HUNTSVILLE MUNICIPAL AIRPORT (UTS)

- AIRPORT MASTER PLAN -

2020

Submitted to:
City of Huntsville

Submitted by:
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INTRODUCTION AND SUMMARY

AIRPORT STUDY PURPOSE

The Federal Aviation Administration (FAA) recommends airports update their long term planning documents every seven to 10 years, or as necessary to address local changes. The last master plan update for Huntsville Municipal Airport was completed in 2003. The City of Huntsville, the airport sponsor, has received a grant from the Texas Department of Transportation – Aviation Division (TxDOT) to update the Master Plan. The grant covers 90 percent of the fixed fee project cost with the City providing a ten percent grant match.

An Airport Master Plan is designed to 1) evaluate existing airport conditions, 2) identify and assess the impacts of future aviation demand, and 3) provide the City with information and direction in the continued short- and long-term operation, development and planning of the Huntsville Municipal Airport.

The purpose of the Master Plan is to concentrate on the short- and mid-term needs of the Airport, as required within the 0 to 10-year planning period while considering the identified long-term needs over the next 20 years. This involves the preparation of a phased development plan that identifies detailed project schedules and costs. The Report is used to document these findings that will be depicted on an updated and approved Airport Layout Plan (ALP). Overall, the development of the Airport Master Plan is evidence that the City of Huntsville recognizes the importance of aviation in the overall concept of community and transportation planning.

STUDY OBJECTIVES

The Airport Master Plan provides an objective look at future airport needs based on a comprehensive review of design considerations. In addition, the plan answers several basic questions about the role and function of the Airport, including:

- What is the Airport's existing and future service role?
- What are the existing airport facilities and equipment and the airport operational conditions?

- What are the forecast levels of aeronautical activity from current and potential users?
- What are the short- and long-term airport facility requirements and design alternatives?
- What are the preferred airfield and terminal area development options?
- What are the estimated project costs associated with the development program?
- How will the City fund future airfield and terminal area development while striving towards self-sufficiency?

Answers to these items provide the City of Huntsville with information and a schedule of needs to make an informed decision about the future of the Huntsville Municipal Airport. Above all, the Master Plan will provide the basis for an airport facility that is:

- Safe, and constructed in accordance with FAA and TxDOT design standards;
- Economically viable and substantially stakeholder-supported;
- Planned in accordance with broad local, regional. State and national goals.

STUDY GOALS

This Airport Master Plan identifies improvement priorities in accordance with TxDOT policies and standards and is consistent with current FAA design standards and airspace criteria. The approved Master Plan enables the City to apply for grants on eligible development items identified on the updated ALP.

Through a review of background information and discussions with Airport, City, and TxDOT officials the most significant issues to be resolved involve the following tasks:

AIRFIELD:

Determine airport role based on services unique to the system of airports throughout the general aviation airports north and west of Houston.

Determine need and design capabilities for accommodating categories of larger aircraft. Identify characteristics of the most demanding category of aircraft in order to relate aircraft performance standards to geometric airfield (runway & taxiway) improvements.

Identify phased airfield expansion options to meet demand. Determine need and timing for a runway extension. Describe and depict various airport property land acquisition needs.

Assess various aeronautical uses at Huntsville.

Minimize airport (airfield) environmental and erosion conflicts.

TERMINAL AREA:

Expand main apron to support on-airport businesses in the immediate future, including Fixed Base Operator (FBO) franchises.

Expand terminal area to allow for continued hangar construction, including T-hangars and common hangars. Accommodating aircraft owners on the Airport's hangar waiting list.

Provide a site assessment of the potential development area west of the runway on property currently owned by the City.

Provide City with management recommendations to assist in financial planning and operational standards regarding airport tenants and various operating agreements.

LAND USE:
Identify the commercial opportunities at the Airport with respect to the location and visibility of Interstate 45 access, infrastructure improvements, land acquisition, and targeted information from the Huntsville Economic Development Department.

Determine "best use" of property not required for aeronautical purposes.

Provide a public involvement process that communicates the benefits of the Huntsville Municipal Airport, including the significance to users, the financial obligations and economic significance of general aviation to the region.

Provide City with means to protect airport against incompatible development, including the control of off-airport objects that are or could become an obstruction to airport imaginary airspace surfaces.

Enhance the opportunities for economic development and improved employment opportunities consistent with local growth policies and plans.

The following issues and objectives have been identified as being significant to the development of the proposed planning efforts at Huntsville Municipal Airport, and may be included in the Airport Master Plan process as key components in complying with TxDOT standards and policies:

- To provide airport facilities and services for all users in a manner that maximizes safety, efficiency, and opportunities for use.
- To develop the Airport in a manner that meets acceptable physical development standards and environmental requirements of Federal, State, and local agencies for airfield and terminal area facilities.
- To consider safety and security as primary factors in all decision-making situations in the development of the Airport.
- Quantify existing and expected airport activity in terms of current FAA airport design standards (Advisory Circular 50/5300-13, Change #6) and FAA airspace criteria.
- To ensure compatibility with local land use patterns, plans, and growth management objectives as they are affected by airport noise and FAR Part 77 requirements.
- To provide an opportunity for a fair system of user charges that distribute the burden of capital investments, operation, and maintenance equitably between direct users and indirect beneficiaries of the system.
- To provide the opportunity for local officials and the general public to participate in the decision-making process throughout plan development.

PLANING STUDY AGREEMENT

In March 2018, the City and H.W. Lochner (Consultant) entered into an agreement, with TxDOT acting as agent, for the preparation of the Huntsville Municipal Airport Master Plan. The Consultant will be responsible for preparing all elements of the Plan, including the coordination of public participation.

STUDY COORDINATION

Overall, the Airport Master Plan is tailored to be responsive to local issues, while at the same time, inclusive of broader regional issues. The study is intended to serve as a medium for assembling community opinion, spirit, and concurrence. When adopted by the City, and accepted by the various local, regional, State, and Federal agencies, the plan represents the short-, mid-, and long-term intentions regarding the location and extent of airport facility improvements at the Huntsville Municipal Airport.

The study coordination and public participation aspect of the Airport Master Plan is aimed at encouraging public awareness of the airport planning and development process, and the costs and benefits associated with maintenance and improvements at the Huntsville Municipal Airport.

MASTER PLAN ADVISORY COMMITTEE

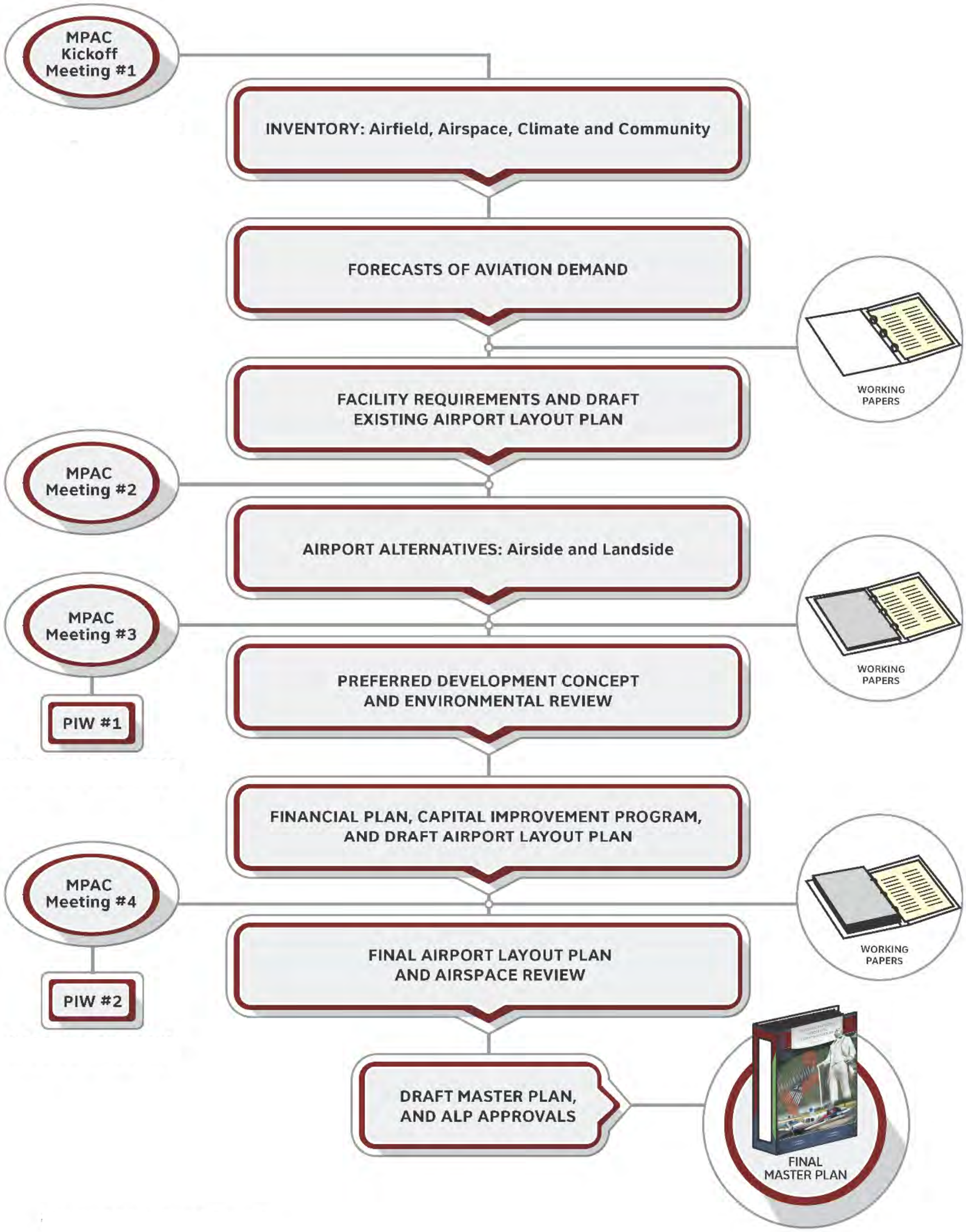
The Huntsville Municipal Airport attracts interest and stakeholders from many within the local community and the greater northwest Houston region. This includes local citizens, local/regional businesses, community organizations, City officials, airport users, airport tenants, and aviation organizations. As a component of the regional, state, and national aviation systems, the Airport is important to both state and federal agencies responsible for overseeing the air transportation system.

To assist in the development of the Master Plan, City management identified a group of government representatives, airport users and tenants, and local community leaders to act in an advisory role in the development of the Master Plan. Members of this Master Planning Advisory Committee (MPAC) will meet at designated points during the study to review draft documents and provide comments to help ensure that a realistic, viable plan was developed with local input. Draft working paper materials will be prepared at various milestones in the planning process. The working paper process allows for timely input and review during each step within the Master Plan to ensure that all issues are fully addressed as the Master Plan develops.

Overall, the MPAC role and purpose of the scheduled airport meetings are:

- To provide a forum through which individuals, public interest groups and civic organizations desiring to be identified with the social and economic progress of the region can participate in the airport planning process;
- To review, respond to, and disseminate information for each stage of the airport study;
- To provide input regarding airport development priorities;
- To recommend a "preferred" course of action for future airport development.

FIGURE 1.1
AIRPORT MASTER PLANNING PROCESS



SWOT ANALYSIS

A SWOT analysis is a strategic business planning technique used to identify Strengths, Weaknesses, Opportunities, and Threats connected with an action or plan. The SWOT analysis involves identifying an action, objective, or element and then identifying the internal and external forces that are positively and negatively impact it in a given environment. For this study, the SWOT analysis factors are being applied to Huntsville Municipal Airport. This provides a continuous vision and direction for the development of the Master Plan as the SWOT analysis is referenced in guiding the plan development.

SWOT DEFINITIONS

As previously discussed, this particular SWOT analysis groups information into two categories:

- Internal – attributes of the airport and market area that may be considered strengths or weaknesses to the action, objective, or element.
- External – attributes of the industry that may pose as opportunities or threats to the action, objective, or element.

The SWOT further categorizes information into one of the following:

- Strengths – internal attributes of the airport that are helpful to achieving the action, objective, or element.
- Weaknesses – internal attributes of the airport that are harmful to achieving the action, objective, or element.
- Opportunities – external attributes of the industry that are helpful to achieving the action, objective, or element.
- Threats – external attributes of the industry that are harmful to achieving the action, objective, or element.

MPAC SWOT ANALYSIS

The SWOT analysis for Huntsville Municipal is based on information gathered, including a kick-off MPAC meeting that was conducted in April 2018. As previously discussed, the MPAC is a diversified group of airport stakeholders that represent various different viewpoints and interests at and of the Airport. A SWOT analysis was conducted with this group to identify key factors to be addressed in the Master Plan. A summary of the results from the SWOT analysis session with the MPAC is summarized in Figure 1.2. These results will be utilized to guide and frame the subjective or judgmental data processing as presented in the Master Plan.

FIGURE 1.2
SWOT ANALYSIS SYNOPSIS

CHAPTER 1: EXISTING CONDITIONS INVENTORY

INTRODUCTION

The Huntsville Municipal Airport (UTS) Master Plan will provide the City of Huntsville with a basis for the development of the community's aviation facilities over the course of the next 20 years. This plan is tailored to meet the specific needs of Huntsville, while adhering to the airport design standards established by the FAA in Advisory Circular 150/5300-13A, *Airport Design*, with a primary goal of defining facility needs and potential development for assurance the airport is able to meet the future aviation needs of the community.

While this master plan will address changes in aviation standards, changing local demographics, and desired improvements, the primary focus will fine tune basic aeronautical forecasts, need and justification for development, and a staged plan for recommended development. The first phase generally focuses on correcting any existing facility deficiencies or violations of standards that can and should be corrected quickly. Subsequent phases typically address features needed to accommodate predicted growth, based on reasonable assumptions, with the main objective to produce an efficient and environmentally acceptable development program for the airport.

The centerpiece of the master plan is the completion of the airport layout plan (ALP) which will be updated during the latter stages of the master plan. The ALP is a set of scaled drawings that depicts current facilities and proposed facility expansion necessary to safely and efficiently accommodate projected aviation demand. The ALP will illustrate existing and ultimate airfield and terminal area facilities and proposed layouts, property interests, land use, and airspace improvements. More than just a strategic plan for future expansion, the master plan plays an important role for the City in the following ways:

EDUCATIONAL PROCESS
The airport master plan is intended to educate Federal and state aviation agencies, city leaders, and citizens about the benefits and importance of the airport within the local community.

PROMOTIONAL PROCESS
The master plan can assist the City with attracting businesses and additional users to the airport by promoting the services offered at the airport that benefit airport users especially the business community.

PRESERVE AIRPORT INFRASTRUCTURE
The master plan identifies future facility needs to ensure that airside, landside, airspace, and support facilities can be feasibly developed, as demand warrants.

IMPROVE AIRPORT FACILITIES
The master plan identifies ultimate facility needs to accommodate current and future users, as well as, safely and efficiently providing facilities that can serve a wide array of aircraft, users, and stakeholders.

BACKGROUND INFORMATION

AIRPORT LOCATION
Located in Walker County, Huntsville is approximately 65 miles north-northwest of Houston, 45 miles east-northeast of College Station, and 160 miles south-southeast of Dallas. The field is situated on approximately 180 acres of land and situated three miles northwest of the City's central business district. UTS can be accessed via State Highway 75, which delineates the southern airport property boundary. **Exhibit 1.1** illustrates the general location of UTS and the immediate vicinity.

AIRPORT ROLE
UTS is classified as a General Aviation – Regional airport within the non-primary airports in the FAA's *National Plan of Integrated Airport Systems* (NPIAS) and is classified as one of the 67 Business/Corporate Airports within the *Texas State Airport System Plan* (TASP), last updated in 2010. The NPIAS defines Regional Airports as those that connect communities to regional and national markets. Generally located in metropolitan areas, Regional Airports typically serve relatively large populations, with high levels of activity including some jets and multi-engine propeller aircraft. The metropolitan areas in which regional airports are located can be metropolitan statistical areas with an urban core population of at least 50,000 or micropolitan statistical areas with a core urban population between 10,000 and 50,000.

The TASP role of UTS as a Business/Corporate airport indicates that it provides access to turboprop and turbojet business aircraft and is located where there is sufficient population or economic activity to support a moderate to high level of business jet activity and/or to provide capacity in metropolitan areas.

Business/Corporate airports serve communities located more than 30 minutes from the nearest Commercial Service or Reliever airport. These airports are generally located 25 miles from other Business/Corporate airports and serve an area of concentrated population, purchasing power, or mineral production. Each have or are forecasted to have 500 or more annual Business/Corporate aircraft operations within five years, or have two permanently based jets. Some of these airports may be located within 25 miles of a significant national recreation or preservation area.

OWNERSHIP AND MANAGEMENT

UTS is owned and operated by the City of Huntsville. The City is responsible for maintaining and operating the airport in accordance with FAA grant assurance agreements. The City is directly responsible for the administrative and contractual functions, which include preparation of an annual budget, coordination of capital improvement projects, lease negotiations and agreements, and public relations.

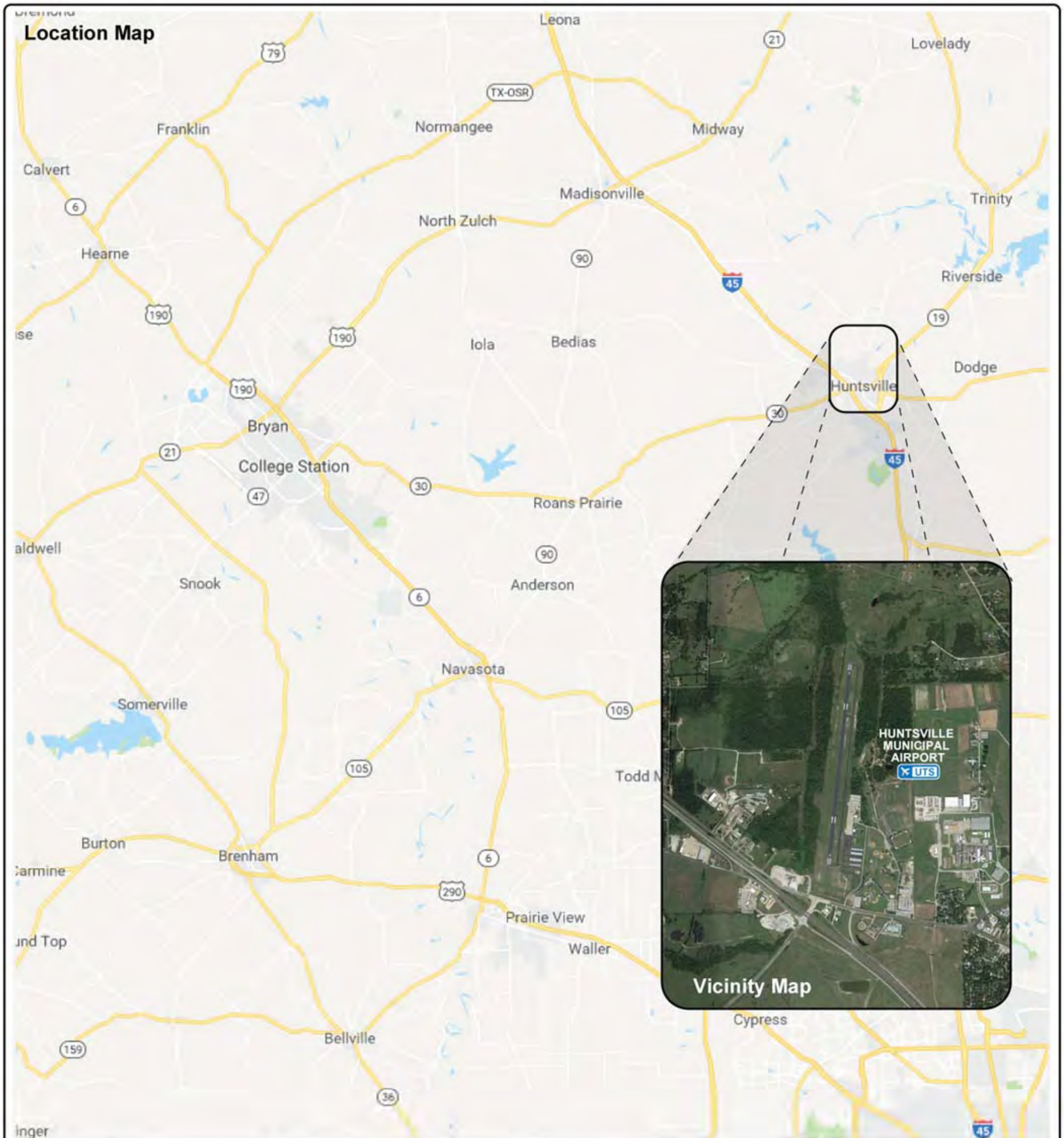
The Fixed-Base Operator (FBO), serving the role of Airport Manager at UTS, provides the day-to-day airfield operations.

ON-AIRPORT BUSINESSES

Currently, there is only one business located at UTS that provides aviation-related goods and services.

Huntsville Aviation

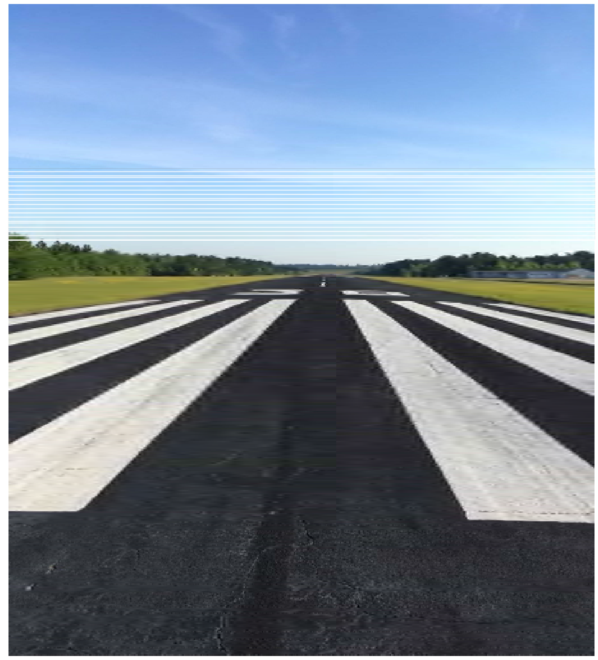
Huntsville Aviation is a full-service FBO that provides the day-to-day airport management, management of hangar rentals, all fuel sales, and general airframe and power plant maintenance to local and regional aircraft. Huntsville Aviation offices in the dedicated terminal building and performs aircraft maintenance services in the aircraft maintenance hangar south of the terminal building. Additionally, the FBO provides flight instruction on a part-time basis along with pilot/charter services and other minor services to the general aviation (GA) community.

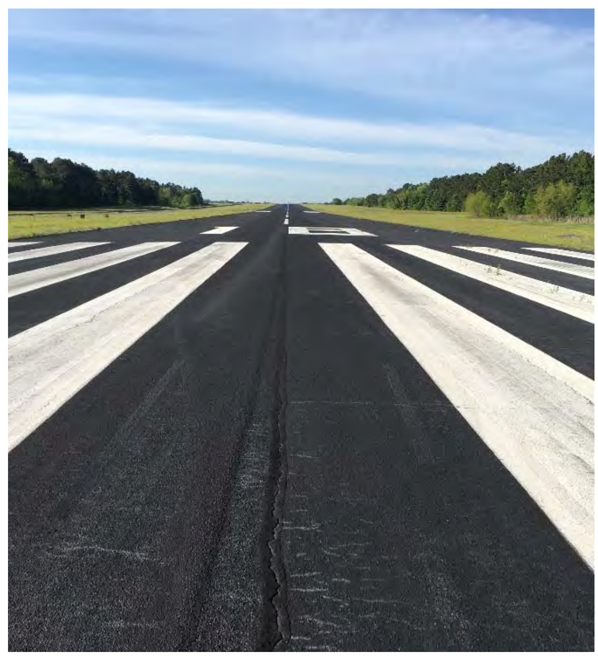


NOT TO SCALE	**HUNTSVILLE MUNICIPAL AIRPORT (UTS)** City of Hunstville, Texas	City of Huntsville
	Exhibit 1.1 **Location & Vicinity Maps**	LOCHNER 12001 N Central Expressway | Suite 1050 | Dallas, TX 75243 214.373.7873 | www.hwlochner.com

AIRFIELD FACILITIES

Airfield facilities include runways, taxiways, airfield lighting, weather reporting system, navigational aids (NAVAIDs), visual approach aids, and instrument approach procedures. UTS operates with a single runway system (Runway 18-36), oriented in a north/south direction. **Exhibit 1.2** illustrates the airfield facilities and layout of UTS.





Runway 18-36

The primary runway, Runway 18-36, is 5,005 feet long by 100 feet wide. The runway is constructed in smooth asphalt and is currently classified by the Texas Department of Transportation, Aviation Division (TxDOT) and Federal Aviation Administration (FAA) as being in good condition. The weight-bearing capacity for single-wheel gear (SWG) aircraft is 27,000 pounds without a published weight-bearing capacity for dual-wheel gear (DWG) aircraft. The runway is equipped with Medium Intensity Runway Lights (MIRL), a four-light Precision Approach Path Indicator (PAPI) light on the left side of each runway end, and Runway End Identifier Lights (REIL) at each runway end. Runway markings are non-precision and considered to be in good condition. Runway 18-36 accommodates a straight-in RNAV (also known as GPS) and a non-directional beacon (NDB) approach to Runway 18, and a VHF-omnidirectional range and distance measuring equipment (VOR/DME) to the airfield. **Table 1.1** provides a summary of specifications for Runway 18-36.

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HUNTSVILLE MUNICIPAL AIRPORT (UTS)
City of Huntsville, Texas

Exhibit 1.2
Airfield Facilities and Airport Layout

City of Huntsville

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TABLE 1.1
RUNWAY SUMMARY

RUNWAY 18-36	
Dimensions	5,005' x 100'
Pavement Type	Asphalt
Pavement Condition	Fair
Pavement Strength	27,000 (SWG)
Marking	Non-precision
Lighting	Medium Intensity Runway Lights
Runway End Elevation	Runway 18 – 299.4' MSL Runway 36 – 362.3' MSL
Gradient	RW 18 – 1.3% up RW 36 – 1.3% down
Note: SWG – Single Wheel Gear (landing gear configuration); MSL – Mean Sea Level	

Source: Lochner Site Visit; FAA AVNIS Database; FAA Form 5010 Report.

Taxiways

Taxiway A is the full-length parallel taxiway with a 200-foot offset to the east of Runway 18-36, when measured from runway centerline to taxiway centerline. Four connectors serve Runway 18-36 and Taxiway A. The two northern connectors, identified in this report as part of Taxiway A and B, provide access to the runway. The southernmost connector, also identified as Taxiway A in this report, provides access to the Runway 36 end, as well as connection to the parallel taxilane to the south hangar area. The fourth taxiway connector (identified as Taxiway C), located approximately 1,520 feet north of the Runway 36 end, provides through access from Runway 18-36 to the terminal and aircraft apron area. All taxiways are 40 feet in width and constructed in asphalt. All taxiways are currently marked and equipped with Medium Intensity Taxiway Lights (MITL), centerline reflectors, and basic airfield signage.

Taxiway A is currently being redesigned and relocated to a centerline-to-centerline offset distance from Runway 18-36 to the FAA standard of 240 feet. Additionally, the current design for the taxiway system is relocating both connecting taxiways, Taxiway B and C. Taxiway B is proposed to move approximately 300 feet north. Taxiway C is relocating an estimated 400 feet south, eliminating the direct connection from the terminal parking apron to Runway 18-36. Under the redesign project, the widths of Taxiway A and associated connectors will be reduced to a width of 35 feet to meet design standards.

Table 1.2 provides a summary description of the taxiway system providing navigation around the airport.

TABLE 1.2
TAXIWAY SYSTEM SUMMARY

TAXIWAY	A	B	C
Type	Full-Parallel and North / South End Connectors	Southern Connector	Northern Connector
Width	40’	40’	40’
Condition	Fair	Fair	Fair
Offset Distance	200’ (E) 240’ (Planned)	N/A	N/A
Lighting	MITL	MITL	MITL
Signage	Yes	Yes	Yes
Note: MITL – Medium Intensity Taxiway Lights			

Source: Lochner Site Visit.

Lighting

Runway 18-36 is equipped with pilot-activated LED MIRL operational sunset to sunrise, as well as REIL. Both sets of REIL are owned by the City of Huntsville. Taxiway A and associated connectors are equipped with MITL and centerline reflectors along their entire length.

Visual Approach Aids

Visual approach aids assist aircraft on final approach by providing vertical situational awareness in relation to the runway threshold. Runway 18-36 is equipped with a PAPI-4L situated on the left side of each runway end.

Each runway end, outboard of the threshold lights, is equipped with light emitting diodes (LED) REIL.

An additional aid to navigation is the airport beacon. The beacon is a visual navigation aid displaying white and green flashes to indicate a lighted airport or white flashes only for an unlighted airport. The airport's beacon is located behind the terminal building. Since Runway 18-36 has lighting, the beacon illuminates a green and white flash and is in good condition.

Additionally, the airport has a wind cone/segmented circle located approximately 1,500 feet north of Runway 36, 280 west of the runway. While the wind cone is a free rotating truncated cone to indicate wind direction and wind force, the segmented circle aids pilots in locating an airport and specifying visual traffic pattern flight direction. This equipment is in good condition.

Weather Reporting System

UTS is served by an Automated Surface Observation System (ASOS), owned by the FAA, on frequency 119.425 or can be called from a telephone at (936) 291-7997. An ASOS is a suite of sensors used to measure, collect, and disseminate weather data to assist aircrews

and flight dispatchers monitor weather conditions and plan flight routes for navigation to or from UTS. The ASOS facility is currently located approximately 275 feet east of Runway 18-36 and 1,600 feet north of the Runway 36 end. Coordination for relocation is being conducted during the Taxiway A design project.

TERMINAL AREA FACILITIES

The existing landside development area at the UTS consists of a general linear layout, running parallel with Runway 18-36, along the east side of the airfield. These various facilities include the terminal building, FBO/maintenance hangar, aircraft parking aprons with tie-downs, and general aviation aircraft storage hangars. **Exhibit 1.3** illustrates the airport's terminal area facilities and layout.

Terminal Building and Auto Parking

The terminal building is located on the east side of the airfield along the eastern edge of the existing aircraft parking apron. The terminal building measures approximately 3,600 square feet and provides amenities for local and transient users, including a pilots' lounge, waiting area, flight planning facilities, and public restrooms. Additionally, the FBO/Airport Manager's office is housed within the structure.

The terminal auto parking facilities include one area east of the terminal approximately 11,200 square feet in size accommodating 32 parking spaces. All spaces are clearly marked and identifiable.

Hangar Facilities

Table 1.3 identifies UTS's aircraft hangars by size (square footage), type, and capacity. Presently, the total available hangar area is estimated to be nearly 79,000 square feet and includes six nested T-hangar buildings, three clear span/box/executive type hangar buildings, and one maintenance hangar. The City of Huntsville owns nine of the hangars, as well as the terminal building; the hangars are maintained by the FBO, Huntsville Aviation. One box hangar, an executive hangar, is privately-owned by the TDCJ and on a ground lease with the City of Huntsville. These hangars house a total of 54 based aircraft and has an active wait list for additional aircraft storage needs.

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HUNTSVILLE MUNICIPAL AIRPORT (UTS)
City of Huntsville, Texas

Exhibit 1.3
Terminal Area Facilities and Layout

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TABLE 1.3
HANGAR FACILITIES SUMMARY

HANGAR DESIGNATION	BUILDING SIZE	HANGAR TYPE	OWNERSHIP
Buis Hangar	80' x 65'	Clear-span/Box	City of Huntsville
Hangar A	275' x 50'	T-Hangar	City of Huntsville
Hangar B	280' x 60'	T-Hangar	City of Huntsville
Hangar C	275' x 50'	T-Hangar	City of Huntsville
TDCJ Hangar	275' x 35'	T-Hangar	TDCJ
Hangar G	80' x 60'	Clear-span/Box	City of Huntsville
Hangar T	40' x 40'	Clear-span/Box	City of Huntsville
Hangar E	70' x 50'	Maintenance	City of Huntsville
Hangar Q	65' x 40'	T-Hangar	City of Huntsville
Hangar G	230' x 30'	T-Hangar	City of Huntsville
Note: Hangar dimensions are estimated figures based on on-site inspection and are rounded to the nearest hundred for planning purposes.			

Source: Lochner; UTS Site Visit.

Aircraft Apron

The aircraft apron is comprised of approximately 125,000 square feet of maneuvering space and aircraft parking accommodating approximately 22 tie-down spaces. The northern portion of the aircraft apron is comprised of concrete, while the southern portion is constructed of asphalt.

Fuel Farm

Fuel is provided by the FBO from various size and type storage tanks. Three 12,000-gallon underground storage tanks, currently registered with the Texas Commission on Environmental Quality, provide 100LL and Jet-A options. Additionally, there is a 24-hour self-fuel pump/meter located on the northeast side of the apron.

Mobile fuel dispensing is also available via a 2,000-gallon AVGAS and two 2,000-gallon Jet-A trucks. When not in use, these vehicles are stored on the concrete pavement on the west side of Hangar Q. **Table 1.4** shows the fuel sales records for the past five years. The airport has averaged annual fuel sales of 138,556 gallons over the last five years. Fuel sales fluctuated with an average annual increase of 0.6 percent over the last five years.

TABLE 1.4
FUEL FARM FACILITIES SUMMARY

YEAR	AVGAS (GALLONS)	JET-A (GALLONS)	TOTAL (GALLONS)
2017	36,939	103,050	139,989
2016	34,033	103,050	137,083
2015	31,438	105,818	137,256
2014	20,035	121,489	141,524
2013	23,727	113,202	136,929

Source: Huntsville Aviation (FBO)

LOCAL AIRPORTS AND AIRSPACE SYSTEM

As with all airports, UTS functions with the local, regional, and national system of airports and airspace. The following narrative provides a brief description of the airport's role as an element within these systems.

LOCAL AIRPORTS

Exhibit 1.4 illustrates the NPIAS service area for comparably-sized airports in the vicinity of UTS, while **Exhibit 1.5** depicts the airspace of neighboring airports. **Table 1.5** lists local airports including information regarding each facility's runway characteristics, based aircraft and operations, as well as distance and direction from UTS. Currently, there are two airports within UTS's 25 NM service area and three other airports within a 50 NM radius of the field. Of these airports within a 50 NM radius, UTS offers the second-longest runway and is well situated to accommodate small- to medium-type turbine category aircraft.

TABLE 1.5
LOCAL AIRPORTS SUMMARY

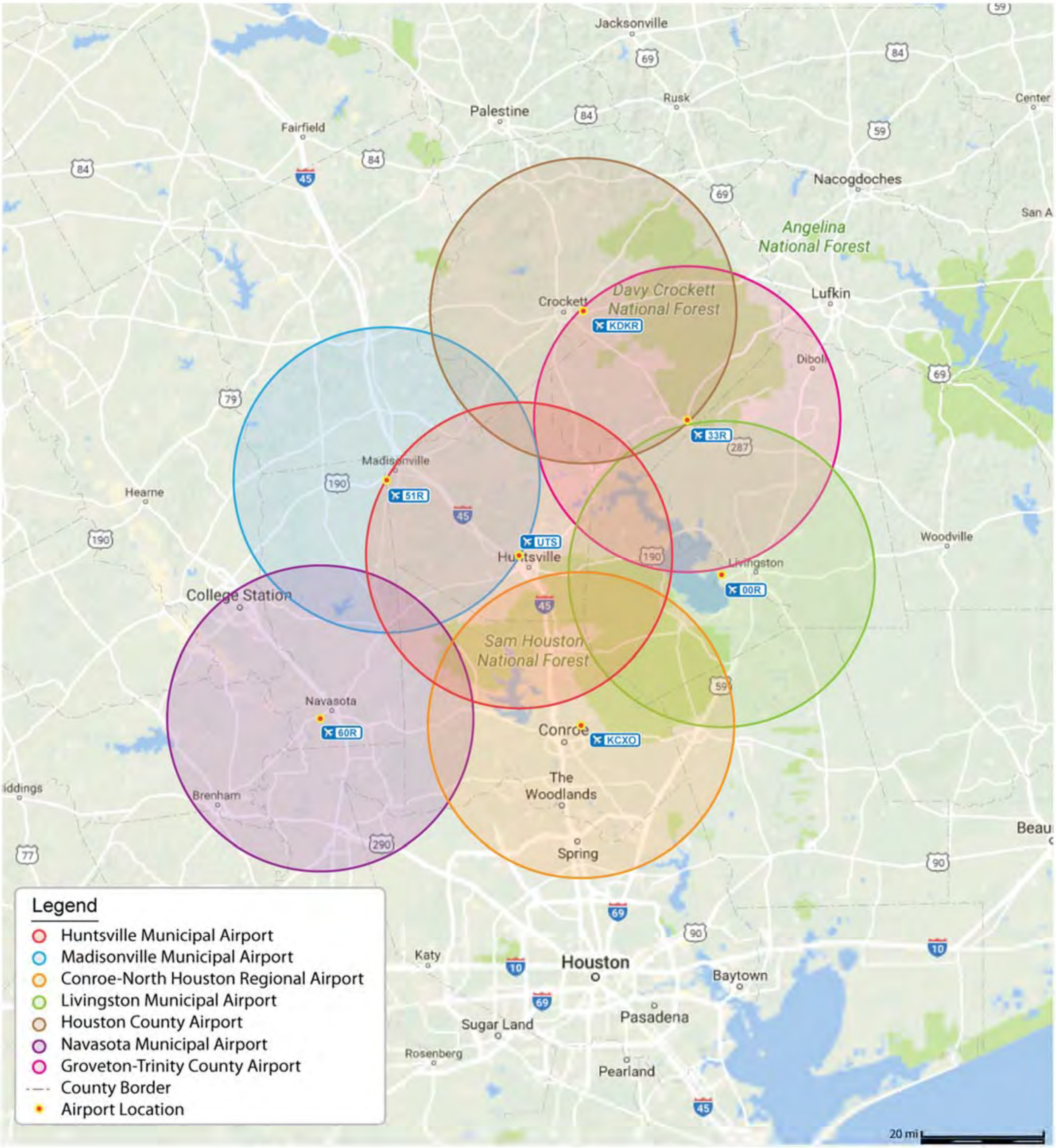
AIRPORT NAME	PRIMARY R/W CHARACTERISTICS	BASED AIRCRAFT	ANNUAL OPERATIONS	DISTANCE TO UTS
Madisonville Municipal (51R)	18-36 / 3,202' x 50'	3	400	21 nm NW
Conroe-North Houston Regional (CXO)	14-32 / 7,501' x 150' 1-19 / 5,000' x 100'	279	63,269	25 nm S
Livingston Municipal (00R)	12-30 / 3,704' x 60'	24	9,200	30 nm E
Houston County (DKR)	2-20 / 4,000' x 75'	0	8,800	35 nm N
Navasota Municipal (60R)	17-35 / 5,003' x 75'	27	12,800	35 nm SW
Groveton – Trinity County (33R)	16-34 / 3,500' x 60'	6	2,400	30 nm NE

Source: NOAA/FAA Houston Aeronautical Sectional Chart; Airnav.com

AIR TRAFFIC SERVICE AREAS

Within the continental United States, there are 21 geographic areas that are under Air Traffic Control (ATC), or en-route jurisdiction, and are referred to as Air Route Traffic Control Centers (ARTCC). As defined by the FAA, "these facilities have been established to provide air traffic control service to aircraft operating on instrument flight rules (IFR) flight plans within controlled airspace, principally during the en-route phase of flight. When equipment and capabilities and controller workload permit, certain advisory/assistance services may be provided to visual flight rules (VFR) aircraft." The airspace overlying Huntsville Regional is contained within the Houston ARTCC jurisdiction, which has a coverage area of airspace in southern Texas, Louisiana, southern Mississippi, southwestern Alabama, and areas in the Gulf of Mexico.

Huntsville Regional can be found on the Houston sectional aeronautical chart. Aviation communication facilities associated with the airport include an Aeronautical Advisory Station (UNICOM) and Common Traffic Advisory Frequency (CTAF) on frequency 122.8 (VHF), Montgomery County Flight Service Station (FSS) on frequency 122.2 (VHF), and the Houston Center Approach and Departure Control on frequency 134.8 (VHF) and 269.6 (UHF).



NOT TO SCALE

HUNTSVILLE MUNICIPAL AIRPORT (UTS)
City of Huntsville, Texas

Exhibit 1.4
NPIAS Service Area Exhibit

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AIRSPACE CLASSIFICATIONS

The local airspace surrounding Huntsville Regional is designated as Class E airspace which is tailored to individual airports. Class E airspace extends upward from either the surface or a designated altitude. At UTS, it extends upwards from the surface out to five NM from the airport. Between five and ten NM from the facility, it extends upwards from 700 feet to the overlying or adjacent controlled airspace (Class G). Class E airspace is also the airspace used by aircraft transitioning to and from the terminal or en-route environment normally beginning at 14,500 feet to 18,000 feet. Class E airspace ensures IFR aircraft remain in controlled airspace when approaching airports without Class D airspace or when flying on Victor Airways (Federal airways that are below 18,000 feet). Class E airspace exists everywhere from 1,200 feet above mean sea level (AMSL) up to 18,000 feet AMSL. Aircrew are not required to be in contact with air traffic control (ATCT) services; but, are recommended to follow traffic advisory practices while maintaining an aircraft speed of 250 knots or less when operating below 10,000 feet MSL. **Exhibit 1.5** depicts the Class E airspace in the UTS vicinity.

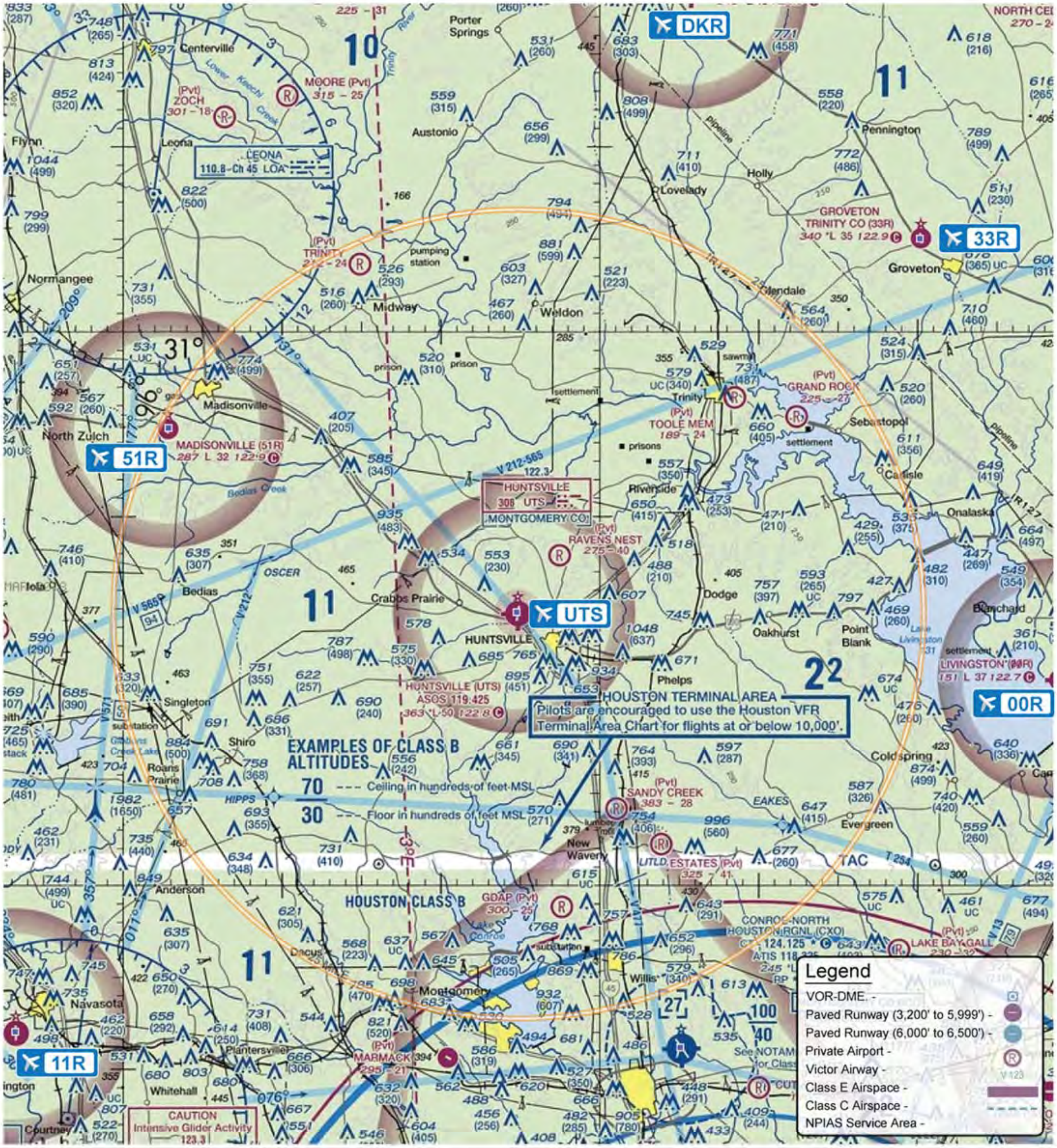
NAVAIDS/COMMUNICATIONS

A variety of navigational facilities are currently available to pilots in and around UTS, whether located at the field or at other locations in the region. The navigational aids available for use by pilots in the vicinity of the airport include VORTAC, VOR/DME, and NDB facilities.

A VORTAC (Very High Frequency (VHF) Omnidirectional Range with Tactical Air Navigation) is a ground-based electronic navigation aid transmitting very high frequency signals 360 degrees in azimuth oriented from magnetic north. This equipment is used to measure, in nautical miles, the slant range distance of an aircraft from the navigational aid. The VORTAC broadcast range is typically 200 nautical miles and is restricted by line-of-sight and provides VOR azimuth, TACAN azimuth, and TACAN distance-measuring equipment at one site. Currently, the VORTAC nearest UTS is the LEONA VORTAC (LOA, 110.80), located 29.9 nm northwest of the field.

A VOR/DME system is a VHF Omnidirectional Range Station with Distance Measuring Equipment (DME) transmitting very high frequency signals, 360 degrees in azimuth oriented from magnetic north. The DME is used to measure, in nautical miles, the slant range distance of an aircraft from the navigational aid. The Navasota VOR/DME (TNV, 115.90) is located 36.7 nm southwest of UTS.

A non-directional beacon (NDB) is a low to medium frequency radio beacon transmitting non-directional signals whereby the pilot of an aircraft equipped with direction-finding equipment can determine bearings and “home” in on the station. NDBs are considered to be non-precision navigational aids; thus, approach minimums are typically higher than other types of non-precision approaches. Due to the advent of GPS navigation capabilities, the FAA has been decommissioning NDB equipment when equipment is in need of repair or service is required. The timeline for complete decommissioning of NDBs is undetermined. UTS operates a NDB (frequency 308) on the southwest part of the airfield.



NOT TO SCALE

HUNTSVILLE MUNICIPAL AIRPORT (UTS)
City of Huntsville, Texas

Exhibit 1.5
Airspace/NAVAIDs Summary

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There is also a network of low-altitude published Federal airways (i.e. Victor Airways) in the vicinity of UTS which traverse the area and span between the regional ground-based VOR/DME and VORTAC equipment. Victor Airways include the airspace within parallel lines located four nautical miles on either side of the airway and extend 1,200 feet above the terrain to, but not including, 18,000 feet AMSL. When an aircraft is flying on a Federal airway below 18,000 feet AMSL, the aircraft is operating in Class E airspace. There are several airways with various radial degrees operating from the LEONA VORTAC or NAVASOTA VOR/DME. **Exhibit 1.5** depicts the airspace in the vicinity of the airport.

