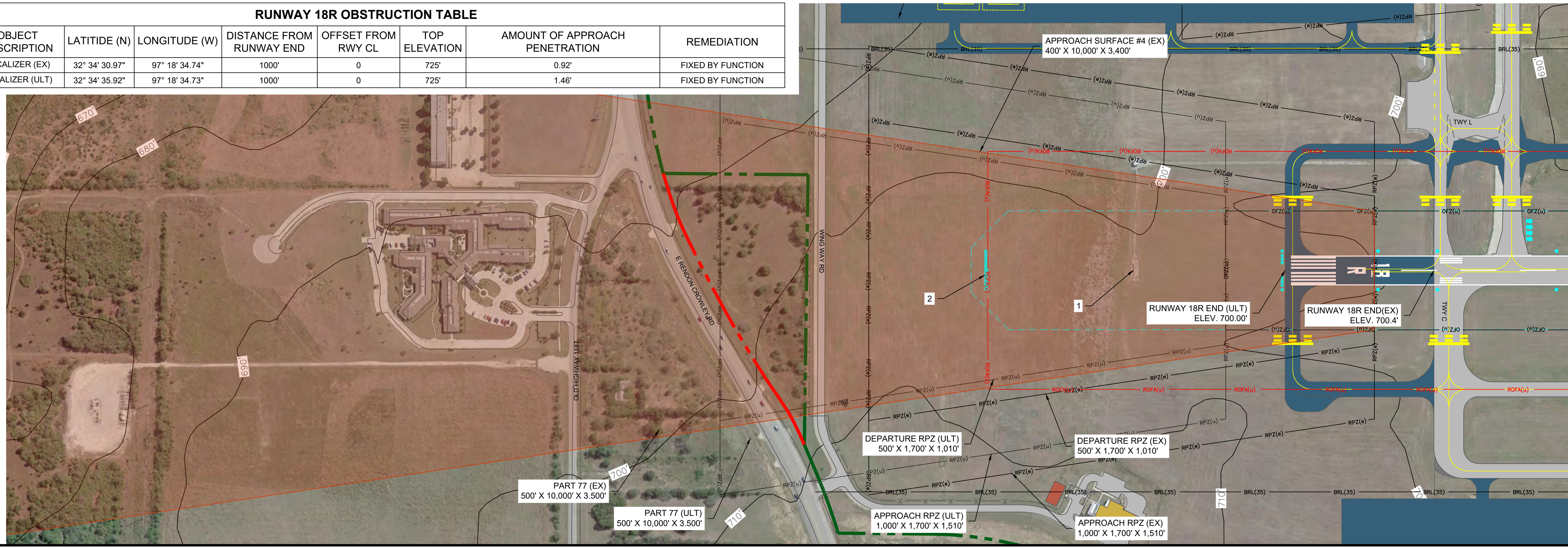


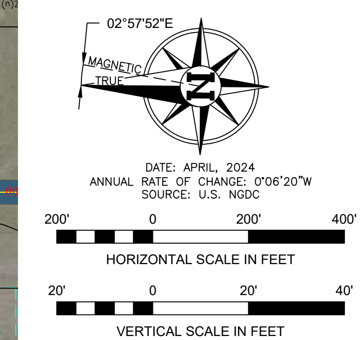


DES: MM	ISSUE RECORD				SPINKS AIRPORT	DRAFT	AIRSPACE APPROACH PROFILES	07
DR: ED	NO.	BY	DATE	REVISION	FORT WORTH SPINKS AIRPORT	AIRPORT LAYOUT PLAN	AIP GRANT NO. 3-48-0215-xx-2019	SHEET NO.
CH: MM					FORT WORTH, TX		KSA JOB NO. FWS011	
APP: MM							DATE: August 23, 2024	

RUNWAY 18R OBSTRUCTION TABLE

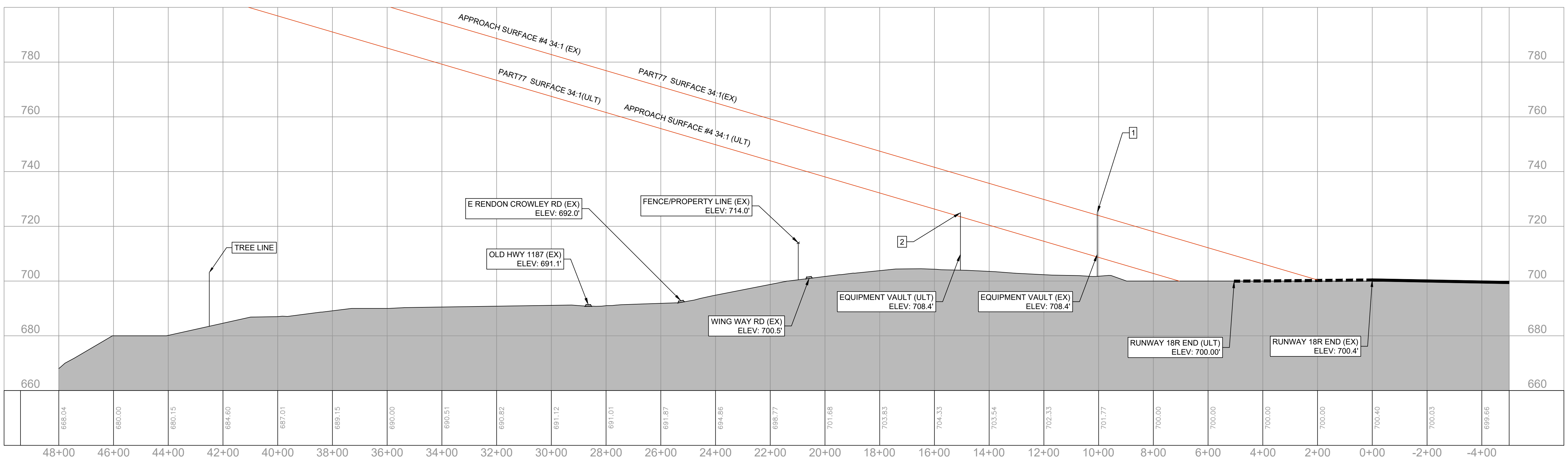
No.	OBJECT DESCRIPTION	LATITIDE (N)	LONGITUDE (W)	DISTANCE FROM RUNWAY END	OFFSET FROM RWY CL	TOP ELEVATION	AMOUNT OF APPROACH PENETRATION	REMEDIATION
1	LOCALIZER (EX)	32° 34' 30.97"	97° 18' 34.74"	1000'	0	725'	0.92'	FIXED BY FUNCTION
2	LOCALIZER (ULT)	32° 34' 35.92"	97° 18' 34.73"	1000'	0	725'	1.46'	FIXED BY FUNCTION





NOTES:

1. OBSTRUCTION ANALYSIS WAS DETERMINED USING PREVIOUS ALP ATTAINED FROM TxDOT. AN OBSTRUCTION SURVEY WAS NOT CONDUCTED FOR THIS PROJECT AS IT WAS NOT PART OF THE CONTRACT SCOPE. THE MOST UP TO DATE INFORMATION PROVIDED IS DEPICTED IN THIS DRAWING.
2. ALL HORIZONTAL COORDINATES ARE SHOWN IN TEXAS STATE PLANE CENTRAL ZONE, US FOOT, NAD 83/2019.
3. ALL VERTICAL COORDINATES ARE SHOWN IN NAD 88.



KSA

DES: MM	ISSUE RECORD			
DR: ED	NO.	BY	DATE	REVISION
CH: MM				
APP: MM				

SPINKS AIRPORT

FORT WORTH SPINKS AIRPORT
FORT WORTH, TX

DRAFT

AIRPORT LAYOUT PLAN

INNER APPROACH SURFACE DRAWING - RUNWAY 18R

AIP GRANT NO.	KSA JOB NO.	DATE:
3-48-0215-xx-2019	FWS011	August 23, 2024

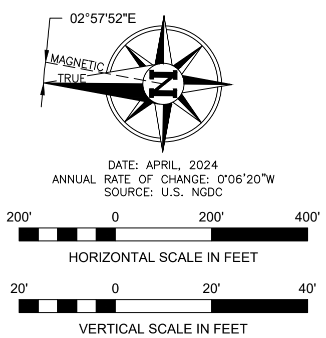
08

SHEET NO.

\\ksa.net\gateway\Projects\FWS011\008 CAD\02 ALP\30 Sheets\FWS011-C-ALP-PROFILES.dwg : INNER APPROACH SURFACE DRAWING - RUNWAY 18R

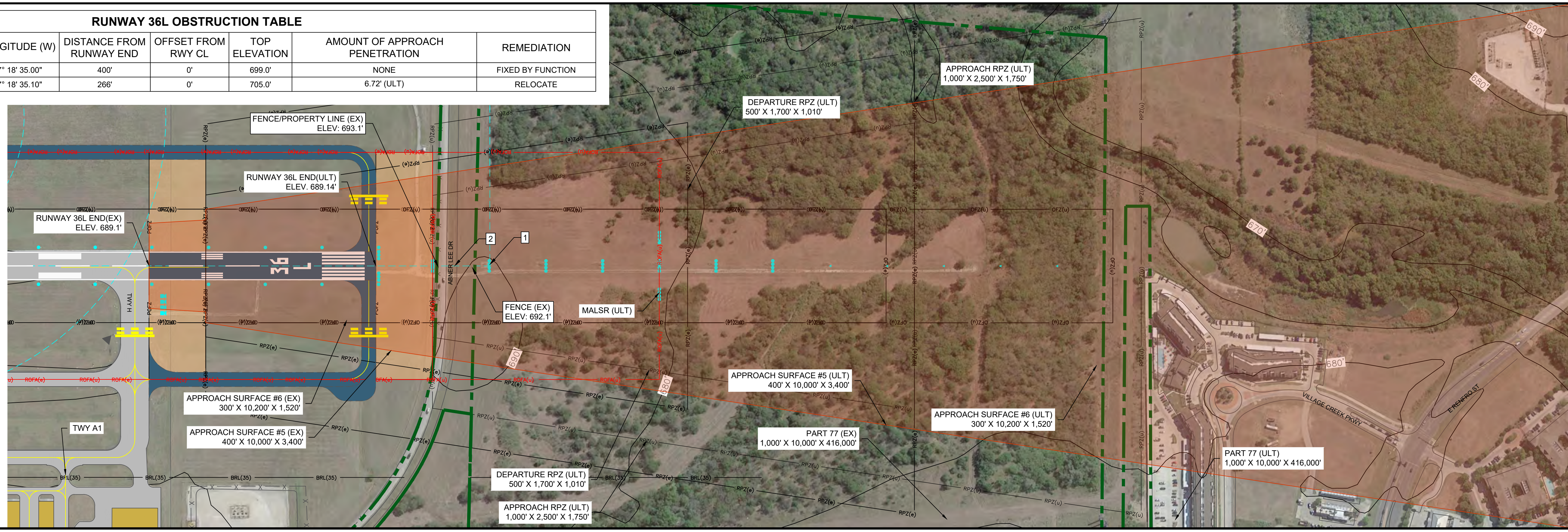
RUNWAY 36L OBSTRUCTION TABLE

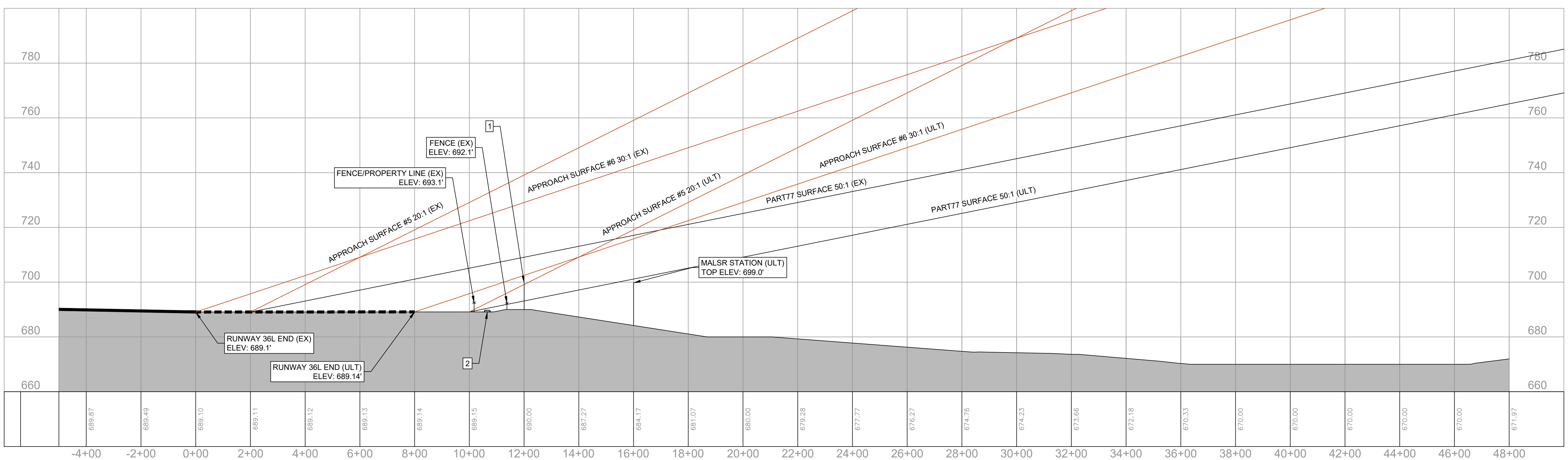
No.	OBJECT DESCRIPTION	LATITIDE (N)	LONGITUDE (W)	DISTANCE FROM RUNWAY END	OFFSET FROM RWY CL	TOP ELEVATION	AMOUNT OF APPROACH PENETRATION	REMEDIATION
1	MALSR STATION	32° 33' 09.79"	97° 18' 35.00"	400'	0'	699.0'	NONE	FIXED BY FUNCTION
2	ABNER LEE RD	32° 33' 11.13"	97° 18' 35.10"	266'	0'	705.0'	6.72' (ULT)	RELOCATE



NOTES:

1. OBSTRUCTION ANALYSIS WAS DETERMINED USING PREVIOUS ALP ATTAINED FROM TxDOT. AN OBSTRUCTION SURVEY WAS NOT CONDUCTED FOR THIS PROJECT AS IT WAS NOT PART OF THE CONTRACT SCOPE. THE MOST UP TO DATE INFORMATION PROVIDED IS DEPICTED IN THIS DRAWING.
2. ALL HORIZONTAL COORDINATES ARE SHOWN IN TEXAS STATE PLANE CENTRAL ZONE, US FOOT, NAD 83/2019.
3. ALL VERTICAL COORDINATES ARE SHOWN IN NAD 88.





KSA

DES: MM	ISSUE RECORD			
DR: ED	NO.	BY	DATE	REVISION
CH: MM				
APP: MM				

SPINKS AIRPORT

FORT WORTH SPINKS AIRPORT
FORT WORTH, TX

DRAFT

AIRPORT LAYOUT PLAN

INNER APPROACH SURFACE DRAWING - RUNWAY 36L

AIP GRANT NO.	KSA JOB NO.	DATE:
3-48-0215-xx-2019	FWS011	August 23, 2024

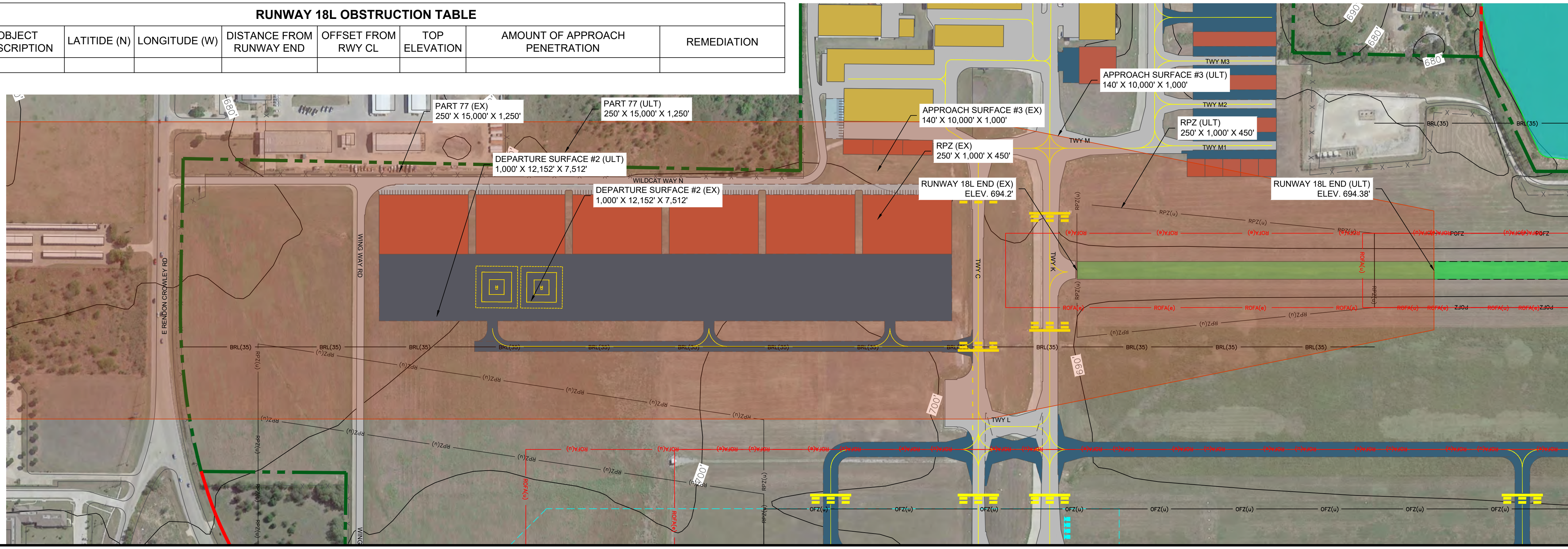
09

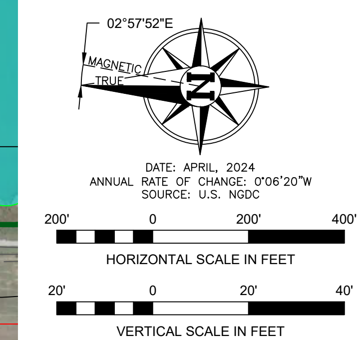
SHEET NO.

\\ksa.net\gateway\Projects\FWS011\008 CAD\02 ALP\30 Sheets\FWS011-C-ALP-PROFILES.dwg : INNER APPROACH SURFACE DRAWING - RUNWAY 36L

RUNWAY 18L OBSTRUCTION TABLE

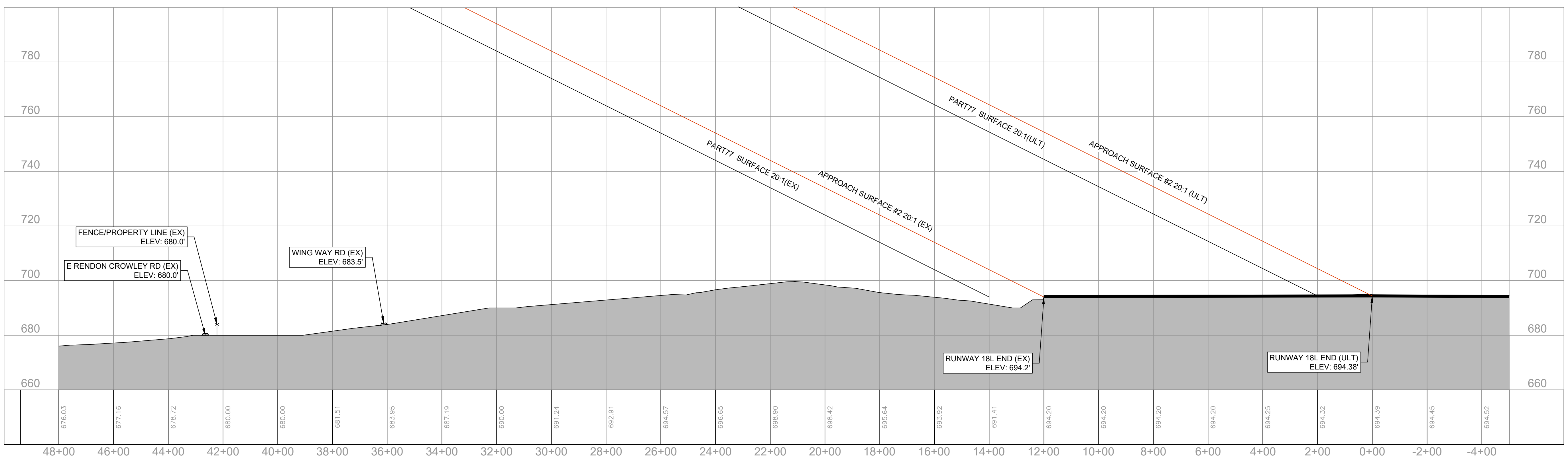
No.	OBJECT DESCRIPTION	LATITIDE (N)	LONGITUDE (W)	DISTANCE FROM RUNWAY END	OFFSET FROM RWY CL	TOP ELEVATION	AMOUNT OF APPROACH PENETRATION	REMEDIATION
1	NONE							





NOTES:

1. OBSTRUCTION ANALYSIS WAS DETERMINED USING PREVIOUS ALP ATTAINED FROM TxDOT. AN OBSTRUCTION SURVEY WAS NOT CONDUCTED FOR THIS PROJECT AS IT WAS NOT PART OF THE CONTRACT SCOPE. THE MOST UP TO DATE INFORMATION PROVIDED IS DEPICTED IN THIS DRAWING.
2. ALL HORIZONTAL COORDINATES ARE SHOWN IN TEXAS STATE PLANE CENTRAL ZONE, US FOOT, NAD 83/2019.
3. ALL VERTICAL COORDINATES ARE SHOWN IN NAD 88.



KSA

DES: MM	ISSUE RECORD			
DR: ED	NO.	BY	DATE	REVISION
CH: MM				
APP: MM				

SPINKS AIRPORT

FORT WORTH SPINKS AIRPORT
FORT WORTH, TX

DRAFT

AIRPORT LAYOUT PLAN

INNER APPROACH SURFACE DRAWING - RUNWAY 18L

AIP GRANT NO.	KSA JOB NO.	DATE:
3-48-0215-xx-2019	FWS011	August 23, 2024

10
SHEET NO.

RUNWAY 36R OBSTRUCTION TABLE

No.	OBJECT DESCRIPTION	LATITIDE (N)	LONGITUDE (W)	DISTANCE FROM RUNWAY END	OFFSET FROM RWY CL	TOP ELEVATION	AMOUNT OF APPROACH PENETRATION	REMEDIATION
1	SEE SHEETS 17 - 19							

02°57'52"E
MAGNETIC
TRUE

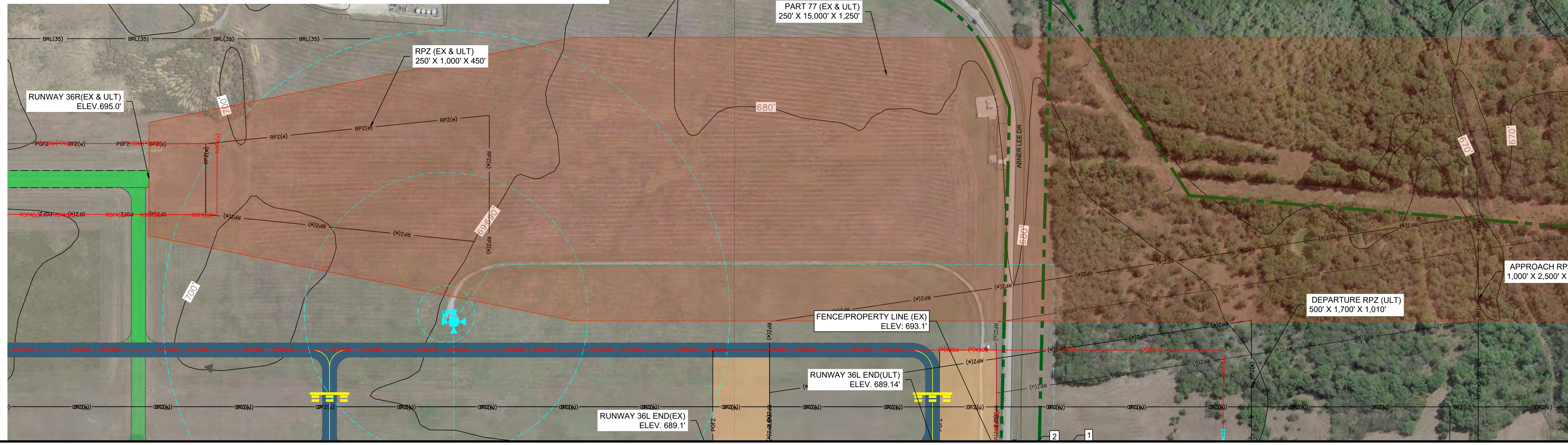
DATE: APRIL, 2024
ANNUAL RATE OF CHANGE: 0°06'20"W
SOURCE: U.S. NGDC

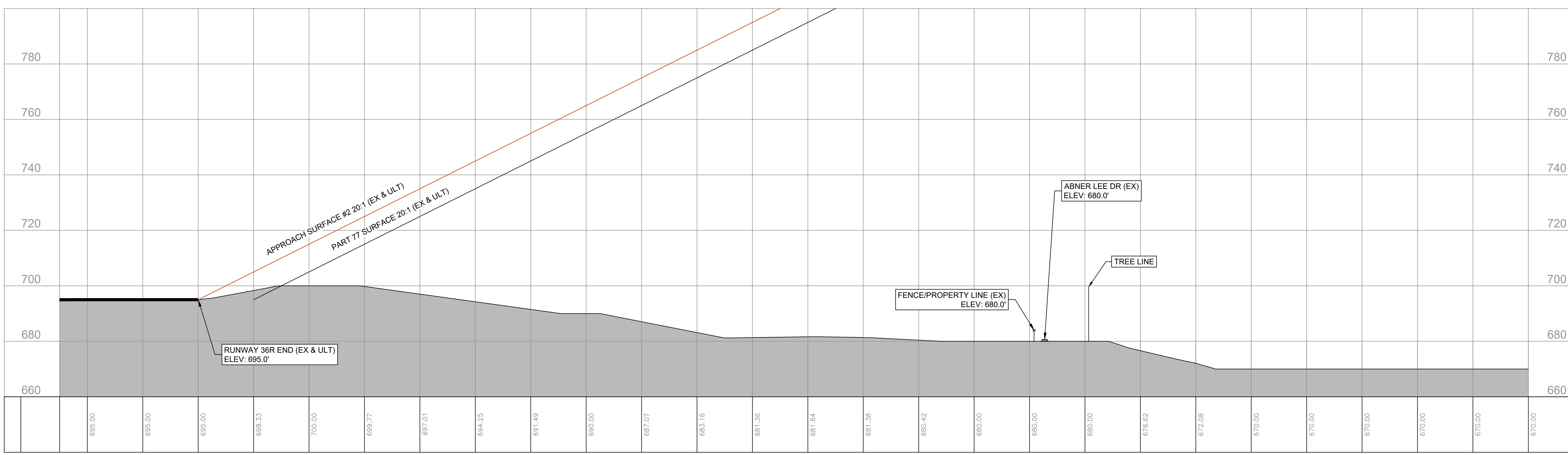
200' 0 200' 400'
HORIZONTAL SCALE IN FEET

20' 0 20' 40'
VERTICAL SCALE IN FEET

NOTES:

1. OBSTRUCTION ANALYSIS WAS DETERMINED USING PREVIOUS ALP ATTAINED FROM TxDOT. AN OBSTRUCTION SURVEY WAS NOT CONDUCTED FOR THIS PROJECT AS IT WAS NOT PART OF THE CONTRACT SCOPE. THE MOST UP TO DATE INFORMATION PROVIDED IS DEPICTED IN THIS DRAWING.
2. ALL HORIZONTAL COORDINATES ARE SHOWN IN TEXAS STATE PLANE CENTRAL ZONE, US FOOT, NAD 83/2019.
3. ALL VERTICAL COORDINATES ARE SHOWN IN NAD 88.