There are also several existing visual navigational aids located on the airport and available to pilots including a rotating beacon and segmented circle with a lighted wind cone. Additionally, both ends for Runway 18-36 are equipped with a PAPI-4L system.

Another en-route and more prevalent terminal area NAVAID is GPS. GPS is a highly accurate worldwide satellite navigational system that is unaffected by weather and provides point-to-point navigation by encoding transmissions from multiple satellites and ground-based datalink stations using an airborne receiver. GPS currently supports the published straight-in RNAV (GPS) instrument approach procedures to each runway end at the airport.

INSTRUMENT FLIGHT PROCEDURES (IFP)

Table 1.6 discloses information regarding the published IFPs in use at UTS. IFPs permit operations during instrument meteorological conditions (IMC) with low visibilities and further increase access, capacity, and overall safety of the airport.

TABLE 1.6
PUBLISHED IFPS

RUNWAY END	APPROACH TYPE	CEILING MINIMUM (AGL)	VISIBILITY MINIMUMS
18	RNAV/GPS	250’	1 mile
18	NDB	622’	1 mile – CAT A and B 1.75 mile – CAT C
18-36	VOR/DME-A	637’	1 mile – CAT A 1.25 mile – CAT B 1.75 mile – CAT C

Source: U.S. Terminal Procedures – South Central (SC-5, published 26 April 2018)

SPECIAL USE AIRSPACE

ATC designates certain areas of airspace as special-use airspace, which is designed to segregate flight activity related to military and national security needs from other airspace users. There are currently six classifications of special-use airspace – prohibited areas, restricted areas, military operations areas (MOA), alert areas, warning areas, and controlled firing areas. None of these special-use areas impact UTS operations.

AIRPORT ENVIRONS

This section will address and examine the UTS regional setting and land uses. This task is critical to the future development of the airport given that planning decisions will most likely extend beyond the airport's physical property boundary, while local land use patterns will ultimately affect the potential for expansion and capital improvements.

COUNTY/CITY/AIRPORT GEOGRAPHY

The County Seat for Walker County, Huntsville was founded in 1836, named after its founding father's hometown in Huntsville, Alabama. The most recent US Census data (2010) shows Huntsville with a population of 38,548 and Walker County with a population of 67,861. Huntsville encompasses approximately 36 square miles, while Walker County encompasses 802 square miles of coverage area. UTS, situated on 180 acres of fee simple property, is located approximately three miles northwest of the Huntsville Central Business District (CBD).

AREA EXISTING ZONING/LAND USE

While the City of Huntsville does have police powers and local land use controls in the form of zoning and comprehensive planning, Walker County has a limited role in providing these limitations, which is not uncommon for a majority of counties nationwide. It is more difficult to implement restrictions within a county than that of a city due to the lack of population density, as well as the overall general use of land, which typically lies within the agricultural category.

Currently, the airport is situated in area free of incompatible land use and resides within the northwestern portion of the Huntsville city limits, and is classified within the "Management" district of zoning categories. UTS is surrounded by low-density residential land to the north and northeast, a prison to the east, Kate Barr Ross Park to the southeast, State Highway 75 and Interstate 45 to the south (along with numerous commercial businesses), and a recycling facility and city-owned forestland to the west. Other land uses associated with Section 4(f) and/or institutional properties (i.e., schools, churches, and medical care facilities) were not noted and/or not readily apparent.

LAND USES AFFECTING EXPANSION

Based on this evaluation, future airport expansion could potentially be affected by adjacent land uses. UTS is bound to the south by Interstate 45, which is currently in the design phase for a roadway improvement project. Due to the location of the interstate, expansion of the airport property to the south is not feasible. Additionally, a rural residential neighborhood is situated approximately 0.50-mile north of Runway 18-36, which may impact a northerly runway extension. An unnamed intermittent tributary to Hadley Creek runs approximately 700 feet north of Runway 18-36, and continues to run along the east side of airport property, approximately 500 feet east of runway centerline. Development east of the existing taxiway would require a significant amount of fill within the streambed of the creek, as well is in the adjacent areas. Furthermore, the land outside of the existing runway safety areas is comprised of mature loblolly pines; future development projects would likely entail clearing of trees within a heavily-wooded area. Prior to future development, further investigation would need to be conducted to ensure any area is clear from environmental conflicts and not pose a challenge before any type of construction could begin.

ENVIRONMENTAL SETTING

FAA Order 5050.4B, *National Environmental Policy Act (NEPA) Implementation Instructions for Airport Actions*, requires the evaluation of airport development projects as they relate to specific environmental impact categories by outlining types of impacts and the thresholds of which the impacts are considered significant. For some impact categories, this determination can be made through calculations, measurements, or observations. However, other impact categories require that the determination be established through correspondence with appropriate federal, state, and/or local agencies. A complete evaluation of the impact categories identified in FAA Order 5050.4B is required during an environmental assessment or environmental impact statement.

This section provides an overview of each category as it applies to the environs surrounding UTS. It includes a brief description of each category and the potential effect that the implementation of future airport projects may have on the resources identified in the environmental category. Future development plans at UTS should take into careful consideration those environmental issues that are known to exist in the airport vicinity. Early identification of these environmental factors may help to avoid impeding development plans in the future.

Air Quality: UTS is located in Walker County, Texas, which is not currently listed as being in a nonattainment area for criteria pollutants under the Clean Air Act. The operational levels at UTS are well below the minimum operations of having 1.3 million enplanements per year or more than 180,000 general aviation and air taxi annual operations needed to initiate an air quality analysis.

Biological Resources: The US Fish and Wildlife Service lists the following species as being threatened, endangered, or candidate species for listing in Walker County:

- Least tern (*Sterna antillarum*): Endangered. No critical habitat has been designated for this species; however, it nests on barren to sparsely vegetated sandbars along rivers, sand and gravel pits, lake and reservoir shorelines, and occasionally gravel rooftops.
- Piping plover (*Charadrius melodus*): Threatened. Final critical habitat has been designated for this species; however, UTS is located outside of the critical habitat. The piping plover nests and feeds along coastal sand and gravel beaches in North America.
- Red knot (*Calidris canutus rufa*): Threatened. No critical habitat has been designated for this species. The red knot breeds in drier tundra areas, such as sparsely vegetated hillsides. Outside of breeding season, it is found primarily in intertidal, marine habitats, especially near coastal inlets, estuaries, and bays.
- Red-cockaded woodpecker (*Picoides borealis*): Endangered. No critical habitat has been established for this species. The red-cockaded woodpecker prefers open pine woodlands. Ideal habitat is mature pine woods (trees 80-100 or more

years old), with very open understory maintained by frequent fires (the pines are fire-resistant).

Additionally, the Texas Parks and Wildlife Department (TPWD) lists 36 species in Walker County that are state-listed threatened, endangered, or in need of conservation. Future development projects at UTS will require analysis of potential impacts on both federally- and state-listed threatened and endangered species.

Climate: Typical operations at UTS are not known to significantly increase greenhouse gases in the region. No further analysis regarding climate change is currently recommended.

Coastal Resources: As UTS is located inland, coastal resources are not required to be analyzed.

Department of Transportation Act, Section 4(f): The intent of the Section 4(f) statute and the policy of the FAA is to avoid the use of significant public parks, recreation areas, wildlife and waterfowl refuges, and historic sites as part of a project, unless there is no feasible and prudent alternative to the use of such land.

No Section 4(f) lands are located on existing airport property. However, Kate Barr Ross Park is located southeast and adjacent to UTS. Impacts to this park's property would require a Section 4(f) analysis.

Compatible Land Use: The City of Huntsville has signed a Land Use Assurance Letter to preserve and protect the airport from incompatible land use.

Construction Impacts: As UTS is a federally-obligated airport, construction activities are required to comply with State and Federal environmental guidelines. Proper best management practices (BMPs) will be prepared specifically for the project prior to construction, and future projects will comply with guidelines set forth in FAA AC 150/5370-10G, *Standards for Specifying the Construction of Airports*.

Farmlands: The Natural Resource Conservation Service (NRCS) Web Soil Survey was utilized to identify soil types and farming potential of land in the UTS vicinity. Soils on airport property and vicinity are comprised predominantly of Falba fine sandy loam, Ferris clay, and Leson clay. These soils are listed by the NRCS as being prime farmland, with Falba fine sandy loam being farmland of statewide importance.

Hazardous Materials, Solid Waste, and Pollution Prevention: Environmental regulatory databases are an important tool in determining whether airport improvement projects would contribute to hazardous materials production or storage, or whether hazardous waste could potentially impact the construction of the alternatives.

The EPA Enviromapper tool is a single point of access to environmental data that is directly regulated by the EPA. The tool provides access to several EPA databases that provide information about environmental activities that may affect air, water, and land.

The EPA Enviromapper lists the City of Huntsville Sanitary Landfill as being located approximately 0.50-mile west of the airport. No other listings of environmental interest within a 0.50-mile radius of UTS are provided by EPA Enviromapper.

Historical, Architectural, Archeological, and Cultural Resources: The Texas Historical Commission (THC) lists 11 sites in Walker County as being listed on the National Register of Historic Places (NRHP), or as a state antiquities landmark. None of the sites are located in the UTS vicinity.

Land Use: Although future major development projects at UTS may require land acquisition from properties adjoining the airport, the land acquisition would not likely adversely impact land uses surrounding the airport. Development projects' impacts on adjoining land use would be evaluated on a case-by-case basis.

Light Emissions and Visual Impacts: Lighting required for future development projects would be designed to be consistent with the current visual aesthetics of UTS.

Natural Resources and Energy Supply: Reasonably foreseeable projects at UTS are not anticipated to significantly alter energy supply or requirements or disproportionately consume natural resources. As ground and airport activity increases, it is anticipated that consumption of automobile gasoline and aviation fuel may also increase, but this will not significantly impact regional energy supplies.

Noise and Compatible Land Use: According to FAA Order 1050.1F, noise analysis is required on a per-project basis for airports whose forecast operations exceed 90,000 annual propeller operations or 700 annual jet operations. Operations at UTS are not projected to exceed this threshold; therefore, a noise assessment would not likely be required.

Secondary (Induced) Impacts: Major development projects often involve the potential for induced or secondary impacts on the surrounding community. This could mean that development at the airport could lead to social impacts, impacts on surface transportation, change in demand for public transportation, or employment impacts. Small-scale positive impacts such as economic development and transportation improvements would likely result from each of the development alternatives. However, positive or negative induced impacts caused by the proposed development alternatives are not likely to significantly vary from impacts that are currently induced by airport operations.

Socioeconomics, Environmental Justice, and Children's Environmental Health and Safety Risks: Socioeconomic analysis evaluates how elements of the human environment such as population, employment, housing, and public services might be affected. Environmental justice is the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies.

Negative impacts such as effects to employment, public housing, or other public services would not be incurred as part of the development alternatives.

According to the 2010 US Census, the median household income in Huntsville was $26,864. UTS is located in Census Tract 7904 of Walker County, which had a median household income of $50,000 in 2010. Additionally, the 2010 US Census indicated that approximately 31.8% of the population of Huntsville was comprised of Black, American Indian, Asian, Pacific Islander, or mixed races. The 2010 US Census indicated that approximately 26.9% of the population of Census Tract 7904 was comprised of Black, American Indian, Asian, Pacific Islander, or mixed races. Based on this information, the area in which UTS is located is comprised of a population with a higher median household income, as well as lower proportion of minorities.

Water Resources: UTS is located in an area bounded by Hadley Creek and its associated tributaries, which delineate the northern, eastern, and western portions of the airport. Jurisdictional wetlands are not known to be present on the existing airport property.

UTS is located in an area depicted on Federal Emergency Management Agency (FEMA) Panel Numbers 48471C0240D and 48471C0355D, effective August 2011. Hadley Creek and its tributaries are denoted as being located in Zone A, which are areas with special flood hazards for which base flood elevations have not been established. Any development within these areas would require coordination with the Walker County floodplain administrator, as well as potential amendment of the FEMA maps.

SOLID WASTE RECYCLING

Per the guidance set forth in the September 2014 Policy Memorandum Guidance on *Airport Recycling, Reuse, and Waste Reduction Plans*, a plan for recycling and minimizing the generation of airport solid waste will be developed for the airport, consistent with Section 133 of the FAA Modernization and Reform Act of 2012.

Due to its size, UTS currently produces significantly less solid waste per year than its larger airport counterparts. Solid waste at UTS is presently generated at the terminal building, as well as solid waste generated in each of the hangars located on airport property. Waste is currently disposed of on a weekly basis, in accordance with Walker County requirements. Waste disposed at this location includes household solid waste as well as grass clippings generated during the growing season. The City does not currently offer pick-up recycling services to UTS. The nearest recycling center is located at 590 I-45, Huntsville, TX 77320, located west adjacent to the airport.

Construction waste is another form of solid waste generated at UTS, although it falls under the responsibility of the contractor for each specific project. The most feasible and prudent method for reducing solid waste generated at airport is to recycle materials that would ordinarily be hauled offsite as waste. For example, concrete and asphalt pavement recycling allows the ability to reuse the rubble while also significantly reducing overall construction costs.

Because relatively little waste is produced at UTS, opportunities are limited to reduce solid waste generation. However, UTS should still have a goal to reduce the amount of solid waste generated. This goal could be achieved by providing additional recycling options at the pilot's lounge (glass, paper, etc.). Furthermore, although the airport is not responsible for waste generated by hangar tenants, informational brochures on recycling opportunities could be distributed to all of the hangar tenants to encourage them to recycle their waste. To track the amount of waste generated after implementing new policies, the City could make a note of the amount of waste generated each time waste is removed from the terminal building. A solid waste and recycling program should be included in the airport's minimum standards and lease agreements to ensure compliance with FAA airport grant assurances.

GENERAL AVIATION ACTIVITY

The FAA recognizes three broad categories of aviation which include general aviation (GA), certificated air carrier, and military. GA is defined as all aviation activity except that of air carriers and military aircraft. A tabulation of UTS's historical aviation activity from 2007 to 2017, as provided by the FAA and UTS's Form 5010, Airport Master Record, is presented in **Table 1.7.** This table presents a summary of airport activity including the total annual operations including local versus itinerant operations, as well as number of aircraft based at the facility throughout the last 10-year period.

TABLE 1.7
OPERATIONAL ACTIVITY SUMMARY

YEAR	BASED AIRCRAFT	LOCAL OPERATIONS	ITINERANT OPERATIONS	TOTAL OPERATIONS
2017	54	18,900	6,300	29,613
2016	67	18,900	6,300	29,613
2015	67	18,900	6,300	29,613
2014	64	11,313	10,087	21,400
2013	64	11,313	10,087	21,400
2012	48	11,313	10,087	21,400
2011	46	11,313	10,087	21,400
2010	34	6,793	6,057	12,850
2009	34	6,793	6,057	12,850
2008	34	6,793	6,057	12,850
2007	34	6,793	6,057	12,850

Source: FAA Terminal Area Forecasts; Lochner Interpolation; FAA 5010 Airport Master Record; [1] Airport personnel

The FAA's Terminal Area Forecasts (TAF) and 5010 Form for 2017 indicate a total of 79 based aircraft and 29,613 annual operations were experienced at the airport. However, after discussions with airport and city personnel, the operational estimate was somewhat excessive and could not be established or confirmed. Huntsville Aviation indicated that, for 2017, 54 aircraft were based at UTS, but that the operations reported in the APO Terminal Area Forecast were consistent with airport records.

BASED AIRCRAFT

The based aircraft activity has more than doubled within the past 10 years at UTS, with current based aircraft being 54. The based aircraft fleet mix over the past 10 years has consisted primarily of single- and twin-engine piston airplane traffic. One jet is based at UTS.

ANNUAL OPERATIONS

Since 2007, UTS's annual operational total has increased from 12,850 to 29,613 operations in 2017. Local general aviation operations (aircraft operating in the local traffic pattern or flights conducted within a 20-nautical mile radius of the airport) account for approximately 60 percent of this total, while 20 percent are said to be attributed to itinerant operations. Approximately 15 percent of operations at UTS are conducted by military aircraft.

AIR CHARTER OPERATIONS

Air charter operations, also known as air taxi, are governed by FAR Part 135 while private individuals operating their own turbine airplane can operate under FAR Part 91. Corporate flight departments, as well as fractional aircraft ownership operators, typically operate under FAR Part 91K. Turbine operations for UTS were provided by the FAA's Traffic Flow Management System Counts (TFMSC) (http://aspm.faa.gov) program for the previous calendar year of aircraft traveling to and from the airport on an instrument flight rule (IFR) flight plan. The data indicated that UTS experienced approximately 1,336 civil aircraft operations by IFR aircraft during the one-year reporting period. Turboprop and jet aircraft exclusively operate on IFR flight plans because flights above 18,000 feet MSL (Flight Level [FL] 180), as is customary for these aircraft, require an IFR clearance.

Of the 1,336 documented IFR operations for 2017, 457 were conducted by small- and medium-sized business jets. However, this figure is assumed to be approximately half of the actual jet activity taking place at the facility. The reason for this is that IFR clearances cancelled on approach and/or picked up while enroute after departure are not included in the FAA IFR activity data. Therefore, these departures are not documented as IFR operations and thus, not included in the TFMSC operational data. Regarding aircraft arrivals, aircraft flying with an IFR flight plan will routinely cancel the IFR clearance on arrival unless low visibility conditions dictate completing an instrument approach in actual IFR conditions. Accordingly, the airport's current estimated operational activity is 900 annual jet operations.

EXISTING CRITICAL AIRCRAFT

FAA Advisory Circular (AC) 150/5000-XX, Critical Aircraft and Regular Use Determination was referenced to determine UTS's critical aircraft. The critical aircraft is defined as the most demanding aircraft type, or grouping of aircraft with similar characteristics, that make regular use of the airport (e.g., 500 annual operations, excluding touch-and-go operations). **Table 1.8** below provides information regarding the critical aircraft for UTS.

Based on operational data provided by the TFMSC, the existing critical aircraft is a group of aircraft which share similar operational and/or physical characteristics within Airplane Design Group II. The aircraft which best represents this diverse fleet mix of aircraft is the Cessna Citation II 'Bravo' (550 series). The Citation II Bravo is capable of operating from a 5,500-foot runway during extreme (hot) weather conditions while carrying nearly a full-compliment of payload including passengers, baggage, and fuel.

In addition to the based jet aircraft, regular business jet users of UTS include the full line of Cessna Citations jets (CJ2/CJ3/CJ4/501/525/550/560/680/750 series); Bombardier Challenger 300; Raytheon/Beechjet 400 series; Embraer Phenom 300; and Dassault Falcon 20/50/900 series.

TABLE 1.8
EXISTING CRITICAL AIRCRAFT

CHARACTERISTIC	SPECIFICATIONS AND PERFORMANCE – CESSNA CITATION II BRAVO
Airport Reference Code (ARC)	B-II
Wingspan	52'2"
Length	47'2"
Height	15'0"
Seating (Crew + passengers)	2 plus 7-11
Maximum Takeoff Weight (MTOW)	14,800 lbs.
Maximum Landing Weight (MLW)	13,500 lbs.
Normal Approach Speed	132.8 knots
Takeoff Field Length	3,600'
Landing Distance	3,010'
Maximum Range Performance	1,930 miles

Source: Airport Owners and Pilots Association (AOPA)

SOCIOECONOMIC CONDITION

Population, income data including per capita income (PCI), and median household income (MHI), as well as labor force participation information, has been collected to understand and evaluate current socioeconomic conditions in the region that will assist in formulating assumptions and developing aviation demand projections for UTS.

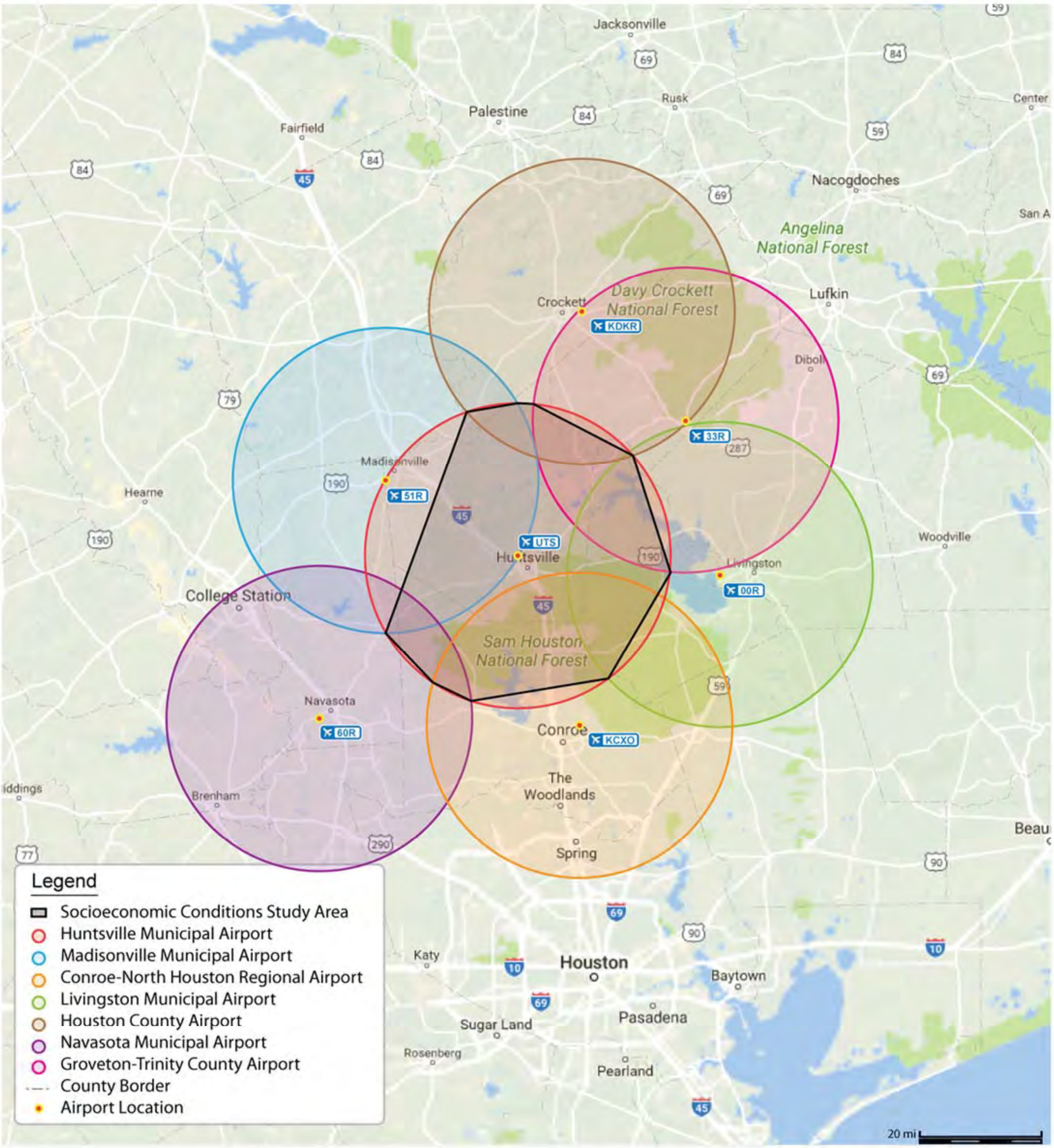
POPULATION

In terms of economic and demographic data, the US Census Bureau can be utilized to find population data and projections for divisions of land called Census Tracts. Census Tracts are small, relatively permanent statistical subdivisions of a county or equivalent entity that are updated by local participants prior to each decennial census as part of the Census Bureau's Participant Statistical Areas Program.

When analyzing population trends for the purpose of airport planning, the catchment areas of other similar-sized airports in the region can be utilized to determine the appropriate study area for socioeconomics. **Exhibit 1.6** shows the NPIAS catchment area of the airports in the vicinity identified in **Table 1.5**. As is evident in **Exhibit 1.6**, the catchment areas of UTS and the surrounding airports overlap in numerous places. For the purpose of the evaluation of socioeconomic data, the catchment areas of UTS and surrounding airports were 'split' to delineate an area of detailed socioeconomic study. This delineation is shaded in gray on **Exhibit 1.6** and includes 13 census tracts. The 13 Census Tracts, as well as Walker County as a whole, will be utilized and considered as the catchment area for future operational and development considerations. **Table 1.9** illustrates the population trends for Walker County and these Census Tracts since 2000.

Over the past 15+ years, Walker County population has steadily increased, exhibiting an average annual growth rate of 0.80 percent.

As indicated in **Table 1.10**, population in the study area is expected to follow the lines of a steadily increasing trend in population.



NOT TO SCALE

HUNTSVILLE MUNICIPAL AIRPORT (UTS)
City of Huntsville, Texas

Exhibit 1.6
Socioeconomic Study Area

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TABLE 1.9
HISTORIC POPULATION SUMMARY

PLACE NAME	2000	2005	2010	2015
Walker County	61,745	64,330	66,353	69,330
Census Tract 6941.01	7,693	9,499	11,249	11,334
Census Tract 6942.01	3,634	5,787	6,786	6,656
Census Tract 6947	2,828	2,995	3,272	3,264
Census Tract 7901.01	7,398	7,380	7,351	6,990
Census Tract 7901.02	3,067	3,205	3,343	3,835
Census Tract 7901.03	5,201	5,370	5,547	5,202
Census Tract 7902	6,580	6,788	6,989	7,261
Census Tract 7903	7,819	8,022	8,378	7,182
Census Tract 7904	7,232	8,783	10,095	12,925
Census Tract 7905	8,879	8,420	7,950	7,656
Census Tract 7906	4,670	4,785	4,901	5,340
Census Tract 7907	5,354	6,279	7,363	7,036
Census Tract 7908	5,563	5,701	5,944	5,903
State of Texas	20,851,820	22,859,968	24,311,891	26,538,614

Source: U.S. Census Bureau

TABLE 1.10
PROJECTED POPULATION SUMMARY

PLACE NAME	2015	2020	2030	2040
Walker County	69,330	72,239	76,209	79,290
Census Tract 6941.01	11,334	11,809	12,399	12,895
Census Tract 6942.01	6,656	6,935	7,282	7,573
Census Tract 6947	3,264	3,400	3,570	3,713
Census Tract 7901.01	6,990	7,269	7,632	7,938
Census Tract 7901.02	3,835	3,988	4,187	4,355
Census Tract 7901.03	5,202	5,410	5,681	5,908
Census Tract 7902	7,261	7,551	7,929	8,246
Census Tract 7903	7,182	7,469	7,842	8,156
Census Tract 7904	12,925	13,442	14,114	14,679
Census Tract 7905	7,656	7,962	8,360	8,695
Census Tract 7906	5,340	5,553	5,831	6,064
Census Tract 7907	7,036	7,317	7,683	7,990
Census Tract 7908	5,903	6,139	6,446	6,704
State of Texas	26,538,614	28,813,282	32,680,217	36,550,595

Source: U.S. Census Bureau; Texas Demographic Center. Reflects estimates.

LABOR FORCE

Table 1.11 illustrates the labor force in terms of unemployment for the study area as of 2016. The average unemployment rate for the region equates to 4.2 percent, which is lower than that for the entire state of Texas at 6.4 percent.

TABLE 1.11
LABOR FORCE SUMMARY, 2016

LOCATION	CIVILIAN LABOR WORKFORCE	EMPLOYED	UNEMPLOYED	UNEMPLOYMENT RATE
Walker County	23,864	22,774	1,090	4.2%
Census Tract 6941.01	5,178	4,948	230	3.8%
Census Tract 6942.01	3,240	3,123	117	3.7%
Census Tract 6947	1,522	1,434	118	5.7%
Census Tract 7901.01	869	842	27	2.5%
Census Tract 7901.02	1,763	1,733	30	1.8%
Census Tract 7901.03	2,336	2,253	83	3.6%
Census Tract 7902	2,594	2,528	66	2.4%
Census Tract 7903	3,190	3,148	42	1.2%
Census Tract 7904	2,478	2,387	91	2.5%
Census Tract 7905	3,391	3,050	341	10.1%
Census Tract 7906	1,286	1,176	110	8.5%
Census Tract 7907	3,265	3,147	118	2.1%
Census Tract 7908	2,693	2,499	194	6.6%
State of Texas	20,599,223	13,307,098	7,292,125	6.4%

Source: US Census Bureau.

PER CAPITA AND MEDIAN HOUSEHOLD INCOME

Per Capita Income (PCI) and Median Household Income (MHI) are widely used indicators for gauging the economic performance of local economies. PCI serves as an indicator of the economic well-being of a community being defined as the total personal income for all people in an area, divided by the total number of people. MHI, on the other hand, includes the income of the householder and all other persons 15 years and older in the household, whether related to the householder or not, and represents the value in the middle when all incomes in a geographical area are arranged highest to lowest. **Table 1.12** illustrates the PCI and MHI for the state, county, and study area since 2000.

TABLE 1.12
PER CAPITA INCOME SUMMARY

GEOGRAPHY	2000	2016	ANNUAL GROWTH RATE
Walker County	$13,920	$16,419	1.11%
Census Tract 6941.01	$17,645	$19,702	0.74%
Census Tract 6942.01	$28,225	$29,923	0.39%
Census Tract 6947	$26,271	$31,666	1.25%
Census Tract 7901.01	$4,982	$7,141	2.43%
Census Tract 7901.02	$17,964	$27,447	2.87%
Census Tract 7901.03	$20,963	$23,318	0.71%
Census Tract 7902	$17,044	$20,327	2.11%
Census Tract 7903	$28,429	$33,247	1.05%
Census Tract 7904	$12,453	$12,804	0.19%
Census Tract 7905	$10,097	$12,281	1.31%
Census Tract 7906	$6,969	$10,047	2.47%
Census Tract 7907	$11,005	$11,443	0.26%
Census Tract 7908	$11,683	$14,705	1.55%
State of Texas	$24,870	$27,828	0.75%

Source: U.S. Census Bureau, American Factfinder.

WIND ANALYSIS

Local wind conditions were analyzed to determine the impacts of all-weather, visual flight rules (VFR) and instrument flight rules (IFR) on the existing runway configuration. Yearly wind observations were obtained from the National Climatic Data Center (NCDC), Integrated Surface Hourly/Integrated Surface Data (ISH/ISD) Wind Inventory, as reported hourly at UTS during the period from 2006 to 2015. Combined, the recorded wind data included 111,094 all-weather, 92,144 VFR and 19,858 IFR observations.

For planning standards, the desirable wind coverage is 95 percent crosswind coverage for the primary runway. This is computed based on the crosswind component not exceeding 10.5 knots small single- and twin-piston airplanes (ARC A-I/B-I), 13.0 knots for large single and twin turbo-prop aircraft (ARC A-II/B-II), and 16.0 knots for primarily business jet aircraft (ARC A-III/B-III and C-I to D-III). By design, a small aircraft (weighing less than 12,500 pounds) is recommended to be able to operate approximately 95 percent of the year without experiencing a crosswind component greater than 10.5 knots.

ALL-WEATHER WINDS

Table 1.13 illustrates the percent of all-weather wind coverage for the 10.5, 13.0 and 16.0 knot wind velocities for each runway individually and combined. RW 18-36 provides 98.9 percent coverage at 10.5 knots for ARC A-I/B-I aircraft; 99.5 percent coverage at 13.0 knots for A-II/B-II aircraft, and 99.9 percent coverage for ARC C-I to D-III aircraft at 16.0 knots.

Based on prevailing conditions and wind coverage provided by RW 18-36, no additional runways are warranted or considered necessary since the required 95 percent is exceeded at all crosswind components. **Exhibit 1.7** illustrates the airport's wind rose depicting the predominant wind directions and velocities occurring at UTS during all-weather conditions.

TABLE 1.13
ALL-WEATHER, VFR, AND IFR WIND COVERAGE

RUNWAY ALIGNMENT	CROSSWIND COMPONENT	% ALL	IFR	VFR
18-36	10.5	98.9%	98.3%	99.1%
18-36	13.0	99.5%	99.1%	99.6%
18-36	16.0	99.9%	99.7%	99.9%

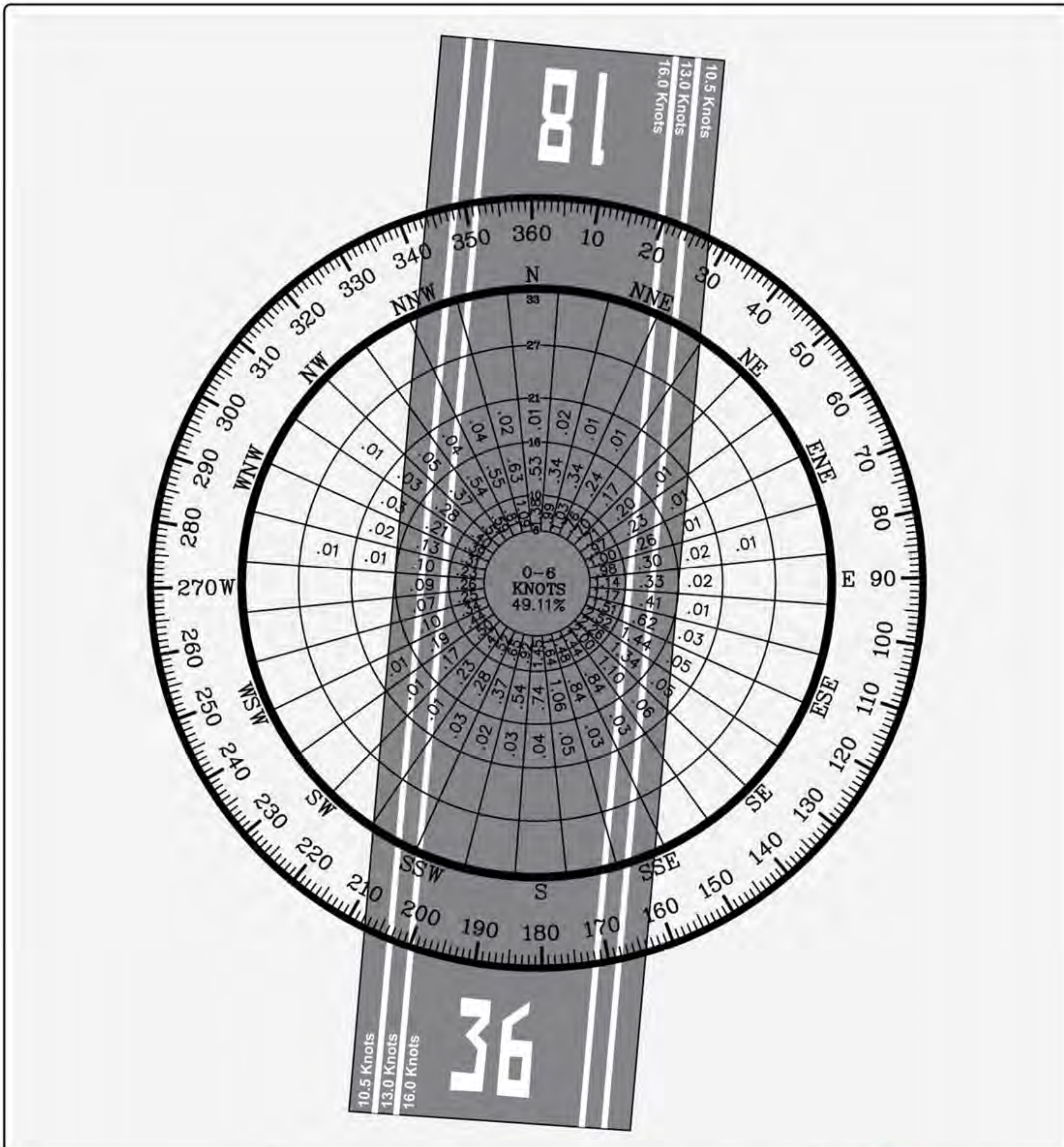
Source: NOAA, Station 722447, Huntsville Municipal Airport. Period of Record 2008-2017. [1] Ceiling less than 1,000', but equal to or greater than 200 feet and/or visibility less than 3 miles, but equal to or greater than ½ mile

VFR WINDS

Table 1.13 illustrates the percent wind coverage during visual meteorological conditions (VMC). Runway 18-36 provides 99.1 and 99.6 percent coverage during VMC for ARC A and B aircraft at 10.5 and 13.0 knots, respectively, and 99.9 percent wind coverage for ARC C-I to D-III aircraft at 16.0 knots.

IFR WINDS

Table 1.13 also illustrates the percent wind coverage during IMC conditions. Runway 18-36 provides 98.3 and 99.1 percent coverage during IMC conditions for the 10.5 and 13.0 knots crosswind components, respectively, and 99.7 percent coverage at 16.0 knots crosswind.



NOT TO SCALE

HUNTSVILLE MUNICIPAL AIRPORT (UTS)
City of Huntsville, Texas

Exhibit 1.7
All-Weather Wind Rose

LOCHNER
12001 N Central Expressway | Suite 1050 | Dallas, TX 75243
214.373.7873 | www.hwlochner.com

AIRPORT ECONOMIC IMPACT

In 2011, TxDOT completed an Economic Impact Study to determine the overall benefit of the Texas system of public-use airports to the statewide economy. The total economic benefit of aviation activity in the state was quantified in terms of employment, payroll and economic activity.

The airports were surveyed to measure the direct benefits associated with on-airport businesses and indirect benefits related to visitor expenditures. Direct benefits include the economic activity associated not only with on-airport businesses but also airport tenants and governmental entities which support general aviation. Indirect benefits generally occur off-airport and can be attributed to visitor expenditures. Secondary benefits consist of the induced impact of the recirculation of direct and indirect benefits resulting from a 'multiplier effect.' The multiplier effect attributed to both direct and indirect economic benefits is calculated to determine the overall economic impact of each airport.

The following discussion highlights each benefit measured for UTS in terms of employment, payroll and total economic output to the local community.

EMPLOYMENT

This component measured the number of people employed as a result of the operation and maintenance of the airport. It also included citizens employed in the aviation industry and those jobs that support aviation activity. UTS is responsible for employing approximately 48 residents.

PAYROLL

The payroll section measured the annual wages and benefits paid to employees whose salaries are directly or indirectly attributed to the airport. The total payroll attributed to the operation of UTS is estimated to be approximately $1.5 million.

TOTAL ECONOMIC IMPACT

The final piece measured the dollar value of all aviation and non-aviation related goods and services that exist within Walker County as a direct result of the airport providing services to its users. The total annual UTS economic benefit is approximately $3.1 million, which is assumed to be the sum of annual gross sales of aviation and non-aviation related activity occurring within the community.

CHAPTER 2: DEMAND FORECASTS

INTRODUCTION

The demand forecast element of the master plan is used as a method to determine the need for future capital development, as well as investment in the facility itself. Essential to this determination is the generation of forecasts and projected increases in airport activity. Demand forecasts provide a means of determining the type, extent, size, location, timing, and financial feasibility of future capital improvements. Consequently, demand forecasts influence the remaining phases of the master plan process.

Forecasting aviation activity requires more than an extrapolation of past trends and the application of statistical measures to correlate future demand with population projections, economic performance, and demographic data. Demand forecasting requires the application of professional judgment and experience, as well as an understanding of the market forces that tend to promote or limit aviation growth. In the case of UTS, the market forces that directly relate to activity at the airport are represented by 1) historic socioeconomic and demographic growth within the City of Huntsville, as well as the surrounding region and 2) the historic and projected growth rates of the general aviation (GA) segment of the air transportation system.

Demand forecasts have been prepared and are presented in this chapter to assist the city in the evaluation of the performance-based needs of the airport during the next 20 years. The forecasts are organized to include: based aircraft and fleet mix; annual operations; local versus itinerant operational activity; operational fleet mix; annual instrument approach demand; and ultimate critical aircraft.

DATA SOURCES

The forecasting process begins by obtaining recorded data pertinent to the operation and administration of the airport. When necessary, this information is supplemented with historical trends which evolve from a thorough examination of historic data and planning documents related to the airport. Data sources used to generate the demand forecasts include the FAA *Aerospace Forecasts, Fiscal Years 2017-2037*, regional socioeconomic and demographic characteristics as provided by the US Census Bureau and the Texas Demographic Center; FAA Order 5090.3c, *Field Formulation of the National Plan of Integrated Airport Systems* (NPIAS); and the Texas State Airport System Plan (TASP). In addition, supplemental publications such as the *General Aviation Statistical Databook and Industry Outlook* and *Business Aviation Fact Book* will be referenced and evaluated for concurrence of the latest trends and conditions of the aviation industry.

FACTORS AFFECTING FUTURE AVIATION DEMAND

Projected aviation demand at UTS can, and is, expected to be potentially influenced by a number of local, national, and global factors. These conditions are discussed in the following passages and involve a wide range of operational, socioeconomic and industry-related topics that are not discussed in any order of priority.

FAA AEROSPACE FORECASTS AND THE GENERAL AVIATION MARKET SEGMENT

Forecasts for active aircraft, projected by the FAA, include fleet size, hours flown, and utilization, from the *General Aviation and Part 135 Activity Survey* (GA Survey). The GA Survey establishes a baseline of activity to which anticipated growth trends can be applied. In recent years, the FAA has developed statistical improvements to the survey methodology for data collection. Since 2004, the improvements to the GA Survey have resulted in more accurate estimates compared to aviation projections based on past surveys. These improvements are viewed as an indication of a higher level of reliability of the FAA's forecasts. Accordingly, the FAA's assumptions have a high level of influence on the forecasts which highlight positive factors potentially influencing demand at UTS.

The US economy has only recently assumed a positive growth trajectory from the turmoil of the 2008/09 Great Recession, debt ceiling crises, sequestration, and other global and political factors, which were the culprits of across the board decreases in aviation activity. Unemployment has begun to decrease and the US economy seems to have stabilized with increasing, but limited, output and business investment is increasing. As such, aviation demand is experiencing slight, but positive, increases in activity and aircraft deliveries.

Each year, the General Aviation Manufacturers Association (GAMA) highlights various topics within the GA market with their publication of the *General Aviation Statistical Databook*. GAMA is an international trade association devoted to fostering and advancing the interests and activities of GA. This publication helps paint a broad picture of the overall condition of GA, which, in turn, helps to understand how and what assumptions to associate with future activity at an airport. Highlights from the 2017 market overview include:

- GA aircraft deliveries are stable with essentially no increase from 2013 to 2017 (1,323 and 1,325, respectively);
- The business jet market increased 6.5 percent from 2013; after a

decrease in activity from the previous four years;

- The turbo-prop aircraft sector increased 7.5 percent; however, aircraft dedicated to fractional ownership decreased 5.2 percent from 2013 to 2016;
- Piston aircraft deliveries increased 7.0 percent, mostly driven by the global demand for flight training aircraft;
- The fractional aircraft fleet decreased by 5.2 percent, while fractional aircraft ownership increased by 1 percent; both aircraft and ownership peaked in 2008; and
- US pilot population continues to follow its downward trajectory of decreasing membership. The average of 7,500 pilots year over year are leaving the private pilot market have decreased the overall population from its peak of 827,071 in 1980 to today's membership of 584,362. A bright spot in the pilot segment is female aviators segment reached its highest ratio – 6.78 percent in 2017.

Growth of single-engine airplanes is expected to be largely the result of light sport aircraft (LSA) replacing traditional low-end piston single-engine airplanes. Twin-engine piston airplanes are expected to decline throughout the planning period due to attrition of the aging fleet and a limiting market with no new manufacturing or entrants in the marketplace. Lastly, system wide growth of the turbine fleet – turbo-prop and jets – is expected to increase 1.4 and 2.3 percent, respectively.

GA fleet utilization rates (hours flown) are expected to decrease for both single-engine and multi-engine piston by 0.9 percent and 0.1 percent, respectively. However, increases are expected for turbo-props at 1.6 percent, business jets at 3.0 percent, and LSAs at 4.6 percent. With the exception of LSAs and piston propulsion aircraft, increased utilization rates are anticipated to be the result of business usage of GA aircraft expanding at a faster rate than personal/recreational use. Factors such as short-term post-recession recovery, increased size of the overall GA fleet, and recovery from recession induced record lows are also expected to contribute to the increase in GA flight activity throughout the planning period.

NATIONAL AND GLOBAL ECONOMIC CLIMATE

Although the demand for GA air transportation has proven to be resilient in the past despite a slow recovery from the 2008 recession, including numerous industry, financial, and economic factors, there are still some conditions that remain which have the potential to negatively influence the demand projections for UTS.

Overall, the global economy has remained fragile and uncertain with decrease in oil prices significantly affecting many nations, especially the United States. In addition, the global economy has been hit by a number of headwinds over the past few years, from recession in Europe to a "soft landing" in China and inconsistent performance in other emerging economies.

International terrorism remains atop the list of concerns that may influence demand for aviation services on a national scale and at

UTS. Additionally, the uncertainty of oil prices, punctuated by potential spikes in oil demand, has the ability to depress optimism once economic growth resumes. Either of these prospects has the ability to 1) shift consumer spending away from air travel, 2) lower industry profitability, and 3) reduce new orders and/or scuttle the purchase of a new or used aircraft which could further depress the forecasts on a local and national scale.

Considering the turmoil of the recent past and despite positive signs of recovery, the FAA remains cautiously optimistic that the current outlook for demand can be achieved over the next two decades. Doubts about the economic recovery and the strength and sustainability of economic growth linger and have the potential to depress the projected activity for UTS. The terms of recovery will be heavily influenced by national economic growth, corporate profits, and personal wealth.

LOCAL SOCIOECONOMIC CONDITIONS

GA operations and based aircraft are more directly tied to local economic conditions than any other segment of the industry. Population trends also play a role in determining airport activity. Given this fact, the forecast of GA demand at UTS will reflect historic socioeconomic trends for Huntsville, Walker County, and the socioeconomic study area comprised of 13 Census Tracts identified in Chapter 1.

Since 2000, the combined population of the socioeconomic study area has increased approximately one percent annually, resulting in a total population of nearly 90,584 residents in 2015, up from 89,168 residents in 2010 and 75,918 residents in 2000. In addition to population, per capita income (PCI) and median household income (MHI) are widely used indicators for gauging the economic performance of communities as well. The PCI levels for the 13-Census Tract study area have increased 1.3 percent annually from 2000 while the MHI has increased 2.1 percent annually through this same period.

AIRPORT ROLE

UTS is expected to remain a NPIAS GA facility throughout the planning period while at the same time remaining classified as a Regional Airport according to the TASP. Considering historic and current operational activity, fleet mix, and future demand at the facility, the airport is expected to remain capable of accommodating 95 percent of the GA aircraft fleet weighing greater than 12,500 pounds up to and including 60,000 pounds. Additionally, a vast majority of the airport's operations will be generated by single- and twin-piston type aircraft. While turbine aircraft are expected to contribute a small percentage of the overall airport activity level, this segment could see great increases if runway lengths were to increase, which will be discussed in more detail in the following chapters. The airport's ultimate critical aircraft is expected to be a medium-sized business jet weighing approximately 20,000 pounds and capable of carrying up to nine or 10 passengers.

FUEL FLOWAGE

Fuel flowage estimates can be a useful tool in realizing the overall operational trends of an airport in terms of annual operational activity and fleet mix. From 2013 to 2017, UTS saw a 35 percent increase in AVGAS sales and a 10 percent decrease in Jet-A sales.

GENERAL AVIATION FORECASTS

Aviation activity is forecast by using various methods such as analytical and statistical processes (trend lines and single/multiple regression), historical data, and judgmental processes to incorporate relevant assumptions, conditions, and trends. Forecasting, by its nature, is as much an art as a science and represents a suitable "best case scenario" at a particular time, no matter the sophistication of the forecast method. Therefore, forecasts should be updated periodically and revised to reflect new conditions and developments. Activity forecasts for airports are often established using various sets of assumptions that generate different outcomes providing a broad view of future airport utilization potentials.