KSA

DES: MM	ISSUE RECORD			
DR: ED	NO.	BY	DATE	REVISION
CH: MM				
APP: MM				

SPINKS AIRPORT

FORT WORTH SPINKS AIRPORT
FORT WORTH, TX

DRAFT

AIRPORT LAYOUT PLAN

INNER APPROACH SURFACE DRAWING - RUNWAY 36R

AIP GRANT NO.	KSA JOB NO.	DATE:
3-48-0215-xx-2019	FWS011	August 23, 2024

11
SHEET NO.

\\ksa.net\gateway\Projects\FWS011\008 CAD\02 ALP\30 Sheets\FWS011-C-ALP-PROFILES.dwg : INNER APPROACH SURFACE DRAWING - RUNWAY 36R

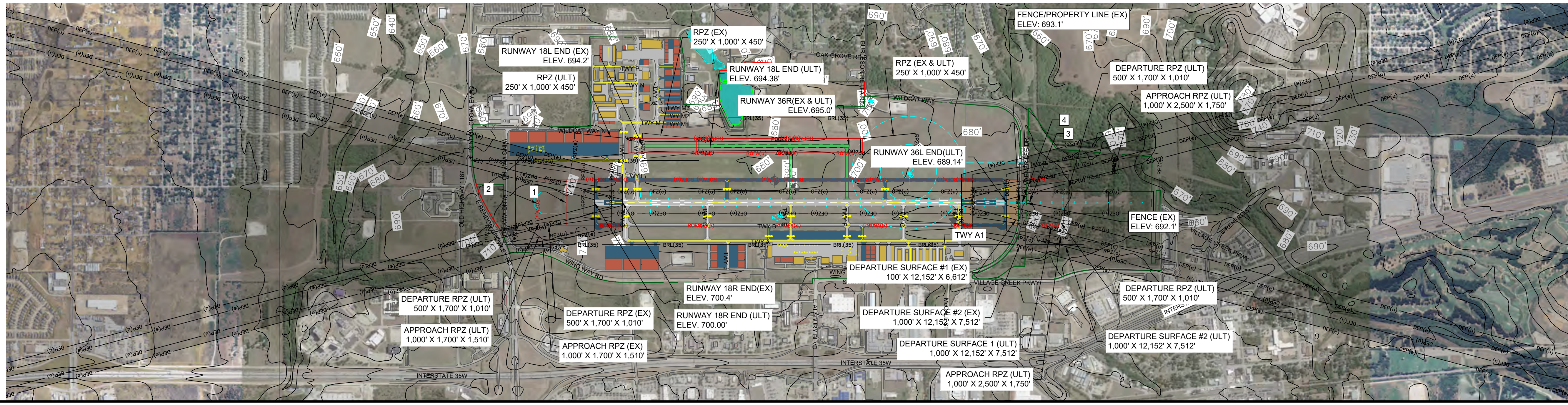
02°57'52"E
MAGNETIC
TRUE
DATE: APRIL, 2024
ANNUAL RATE OF CHANGE: 0°06'20"W
SOURCE: U.S. NGDC

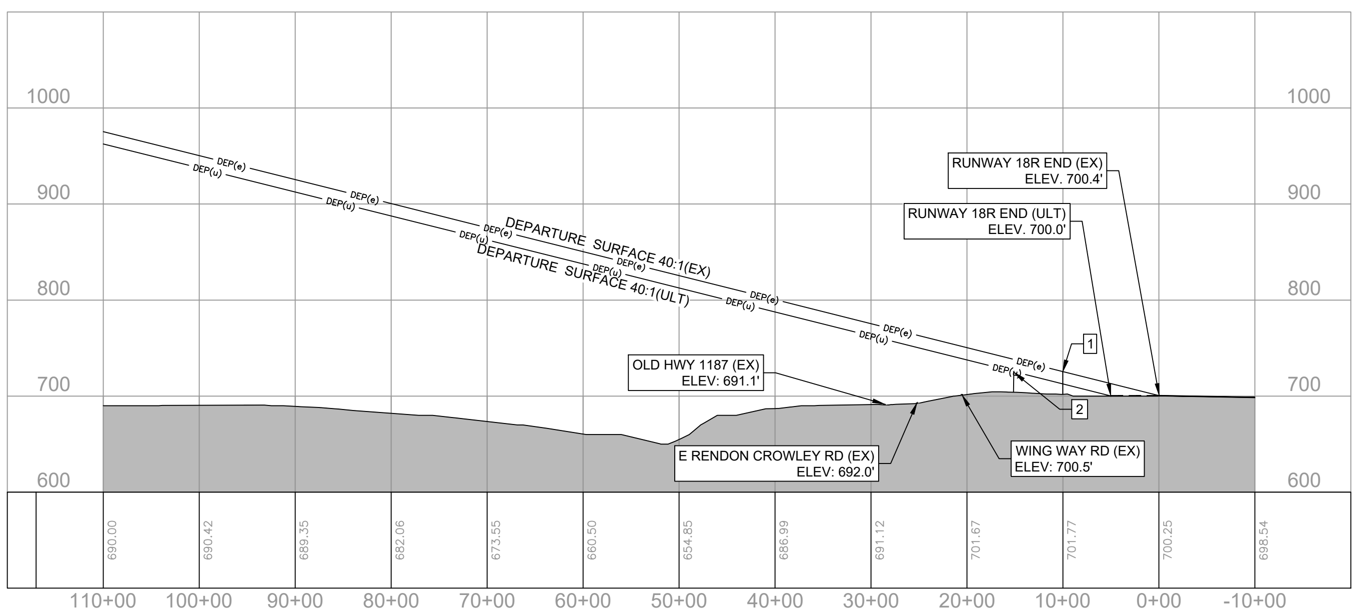
HORIZONTAL SCALE IN FEET (200' 0 200' 400')

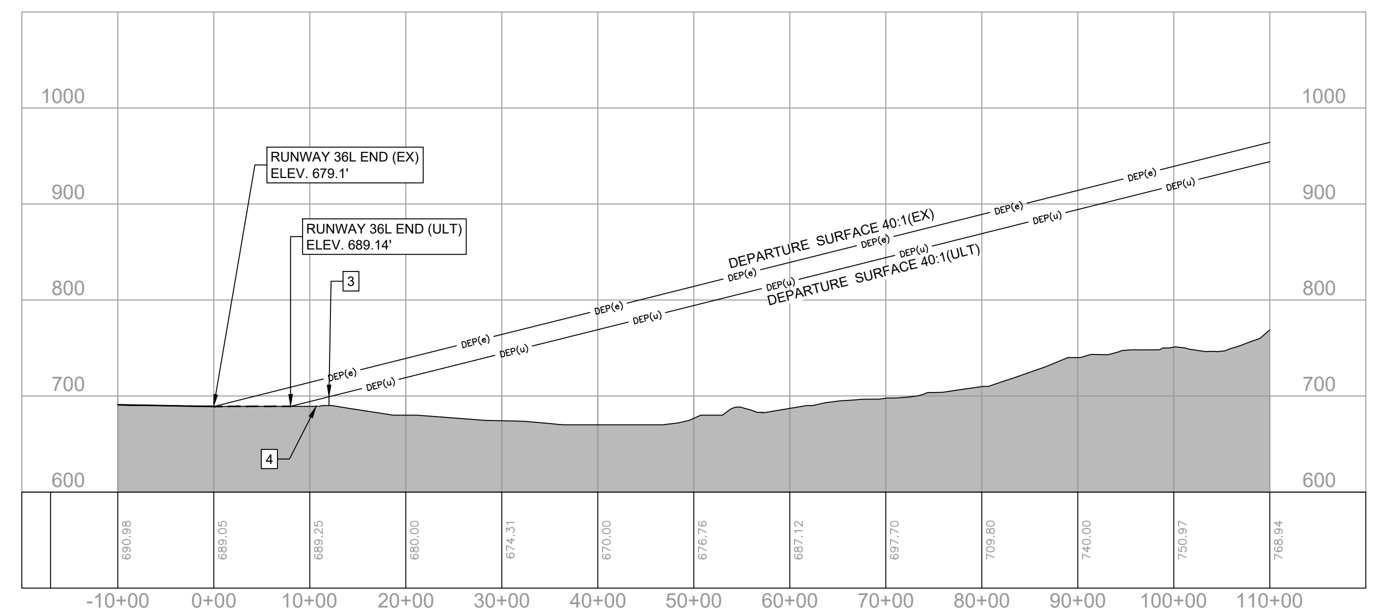
VERTICAL SCALE IN FEET (20' 0 20' 40')

NOTES:

1. OBSTRUCTION ANALYSIS WAS DETERMINED USING PREVIOUS ALP ATTAINED FROM TxDOT. AN OBSTRUCTION SURVEY WAS NOT CONDUCTED FOR THIS PROJECT AS IT WAS NOT PART OF THE CONTRACT SCOPE. THE MOST UP TO DATE INFORMATION PROVIDED IS DEPICTED IN THIS DRAWING.
2. ALL HORIZONTAL COORDINATES ARE SHOWN IN TEXAS STATE PLANE CENTRAL ZONE, US FOOT, NAD 83/2019.
3. ALL VERTICAL COORDINATES ARE SHOWN IN NAD 88.







RUNWAY 36L OBSTRUCTION TABLE

No.	OBJECT DESCRIPTION	LATITIDE (N)	LONGITUDE (W)	DISTANCE FROM RUNWAY END	OFFSET FROM RWY CL	TOP ELEVATION	AMOUNT OF DEPARTURE PENETRATION	REMEDIATION
1	LOCALIZER (EX)	32° 34' 30.97"	97° 18' 34.74"	1000'	0	725'	0'	FIXED BY FUNCTION
2	LOCALIZER (ULT)	32° 34' 35.92"	97° 18' 34.73"	1000'	0	725'	0'	FIXED BY FUNCTION

RUNWAY 18R OBSTRUCTION TABLE

No.	OBJECT DESCRIPTION	LATITIDE (N)	LONGITUDE (W)	DISTANCE FROM RUNWAY END	OFFSET FROM RWY CL	TOP ELEVATION	AMOUNT OF DEPARTURE PENETRATION	REMEDIATION
3	MALSR STATION	32° 33' 09.79"	97° 18' 35.00"	400'	0'	699.0'	0'	FIXED BY FUNCTION
4	ABNER LEE RD	32° 33' 11.13"	97° 18' 35.10"	266'	0'	705.0'	3.36' (ULT)	RELOCATE

KSA

DES: MM
DR: ED
CH: MM
APP: MM

ISSUE RECORD

NO.	BY	DATE	REVISION

SPINKS AIRPORT

FORT WORTH SPINKS AIRPORT
FORT WORTH, TX

DRAFT

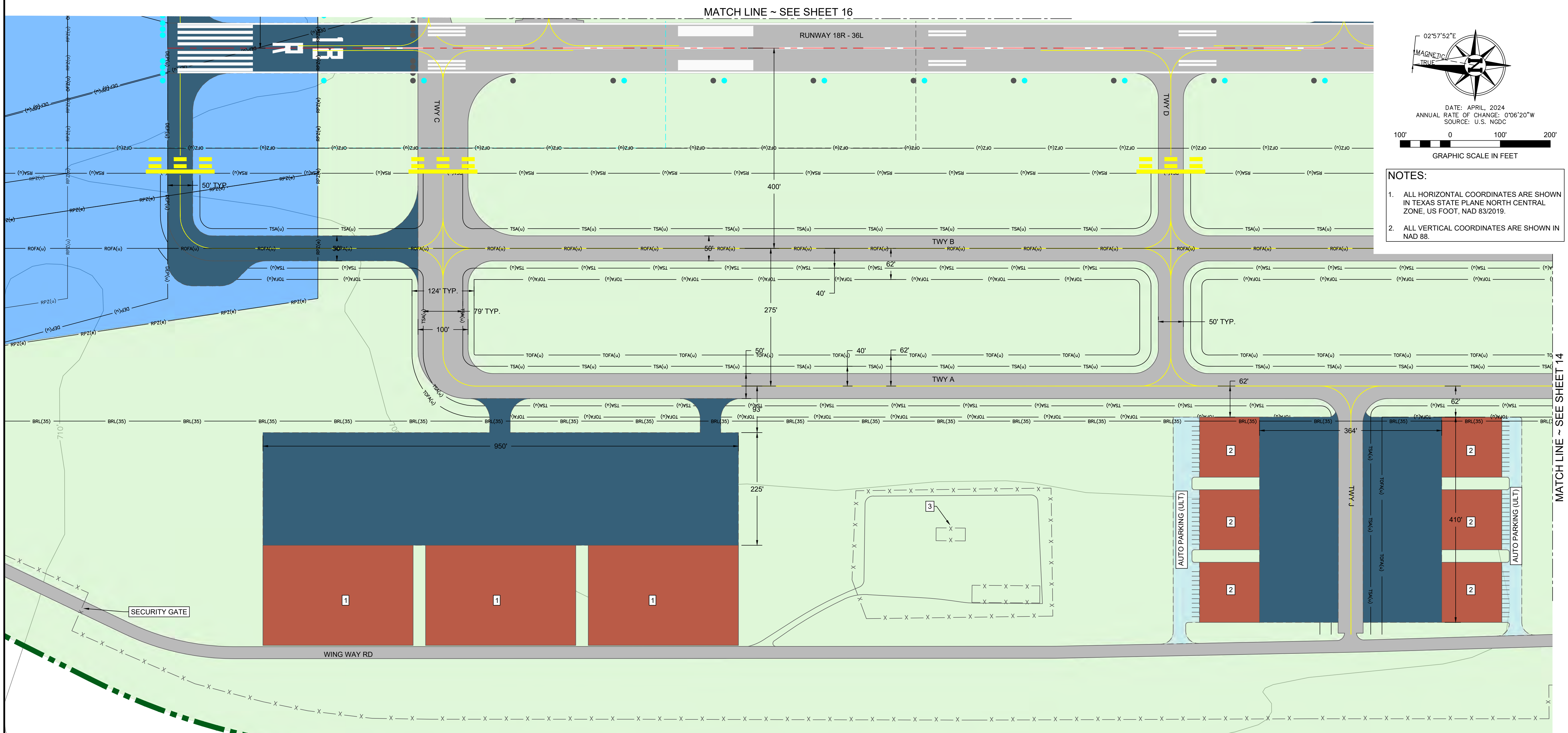
AIRPORT LAYOUT PLAN

RUNWAY DEPARTURE SURFACE DRAWING - RUNWAY 18R-36L

AIP GRANT NO. 3-48-0215-xx-2019
KSA JOB NO. FWS011
DATE: August 23, 2024

SHEET NO. 12

\\ksa.net\gateway\Projects\FWS011\008 CAD\02 ALP\30 Sheets\FWS011-C-ALP-PROFILES.dwg : RUNWAY DEPARTURE SURFACE DRAWING - RUNWAY 18R-36L



NOTES:

1. ALL HORIZONTAL COORDINATES ARE SHOWN IN TEXAS STATE PLANE NORTH CENTRAL ZONE, US FOOT, NAD 83/2019.
2. ALL VERTICAL COORDINATES ARE SHOWN IN NAD 88.

DRAWING LEGEND

ITEM	EXISTING	ULTIMATE
AIRPORT PROPERTY		
AIRPORT PAVEMENT RUNWAY/TAXIWAY		
PAVEMENT TO BE REMOVED		
ROAD/DRIVE/HIGHWAY		
BUILDING/HANGAR		
WETLANDS		
RUNWAY PROTECTION ZONE (RPZ)	RPZ(e)	RPZ(u)
PRECISION OBSTACLE FREE ZONE (POFZ)	POFZ	POFZ

ITEM	EXISTING	ULTIMATE
BUILDING RESTRICTION LINE (BRL)	BRL(35)	BRL(35)
RUNWAY OBJECT FREE AREA (ROFA)	ROFA(e)	ROFA(u)
RUNWAY SAFETY AREA (RSA)	RSA(e)	RSA(u)
RUNWAY OBJECT FREE ZONE (ROFZ)	ROFA(e)	ROFA(u)
INNER APPROACH OBJECT FREE ZONE (OFZ)	OFZ(e)	OFZ(u)
TAXIWAY OBJECT FREE AREA (TOFA)	TOFA(e)	TOFA(u)
TAXIWAY SAFETY AREA (TSA)	TSA(e)	TSA(u)
APPROACH SURFACE		
FENCE	X	X
RUNWAY THRESHOLD LIGHT	●	●

ITEM	EXISTING	ULTIMATE
RUNWAY END IDENTIFIER LIGHTS (REIL)	●●●●	●●●●
ROTATING BEACON		
GLIDE SLOPE ANTENNA		
AWOS		
MALSR	●●●●	●●●●
LOCALIZER		
PAPI		
WINDCONE		
SEGMENTED CIRCLE		

AIRPORT FACILITY LIST

BUILDING NUMBER	DESCRIPTION		TOP ELEVATION
	EXISTING	ULTIMATE	
1	-	200' X 300' BOX HANGAR	-
2	-	120' X 120' BOX HANGAR	-
3	GAS WELL	-	-

KSA

DES: MM
DR: ED
CH: MM
APP: MM

ISSUE RECORD

NO.	BY	DATE	REVISION

SPINKS AIRPORT

FORT WORTH SPINKS AIRPORT
FORT WORTH, TX

DRAFT

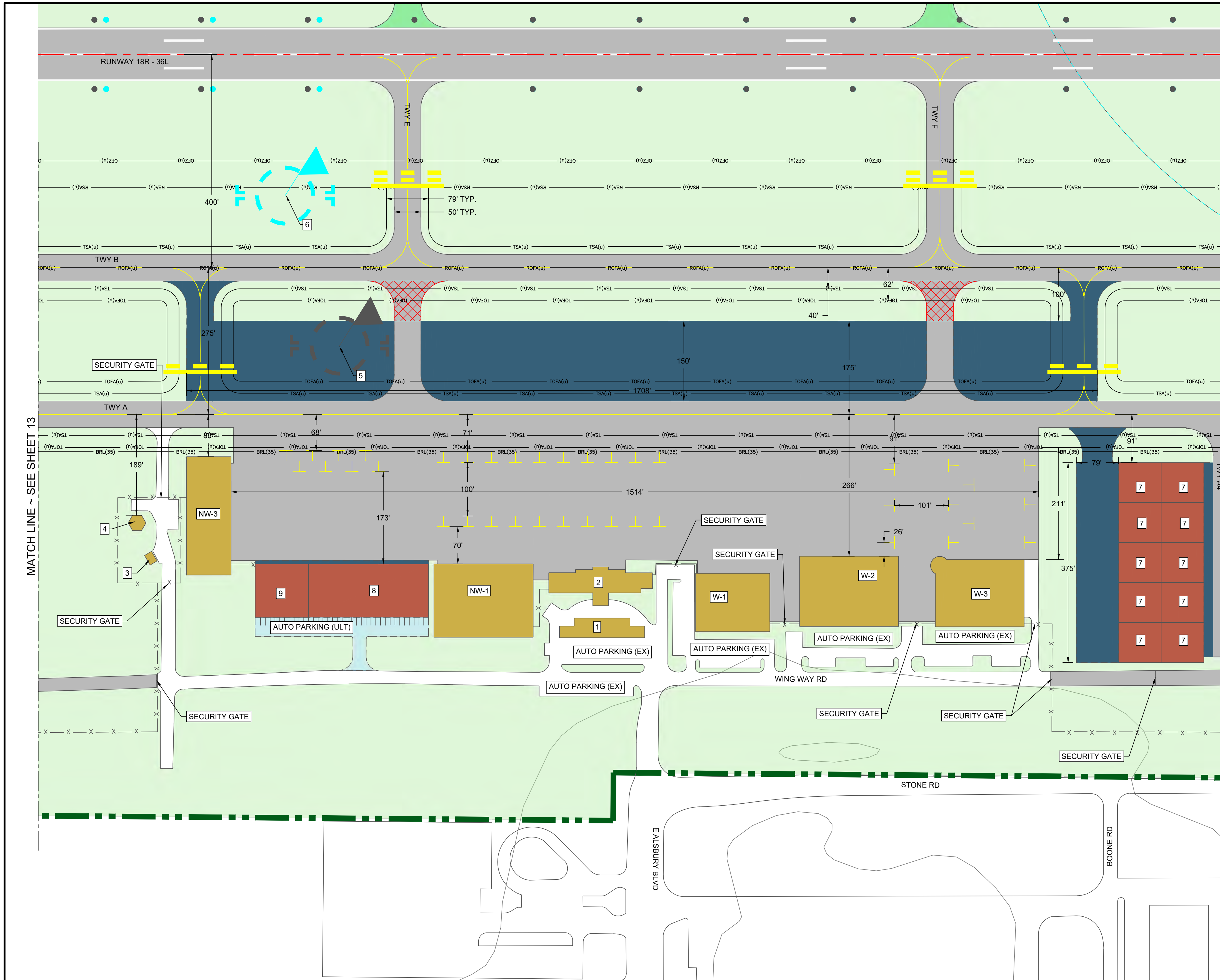
AIRPORT LAYOUT PLAN

AIRPORT TERMINAL AREA DRAWING I

AIP GRANT NO.: 3-48-0215-xx-2019
KSA JOB NO.: FWS011
DATE: August 23, 2024

13
SHEET NO.

\\ksa.net\gateway\Projects\FWS011\008 CAD\02 ALP\30 Sheets\FWS011-C-ALP-ATAD.dwg : AIRPORT TERMINAL AREA DRAWING I



NOTES:

1. ALL HORIZONTAL COORDINATES ARE SHOWN IN TEXAS STATE PLANE NORTH CENTRAL ZONE, US FOOT, NAD 83/2019.
2. ALL VERTICAL COORDINATES ARE SHOWN IN NAD 88.
3. SEE SHEETS 15 FOR WEST TERMINAL BUILDING DATA.

DRAWING LEGEND

ITEM	EXISTING	ULTIMATE
AIRPORT PROPERTY		
AIRPORT PAVEMENT RUNWAY/TAXIWAY		
AIRPORT PAVEMENT TO BE REMOVED		
ROAD/DRIVE/HIGHWAY		
BUILDING/HANGAR		
WETLANDS		
RUNWAY PROTECTION ZONE (RPZ)	RPZ(e)	RPZ(u)
PRECISION OBSTACLE FREE ZONE (POFZ)	POFZ	POFZ
BUILDING RESTRICTION LINE (BRL)	BRL(35)	BRL(35)
RUNWAY OBJECT FREE AREA (ROFA)	ROFA(e)	ROFA(u)
RUNWAY SAFETY AREA (RSA)	RSA(e)	RSA(u)
RUNWAY OBJECT FREE ZONE (ROFZ)	ROFA(e)	ROFA(u)
INNER APPROACH OBJECT FREE ZONE (OFZ)	OFZ(e)	OFZ(u)
TAXIWAY OBJECT FREE AREA (TOFA)	TOFA(e)	TOFA(u)
TAXIWAY SAFETY AREA (TSA)	TSA(e)	TSA(u)
APPROACH SURFACE		
FENCE	X	XX
RUNWAY THRESHOLD LIGHT		
RUNWAY END IDENTIFIER LIGHTS (REIL)		
ROTATING BEACON		
GLIDE SLOPE ANTENNA		
AWOS		
MALSR ARRAY		
MALSR		
LOCALIZER		
PAPI		
WINDCONE		
SEGMENTED CIRCLE		

KSA

DES: MM
DR: ED
CH: MM
APP: MM

ISSUE RECORD			
NO.	BY	DATE	REVISION

SPINKS AIRPORT

FORT WORTH SPINKS AIRPORT
FORT WORTH, TX

DRAFT

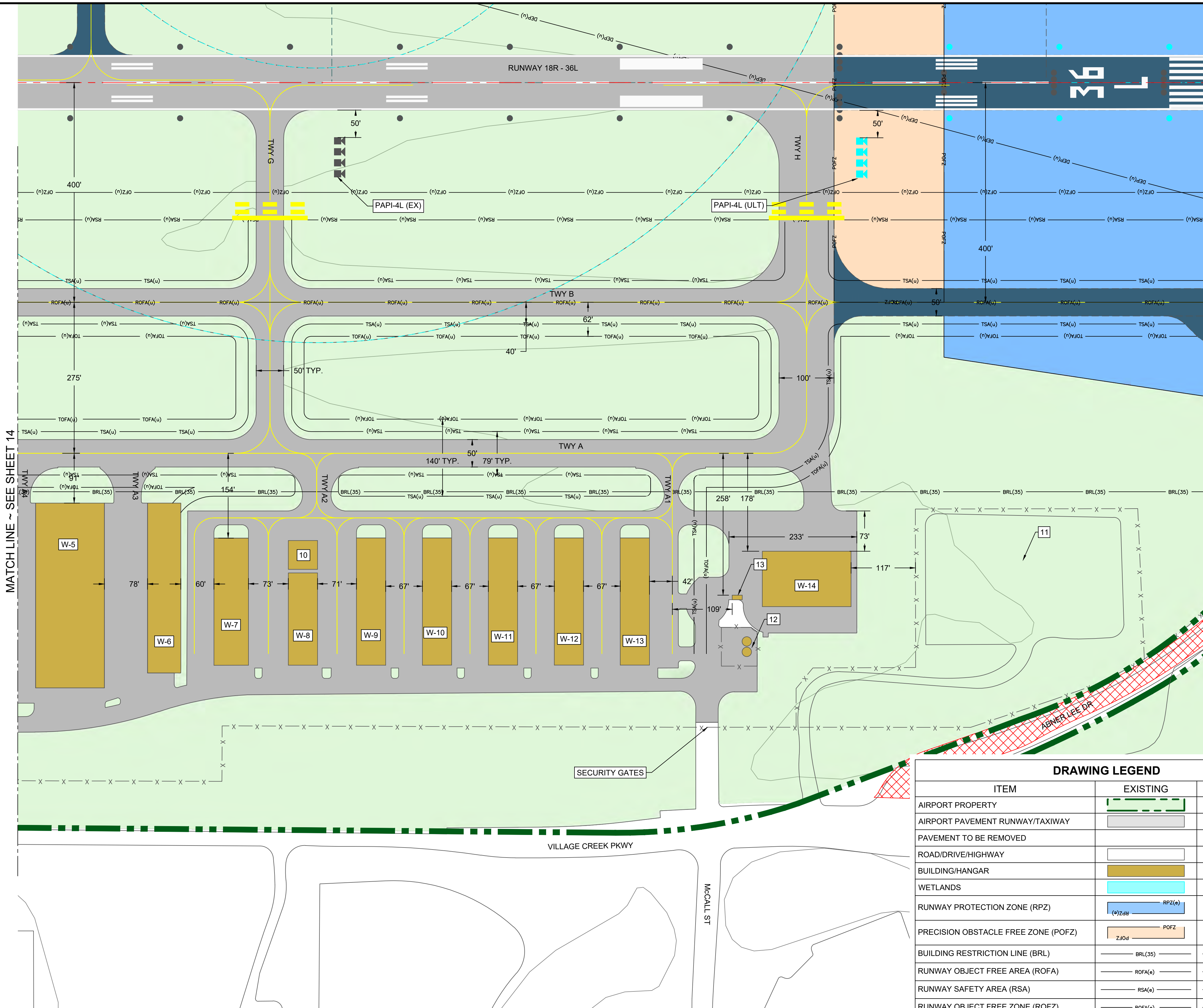
AIRPORT LAYOUT PLAN

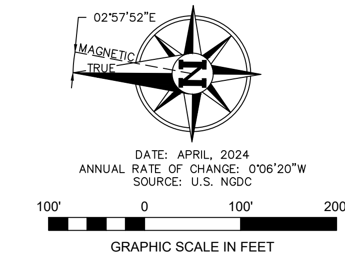
AIRPORT TERMINAL AREA DRAWING II

AIP GRANT NO. 3-48-0215-xx-2019
KSA JOB NO. FWS011
DATE: August 23, 2024

14
SHEET NO.

\\ksa.net\gateway\Projects\FWS011\008 CAD\02 ALP\30 Sheets\FWS011-C-ALP-ATAD.dwg : AIRPORT TERMINAL AREA DRAWING II





NOTES:

1. ALL HORIZONTAL COORDINATES ARE SHOWN IN TEXAS STATE PLANE NORTH CENTRAL ZONE, US FOOT, NAD 83/2019.
2. ALL VERTICAL COORDINATES ARE SHOWN IN NAD 88.