The following sections will concentrate on the activity generated by the airport's total based aircraft fleet including annual operations, local versus itinerant operational activity, and annual instrument approach (AIA) flight activity, and operational fleet mix estimates. The airport's future critical aircraft will also be identified and discussed. The regional and local population statistics, which are typical markers for inclusion within forecasts, will be included in these scenarios, as both Walker County and the 13-Census Tract socioeconomic study area described in Chapter 1 indicate steady growth over the 20-year time frame. For the purpose of identifying the most reasonable forecasting methodology, forecasting tools using socioeconomic data will be compared to other methods, such as regression analysis or FAA aerospace forecasts.

FORECAST OF BASED AIRCRAFT

There are many factors that determine the number of GA aircraft that can be expected to base at an airport, such as radio and weather communications, available facilities and services, airport proximity and access, and amenities and facilities of adjacent or other nearby airports. GA aircraft owners and operators are particularly sensitive to both the quality and location of their basing facilities. Generally, owners would rather be in close proximity to their home and/or work, and typically weigh this need high when determining and considering a location.

Numerous different forecasts methods were used to predict based aircraft growth for UTS. Six (6) are presented here: Trend Line, Time Series, Market Share, Multiple Regression, FAA Aerospace Forecasts GA Fleet Growth, and Single Regression:

- The trend line analysis of UTS looked back at historic figures from 1990 to the present in two groups: 1990 – 2017 and 2007 - 2017. The trend line process over-utilized the substantial growth period at UTS from 2007 to 2013—a timeframe in which based aircraft nearly doubled—potentially over-predicting based aircraft at UTS for years to come.
- The time series methodology shows the dependent variable (time) and is utilized quite frequently where both time and data are limited such as forecasting a single variable where historical data is obtained for that particular variable. In this case, historical data is not limited for UTS,

and the time series methodology appears to over-predict future based aircraft.

- The market share evaluation utilized an analysis of similar-sized airports included in the Chapter 1 discussion (Madisonville Municipal, Conroe-North Houston Regional, Livingston Municipal, Houston County, and Navasota Municipal, Groveton Municipal), using historically-reported based aircraft and the FAA's Terminal Area Forecasts with a determination of each airports market share of based aircraft. However, the lack of historical data available at numerous similar-sized airports in the vicinity of UTS appears to hold back the true predictive capabilities of the market share evaluation.
- The multiple regression model projects the forecast of parameters (dependent variable – i.e. based aircraft and annual operations) on the basis of two or more external factors or indicators (in the case of UTS, PCI and MHI were utilized).
- The FAA growth percentages for the overall segments of GA were employed and this forecast showed a relatively static condition at UTS.
- Like multiple regression analysis, the preferred based aircraft methodology, single regression, uses a single independent variable (MHI) to predict the value of a dependent value (based aircraft).

Socioeconomic factors like population, median household income, and income distribution can be tied directly to aircraft ownership. Walker County is expected to continue experiencing marked growth in population. Household incomes and income distribution are expected to remain steady. With these socioeconomic influences, it is expected that they will influence based aircraft growth and the demands for basing aircraft at UTS. As such, single regression analysis is an appropriate measure of growth in based aircraft, both in the short- and long-term forecasts.

Table 2.1 provides a summary of the forecasts and methods used for based aircraft anticipated at UTS over the 20-year planning period.

TABLE 2.1
FORECAST OF BASED AIRCRAFT SUMMARY, 2017-2037

Forecast Methodology	Existing 2017	Short-Term (0-5 Years)	Mid-Term (6-10 Years)	Long-Term (11-20 Years)
Trend Line	54	68	94	107
Time Series	54	67	124	164
Market Share	54	57	62	73
Multiple Regression	54	71	84	97
FAA Aerospace Forecasts GA Fleet Growth	54	56	57	60
Single Regression	**54**	**64**	**73**	**83**

Source: Lochner.
Bold – Selected Forecast

EXHIBIT 2.1
PREFERRED BASED AIRCRAFT SUMMARY – SINGLE REGRESSION (PREFERRED)

As depicted in **Table 2.1**, there is reasonable evidence that between 80 and 100 aircraft could be based at UTS in the long-term planning period, based on past, current, and future demand and local forecasting trends. The trend line and time series methodologies are good indicators of the general directional trend of based aircraft growth at an airport; in the case of UTS, because of the significant increase in based aircraft in recent years, these methodologies result in a number of based aircraft that is unreasonable for an aiport in the role of UTS. As such, these methodologies were discarded, and the remaining methodologies—the market share analysis, single regression, multiple regression, and FAA Aerospace Forecasts—were averaged to determine the mean number of aircraft in the short-, mid-, and long-term planning periods. Of these forecasts, the single regression analysis was closest across all planning periods to the average number of aircraft predicted by these methodologies; as such, single regression was adopted as the preferred forecast.

PREFERRED BASED AIRCRAFT DEMAND AND FLEET MIX

Based on the principle that shows based GA aircraft are directly tied to local economic conditions, the projected total number of based aircraft were calculated based on a single regression of historic and future regional population. However, it is important to also take into account the FAA aerospace forecasts to arrive at a preferred based aircraft forecast to accommodate long-term demand. Although not a statistical or analytical forecast methodology, relying on FAA forecasts to project based aircraft and operational demand as part of the planning process is an important tool. FAA projected average annual growth of a particular fleet of aircraft (i.e. piston, turbine, or jet) can be applied to the local forecasts to project future based aircraft at the facility. Likewise, by applying FAA projected aircraft utilization rates (i.e. flight hours) to the demand forecasts, a reasonable expectation of future annual operational activity (total operations) can be determined for based aircraft and itinerant users. Additionally, future aircraft utilization projections provided by the FAA can be a valuable tool in estimating the airport's ultimate annual operational fleet mix (i.e. annual operations by a particular category). **Table 2.2** and **Exhibit 2.1** summarize the airport's preferred forecast of based aircraft.

TABLE 2.2
PREFERRED BASED AIRCRAFT AND FLEET MIX SUMMARY, 2017-2037

Aircraft Category	Existing	Short-Term (0-5 Years)	Mid-Term (6-10 Years)	Long-Term (11-20 Years)
Single-Engine	47	52	58	66
Multi-Engine	6	8	8	8
Turbo-Prop	0	2	4	4
Business Jet	1	2	2	4
Helicopter	0	0	1	1
Total Based Aircraft	**54**	**64**	**73**	**83**

Source: Lochner.
Note: Fleet mix percentage rounded to the nearest whole number.

The single-engine fleet is expected to increase from 47 existing units to 66 units totaling an additional 19 traditional single-engine, experimental and light sport aircraft in the next 20 years. Multi-engine piston aircraft are expected increase by two, and turbo-prop aircraft are expected to increase from zero to four two. Additionally, the existing jet fleet is anticipated to increase to four jets by the end of the planning period.

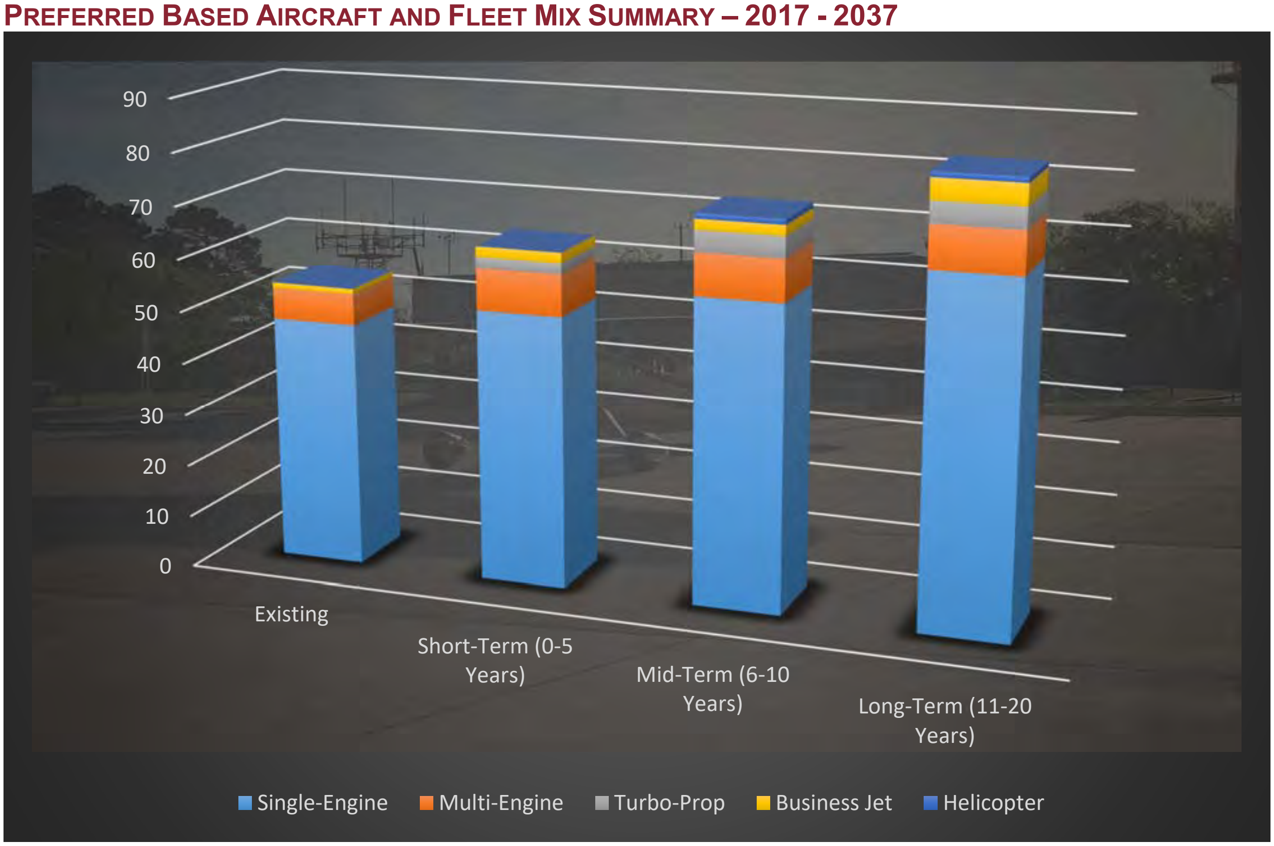
Although helicopters that utilize UTS currently do not remain based at the airport more than six months of the year, and are therefore not currently counted in the baseline count of aircraft, the airport will continue to be capable of having at least one based helicopter during the planning period and facilities could be developed to house more than one should the need arise.

TABLE 2.3
PREFERRED BASED AIRCRAFT AND FLEET MIX SUMMARY, 2017-2037

Aircraft Category	Existing	Short-Term (0-5 Years)	Mid-Term (6-10 Years)	Long-Term (11-20 Years)
Single-Engine	47	52	58	66
Multi-Engine	6	8	8	8
Turbo-Prop	0	2	4	4
Business Jet	1	2	2	4
Helicopter	0	0	1	1
Total Based Aircraft	**54**	**64**	**73**	**83**

Source: Lochner.
Note: Fleet mix percentage rounded to the nearest whole number.

EXHIBIT 2.2
PREFERRED BASED AIRCRAFT AND FLEET MIX SUMMARY – 2017 - 2037



It should be noted that the FAA Aerospace Forecasts indicate that turbo-prop aircraft are anticipated to increase 1.2 percent annually, while business jets are anticipated to increase three percent annually. The preferred based aircraft and fleet mix summary presented in **Table 2.3** depicts a much higher annual increase, 7.5 percent increase in turbo-prop aircraft and 6.5 percent increase in business jets. The increase in turbo-prop aircraft and business jets at UTS is anticipated to be greater than the FAA Aerospace Forecast because the demand for improvements to UTS to accommodate these larger aircraft has been vocalized by local pilots and business in the area. Additionally, it is anticipated that future improvements at UTS could draw in turbo-prop aircraft and business jets from nearby reliever airports such as Conroe-North Houston Regional Airport (CXO). A change in the local economy, with the addition of a business that utilizes a large business jet on a regular basis, could influence airport growth the accommodate these larger business jet aircraft at UTS in the future.

OPERATIONAL DEMAND

Generally, there is a direct relationship between based aircraft and annual operations, especially due to the national trend of more aircraft being utilized for business purposes and less for pleasure or recreation. Because based aircraft and annual operations have historically followed similar trends and growth rates, this analysis will compare the two and draw conclusions as to the potential estimated activity at the facility. The relationship between the two, known as operations per based aircraft (OPBA), will be examined whereby the estimated increase in activity – total aircraft operations – will be calculated and established. **Table 2.4** and **Exhibit 2.2** summarizes the forecast scenarios of annual operations for UTS throughout the 20-year master planning period.

The OPBA for UTS in 2017 was 548, which is in line with the average 15-year OPBA of 477. This OPBA of 477 was utilized because of the amount of jet traffic present at UTS, the amount of itinerant traffic, and the amount of flight training at UTS.

OPERATIONAL FLEET MIX

Given the close correlation of based aircraft to annual operational activity, just as with determining the projected annual operational forecasts based on OPBA, the relationship of both based airplanes and operations can be evaluated to determine an ultimate level of activity (operations) conducted by a particular aircraft category.

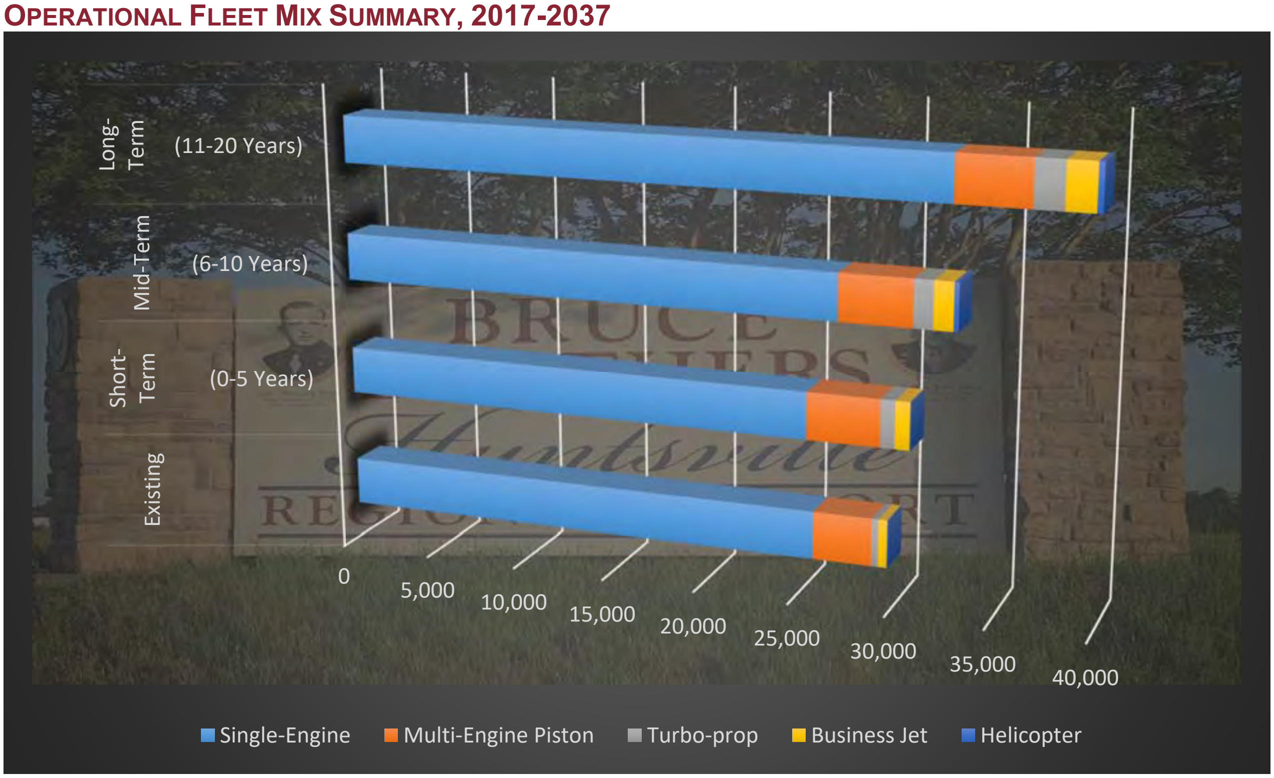
Projected operational mix by a certain aircraft category can be determined by highlighting a category's share of the existing based aircraft fleet and apply that figure/percentage to the future operations for each aircraft category. For example, the single-engine fleet averaged approximately 85 percent of the overall based aircraft in 2017. Given the parallel trends of operations versus based aircraft, it can be assumed that the same percentage of annual activity, or approximately 25,700 operations in 2017, is contributed by single-engine airplanes.

TABLE 2.4
OPERATIONAL FLEET MIX SUMMARY, 2017-2037

Aircraft Category	Existing	Short-Term (0-5 Years)	Mid-Term (6-10 Years)	Long-Term (11-20 Years)
Single-Engine	25,700	25,300	26,850	32,500
Multi-Engine Piston	3,050	3,800	3,800	3,800
Turbo-prop	350	750	1,000	1,500
Business Jet	450	750	1,000	1,500
Helicopter	50	50	250	300
Total Annual Operations	**29,600**	**30,650**	**34,900**	**39,600**

Source: Lochner.
Note: Figures rounded to the nearest whole number.

EXHIBIT 2.3
OPERATIONAL FLEET MIX SUMMARY, 2017-2037



Ultimately, single-engine aircraft are expected to contribute approximately 32,500 total operations or 80 percent of the annual activity at the airport. Multi-engine piston aircraft are expected to contribute approximately 10 percent of the operational activity, or 3,800 annual operations, while single- and multi-engine turbine airplanes are anticipated to conduct approximately 1,500 operations and account for approximately four percent of the yearly activity. Business jets, while conducting 1,500 annual operations at the conclusion of the planning period, will account for approximately four percent of the annual activity at UTS in 2037. While the forecast for turbo-prop aircraft and business jets indicates growth beyond the FAA Aerospace Forecasts, the forecasted growth is in line with current business demands for airfield improvements at UTS to accommodate larger aircraft.

Although no based helicopters are listed as being present in the existing fleet mix, helicopters are present some portions of the year at UTS. As such, 50 annual operations are shown per year, until a more permanently-based helicopter is forecasted in the 10-20 year planning period.

AIR TAXI OPERATIONS

Air taxi (or air charter) operations are those on-demand operations of passengers and/or cargo contributed by privately-owned corporations or individuals operating single- or twin-engine turbo-props and/or business jets with greater than six passenger seats. These types of operations are governed by FAR Part 135, while private individuals operating their own turbine airplane can operate under FAR Part 91. Corporate flight departments, as well as fractional aircraft ownership operators, typically operate under FAR Part 91K. **Table 2.5** summarizes the total projected FAR Part 135, 91 and/or 91K turbine operations expected to be conducted at UTS throughout the planning period.

TABLE 2.5
AIR TAXI OPERATIONS SUMMARY, 2017-2037

Aircraft Category	Existing	Short-Term (0-5 Years)	Mid-Term (6-10 Years)	Long-Term (11-20 Years)
Single-, Multi-Engine, Turbo-Prop	325	700	950	1,400
Business Jet	425	700	950	1,400
Total Air Taxi/Charter Operations	**750**	**1,400**	**1,900**	**2,800**

LOCAL VERSUS ITINERANT OPERATIONS

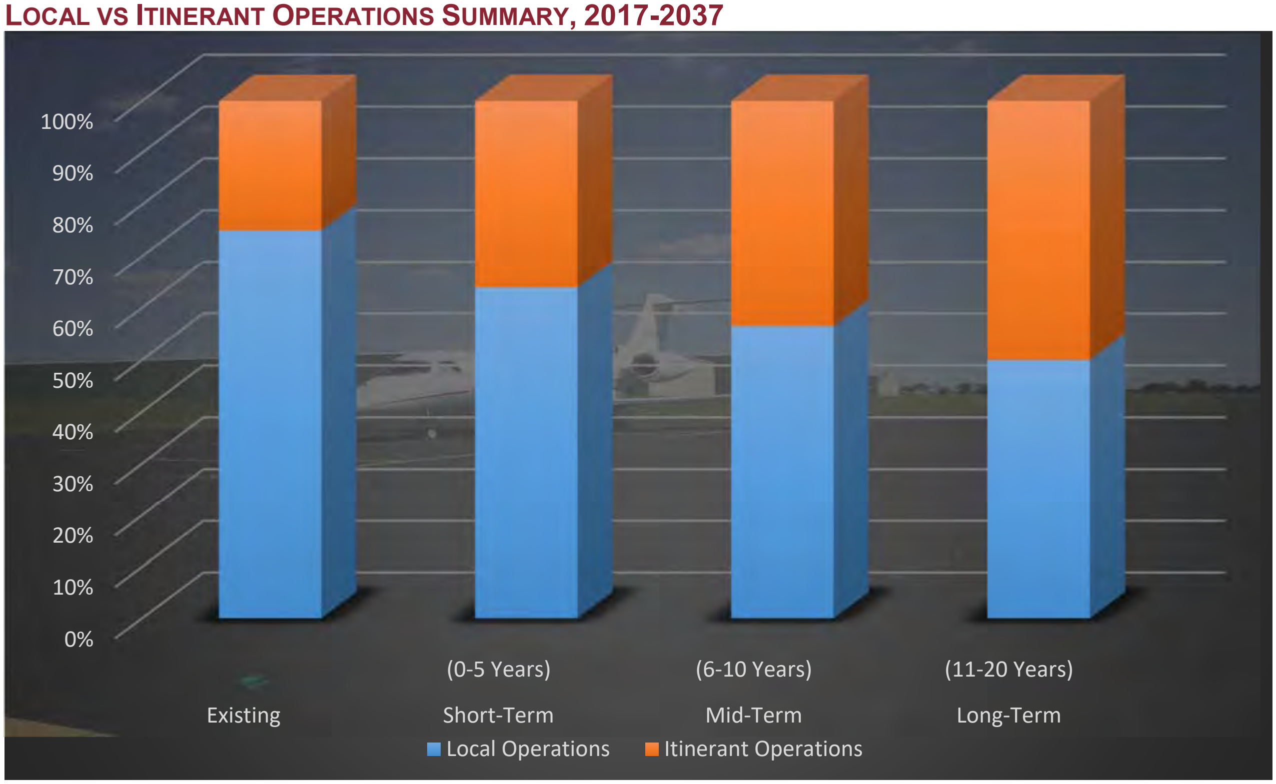
Over the past 20 years, the relationship between local versus itinerant operations for the airport was approximately 35 percent local and 65 percent itinerant in nature. As more aircraft are utilized for business purposes, it is assumed the rate of local operations will decrease while itinerant use will rise over the planning period. These figures coincide with the airport's overall increase in operational activity. **Table 2.6** and **Exhibit 2.5** also summarize the share of local versus itinerant operations expected to be conducted at UTS.

TABLE 2.6
LOCAL VS ITINERANT OPERATIONS SUMMARY, 2017-2037

Operations	Existing	Short-Term (0-5 Years)	Mid-Term (6-10 Years)	Long-Term (11-20 Years)
Local Operations	18,900	19,600	19,700	19,800
Itinerant Operations	6,300	11,050	15,200	19,800
Total Operations	**29,600**	**30,650**	**34,900**	**39,600**

Source: Lochner.
Note: Fleet mix percentages rounded to the nearest whole number.

EXHIBIT 2.4
LOCAL VS ITINERANT OPERATIONS SUMMARY, 2017-2037



It should be noted that, currently, approximately 4,150—or 65 percent—of the existing itinerant operations are categorized as miliatary operations. While military operations are an imporant component of an airport's infrastructure needs, they are generally not included in the forecasts of GA airports. However, itinerant operations at UTS are projected to increase to the point at which itinerant operatiosn comprise approxiamtely 50 percent of all operations. This is due to the expected increase in turbo-prop and business jet operations at UTS. As operations shift more proportionately toward itinerant traffic, the proportion of military operations at UTS is expected to decrease.

ANNUAL INSTRUMENT APPROACH DEMAND

Forecasts of annual instrument approaches (AIA's) are generated to provide guidance in determining requirements for installation of NAVAID equipment and/or establishment of instrument approach procedures. Based on the volume of 1) approaches conducted in instrument conditions (AIA's) and 2) operations (approaches and departures) conducted during instrument meteorological conditions (IMC), the type and timing of future NAVAIDs can be determined. Technological and equipment improvements (airborne, as well as, ground based) will also affect NAVAID installation and published instrument approaches. **Table 2.7** summarizes the forecast of annual instrument approaches for the airport throughout the 20-year planning period.

TABLE 2.7
ANNUAL INSTRUMENT APPROACH SUMMARY, 2017-2037

Operational Factors	Existing	Short-Term (0-5 Years)	Mid-Term (6-10 Years)	Long-Term (11-20 Years)
Total Itinerant Operations*	18,900	19,600	22,300	25,350
Percent IFR Rated Pilots	51.5%	52.0%	52.0%	52.0%
Percent IMC Conditions**	7.5%	7.5%	7.5%	7.5%
Total IMC Operations***	488	865	985	1,544
Total Annual Instrument Operations (AIA)	**244**	**433**	**492**	**772**

Source: Lochner.
Note: Figures rounded to the nearest whole number.
(*) Total itinerant operations include air taxi and military.
(**) Total IMC operations include arrivals and departures in instrument weather conditions (Ceiling <1,000' and visibility <3 miles).
(***) Total AIAs represent the projected number of annual operations during IMC.

The AIA forecast considers the existing and projected total IMC operations at the airport compared to the percentage of instrument rated pilots, as well as, percent of IMC in the area. This analysis will determine a projected annual instrument approach estimate for UTS. Currently, the airport experiences nearly 250 annual instrument approaches. Ultimately, these operations are expected to increase to over 750 AIAs and are anticipated to be conducted by piston singles and twins, as well as civilian and military turbine airplanes and rotorcraft. According to the NBAA, approximately 25 percent of all

AIAs are conducted by air taxi and/or itinerant turbine aircraft operating in accordance with Part 91/91K and/or Part 135 regulations. Of the 1,544 annual IMC operations projected in 2037, nearly 400 of those are estimated to be conducted by turbine powered aircraft.

CRITICAL AIRCRAFT

As discussed in the Inventory chapter, the critical aircraft is the largest airplane within a composite family of aircraft conducting at least 500 annual itinerant operations (combination of 250 takeoffs and landings) at an airport. It is evaluated with respect to size, speed, and weight, and is important for determining airport design and safety area standards, as well as structural and equipment needs at the airfield and within terminal area facilities.

Forecasts indicate a growing number of turbo-prop and small business jets will frequent UTS during the next 20 years. **Table 2.8** provides information regarding the Cessna Sovereign within the ARC B-II family of aircraft expected to regularly operate at UTS throughout the planning period.

The Cessna Sovereign, or an aircraft with similar operational and physical characteristics, was identified as the aircraft representing the ARC B-II family of jet airplanes. Because the Sovereign is based at the airport, it is expected to provide regularly occurring operations at the airport throughout the planning period. The Sovereign is prevalent within the general aviation air charter, fractional ownership, and corporate market segments and is expected to continue its popularity within these markets for the foreseeable future. The Sovereign is capable of operating from a 5,000 foot runway during extreme (hot) weather conditions while carrying nearly a full complement of payload including passengers, baggage, and fuel and are pervasive within the general aviation air taxi, corporate flight department and fractional ownership market segments. Operational and physical characteristics of the Cessna Sovereign jet is presented in **Table 2.8**.

In the long-range planning period, UTS is also anticipated to accommodate a number of aircraft in the ARC C-I, C-II, and D-II category. Critical aircraft representing these categories have been identified as the Learjet 35 (C-I), Gulfstream III (C-II), and Gulfstream IV (D-II). Based on current data, operations at UTS by this size and type of aircraft are not expected to reach 500 annual operations.

TABLE 2.8
FUTURE CRITICAL AIRCRAFT – CESSNA SOVEREIGN

Characteristic	Specifications and Performance	
Airport Reference Code (ARC)	B-II	
Wing Span	72' 4"	
Length	63' 6"	
Height	20' 4"	
Seating (Crew + standard pax/max pax)	2 + 12	
Maximum Takeoff Weight (MTOW)	30,775 pounds	
Maximum Landing Weight (MLW)	27,575 pounds	
Normal Approach Speed	120 knots	
Takeoff Field Length*	3,530'	
Landing Distance**	2,600'	
Maximum Range Performance***	3,190 miles	

Source: Textron Aviation.
(*) MTOW, sea level, standard temperature, and departure flaps.
(**) Max. landing weight, sea level, standard temperature, and approach over 50-foot obstacle.
(***) Full fuel and available payload.

SUMMARY

Table 2.9 summarizes the forecasts of projected aviation activity at UTS throughout the 20-year planning period.

UTS is expected to have an increase in the based aircraft fleet by 29 aircraft throughout the planning period. The ultimate based fleet mix includes 66 single-engine pistons, eight multi-engine pistons, four turbo-props, four business jets, and one helicopter.

The growth of turbo-props and business jets at UTS over the long-term planning period is anticipated to exceed the FAA Aerospace Forecasts for aircraft in those categories. This increase in turbo-prop and business jets is expected due to information relayed to the FBO and City staff, indicating the desire for businesses to base larger aircraft at UTS in the future. Additionally, it is anticipated that future improvements at UTS could draw in turbo-prop aircraft and business jets from nearby reliever airports.

TABLE 2.9
DEMAND FORECAST SUMMARY, 2017-2037

Forecast Element	Existing	Short-Term (0-5 Years)	Mid-Term (6-10 Years)	Long-Term (11-20 Years)
Preferred Based Aircraft Demand				
Single-Engine	47	52	58	66
Multi-Engine Piston	6	8	8	8
Turbo-Prop	0	2	4	4
Business Jet	1	2	2	4
Helicopter	0	0	1	1
Total Based Aircraft	54	64	73	83
Annual Operational Demand				
Local Operations	18,900	19,600	19,700	19,800
Itinerant Operations	6,300	11,050	15,200	19,800
Total Operations	29,600	30,650	34,900	39,600
Operational Fleet Mix				
Single-Engine	25,700	25,300	26,850	32,500
Multi-Engine Piston	3,050	3,800	3,800	3,800
Turbo-Prop	350	750	1,000	1,500
Business Jet	450	750	1,000	1,500
Helicopter	50	50	250	300
Total Annual Operations	29,600	30,650	34,900	39,600
Instrument Approach Demand				
Total IMC Operations	488	865	985	1,544
Total Annual Instrument Operations (AIAs)	244	433	492	772

Source: Lochner.

Annual operations are anticipated to experience an overall increase in operational activity of 1.47 percent annually to total approximately 39,600 annual operations at the end of the 20-year planning period. Local and itinerant operations will comprise a 50/50 percent split of the overall 2037 activity, equaling 19,800 local and 19,800 itinerant operations by the end of the planning period. Lastly, at the conclusion of the master planning period, UTS is expected to experience approximately 1,544 IMC operations and nearly 772 AIAs per year.

The demand forecasts, combined with the existing conditions information, will be used to identify the airport's short-term and long-range airfield and terminal area facility needs. The next chapter, Facility Requirements, identifies the types and extent of airside and landside facilities needed to adequately accommodate the based aircraft and operational demand identified in this chapter.

CHAPTER 3:

FACILITY REQUIREMENTS

INTRODUCTION

This chapter identifies the short- and long-term airfield and terminal area facilities needed to satisfy current and future airport activity. Facility needs have been identified based on the existing conditions of the airport, projected aviation demand, and peak period operational and passenger activity. The identification of facility needs does not constitute a commitment on the part of the city, but a recommendation to improve operational conditions for local and transient airport users based on current FAA guidance and design criteria.

PEAKING CHARACTERISTICS

The traffic demands imposed on an airport vary based on an annual, monthly, daily, and hourly basis. These fluctuations result in periods of activity which place the greatest demand on airfield and terminal area facilities to accommodate aircraft and passengers. As the need for aviation services increases, so too does the demand for appropriate facilities to accommodate activity during peak periods of activity.

Operational trends are considered when proposing improvements so that airfield and terminal area facilities are adequate to accommodate airport demand.

This analysis will forecast aircraft operations as well as passenger needs during peak periods of activity which also takes into account normal airport activity. Evaluation of Huntsville Municipal's (UTS) peak periods are organized into peak month/average day and peak hour operational/passenger estimates for the short-, intermediate-, and long-term phases throughout the master planning period.

PEAK MONTH/AVERAGE DAY (PMAD) DEMAND

Historic activity was evaluated to identify trends of the average day of the peak month. Peak operations at general aviation airports generally occur is July and/or August. Airports similar to UTS have peak hour operations as high as 12 to 20 percent of daily total operations. Due to regular operation by local and transient piston, turbo-prop and business jet airplanes, it is assumed that approximately 2,700 operations, or nearly 16 percent of the total activity, occur during peak months. This operational trend is expected to continue throughout the master planning period.

To arrive at the average day of peak month (Design Day) operational total, the PMAD activity was divided by the number of days in the peak month (30). Peak Hour operational projections are the result of the Design Day compared to the ratio of activity occurring during the peak month (16 percent). **Table 3.1** summarizes UTS's peak operational estimates.

Table 3.1
Peaking Characteristics Summary

FORECAST METHODOLOGY	EXISTING	SHORT-TERM (0-5 YEARS)	MID-TERM (6-10 YEARS)	LONG-TERM (11-20 YEARS)
Annual Operational Demand	**29,600**	**30,650**	**34,900**	**39,600**
Peak Month (OMAD) Operations	**3,256**	**3,372**	**3,839**	**4,356**
Design Day (PMAD) Operations	**107.1**	**110.9**	**126.3**	**143.3**
Peak Hour Operations	**16.1**	**16.6**	**18.9**	**21.5**
Peak Hour Passengers	**24.1**	**28.3**	**35.0**	**44.1**

Source: Lochner; UTS Demand Forecasts.

Peak month operations are projected to increase from 3,256 to 4,356 at the conclusion of the planning period. The airport currently experiences 107 design day operations, totaling 16 takeoffs and landings during peak hours. Ultimately, the airport is expected to experience as many as 143 design day and 22 peak hour operations. Peak operational activity will have the most influence on apron size and the number of tie-down spaces to accommodate peak airport demand.

PEAK HOURLY PASSENGER ACTIVITY

Planning for the proper space allowances needed for terminal building facilities and passenger circulation requires hourly volumes of activity consistent with the average daily baseline of activity at an airport. Peak hour passenger estimates are generated by determining peak monthly passenger activity based on enplanement estimates. In the case of UTS, assumptions were made as to what the reasonable level of passenger traffic would be during peak periods of operational activity. **Table 3.1** also summarizes the peak hour passenger activity estimates throughout the planning period.

To determine the peak hourly demand, it was assumed that peak passenger activity would be similar to that of the Design Day peak operational activity, or approximately 16 percent of average day activity. In terms of passenger and operational activity, as airport activity increases, the peak of activity tends to spread throughout the day - as aircraft operations increase, so too does the level of passenger traffic. The airport currently experiences nearly 24 peak hour passengers. Ultimately, 44 passengers are anticipated to access the terminal building during peak conditions.

AIRFIELD DESIGN STANDARDS

RUNWAY DESIGN CODE

UTS is recognized by the FAA as an Airport Reference Code (ARC) ([1]) B-II facility. The dimensional criteria of the airport is determined by the Runway Design Code (RDC)([2]). The RDC is defined by the FAA as a code signifying the design standards to which the runway is to be built. **Table 3.2** illustrates the FAA's RDC criteria.

The current runway width and pavement strength indicate a potential RDC of B-II-5000. However, the taxiway/runway geometry contrasts this with existing centerline offset only at 200 feet with a planned offset of 240 feet that is under design (2018) to be reconstructed (2019) to meet the current UTS of RDC B-II-5000. UTS is designed to serve all small aircraft and some small to medium-sized turbine aircraft with approach speeds of 91-121 knots and wingspans up to 79 feet.

Based on the operational activity and critical aircraft discussion in the previous chapter, as well as the existing conditions of the airfield facilities, the RDC for UTS is B-II-5000. This RDC is favored because the airport's published minimum visibilities for instrument flight procedures is 1-mile, and the current and future critical aircraft is the Cessna Citation 'Sovereign,' which has an approach speed of 120 knots and wingspan of 72 feet 4 inches.

[1] The ARC is an airport designation that signifies the airport's highest Runway Design Code (RDC). The ARC is used for planning and design only and does not limit the aircraft that may be able to operate safely at an airport. ARC is also a product of Aircraft Approach Category (AAC) and Airplane Design Group (ADG). The AAC is a grouping of aircraft based on 1.3 times their stall speed in their landing configuration at the certificated maximum flap setting and maximum landing weight at standard atmospheric conditions. Category C operate at a final approach speed of 121 knots or more but less than 141 knots. The ADG is a grouping of airplanes based on wingspan and/or tail height. ADG II aircraft have a wingspan from 49 feet up to but not including 79 feet and/or tail height from 20 up to but not including 30 feet.

[2] The selected AAC, ADG, and approach visibility minimums are combined to form the RDC of a particular runway. The RDC provides the information needed to determine certain design standards that apply. The first component, depicted by a letter, is the AAC and relates to aircraft approach speed (operational characteristics). The second component, depicted by a Roman numeral, is the ADG and relates to either the aircraft wingspan or tail height; whichever is most restrictive, of the largest aircraft expected to operate on the runway and taxiways adjacent to the runway. The third component relates to the visibility minimums expressed by RVR values in feet of 1200, 1600, 2400, 4000, and 5000 (corresponding to lower than 1/4 mile, lower than 1/2 mile but not lower than 1/4 mile, lower than 3/4 mile but not lower than 1/2 mile, lower than 1 mile but not lower than 3/4 mile, and not lower than 1 mile, respectively).

Activity by larger business jet aircraft in the RDC C-II-5000 category are currently conducting operations at UTS. Today, these operations do not exceed the threshold of 500 annual operations (takeoffs/landings) to indicate a need to change the RDC. Future operations as forecast in the previous chapter do not predict the growth of ARC C-II aircraft operational numbers at UTS to reach the 500 operational threshold within the 20-year forecast period. However, their numbers could change through the decision of a single user or stakeholder to base one of these aircraft at UTS during the planning period. The following chapter, Alternatives, will evaluate the impacts of an increase in the RDC at UTS from B-II-5000 to C-II-5000, as well as the introduction to better/lower instrument approach minimums for UTS.

Table 3.2
Runway Design Code Criteria

AIRCRAFT APPROACH CATEGORY (AAC)		
Approach Category	Approach Speed	
A	< 91 Knots	
B	91 - < 121 Knots	
C	121 - < 141 Knots	
D	141 - < 166 Knots	
E	> 166 Knots	
AIRPLANE DESIGN GROUP (ADG)		
Design Group	Tail Height (ft)	Wingspan (ft)
I	< 20 feet	< 49 feet
II	20 - < 30 feet	49 < 79 feet
III	30 - < 45 feet	79 - < 118 feet
IV	45 - < 60 feet	118 - < 171 feet
V	60 - < 66 feet	171 - < 214 feet
VI	66 - < 80 feet	214 - < 262 feet
VISIBILITY MINIMUMS		
RVR (ft)	Instrument Flight Visibility Category (statute mile)	
Visual	Visual Only	
5000	> 1-mile	
4000	< 1-mile but > ¾-mile	
2400	< ¾-mile but > ½-mile	
1600	< ½-mile but > ¼-mile	
1200	< ¼-mile	

Source: FAA 150/5300-13A, Airport Design.

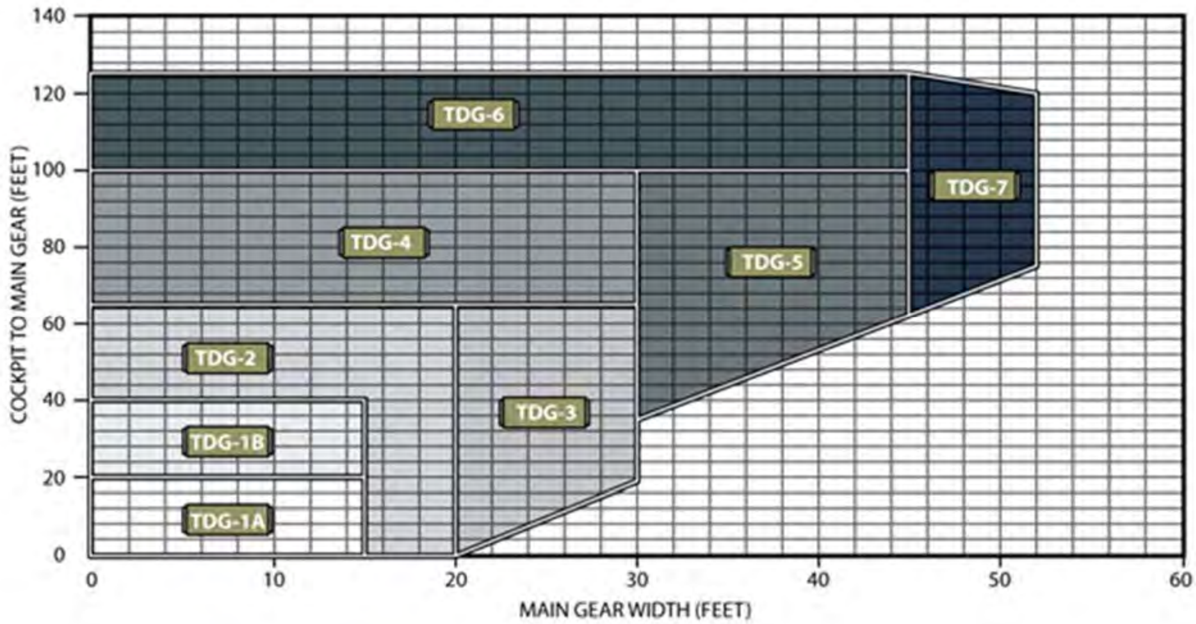
TAXIWAY DESIGN GROUP

These criteria are established through a classification of airplanes based on outer to outer Main Gear Width (MGW) and Cockpit-to-Main Gear distance (CMG). Combined, these specifications establish the Taxiway Design Group (TDG). TDG relates to the undercarriage dimensions of the critical aircraft. Taxiway/taxilane width and fillet standards, and in some instances, runway-to-taxiway and taxiway/taxilane separation requirements, are determined by TDG. Based on this information, UTS is included in TDG 2, which corresponds with the airport's current configuration and intended design to accommodate all small aircraft and most medium turbine aircraft. It is recommended the TDG for future taxiway design be based on the most demanding aircraft fleet mix of ARC A-I to B-II aircraft that use the airport on a regular basis. Aircraft such as the Cessna Citation Mustang/Sovereign frequent UTS regularly. There are infrequent operations by larger business jet aircraft as documented during this study by the FBO by photographing them and providing those to the consultant team. These larger aircraft have included Bombardier Challengers, Dassault Falcons, and Gulfstream 300/400. These and the existing/future critical aircraft all correspond with TDG 2 criteria. **Table 3.3** provides the essential TDG requirements.

Table 3.3
Taxiway Design Group (TDG) Criteria

Criteria	Taxiway Design Group							
	1A	1B	2	3	4	5	6	7
Taxiway Width	25'	25'	35'	50'	50'	75'	75'	82'
Taxiway Edge Safety Margin	5'	5'	7.5'	10'	10'	15'	15'	15'
Taxiway Shoulder Width	10'	10'	15'	20'	20'	30'	30'	40'

Source: FAA 150/5300-13A, Airport Design.



RUNWAY DESIGN REQUIREMENTS

Table 3.4 illustrates the runway design standards matrix for UTS. **Table 3.4** also includes the existing conditions of the airfield dimensional criteria. As previously indicated, the RDC for Runway 18-36 is B-II-5000. Because of the increasing operational tempo of ARC C-II aircraft, an RDC of C-II-4000/5000 is also included in **Table 3.4** to compare and contrast the runway design standards for all anticipated RDCs for UTS.

Table 3.4
Runway Design Standards Matrix

RUNWAY ITEM	RW 18-36 EXISTING STANDARDS RDC B-II-5000	RW 18-36 STANDARDS RDC B-II-4000	RW 18-36 STANDARDS RDC C-II-5000	RW 18-36 STANDARDS RDC C-II-4000
Runway Width	100’	75’	100’	100’
Runway Safety Area (RSA)				
RSA Width	150’	150’	500’	500’
Length beyond departure end	300’	300’	1,000’	1,000’
Length prior to threshold	300’	300’	600’	600’
Object Free Area (OFA)				
OFA Width	500’	500’	800’	800’
Length beyond departure end	300’	300’	1,000’	1,000’
Length prior to threshold	300’	300’	600’	600’
Obstacle Free Zone (OFZ)				
OFZ Width	400’	400’	400’	400’
Length beyond departure end	200’	200’	200’	200’
Runway Protection Zone (RPZ)				
Inner Width	500’	1,000’	500’	1,000’
Outer Width	700’	1,510’	1,010’	1,750’
Length	1,000’	1,700’	1,700’	2,500’
Taxiways				
Taxiway Design Group	1B	1B	2	2
Width	35’	35’	35’	35’
Safety Area Width	79’	79’	79’	79’
Object Free Area Width	131’	131’	131’	131’
Runway Centerline to:				
Holdline	200’	200’	250’	250’
Aircraft Parking Area	250’	250’	400’	400’
Parallel Taxiway Centerline	200’ (‘18)/240’ (‘19)	240’	300’	300’

Runway Safety Area (RSA): The RSA is a two-dimensional surface surrounding the runway prepared or suitable for reducing the risk of damage to airplanes in the event of undershoot, overshoot or excursion from the runway.

Object Free Area (OFA): The OFA is a two-dimensional area on the ground centered on the runway, taxiway, or taxilane centerline provided to enhance the safety of aircraft operations by having the area free of objects, except for those that need to be located in the OFA for air navigation or aircraft ground maneuvering purposes.

Runway Obstacle Free Zone (ROFZ): The OFZ is the airspace below 150 feet above the a established airport elevation and centered on the runway centerline that is required to be clear of all objects in order to provide clearance protection for aircraft landing or taking off from the runway and for missed approaches.

Runway Protection Zone (RPZ): The purpose of the RPZ is to enhance the protection of people and property on the ground, and to prevent obstructions to aircraft. The FAA recommends that airport sponsor own the RPZ property in fee simple, and that the RPZ be clear of any non-aeronautical structure of public assembly or object that would interfere with the arrival and departure of aircraft.

Source: FAA AC 150/5300-13A, Airport Design.

AIRFIELD FACILITY REQUIREMENTS

The determination of airfield and airspace requirements includes 1) an assessment of the airport's ability to accommodate current and future aircraft activity, 2) compliance with recommended FAA design standards, and 3) an evaluation of design standards for new facilities and/or the improvement of existing facilities.

Airfield facility needs include runway orientation, runway length, width, and pavement strength, as well as taxiway requirements, airfield marking, and lighting needs. Airspace needs include approach surface slope, approach type, and approach minimums to the runway environment.

RUNWAY ORIENTATION

It is preferable for the primary runway to be oriented as closely as possible with the direction of the prevailing winds. The desirable wind coverage is 95 percent for the primary runway and is computed based on the crosswind component not exceeding 10.5 knots for small aircraft. These aircraft are recommended to be able to operate approximately 95 percent of the time without experiencing a crosswind component greater than 10.5 knots for aircraft weighing less than 12,500 pounds and 13 to 20 knots for aircraft weighing greater than 12,500 pounds.

As indicated in Chapter 1, Wind Analysis, UTS's only runway provides adequate wind coverage for small aircraft at 10.5 knots of crosswind. Specifically, Runway 18-36 provides 98.9 percent wind coverage for 10.5 knot crosswinds during all-weather wind conditions. Therefore, the alignment of the runway system is properly oriented to satisfy FAA recommended wind coverage needs of UTS.

RUNWAY LENGTH

Determination of runway length requirements for UTS was derived from FAA AC 150/5325-4B, Runway Length Requirements for Airport Design.

Runway lengths for small aircraft (less than 12,500 lbs.) consider performance curves of propeller and some turbo-prop aircraft, including maximum takeoff and landing weights, headwind component, optimal flap settings for normal operations, elevation above mean sea level, and mean maximum daily temperature for the airport. The recommended runway length for small piston aircraft should accommodate 95 to 100 percent of the small GA aircraft fleet with less than 10 passenger seats. **Table 3.5** illustrates Runway 18-36's length requirements, taking into consideration varying operational variables. Table 3.5 also highlights the recommended length and width to correspond with the FAA's planning guidelines.

Runway lengths for large aircraft (12,500 lbs. up to 60,000 lbs.) consider performance curves derived from FAA-approved flight manuals for turbo-prop and business jets developed in accordance with provisions of Federal Aviation Regulation (FAR) Part 25, Airworthiness Standards: Transport Category Airplanes and Part 91, General Operating and Flight Rules. Landing and takeoff operational adjustments such as load factor, runway gradient and pavement conditions are those variables which have the most influence on runway length requirements for large aircraft. Suitable runway length for UTS is recommended to serve 75 percent of the GA aircraft fleet at 60 percent useful load on takeoff and weighing between 12,500 pounds and 60,000 pounds. This is presented for future planning purposes and to provide data for the alternatives evaluation process in the following chapter of the master plan.

Table 3.5
Runway Length Requirements Summary

Airport and Runway Data	Variable
Airport elevation (mean sea level-MSL)	362.9’
Mean daily maximum temperature of the hottest month	96º F
Existing/Future Critical Aircraft	Cessna Citation ‘Sovereign’
Maximum difference in runway centerline elevation*	62.9 feet
Percent of Fleet/Useful Load (%)*	75/60
Runway Lengths for Small Airplanes w/ MTOW < 12,500 pounds or Less for 100% of GA Fleet	
RW 18-36 Length (Existing)	5,005 feet
RW 18-36 Length (FAA Recommended)	3,900 feet
Runway Lengths for Airplanes w/ MTOW of > 12,500 pounds up to 60,000 pounds (75% of GA Fleet)	
RW 18-36 Existing Length	5,005 feet
RW 18-36 (75% of GA Fleet at 60% Useful Load)	4,800 feet
RW 18-36 (Runway Gradient – 1.3%)**	5,500 feet
RW 18-36 (Wet Pavement Condition)***	5,500 feet
Runway Lengths for Airplanes w/ MTOW of > 12,500 pounds up to 60,000 pounds (100% of GA Fleet)	
RW 18-36 Existing Length	5,005 feet
RW 18-36 (100% of GA Fleet at 60% Useful Load)	5,800 feet
RW 18-36 (Runway Gradient – 1.3%)****	6,500 feet

MTOW- Maximum Takeoff Weight
(*) Information used to calculate runway length requirements for turbine aircraft weighing greater than 12,500 pounds up to 60,000 pounds.
(**) Runway lengths are increased at the rate of 10 feet for each foot of elevation difference between the high and low points of the runway centerline. In this case, runway gradient accounts for an additional 629 feet of runway length (5,429 feet) which results in an adjusted recommended length of 5,500 feet.
(***) Runway length requirements for jet powered airplanes obtained from the “60 percent useful load” curves are increased by 15 percent or up to 5,500 feet, whichever is less.
(****) Runway lengths are increased at the rate of 10 feet for each foot of elevation difference between the high and low points of the runway centerline. In this case, runway gradient accounts for an additional 629 feet of runway length (6,429 feet) which results in an adjusted recommended length of 6,500 feet.
Source: FAA AC 150/5325-4B, Runway Length Requirements for Airport Design.

Considering the airport’s current and projected aircraft activity and diverse aircraft fleet mix, the usable length of Runway 18-36 is recommended to be 5,500 feet.

Although the demand forecasts project business jet activity less than what is necessary to justify extending the primary runway to accommodate 100 percent of the GA business jet fleet and/or ARC C-II aircraft (Bombardier Challenger 300/600/601/604 and Gulfstream G150/G280), it is always feasible to plan for additional runway length to accommodate business jets beyond forecasted levels should the demand arise. **Table 3.5** also illustrates the recommended length requirements for Runway 18-36 in the event the airport experiences greater than 500 transient jet operations or hosts a based ARC C-II business jet at some point during the planning period. In this scenario, the recommended runway length would be 6,500 feet. However, this length consideration would have to be justified with demand by ARC C-II airplanes (500 annual operations) in order to be eligible for federal funding. Otherwise, the costs associated with extending the runway will be financed with 100 percent local funding sources.

RUNWAY WIDTH

The recommended runway width is a function of the RDC for a particular runway. For planning purposes, the current 100-foot width of Runway 18-36 will be sufficient to accommodate existing and projected demand and is recommended to remain unchanged throughout the planning period.

Per FAA runway design standards, UTS's critical aircraft requires a runway width of 75 feet. Although the airport's current design standards meet Category C requirements, the projected business jet activity by Category C airplanes is not currently supported by demand and is less than what is recommended to maintain the current 100-foot width. However, it is reasonable to plan for maintaining additional runway width to accommodate activity by large business jets beyond forecast levels.

In the future, TxDOT will likely only participate in a width of 75 feet for any reconstruction and/or extension project associated with Runway 18-36 unless the requisite 500 operations are reached by the larger ARC C-II aircraft. The City may be required to justify the 100-foot width with demand in order to be eligible for federal funding. Otherwise, the City may have to commit to funding any additional width beyond 75 feet with local funding sources.

PAVEMENT STRENGTH

The recommended pavement strength is based on normal activity levels and is expressed in terms of aircraft landing gear type (i.e., single wheel gear- SWG and dual wheel gear - DWG). It is important for airfield pavements to be capable of withstanding regular activity by large and heavy turbine aircraft.

Based on UTS's critical aircraft, as well as current and projected large aircraft activity, Runway 18-36's weight bearing capacity of 27,000 pounds for SWG loading is sufficient to accommodate demand throughout the planning period.

TAXIWAYS

Taxiways serve a defined area accommodating the movement of aircraft to and from the runway and also serve as a transition between the airside and terminal area.

UTS's taxiway system was described in **Chapter 1**, **Table 1.2** and depicted on **Exhibit 1.2**. Runway 18-36's taxiway system is recommended to be continuously served by a 35-foot-wide full-length parallel, connector and access taxiways throughout the planning period. As previously discussed, this width recommendation will serve the most demanding aircraft fleet mix of ARC B-II and C-II aircraft that use the airport on a regular basis including the Cessna Citation and Bombardier family of business jets. The 200 foot (2018)/240 foot (2019) distance between Runway 18-36 and Taxiway A has been planned in accordance with FAA guidance and meets the recommended RDC standards for UTS. The weight bearing capacity of the Airport's current taxiway system should accommodate 27,000 pound SWG aircraft.

LIGHTING, MARKING AND SIGNAGE

The airport's markings and lighting systems were described in Chapter 1, Airfield Facilities. These facilities assist pilots in navigating to the airport at night and in low visibility conditions and also guide aircraft maneuvering on the ground.

RUNWAY AND TAXIWAY LIGHTING

It is recommended Runway 18-36 maintain pilot-controlled, medium intensity runway lighting (MIRL), as well as the red and green omni-directional threshold lights throughout the planning period.

The airport's taxiway system is recommended to be continuously equipped with blue, medium intensity taxiway lighting (MITL) and centerline reflectors throughout the planning period.

RUNWAY END INDICATOR LIGHTS (REIL)

REILs include high intensity, photo strobe lights used for rapid identification of the thresholds during night and inclement weather conditions. Runway 18-36 is recommended to retain the REILs located at the runways' thresholds throughout the planning period.

VISUAL APPROACH AIDS

Precision Approach Path Indicators (PAPI) emit a sequence of colored light beams providing continuous visual descent guidance information along the desired final approach descent path (normally at 3 degrees for 3 nautical miles during daytime, and up to 5 nautical miles at night) to the runway touchdown point. Runway 18-36 is recommended to be continuously served by a four box PAPI-4L system throughout the planning period.

APPROACH LIGHTING SYSTEMS

An approach lighting system is utilized in conjunction with existing and future instrument approach procedures with minimum visibilities less than 1-mile to aid in identifying the airport environment while conducting approaches during IFR weather conditions. Should the airport be capable of accommodating non-precision approaches with visibilities not lower than 3/4-mile, then a medium intensity approach lighting system with runway alignment indicator lights (MALSR) is recommended. In the event the airport is capable of providing precision approach capabilities with minimum visibilities down to but not less than 1/2-mile, again, a MALSR is recommended.

AIRFIELD MARKINGS

UTS's runway and taxiway system is recommended to be marked in accordance with FAA AC 150/5340-1J, Standards for

Airport Markings. Runway 18-36 is recommended to remain marked as a non-precision runway given published instrument approach procedures. However, in the event the airport is capable of providing precision approach capabilities with minimum visibilities down to 1/2-mile, Runway 18-36 would need to be marked as a precision runway.

AIRFIELD SIGNAGE

UTS's runway and taxiway system is recommended to be served by airfield signage installed and sited in accordance with FAA AC 150/5340-18F, Standards for Airport Sign Systems. The current signs are an older design and sign panels do not meet current standards. An upgrade to the airfield signage is recommended with the next major airfield electrical project.

AIRSPACE REQUIREMENTS

UTS's airspace characteristics were described in Chapter 1, Existing Conditions. This section will discuss obstacle clearance surfaces (OCS) associated with a runway. OCS are evaluation surface that define the minimum required obstruction clearance for approach or departure procedures.

RUNWAY END SITING REQUIREMENTS

These standards provide guidance on the preliminary design for the establishment of runway thresholds and departure ends. Furthermore, these standards are used to protect the Terminal Instrument Procedures (TERPS) for runway ends to ensure all surfaces associated with the runway threshold are clear of obstacles.

Approach ends for Runway 18-36 are expected to support instrument night operations serving greater than approach Category B aircraft. The dimensions for this surface begin 200 feet from the runway threshold, with dimensions of 800' x 3,800' x 10,000' and include a 20:1 OCS slope.

FAR PART 77

Exhibit 3.1 depicts airspace surfaces based on FAR Part 77, Objects Affecting Navigable Airspace. Part 77 airspace surfaces are used to assess existing and proposed obstacles against the safe and efficient use of the airport's navigable airspace. Part 77 surfaces include the primary, horizontal, transitional, approach, and conical surfaces. The approach surface is a three-dimensional trapezoidal-shaped imaginary surface beyond each runway end and has a defined slope. The three slopes for an approach are 20:1, 34:1, and 50:1.

Due to existing and proposed non-precision approach capabilities and pavement strength rating, the ultimate Part 77 approach surfaces obstruction standard slope will remain 34:1 for each approach end of Runway 18-36.

GLIDE PATH QUALIFICATION SURFACE

According to FAA guidance, the Glide Path Qualification Surface (GQS) has a 30:1 OCS slope and extends from the runway threshold along the runway centerline to the Decision Altitude (DA) point for a vertically-guided instrument approach procedure. The GQS limits the height of obstructions between this point and the runway threshold. When obstructions exceed the height of the GQS, an approach procedure with positive vertical guidance (i.e., LPV) is not authorized.

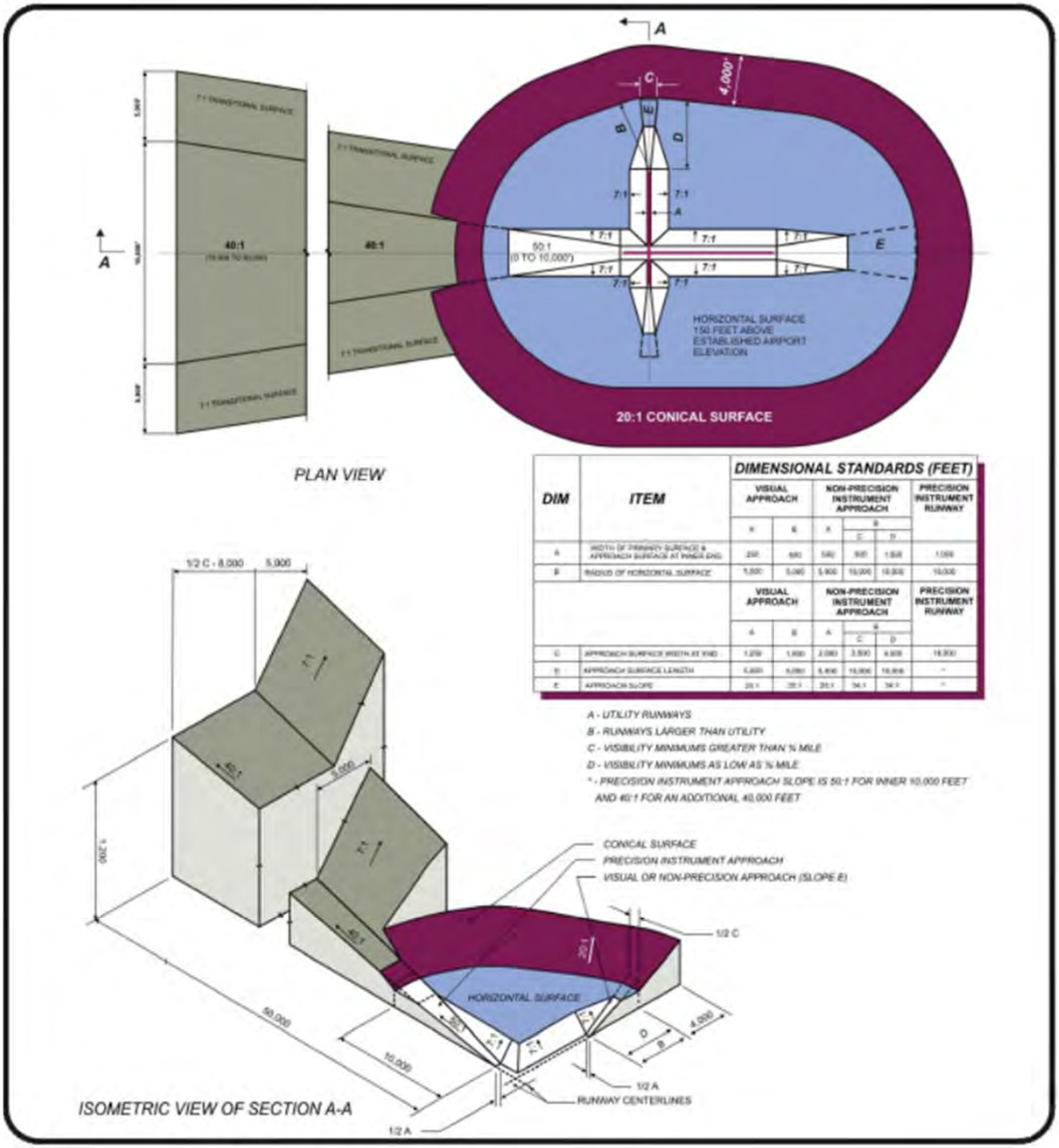
Due to existing and proposed vertically-guided non-precision approach capabilities for Runway 18-36, the 30:1 GQS surface must remain clear of obstacles throughout the planning period. The GQS surface for each approach end begins at the threshold and measures 300’ x 10,000’ x 1,520’.

DEPARTURE SURFACE

According to FAA guidance, the Departure Surface (DS) has a 40:1 OCS slope and extends from the runway threshold along the runway centerline to a point 10,200 feet from the runway departure end. The DS for each runway end measures 1,000’ x 10,200’ x 6,466’. Departure surfaces for runways with published instrument approaches, when clear, allow aircraft to fly standard departure procedures.

The 40:1 DSs associated with Runway 18-36 are recommended to remain clear of obstacles throughout the planning period.

Exhibit 3.1
Part 77, Objects Affecting Airspace



OTHER AIRFIELD REQUIREMENTS

This section provides brief planning recommendations for UTS's weather reporting system, airport beacon, and potential land acquisition needs associated with airfield expansion.

WEATHER REPORTING SYSTEM

The Automated Surface Observation System (ASOS) is a suite of sensors which measures, collects, and disseminates weather data on a minute-to-minute basis to assist pilots with monitoring weather conditions and flight planning. An ASOS measures weather parameters such as wind speed and direction, temperature and dew point, visibility, cloud ceilings and types, precipitation, and barometric pressure, as well as airport identifier and time of observation. Operated and controlled cooperatively by the National Weather Service (NWS), FAA and Department of Defense (DOD), ASOS serves as the primary climatological network in the U.S. making up the first-order network of climate stations.

UTS's ASOS is recommended for relocation as part of the Taxiway A relocation project. A final site has yet to be determined. Potential relocation sites will be evaluated during the alternatives evaluation of the next chapter in the master plan.

AIRPORT BEACON

The airport beacon provides visual airport identification and location during night-time operations, as well as during inclement weather conditions. It is recommended that the airport beacon be maintained in its current location for the foreseeable future and replaced and maintained as necessary during the planning period.

LAND ACQUISITION REQUIREMENTS

UTS's property includes part or all of four land parcels, totaling 180 acres held in fee simple ownership. The preferred airfield development concept discussed in the next chapter may require additional property acquisition.

Per FAA runway design standards and land use guidance, an RPZ totaling approximately 14 acres is sufficient to provide land use compatibility for Category B airplanes similar to UTS's critical aircraft. It is important to plan for larger RPZs to maintain land use compatibility within the inner portion of the approach surfaces to serve large business jets beyond forecasted levels should the demand arise. Although the airport's current RPZ standards plan for Category C criteria, regular activity by Category C airplanes is not supported by demand and is less than what is recommended to maintain RPZs totaling nearly 30 acres in size.

In the future, the FAA will likely only participate in acquiring land inside a 14 acre RPZ for any expansion project associated with Runway 18-36. The City will be required to justify the Category C RPZ size with demand in order to be eligible for federal funding.

TERMINAL AREA REQUIREMENTS

Terminal area facilities include the passenger terminal building, auto parking, aircraft hangars, aircraft parking apron, as well as support facilities such as fuel storage and aircraft maintenance.

PASSENGER TERMINAL BUILDING

The terminal building is often viewed as the front door to a community. This building will host travelers and is the first impression of the local community that visitors will encounter. Terminal buildings accommodate users by providing airport administrative offices, conference areas, pilots' lounge, flight planning and weather data, restrooms, concessions, and FBO space. Improvements to the terminal building should strive to achieve an acceptable balance between passenger convenience, operational efficiency, financial feasibility, and aesthetics.

The recommended terminal functional areas including square footage and parking facilities were determined by referring to FAA AC 150/5360-13, Planning and Design for Airport Terminal Facilities, as well as FAA AC 150/5390-9, Planning and Design of Terminal Facilities at Non-Hub Locations. **Table 3.6** summarizes the terminal building spatial needs throughout the long-term planning period.

Table 3.6
Terminal Building Needs Summary

Operational Activity/Factors	Existing	Short-Term (0-5 Years)	Mid-Term (6-10 Years)	Long-Term (11-20 Years)
Annual Operational Demand	**29,600**	**30,650**	**34,900**	**39,600**
Peak Month (OMAD) Operations	**3,256**	**3,372**	**3,839**	**4,356**
Design Day (PMAD) Operations	**107.1**	**110.9**	**126.3**	**143.3**
Peak Hour Operations	**16.1**	**16.6**	**18.9**	**21.5**
Peak Hour Passengers	**24.1**	**28.3**	**35.0**	**44.1**
Terminal Building Spatial Needs (sq. ft.)	**3,600**	**4,400**	**5,400**	**6,800**
Existing Terminal Space (sq. ft.)	**3,600**			
Terminal Building Space Surplus/(Need) (sq. ft)	**300**	**(800)**	**(2,500)**	**(3,200)**

Source: Lochner; FAA AC 150/5360-13 and FAA AC 150/5360-9.

The terminal building has a surplus of 300 square feet based on existing conditions and with the FBO providing the day-to-day airport management functions. In the future with the option of a full-time airport manager, the current terminal building will have less space than prescribed. In the short-term an additional 800 square feet is recommended while the long-term needs see the building almost doubling in size to 6,800 square feet at the conclusion of the planning period. Accordingly, UTS's terminal building is recommended to be maintained in its current size and condition with expansion options explored during the alternatives evaluation to provide for full-time management space and expansion space.

TERMINAL AREA AUTO PARKING

Public auto parking facilities were described in Chapter 1, Terminal Area Facilities. Auto parking facility needs will evaluate parking stalls and maneuvering area needed for local and transient airport users based on the peak hour passengers identified previously. **Table 3.7** summarizes the ultimate auto parking needs during peak operating conditions.

Table 3.7
Auto Parking Needs Summary

OPERATIONAL ACTIVITY/FACTORS	EXISTING	SHORT-TERM (0-5 YEARS)	MID-TERM (6-10 YEARS)	LONG-TERM (11-20 YEARS)
Peak Hour Passengers	**24.1**	**28.3**	**35.0**	**44.1**
Parking Spaces/Peak Hour Passenger	**1.5 parking spaces**			
Total Parking Demand (Stalls)	**36**	**42**	**53**	**66**
Square Footage/Parking Stall	**400 sq. ft.**			
Total Parking Area Demand (square feet)	**18,100**	**21,200**	**26,300**	**33,000**
Existing Auto Parking Facilities	**32 Stalls/11,200 sq. ft.**			
Parking Stall Surplus/(Need)	**(4)**	**(10)**	**(21)**	**(34)**
Parking Area Surplus/(Need) (square feet)	**(6,900)**	**(10,000)**	**(15,100)**	**(21,800)**

Source: Lochner; FAA AC 150/5360-9.

The terminal building auto parking facilities are frequently full, overflowing to other nearby parking areas. There is a current need for an additional four parking spaces and 6,900 square feet of parking stalls/maneuvering space. Ultimately, these parking facilities are expected to have a need for 21,800 additional square feet of parking/maneuvering area and 34 parking stalls at the conclusion of the planning period. Options to expand the existing auto parking facilities to serve peak hour passenger demand in the future will be examined.

AIRCRAFT HANGARS

UTS's hangar facilities and corresponding square footage estimates were discussed in Chapter 1, **Table 1.3**. Hangar requirements will include the recommended number of future hangar spaces and spatial requirements for T-hangars and clear span or box hangars. UTS's demand forecasts project 83 total based aircraft, including 66 single engine, eight twin-piston, four multi-engine turbo-props, four business jets and one helicopter in 2038.

T-Hangars

It is assumed that 95 percent of the based single and multi-engine piston aircraft would be provided enclosed T-hangar space in the future. However, this may differ from actual hangar arrangements. It is also assumed that the majority of piston aircraft currently stored in clear span hangars would be relocated to T-hangars throughout the planning period. Single- and twin-engine aircraft generally require approximately 1,250 square feet of storage space. **Table 3.8** summarizes the T-hangar storage requirements for UTS throughout the planning period.

Table 3.8
T-Hangar Requirements Summary

Operational Activity/Factors	Existing	Short-Term (0-5 Years)	Mid-Term (6-10 Years)	Long-Term (11-20 Years)
Based Aircraft*	53	60	66	72
Square Footage/Aircraft	1,250 square feet			
T-Hangar Demand (Spaces)**	50	57	63	68
T-Hangar Area Demand (square feet)	60,000	71,300	78,400	85,000
Existing T-Hangar Facilities	51 T-hangar units/58,600 square feet			
T-Hangar Space Surplus / (Need)	1	(6)	(12)	(17)
T-Hangar Area Surplus / (Need) (square feet)	1,250	7,500	15,000	(21,250)

(*) Includes single and multi–engine piston aircraft and excludes multi-engine turbine aircraft and business jets as they will most likely be stored in clear span or box hangars.
(**) Indicates 95 percent of local single and multi-engine piston based aircraft. Two to three piston powered aircraft per planning phase will likely be stored on the apron.
Source: Lochner. Figures rounded to the nearest hundred for planning purposes.

The development of two additional 10-unit T-hangar structures totaling 25,000 square feet of space is recommended to serve projected single- and twin-piston based aircraft demand. These additional facilities are expected to accommodate based aircraft demand slightly beyond projected levels. Ultimately, UTS is expected to accommodate approximately 68 T-hangar units, totaling nearly 85,000 square feet of space.

Clear Span Hangars

Clear span, or box, hangars are usually 5,000 square feet or larger and generally preferred by operators of turbine aircraft or owners of multiple aircraft. Based on the overall square footage and door height, the Microhangar and TDCJ hangar are suited to accommodate large turbine aircraft storage. The western section of Hangar B is an 80’ x 60’ clear span hangar end cap to this T-hangar building. Although capable of hosting turbine airplanes, some of these hangars will likely continue to be occupied by piston aircraft throughout the planning period. Therefore, this evaluation will determine the recommended facility needs for future based turbine aircraft which are expected to be stored in privately-owned hangars. However, this assumption may differ from actual future hangar arrangements. **Table 3.9** summarizes the clear span hangar storage needs throughout the planning period.

Table 3.9
Clear Span Hangar Requirements Summary

Operational Activity/Factors	Existing	Short-Term (0-5 Years)	Mid-Term (6-10 Years)	Long-Term (11-20 Years)
Turbine Aircraft Demand	6	8	10	12
Square Footage/Aircraft and/or Hangar	5,000 square feet (minimum)			
Clear Span Hangar Demand (Spaces)	6	8	10	12
Clear Span Hangar Demand (square feet)	30,000	40,000	50,000	60,000
Existing Clear Span Hangar Facilities	4 hangars/20,500 square feet			
Clear Span Hangar Surplus/(Deficit)	(2)	(4)	(6)	(8)
Clear Span Hangar Area Surplus (square feet)	10,000	20,000	30,000	40,000

Source: Lochner. Figures rounded to the nearest hundred for planning purposes.

At the conclusion of the planning period, 12 clear span hangars totaling 60,000 square feet will be necessary to accommodate based turbine airplane demand. These aircraft are expected to include single-, twin-turbine and business jets associated with new tenants. This recommendation includes constructing new hangars in addition to those already located at UTS.

APRON AREAS AND TIE-DOWNS

Apron and tie-down facilities were discussed in Chapter 1, Terminal Area Facilities. This evaluation will include apron area and tie-down needs for local as well as transient piston and turbine airplanes.

Apron needs for single- and multi-engine piston based aircraft total approximately 360 square yards of apron area which includes taxilane dimensions for aircraft maneuvering with wingspans up to 49 feet. Per planning guidelines, five percent of the based piston aircraft will be provided with apron space for storage equaling 755 square yards of apron area per tie-down space. The norm for similar airports is for UTS to house 95 percent of based aircraft within hangars and only five percent initially in tiedowns.

Evidence from an on-site inspection indicates the long-term apron south of the terminal building is used to a greater degree than the norm for similar general aviation airports in the region. During the inventory of airport facilities in April 2018, eight aircraft were parked on the long-term apron.

As a result of this information, based aircraft tiedowns and apron needs were adjusted to reflect the higher use. Existing tiedown and apron needs were set at ten percent during existing conditions. This percentage increases slightly until the end of the planning period, when 12 percent of based aircraft can be accommodated in apron tiedowns for long-term storage. **Table 3.10** summarizes the airport's based aircraft apron area requirements.

Aircraft parking and tie-downs to serve transient aircraft were calculated by relying on the airport's projected Design Day operational activity. For single- and multi-engine aircraft with wingspans up to 49 feet, 800 square yards of apron will be provided. Single- and multi-engine turbo-props and business jets with wingspans up to 79 feet will be provided nearly 1,100 square yards of apron space per aircraft plus 10 feet of clearance between wingtips. It was assumed, based on inventory data and confirmed by the FBO, that 60 percent of itinerant aircraft are small single- and twin-piston aircraft and a corresponding 40 percent are large business aircraft. Photos provided by the FBO indicate the transient apron closer to the terminal building and fueling operations is filled to overflowing with visits by not more than two business aircraft similar to the existing and future design aircraft. **Table 3.10** summarizes UTS's itinerant aircraft apron calculations throughout the planning period.

Table 3.10
Apron Area/Tie-Down Needs Summary

OPERATIONAL ACTIVITY/FACTORS	EXISTING	SHORT-TERM (0-5 YEARS)	MID-TERM (6-10 YEARS)	LONG-TERM (11-20 YEARS)
Based Aircraft Apron Area/Tie-Down Demand				
Tie-Down Spaces	5	7	8	10
Apron Area Demand (square yards)	2,400	3,000	3,500	4,500
Transient Single- and Multi-Engine Piston (wingspan less than 49 feet) Apron/Tie-Down Demand				
Tie-Down Spaces	3	5	7	10
Apron Area Demand (square yards)	1,900	3,300	4,600	6,000
Transient Turbine and Business Jet (wingspan up to 79 feet) Apron/Tie-Down Demand				
Tie-Down Spaces	2	4	5	6
Apron Area Demand (square yards)	2,700	4,600	6,400	8,300
Total Apron Area/Tie-Down Demand (Local and Transient Airplanes)				
Small Piston Aircraft Tie-Downs	8	11	13	20
Large Turbine Aircraft Tie-Downs	4,300	6,300	8,100	10,500
Total Apron Area Demand (square yards)	2	4	5	6
Existing Apron and Tie-Down Facilities	2,700	4,600	6,400	8,300
Existing Tie-Spaces	22			
Existing Apron Area (square yards)	13,900			
Apron and Tie-Down Surplus				
Tie-Down Space Surplus/(Deficit)	14	10	6	(1)
Apron Area Surplus/(Deficit) (square yards)	6,900	2,900	500	(4,900)

Source: Lochner.

Long-term apron area and tie-down needs for projected local and transient aircraft demand is expected to total approximately 18,800 square yards and include 20 small and six large aircraft tie-downs. During the long-term, another 4,900 square yards of apron area and one additional tie-down is recommended by the conclusion of the planning period. Based on available apron facilities, UTS will have a surplus initially and may need to seek more efficient use of the space. Future apron expansion to accommodate existing and long-term based and transient aircraft is needed. An evaluation of this need will be provided in the Alternatives chapter.

SUPPORT FACILITY REQUIREMENTS

Functions and/or facilities that related to the overall operation of the airport include fueling facilities, aviation maintenance facilities, and fuel truck spill containment facilities. Each of these areas will be discussed below with estimates for space required to support based and transient aircraft operations at the airport.

FUEL STORAGE

Fuel facilities were discussed in Chapter 1, Terminal Area Facilities. This evaluation will include recommended storage capacity for 100LL and Jet-A fuel. During the past five-year period, the airport has dispensed an average of approximately 138,500 total gallons of fuel, including nearly 30,000 gallons of 100LL and 108,500 gallons of Jet-A annually. **Table 3.11** summarizes peak fueling levels for 100LL and Jet-A along with recommended fuel reserves throughout the planning period.

Table 3.11
Fuel Storage Summary

OPERATIONAL ACTIVITY/FACTORS	EXISTING	SHORT-TERM (0-5 YEARS)	MID-TERM (6-10 YEARS)	LONG-TERM (11-20 YEARS)
100LL Fueling Operations				
Annual Fueling Demand (Gal.)	37,000	50,300	58,200	65,100
Peak Monthly Fueling Demand (Gal.)	2,900	4,200	4,900	5,400
Peak Day Flowage (Gal.)	100	140	160	180
100LL Demand + Reserves (Gal.)*	1,300	1,900	2,200	2,500
Existing 100LL Storage Capacity	14,000**			
Jet-A Fueling Operations				
Annual Fueling Demand (Gal.)	103,000	136,900	178,800	252,300
Peak Monthly Fueling Demand (Gal.)	8,600	11,400	14,900	21,000
Peak Day Flowage (Gal.)	280	370	490	690
Jet-A Demand + Reserves (Gal.)*	3,900	5,200	6,800	9,700
Existing Jet-A Storage Capacity	28,000**			

Note: Figures rounded to the nearest hundred for planning purposes.
Note: Peak month fueling operations are assumed to be 18 percent of the annual fueling activity.
Note: Peak day fueling operations consider the peak month activity and divides that figure by 30 days.
(*) Recommended fuel reserves equal Peak Day plus 13 days (2 weeks).
(**) 100LL and Jet-A fuel storage capabilities consider the airport's underground storage tanks plus the mobile fuel truck capacity.
Source: Lochner.

Projected fuel flowage for 100LL was determined by applying anticipated annual operational growth rates for piston aircraft to the base case fuel flowage figures. 100LL fuel demand is expected to increase approximately 2.3 percent annually throughout the period, which is reflective of the piston powered airplane fleet operational growth estimates and additional aircraft storage at UTS. Jet-A fuel demand was projected to increase approximately three percent annually, which is reflective of

UTS's anticipated turbine aircraft operational growth.

As a result of the fuel storage needs analysis, the airport is recommended to have no less than 1,900 gallons of 100LL and 5,200 gallons of Jet-A fuel on hand to accommodate existing operational activity. Ultimately, the airport is recommended to have 2,500 and 9,700 gallons of 100LL and Jet-A fuel, respectively, available to serve anticipated peak activity. Taking into account fuel storage and peak month fueling throughout the planning period, the existing fuel farm is adequate to meet long-term fueling demands.

AIRCRAFT MAINTENANCE

The airport's maintenance capabilities were discussed in Chapter 1, On-Airport Businesses. Huntsville Aviation, the full-service fixed base operator, provides airframe and powerplant maintenance for piston powered aircraft as well as general aviation aircraft fueling, flight training, and charter services. The FBO currently operates from the terminal building and the maintenance hangar. Should the opportunity and/or demand arise, a 10,000 square foot, at minimum, clear span hangar would be recommended for major and/or minor airframe and powerplant maintenance for piston and turbine airplanes.

FUEL TRUCK PARKING AREA/SPILL CONTAINMENT

As part of any future Spill Prevention Control and Countermeasure Plan (SPCC) for the airport, a fuel spill containment system is recommended for current and/or future fuel truck parking areas to protect local groundwater sources from potential containment arising from a fuel spill or leakage.

The 100LL and Jet-A fuel trucks are stored on pavement in front of Hangar Q when not in use. Construction of containment barrier around the fuel truck parking is recommended. This would be approximately eight inches in height. The containment would be also constructed on the declining gradient side in order to ensure that any fuel spills would be directed to the barrier and prevent petroleum products from contaminating groundwater or soils in the area.

SUMMARY

The intent of the chapter has been to outline the recommended facility improvements necessary to meet aviation demand throughout the long-term planning period. The next step of the planning process is to develop airfield and terminal area development alternatives that meet the operational needs of current and projected airport activity. The remaining elements of the project will be dedicated to updating UTS's Airport Layout Plan (ALP) and highlighting future capital development, including project timing and potential costs, during the 0-10 year planning period.

CHAPTER 4: DEVELOPMENT ALTERNATIVES

INTRODUCTION

The previous chapter, Facility Requirements, presented potential airfield, terminal area, and support facility needs of the Huntsville Regional Airport (UTS) throughout the 20-year period. The focus of this chapter will be to describe and evaluate development alternatives that will allow UTS to accommodate projected long-term aviation demand.

The development alternatives proposed for UTS are intended to serve as the formulation of a development concept rather than the recommendation of a final design.

The preferred development alternatives, based on an assessment of factors involved with airport expansion, should be those having the greatest potential for implementation. Additionally, the preferred alternatives, selected by the City of Huntsville (Airport Sponsor), will serve as the basis for the Airport Layout Plan (ALP) drawing set.

AIRPORT DEVELOPMENT GOALS AND OBJECTIVES

Realistic goals for airport expansion have been established to serve as a guide for future improvements. These goals and objectives take into account the projected long-term aviation demand, airport operating conditions, UTS's role within the national and state aviation systems, as well as needs identified in Chapter 3. These include the following:

- Continued adherence to FAA and TxDOT design and land use standards.
- Preparation of a reasonable Capital Improvement Program (CIP) that provides a realistic vision to meet future aviation demand.
- Preferred airfield and terminal area improvement will be those that best fit the needs of the Airport Sponsor and UTS users.
- Evaluation of development options that minimize the need to acquire property and/or realign roadways while allowing the airport to serve transportation needs of the Airport Sponsor and region.

Inclusion of the preferred development alternative, or projects related to those alternatives, on the ALP do not indicate a commitment on the part of the TxDOT and/or FAA to provide funding for improvements discussed in this chapter.

EVALUATION CRITERIA

Development alternatives for UTS coincide with current and future operational trends, aircraft demand forecasts, and facility needs to serve activity throughout the planning period, as well as potential environmental impacts of expanding airfield and/or terminal facilities. Goals and objectives pertaining to airfield and terminal area improvements were also considered. The following criteria was used to evaluate development alternatives including, but not limited to:

- Operational Factors – Provide a runway that accommodates 100 percent of the general aviation fleet of aircraft with a maximum takeoff weight of not more than 12,500 pounds along with some business aircraft weighing in excess of 12,500 pounds with annual operations less than 500, allowing for operations of ARC C-II aircraft to increase beyond the 500 operations-per-year standard to allow for further growth beyond the planning period.
- Environmental Conditions – Proposed airport improvements will be evaluated to ensure the projects result in minimal and/or temporary environmental impacts.
- Land Use Compatibility – UTS, including any future improvements, shall be compatible with on-airport and adjacent land use. Furthermore, airport improvements will minimize adjacent land acquisition to the fullest extent feasible.
- Airspace Surfaces – Approach and departure surfaces will be planned in accordance with current FAA guidance and be compatible with current and future aircraft demand.
- Terminal Area Development – Terminal area improvements are expected to involve the development of new hangars, as well as the

reconfiguration and expansion of the aircraft apron, that are intended to serve current and future piston, turbine and jet aircraft, including demand beyond projected levels.

AIRPORT DEVELOPMENT CONSIDERATIONS

Airfield and terminal area improvements are recommended to coincide with anticipated needs identified in the Facility Requirements chapter. Proposed development alternatives present a broad range of expansion options and are discussed in the following sections. In evaluating the feasibility of potential expansion, considerations related to the airfield and terminal area are important in determining the need and practicality of expanding the facility. Pertinent airfield expansion considerations include:

- Maintain RDC B-II-5000 planning standards for RW 18-36 based on airfield facility needs discussion in the previous chapter including runway length and width, pavement strength, safety areas, as well as marking, lighting and signage.
- Plan for the ultimate upgrade of the airfield to RDC C-II-5000 planning standards should the need arise during the planning period, although operations conducted by ARC C-II aircraft do not currently meet the threshold of 500 per year, nor does the 20-year forecast project operations to reach 500 per year.
- Assess the option for better approaches on one or both ends of Runway 18-36 to accommodate larger aircraft in the timeframe before runway extension is warranted.
- Assess alternatives that provide airport environs that are free from incompatible uses; most notably, with no roadways traversing the RPZs.

Pertinent terminal area development considerations include:

- Redevelopment of terminal area in current location beyond existing and future building restriction lines.
- Development of a new terminal area to the west of the runway to accommodate a future RDC of C-II, as well as minimizing constraints of the current terminal area.

AIRFIELD DEVELOPMENT ALTERNATIVES

The Airport Sponsor was presented with five alternative development options, in addition to a ‘no action’ option to expand and/or improve the airfield. The following discussion will highlight the development alternatives intended to meet short- and long-term aviation demand.

NO ACTION

The No Action alternative involves maintaining the airfield geometry in its current condition and dimensions while not planning for future improvements. This option would result in the continued use of Runway 18-36 at its current length of 5,005 feet, with one-mile visibility minimums. As this alternative does not satisfy operational, airspace, or terminal area growth factors identified in the Evaluation Criteria, a practicable alternative must be identified.

Based on the airport’s current and future annual operational activity, diverse aircraft fleet mix, existing airfield geometry, and clear intent of the Airport Sponsor to improve UTS's airfield environment, the no action alternative is not considered a reasonable and/or prudent alternative.

AIRFIELD ALTERNATIVE 1 (EXTEND RUNWAY 18-36 TO 5,500'; MAINTAIN EXISTING RUNWAY 36 THRESHOLD; IMPROVE VISIBILITY MINIMUMS TO 3/4-MILE)

Airfield Alternative 1, as shown as **Exhibit 4.1**, extends Runway 18-36 by 495 feet while maintaining the Runway 36 threshold in its current location. The future runway dimensions would be 5,500' x 100'. The future length would allow UTS to retain the B-II-5000 RDC while allowing it to be used by some larger aircraft. The parallel taxiway would be extended accordingly. Extension of the runway and parallel taxiway to the north impacts the floodplain, and the extension of the taxiway would entail placement of fill into Hadley Creek. On the north end of the runway, both one-mile and 3/4-mile visibility minimums would be accommodated by the existing airport property; however, the RPZ on the south end of the runway would require land acquisition for both the one-mile and 3/4-mile minimums. Highway 75 also traverses the RPZ.

This alternative satisfies the operational, environmental conditions, and land use compatibility Evaluation Criteria, but does not satisfy the airspace surfaces, as Highway 75 would continue to traverse the southern RPZ.

It should be noted that the Master Plan Advisory Committee (MPAC) was also shown this alternative with a 6,500-foot runway with a C-II-5000 RDC. As the 'extended version' of this alternative was not warranted by the forecasts or facility requirements in the previous chapters, and involved extensive land acquisition and significant environmental impacts, it was eliminated from consideration by the MPAC and therefore not described in detail in this report.

AIRFIELD ALTERNATIVE 2 (EXTEND RUNWAY 18-36 TO 5,500'; SHIFT EXISTING RUNWAY 36 THRESHOLD TO THE NORTH; MAINTAIN VISIBILITY MINIMUMS AT ONE-MILE)

Airfield Alternative 2, presented in **Exhibit 4.2**, also extends Runway 18-36 by 495 feet and maintains a B-II-5000 RDC. However, this alternative differs from Airfield Alternative 1 in that the southern runway threshold is shifted to the north enough to accommodate one-mile visibility minimums and an RPZ being located entirely on existing airport property. Like Airfield Alternative 1, the future runway dimensions would be 5,500' x 100,' allowing UTS to retain the B-II-5000 RDC and accommodate some larger aircraft. This alternative would involve more extensive impacts to Hadley Creek and its tributaries, as the threshold being shifted 450 feet north and 495-foot extension would mean that the Runway 18 threshold would be 945 feet north of its current location. One-mile visibility minimums would be maintained. This alternative satisfies all Evaluation Criteria described on page 4.2.

It should be noted that the MPAC was shown this alternative with a 6,500-foot build-out alternative. Although not justifiable in the forecasts or facility requirements, further extension of the runway beyond

5,500 feet with the geometry presented in this alternative was examined to maximize long-term investment in the airport infrastructure for growth beyond the 20-year planning period. This examination yielded the conclusion that the negative impacts, such as four or five residences and extensive impacts to Hadley Creek and the floodplain, would prevent the airport from expanding beyond a 5,500-foot runway in its current location. As such, the MPAC considers the runway on its current alignment to be 'landlocked,' with feasibility of improvements beyond 5,500 feet impractical.

AIRFIELD ALTERNATIVE 3 (EXTEND RUNWAY 18-36 TO 5,500'; SHIFT EXISTING RUNWAY 36 THRESHOLD TO THE NORTH; 3/4-MILE VISIBILITY MINIMUMS AT ONE-MILE)

Similar to Airfield Alternative 2, this alternative entails a 5,500-foot runway with a threshold placed in a location that allows the southern RPZ to be on airport property. While Alternative 2 maintained one-mile visibility minimums, this alternative provides RPZs that will accommodate 3/4-mile minimums. This alternative also shifts the runway threshold to the north enough to allow the RPZ to be free of Highway 75; however, approximately three acres of land would need to be acquired from the Two Texans Truckwash, located west of the airport property. To accommodate a 3/4-mile minimum for Runway 18, approximately 35 acres of residential land, including three houses, would need to be acquired. To maintain an RPZ free of roadways, Hadley Creek Bend Road would also need to be closed at the new airport property boundary line.

To accommodate the larger RPZ on the south end of the runway, the Runway 36 threshold would need to be shifted north by approximately 1,162 feet to clear Highway 75. As such, approximately 1,657 feet of pavement would need to be added to the northern side of the runway to result in a 5,500-foot runway. This would also entail extension of the parallel taxiway 1,657 feet to the north. This action would result in Hadley Creek and its tributaries being impacted in three locations. The floodplain would also be impacted.

To accommodate the 3/4-mile visibility minimums for Runway 36, four T-hangar buildings would need to be relocated. Relocation of these hangars would be difficult on the east side of the airfield would be difficult, as a tributary to Hadley Creek extends nearly to the northern side of the existing taxilane pavement on the north side of the terminal area. Therefore, these T-hangar buildings would likely be moved to the west side of the airfield, as part of a new terminal area development. Impacts of terminal area development on the west side of the airfield are discussed in the subsequent section of this report.

AIRFIELD ALTERNATIVE 4 (SHIFT RUNWAY 18-36 300' WEST)

This alternative was developed with the vision that UTS could ultimately upgrade the airfield's geometry to a C-II-5000 RDC beyond the 20-year planning period forecasted in this Master Plan. Such long-term future improvements would require an additional offset of the taxiway to 300 feet from the runway; a concern of the MPAC, as a taxiway is currently underway that would not satisfy this requirement. Although a C-II-5000 RDC is not currently justified in the forecast or facility requirements in this Master Plan, the MPAC was concerned that the improvements within the 20-year planning period would not be useable once the runway warranted extension beyond 5,500 feet. This alternative also capitalizes on the need of Runway 18-36 to be reconstructed.

Airfield Alternative 4 depicts Runway 18-36 being constructed at an offset of 300 feet from the current runway centerline, allowing the existing runway alignment to be utilized as a parallel taxiway. As the MPAC desired to analyze an ultimate build-out of the runway beyond the 20-year planning period, a 6,500-foot runway length was depicted; however, a 5,500-foot runway could be constructed within the planning period, with additional extensions being possible beyond the planning period.

To maintain the southern RPZ on current airport property to the greatest extent possible, the Runway 36 RPZ was shifted approximately 1,700 feet to the north. This shift intentionally avoided impacts to the truck wash facility on the west/south side of airport property. To accommodate a 6,500-foot runway, approximately 99 acres of land acquisition would be required, with relocation of at least nine residences and closure of two roads. This alignment would also lead to Runway 18-36 traversing Hadley Creek and its tributaries in three places, with the extension of the parallel taxiway (former runway alignment) crossing the creek in two additional locations. A preliminary engineering feasibility analysis indicated that drainage impacts would be significant and potentially insurmountable.

AIRFIELD ALTERNATIVE 5 (CONSTRUCT RUNWAY 16-34)

Airfield Alternative 5 examines impacts of a runway on a new alignment, Runway 16-34, in effort to minimize residential and environmental impacts from airfield improvements. This alignment was adapted from the 2003 Master Plan, although it was not selected as the preferred development alternative at that time. At the request of the MPAC, this alternative examines the residential and environmental ultimate build-out of a 7,000-foot runway, although a runway of this length would not be warranted in the 20-year planning period. Visibility minimums of 3/4-mile were also included on each end of the runway, as well as airfield geometry supporting a C-II-5,000 RDC. This alternative also maximizes availability of a City-owned tract of land west-adjacent to the airport, which is not currently utilized for aviation purposes. It should be noted that, in order to satisfy the Evaluation Criteria set forth in this chapter, the alignment presented in the 2003 Master Plan was shifted northwest to remove Highway 75 and multiple buildings from the southern RPZ.

A 7,000-foot runway aligned as Runway 16-34 would garner favorable wind coverage, even without the use of Runway 18-36 as a crosswind runway. Ultimate build-out of this alternative would entail 310 acres of land acquisition, with the relocation of one farmstead with five buildings. Additionally, approximately one acre of Kate Barr Ross Park, including removal of a pavilion used for public activities. A 7,000-foot runway and its associated taxiway would traverse three tributaries to Hadley Creek, and would require removal of approximately 70 acres of removal of loblolly pine forest. The new terminal area, which was proposed to be located on the east side of the parallel taxiway, would involve fill in two tributaries of Hadley Creek, as well as grading and fill in the main channel of Hadley Creek.

Another noteworthy development barrier is the lack of devoted space for the ASOS. The new runway alignment would interfere with the proposed relocation of the ASOS. Should this development alternative be identified for further consideration, an alternate location for the ASOS would need to be identified.

Although this alignment would satisfy all Evaluation Criteria presented in this chapter, as well as provide C-II-5000 RDC airfield geometry, the environmental consequences and cost of this alternative would be significant. Additionally, as this alternative provides a runway length that is well beyond the needs of the 20-year planning period, this alternative would not be eligible for FAA funding.