AIRPORT FACILITY LIST

BUILDING NUMBER	DESCRIPTION		TOP ELEVATION
	EXISTING	ULTIMATE	
W-1	CITY OF FORT WORTH ADMIN BOX HANGAR	-	716.5'
W-2	HARRISON AVIATION BOX HANGAR	-	720.6'
W-3	PRIVATE BOX HANGAR	-	725.2'
W-5	CITY OF FORT WORTH BOX HANGAR	-	721.6'
W-6	CITY OF FORT WORTH T-HANGAR	-	721.6'
W-7	PRIVATE T-HANGAR	-	714.2'
W-8	PRIVATE T-HANGAR	-	714.2'
W-9	PRIVATE T-HANGAR	-	714.2'
W-10	PRIVATE T-HANGAR	-	714.2'
W-11	PRIVATE T-HANGAR	-	714.2'
W-12	PRIVATE T-HANGAR	-	714.2'
W-13	PRIVATE T-HANGAR	-	714.2'
W-14	PRIVATE BOX HANGAR	-	724.2'
NW-1	HARRISON AVIATION BOX HANGAR	-	724.0'
NW-3	HARRISON AVIATION BOX HANGAR	-	724.0'
1	FBO COVERED PARKING	-	714.4'
2	FBO	-	725.2'
3	LIGHTING VAULT	-	708.2'
4	AIR TRAFFIC CONTROL TOWER (ATCT)	-	759.2'
5	SEGMENTED CIRCLE/WINDCONE	-	718.3'
6	-	SEGMENTED CIRCLE/WINDCONE	-
7	-	75' X 75' BOX HANGAR	-
8	-	100' X 175' BOX HANGAR	-
9	-	OFFICE SPACE	-
10	WASH BAY CITY OF FORT WORTH	-	723.0'
11	GAS WELL	-	715.2'
12	FUEL STORAGE TANKS	-	714.2'
13	SELF SERVICE FUEL FARM	-	724.0'

DRAWING LEGEND

ITEM	EXISTING	ULTIMATE
AIRPORT PROPERTY		
AIRPORT PAVEMENT RUNWAY/TAXIWAY		
PAVEMENT TO BE REMOVED		
ROAD/DRIVE/HIGHWAY		
BUILDING/HANGAR		
WETLANDS		
RUNWAY PROTECTION ZONE (RPZ)	RPZ(e)	RPZ(u)
PRECISION OBSTACLE FREE ZONE (POFZ)	POFZ	POFZ
BUILDING RESTRICTION LINE (BRL)	BRL(35)	BRL(35)
RUNWAY OBJECT FREE AREA (ROFA)	ROFA(e)	ROFA(u)
RUNWAY SAFETY AREA (RSA)	RSA(e)	RSA(u)
RUNWAY OBJECT FREE ZONE (ROFZ)	ROFA(e)	ROFA(u)

ITEM	EXISTING	ULTIMATE
INNER APPROACH OBJECT FREE ZONE (OFZ)	OFZ(e)	OFZ(u)
TAXIWAY OBJECT FREE AREA (TOFA)	TOFA(e)	TOFA(u)
TAXIWAY SAFETY AREA (TSA)	TSA(e)	TSA(u)
APPROACH SURFACE		
FENCE	x	x
RUNWAY THRESHOLD LIGHT		
RUNWAY END IDENTIFIER LIGHTS (REIL)		
ROTATING BEACON		
GLIDE SLOPE ANTENNA		
AWOS		
MALSR		
LOCALIZER		
PAPI		
WINDCONE		
SEGMENTED CIRCLE		

KSA

DES: MM
DR: ED
CH: MM
APP: MM

ISSUE RECORD

NO.	BY	DATE	REVISION

SPINKS AIRPORT

FORT WORTH SPINKS AIRPORT
FORT WORTH, TX

DRAFT

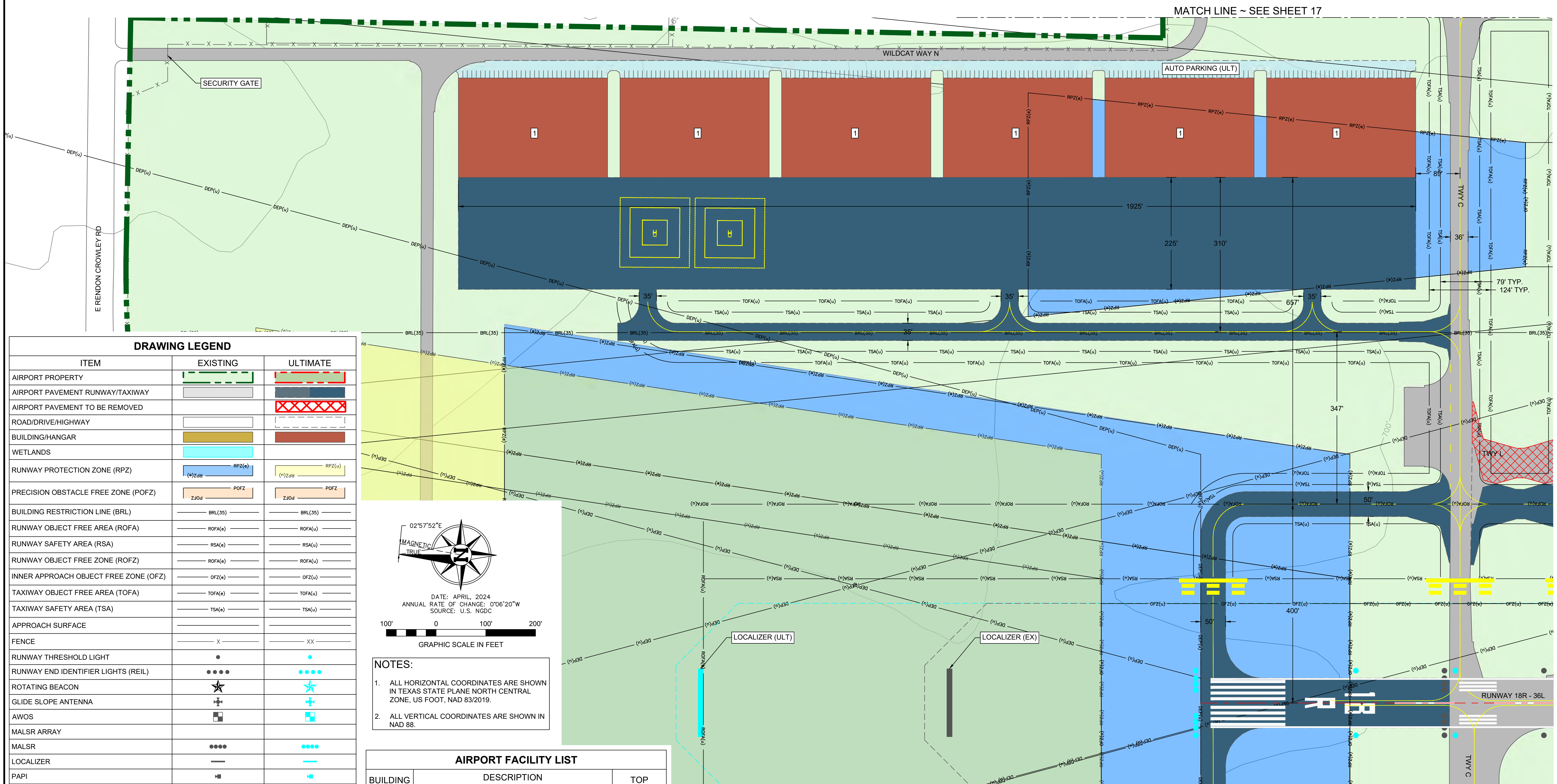
AIRPORT LAYOUT PLAN

AIRPORT TERMINAL AREA DRAWING III

AIP GRANT NO.	KSA JOB NO.	DATE:
3-48-0215-xx-2019	FWS011	August 23, 2024

15
SHEET NO.

\\ksa.net\gateway\Projects\FWS011\008 CAD\02 ALP\30 Sheets\FWS011-C-ALP-ATAD.dwg : AIRPORT TERMINAL AREA DRAWING III



DRAWING LEGEND

ITEM	EXISTING	ULTIMATE
AIRPORT PROPERTY		
AIRPORT PAVEMENT RUNWAY/TAXIWAY		
AIRPORT PAVEMENT TO BE REMOVED		
ROAD/DRIVE/HIGHWAY		
BUILDING/HANGAR		
WETLANDS		
RUNWAY PROTECTION ZONE (RPZ)	RPZ(e)	RPZ(u)
PRECISION OBSTACLE FREE ZONE (POFZ)	POFZ	POFZ
BUILDING RESTRICTION LINE (BRL)	BRL(35)	BRL(35)
RUNWAY OBJECT FREE AREA (ROFA)	ROFA(e)	ROFA(u)
RUNWAY SAFETY AREA (RSA)	RSA(e)	RSA(u)
RUNWAY OBJECT FREE ZONE (ROFZ)	ROFA(e)	ROFA(u)
INNER APPROACH OBJECT FREE ZONE (OFZ)	OFZ(e)	OFZ(u)
TAXIWAY OBJECT FREE AREA (TOFA)	TOFA(e)	TOFA(u)
TAXIWAY SAFETY AREA (TSA)	TSA(e)	TSA(u)
APPROACH SURFACE		
FENCE	X	XX
RUNWAY THRESHOLD LIGHT		
RUNWAY END IDENTIFIER LIGHTS (REIL)		
ROTATING BEACON		
GLIDE SLOPE ANTENNA		
AWOS		
MALSR ARRAY		
MALSR		
LOCALIZER		
PAPI		
WINDCONE		
SEGMENTED CIRCLE		

02°57'52"E
MAGNETIC
TRUE

DATE: APRIL, 2024
ANNUAL RATE OF CHANGE: 0°06'20"W
SOURCE: U.S. NGDC

100' 0 100' 200'
GRAPHIC SCALE IN FEET

NOTES:

1. ALL HORIZONTAL COORDINATES ARE SHOWN IN TEXAS STATE PLANE NORTH CENTRAL ZONE, US FOOT, NAD 83/2019.
2. ALL VERTICAL COORDINATES ARE SHOWN IN NAD 88.

AIRPORT FACILITY LIST

BUILDING NUMBER	DESCRIPTION EXISTING	DESCRIPTION ULTIMATE	TOP ELEVATION
1	-	200' X 300' BOX HANGAR	-

KSA

DES:	MM
DR:	ED
CH:	MM
APP:	MM

ISSUE RECORD

NO.	BY	DATE	REVISION

SPINKS AIRPORT
FORT WORTH SPINKS AIRPORT
FORT WORTH, TX

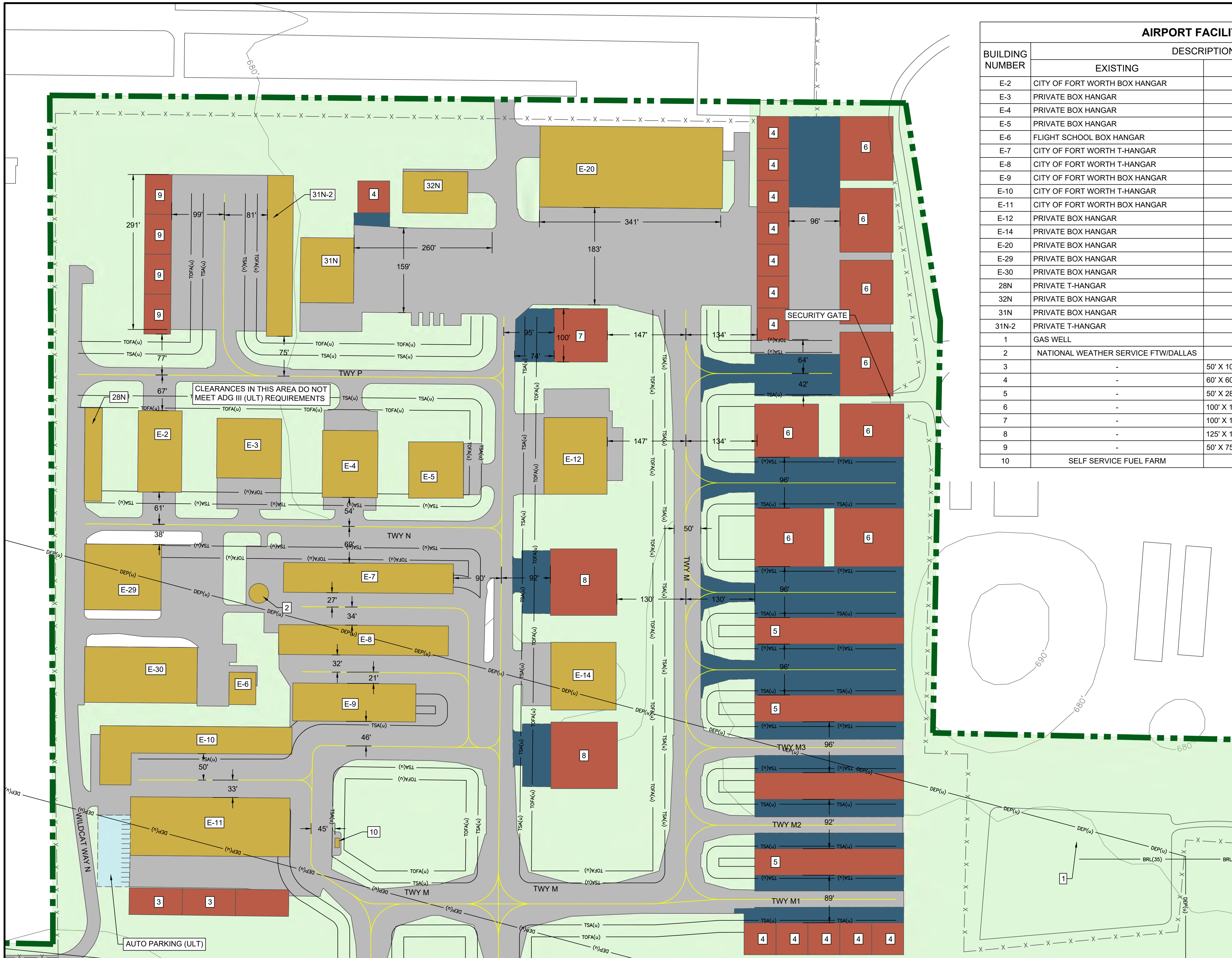
DRAFT
AIRPORT LAYOUT PLAN

AIRPORT TERMINAL AREA DRAWING IV

AIP GRANT NO.	KSA JOB NO.	DATE:
3-48-0215-xx-2019	FWS011	August 23, 2024

16
SHEET NO.

\\ksa.net\gateway\Projects\FWS011\008 CAD\02 ALP\30 Sheets\FWS011-C-ALP-ATAD.dwg : AIRPORT TERMINAL AREA DRAWING IV



AIRPORT FACILITY LIST			
BUILDING NUMBER	DESCRIPTION		TOP ELEVATION
	EXISTING	ULTIMATE	
E-2	CITY OF FORT WORTH BOX HANGAR	-	705.0'
E-3	PRIVATE BOX HANGAR	-	710.9
E-4	PRIVATE BOX HANGAR		710.0'
E-5	PRIVATE BOX HANGAR	-	710.0'
E-6	FLIGHT SCHOOL BOX HANGAR	-	718.9
E-7	CITY OF FORT WORTH T-HANGAR	-	705.0'
E-8	CITY OF FORT WORTH T-HANGAR	-	705.9'
E-9	CITY OF FORT WORTH BOX HANGAR	-	717.2'
E-10	CITY OF FORT WORTH T-HANGAR	-	710.4'
E-11	CITY OF FORT WORTH BOX HANGAR	-	711.8'
E-12	PRIVATE BOX HANGAR	-	710.0'
E-14	PRIVATE BOX HANGAR	-	715.0'
E-20	PRIVATE BOX HANGAR	-	710.3'
E-29	PRIVATE BOX HANGAR	-	709.5
E-30	PRIVATE BOX HANGAR	-	708.1'
28N	PRIVATE T-HANGAR	-	695.8'
32N	PRIVATE BOX HANGAR	-	708.0'
31N	PRIVATE BOX HANGAR	-	710.0'
31N-2	PRIVATE T-HANGAR	-	705.2'
1	GAS WELL	-	-
2	NATIONAL WEATHER SERVICE FTW/DALLAS	-	778.7'
3	-	50' X 100' BOX HANGAR	-
4	-	60' X 60' BOX HANGAR	-
5	-	50' X 280' T-HANGAR	-
6	-	100' X 120' BOX HANGAR	-
7	-	100' X 100' BOX HANGAR	-
8	-	125' X 125' BOX HANGAR	-
9	-	50' X 75' BOX HANGAR	-
10	SELF SERVICE FUEL FARM	-	-

02°57'52"E
MAGNETIC
TRUE

DATE: APRIL, 2024
ANNUAL RATE OF CHANGE: 0°06'20"W
SOURCE: U.S. NGDC

100' 0 100' 200'
GRAPHIC SCALE IN FEET

NOTES:

1. ALL HORIZONTAL COORDINATES ARE SHOWN IN TEXAS STATE PLANE NORTH CENTRAL ZONE, US FOOT, NAD 83/2019.
2. ALL VERTICAL COORDINATES ARE SHOWN IN NAD 88.

DRAWING LEGEND		
ITEM	EXISTING	ULTIMATE
AIRPORT PROPERTY		
AIRPORT PAVEMENT RUNWAY/TAXIWAY		
AIRPORT PAVEMENT TO BE REMOVED		
ROAD/DRIVE/HIGHWAY		
BUILDING/HANGAR		
WETLANDS		
RUNWAY PROTECTION ZONE (RPZ)	RPZ(e)	RPZ(u)
PRECISION OBSTACLE FREE ZONE (POFZ)	POFZ	POFZ
BUILDING RESTRICTION LINE (BRL)	BRL(35)	BRL(35)
RUNWAY OBJECT FREE AREA (ROFA)	ROFA(e)	ROFA(u)
RUNWAY SAFETY AREA (RSA)	RSA(e)	RSA(u)
RUNWAY OBJECT FREE ZONE (ROFZ)	ROFA(e)	ROFA(u)
INNER APPROACH OBJECT FREE ZONE (OFZ)	OFZ(e)	OFZ(u)
TAXIWAY OBJECT FREE AREA (TOFA)	TOFA(e)	TOFA(u)
TAXIWAY SAFETY AREA (TSA)	TSA(e)	TSA(u)
APPROACH SURFACE		
FENCE	X	XX
RUNWAY THRESHOLD LIGHT		
RUNWAY END IDENTIFIER LIGHTS (REIL)		
ROTATING BEACON		
GLIDE SLOPE ANTENNA		
AWOS		
MALSR ARRAY		
MALSR		
LOCALIZER		
PAPI		
WINDCONE		
SEGMENTED CIRCLE		

KSA

DES: MM	ISSUE RECORD			
DR: ED	NO.	BY	DATE	REVISION
CH: MM				
APP: MM				

SPINKS AIRPORT

FORT WORTH SPINKS AIRPORT
FORT WORTH, TX

DRAFT

AIRPORT LAYOUT PLAN

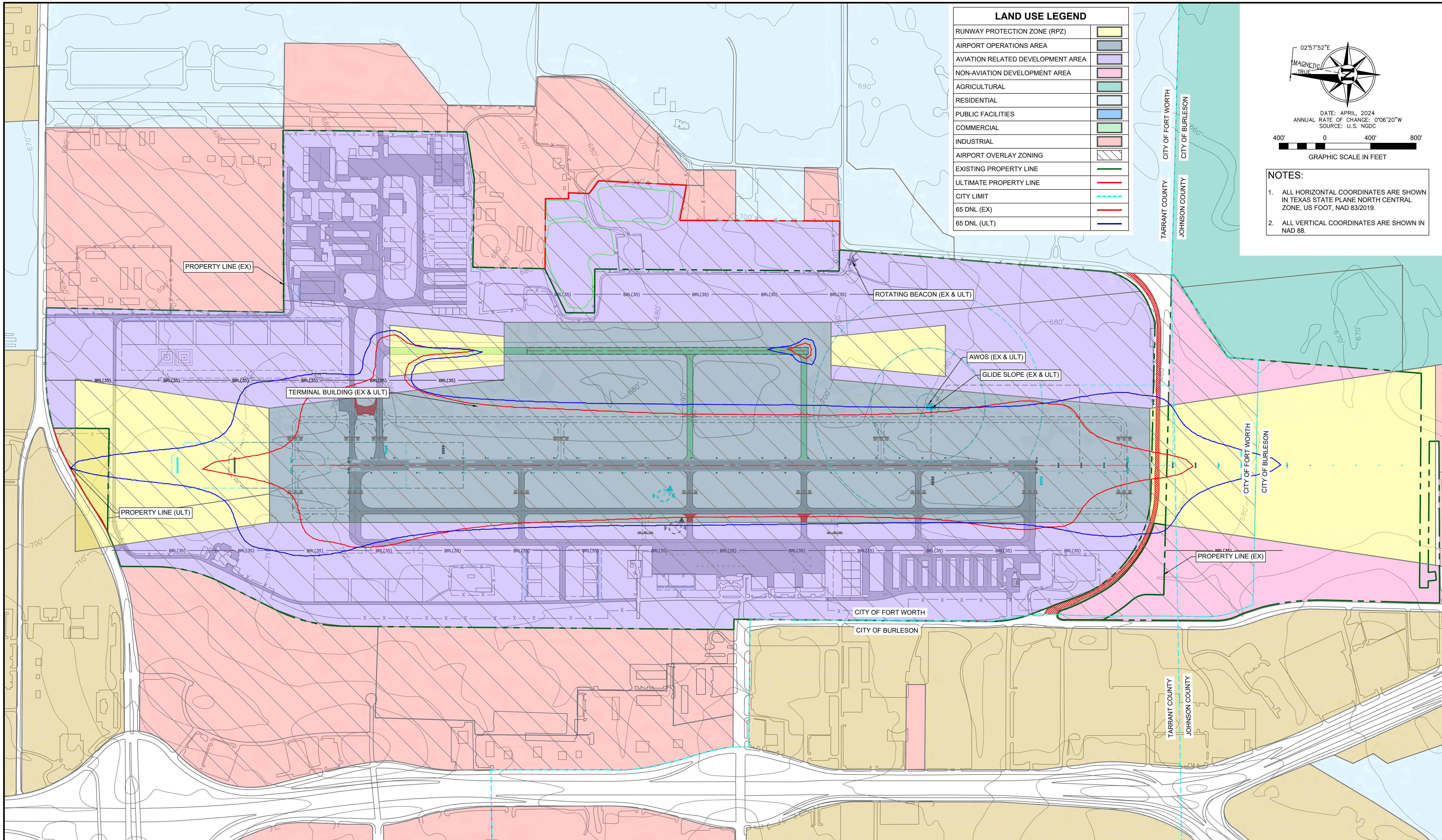
AIRPORT TERMINAL AREA DRAWING V

AIP GRANT NO.	KSA JOB NO.	DATE:
3-48-0215-xx-2019	FWS011	August 23, 2024

17

SHEET NO.

\\ksa.net\gateway\Projects\FWS011\008 CAD\02 ALP\30 Sheets\FWS011-C-ALP-ATAD.dwg : AIRPORT TERMINAL AREA DRAWING V



LAND USE LEGEND

RUNWAY PROTECTION ZONE (RPZ)	
AIRPORT OPERATIONS AREA	
AVIATION RELATED DEVELOPMENT AREA	
NON-AVIATION DEVELOPMENT AREA	
AGRICULTURAL	
RESIDENTIAL	
PUBLIC FACILITIES	
COMMERCIAL	
INDUSTRIAL	
AIRPORT OVERLAY ZONING	
EXISTING PROPERTY LINE	
ULTIMATE PROPERTY LINE	
CITY LIMIT	
65 DNL (EX)	
65 DNL (ULT)	

NOTES:

1. ALL HORIZONTAL COORDINATES ARE SHOWN IN TEXAS STATE PLANE NORTH CENTRAL ZONE, US FOOT, NAD 83/2019.
2. ALL VERTICAL COORDINATES ARE SHOWN IN NAD 88.

KSA

DES: MM
DR: ED
CH: MM
APP: MM

ISSUE RECORD

NO.	BY	DATE	REVISION

SPINKS AIRPORT

FORT WORTH SPINKS AIRPORT
FORT WORTH, TX

DRAFT

AIRPORT LAYOUT PLAN

AIRPORT LAND USE DRAWING

AIP GRANT NO. 3-48-0215-xx-2019
KSA JOB NO. FWS011
DATE: August 23, 2024

18
SHEET NO.

\\ksa.net\gateway\Projects\FWS011\008 CAD\02 ALP\30 Sheets\FWS011-C-ALP-ALUD.dwg : AIRPORT LAND USE DRAWING

(d) *Spinks Airport.*

(1) *Purpose and intent.* The City of Fort Worth has designated the Spinks Airport Overlay and Runway Protection Zone (AO and RPZ) in order to promote the public health, safety, peace, comfort, convenience and general welfare of the inhabitants of and near municipal airport environs and to prevent the impairment of municipal airports and the public investment therein.

(2) *Boundaries.* The specific boundaries of the Spinks Airport Overlay and Runway Protection Zones are shown on the official zoning map maintained by the city and depicted and attached as Exhibit B.28. The Runway Protection Zones (RPZs) are as defined in the airport layout plan for the airport.

(3) *Use restrictions in runway protection zones.*

a. Permitted uses shall be allowed in accordance with Table 2, attached and incorporated hereinto the zoning ordinance.

b. Certain uses within Table 2 shall be prohibited within the RPZs. Prohibited uses include, but are not limited to, new residences, schools, places of public assembly and outdoor recreation uses. Other prohibited uses include the manufacture of flammable or combustible liquids or materials, the generation of any substance that would impair visibility or otherwise interfere with the operation of aircraft including steam/dust/smoke; and uses that may encourage the congregation of birds or waterfowl increasing the chance of a bird strike including landfills.

c. Above ground fuel storage facilities shall be permitted only in accordance with the Uniform Fire Code.

d. All new nonresidential uses indicated on the table as "N" Not Compatible on Table 2 are considered prohibited.

(4) *Communications facilities and electrical interference.* No use shall cause electrical interference with navigational signals or radio communications at the airport or with radio or electronic communications between the airport and aircraft. Proposals for the location of new or expanded radio, radio-telephone, television transmission facilities, electrical transmission lines and wind turbines shall be coordinated with the Federal Aviation Administration's (FAA) Texas Airports Development Office prior to approval.

(5) *Outdoor lighting.*

a. *Generally.* No use shall project lighting directly onto an existing runway or taxiway or into existing airport approach and landing paths except where necessary for safe and convenient air travel. Lighting for any new or expanded use shall incorporate shielding in their designs to reflect light away from airport approach and landing paths. Control of outdoor lighting shall be achieved primarily through the use of such means as cutoff fixtures, shields and baffles, and appropriate application of fixture mounting height, wattage, aiming angle and fixture placement.

b. *Criteria.* Lighting shall meet the following criteria.

1. *Lighting arrangement.* Lighting arrangements that mimic runway lighting (i.e., long linear parallel rows of lighting) that could be confused with runway or taxiway lighting are not permitted.

2. *Illumination levels.* Lighting shall have intensities, uniformities and glare control in accordance with the recommended practices of the Illuminating Engineering Society of North America (IESNA), unless otherwise directed by the City of Fort Worth.