Table 4.1 provides a comparison of the three airfield improvement alternatives. The preferred airfield alternative is discussed in the following section.

Table 4.1 – Evaluation Criteria Comparison Matrix

	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Advantages	Fewest environmental impacts	Satisfies airfield requirements for planning period	Optimal build-out of airport	Optimal build-out of airport	Optimal build-out of airport
Disadvantages	Buildings and highway in RPZ	Benefits of alignment maxed out at 5,500’	Extensive social and environmental impacts	Extensive social and environmental impacts	Extensive social and environmental impacts
Operational Factors	X	X	X	X	X
Environmental Conditions	X	X			
Land Use Compatibility	X	X			X
Airspace Surfaces		X	X	X	X
Terminal Area Development	X	X	X	X	X

Source: Lochner evaluation.

TERMINAL AREA DEVELOPMENT ALTERNATIVES

The Airport Sponsor was presented with a two terminal area development alternatives, in addition to a 'no action' option. The following discussion will highlight these development alternatives intended to meet short- and long-term aviation demand for UTS.

NO ACTION

The No Action alternative involves maintaining the terminal area in its current condition while not planning for apron improvements or additional hangar capacity. This would result in continuing to operate an apron that is insufficient to accommodate aircraft demand, and too few hangars to store airplanes. The FBO reports that the existing apron space is currently cramped when a large aircraft parks at UTS, and that there is a current waitlist for hangar space. Therefore, a practicable alternative must be identified.

Given the current terminal area configuration, projected based aircraft demand and clear intent of the Airport Sponsor to improve UTS's terminal area facilities, the no action alternative is not considered a reasonable and/or prudent alternative.

TERMINAL AREA ALTERNATIVE 1 (MAINTAINING EAST SIDE TERMINAL AREA)

Terminal Area Alternative 1, as shown in **Exhibit 4.6**, revolves around maintaining the existing runway location and most of the existing terminal area. With Airfield Alternatives 1, 2, and 4, the existing hangar buildings would be able to remain in place; however, Airfield Alternatives 3 and 5 would require removal of the southern portion of T-hangars, as well as relocation of the existing ramp space. Terminal Area Alternative 1 in its entirety is only compatible with Airfield Alternatives 1, 2, and 4. This alternative involves the expansion of the aircraft parking apron, making room for additional tie-downs of smaller aircraft on a newly-construction portion of pavement situated south of the existing apron. Under this scenario, the existing apron space would be utilized for larger turbo-props and jets.

Three additional 10-unit T-hangar buildings are depicted as being constructed north and east of the existing terminal area. Five additional box hangars would be situated east of the existing apron facility, while three additional box hangars would be situated south of the southernmost existing box hangar. It should be noted that development of the additional T-hangar buildings would entail placement of fill into a tributary of Hadley Creek. Furthermore, the additional box hangars and ramp space would occupy what is currently being used as a detention basin for the airfield. These developments would require another methodology for conveying stormwater throughout and off the southeastern portion of the airfield.

TERMINAL AREA ALTERNATIVE 2 (DEVELOPING A WEST TERMINAL AREA)

Terminal Area Alternative 2, as shown in **Exhibit 4.7**, considers a new location for the future terminal area at UTS. This alternative is implementable with any of the Airfield Alternatives, but is mandatory for

Alternatives 3 and 5. This Terminal Area Alternative includes provisions for:

- Airport entrance road off Highway 75.
- A new terminal building.
- Auto parking near the new terminal building.
- Aircraft parking apron supporting 14 tie-down spaces for small aircraft.
- Six 6-unit T-hangar buildings.
- 12 individual box hangars.

This Terminal Area Alternative provides the opportunity for smaller, locally-based aircraft to utilize one side of the airfield, while larger or transient aircraft utilize the other side, adjacent to the FBO. Furthermore, this Terminal Area Alternative allows for gradual additions to the west side of the airfield, and concurrent use with the eastern terminal area. It utilizes existing airport property, maintains visibility of the airport from Highway 75, and requires a relatively small area of tree clearing. Due to the versatility of this alternative, it was selected as the preferred Terminal Area Alternative.

ENVIRONMENTAL ANALYSIS OF DEVELOPMENT ALTERNATIVES

FAA Order 5050.4B, National Environmental Policy Act (NEPA) Implementation Instructions for Airport Actions, requires the evaluation of airport development projects as they relate to specific environmental impact categories by outlining types of impacts and the thresholds at which the impacts are considered significant. For some impact categories, this determination can be made through calculations, measurements, or observations. However, other impact categories require that the determination be established through correspondence with appropriate federal, state, and/or local agencies. A complete evaluation of the impact categories identified in FAA Order 5050.4B and Order 1050.1F, Environmental Impacts: Policies and Procedures, is required during an Environmental Assessment or Environmental Impact Statement.

The following analysis provides an overview of each environmental impact category as it applies to the environs surrounding UTS. A brief description of each impact category and the potential effect that the implementation of the Master Plan projects at the airport may have on the resources identified in the environmental category. Future development plans at UTS should take into careful consideration those environmental issues that are known to exist in the vicinity of the airport. Early identification of these environmental factors may help to avoid impeding development plans in the future. It should be noted that some of the environmental resource categories, such as air quality or construction impacts, are impacted universally by all of the development alternatives. In these cases, the impacts of the development alternatives are discussed in a generic manner. Some of the development alternatives affect environmental resources in different ways, so impact categories such as biological resources discuss the impacts of the development alternatives separately.

AIR QUALITY

UTS is located in Walker County, Texas, which is not currently listed as being in a nonattainment area for criteria pollutants under the Clean Air Act. Although the operational levels at UTS are well below the minimum operations needed to initiate an air quality analysis, it can be inferred that runway and terminal area expansion would ultimately lead to more operations at UTS, as well as more based aircraft. As such, the development alternatives would lead to direct emissions—those that are caused by operation of construction equipment—as well as indirect emissions, which would be brought upon by the increased operational activity at the airport. As the long-term operational projections for UTS are less than the 180,000 operations threshold for conducting National Ambient Air Quality Standards analyses as specified in Chapter 1, Section 6 of the FAA Environmental Desk Reference for Airport Actions, no further air quality analysis is necessary to examine effects of the airfield and terminal area development alternatives.

BIOLOGICAL RESOURCES

The US Fish and Wildlife Service lists the following species as being threatened, endangered, or candidate species for listing in Walker County:

- Least tern (*Sterna antillarum*): Endangered. No critical habitat has been designated for this species; however, it utilizes barren ground and sparsely-vegetated sandbars along rivers to nest, and forages near flowing water to catch small fish.
- Piping plover (*Charadrius melodus*): Threatened. Final critical habitat has been designated for this species; however, UTS is located outside of the critical habitat. The piping plover uses wide, flat, open, sandy beaches with very little grass or vegetation to nest and forage.
- Red knot (*Calidris canutus rufa*): Threatened. No critical habitat has been established for this species. The red knot breeds in drier tundra areas, such as sparsely-vegetated hillsides, and forages in intertidal, marine habitats, especially near coastal inlets.
- Red-cockaded woodpecker (*Picoides borealis*): Endangered. No critical habitat has been designated for this species. The red-cockaded woodpecker is found in patchy distribution throughout mature pine forests that are maintained by fire.

Additionally, the Texas Parks and Wildlife Department lists the following species as being protected by the State of Texas:

- American peregrine falcon (*Falco peregrinus anatum*): Threatened in Texas, but has been delisted as a Federally-listed species. The American peregrine falcon nests in tall cliff eyries, and winters along to coast, with concentrations along the barrier islands.
- Bachman's sparrow (*Peucaea aestivalis*): Threatened in Texas, but not listed as a Federal species. Bachman's sparrow prefers open pine woods with scattered bushes and grassy understory in Pineywoods region, brushy or overgrown grassy hillsides, overgrown fields with thickets and brambles, or grassy orchards.

- Bald eagle (*Haliaeetus leucocephalus*): Threatened in Texas, but not listed as a Federal species. The bald eagle is found primarily near rivers and large lakes, nesting in tall trees or on cliffs near water.
- Whooping crane (*Grus americana*): Endangered in Texas, but not listed as a Federal species. The whooping crane nests in poorly drained wetlands and overwinters in salt marshes in the South.
- Wood stork (*Mycteria americana*): Threatened in Texas, but not a Federally-listed species. Wood storks breed in lowland wetlands with trees, building a large stick nest in a tree.
- Creek chubsucker (*Erimyzon oblongus*): Threatened in Texas, but not a Federally-listed species. This fish prefers the headwaters of small rivers and creeks of various types.
- Paddlefish (*Polyodon spathula*): Threatened in Texas, but not a Federally-listed species. The paddlefish prefers large, free-flowing rivers, and spawns in fast, shallow water over gravel bars.
- Louisiana black bear (*Ursus americanus luteolus*): Threatened in Texas, but not a Federally-listed species. The Louisiana black bear utilizes bottomland hardwoods and large tracts of inaccessible forested areas.
- Rafinesque's big-eared bat (*Corynorhinus rafinesquii*): Threatened in Texas, but not a Federally-listed species. This bat roosts in cavity trees of bottomland hardwoods, concrete culverts, and abandoned man-made structures.
- Louisiana pigtoe (*Pleurobema riddellii*): Threatened in Texas, but not a Federally-listed species. This species utilizes streams and moderate-size rivers, usually flowing water on substrates of mud, sand, and gravel.
- Sandbank pocketbook (*Lampsilis satura*): Threatened in Texas, but not a Federally-listed species. This mollusk prefers small to large rivers with moderate flows and swift current on gravel, gravel-sand, and sand bottoms.
- Texas heelsplitter (*Potamilus amphichaenus*): Threatened in Texas, but not a Federally-listed species. This species prefers quiet waters in mud or sand and also in reservoirs.
- Texas pigtoe (*Fusconaia askewi*): Threatened in Texas, but not a Federally-listed species. This species prefers rivers with mixed mud, sand, and fine gravel in protected areas associated with fallen trees or other structures.
- Alligator snapping turtle (*Macrochelys temminckii*): Threatened in Texas, but not a Federally-listed species. The snapping turtle prefers perennial water bodies; deep water of rivers, canals, lakes, and oxbows; also swamps, bayous, and ponds near deep running water.
- Texas horned lizard (*Phrynosoma cornutum*): Threatened in Texas, but not a Federally-listed species. The lizard prefers open, arid and semi-arid regions with sparse vegetation, including grass, cactus, scattered brush or scrubby trees.

- Timber rattlesnake (*Crotalus horridus*): Threatened in Texas, but not a Federally-listed species. The rattlesnake frequents swamps, floodplains, upland pine and deciduous woodlands, riparian zones, abandoned farmland; limestone bluffs, sandy soil or black clay, and prefers dense ground cover.

Airfield Alternatives 1, 2, and 3 involve extension of Runway 18-36 at least 500 feet to the north and relocation of the ASOS. Completion of this runway extension would entail placement of fill into Hadley Creek, currently located approximately 500 feet north of the northern end of Runway 18-36. Filling or placing a structure into Hadley Creek could impact preferred habitat of the timber rattlesnake and Texas heelsplitter. Furthermore, extension of the Runway 18-36 to the north and relocation of the ASOS (required in all development alternatives) would entail removal of numerous acres of loblolly pines. Removal of these trees could disturb habitat for the red-cockaded woodpecker. Of all the alternatives, Airfield Alternatives 1 and 2 would disrupt the least amount of habitat for threatened and endangered species.

CLIMATE

The proposed improvements are likely to increase airfield operations at UTS, as well as traffic patterns/volume traveling to or from the airport. However, the operations are expected to increase approximately 25 percent over the span of 20 years. This type of gradual increase in operations and based aircraft would not significantly increase greenhouse gases. No further analysis regarding climate change is currently recommended.

COASTAL RESOURCES

As UTS is located inland, coastal resources would not be impacted by any of the airfield or terminal area development alternatives.

DEPARTMENT OF TRANSPORTATION ACT, SECTION 4(F)

The intent of the Section 4(f) statute and the policy of the FAA is to avoid the use of significant public parks, recreation areas, wildlife and waterfowl refuges and historic sites as part of a project, unless there is no feasible and prudent alternative to the use of such land.

No Section 4(f) lands are located on existing airport property. However, Kate Barr Ross Park, located east adjacent to the airport, is approximately 80 acres in size and features baseball and softball fields, a basketball court, soccer fields, a playground, and picnic area. Any acquisition of property from Kate Barr Ross Park would potentially require a Section 6(f) Land and Water Conservation Fund (LWCF) analysis to be approved by the National Park Service. Airfield Alternative 5 would require one acre of land from Kate Barr Ross Park.

COMPATIBLE LAND USE

Land to the north of the airport is currently comprised of low-density single-family residential housing, with parcels averaging 10 acres apiece. Land to the east of the airport is comprised of Kate Barr Ross Park, as well as additional low-density single-family residential housing to the northeast. Land to the south of the airport is comprised of State Highway 75, Interstate 45, a Texas Department of Public Safety driver's license office, as well as the Holliday Transfer Facility of the Texas Department of Criminal Justice. Land to the west of the airport is comprised of densely-treed forestland, as well as a scrap metal and electronics recycling facility located near the southwest portion of airport property. The proposed runway improvements and terminal area development will not significantly alter the operational use of UTS as an airport; therefore, the use will continue to be compatible with adjacent properties. The City of Huntsville has signed a Land Use Assurance Letter to preserve and protect the airport from incompatible land use.

CONSTRUCTION IMPACTS

Each of the development alternatives identified in this chapter would involve disturbances of land. During construction of recommended improvements, noise, soil erosion, and pollutant runoff may temporarily increase. Soil erosion and pollutant runoff will be minimized by employing Best Management Practices (BMPs) during construction. Proper BMPs will be prepared specifically for the project prior to construction, and future projects will comply with guidelines set forth in FAA AC 150/5370-10G, Standards for Specifying the Construction of Airports.

FARMLANDS

The Natural Resource Conservation Service (NRCS) Web Soil Survey was utilized to identify soil types and farming potential of land that would be acquired as part of the proposed development alternatives.

Airfield Alternative 1: The land acquisition necessary for accommodating the extension of Runway 18-36 to the north would not involve acquisition and development of land classified as prime farmland. Relocation of the ASOS to the west side of the airport property would not involve prime or unique farmland. Relocation of the taxiway will also not affect prime farmland.

Airfield Alternative 2 would involve more land acquisition than Alternative 1, as the existing runway would be shifted to the north in order to accommodate the entire Runway 36 Runway Protection Zone. However, the land acquisition necessary for accommodating the extension of Runway 18-36 to the north would not involve acquisition and development of land classified as prime farmland. Relocation of the ASOS to the west side of the airport property would not involve prime or unique farmland. Relocation of the taxiway will also not affect prime farmland.

Airfield Alternative 3 is similar to Alternative 2 in that it involves shifting the runway to the north, as well as extending the runway by approximately 450 feet. However, Alternative 3 entails 3/4-mile approach minimums, which increases the size of the RPZs, therefore increasing the amount of land acquisition required for this alternative. A portion of the land that would need to be acquired within the Runway 18 RPZ is classified as prime farmland. However, the use of prime farmland within an RPZ does not constitute a 'conversion' of farmland, and while additional coordination with the NRCS would be necessary, it is unlikely that mitigation of the use of prime farmland would be required.

Airfield Alternative 4 entails acquisition of 99 acres of land within the RPZs, some of which are comprised of prime farmland. As such, coordination with the NRCS would be required to complete improvements in this alternative.

Airfield Alternative 5, similar to Alternative 4, entails a realignment of the runway, resulting in 310 acres of land acquisition. As land use on the northwest side of this alternative is predominantly farmland, and a farmstead would be acquired as part of this alternative, the NRCS would require coordination as part of the preliminary planning endeavors.

Terminal Area Alternative 1 would entail expansion of the existing terminal area. This alternative would not involve land acquisition, and would be utilizing area currently maintained on the airfield, or riparian area to the north of the existing terminal area pavement. No farmland would be converted for this alternative.

Terminal Area Alternative 2 would involve construction of a terminal area on the west side of Runway 18-36. No land acquisition would be necessary for this alternative. This area is comprised partly of maintained airfield grass and predominantly of an area comprised of loblolly pine forest. As such, no farmland would be converted for this alternative.

In accordance with the Farmland Protection Policy Act, further coordination should be conducted with the NRCS in the planning phase of the aforementioned projects to determine the extent of impacts to prime farmland.

HAZARDOUS MATERIALS, SOLID WASTE, AND POLLUTION PREVENTION

Environmental regulatory databases are an important tool in determining whether airport improvement projects would contribute to hazardous materials production or storage, or whether hazardous waste could potentially impact the construction of the alternatives.

The EPA Enviromapper tool is a single point of access to environmental data that is directly regulated by the EPA. The tool provides access to several EPA databases that provide information about environmental activities that may affect air, water, and land. The only listing for sites within a 0.5-mile radius of the existing airport property was for UTS receiving a General Permit for a stormwater permit in 2007. No other facilities generating or handling hazardous materials were listed as being permitted within a 0.5-mile radius of the airport.

The Texas Commission on Environmental Quality's (TCEQ) Underground Storage Tank (UST) Viewer was utilized to determine whether USTs are present within a 0.5-mile radius of UST property. USTs located within that range of the current property boundary of UTS include two tanks that are in use by TxDOT Walker County Maintenance, which are fully-regulated and located 0.40 mile west of the airport. The Hitchin Post Truck Stop, located southwest adjacent to airport property, is comprised of four fully-regulated USTs. A Leaking Petroleum Storage Tank (LPST) incident occurred in 1987, but has since been remediated under the jurisdiction of the TCEQ. Pivot Travel Center, located approximately 0.25-mile southwest of the airport, has five USTs that were installed in 2004. No LPST incidents have been reported at this facility. The Bar T Travel Center, located 0.20 mile south/southwest of the airport, has three fully-regulated USTs installed in 2015, with no known leaks since installation. The City of Huntsville Service Center, located 0.27-mile southeast of airport property, has four fully-regulated USTs. No LPST incidents have been reported at this facility.

Aboveground Storage Tanks (ASTs) in Texas, including the fuel tanks located at UTS that were registered in 1987, are regulated by the Texas Department of Agriculture. No information suggesting a release of petroleum product on UTS property was found.

T J Burdett & Sons Recycling, located approximately 0.25-mile southwest of the airport property, conducts scrap metal recycling of ferrous and non-ferrous metals. The facility was established in 1976. Additionally, the land west adjacent to the airport property, also owned by the City of Huntsville, was formerly utilized as a landfill. These areas may impact Airfield Alternatives 4 and 5, as well as Terminal Area Alternative 2. During the planning phase of these alternatives, subsurface investigation of areas in which earthwork would be conducted is recommended, in addition to geotechnical borings.

HISTORICAL, ARCHITECTURAL, ARCHEOLOGICAL, AND CULTURAL RESOURCES

The Texas Historical Commission (THC) lists four sites in Walker County as being listed on the National Register of Historic Places (NRHP). None of the sites are located in the vicinity of UTS. The THC does not list any archaeological surveys as having been conducted in the vicinity of UTS. During the design phase of any of the airfield or terminal area development alternatives, coordination with the THC State Historic Preservation Office (SHPO) should be conducted to determine whether a cultural resources survey is recommended in the area in which construction would occur.

LAND USE

Airfield Alternatives 3, 4, and 5 entail acquisition of residential and farmed land, as well as relocation of multiple residences. Airfield Alternative 3 would require potential relocation of a road traversing a subdivision. Public involvement would be required as part of the planning and Environmental Assessment efforts for these alternatives, allowing residents in the affected neighborhood to ask questions and voice concerns regarding the proposed actions. Additionally, Alternatives 4 and 5 involve a substantial modification and conversion of land currently maintained as forestland. Regulatory agencies such as the USFWS and TPWD, as well as the public, would be required to be afforded the opportunity to comment on the proposed actions.

LIGHT EMISSIONS AND VISUAL IMPACTS

Lighting required for the proposed development alternatives would be consistent with the current visual aesthetics of UTS. However, each of the airfield alternatives would require additional lighting in locations in which visual impacts are not currently present. Light emissions impacts from these improvements are not anticipated to be significant.

NATURAL RESOURCES AND ENERGY SUPPLY

Reasonably foreseeable projects at UTS are not anticipated to significantly alter energy supply or requirements or disproportionately consume natural resources. As ground and airport activity increases, it is anticipated that consumption of automobile gasoline and aviation fuel may also increase, but this will not significantly impact regional energy supplies.

NOISE AND COMPATIBLE LAND USE

According to FAA Order 1050.1F, noise analysis is required on a per-project basis for airports whose forecast operations exceed 90,000 annual propeller operations or 700 annual jet operations. Operations at UTS are not projected to exceed this threshold; therefore, a noise assessment would not likely be required for the proposed development alternatives. Although not required, inclusion of a noise model during the planning stage of the preferred development alternative is recommended, especially in the event that Alternatives 4 or 5 were implemented.

SECONDARY (INDUCED) IMPACTS

Major development projects often involve the potential for induced or secondary impacts on the surrounding community. This could mean that development at the airport could lead to social impacts, impacts on surface transportation, change in demand for public transportation, or employment impacts. Small-scale positive impacts such as economic development and transportation improvements would likely result from each of the development alternatives. However, positive or negative induced impacts caused by the proposed development alternatives are not likely to significantly vary from impacts that are currently induced by airport operations.

SOCIOECONOMICS, ENVIRONMENTAL JUSTICE, AND CHILDREN'S ENVIRONMENTAL HEALTH AND SAFETY RISKS

Socioeconomic analysis evaluates how elements of the human environment such as population, employment, housing, and public services might be affected by the proposed action and alternative(s). Environmental justice is the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies.

Negative impacts such as effects to employment, public housing, or other public services would not be incurred as part of the development alternatives.

According to the 2010 US Census, the median household income in Huntsville was $31,306. The development alternatives are located in Census Tract 7904 of Walker County, which had a median household income of $47,868 in 2010. Additionally, the 2010 US Census indicated that approximately 36.3% of the population of Huntsville was comprised of Black, American Indian, Asian, Pacific Islander, or mixed races. The 2010 US Census indicated that approximately 26.1% of the population of Census Tract 7904 was comprised of Black, American Indian, Asian, Pacific Islander, or mixed races. Based on this information, the area in which the proposed development alternatives are located is comprised of a population with a higher median household income, as well as lower proportion of minorities. As such, the development alternatives would not likely have a disproportionate impact on disadvantaged populations.

WATER RESOURCES

UTS is abutted by Hadley Creek and its tributaries on the eastern, northern, and western sides of Runway 18-36. All development alternatives, including terminal area alternatives, affect at least one branch of Hadley Creek. Additionally, UTS is located in an area depicted on Federal Emergency Management Agency (FEMA) Panel Numbers 48471C0240D and 48471C0355D, both effective August 16, 2011. The land surrounding all of Hadley Creek and its tributaries, with the exception of the southernmost points of the streams (the headwaters), are designated as Zone A by FEMA. Zone A is defined as special flood hazard areas that are subject to inundation by the one-percent annual chance flood, but for which no base flood elevations have been established. Jurisdictional wetlands are not known to be present on the existing airport property or in the vicinity, although numerous impoundments are located in the vicinity. The development alternatives would impact these waterbodies in the following ways:

Airfield Alternative 1: The extension of Runway 18-36 would entail placement of fill material into the primary channel of Hadley Creek, which is a jurisdictional waterbody. No other jurisdictional waterbodies, such as wetlands, are anticipated to be impacted. Approximately 800 linear feet of the primary channel would be impacted, as well as approximately 200 feet of a tributary Hadley Creek.

Airfield Alternative 2: Extension of Runway 18-36 in this alternative would also impact the primary channel of Hadley Creek and its tributary. As with the previous alternative, approximately 800 linear feet of the primary channel would be impacted, as well as approximately 200 linear feet of a tributary Hadley Creek.

Airfield Alternative 3 would affect approximately 800 linear feet of the primary channel would be impacted, as well as approximately 200 linear feet of one tributary to Hadley Creek, and 600 linear feet of a second tributary to Hadley Creek. A 1.94-acre freshwater pond that is hydrologically connected to the tributary to Hadley Creek would also potentially be impacted.

Airfield Alternative 4 would impact approximately 1,000 linear feet of the primary channel of Hadley Creek, as well as approximately 200 linear feet of one tributary to Hadley Creek, and 800 linear feet of a second tributary to Hadley Creek. A 1.94-acre freshwater pond that is hydrologically connected to the tributary to Hadley Creek would also be impacted.

Airfield Alternative 5 would avoid placement of fill in to the primary channel of Hadley Creek. Approximately 2,000 linear feet of the tributary to Hadley Creek that lies on the western side of the existing runway would be affected by development of this runway alignment. Additionally, approximately 1,500 linear feet of a second tributary, located north of the former landfill site, would be impacted. Approximately 1,200 linear feet of a third tributary to Hadley Creek that currently traverses farmland would be affected. Freshwater ponds located within the area currently comprised of loblolly pine forest, sized at 0.25-acre, 0.64-acre, and 0.48-acres, would require fill to construct this alternative. A 0.17-acre freshwater pond located south of the farmstead that would need to be acquired would also need to be filled.

Terminal Area Alternative 1 would affect approximately 350 linear feet of the tributary to Hadley Creek located north of the existing terminal area. Additionally, it would involve placement of fill in an area currently being utilized as a stormwater retention area. Terminal Area Alternative 2 would require placement of fill into approximately 1,000 linear feet of the tributary to Hadley Creek that is located west of the existing runway.

Coordination with and permitting through the US Army Corps of Engineers (USACE) would be required for all development alternatives presented in this chapter.

Tables 4.2 and **4.3** summarize the environmental resources discussed above, indicating whether further analysis (NFA) is warranted, or whether additional assessment, permitting, or coordination with a regulatory agency may be necessary. Green shading in the table denotes that No Further Action (NFA) is required for assessing this environmental resource. Gray shading denotes that further assessment, permitting, or coordination with a regulatory agency is necessary. Orange shading denotes that significant impacts are likely.

Table 4.2 – Airfield Alternatives Environmental Matrix

Environmental Resource	Airfield Alternative 1	Airfield Alternative 2	Airfield Alternative 3	Airfield Alternative 4	Airfield Alternative 5
Air Quality	NFA	NFA	NFA	NFA	NFA
Biological Resources	Coordination with USFWS & TPWD	Coordination with USFWS & TPWD	Coordination with USFWS & TPWD	Significant Impacts Likely	Significant Impacts Likely
Climate	NFA	NFA	NFA	NFA	NFA
Coastal Resources	NFA	NFA	NFA	NFA	NFA
Section 4(f)/6(f)	NFA	NFA	NFA	NFA	Impacts Likely
Compatible Land Use	NFA	NFA	Significant Land Acquisition Required	Significant Land Acquisition Required	Significant Land Acquisition Required
Construction Impacts	Manageable drainage challenges	Manageable drainage challenges	Significant drainage challenges	Significant drainage challenges	Significant drainage challenges
Farmlands	NFA	NFA	NFA	NRCS Coordination	NRCS Coordination
Hazardous Waste	NFA	NFA	NFA	NFA	Subsurface Investigation Required
Cultural Resources	SHPO Coordination	SHPO Coordination	SHPO Coordination	SHPO Coordination	SHPO Coordination
Land Use	NFA	NFA	Significant Land Acquisition Required	Significant Land Acquisition Required	Significant Land Acquisition Required
Visual Impacts	Further Analysis During Design	Further Analysis During Design	Further Analysis During Design	Further Analysis During Design	Further Analysis During Design
Energy Supply	NFA	NFA	NFA	NFA	NFA
Noise	NFA	NFA	Further Analysis During Planning	Further Analysis During Planning	Further Analysis During Planning
Induced Impacts	NFA	NFA	NFA	NFA	NFA
Socioeconomics	NFA	NFA	NFA	NFA	NFA
Water Resources	1,000 linear feet of streams impacted	1,000 linear feet of streams impacted	1,600 linear feet of streams impacted and 1.94 acres of ponds	2,000 linear feet of streams impacted and 1.94 acres of ponds	4,700 linear feet of streams impacted and 1.54 acres of ponds

Table 4.3 – Terminal Development Alternatives Environmental Matrix

Environmental Resource	Terminal Area Alternative 1	Terminal Area Alternative 2
Air Quality	NFA	NFA
Biological Resources	Coordination with USFWS & TPWD	Coordination with USFWS & TPWD
Climate	NFA	NFA
Coastal Resources	NFA	NFA
Section 4(f)	NFA	NFA
Compatible Land Use	NFA	NFA
Construction Impacts	Manageable drainage challenges	Manageable drainage challenges
Farmlands	NFA	NRCS Coordination
Hazardous Waste	NFA	Subsurface investigation recommended
Cultural Resources	SHPO Coordination	SHPO Coordination
Land Use	NFA	NFA
Visual Impacts	NFA	NFA
Energy Supply	NFA	NFA
Noise	NFA	NFA
Induced Impacts	NFA	NFA
Socioeconomics	NFA	NFA
Water Resources	350 linear feet of streams impacted	1,000 linear feet of streams impacted

PREFERRED AIRFIELD ALTERNATIVE

The proposed long-term airport expansion option, designated **Exhibit 4.2 – Airfield Alternative 2** (Preferred), satisfies all of the Evaluation Criteria while minimizing environmental impacts, relative to the other alternatives explored through this Master Plan.

The following items are attributes of UTS's preferred airfield development alternative:

- Relocate the Runway 36 threshold approximately 450 feet to the north to accommodate location of the southern RPZ on airport property.
- Extending the runway and parallel taxiway 945 feet to the north to provide a length of 5,500 feet.
- Maintain the current one-mile visibility minimums, with the option of acquiring avigation easements north of the existing airport property to support a larger RPZ and 3/4 visibility minimums for Runway 18.

ADDITIONAL CONSIDERATIONS

Any change in a runway threshold (e.g., shift runway end location) is expected to involve a comprehensive FAA review process for existing and proposed land uses within an RPZ in accordance with FAA's *Interim Guidance on Land Uses Within a Runway Protection Zone* (September 2012).

The preferred airfield alternative is not expected to involve long-term significant social or environmental impacts. Future construction activities will utilize best management practices to minimize impacts to groundwater resources located in the project area. This alternative assumes the completion of the parallel taxiway relocation project that is underway, as well as relocation of the ASOS to the west side of the airfield and the acquisition of the required easements to accommodate the ASOS.

It is important to note that an Aeronautical GIS (AGIS) survey was not completed as part of this Master Plan. Furthermore, no AGIS survey data was provided from previous analyses. The shift of the Runway 36 threshold 450 feet to the north was determined by non-survey-grade ground and structure elevation data. Any obstacles that are determined in the future to penetrate the airspace obstruction standards surfaces associated with the preferred alternative and/or current conditions would need to be mitigated to coincide with FAA airspace guidance. Finally, approach and departure surfaces will need be planned and established to continue to meet aircraft demand.

While the preferred airfield alternative that was assessed in this report and can reasonably address the identified social and environmental impacts in the short-term, future lengthening of the runway beyond 5,500-foot may trigger additional impacts and necessitate a more comprehensive mitigation strategy. A preliminary review beyond the 20-day planning period of the UTS Master Plan indicates more detailed study of impacts will be needed to address acquisition of residential properties necessary for additional runway lengthening, and well as a more comprehensive assessment of surface drainage impacts caused by further site development. This effort is beyond the planning period and was not within the scope of this study, nor fully assessed in this report.

The preferred airfield alternative represented in this report provides the most practical build-out at the existing site corresponding with forecasted user demand during the 20-year planning period. As with many airports attempting to introduce larger turbojet aircraft with longer stage lengths, the corresponding upgrades needed to satisfy FAA standards also create significant challenges. As such, this site may have reached its full potential with serious challenges for accommodating the C-II-5000 RDC airfield geometry. Based on the limitations of sufficient land for development of the runway beyond 5,500 feet, as well as the need for rehabilitating existing runway pavements during the planning period, it is suggested that the Sponsor consider a feasibility study of other potential sites for an airport relocation in order to achieve the vision of a C-II-5000 RDC airport exceeding 5,500' of runway length.

PREFERRED TERMINAL AREA ALTERNATIVE

The proposed long-term terminal area expansion option, designated **Exhibit 4.7 – Terminal Area Alternative 5** (Preferred), involves construction of a new terminal area on the west side of the airfield, allowing the east side terminal area to continue to be in operation.

The following items are attributes of UTS's preferred terminal area development alternative:

- A new airport entrance road off Highway 75. This would allow for the City to better showcase the airport to the public.
- A new terminal building.
- Auto parking near the new terminal building.
- Aircraft parking apron supporting 14 tie-down spaces for small aircraft.
- Six 6-unit T-hangar buildings.
- 12 individual box hangars.

ADDITIONAL CONSIDERATIONS

The preferred terminal area alternative is not expected to involve long-term significant environmental impacts. Temporary construction impacts associated with hangar, taxilane, taxiway, and apron facility improvements are expected. Future construction activities will utilize best management practices to minimize impacts to water resources located in the project area.

On-airport land use associated with airfield operations will not be converted for terminal area development. Long-term terminal area land use will be compatible with airfield operation and potential expansion.

Terminal area improvements and/or hangar development is not expected to impact FAA airspace guidance, nor are any future hangars expected to penetrate the airport's imaginary airspace surfaces.

SUMMARY

The development alternatives discussed above and selected by the Airport Sponsor will be incorporated in UTS's Airport Layout Plan as the preferred development concept.

The following chapter, Facilities Implementation Plan, will present a detailed schedule of airfield and terminal area improvement projects and cost summaries necessary to implement the preferred development concept throughout the short-, mid- and long-term planning periods.

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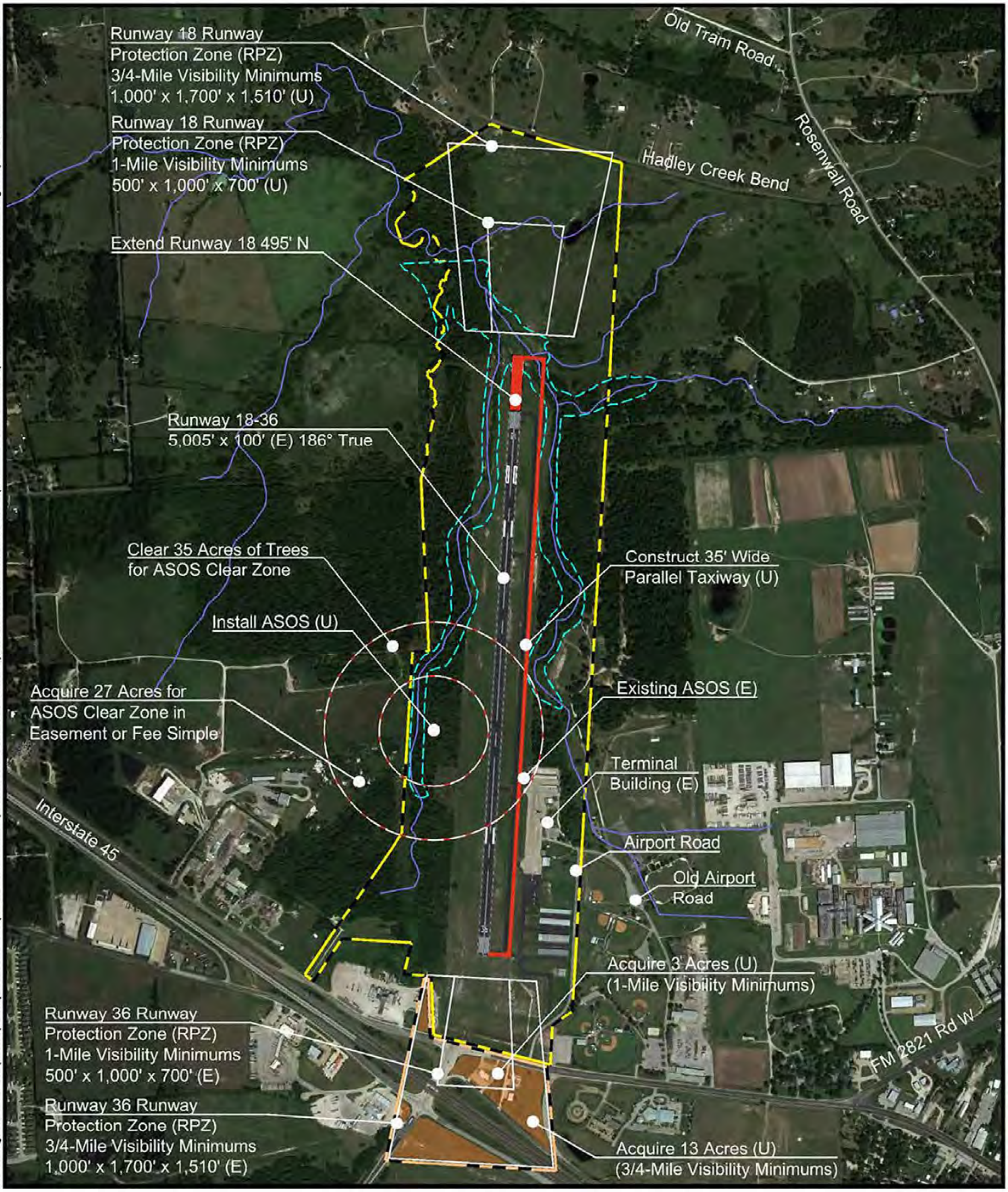

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HUNTSVILLE MUNICIPAL AIRPORT (UTS)

City of Huntsville, Texas

Exhibit 4.1: Airfield Alternative 1

Extend Runway 18-36, Realign Parallel Taxiway;
1-Mile & 3/4 -Mile Approach Minimums

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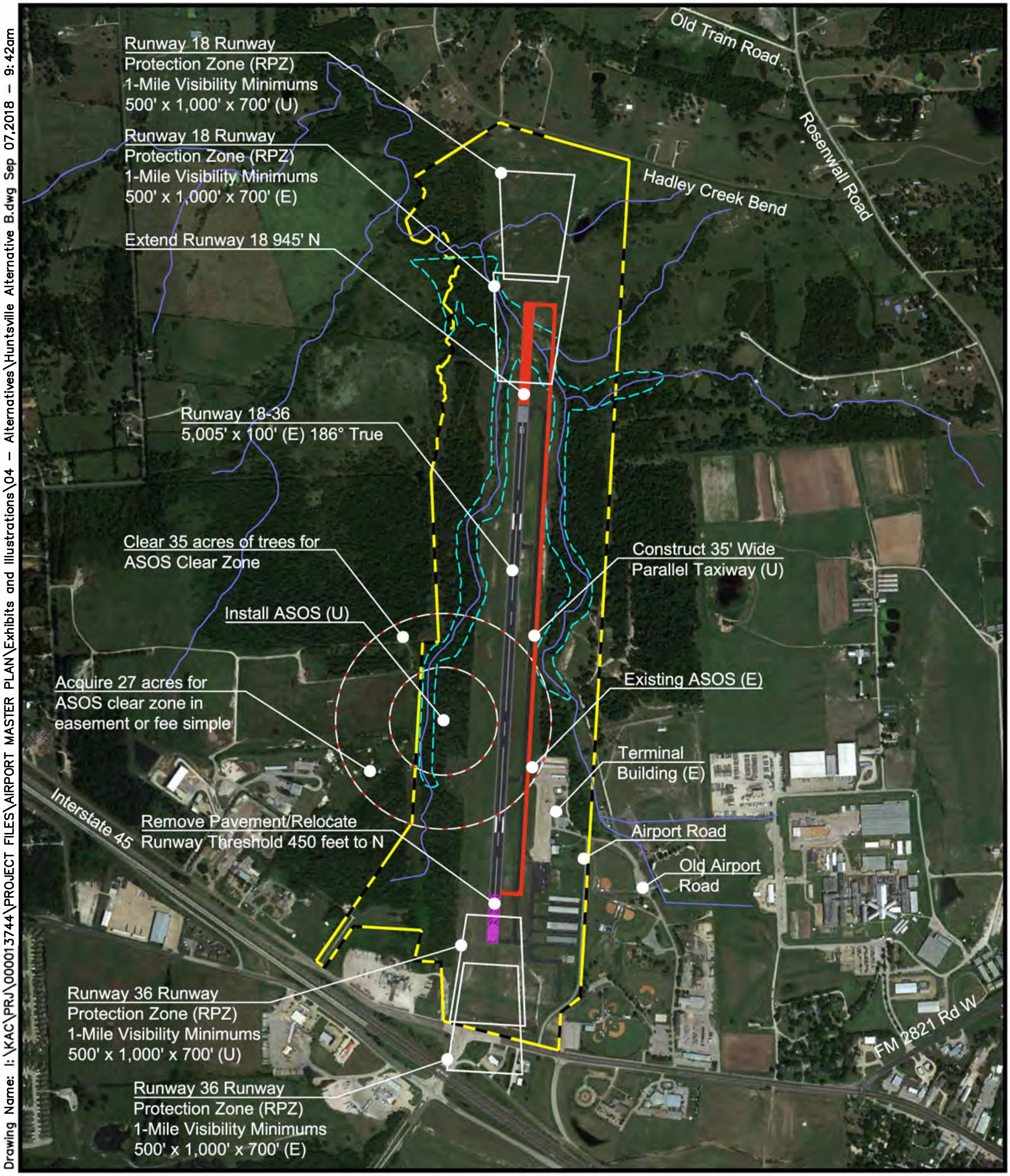

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HUNTSVILLE MUNICIPAL AIRPORT (UTS)
City of Huntsville, Texas

Exhibit 4.2: Airfield Alternative 2
Extend Runway 18-36; Realign Parallel Taxiway; Shift Runway to the North to Minimize Land Acquisition; 1-Mile Approach Minimums

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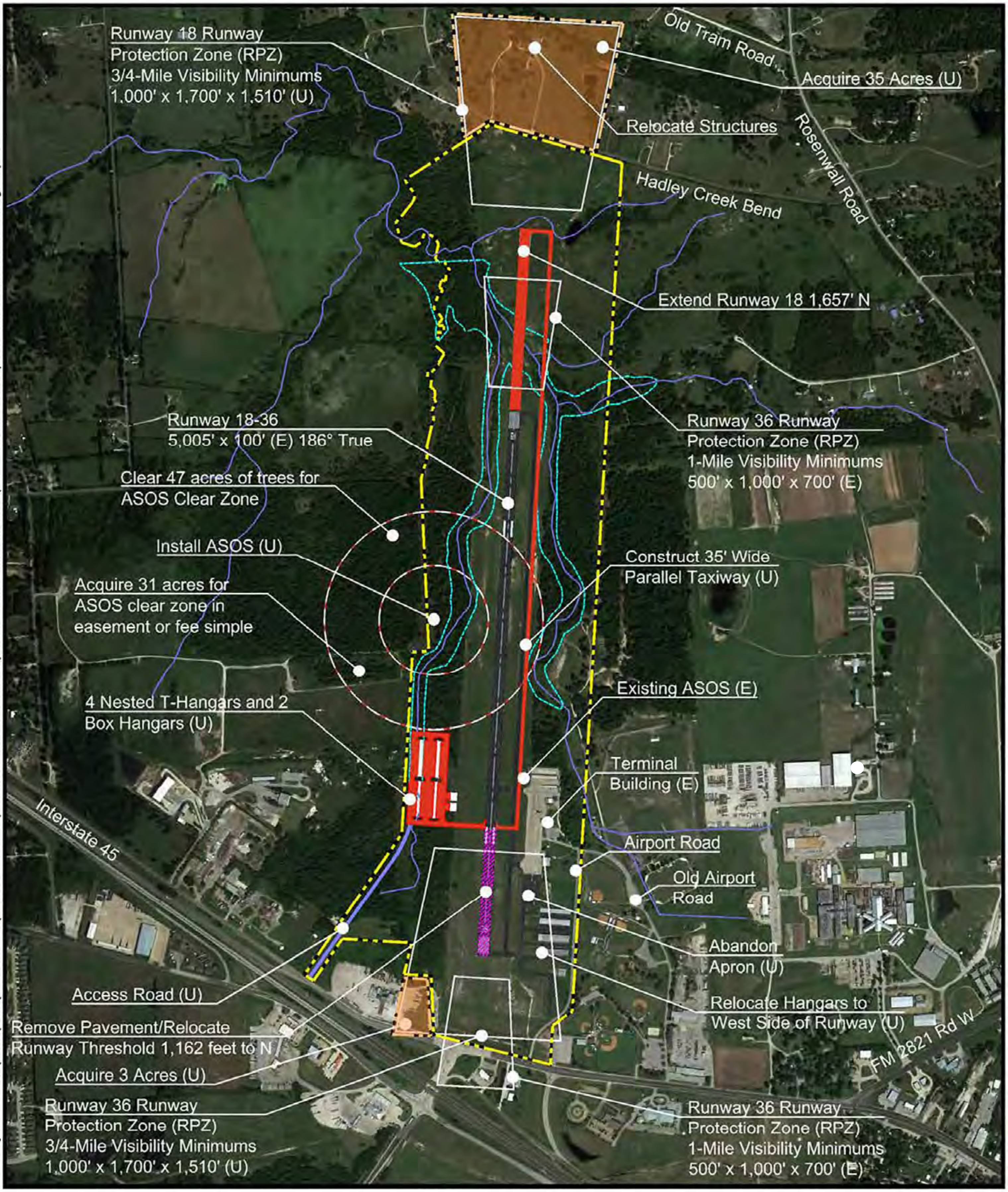

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HUNTSVILLE MUNICIPAL AIRPORT (UTS)
City of Huntsville, Texas

Exhibit 4.3: Airfield Alternative 3
Extend Runway 18-36, Realign Parallel Taxiway; Shift Runway to the North to Minimize Land Acquisition; 3/4-Mile Approach Minimums

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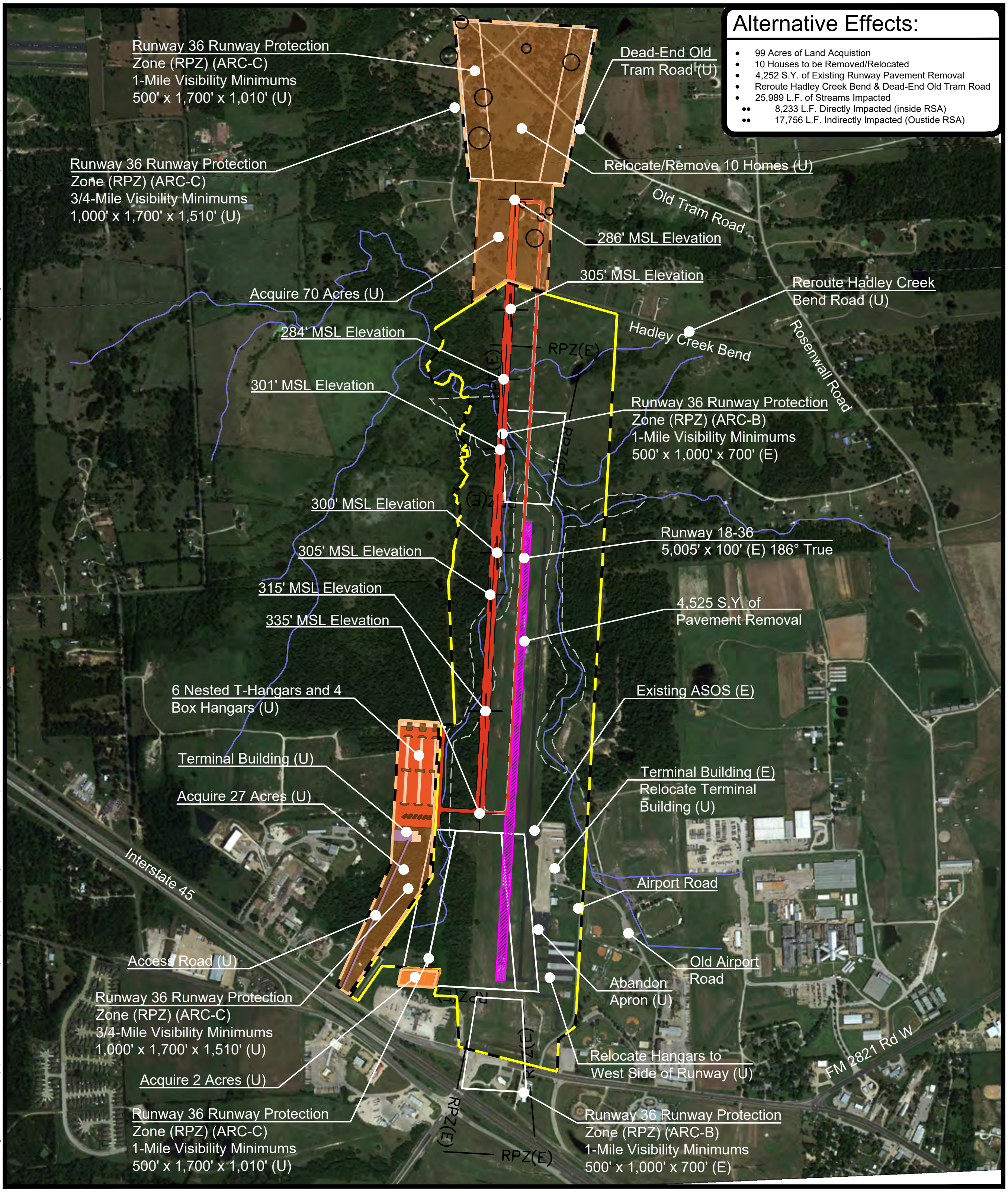

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HUNTSVILLE MUNICIPAL AIRPORT (UTS)
City of Huntsville, Texas

Exhibit 4.4: Airfield Alternative 4

Extend Runway 18-36 to 6,500'; Realign Parallel Taxiway; Shift Runway to the Northwest; 1-Mile & 3/4-Mile Approach Minimums

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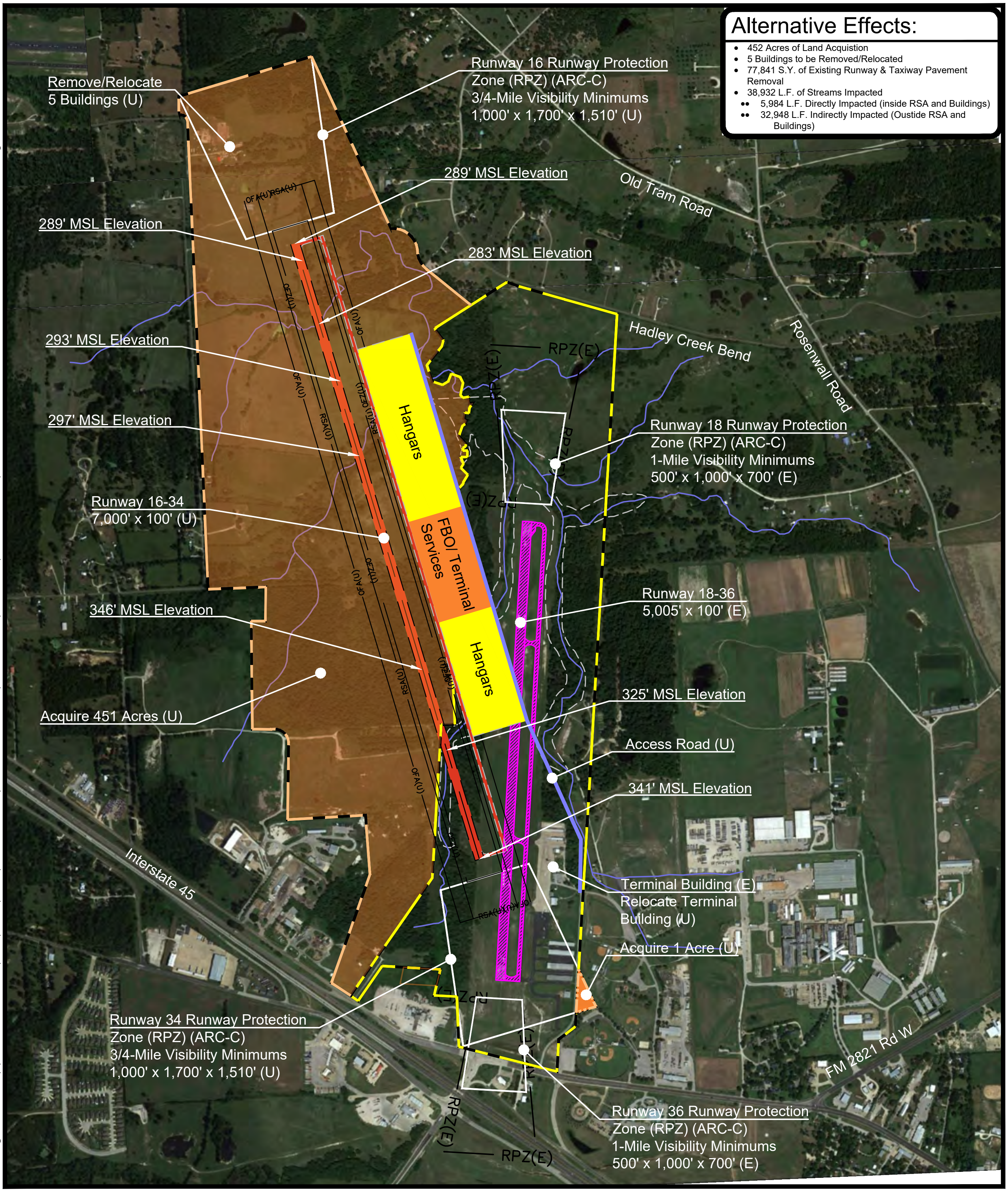

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HUNTSVILLE MUNICIPAL AIRPORT (UTS)

City of Huntsville, Texas

Exhibit 4.5: Airfield Alternative 5

Construct Runway 16-34 7,000' x 100'; Realign Parallel Taxiway; Demolish Existing Runway 18-36 and Parallel Taxiway; 3/4-Mile Approach Minimums

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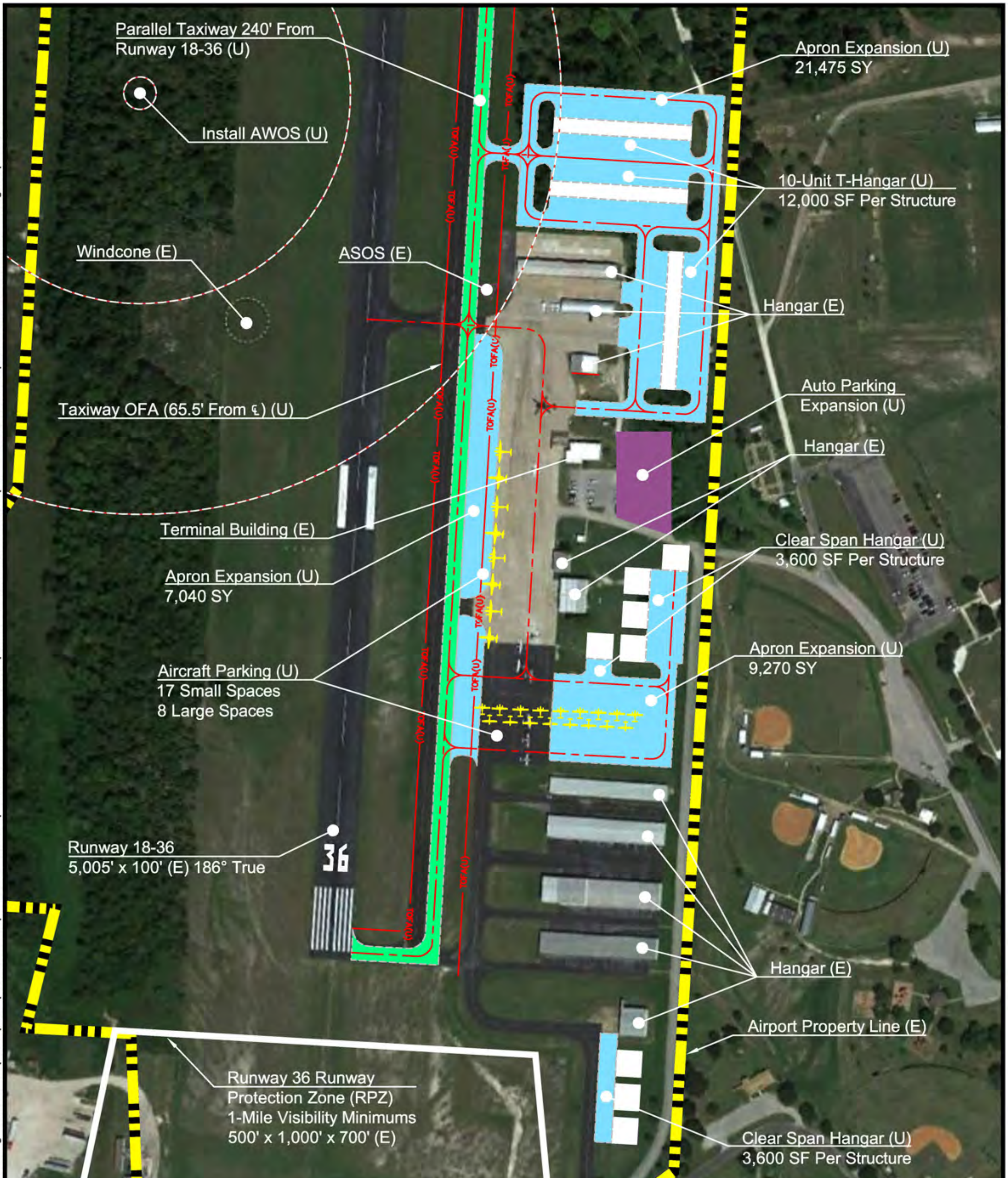

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City of Huntsville, Texas

Exhibit 4.6: Terminal Area Alternative 1
Expand and Reconfigure Existing Terminal Area

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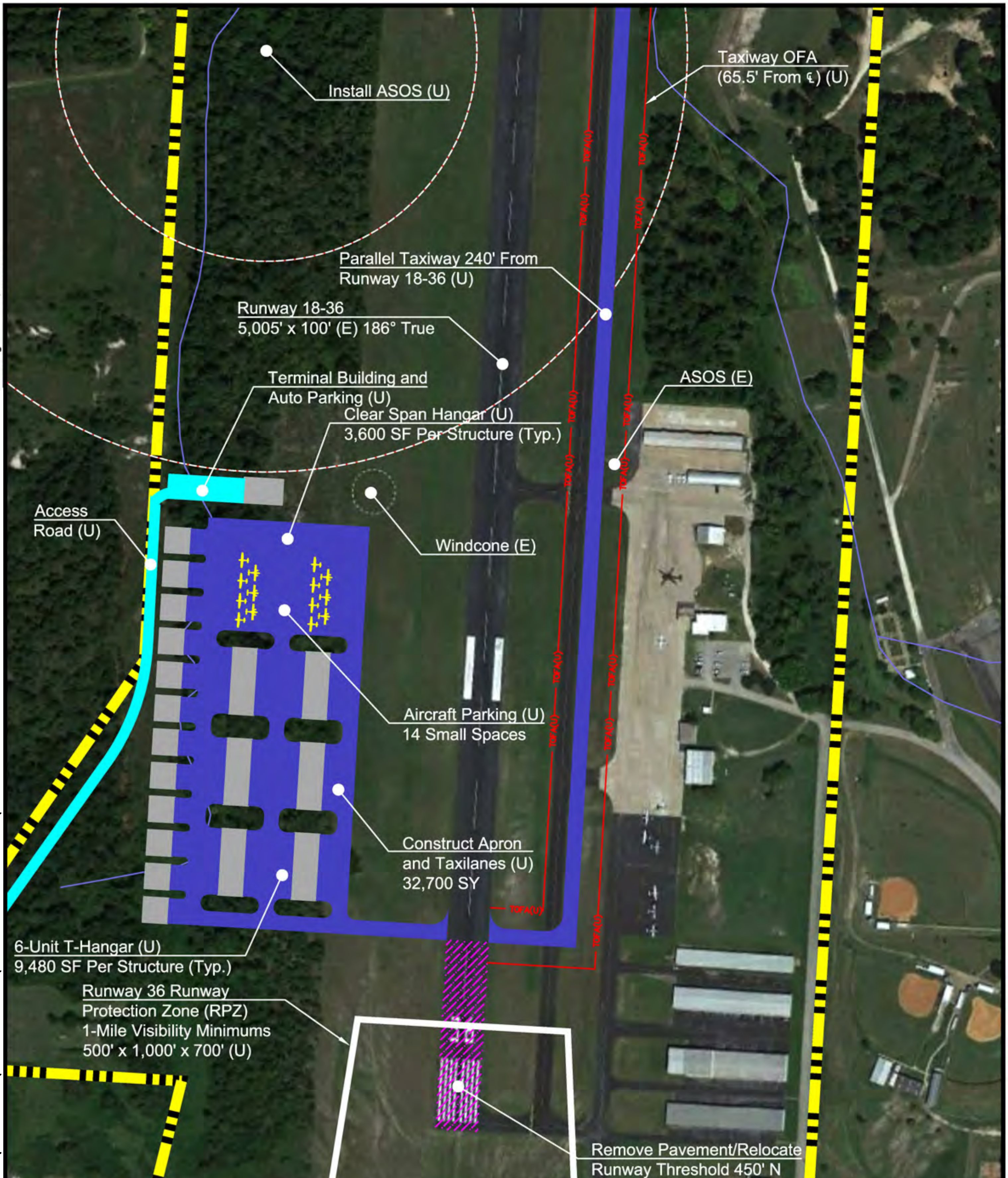

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HUNTSVILLE MUNICIPAL AIRPORT (UTS)
City of Huntsville, Texas

Exhibit 4.7: Terminal Area Alternative 2:
Expand Terminal Area West of Runway 18-36

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CHAPTER 5: CAPITAL IMPROVEMENT PLAN

INTRODUCTION

The Capital Improvement Program (CIP) involves the compilation of a schedule of recommended development projects, and their probable costs, that are based on the findings of the demand forecasts and facility requirements evaluation. The CIP identifies the improvements necessary to accommodate projected aircraft and passenger demand throughout the 20-year planning period.

CAPITAL DEVELOPMENT PHASING

UTS's CIP will be based on short (0-5 year), intermediate (6-10 year), and long-term (11-20 year) development requirements. The short-term planning period serves as an immediate action program that recognizes federal, state and local funding capabilities. For this reason, the 0-5 year development phase is given special attention in that projects are outlined by year due to the critical nature of the improvements and the necessary financial investments that accompany each improvement project.

The short-term improvement plan also plays a key role in formulating the CIP submitted to the TxDOT Aviation Division and utilized by the FAA, which indicates development priorities for the airport and costs to be incurred by the city. Aside from assisting with the development of the CIP, the short-term implementation plan should allow for additional capital improvement items that contribute to the overall operational safety and efficiency of the facility such as pavement maintenance and rehabilitation, as well as terminal area improvements.

The intermediate development plan consists of projects that will affect the overall geometry and layout of the facility including improvements to the airfield and terminal area. The long-range development phase is formulated in an effort to identify the ultimate role of the airport including a planning concept that will eventually accommodate the airport's future facility needs.

PROJECT SCHEDULING

Decisions regarding project scheduling will evolve from numerous considerations involved with implementation of the CIP. For instance, care must be given to the amount of time and effort that will be needed to acquire land and/or develop engineering and construction design reports including plans and specifications. For this reason, the timing of particular improvement projects presented in this chapter are merely suggested planning schedules and may require some reprioritizing throughout each phase of airport development. Operational safety, demand for certain airfield and/or terminal area facilities and the economic feasibility of their development are considered prime factors in determining the timing and construction of individual projects throughout the planning period.

TxDOT and FAA CAPITAL IMPROVEMENT PROGRAMS

The overall purpose of establishing the CIP is to provide a reasonable expectation of costs associated with capital improvements that will be utilized by TxDOT and the FAA for purposes of project prioritization and financial programming. Upon publication, the implementation plan presented in this chapter, due to variances in past capital development priorities, will differ to some degree from the five-year CIP worksheets currently maintained by TxDOT and the FAA.

COST ESTIMATES

The CIP cost estimates are based on current dollar value without consideration being given to inflation. Cost estimates are based on unit prices that correspond to the breadth and size of the particular project. As with project scheduling, financial considerations such as the availability and timing of funding availability have the ability to impact the scheduling priority of certain improvements.

The airport's short-term CIP is presented within **Table 7.1** while **Table 7.2** summarizes improvements cost estimates for the intermediate and long-term planning periods. Table 7.1 is categorized by year showing capital improvements throughout the short-term planning period. Each year of Phase I also includes potential engineering, inspection and administrative costs for each project.

Table 5.1
Phase I (0-5 Year) CIP Summary

Short Term Program Projects	Projected Local/City Share (10%)	Projected TxDOT/ Federal Share (90%)	Projected Total Cost(100%)
Year 1 - 2021			
Runway Extension Engineering and Design	$ 150,000	$ 1,250,000	$ 1,500,000
Environmental Review(s) for Extension	$ 25,000	$ 225,000	$ 250,000
New Runway Ends Approach Development	$ 20,000	$ 180,000	$ 200,000
Year 1 Total Cost	**$ 45,000**	**$ 405,000**	**$ 1,950,000**
Year 2 - 2022			
Creek Realignment Drainage	$ 146,600	$ 1,319,400	$ 1,466,000
Utility Relocation (Electric)	$ 5,000	$ 45,000	$ 50,000
Year 2 Total Cost	**$ 151,600**	**$ 1,364,400**	**$ 1,516,000**
Year 3 - 2023			
Floodplain Mitigation Banking (~6 Ac.)	$ 13,500	$ 121,500	$ 135,000
Mass Grading for Runway and Taxiway Extension	$ 785,000	$ 7,065,000	$ 7,850,000
Year 3 Total Cost	**$ 798,500**	**$ 7,186,500**	**$ 7,985,000**
Year 4 - 2024			
South Taxiway Connector Engineering and Design	$ 2,500	$ 22,500	$ 25,000
Runway Extension (945 feet)			
Runway Extension	$ 362,500	$ 3,262,500	$ 3,625,000
Runway End Reconstruction for Profile	$ 283,700	$ 2,553,300	$ 2,837,000
Taxiway Extension	$ 179,400	$ 1,614,600	$ 1,794,000
Taxiway End Reconstruction for Profile	$ 140,600	$ 1,265,400	$ 1,406,000
Replace Taxiway A Connector to Elevated Runway	$ 33,300	$ 299,700	$ 333,000
Existing Runway Pavement Overlay	$ 375,900	$ 3,383,100	$ 375,900
Remarking of Runway 18-36	$ 8,400	$ 75,600	$ 84,000
Year 4 Total Cost	**$ 1,386,300**	**$ 12,476,700**	**$ 13,863,000**
Year 5 - 2025			
South Taxiway Connector at RW 36 Displaced Threshold	$ 27,800	$ 250,200	$ 278,000
Year 5 Total Cost	**$ 27,800**	**$ 250,200**	**$ 278,000**
Total Short Term Program Projects	**$ 2,409,200**	**$ 21,682,800**	**$ 25,592,000**

Table 5.2
Phase II & Phase III CIP Summary

Medium Term Program Projects	Projected Local/City Share (10%)	Projected TxDOT/ Federal Share (90%)	Projected Total Cost(100%)
PHASE II (6-10 Year) ACIP COSTS			
Surface Treatment of Taxiway Pavements	$ 15,750	$ 141,750	$ 157,500
Utilities for West Apron	$ 58,800	$ 529,200	$ 588,000
Site Fill and Entry Road for West Apron	$ 2,170,000	$ 2,170,000	$ 4,340,000
Terminal Building for West Apron	$ 1,800,000	$ 600,000	$ 2,400,000
Install new Avgas System at West Apron	$ 250,000	$ 250,000	$ 500,000
Install new Jet A System at West Apron	$ 250,000	$ 250,000	$ 500,000
Install Hangar Taxilane Pavement (Phase 1: Inboard Row)	$ 389,500	$ 3,505,500	$ 3,895,000
Total Medium Term Program Projects	**$ 4,934,050**	**$ 7,446,450**	**$ 12,380,500**

Long Term Program Projects	Projected Local/City Share (10%)	Projected TxDOT/ Federal Share (90%)	Projected Total Cost(100%)
PHASE III (11-20 Year) ACIP COSTS			
Install Hangar Taxilane Pavement (Phase 2: Outboard Row)	$ 241,600	$ 2,174,400	$ 2,416,000
Surface Treatment of Runway Pavement	$ 35,700	$ 321,300	$ 357,000
Runway Marking Replacement	$ 8,400	$ 75,600	$ 84,000
Surface Treatment of Taxiway Pavements	$ 15,750	$ 141,750	$ 157,500
Total 11-20 Year Development Cost	**$ 301,450**	**$ 2,713,050**	**$ 3,014,500**

20-YEAR ACIP COSTS	**Local Share**	**Federal Share**	**Project Cost**
Phase I (0-5 Year) Short-Term Costs	$ 2,409,200	$ 21,682,800	$ 25,592,000
Phase II (6-10 Year) Medium-Term Costs	$ 4,934,050	$ 7,446,450	$ 12,380,500
Phase III (11-20 Year) Long-Term Costs	$ 301,450	$ 2,713,050	$ 3,014,500
Grand Total of 0-20 Year Development Cost	**$7,644,700**	**$31,842,300**	**$40,987,000**

These contingent costs are included in the total costs of the 0-5 year planning period. Phases II (mid-term) and III (long-term) of the CIP also include contingent costs added to the sum of the costs for each of the development phases.

The CIP cost estimates presented for airside, landside and support facilities were derived from engineering bid tabs taken from recent construction projects similar to those recommended for the airport. Absent a real or market value appraisal for property acquisition, costs associated with land acquisition are not included as part of the CIP. Lastly, the proposed cost estimates are intended to be utilized for planning purposes only and should not be considered an engineer's opinion of probable construction costs.

SUMMARY

UTS's CIP cost projections, not including direct operational and maintenance expenses, are expected to total approximately $40.9 million. The TxDOT/federal share of capital improvements is anticipated to be approximately $31.8 million, while the City's share is estimated to total $7.6 million.

The source of funding (e.g., TxDOT/federal versus local funding) for improvement projects is included within the three CIP summary tables. The City is expected to expend approximately $2.4 million during the short-term period, nearly $4.9 million during the mid-term period, and an additional $300,000 during the long-term phase of airport development.

Until recently, development projects associated with T-hangar construction and terminal building improvements had been ineligible for AIP funds. As of 2010, AIP funds are eligible to be expended on these revenue-generating projects provided that all airfield facility needs are met and in compliance with FAA criteria. Otherwise, these specific improvement projects will be ineligible due to low prioritization and available AIP funds will be expended on higher priority airfield and terminal area facility improvements.

It is important to note that the runway extension described in this CIP entails reconstructing approximately 1,000 feet of the existing runway and taxiway, allowing the future runway to comply with FAR Part 77 non-precision instrument approach surface Category C, which would be a requirement for approach minimums less than one mile in the future. Category C approach minimums would also require an approach lighting system and larger RPZ, which are not included in the preferred development alternative or the CIP described in this chapter. However, the current vertical alignment of Runway 18-36 only supports Category B approach minimums. While an extension maintaining these one-mile, Category B approach minimums would cost less than one providing a vertical alignment supporting Category C, planning runway improvements that would be supportive of future approach category upgrades was determined to be of importance.

CHAPTER 6: FINANCIAL PLAN

INTRODUCTION

Financing the airport's 20-year capital improvement program can be accomplished through a variety of resources by utilizing a combination of Federal, state and local funding methods. These include the FAA's Airport Improvement Program (AIP), TxDOT Aviation State Apportionment Funding, as well as revenue bonds, private investments, airport revenues and budgeted allocations from the City of Huntsville.

This chapter discusses these funding methods and will evaluate the airport's operating revenues and expenditures over the past five fiscal years. Additionally, a projected cash flow analysis will be completed for the short and mid-term planning periods to forecast airport revenues and expenditures. Finally, the master plan financial evaluation will highlight guidelines for generating revenue at the airport while minimizing expenses to the extent practical.

CAPITAL IMPROVEMENT FUNDING SOURCES

FEDERAL GRANTS

Originally authorized by the *Airport and Airway Improvement Act of 1982*, the AIP program is funded through the Airport and Airway Trust Fund (enacted by legislation in 1970), which receives 100 percent of its funding from aviation-generated user fees including passenger and facility fees, as well as cargo and fuel taxes. The AIP provides Federal entitlement and discretionary funding grants to be used for eligible projects at public use airports that serve primarily general aviation activity.

NON-PRIMARY ENTITLEMENT FUNDS

Non-primary entitlement (NPE) funds are specifically for general aviation airports included within the latest published National Plan of Integrated Airport Systems (NPIAS) that show a justified need for airfield and terminal area improvements. During any fiscal year in which the total amount of system-wide apportionments from the AIP and Aviation Trust Fund exceeds $3.2 billion dollars, NPE funds in the amount of $150,000 per fiscal year, or 20 percent of the total five-year NPIAS improvements, whichever is less, will be allocated to the airport sponsor. NPE funds are available during the initial year of allocation, as well as the next three fiscal years. Unused entitlement funds will expire if not obligated under a grant after four years.

The Federal portion of AIP grants eligible to fund capital improvements is currently 90 percent with the remaining 10 percent of development costs to be funded through City and local revenues and/or third-party investments.

DISCRETIONARY FUNDS

There are two types of Discretionary funds. The first, Set-Aside Funds, are reserved for noise compatibility planning and implementing noise compatibility programs. The second type of discretionary funds includes those that are remaining after the apportionments are made and set-asides are accommodated. Of these remaining funds, 75 percent is reserved for preserving and enhancing capacity, safety, security, and carrying out noise compatibility planning and programs at primary and reliever airports. The remaining 25 percent of the funds are known as remaining, or pure discretionary, and may be used at any airport for any AIP eligible improvement project.

Table 6.1 lists eligible and ineligible improvement projects as they relate to AIP funding guidelines.

Table 6.1
AIP Eligible and Ineligible Projects

Eligible Projects	Ineligible Projects
Runway Improvements	Mowers, Sweepers, Trucks, Office Equipment
Taxiway Improvements	Automobile Parking Lots
Airfield Pavement Maintenance	Industrial Park Infrastructure and Buildings
Airfield Lighting/ Signage	Business and Marketing Plans
Airport Master/ Layout Plans	Training of any Kind
Environmental Studies	
Access Roads Located on Airport Property	
Mitigating Obstructions/ Hazard to navigation	
Drainage Improvements	
AWOS Facilities	
Land Acquisition for Eligible Development	
Tree Clearing in Approach Surfaces	
NAVAIDs	
Hangar Development*	
Terminal Development*	
Fuel Farms*	
(*) These items are eligible for AIP funds only when all airfield facility needs are met and in compliance with FAA planning criteria. Otherwise, they are typically ineligible for AIP projects due to low prioritization.	

STATE FUNDING – RAMP PROGRAM

The State of Texas utilizes a Routine Airport Maintenance Program (RAMP) to provide state-appropriated funding for maintenance and small, time-critical capital improvements. The program provides a 50% match on projects up to $100,000, for a $50,000 total maximum per fiscal year for eligible projects. Publicly-owned General Aviation airports in the Texas Airport System Plan, such as UTS, are eligible for RAMP funding. The program is approved by the Texas Transportation Commission at the beginning of each fiscal year.

TEXAS AVIATION FACILITIES DEVELOPMENT PROGRAM

The State of Texas, through TxDOT Aviation, provides funding to support the 278 General Aviation airports in the State of Texas. Like AIP grants, projects utilizing state funds are eligible for 90 percent of project costs, with the remaining 10 percent of development costs to be funded through the airport sponsor and local revenues and/or third-party investments. TxDOT identifies aviation facility requirements, airport locations, and timing for development of general aviation airports. Under the State Block Grant Program, the department refines the projects and determines funding eligibility.

All projects contained in the state's CIP are first identified in the state plan. TxDOT regularly updates its listing of specific airport needs through continuous dialog and planning meetings held with airport sponsors across the state. Each airport in the Texas Airport System Plan (TASP) has an assigned TxDOT planner who works closely with the sponsor to identify and understand their unique needs. A Development Worksheet is maintained for each airport in the state system. These worksheets identify anticipated short-, intermediate-, and long-term improvements. Airport sponsors may request changes to the development worksheets at any time.

During the process of updating the TASP, important aviation-related information is collected, including operations levels and facility conditions. This information also is used in developing the CIP, as is the level of sponsor responsibility regarding airport maintenance and grant compliance.

THIRD PARTY FINANCING

Third party financing may be appropriate in the case where the airport sponsor would use a developer or tenant to finance construction projects. In this case, the third party would lease the structure for a period of years to the tenant paying the ground lease. According to the terms of the agreement, the airport sponsor receives ownership of the asset upon expiration of the lease. This method of financing preserves the sponsor's cash to fund higher priority projects. Examples of projects that are funded in this manner include the development of T-hangars, private and/or corporate clear span and FBO/maintenance hangars.

BONDS

A variety of bonds can be issued to support airport development projects.

GENERAL OBLIGATION (GO) BONDS

GO Bonds are backed by the creditworthiness and taxing power of the municipality operating the airport. They usually bear low interest rates because of their high degree of security. However, state laws may limit a municipality's overall debt, and competition from other community financing requirements may preclude their use for an airport project. Some states have an exemption from the debt limitation rule for general obligation bonds because they are used for a revenue producing enterprise.

REVENUE BONDS

Revenue bonds pledge the revenues of an airport sponsor to the repayment of debt service. These are the most common sources of funding at larger commercial service airports. Revenue bonds are popular because they do not burden the taxpayer or affect the bonding capacity of the municipality. However, their use is limited to airports with a sufficient operating surplus to cover the debt service. Projected Net Revenues must exceed debt service requirements by at least 1.25 times and up to 2.0 times, depending on the strength of the bond issuer and the underlying assumptions with respect to the market risk for the bonds. Interest rates are dependent on the coverage ratio, but in any case will be higher than for general obligation bonds. Other factors that may affect the interest rates on revenue bonds are the strength of the local passenger market and the financial condition of the airlines serving the market.

SPECIAL FACILITY REVENUE BONDS

Special Facility Revenue Bonds are normally issued by the airport sponsor for the construction of a facility for a third party and backed by the revenues generated from that facility. This method of funding can be used for such facilities as maintenance hangars, airline reservation centers, terminal buildings, and air cargo terminals.

INDUSTRIAL DEVELOPMENT BONDS

Industrial Development Bonds can be issued by states, local government, or an airport authority to fund the construction of or improvements to an airport industrial park or other facilities that may attract business and increase aeronautical or non-aviation related lease revenues at the airport.

LOCAL FUNDS

The remaining portion of project costs would be expected to be funded largely from local sources, including airport revenues. The local share of project costs are typically derived from surplus revenue generated at the airport or with budgeted allocations from the City's general fund to the airport account.

Sponsor Grant Assurance No. 25, *Airport Revenues,* stipulates that all revenue, including agricultural leases, generated at the airport will be expended exclusively for the operating costs of the airport including maintenance and improvements projects as well as debt service obligations. Federal grant assurances expressly forbid revenue generated on-airport from being transferred to any other city account and/or department.

HISTORIC CASH FLOW

A review of airport revenues and operating and maintenance expenses was completed in an effort to highlight and evaluate cash flows at UTS.

AIRPORT REVENUES

Revenue is generally derived at UTS through a lease agreement with the FBO, as well as hangar leases. Currently, the City of Huntsville holds a ground lease with Huntsville Aviation, which is required to staff the airport at least nine hours per day. From the lease with Huntsville Aviation, the City of Huntsville makes approximately $12,000 per year from the lease with the FBO. Additionally, the City of Huntsville collects approximately $6,000 per year in hangar leases. All of the lease fees collected are placed in the Airport Fund, which is utilized to pay for airport operating expenses.

OPERATING EXPENSES

The City of Huntsville is tasked with routine maintenance of the airfield. These operating expenses utilize most of the income from hangar and FBO leases.

NET INCOME

The net income realized by the City of Huntsville for UTS has not historically been enough to fund larger-scale projects such as runway extension or pavement reconstruction. As such, the City has relied upon state and federal grants to maintain and expand the airfield.

The airport's financial condition is not unique in general aviation airport ownership and operation nor does it signal that fiscal management of the airport lacks oversight. It is a simple indication of the public welfare role the airport serves to the public and local community, the principals of supply and demand, as well as the revenue-expense relationship of airports.

AIRPORT REVENUES FUND IMPROVEMENTS

As a condition of accepting AIP funding grant, the airport sponsor is required to maintain a fee structure that, given the circumstances of the airport, allows it to be as financially self-sustaining as possible. Therefore, the City and airport are required to abide by accepted principles applicable to fees, rates and charges. This also includes the ability and willingness to assess fair and reasonable fees for use of the facility and prohibit discrimination against any class of user or aircraft type. Lastly, exercising good faith in governing revenue collection and use is important.

UTS benefits southeast Texas through rapid, accessible, and convenient transportation, as well as economic activity generated by the airport. These benefits are diffused throughout the community, thereby providing a common welfare to the region. At the same time, the facility encourages the exchange of goods and services supporting the notion that the airport is a business enterprise and should be self-sustaining. With the assistance of AIP funds, coupled with fair and equitable rates and charges reflective of realities of supply and demand, the airport's CIP can be carried out in a financially feasible manner that will benefit both the airport and its users.

The following discussion concentrates on established practices regarding administering a rates and charges program to optimize the return on the airport's revenue centers. These revenue centers, or services, are those in which the airport will, or currently does, provide to airport users. These services include T-hangar and clear span hangar rental space; tie-down usage; terminal building rental space for an FBO or aviation related on-airport businesses; commercial/industrial/business lease rates within the terminal area; aircraft landing fees; fuel flowage fees; and agricultural leases.

PRIVATELY-OWNED T-HANGAR REVENUE

Rental rates for T-hangars can be established based on an appraisal rate or rate per square foot. The appraisal rate formula involves appraising the value of the land at the facility. The rate would be a percentage of the appraised value of that portion of land supporting the structure sufficient to equal the appraised value and to allow debt service obligations. Conversely, a rate per square foot can be a fixed rate or tied to the value of the land appraisal. For both methods, regular appraisals are recommended so that rates can reflect the increase in the value of the land as the facility grows. Additionally, as maintenance and operational costs increase, lease agreements are recommended to include escalation clauses to recover these costs for improvements and amortization. Where the structure is owned by a private entity, the tenant is recommended to be responsible for maintenance of the structure, as well as a specific amount of land adjacent to the structure.

CLEAR SPAN HANGAR REVENUE

The rental rate for these facilities can be based on an appraisal rate or rate per square foot. Additionally, various hangar rental rates can be based on the structure's locational advantages and its rental rates adjusted accordingly. Escalation clauses within the lease agreements are recommended in order to recover maintenance and operational costs as well as amortization. Maintenance clauses, as discussed above, are also recommended as part of these lease agreements.

ON-AIRPORT INDUSTRIAL/COMMERCIAL BUSINESS REVENUE

Airport property is not to be released, transferred or sold for private, industrial or commercial uses. The City is recommended to lease land for such uses to desirable tenants in order to provide continuous income for the airport. As is common for most general aviation airports, commercial/industrial facilities charges include a fixed rate (appraisal or rate per square foot) plus a percentage of sales. Percentage of sales most generally applies to commercial business, including restaurants or aircraft maintenance providers, that deal in sales while industrial establishments, not relying on local sales for revenue, provide fixed rate fees plus operational and maintenance costs through escalation clauses as part of the lease agreement. These rate structures allow the airport to benefit from the success of the businesses located there. The businesses recoup revenues due to the airport providing the necessary facilities which enable their business to be successful. Additional improvements to the airport, as provided by the City, will only enhance each firm's business outlook. In essence, the businesses are sharing in the cost of improvements in proportion to the financial success they experience as a result of the City's investment in the airport. Maintenance clauses, as well as insurance clauses (if applicable), are also recommended as part of these lease agreements.

Businesses located at the airport now and in the future are recommended to abide by established minimum performance standards, included as part of the lease agreement, which ensure that necessary services are provided and that the quality of services adequately promotes the airport's image.

TERMINAL BUILDING LEASE REVENUE

Current and potential FBO and aviation service providers that might occupy space in the terminal building are recommended to be charged a fixed rate (rate per square foot) plus a percentage of sales fee structure, as is common for general aviation airports. Maintenance and escalation clauses, as well as minimum performance standards, are recommended to be included as part of a lease agreement.

LANDING FEE REVENUE

It is permissible for the City to establish landing fees by utilizing a compensatory model of rates and charges determination. In this approach, the user (large aircraft weighing in excess of 12,500 pounds maximum gross weight) is charged based on their actual use of the facility from which they derive a benefit. A fee is levied against the user to cover the corresponding expenses to maintain and operate the facility. The rate of the landing fee is based on the aircraft operator's prorated share of occupancy or usage. This share of usage may be based on the total weight of the aircraft or annual operational activity. A landing fee for large aircraft operators might be classified under an alternative term such as a ramp fee. In the event that the aircraft operator purchases a minimum amount of fuel, the FBO may elect to waive a landing fee.

FUEL FLOWAGE REVENUE

As is common for many general aviation airports, fuel flowage revenue includes either a fixed fee per gallon of fuel dispensed or a percentage of total sales. This percentage may be quarterly, bi-annually or annually. An alternative method for determining an appropriate fuel royalty/flowage fee might include instituting a graduated percentage of gross fuel revenue collection method in lieu of a fixed fuel flowage fee to allow for seasonal fluctuations, economic conditions or supply and demand. As with any other commercial businesses based at the airport, fuel flowage fees are necessary because the proprietor derives a benefit from airport operation and should compensate the airport sponsor accordingly. Escalation clauses for a fixed rate fee, as well as minimum performance standards, are recommended to be included as part of the lease agreement.

EQUIPMENT USE REVENUE

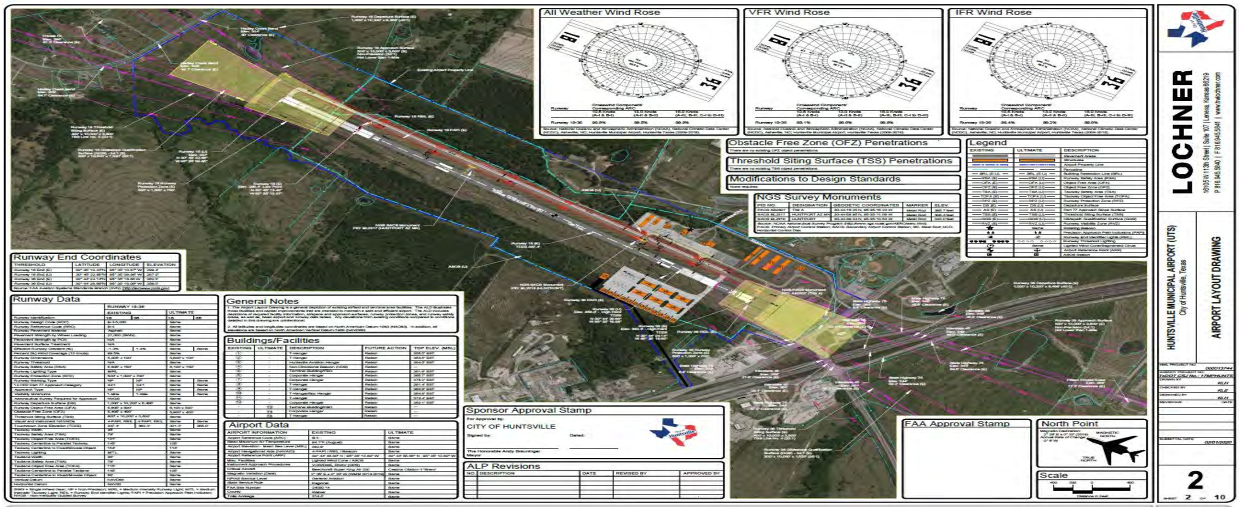
Just as landing fees are levied against aircraft for utilization of the runway facilities, so, too, should aircraft operators and airport users be charged a fee for use of airport equipment. In particular, ground power units (GPU) are often required for larger, more sophisticated aircraft that do not have an auxiliary power unit (APU) to power electrical components while the aircraft is shut down but still requires electrical power. Additionally, portable heaters used to pre-heat the aircraft during periods of cold weather before startup, as well as other items such as aircraft tugs, can be assigned specific costs for each use by aircraft operators.

AIRCRAFT PARKING/ TIE-DOWN REVENUE

A fixed fee for aircraft tie-downs is recommended to be administered on a daily, weekly, monthly and annual basis. The fixed fee may take into account the size of aircraft based on its prorated share or occupancy of the aircraft apron.

SUMMARY

This master plan document addresses the airport's current operational activity and projected operational demand at the facility over the next 20 years. It also determines the recommended airfield and terminal area improvements to accommodate existing and anticipated demand. Combined, these findings and recommendations will allow the City to improve and expand the airport in a financially and operationally feasible manner as demand warrants throughout the 20-year planning period.



CHAPTER 7: AIRPORT LAYOUT PLANS

INTRODUCTION

The Airport Layout Plan (ALP) drawings for UTS depict the current and proposed facility expansion necessary for the safe and efficient utilization of the airport while, at the same time, accommodating projected aviation demand. The proposed capital improvements depicted within the ALP are derived from the master plan's findings and recommendations from the aviation demand forecasts, facility requirements and development alternatives.

The primary functions of the ALP that define its purpose include:

- An approved ALP is necessary in order for the airport to receive financial assistance from the FAA under the terms of the Airport and Airway Improvement Act of 1982 (AIP) and/or grants from TxDOT Aviation. The airport sponsor is required to keep the ALP current and follow the preferred development concept, which reflect grant assurance requirements of the AIP.

- An ALP creates a blueprint for airport development by depicting proposed facility improvements. The ALP also provides a guideline by which the airport sponsor can ensure that airport improvements are implemented in accordance with the FAA's design standards and safety requirements.

- The ALP is a public document that serves as a record of aeronautical requirements, both present and future, and as a point of reference for considerations regarding land use proposals, land acquisition and budgetary allocations and planning.

- The approved ALP enables the airport sponsor, FAA and TxDOT to plan for facility improvements at the airport. It also allows TxDOT and FAA to anticipate long-term operational and maintenance needs for the facility. The approved ALP will also enable the airport sponsor to protect the airport's airspace surfaces, thereby preserving the facility's airspace infrastructure.

- The ALP is a working tool to be utilized by the airport sponsor, including City personnel, airport management staff, as well as airport stakeholders.

Lastly, the approved ALP provides detailed information for the city regarding applicable Federal Aviation Regulations (FAR), airport design criteria, airfield and terminal area facilities, airspace structure and land use, terminal area characteristics, obstructions to air navigation and existing and/or future property interests.

AIRPORT LAYOUT PLAN

The **Airport Layout Drawing (ALD)** depicts existing and ultimate airfield and terminal area development based on proposed capital improvement recommendations for the short, intermediate and long-term planning periods. The ALD illustrates those capital improvements that are intended to maintain a safe and operationally efficient facility. The proposed improvements are intended to ensure the airport remains capable of accommodating current and projected aviation demand throughout the 20-year planning period. The ALD includes depictions of required facility information, airspace and approach surfaces, runway protection zones, and runway safety areas, as well as basic airport and runway data tables.

The ALD and discussion provided in the following passages describes the major elements of the preferred airport development concept. The **Title Sheet** is also included for reference as to the number and name of each sheet within the ALP set.

RUNWAY SYSTEM

The airfield layout consists of a single-runway system. The runway, designated 18-36, is aligned in a north-south orientation. Runway 18-36 is expected to be extended by 495 feet during the planning period to become capable of accommodating 75 percent of the general aviation aircraft fleet weighing greater than 12,500 pounds, to a total length of 5,500 feet. Additionally, the Runway 36 threshold is being shifted to the north by 450 feet to accommodate placement of the RPZ on existing airport property, as well as minimize the possibility of IH-45 presenting an obstruction to the Runway 36 approach surface. To accommodate the 450-foot shift in runway threshold, as well as a 495-foot extension, an additional 945 feet of pavement would be necessary on the north side of the runway alignment.

TAXIWAY SYSTEM

The taxiway system consists of a full-length parallel taxiway currently being relocated to a 240-foot offset from Runway 18-36. The existing and relocated taxiways are 35 feet in width. Runway 18-36 is recommended to be served by a full-length parallel taxiway throughout the duration of the 20-year planning period. The taxiway system is recommended to be equipped with medium intensity taxiway lighting (MITL).

NAVAIDS AND AIRFIELD LIGHTING

Runway 18-36 is a non-precision runway accommodating a straight-in RNAV (also known as GPS) and a nondirectional beacon (NDB) approach to Runway 18, and a VHF-omnidirectional range and distance measuring equipment (VOR/DME) to the airfield. Ultimately, both thresholds of Runway 18-36 are expected to accommodate 34:1 non-precision approaches with minimum visibilities not less than one mile with minimum descent altitudes equal to and/or less than 300 feet AGL.

The medium intensity runway lighting (MIRL), threshold lighting and runway end indicator lights (REIL) serving Runway 18-36 are programmed to remain in place throughout the planning period and upgraded as needed. Additionally, the four-box PAPI visual guidance system serving Runway 18-36 is recommended to remain operational throughout the planning period.

TERMINAL AREA DEVELOPMENT

The existing terminal area is located on the east side of the airfield, and offers a 3,600 square-foot terminal building and over 79,000 square feet of hangar space. The terminal area is constrained by terrain associated with Hadley Creek, a public park, and State Highway 75. As such, the potential for expansion of the eastern terminal area is limited.

The Preferred Terminal Area Alternative incorporates use of land currently owned by the City of Huntsville on the western side of Runway 18-36. This expansion onto the western side could afford an additional terminal building, 36 additional T-hangar units, 12 additional box hangars, and 14 additional tie-down spaces. An access road traversing the western boundary of the existing City-owned property would serve the western terminal area.

LAND ACQUISITION

The preferred airfield alternative and terminal area alternative allow for extension of Runway 18-36 and construction of the new terminal area without acquisition of additional property.

AIRSPACE DRAWING

UTS's airspace drawing is based on FAR Part 77, *Objects Affecting Navigable Airspace*. The provisions of FAR Part 77 have been enacted to protect the airport's airspace infrastructure from objects and structures that represent an obstruction to air navigation in an effort to control the heights of objects in the vicinity of the airport. When penetrated, these imaginary surfaces identify an object as an obstruction or hazard to air navigation. The **Airspace Drawing** depicts the airport's Part 77 surfaces and provides plan and profile views as they relate to the airport and the surrounding area. This airspace drawing is based specifically on the planned runway lengths, as well as planned instrument approach procedures for each runway end. Runway 18-36 is depicted as having 34:1 non-precision instrument approaches.

There is one known penetration to the airport's imaginary airspace surfaces. This obstruction, the eastern entrance road to Two Texans Truck Wash located west of the airport property, penetrates Runway 36 departure surface.

It should be noted that an Aeronautical GIS survey was originally scoped as part of this master plan, to be completed by TxDOT Aviation and provided to the consultant. This survey was not completed due to funding. The airspace drawings on the UTS ALP utilize obstruction survey data previously included in the FAA AGIS database, with data spanning as far back as 2000.

INNER PORTION OF THE APPROACH SURFACE DRAWING(S)

These drawings are intended to provide a detailed view of the inner portion of the Part 77 approach surfaces. The **Inner Portion of the Approach Surface Drawing(s)** provides a large scale profile and plan view of the inner approach surfaces for each runway end and facilitates identification of roadways, utilities, railroads, structures and existing, as well as potential property interests. The inner approach drawings also detail the size and location of the Runway Safety Areas (RSA), Object Free Area (OFA), Runway Protection Zones (RPZ), Obstacle Free Zones (OFZ), and illustrate the existing and future location of the runway thresholds. Lastly, the inner approach surface drawings are based on the planned length and the type of approach established for each runway approach end.