3. *Lighting fixture design.*

i. Fixtures shall be of a type and design appropriate to the lighting application.

ii. For the lighting of predominantly horizontal surfaces such as, but not limited to, parking areas, roadways, vehicular and pedestrian passage areas, merchandising and storage areas, automotive-fuel dispensing facilities, automotive sales areas, loading docks, cul-de-sacs, active and passive recreational areas, building entrances, sidewalks, bicycle and pedestrian paths, and site entrances, fixtures shall be aimed straight down and shall meet IESNA full-cutoff criteria. Fixtures, except those containing directional lamps, with an aggregate rated lamp output not exceeding 500 lumens, e.g., the rated output of a standard non-directional 40-watt incandescent lamp, are exempt from the requirements of this subsection. In the case of decorative street lighting, the City of Fort Worth may approve the use of luminaires that are fully shielded or comply with IESNA cutoff criteria.

iii. For the lighting of predominantly non-horizontal surfaces such as, but not limited to, facades, landscaping, signs, billboards, fountains, displays and statuary, fixtures shall be fully shielded and shall be installed and aimed so as to not project their output past the object being illuminated or skyward. Fixtures, except those containing directional lamps, with an aggregate rated lamp output not exceeding 500 lumens, e.g., the rated output of a standard non-directional 40-watt incandescent lamp, are exempt from the requirements of this subsection.

iv. "Barn lights," aka "dusk-to-dawn lights," shall be shielded.

4. *Billboards and signs.*

i. Externally illuminated billboards and signs shall have fixtures mounted at the top of the billboard or sign and aimed downward. The fixtures shall be designed, fitted and aimed to shield the source from off-site view and to place the light output onto and not beyond the sign or billboard. The face of the sign or billboard and the illumination shall not exceed 30-vertical footcandles during the hours of darkness.

ii. The light source for internally illuminated signs and billboards shall not exceed 1,000 initial lumens per square foot of sign face.

iii. Rotating, traveling, pulsing, flashing or oscillating light sources, lasers, beacons, searchlights or strobe lighting shall not be permitted.

iv. The use of highly reflective signage that creates nuisance glare or a safety hazard is not permitted.

(5) *Glare.*

a. *Generally.* No use shall cause glare by highly reflective materials, including but not limited to unpainted metal or reflective glass, on the exterior of structures located within airport approach and landing paths or on nearby lands where glare could impede a pilot's vision. Proposed solar arrays shall be coordinated with the FAA's Texas Airports Development Office prior to approval.

b. *Criteria.* The control of glare shall meet the following criteria.

1. Vegetation screens shall not be employed to serve as the primary means for controlling glare. Rather, glare control shall be achieved primarily through the use of such means as cutoff fixtures, shields and baffles, and appropriate application of fixture mounting height, wattage, aiming angle and fixture placement. Glare surface suppressants that effectively reduce glare may also be utilized.

2. All lighting shall be aimed, located, designed, fitted and maintained so as not to present a hazard to pilots or the safe operation of aircraft.

3. Directional fixtures such as floodlights and spotlights shall be shielded, installed and aimed that they do not project their output past the object being illuminated or skyward.

4. Except as permitted for certain recreational lighting, fixtures not meeting IESNA Full-cutoff criteria shall not be mounted in excess of 16 feet above finished grade. Fixtures meeting IESNA full-cutoff criteria shall not be mounted in excess of 20 feet above finished grade.

5. Flag lighting sources shall have a beam spread no greater than necessary to illuminate the flag and shall be adequately shielded.

(6) *Emissions.* No use shall, as part of its regular operations, cause emissions of smoke, ash, vapor, gas, dust, steam or other emissions that could obscure visibility of pilots or conflict with airport operations.

(7) *Wildlife attractants.* No use shall foster an increase in bird population and thereby increase the likelihood of a bird impact problem.

(8) *Waste disposal facilities.*

a. No new waste disposal facilities shall be permitted with 10,000 feet of any airport unless approval is obtained from the FAA.

b. Expansions of existing land disposal facilities within these distances shall be permitted only upon demonstration that the facility is designed and will operate so as not to increase the likelihood of bird/aircraft collisions. Timely notice of any proposed expansion shall be provided to the City of Fort Worth, Texas DOT and the FAA, and any approval shall be accompanied by such conditions as are necessary to ensure that an increase in bird/aircraft collisions is not likely to result.

(e) *Meacham International Airport.*

(1) *Purpose and intent.* The City of Fort Worth has designated the Meacham International Airport Overlay and Runway Protection Zone (AO and RPZ) in order to promote the public health, safety, peace, comfort, convenience and general welfare of the inhabitants of and near municipal airport environs and to prevent the impairment of municipal airports and the public investment therein.

(2) *Boundaries.* The specific boundaries of the Meacham Airport Overlay and Runway Protection Zones are shown on the official zoning map maintained by the city and depicted and attached as Exhibit B.29. The Runway Protection Zones (RPZs) are as defined in the airport layout plan for the airport.

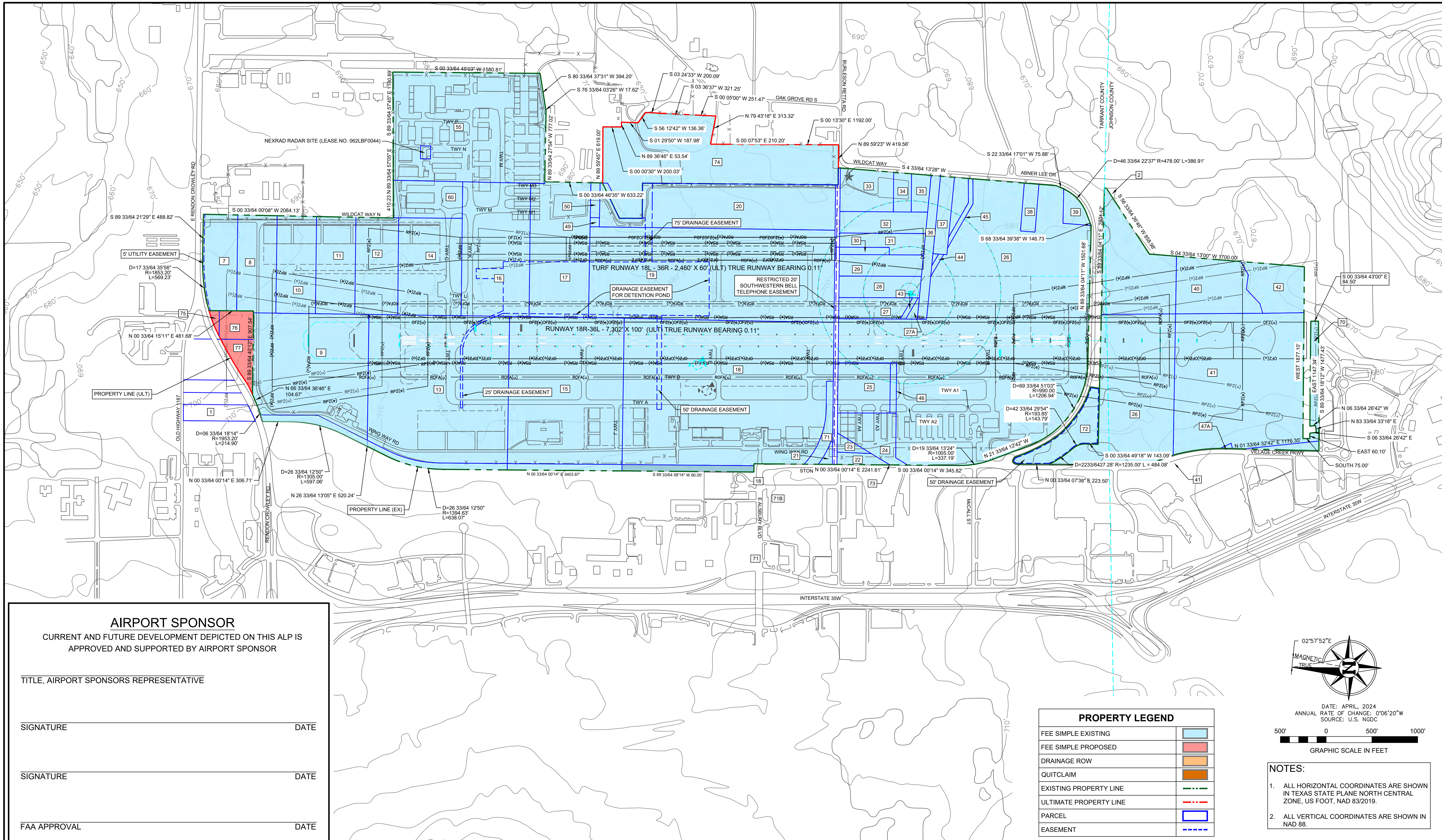
(3) *Use restrictions in runway protection zones.*

a. Permitted uses shall be allowed in accordance with Table 2, attached and incorporated here into the zoning ordinance.

b. Certain uses within Table 2 shall be prohibited within the RPZs. Prohibited uses include, but are not limited to, new residences, schools, places of public assembly and outdoor recreation uses. Other prohibited uses include the manufacture of flammable or combustible liquids or materials, the generation of any substance that would impair visibility or otherwise interfere with the operation of aircraft including steam/dust/smoke; and uses that may encourage the congregation of birds or waterfowl increasing the chance of a bird strike including landfills.

c. Above ground fuel storage facilities shall be permitted only in accordance with the Uniform Fire Code.

d. All new nonresidential uses indicated on the table as "N" Not Compatible on Table 2 are considered prohibited.



AIRPORT SPONSOR

CURRENT AND FUTURE DEVELOPMENT DEPICTED ON THIS ALP IS APPROVED AND SUPPORTED BY AIRPORT SPONSOR

TITLE, AIRPORT SPONSORS REPRESENTATIVE

SIGNATURE DATE

SIGNATURE DATE

FAA APPROVAL DATE

PROPERTY LEGEND

FEE SIMPLE EXISTING	
FEE SIMPLE PROPOSED	
DRAINAGE ROW	
QUITCLAIM	
EXISTING PROPERTY LINE	
ULTIMATE PROPERTY LINE	
PARCEL	
EASEMENT	

NOTES:

1. ALL HORIZONTAL COORDINATES ARE SHOWN IN TEXAS STATE PLANE NORTH CENTRAL ZONE, US FOOT, NAD 83/2019.
2. ALL VERTICAL COORDINATES ARE SHOWN IN NAD 88.

KSA

DES: MM	ISSUE RECORD			
DR: ED	NO.	BY	DATE	REVISION
CH: MM				
APP: MM				

SPINKS AIRPORT

FORT WORTH SPINKS AIRPORT
FORT WORTH, TX

DRAFT

AIRPORT LAYOUT PLAN

EXHIBIT "A" AIRPORT PROPERTY INVENTORY MAP

AIP GRANT NO.	KSA JOB NO.	DATE:
3-48-0215-xx-2019	FWS011	August 23, 2024

20

SHEET NO.

\\ksa.net\gateway\Projects\FWS011\008 CAD\02 ALP\30 Sheets\FWS011-C-ALP-APM.dwg : EXHIBIT "A" AIRPORT PROPERTY INVENTORY MAP