RUNWAY CENTERLINE PROFILE DRAWING

The **Runway Centerline Profile Drawing** includes a plan and profile view of the existing and ultimate runway alignment which delineates the runway's line-of-sight attributes including runway end elevations, effective runway gradient, section gradient, touchdown zone elevations (TDZ) and runway high and low point elevations.

TERMINAL AREA DRAWING

The **Terminal Area Drawing** presents the airport terminal area's existing and future configuration.

PASSENGER TERMINAL BUILDING

The existing 3,600 square foot terminal building is located adjacent to and north of the aircraft apron. Given its size, layout, age and overall physical condition, the terminal building is not considered conducive to supporting necessary passenger processes including flight planning, pilot lounge and passenger circulation areas over the next 20 years. The preferred terminal area development concept accommodates an additional terminal building on the western side of the airfield.

AIRCRAFT APRON

From an operational and spatial standpoint, the airport's 6,900 square yard parking apron is sufficient to accommodate peak hour transient demand throughout the mid-term planning period, but not beyond the 10-year planning period. During peak times, the FBO reports the parking apron is congested and difficult to maneuver if jets are parked on the ramp. Ultimately, additional apron space is recommended on the west side of the airfield.

HANGAR FACILITIES

Given the projected based aircraft demand, approximately 21,250 square feet of T-hangar space are recommended for development throughout the planning period, as well as at least eight additional box hangars. New T-hangar construction could most cost-effectively take place on the western side of the airfield, where approximately 56,880 additional square feet of T-hangar buildings could be accommodated. Twelve box hangars could also be sited on the western terminal area.

SUPPORT AND OTHER FACILITIES

The airport's fuel farm is located adjacent to the existing terminal building. The fuel farm consists of three aging underground storage tanks capable of storing 12,000 gallons of 100 LL and Jet-A fuel. Although the tanks are fully-regulated under TCEQ and continue to pass inspections, the City desires to replace the tanks with self-serve aboveground tanks.

LAND USE DRAWING

The **Land Use Drawing** depicts the existing and recommended land uses within the existing and ultimate airport property boundary. The main purpose of the land use drawing is to provide the airport sponsor a plan to coordinate land uses conducive to airside development and those landside areas available to be leased for revenue producing purposes. Lastly, the land use drawing provides guidance to local community and county authorities for establishing compatible land uses in the vicinity of UTS.

According to the forecasted projections, the anticipated operational activity at UTS is well below the threshold of 90,000 annual piston operations and/or 700 annual jet operations requiring the need to create a Noise Exposure Map (NEM). Accordingly, based on projected operational activity, the preferred airfield alternative is not expected to create adverse cumulative noise impacts within the immediate vicinity of the airport. Therefore, the 65 DNL noise contour is not depicted on the airport's land use drawing.

PROPERTY MAP

The **Property Map** presents the existing and ultimate airport property tracts including the acreage of each parcel, how the airport property was acquired (i.e., Federal AIP funds versus local funding), when each tract of land was acquired, and the existing ownership status of proposed property acquisitions. The property map serves as a guide for the city to analyze the current and future utilization of land acquired with Federal and/or state funding grants.

UTS's property consists of 180 acres held as fee simple ownership, with an additional 161-acre City-owned parcel located west adjacent to the airfield. As noted above, the preferred development concepts do not involve land acquisition.

40:1 DEPARTURE SURFACE DRAWING

The **40:1 Departure Surface Drawing** depicts the plan and profile view of the current and ultimate 40:1 departure surfaces to provide information on existing and potential obstructions to the engine-out departures on instrument procedure for Runway 18-36.

The departure surface for Runway 36 is penetrated by the entrance road to the truck wash located west of the airfield. .

Airport Layout Plan

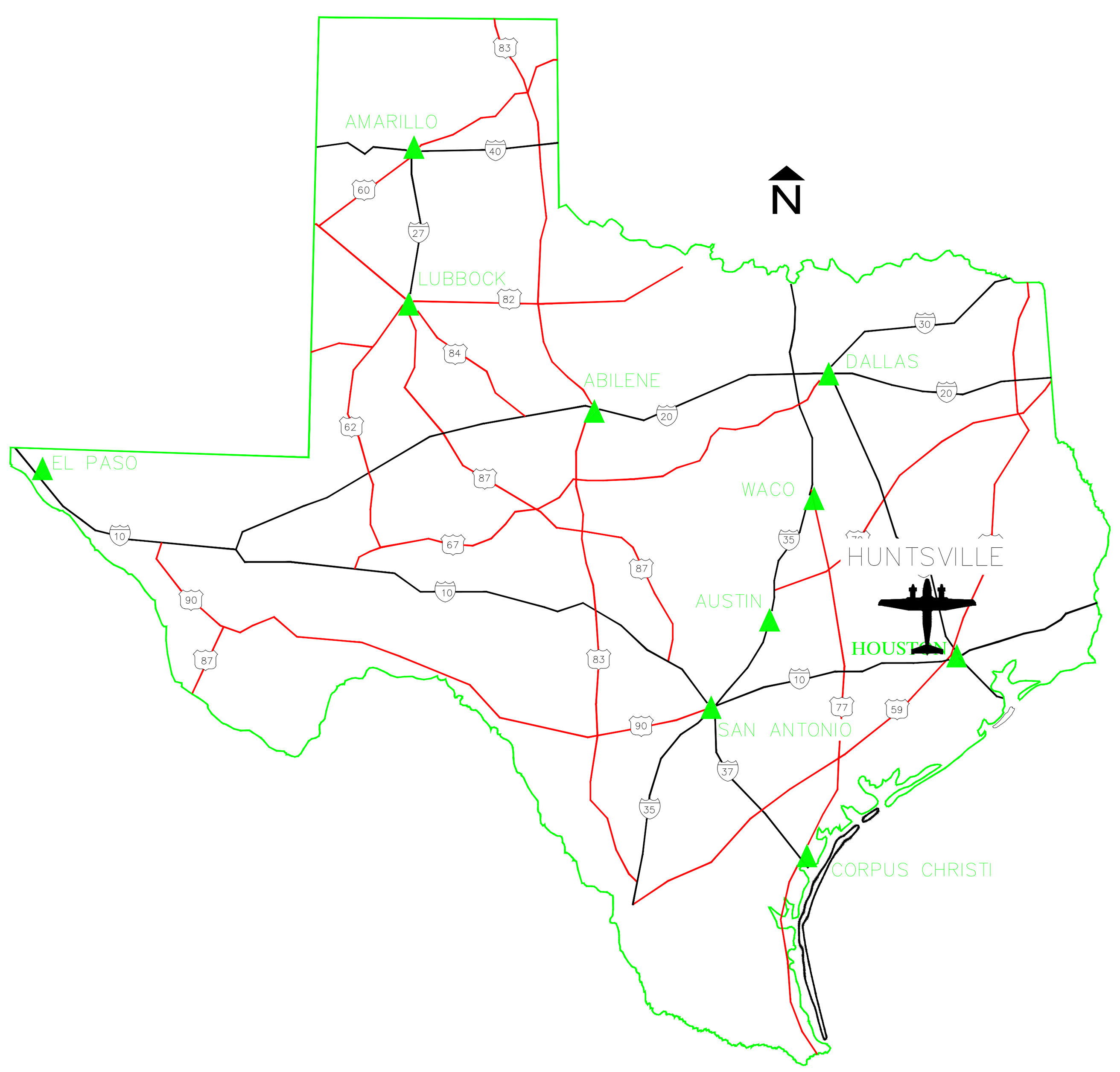
for the

Huntsville Municipal Airport (UTS)

Huntsville, Texas

TxDOT CSJ No.: 17MPHUNTS

LOCATION MAP



NO SCALE

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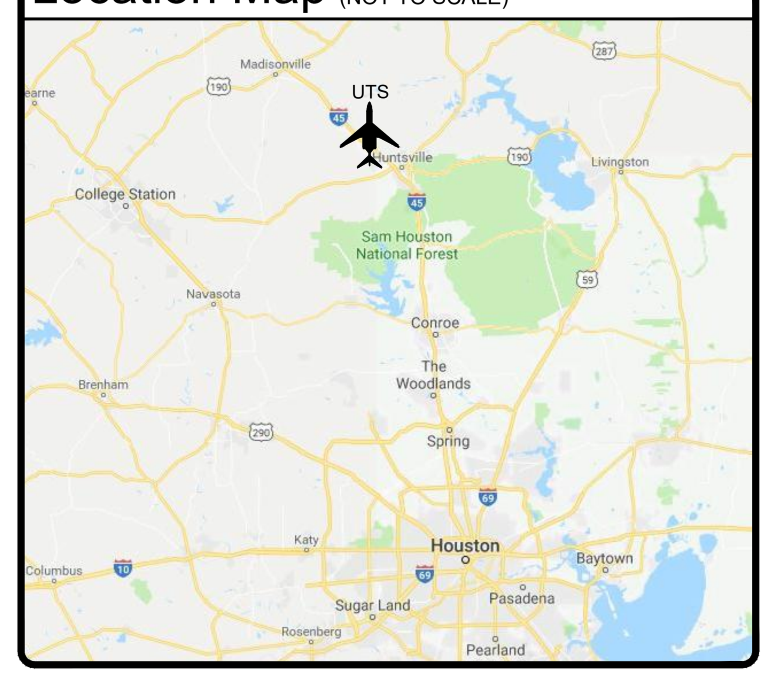
2. Airport Layout Drawing
3. Airspace Drawing
4. Runway 18 Inner Portion of the Approach Surface Drawing
5. Runway 36 Inner Portion of the Approach Surface Drawing
6. Runway Centerline Profile Drawing
7. Terminal Area Drawing
8. Land Use Drawing
9. Property Map Drawing
10. Runway 18-36 40:1 Departure Surface Drawing

FAA Disclaimer

The preparation of this document may have been supported, in part, through a planning grant from Federal Aviation Administration (FAA) as provided under the Airport and Airways Development Act of 1982, as amended. The contents of this document do not necessarily reflect the views or policy of the U.S. Department of Transportation, FAA. Acceptance of this document by the FAA does not in any way constitute a commitment on the part of the United States to participate in any development concept depicted therein nor does it indicate that the proposed development is environmentally acceptable in accordance with appropriate public laws.

Location Map (NOT TO SCALE)



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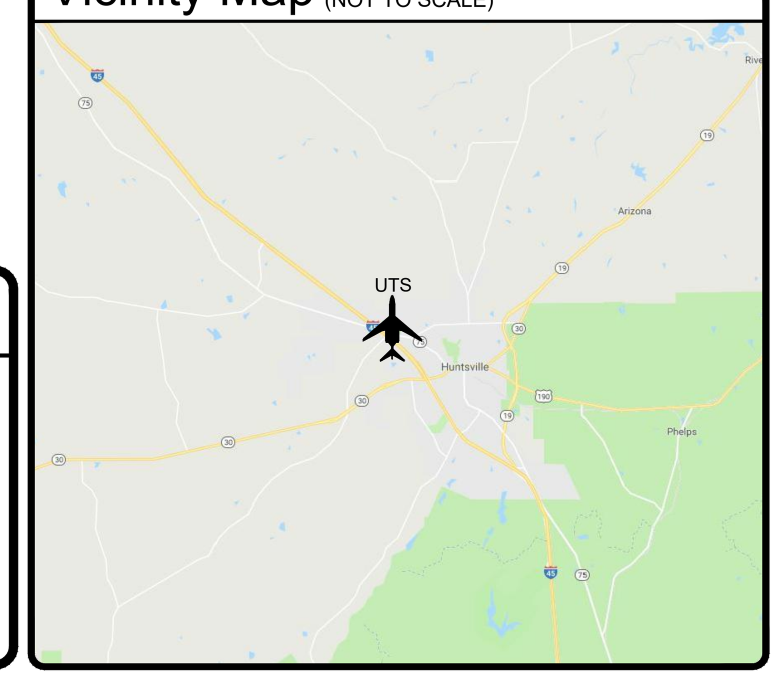

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HUNTSVILLE MUNICIPAL AIRPORT (UTS)
City of Huntsville, Texas

TITLE SHEET

HWL PROJECT NO.	000013744
AGENCY PROJECT NO.	TxDOT CSJ NO.: 17MPHUNTS
DRAWN BY	KLH
CHECKED BY	KLE
DESIGNED BY	KLH
REVISIONS	DATE
SUBMITTAL DATE	2/01/2020

1

SHEET 1 OF 10

Drawing Name: I:\KAC\PRJ\000013744\PROJECT FILES\DRAWINGS\Airport Layout Plan\Production\01 - 13744 - TITLE.dwg Jan 23,2020 - 10:41am

All Weather Wind Rose

Runway	Crosswind Component/ Corresponding ARC 10.5 Knots (A-I & B-I)	13.0 Knots (A-II & B-II)	16.0 Knots (A-III, B-III, C-I to D-III)
Runway 18-36	98.9%	99.5%	99.9%

Source: National Oceanic and Atmospheric Administration (NOAA), National Climatic Data Center (NCDC), Asheville, NC; Huntsville Municipal Airport, Huntsville Texas (2009-2018).

VFR Wind Rose

Runway	Crosswind Component/ Corresponding ARC 10.5 Knots (A-I & B-I)	13.0 Knots (A-II & B-II)	16.0 Knots (A-III, B-III, C-I to D-III)
Runway 18-36	99.1%	99.6%	99.9%

Source: National Oceanic and Atmospheric Administration (NOAA), National Climatic Data Center (NCDC), Asheville, NC; Huntsville Municipal Airport, Huntsville Texas (2009-2018).

IFR Wind Rose

Runway	Crosswind Component/ Corresponding ARC 10.5 Knots (A-I & B-I)	13.0 Knots (A-II & B-II)	16.0 Knots (A-III, B-III, C-I to D-III)
Runway 18-36	98.4%	99.2%	99.8%

Source: National Oceanic and Atmospheric Administration (NOAA), National Climatic Data Center (NCDC), Asheville, NC; Huntsville Municipal Airport, Huntsville Texas (2009-2018).

Obstacle Free Zone (OFZ) Penetrations

There are no existing OFZ object penetrations.

Threshold Siting Surface (TSS) Penetrations

There are no existing TSS object penetrations.

Modifications to Design Standards

None required.

NGS Survey Monuments

PID NO.	DESIGNATION	GEODETIC COORDINATES	MARKER	ELEV.
PACS AB2827	T39 A	30-44-16.25 N, 95-35-15.23 W	Metal Rod	365.7 feet
SACS BL2317	HUNTPORT AZ MK	30-44-59.95 N, 95-35-11.09 W	Metal Rod	308.4 feet
SACS BL2316	HUNTPORT	30-44-39.34 N, 95-35-13.53 W	Metal Rod	343.0 feet

Source: NOAA Aeronautical Survey Program (http://www.ngs.noaa.gov/AERO/aero.html)
PACS- Primary Airport Control Station; SACS- Secondary Airport Control Station; SR- Steel Rod; HCD- Horizontal Control Disk

Legend

EXISTING	ULTIMATE	DESCRIPTION
		Pavement Areas
		Structures
		Airport Property Line
		Fenceline
BRL (E-U)	BRL (E-U)	Building Restriction Line (BRL)
RSA (E)	RSA (U)	Runway Safety Area (RSA)
OFA (E)	OFA (U)	Object Free Area (OFA)
OFZ (E)	OFZ (U)	Object Free Zone (OFZ)
TSA (E)	TSA (U)	Taxiway Safety Area (TSA)
TOFA (E)	TOFA (U)	Taxiway Object Free Area (TOFA)
RPZ (E)	RPZ (U)	Runway Protection Zone (RPZ)
DS (E)	DS (U)	Departure Surface
AS (E)	AS (U)	Part 77 Approach Slope Surface
TSS (E)	TSS (U)	Threshold Siting Surface (TSS)
GQS (E)	GQS (U)	Glidepath Qualification Surface (GQS)
RVZ (E)	RVZ (U)	Runway Visibility Zone (RVZ)
☆	Same	Rotating Beacon
		Precision Approach Path Indicators (PAPI)
		Runway End Identifier Lights (REIL)
●●●● ●●●●	○○○○ ○○○○	Runway Threshold Lighting
	Same	Lighted Wind Cone/Segmented Circle
		Airport Reference Point (ARP)
		ASOS Station

Runway End Coordinates

THRESHOLD	LATITUDE	LONGITUDE	ELEVATION
Runway 18 End (E)	30° 45' 13.42"N	95° 35' 10.87" W	299.4'
Runway 18 End (U)	30° 45' 22.68"N	95° 35' 09.86" W	287.0"
Runway 36 End (E)	30° 44' 24.14"N	95° 35' 16.65 W	362.3'
Runway 36 End (U)	30° 44' 28.68"N	95° 35' 16.08" W	356.0'

Source: FAA Aviation Systems Standards Branch (AVN) (http://avnwww.jccbi.gov)

Runway Data

	RUNWAY 18-36			
	EXISTING		ULTIMATE	
Runway Identification	18	36	18	36
Runway Design Code (RDC)	B-II-5,000		Same	
Runway Reference Code (RRC)	B-II		Same	
Runway Pavement Material	Asphalt		Same	
Pavement Strength by Wheel Loading	27,000 (SWG)		Same	
Pavement Strength by PCN	N/A		Same	
Pavement Surface Treatment	N/A		Same	
Effective Runway Gradient (%)	-1.3%	1.3%	Same	Same
Percent (%) Wind Coverage (13 Knots)	99.5%		Same	
Runway Dimensions	5,005' x 100'		5,500' x 100'	
Runway Threshold	N/A		Same	
Runway Safety Area (RSA)	5,605' x 150'		6,100' x 150'	
Runway Lighting Type	MIRL		Same	
Runway Protection Zone (RPZ)	500' x 1,000' x 700'		Same	
Runway Marking Type	NP	NP	Same	Same
14 CFR Part 77 Approach Category	34:1	34:1	Same	Same
Approach Type	NP	NP	Same	Same
Visibility Minimums	1-Mile	1-Mile	Same	Same
Aeronautical Survey Required for Approach	NVGS		Same	
Runway Departure Surface (DS)	1,000' x 10,200' x 6,466'		Same	
Runway Object Free Area (OFA)	5,605' x 500'		6,100 x 500'	
Obstacle Free Zone (OFZ)	5,405' x 400'		5,900' x 400'	
Threshold Siting Surface (TSS)	800' x 10,000' x 3,800'		Same	
Visual and instrument NAVAIDs	4-PAPI, REIL	4-PAPI, REIL	Same	Same
Touchdown Zone Elevation (TDZE)	337.4'	362.3'	321.0'	356.0'
Taxiway Width	35'		Same	
Taxiway Safety Area (TSA)	79'		Same	
Taxiway Object Free Area (TOFA)	131'		Same	
Taxiway Centerline to Parallel Taxiway	145'		105'	
Taxiway Centerline to Fixed/Movale Object	154'		114'	
Taxiway Lighting	MITL		Same	
Taxilane Width	35'		Same	
Taxilane Safety Area (TSA)	79'		Same	
Taxilane Object Free Area (TOFA)	115'		Same	
Taxilane Centerline to Parallel Taxilane	145'		105'	
Taxilane Centerline to Fixed/Movale Object	68'		Same	
Vertical Datum	NAVD88		Same	
Horizontal Datum	NAV83		Same	

SWG = Single Wheel Gear; NP = Non-Precision; MIRL = Medium Intensity Runway Light; MITL = Medium Intensity Taxiway Light; REIL = Runway End Identifier Lights; PAPI = Precision Approach Path Indicator; NVGS - Non-Vertically Guided Survey

General Notes

1. The Airport Layout Drawing is a general depiction of existing airfield and terminal area facilities. The ALD illustrates those facilities and capital improvements that are intended to maintain a safe and efficient airport. The ALD includes depictions of required facility information, airspace and approach surfaces, runway protection zones, and runway safety areas, as well as, basic airport and runway data tables. Any deviations from existing conditions compared to conditions detailed in this drawing are unintentional.

2. All latitudes and longitudes coordinates are based on North American Datum-1983 (NAD83). In addition, all elevations are based on North American Vertical Datum-1988 (NAVD88)

Buildings/Facilities

EXISTING	ULTIMATE	DESCRIPTION	FUTURE ACTION	TOP ELEV. (MSL)
1	-	T-Hangar	Retain	355.5' EST.
2	-	T-Hangar	Retain	354.5' EST.
3	-	Huntsville Aviation Hangar	Retain	364.5' EST.
4	-	Non-Directional Beacon (NDB)	Retain	---
5	-	Terminal Building/FBO	Retain	361.9' EST.
6	-	Corporate Hangar	Retain	365.7' EST.
7	-	Corporate Hangar	Retain	375.2' EST.
8	-	T-Hangar	Retain	281.4' EST.
9	-	T-Hangar	Retain	383.8' EST.
10	-	T-Hangar/Box Hangar	Retain	384.8' EST.
11	-	T-Hangar	Retain	374.4' EST.
12	-	Corporate Hangar	Retain	382.1' EST.
-	13	Terminal Building/FBO	Retain	---
-	14	Corporate Hangar	Retain	---
-	15	T-Hangar	Retain	---

Airport Data

AIRPORT INFORMATION	EXISTING	ULTIMATE
Airport Reference Code (ARC)	B-II	Same
Mean Maximum Air Temperature	94.1°F (August)	Same
Airport Elevation - Mean Sea Level (MSL)	362.9'	Same
Airport Navigational Aids (NAVAID)	4-PAPI / REIL / Beacon	Same
Airport Reference Point (ARP)	30° 44' 48.80" N ; 95° 35' 13.80" W	30° 44' 55.68" N ; 95° 35' 12.80" W
Misc. Facilities	Lighted Wind Cone / ASOS	Same
Instrument Approach Procedures	VOR/DME, RNAV (GPS)	Same
Critical Aircraft	Beechcraft Super King Air 200	Cessna Citation II 'Bravo'
Magnetic Variation (Date)	2° 26' E ± 0° 20' W (WMM 2014-2019)	Same
NPIAS Service Level	General Aviation	Same
State Service Role	Regional	Same
FAA Site Number	24092.*A	Same
County	Walker	Same
Total Acreage	314.4'	Same

Sponsor Approval Stamp

For Approval by:

CITY OF HUNTSVILLE

Signed by: Dated:

The Honorable Andy Brauninger
Mayor

ALP Revisions

NO.	DESCRIPTION	DATE	REVISED BY	APPROVED BY

FAA Approval Stamp

North Point

Magnetic Declination:
2° 29' E ± 0° 20' (2019)
Annual Rate of Change:
0° 6' W

MAGNETIC NORTH

TRUE NORTH

Scale

400 200 0 400

Distance in Feet

Drawing Name: \\hwlochner.com\hwl\KAC\PRJ\000013744\PROJECT FILES\DRAWINGS\Airport Layout Plan\Production\02 - 13744 - ALD.dwg Feb 04,2020 - 2:10pm

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HUNTSVILLE MUNICIPAL AIRPORT (UTS)

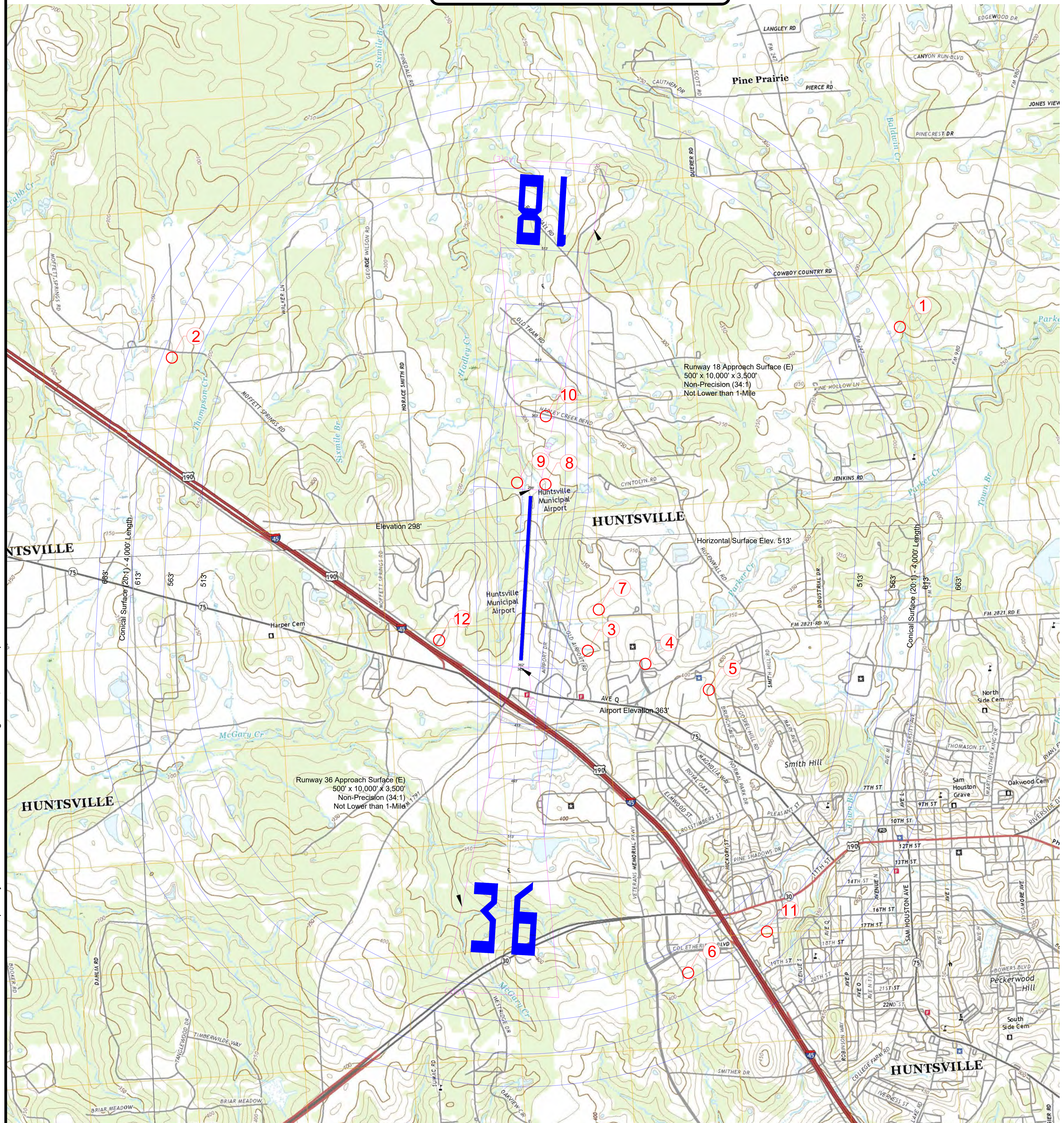
City of Huntsville, Texas

AIRPORT LAYOUT DRAWING

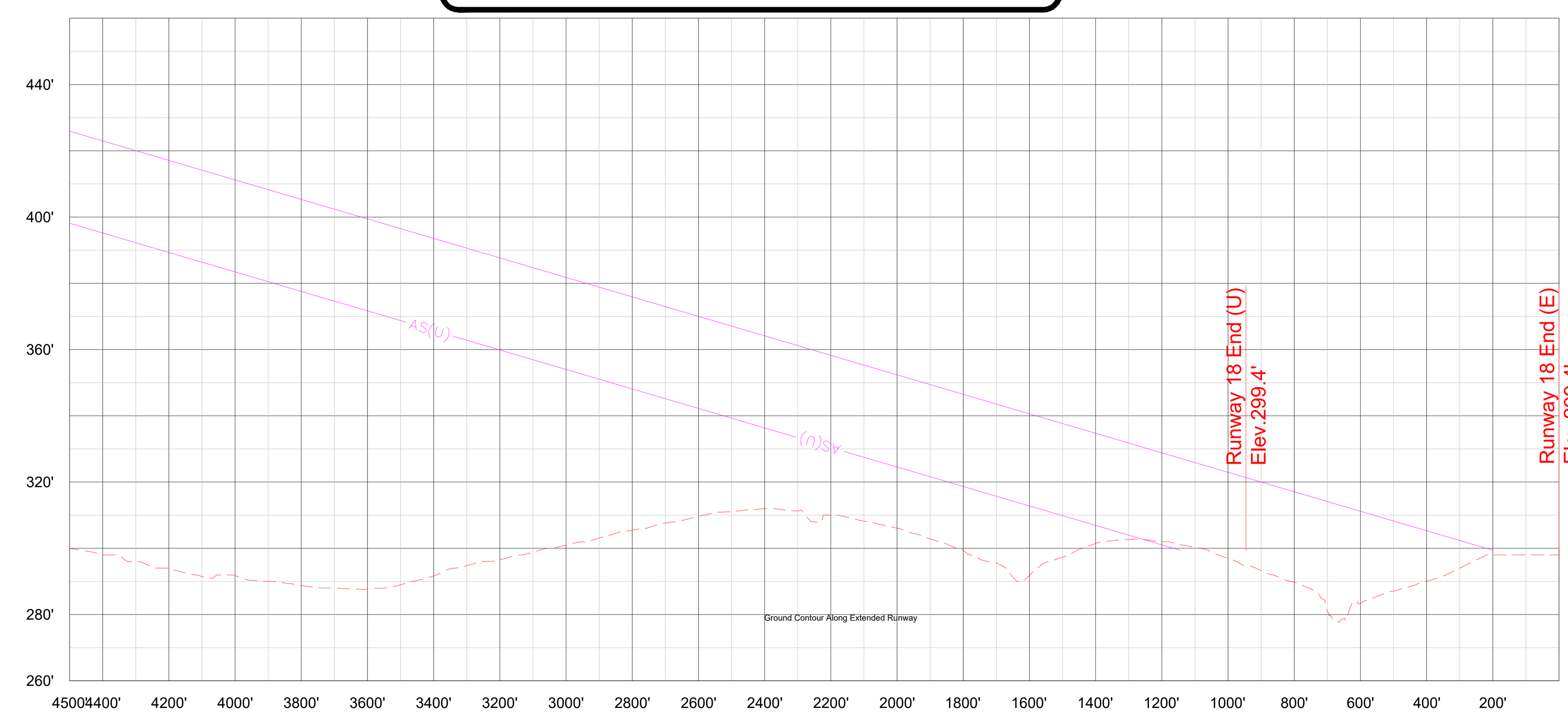
HWL PROJECT NO.	000013744
AGENCY PROJECT NO.	TxDOT CSJ No.: 17MPHUNTS
DRAWN BY	KLH
CHECKED BY	KLE
DESIGNED BY	KLH
REVISIONS	DATE
SUBMITTAL DATE	02/01/2020

2

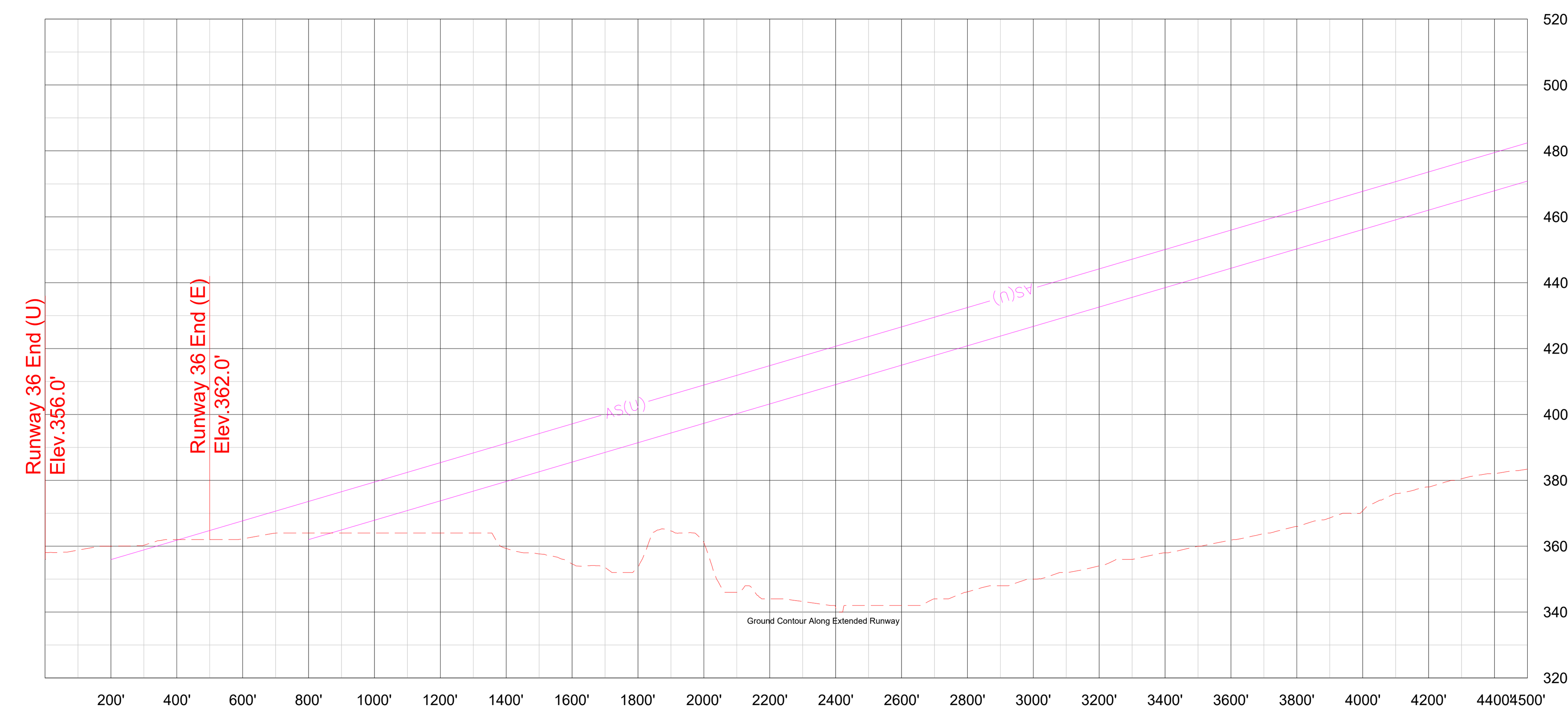
UTS Part 77 Surfaces Plan View



Runway 18 Approach Profile View



Runway 36 Approach Profile View

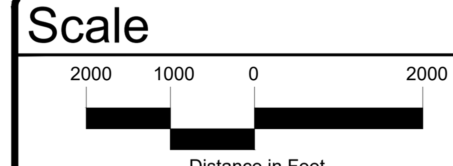


Obstruction Data Table

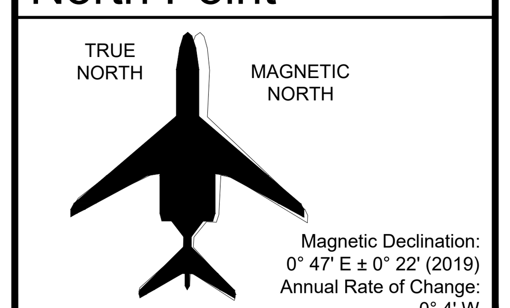
ITEM	DESCRIPTION	LATITUDE	LONGITUDE	TOP ELEV.	PENETRATION	SURFACE	FAA STUDY NO.	DISPOSITION
1	Tower (149' AGL)	30-41-60.00 N	95-32-58.00 W	624.0'	8' Clear	Conical	2001-ASW-00436-OE	None
2	Tower (230' AGL)	30-45-59.57 N	95-37-14.03 W	553.0'	45' Clear	Conical	2010-ASW-04703-OE	Light
3	Tower (168' AGL)	30-44-25.90 N	95-34-53.30 W	513.0'	0' Clear	Horizontal	2006-ASW-06502-OE	None
4	Tower (144' AGL)	30-44-21.21 N	95-34-33.42 W	538.0'	25' Penetration	Horizontal	2007-ASW-05647-OE	Light and Paint
5	Tower (118' AGL)	30-44-12.60 N	95-34-11.65 W	513.0'	0' Clear	Horizontal	2008-ASW-05310-OE	None
6	Tower (180' AGL)	30-42-47.60 N	95-34-23.10 W	585.0'	32' Penetration	Conical	2010-ASW-02488-OE	Light
7	Pole (125' AGL)	30-44-38.18 N	95-34-48.84 W	492.0'	21' Clear	Horizontal	Outside of Study	None
8	Pole (31' AGL)	30-45-16.60 N	95-35-05.59 W	322.0'	4' Clear	Transitional	Outside of Study	None
9	Pole (31' AGL)	30-45-17.46 N	95-35-15.45 W	325.0'	1' Clear	Transitional	Outside of Study	None
10	Pole (36' AGL)	30-45-37.12 N	95-35-04.45 W	348.0'	17' Clear	Approach	Outside of Study	None
11	Tower (120' AGL)	30-42-59.00 N	95-33-55.00 W	518.0'	53' Clear	Conical	1987-ASW-00186-OE	None
12	Tower (102' AGL)	30-44-31.00 N	95-35-45.00 W	470.0'	43' Clear	Horizontal	2010-ASW-02488-OE	None

DEND- Distance from Runway End; DCL- Distance from Runway Centerline; (Date of obstruction survey March 2019).

Scale



North Point



Magnetic Declination:
0° 47' E ± 0° 22' (2019)
Annual Rate of Change:
0° 4' W

General Notes

The City of Huntsville has enacted height and hazard zoning codes to preserve the airport's airspace infrastructure and regulate land use to control the height of objects within the immediate vicinity of UTS. Regulations can be found in the City's 2015 Development Code.

Drawing Name: \\hwlochner.com\hwl\KAC\PRJ\000013744\PROJECT FILES\DRAWINGS\Airport Layout Plan\Production\03 - 13744 - ASD.dwg Feb 04,2020 - 2:11pm

City of Huntsville

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HUNTSVILLE MUNICIPAL AIRPORT (UTS)
City of Huntsville, Texas

AIRSPACE DRAWING

HWL PROJECT NO. 000013744
AGENCY PROJECT NO. TxDOT CSJ No.: 17MPHUNTS
DRAWN BY KLE
CHECKED BY SAR
DESIGNED BY KLE
REVISIONS DATE
SUBMITTAL DATE 12/01/2019

3

General Notes

1. The IPASD is a general representation of existing conditions within the inner portion of the approach slope surface pertaining to traverse ways, runway safety area dimensions, terrain relief and structure location. Any deviations from existing conditions compared to conditions detailed in this drawing are unintentional.
2. The recommended FAR Part 77 minimum adjusted approach surface clearance over a public roadway and/or state highway is 15 feet'. The existing and ultimate calculated clearances over Hadley Creek Bend reflect the clearance over the approximate centerline of the road at ground level plus the 15 foot penalty height.
3. The recommended FAR Part 77 minimum adjusted approach surface clearance over a private drive is 10 feet'. The existing and ultimate calculated clearances over the private road reflect the clearance over the approximate centerline of the road at ground level plus the 10 foot penalty height.
4. Refer to Sheet 10 for obstruction information and penetrations to the 40:1 Departure Surface.

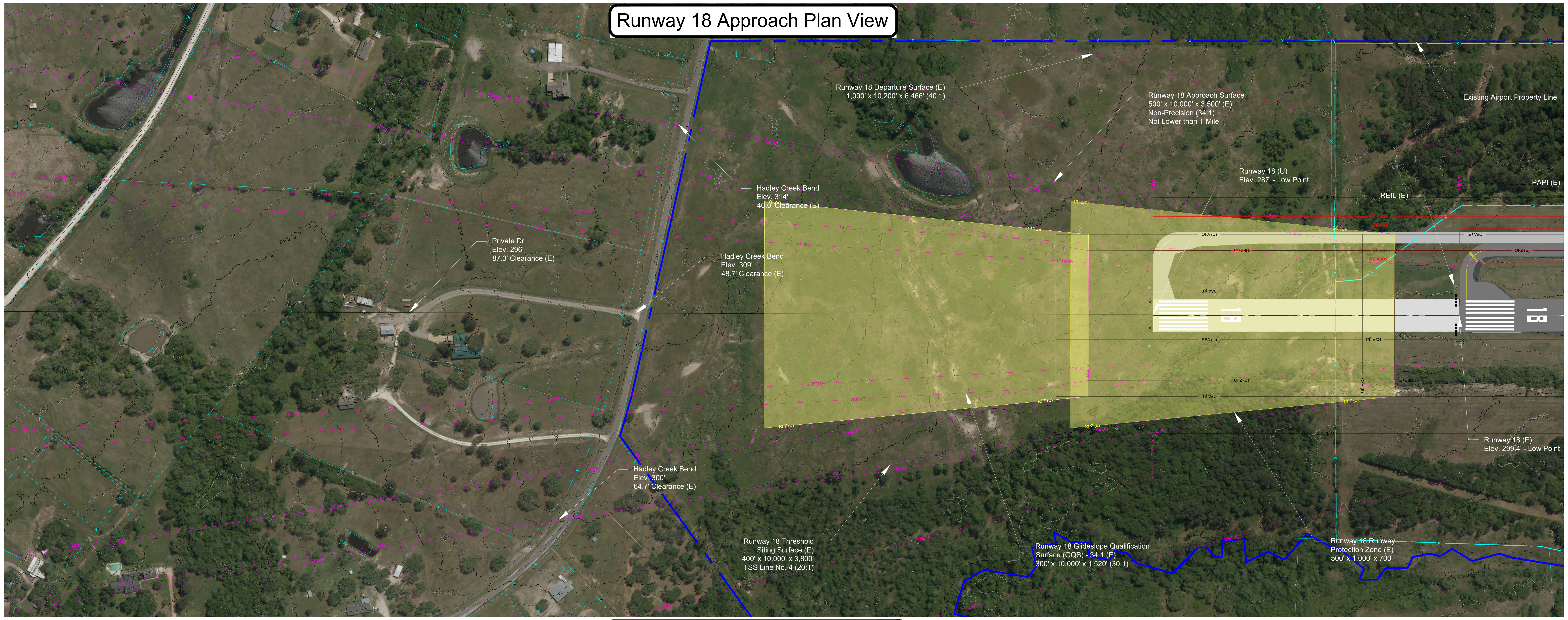
Legend

EXISTING	ULTIMATE	DESCRIPTION
		Pavement Areas
		Structures
		Airport Property Line
	x	Fenceline
BRL (E-U)	BRL (E-U)	Building Restriction Line (BRL)
RSA (E)	RSA (U)	Runway Safety Area (RSA)
OFA (E)	OFA (U)	Object Free Area (OFA)
OFZ (E)	OFZ (U)	Object Free Zone (OFZ)
RPZ (E)	RPZ (U)	Runway Protection Zone (RPZ)
DS (E)	DS (U)	Departure Surface
AS (E)	AS (U)	Part 77 Approach Slope Surface
TSS (E)	TSS (U)	Threshold Siting Surface (TSS)
GQS (E)	GQS (U)	Glidepath Qualification Surface (GQS)
☆	Same	Rotating Beacon
		Precision Approach Path Indicators (PAPI)
		Runway End Identifier Lights (REIL)
●●●● ●●●●	○○○○ ○○○○	Runway Threshold Lighting
	Same	Lighted Wind Cone/Segmented Circle
		Airport Reference Point (ARP)
		ASOS Station

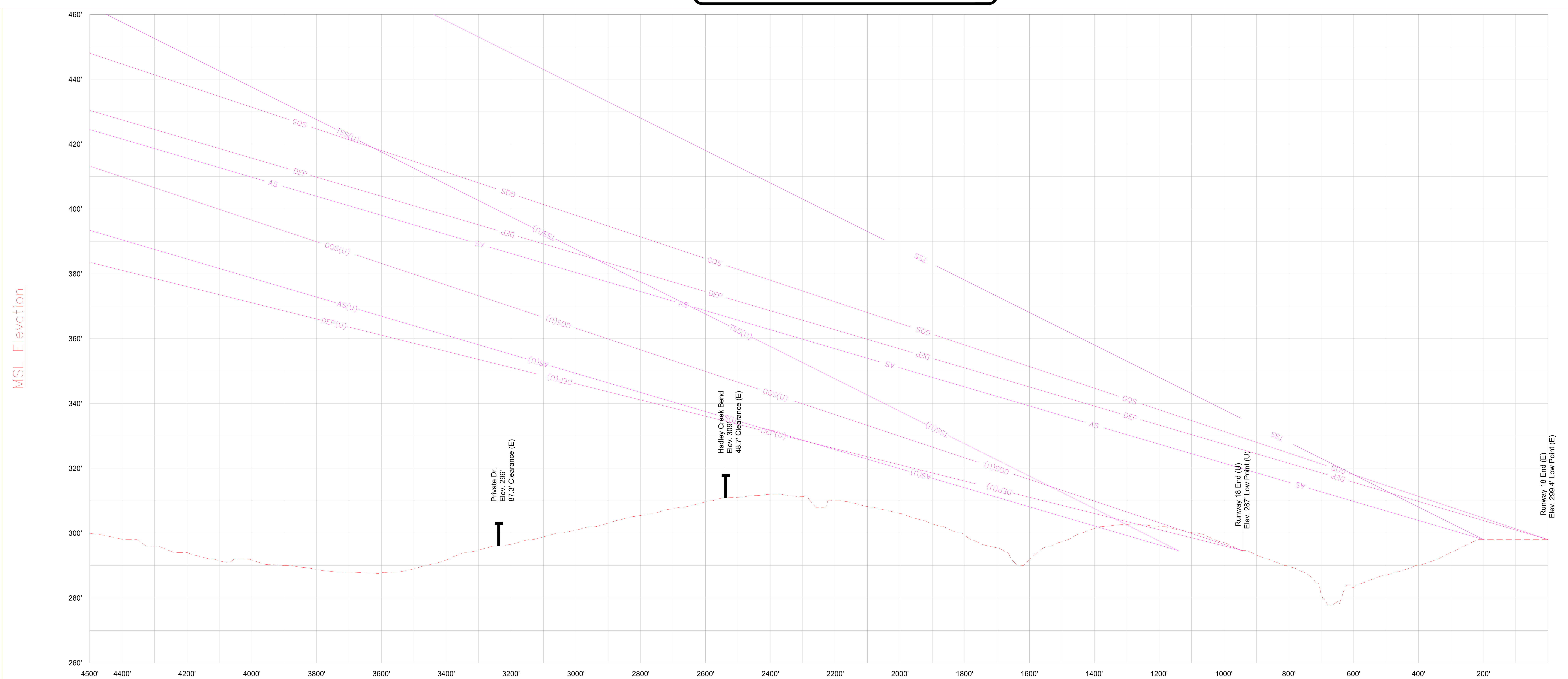
Runway 18 Obstruction Data Table

There are no known existing and/or ultimate FAR Part 77 airspace obstructions. However, completion of a Part 77 obstruction survey is recommended to identify and mitigate potential obstructions that might exist.