AIRPORT PROPERTY - DATA TABLE

PARCEL	GRANTOR	INTEREST	ACREAGE	DATE ACQUIRED	DEED VOL/PAGE CO.	FEDERAL PROJECT NO.
1	LIBURN BLEDSUE, JR., ET. UX.	FEE SIMPLE	2.89	2/22/1984	7750/1302 TARRANT	3-48-0086-03
	CITY OF FORT WORTH	FEE SIMPLE	2.89	9/17/1986	12518/1414 TARRANT	-
2	OKC CORPORATION LIQUIDATING TRUST	FEE SIMPLE	0.09	11/6/1986	1240/856 JOHNSON	-
7	PAULINE P. NORWOOD	FEE SIMPLE	9.47	1/17/1985	8066/722 TARRANT	3-48-0086-05
8	PAULINE P. NORWOOD	FEE SIMPLE	10.40	1/17/1985	8066/722 TARRANT	3-48-0086-05
	MARY RUTH NORWOOD LINKS ESTATE	FEE SIMPLE	-	-	-	-
9 & 9B	HENRY S. MILLER COMPANY, TRUSTEE	FEE SIMPLE	37.16	11/15/1984	8012/2221 TARRANT	3-48-0086-02
10	PAULINE P. NORWOOD	FEE SIMPLE	10.42	1/17/1985	8066/722 TARRANT	3-48-0086-05
	MARY RUTH NORWOOD LINKS ESTATE	FEE SIMPLE	-	-	-	-
11	PAULINE P. NORWOOD	FEE SIMPLE	10.43	1/17/1985	8066/722 TARRANT	3-48-0086-05
12	PAULINE P. NORWOOD	FEE SIMPLE	11.33	1/17/1985	8066/722 TARRANT	3-48-0086-03
	MARY RUTH NORWOOD LINKS ESTATE	FEE SIMPLE	-	-	-	-
13	HENRY S. MILLER COMPANY, TRUSTEE	FEE SIMPLE	58.66	11/15/1984	8012/2221 TARRANT	3-48-0086-02
14	PAULINE P. NORWOOD	FEE SIMPLE	16.89	1/17/1985	8066/722 TARRANT	3-48-0086-05
	MARY RUTH NORWOOD LINKS ESTATE	FEE SIMPLE	-	-	-	-
15	Q. COMPANY, INC.	FEE SIMPLE	48.86	2/14/1985	8094/1339 TARRANT	3-48-0086-01
16	PAULINE P. NORWOOD	FEE SIMPLE	24.84	1/17/1985	8066/722 TARRANT	3-48-0086-03
	MARY RUTH NORWOOD LINKS ESTATE	FEE SIMPLE	-	-	-	-
17	PAULINE P. NORWOOD	FEE SIMPLE	21.88	1/17/1985	8066/722 TARRANT	3-48-0086-03
	MARY RUTH NORWOOD LINKS ESTATE	FEE SIMPLE	-	-	-	-
18	J.C.PACE & COMPANY	FEE SIMPLE	86.02	12/12/1984	8035/116 TARRANT	3-48-0086-06
19	PAULINE P. NORWOOD	FEE SIMPLE	60.24	1/17/1985	8066/722 TARRANT	3-48-0086-03
	MARY RUTH NORWOOD LINKS ESTATE	FEE SIMPLE	-	-	-	-
20	MARSHALSEA INDUSTRIES, INC	FEE SIMPLE	24.61	1/30/1985	8081/154 TARRANT	3-48-0086-02
21	J.C.PACE & COMPANY	FEE SIMPLE	0.99	12/12/1984	8035/116 TARRANT	3-48-0086-06
22	ROBERT GERARD BOONE, ET. UX.	FEE SIMPLE	2.85	4/3/1985	8143/1828 TARRANT	3-48-0086-01
23	O.L. HAGAR	FEE SIMPLE	0.90	1/7/1985	8078/2136 TARRANT	3-48-0086-02
24	ROBERT COLE, ET. UX	FEE SIMPLE	6.63	6/4/1984	7851/797 TARRANT	3-48-0086-01
		FEE SIMPLE	-	-	-	-
25	CARL H. FAIR, ET. UX.	FEE SIMPLE	7.19	10/17/1984	784/178 TARRANT	3-48-0086-01
26	OREIN BROWNING	FEE SIMPLE	180.11	10/18/1984	7995/1523 TARRANT	3-48-0086-03
		FEE SIMPLE	-	-	1069/31 JOHNSON	3-48-0086-01
27 & 27A	CARL H. FAIR, ET. UX.	FEE SIMPLE	4.37	10/17/1984	7984/178 TARRANT	3-48-0086-01
28	EDGAR E. FAIR, ET. UX.	FEE SIMPLE	4.78	3/11/1983	7463/2015 TARRANT	3-48-0086-01
29	JOHN L. McMICKEN, ET. UX.	FEE SIMPLE	4.89	3/9/1983	7463/48 TARRANT	3-48-0086-02
30	LORENE R. DECKER	FEE SIMPLE	1.00	12/21/1983	7699/377 TARRANT	3-48-0086-01
31	DELLA RUTH THURMAN, ET. AL.	FEE SIMPLE	4.00	11/14/1984	8010/576 TARRANT	3-48-0086-02
32	LORENE KRAEMER RODGERS	FEE SIMPLE	5.00	12/21/1984	8057/2258 TARRANT	3-48-0086-02
33	VELMA EAKIN, EXECUTRIX	FEE SIMPLE	6.57	2/25/1985	8196/1707 TARRANT	-
		FEE SIMPLE	-	-	1105/828 JOHNSON	3-48-0086-01
34	DUDLEY EARL MITCHELL, ET. UX.	FEE SIMPLE	2.00	3/7/1983	7461/628 TARRANT	3-48-0086-01
35	SYBLE JOYCE NOBLE	FEE SIMPLE	1.96	6/22/1984	7872/486 TARRANT	3-48-0086-01
36	GORDON LEE PACK, ET. UX.	FEE SIMPLE	3.74	4/3/1985	8165/167 TARRANT	3-48-0086-01
37	J.E. PACK, ET. UX.	FEE SIMPLE	3.04	3/8/1985	8167/55 TARRANT	3-48-0086-01
38	CARLTON EZELL BLACKSTOCK, ET. UX.	FEE SIMPLE	2.00	7/16/1984	7892/2283 TARRANT	3-48-0086-01
39	MORRIS LOWELL BLEVINS, ET. UX.	FEE SIMPLE	4.11	5/30/1984	7845/2228 TARRANT	3-48-0086-01
		FEE SIMPLE	-	-	1067/28 JOHNSON	-
40	OKC CORPORATION LIQUIDATING TRUST	FEE SIMPLE	30.51	11/6/1986	1240/856 JOHNSON	-

AIRPORT PROPERTY - DATA TABLE

PARCEL	GRANTOR	INTEREST	ACREAGE	DATE ACQUIRED	DEED VOL/PAGE CO.	FEDERAL PROJECT NO.
41, 41A, & REM.	DUDLEY BEADLES, TRUSTEE	FEE SIMPLE	45.82	4/24/1986	1215/740 JOHNSON	-
		FEE SIMPLE			8529/628 TARRANT	-
42	HELEN MARIE WALLACE	FEE SIMPLE	7.81	12/16/1985	1160/106 JOHNSON	-
43	TEXAS UTILITIES ELECTRIC COMPANY	FEE SIMPLE	0.31	7/3/1986	8672/1278 TARRANT	3-48-0086-01
44	TEXAS UTILITIES ELECTRIC COMPANY	FEE SIMPLE	0.24	7/3/1986	8672/1278 TARRANT	3-48-0086-01
45	TEXAS UTILITIES ELECTRIC COMPANY	FEE SIMPLE	0.90	7/3/1986	8672/1278 TARRANT	3-48-0086-01
46	TEXAS UTILITIES ELECTRIC COMPANY	FEE SIMPLE	0.88	7/3/1986	8672/1278 TARRANT	3-48-0086-01
47A	TEXAS UTILITIES ELECTRIC COMPANY	FEE SIMPLE	0.30	7/3/1986	8695/1298 TARRANT	-
49	KC CLUB	FEE SIMPLE	0.23	4/1/1985	8143/702 TARRANT	3-48-0086-02
50	Q. COMPANY, INC.	FEE SIMPLE	0.83	2/14/1985	8094/1339 TARRANT	3-48-0086-01
55	MARSHALSEA INDUSTRIES, INC	FEE SIMPLE	44.34	7/21/1983	7563/1473 TARRANT	-
60	ROY E. ENGLISH, TRUSTEE	FEE SIMPLE	7.20	12/3/1987	9139/814 TARRANT	3-48-0086-02
70	JACK C. WESSLER, TRUSTEE	FEE SIMPLE	7.21	7/2/1996	1242/203 TARRANT	-
71	STATE OF TEXAS	FEE SIMPLE	5.85	5/13/1986	8588/1489 TARRANT	-
71B	CITY OF FORT WORTH	FEE SIMPLE	5.85	2/23/1987	-	-
72	CITY OF FORT WORTH	WARRANTY DEED	25.05	9/24/1986	08695/1298 JOHNSON	-
73	TEXAS UTILITIES ELECTRIC COMPANY	QUITCLAIM	0.01	11/9/1998	13512/117 TARRANT	-
74	PROPOSED LAND ACQUITION	FEE SIMPLE	36.02	PROPOSED	-	-
75	PROPOSED LAND ACQUITION	RPZ CONTROL	0.39	PROPOSED	-	-
76	PROPOSED LAND ACQUITION	RPZ CONTROL	2.47	PROPOSED	-	-
77	PROPOSED LAND ACQUITION	RPZ CONTROL	2.42	PROPOSED	-	-

AIRPORT PROPERTY - DATA TABLE

EASEMENT NO.	GRANTOR	INTEREST	ACREAGE	DATE ACQUIRED	DEED VOL/PAGE CO.
E-12	T.U. ELECTRIC CO.	EASEMENT		8/24/1995	12093/200 TARRANT
E-14	T.U. ELECTRIC CO.	EASEMENT		8/24/1995	12093/200 TARRANT
E-16	T.U. ELECTRIC CO.	EASEMENT		8/24/1995	12093/200 TARRANT
E-17	T.U. ELECTRIC CO.	EASEMENT		8/24/1995	12093/200 TARRANT
E-18	TEXAS UTILITIES ELECTRIC COMPANY	EASEMENT		12/31/1986	8872/775 TARRANT
E-19	TEXAS UTILITIES ELECTRIC COMPANY	EASEMENT		12/31/1986	8872/775 TARRANT
E-24	TEXAS UTILITIES ELECTRIC COMPANY	EASEMENT		12/31/1986	8872/775 TARRANT
E-26	TEXAS UTILITIES ELECTRIC COMPANY	EASEMENT		12/31/1986	8872/775 TARRANT
					1261/588 JOHNSON
					1261/590 JOHNSON
E-26A	TEXAS UTILITIES ELECTRIC COMPANY	EASEMENT		12/31/1986	8872/775 TARRANT
					1261/588 JOHNSON
					1261/590 JOHNSON
E-28	TEXAS UTILITIES ELECTRIC COMPANY	EASEMENT		12/31/1986	8872/775 TARRANT
E-36	TEXAS UTILITIES ELECTRIC COMPANY	EASEMENT		12/31/1986	8872/775 TARRANT
E-37	TEXAS UTILITIES ELECTRIC COMPANY	EASEMENT		12/31/1986	8872/775 TARRANT
E-41	TEXAS UTILITIES ELECTRIC COMPANY	EASEMENT		12/31/1986	1261/586 JOHNSON
E-49A	TEXAS UTILITIES ELECTRIC COMPANY	EASEMENT	0.24	9/10/1986	8760/239 TARRANT
E-100	TEXAS UTILITIES ELECTRIC COMPANY	EASEMENT		12/12/1997	13016/193 TARRANT
					2139/168 JOHNSON

DES: MM
DR: ED
CH: MM
APP: MM

ISSUE RECORD

NO.	BY	DATE	REVISION

SPINKS AIRPORT
FORT WORTH SPINKS AIRPORT
FORT WORTH, TX

DRAFT
AIRPORT LAYOUT PLAN

AIRPORT PROPERTY MAP DATA TABLES

AIP GRANT NO. 3-48-0215-xx-2019
KSA JOB NO. FWS011
DATE: August 23, 2024

8 SWOT ANALYSIS

2023 FORT WORTH SPINKS AIRPORT MASTER PLAN

KSA

SPINKS AIRPORT

8. STRENGTHS, WEAKNESSES, OPPORTUNITIES, AND THREATS ANALYSIS

A key component of the airport master plan will be a Strengths, Weaknesses, Opportunities, and Threats (SWOT) analysis. The SWOT analysis is performed to identify internal and external influences on the operation and management of the airport. This exercise will help determine facility requirements, identify the vision for Fort Worth Spinks Airport, and solidify the framework for the master planning process.

The primary objective of the SWOT is to produce tangible and identifiable focus areas for the planning study. In this case, the primary goal of the exercise is improving the airport's services, development areas, and key market drivers. To accurately determine how to apply factors in each category, we must first understand the primary factors at play.

Internal Factors: These factors are the most easily understood because they are internal to the Airport. The Airport can control (even if indirectly) most of these factors. When determining initial action items related to a SWOT, these internal factors can be prioritized and easily influenced by direct airport actions. For example, if an airport has identified that staffing levels are a weakness, they can directly impact it by adding additional staff.

- Strengths: These are the characteristics of the airport that give it an advantage over others or are perceived by customers as a positive asset. We must first understand what gives the Airport a competitive advantage.
- Weaknesses: Similar to strengths, these characteristics may limit the Airport's success. They may be perceived as negative aspects or areas needing improvement compared to others. They are one of the most important when creating a successful SWOT analysis and will ultimately serve as the basis for improvement.

External Factors: It is important to note that external factors exist in the airport's environment. Therefore, many of these factors cannot be directly influenced by the Airport but have a significant impact on the future objectives of the facility.

- Opportunities: After clearly identifying the airport's strengths and weaknesses, the airport can begin to identify opportunities that facilitate growth. These factors catalyze improvement and help the Airport realize its goals and objectives.
- Threats: The final element in the analysis looks at the competitive disadvantages that may arise with the implementation of previously identified opportunities. Understanding these impacts will ensure a viable approach, based in reality, for the future goals of the facility.

Identifying SWOT factors is extremely important and can be applied to airports as with any other business enterprise. In fact, most municipally owned and operated airports greatly benefit if the management and governance of the airport are influenced by sound business approaches such as a SWOT analysis. Often, new revenue streams, market opportunities, and partnerships are realized following a successful SWOT exercise. When combined with an airport planning exercise, the results of a SWOT analysis can expedite the plan's implementation.

8.1. EFFECTIVE SWOT ANALYSIS

There is no right or wrong way to conduct a SWOT exercise. The goal is to be engaging, diverse, and thorough. Brainstorming issues in each key area is a positive way to get thoughts and ideas on paper to provide perspective. In this exercise, participants are encouraged to develop as many ideas as possible, even though they may apply to multiple areas of the SWOT analysis.

Once the ideas have been documented, a diagram or table can be generated to help articulate the exercise clearly. This diagram helps organize and visualize the thought process. Only after quantifying these and putting them into the diagram can focus and priority be given to improvements.

8.2. SWOT RESULTS MATRIX

Strengths	Weaknesses
Location (Metroplex, Transportation)	East Side Access during North Flow
Workforce	Road Access to East Side Facilities
Expansion Potential (Land, Highway Access)	Drainage Locations
Under Class Bravo Airspace	No DME on ILS Approach
Facilities (ATCT, Fire Station 42)	Lighting
Lack of Obstructions	I35 Traffic Congestion
ILS/RNAV (Approach Minimums)	Funding Amounts
Dual Runways (Paved & Turf)	Existing Hangar Space
Local/Surrounding Community Support	Regional Classification
Economic and Population Growth	No Designated Rotorcraft Area
Self-sustaining	Apron Space
Hotels, Food, Hospital (Near Airport)	
Local Innovation (Bell, Lockheed Martin)	
Aircraft Maintenance (Avionics, Airframe)	
Taxiway Access to Runway	
Available Runway Length	
Volume of Goods Moved in Region	
FBO (Harrison Aviation)	
Tax Incentive Policies	

Opportunities	Threats
Investment in Private Development	Light pollution
Transition to National Classification	Advanced Air Mobility Acceptance
Local ISD Aviation Programs	Noise (Specifically East Side)
Education Outreach Programs	Land Use - Nursing Home (North)
Burleson Partnership Programs	Land Use – Apartments (South)
Available Land for Development	Urban Air Mobility Facility Prep
Urban Air Mobility (UAM)	Federal/State/Local Legislation
Advanced Air Mobility (AAM)	Integration with Local/Regional Plans
Electric Vertical Takeoff & Landing (EVTOL)	Complacency
Special Events (2026 World Cup)	Artificial Intelligence & Cyber Security
Federal Funding (On & Off Airport)	Drone Incursions
Innovative Funding	
Research & Development Facility (R&D)	

THIS SECTION LEFT BLANK INTENTIONALLY