Runway 18 Approach Plan View



Runway 18 Approach Profile View



North Point

Magnetic Declination:
2° 29' E ± 0° 20' (2019)
Annual Rate of Change:
0° 6' W

MAGNETIC NORTH

TRUE NORTH

Scale

200 100 0 200

Distance in Feet

Drawing Name: \\hwlochner.com\hwl\KAC\PRJ\000013744\PROJECT FILES\DRAWINGS\Airport Layout Plan\Production\04 - 13744 - RW 18 IPASD.dwg Feb 04,2020 - 2:15pm

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HUNTSVILLE MUNICIPAL AIRPORT (UTS)
City of Huntsville, Texas

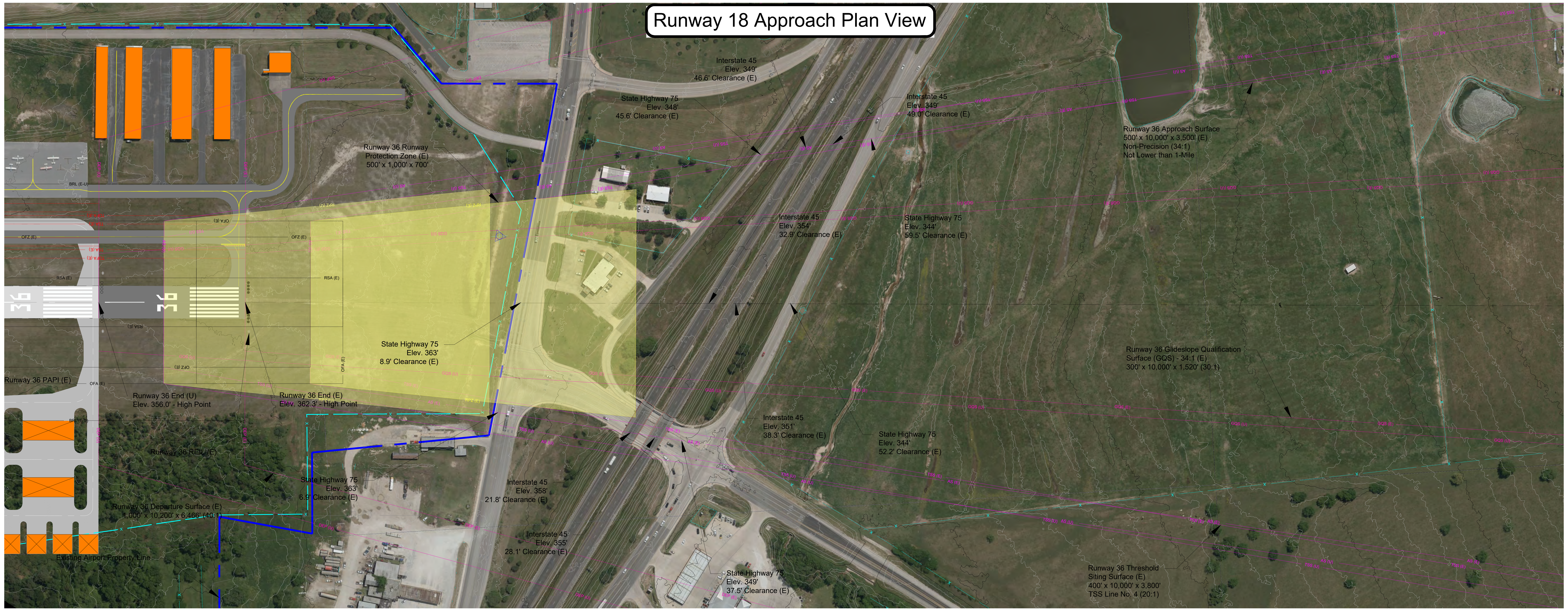
RUNWAY 18 INNER APPROACH PORTION SURFACE DRAWING

HWL PROJECT NO.	000013744
AGENCY PROJECT NO.	TxDOT CSJ No.: 17MPHUNTS
DRAWN BY	KLH
CHECKED BY	KLE
DESIGNED BY	KLH
REVISIONS	DATE
SUBMITTAL DATE	02/01/2020

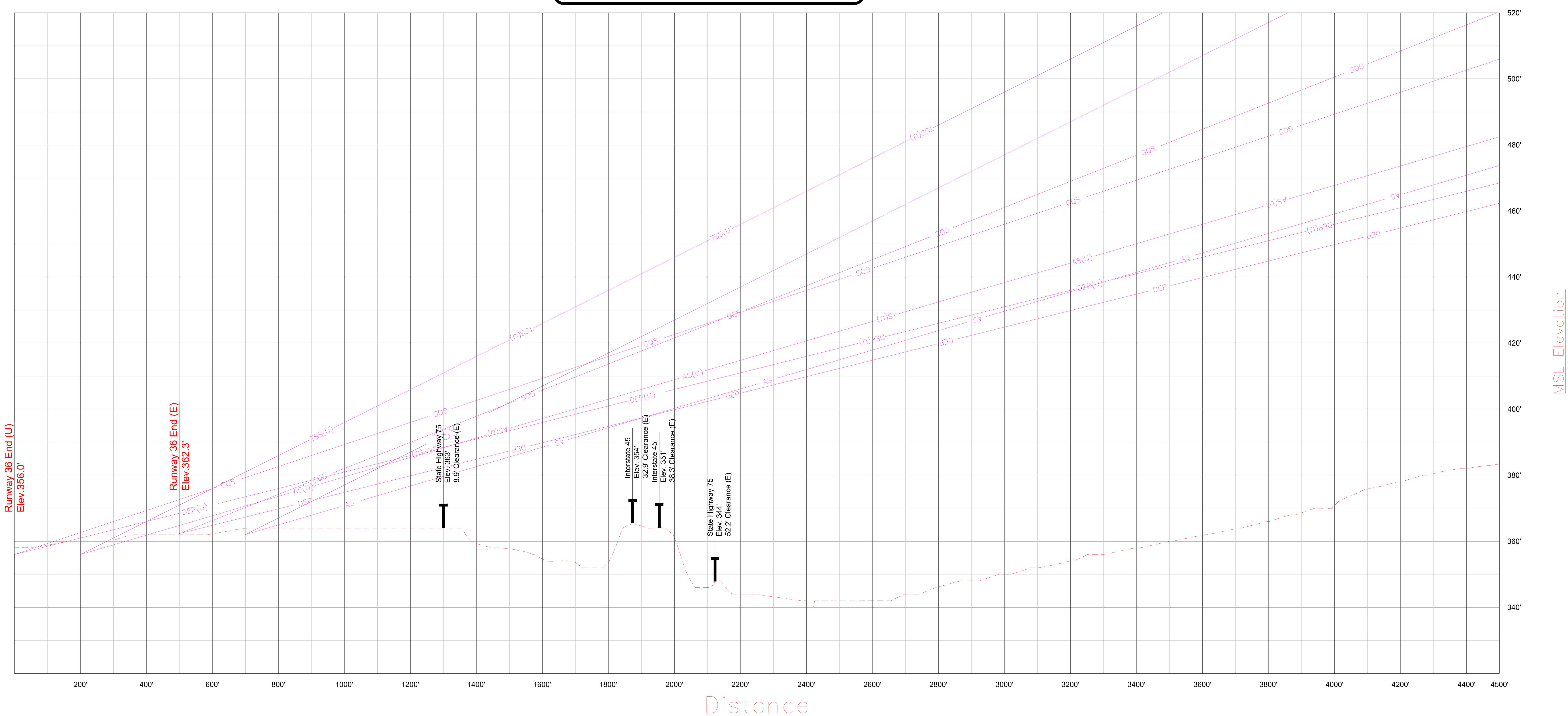
4

SHEET 4 OF 10

Runway 18 Approach Plan View



Runway 36 Approach Profile View



General Notes

1. The IPASD is a general representation of existing conditions within the inner portion of the approach slope surface pertaining to traverse ways, runway safety area dimensions, terrain relief and structure location. Any deviations from existing conditions compared to conditions detailed in this drawing are unintentional.
2. The recommended FAR Part 77 minimum adjusted approach surface clearance over an Interstate is 17 feet'. The existing and ultimate calculated clearances over Interstate 45 reflect the clearance over the approximate centerline of the road at ground level plus the 17 foot penalty height.
3. The recommended FAR Part 77 minimum adjusted approach surface clearance over a public roadway and/or state highway is 15 feet'. The existing and ultimate calculated clearances over State Highway 75 reflect the clearance over the approximate centerline of the road at ground level plus the 15 foot penalty height.
4. Refer to Sheet 10 for obstruction information and penetrations to the 40:1 Departure Surface.

Legend

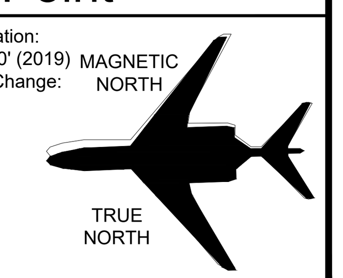
EXISTING	ULTIMATE	DESCRIPTION
		Pavement Areas
		Structures
		Airport Property Line
x	XX	Fenceline
BRL (E-U)	BRL (E-U)	Building Restriction Line (BRL)
RSA (E)	RSA (U)	Runway Safety Area (RSA)
OFA (E)	OFA (U)	Object Free Area (OFA)
OFZ (E)	OFZ (U)	Object Free Zone (OFZ)
RPZ (E)	RPZ (U)	Runway Protection Zone (RPZ)
DS (E)	DS (U)	Departure Surface
AS (E)	AS (U)	Part 77 Approach Slope Surface
TSS (E)	TSS (U)	Threshold Siting Surface (TSS)
GQS (E)	GQS (U)	Glidepath Qualification Surface (GQS)
★	Same	Rotating Beacon
		Precision Approach Path Indicators (PAPI)
		Runway End Identifier Lights (REIL)
●●●● ●●●●	○○○○ ○○○○	Runway Threshold Lighting
	Same	Lighted Wind Cone/Segmented Circle
		Airport Reference Point (ARP)
		ASOS Station

Runway 18 Obstruction Data Table

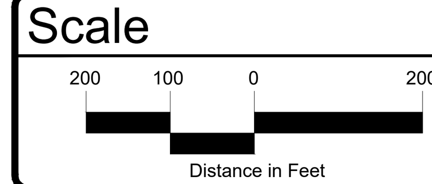
There are no known existing and/or ultimate FAR Part 77 airspace obstructions. However, completion of a Part 77 obstruction survey is recommended to identify and mitigate potential obstructions that might exist.

North Point

Magnetic Declination:
2° 29' E ± 0° 20' (2019)
Annual Rate of Change:
0° 6' W



Scale



City of Huntsville

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HUNTSVILLE MUNICIPAL AIRPORT (UTS)
City of Huntsville, Texas

RUNWAY 36 INNER APPROACH PORTION SURFACE DRAWING

HWL PROJECT NO.	000013744
AGENCY PROJECT NO.	TxDOT CSJ No.: 17MPHUNTS
DRAWN BY	KLH
CHECKED BY	KLE
DESIGNED BY	KLH
REVISIONS	DATE
SUBMITTAL DATE	02/01/2020

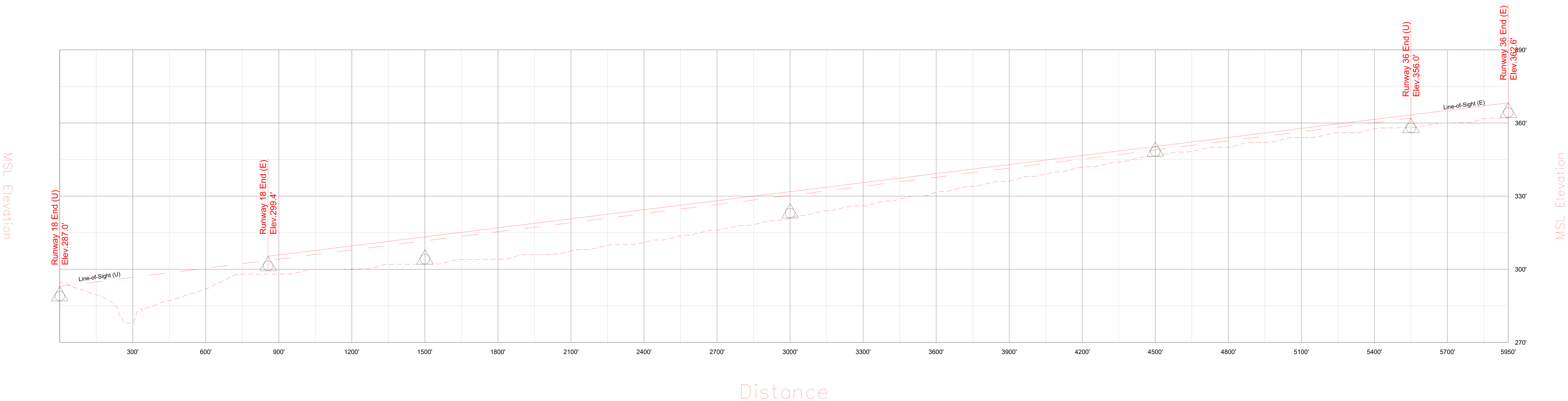
5

SHEET 5 OF 10

Drawing Name: \\hwlochner.com\hwl\KAC\PRJ\000013744\PROJECT FILES\DRAWINGS\Airport Layout Plan\Production\05 - 13744 - RW 36 IPASD.dwg Feb 04,2020 - 2:19pm

Runway 18-36 Centerline Plan View

Runway 18-36 Centerline Profile View



Legend

EXISTING	ULTIMATE	DESCRIPTION
		Pavement Areas
		Structures
		Airport Property Line
	XX	Fenceline
BRL (E-U)	BRL (E-U)	Building Restriction Line (BRL)
RSA (E)	RSA (U)	Runway Safety Area (RSA)
OFA (E)	OFA (U)	Object Free Area (OFA)
OFZ (E)	OFZ (U)	Object Free Zone (OFZ)
TSA (E)	TSA (U)	Taxiway Safety Area (TSA)
TOFA (E)	TOFA (U)	Taxiway Object Free Area (TOFA)
RPZ (E)	RPZ (U)	Runway Protection Zone (RPZ)
DS (E)	DS (U)	Departure Surface
AS (E)	AS (U)	Part 77 Approach Slope Surface
TSS (E)	TSS (U)	Threshold Siting Surface (TSS)
GQS (E)	GQS (U)	Glidepath Qualification Surface (GQS)
RVZ (E)	RVZ (U)	Runway Visibility Zone (RVZ)
☆	Same	Rotating Beacon
		Precision Approach Path Indicators (PAPI)
		Runway End Identifier Lights (REIL)
●●●● ●●●●	○○○○ ○○○○	Runway Threshold Lighting
	Same	Lighted Wind Cone/Segmented Circle
		Airport Reference Point (ARP)
		ASOS Station

Effective Gradient

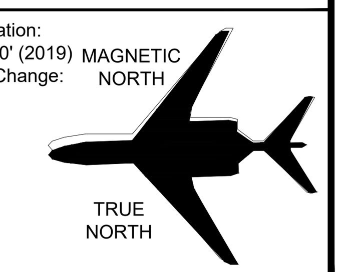
Existing/Ultimate Runway Grade: 1.3%

General Notes

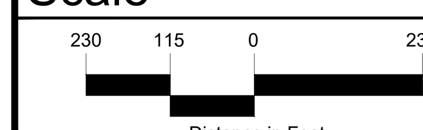
1. The centerline profile is a general representation of existing runway conditions pertaining to grade changes, elevations, and terrain contours. Any deviations from existing conditions compared to conditions detailed in this drawing are unintentional.
2. Per FAA AC 150/5300-13A, paragraph 313, the runways meets line of sight requirements.

North Point

Magnetic Declination:
2° 29' E ± 0° 20' (2019)
Annual Rate of Change:
0° 6' W



Scale



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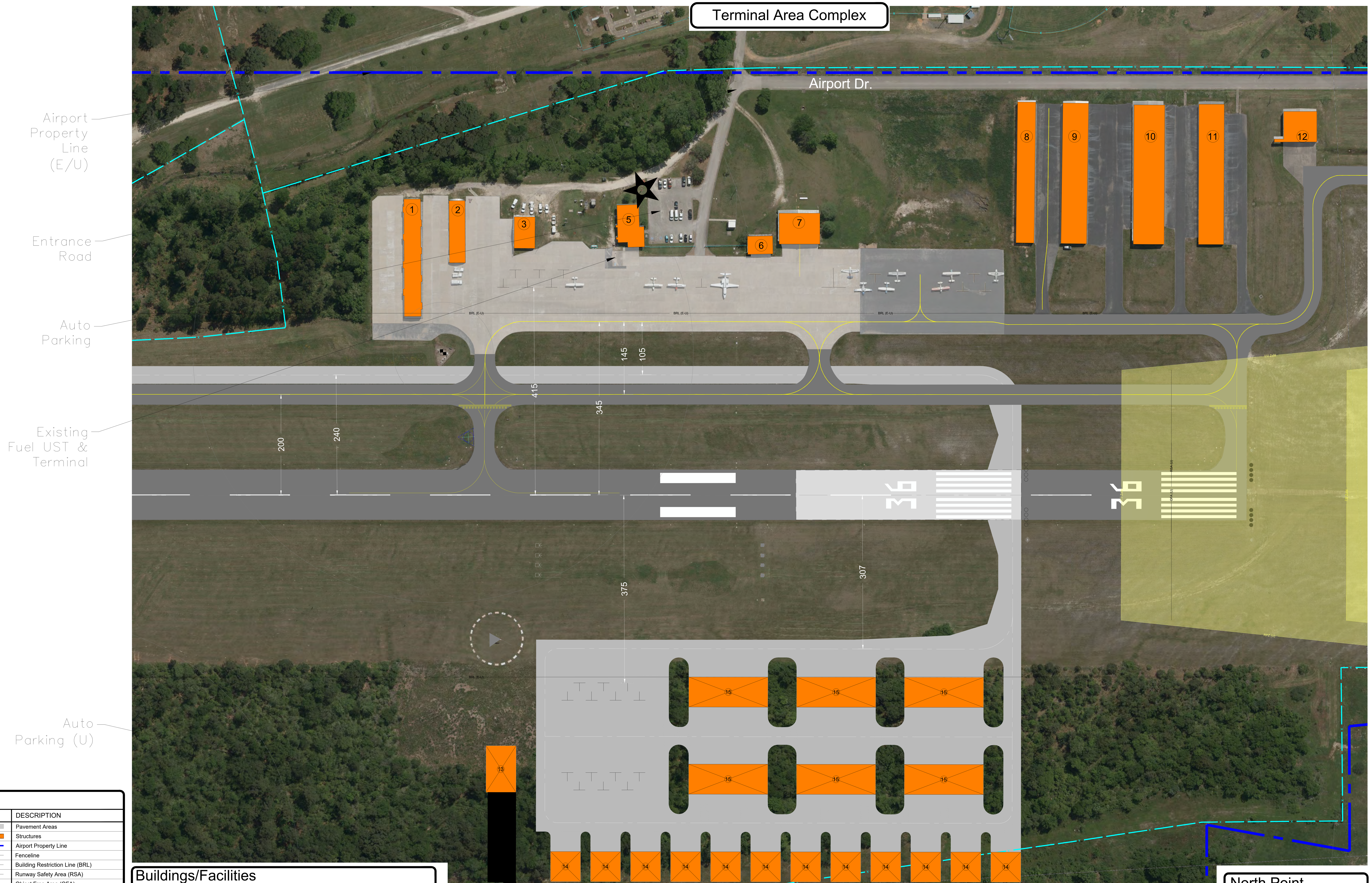
HUNTSVILLE MUNICIPAL AIRPORT (UTS)
City of Huntsville, Texas

RUNWAY 18-36 CENTERLINE DRAWING

HWL PROJECT NO.	000013744
AGENCY PROJECT NO.	TxDOT CSJ No.: 17MPHUNTS
DRAWN BY	KLH
CHECKED BY	KLE
DESIGNED BY	KLH
REVISIONS	DATE
SUBMITTAL DATE	02/01/2020

6

Terminal Area Complex



Legend

EXISTING	ULTIMATE	DESCRIPTION
		Pavement Areas
		Structures
		Airport Property Line
	XX	Fenceline
BRL (E-U)	BRL (E-U)	Building Restriction Line (BRL)
RSA (E)	RSA (U)	Runway Safety Area (RSA)
OFA (E)	OFA (U)	Object Free Area (OFA)
OFZ (E)	OFZ (U)	Object Free Zone (OFZ)
TSA (E)	TSA (U)	Taxiway Safety Area (TSA)
TOFA (E)	TOFA (U)	Taxiway Object Free Area (TOFA)
RPZ (E)	RPZ (U)	Runway Protection Zone (RPZ)
DS (E)	DS (U)	Departure Surface
AS (E)	AS (U)	Part 77 Approach Slope Surface
TSS (E)	TSS (U)	Threshold Siting Surface (TSS)
GQS (E)	GQS (U)	Glidepath Qualification Surface (GQS)
RVZ (E)	RVZ (U)	Runway Visibility Zone (RVZ)
★	Same	Rotating Beacon
		Precision Approach Path Indicators (PAPI)
		Runway End Identifier Lights (REIL)
●●●● ●●●●	○○○○ ○○○○	Runway Threshold Lighting
	Same	Lighted Wind Cone/Segmented Circle
		Airport Reference Point (ARP)
		ASOS Station

Buildings/Facilities

EXISTING	ULTIMATE	DESCRIPTION	FUTURE ACTION	TOP ELEV. (MSL)
1	-	T-Hangar	Retain	355.5' EST.
2	-	T-Hangar	Retain	354.5' EST.
3	-	Huntsville Aviation Hangar	Retain	364.5' EST.
4	-	Non-Directional Beacon (NDB)	Retain	---
5	-	Terminal Building/FBO	Retain	361.9' EST.
6	-	Corporate Hangar	Retain	365.7' EST.
7	-	Corporate Hangar	Retain	375.2' EST.
8	-	T-Hangar	Retain	281.4' EST.
9	-	T-Hangar	Retain	383.8' EST.
10	-	T-Hangar/Box Hangar	Retain	384.8' EST.
11	-	T-Hangar	Retain	374.4' EST.
12	-	Corporate Hangar	Retain	382.1' EST.
-	13	Terminal Building/FBO	Retain	-
-	14	Corporate Hangar	Retain	-
-	15	T-Hangar	Retain	-

General Notes

The terminal area drawing is a general representation of existing conditions within the airport's terminal area complex pertaining to apron geometry, tie-down locations, dimensions, terrain relief, taxiway and taxilane location and configuration, as well as structure location. Any deviations from existing conditions compared to conditions detailed in this drawing are unintentional.

NGS Survey Monuments

PID NO.	DESIGNATION	GEODETIC COORDINATES	MARKER	ELEV.
PACS AB2827	T39 A	30-44-16.25 N, 95-35-15.23 W	Metal Rod	365.7 feet
SACS BL2317	HUNTPORT AZ MK	30-44-59.95 N, 95-35-11.09 W	Metal Rod	308.4 feet
SACS BL2316	HUNTPORT	30-44-39.34 N, 95-35-13.53 W	Metal Rod	343.0 feet

Source: NOAA Aeronautical Survey Program (http://www.ngs.noaa.gov/AERO/aero.html)
PACS- Primary Airport Control Station; SACS- Secondary Airport Control Station; SR- Steel Rod; HCD- Horizontal Control Disk

Terminal Area Design Criteria

TERMINAL AREA STANDARD	AIRPLANE DESIGN GROUP (ADG)	
	GROUP I	GROUP II
Runway ℄ to Parallel Taxiway ℄ Seperation	225'	240'
Taxiway ℄ to Fixed or Movable Object	44.5'	65.5'
Taxiway ℄ to Parallel Taxiway ℄ Seperation	59'	105'
Taxiway Object Free Area Width	89'	131'
Taxiway Safety Area Width	49'	79'
Taxiway Wingtip Clearance	10'	26'
Taxiway Width	25'	35'
Taxilane Object Free Area Width	79'	115'
Taxilane ℄ to Parallel Taxilane ℄ Seperation	64'	97'
Taxiway ℄ to Fixed or Movable Object	39.5'	57.5'

North Point

Magnetic Declination:
2° 29' E ± 0° 20' (2019)
Annual Rate of Change:
0° 6' W

MAGNETIC NORTH

TRUE NORTH

Scale

100 50 0 100

Distance in Feet

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HUNTSVILLE MUNICIPAL AIRPORT (UTS)
City of Huntsville, Texas

TERMINAL AREA DRAWING

HWL PROJECT NO.	000013744
AGENCY PROJECT NO.	TxDOT CSJ No.: 17MPHUNTS
DRAWN BY	KLH
CHECKED BY	KLE
DESIGNED BY	KLH
REVISIONS	DATE
SUBMITTAL DATE	02/01/2020

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Zoning/Ordinance Statement

The City of Huntsville has enacted height and hazard zoning codes to preserve the airport's airspace infrastructure and regulate land use to control the height of objects within the immediate vicinity of UTS. Regulations can be found in the City's 2015 Development Code.

Land Use Legend

HATCH TYPE	LAND USE DESCRIPTION
	Runway Protection Zone (RPZ)
	Existing/Ultimate Aviation Operations Area
	Existing/Ultimate Terminal Area
	Open Space Area/Agricultural

Legend

EXISTING	ULTIMATE	DESCRIPTION
		Pavement Areas
		Structures
		Airport Property Line
		Fenceline
BRL (E-U)	BRL (E-U)	Building Restriction Line (BRL)
RSA (E)	RSA (U)	Runway Safety Area (RSA)
OFA (E)	OFA (U)	Object Free Area (OFA)
OFZ (E)	OFZ (U)	Object Free Zone (OFZ)
TSA (E)	TSA (U)	Taxiway Safety Area (TSA)
TOFA (E)	TOFA (U)	Taxiway Object Free Area (TOFA)
RPZ (E)	RPZ (U)	Runway Protection Zone (RPZ)
CRL (E)	CRL (U)	Crop Restriction Line
★	Same	Rotating Beacon
		Precision Approach Path Indicators (PAPI)
		Runway End Identifier Lights (REIL)
●●●● ●●●●	○○○○ ○○○○	Runway Threshold Lighting
	Same	Lighted Wind Cone/Segmented Circle
		Airport Reference Point (ARP)
		ASOS Station

Crop Restriction Line Criteria

CRL STANDARD	AIRCRAFT APPROACH CATEGORY and AIRPLANE DESIGN GROUP	
	CATEGORY A & B AIRCRAFT	
	GROUP I	GROUP II
Distance in Feet from Runway ℄ to Crop (Visual & 3/4 mile)	200'	250'
Distance in Feet from Runway End to Crop (Visual & 3/4 mile)	300'	400'
Distance in Feet from ℄ of Taxiway to Crop	45'	66'
Distance in Feet from Edge of Apron to Crop	40'	58'
CRL STANDARD	CATEGORY C, D, & E AIRCRAFT	
	GROUP I	GROUP II
Distance in Feet from Runway ℄ to Crop (Visual & 3/4 mile)	575'	575'
Distance in Feet from Runway End to Crop (Visual & 3/4 mile)	1,000'	1,000'
Distance in Feet from ℄ of Taxiway to Crop	45'	66'
Distance in Feet from Edge of Apron to Crop	40'	58'

North Point

TRUE NORTH
MAGNETIC NORTH

Magnetic Declination:
2° 29' E ± 0° 20' (2019)
Annual Rate of Change:
0° 6' W

Scale

400 200 0 400

Distance in Feet

City of Huntsville

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HUNTSVILLE MUNICIPAL AIRPORT (UTS)

City of Huntsville, Texas

LAND USE DRAWING

HWL PROJECT NO.	000013744
AGENCY PROJECT NO.	TxDOT CSJ No.: 17MPHUNTS
DRAWN BY	KLH
CHECKED BY	KLE
DESIGNED BY	KLH
REVISIONS	DATE
SUBMITTAL DATE	02/01/2020

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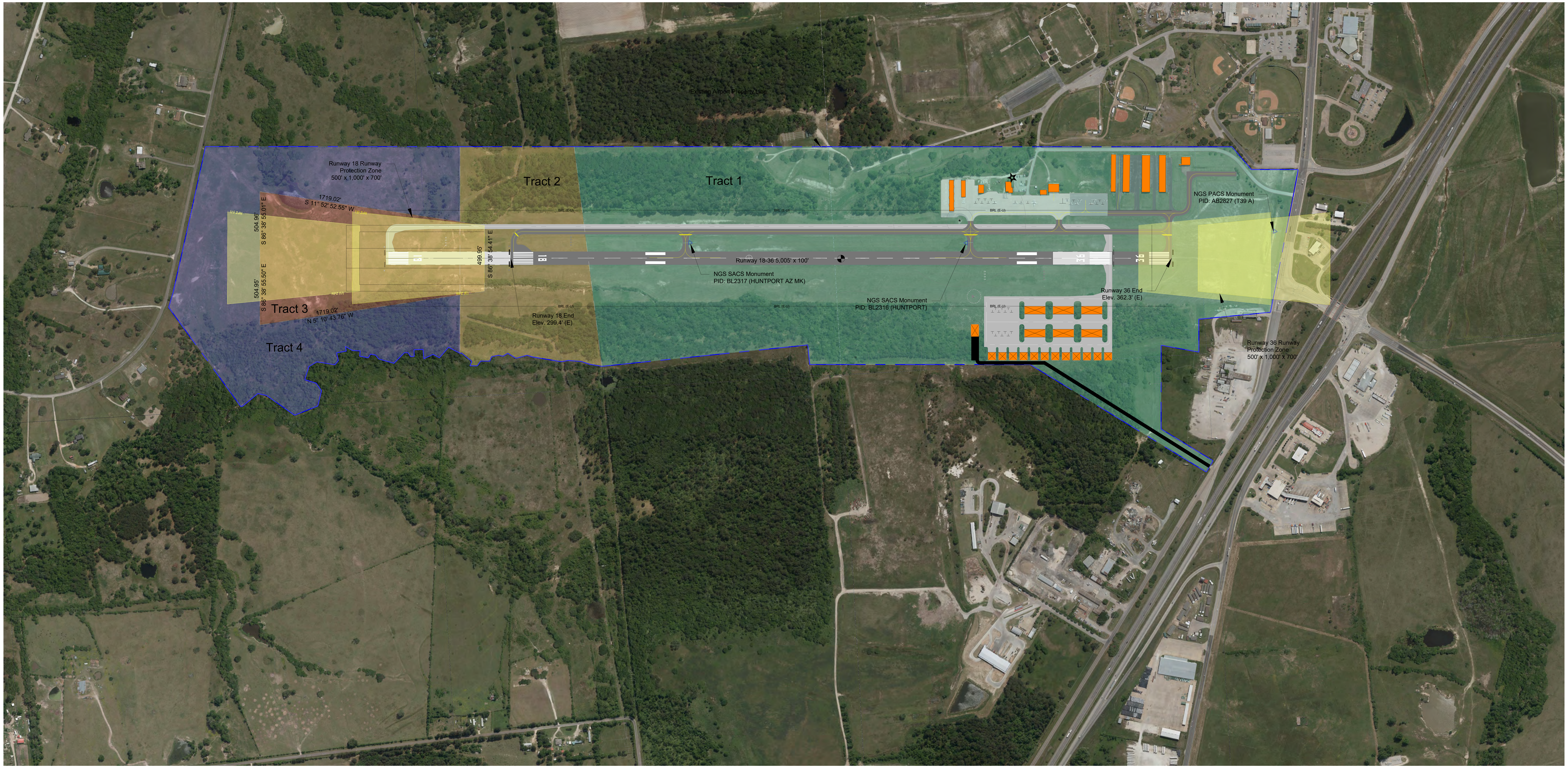
SHEET 8 OF 10

Drawing Name: \\hwlochner.com\hw\KAC\PRJ\000013744\PROJECT FILES\DRAWINGS\Airport Layout Plan\Production\08 - 13744 - LUD.dwg Feb 04,2020 - 2:32pm



Legend

EXISTING	ULTIMATE	DESCRIPTION
		Pavement Areas
		Structures
		Airport Property Line
		Fenceline
RPZ (E)	RPZ (U)	Runway Protection Zone (RPZ)
		Fenceline
	Same	Rotating Beacon
		Precision Approach Path Indicators (PAPI)
		Runway End Identifier Lights (REIL)
		Runway Threshold Lighting
	Same	Lighted Wind Cone/Segmented Circle
		Airport Reference Point (ARP)
		ASOS Station

NGS Survey Monuments

PID NO.	DESIGNATION	GEODETIC COORDINATES	MARKER	ELEV.
PACS AB2827	T39 A	30-44-16.25 N, 95-35-15.23 W	Metal Rod	365.7 feet
SACS BL2317	HUNTPORT AZ MK	30-44-59.95 N, 95-35-11.09 W	Metal Rod	308.4 feet
SACS BL2316	HUNTPORT	30-44-39.34 N, 95-35-13.53 W	Metal Rod	343.0 feet

Source: NOAA Aeronautical Survey Program (http://www.ngs.noaa.gov/AERO/aero.html)
PACS- Primary Airport Control Station; SACS- Secondary Airport Control Station; SR- Steel Rod; HCD- Horizontal Control Disk

Existing Property Data

TRACT	ACREAGE	PROPERTY INTEREST	LAND OWNER	FEDERAL AID PROJECT NUMBER
Tract 1	197.124	Fee-Simple	City of Huntsville	---
Tract 2	35.81	Fee-Simple	City of Huntsville	Federal 5-48-0114-02
Tract 3	40.08	Avigation Easement	City of Huntsville	Federal 5-48-0114-02
Tract 4	*81.03	Fee-Simple	City of Huntsville	---
Total	354.044			

Source: "Airport Property Map" dated 06/09/2004 and completed by Coffman Associates; Walker County, TX Assessor's Office, Huntsville, TX

*Note: 1. 47.962 acres of parcel was reimbursed in 1988 for Federal Project No. 3-48-0114-02. This tract consists of Tract 3 and 7.882 acres.
2. 33.068 acres of this parcel was reimbursed in1996 for Federal TxDOT Project No. 9617HUNTS

General Notes

The property map is a general representation of the existing and ultimate property tracts including the acreage of each tract, how the airport property was acquired (i.e. Federal AIP funds, military/government surplus, local funding, etc.), when each tract of land was acquired, and relevant information of proposed property acquisitions. The property map serves as a guide for the airport sponsor to show existing and future features (runways, RPZ's, NAVAIDS, etc.) that would indicate a potential aeronautical need for property acquisition. Any deviations from existing property information compared to conditions detailed in this drawing are unintentional.

North Point

Magnetic Declination:
2° 29' E ± 0° 20' (2019)
Annual Rate of Change:
0° 6' W

MAGNETIC NORTH

TRUE NORTH

Scale

400 200 0 400

Distance in Feet

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HUNTSVILLE MUNICIPAL AIRPORT (UTS)

City of Huntsville, Texas

PROPERTY MAP DRAWING

HWL PROJECT NO. 000013744

AGENCY PROJECT NO. TxDOT CSJ No.: 17MPHUNTS

DRAWN BY KLH

CHECKED BY KLE

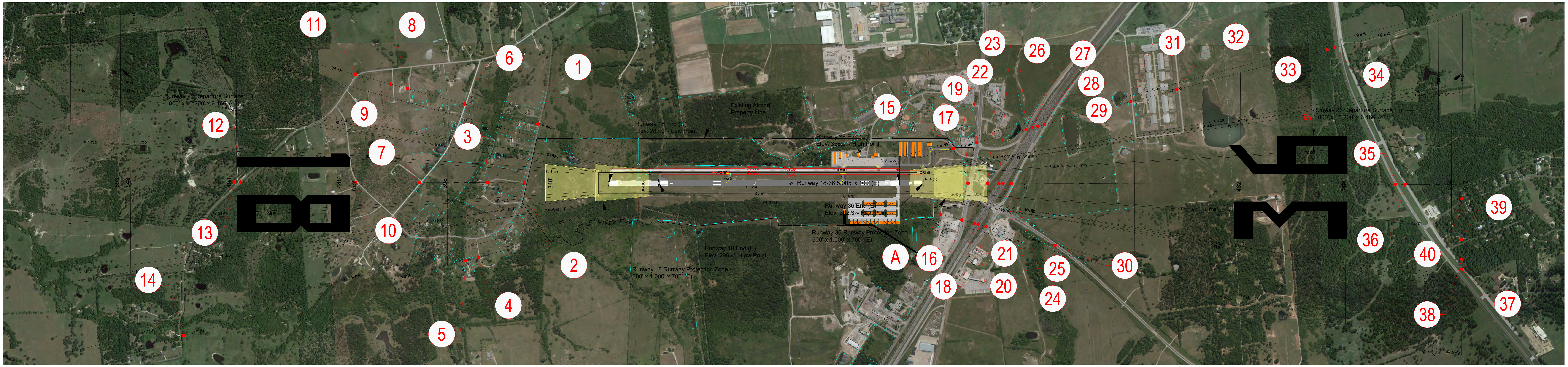
DESIGNED BY KLH

REVISIONS DATE

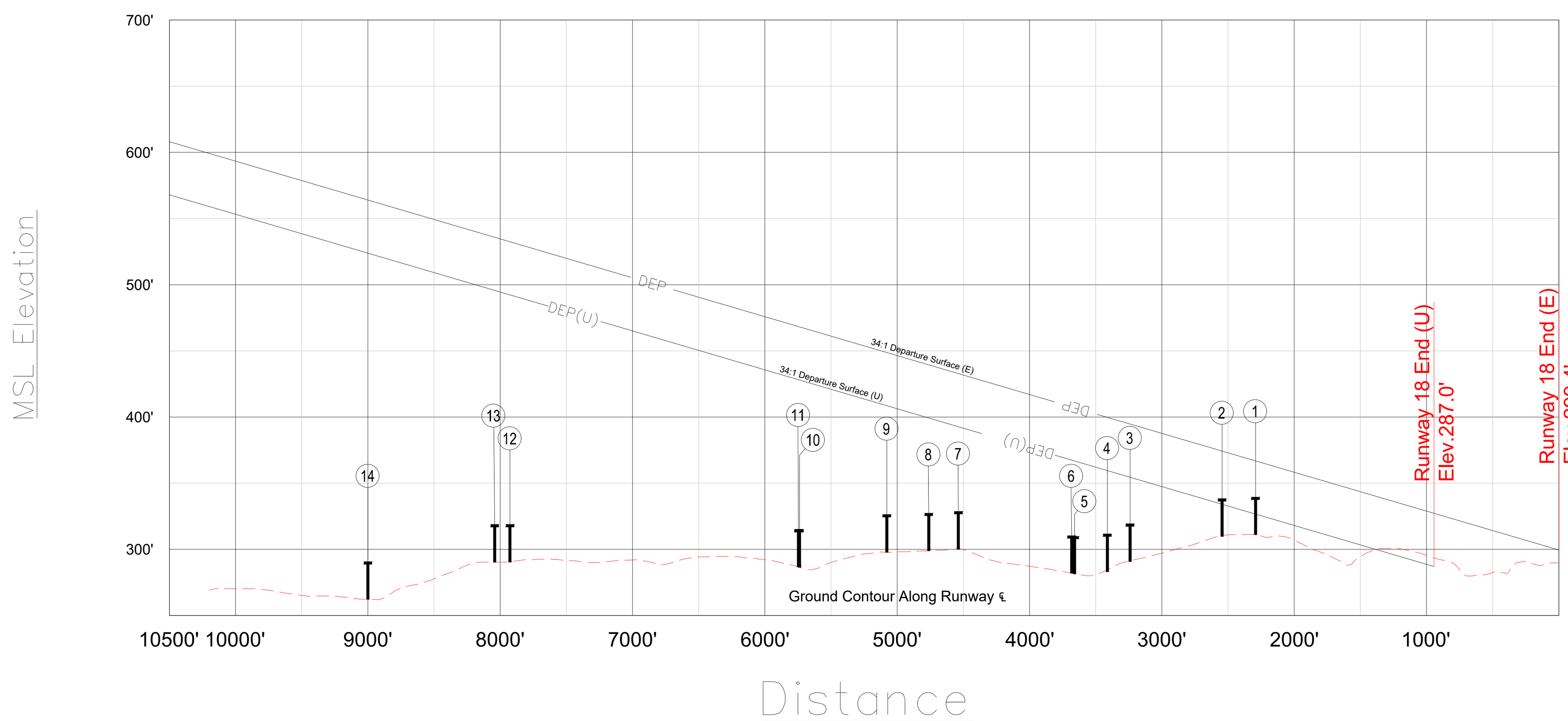
SUBMITTAL DATE 02/01/2020

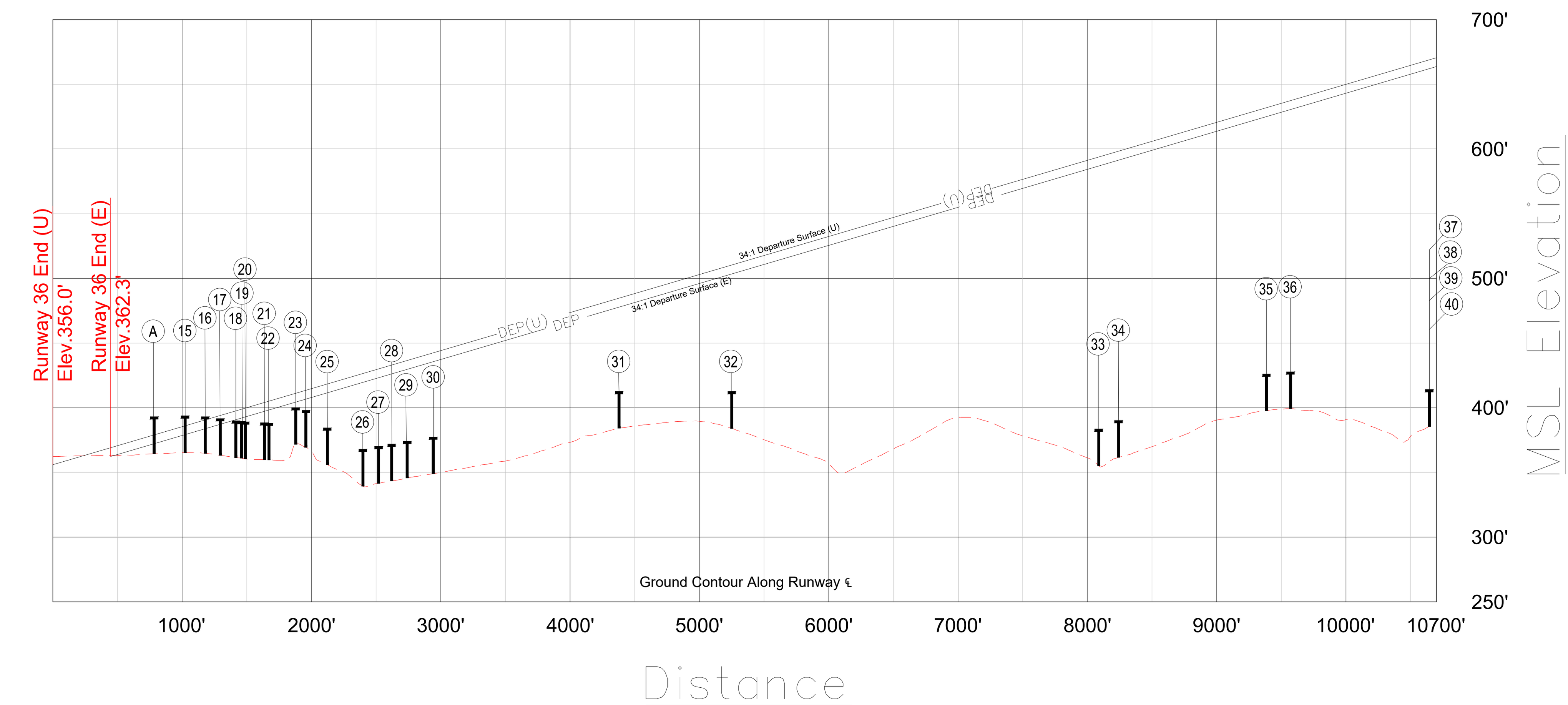
9

Drawing Name: \\hwlochner.com\hwl\KAC\PRJ\000013744\PROJECT FILES\DRAWINGS\Airport Layout Plan\Production\09 - 13744 - PMD.dwg Feb 04,2020 - 2:38pm



Runway 18-36 - 34:1 Departure Surfaces Profile View





Runway 18 Clearance Table

ITEM	DESCRIPTION	ELEV.	CLEARANCE
1	Hadley Creek Bend	321'	19.3'
2	Hadley Creek Bend	309'	37.5'
3	Private Drive	296'	73.0'
4	Private Drive	274'	99.3'
5	Private Drive	274'	105.2'
6	Old Tram Road	312'	63.1'
7	Old Tram Road	299'	97.4'
8	Private Drive	317'	90.1'
9	Private Drive	316'	99.1'
10	Hadley Creek Bend	292'	134.5'
11	Rosenwall Road	309'	117.8'
12	Rosenwall Road	298'	183.0'
13	Private Drive	299'	190.0'
14	Rosenwall Road	247'	260.8'

Runway 36 Clearance Table

ITEM	DESCRIPTION	ELEV.	CLEARANCE
15	Airport Drive	360'	1.3'
16	State Highway 75	364'	1.3'
17	State Highway 75	362'	6.2'
18	Interstate 45	369'	0.24'
19	State Highway 75	363'	9.3'
20	Interstate 45	369'	2.0'
21	State Highway 75	353'	23.7'
22	Interstate 45 Service Rd	351'	24.5'
23	Interstate 45	354'	26.7'
24	Interstate 45	351'	31.7'
25	Interstate 45 Service Rd	344'	43.0'
26	Interstate 45 Service Rd	347'	46.6'
27	Interstate 45	347'	49.7'
28	Interstate 45	347'	52.2'

Runway 36 Clearance Table

ITEM	DESCRIPTION	ELEV.	CLEARANCE
29	Interstate 45 Service Rd	347'	55.2'
30	FM 1791 Road	343'	66.4'
31	Prison Private Road	393'	57.1'
32	Prison Private Road	389'	82.9'
33	Highway 30	390'	147.9'
34	Highway 30	390'	151.6'
35	Highway 30	391'	179.4'
36	Highway 30	387'	188.1'
37	Highway 30	399'	203.0'
38	Highway 30	401'	201.0'
39	Forest Lane	399'	203.0'
40	Westridge Drive	385'	217.0'

Legend

EXISTING	ULTIMATE	DESCRIPTION
		Pavement Areas
		Structures
		Airport Property Line
x	XX	Fenceline
RPZ (E)	RPZ (U)	Runway Protection Zone (RPZ)
DS (E)	DS (U)	Departure Surface
	Same	Rotating Beacon
		Precision Approach Path Indicators (PAPI)
		Runway End Identifier Lights (REIL)
		Runway Threshold Lighting
	Same	Lighted Wind Cone/Segmented Circle
		Airport Reference Point (ARP)
		ASOS Station

Runway 18 Obstruction Data Table

There are no known existing and/or ultimate Departure Surface obstructions.

General Notes

1. The Departure Surface Drawing depicts the plan and profile plan view of the current and ultimate 40:1 departure surfaces. This drawing provides information on existing and potential obstructions to the engine-out departures for instrument procedures established for Runways 18-36. Any deviations from existing conditions compared to conditions detailed in this drawing are unintentional.

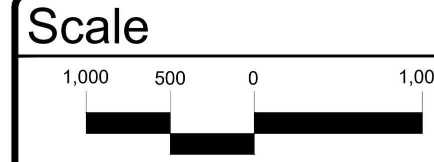
2. Departure Surface penetrations which will require one of two actions and/or mitigation including removal or lowering of the obstruction and/or raising instrument departure minimums

Runway 36 Obstruction Data Table

ITEM	DESCRIPTION	DEND	DCL	TOP ELEV.	PENETRATION	SURFACE	LIGHTING	MITIGATION
A	Road	333 feet	589 feet R	361' MSL	1.3 feet	Departure	None	Lower

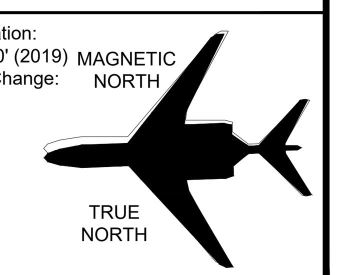
DEND- Distance from Runway End; DCL- Distance from Runway Centerline

Scale



North Point

Magnetic Declination:
2° 29' E ± 0° 20' (2019)
Annual Rate of Change:
0° 6' W



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HUNTSVILLE MUNICIPAL AIRPORT (UTS)
City of Huntsville, Texas

40:1 DEPARTURE SURFACE DRAWING

HWL PROJECT NO. *000013744*

AGENCY PROJECT NO. *TxDOT CSJ No.: 17MPHUNTS*

DRAWN BY *KLH*

CHECKED BY *KLE*

DESIGNED BY *KLH*

REVISIONS | DATE

SUBMITTAL DATE *02/01/2020*

10

SHEET 10 OF 10

City of Huntsville

LOCHNER

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