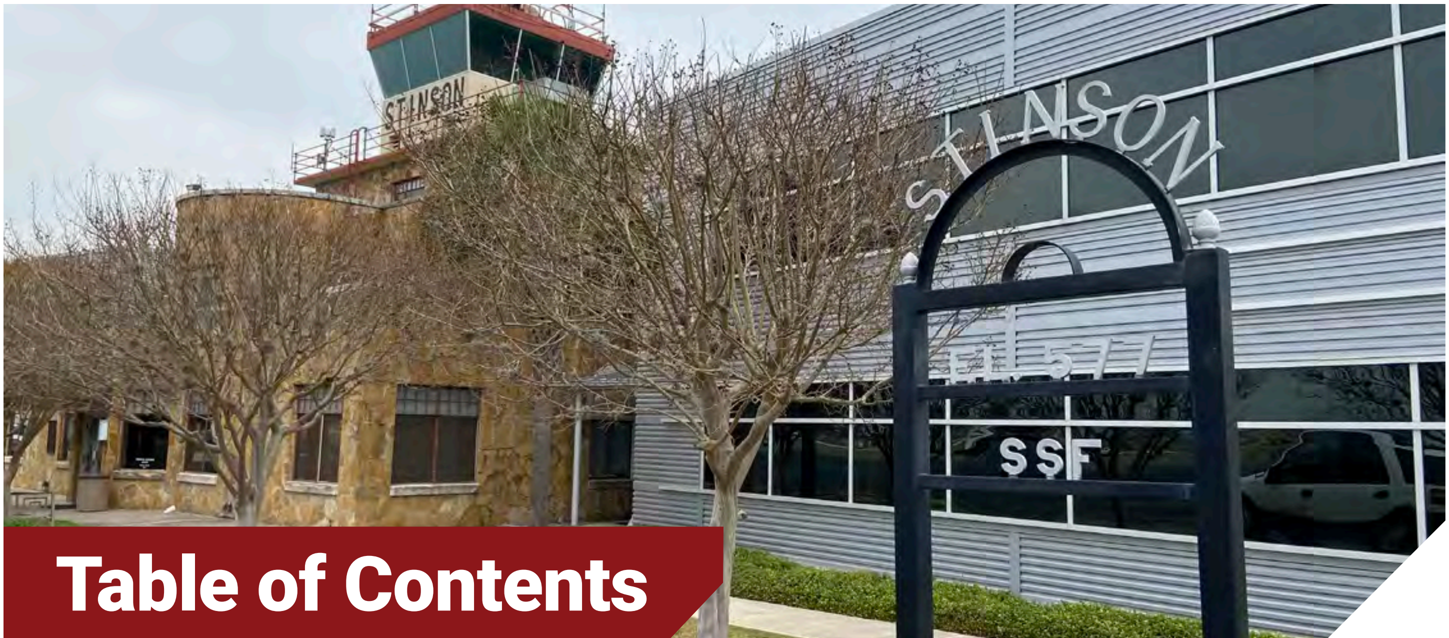
GARVER

AIRPORT LAYOUT PLAN WITH NARRATIVE REPORT

Stinson Municipal Airport

August 2023



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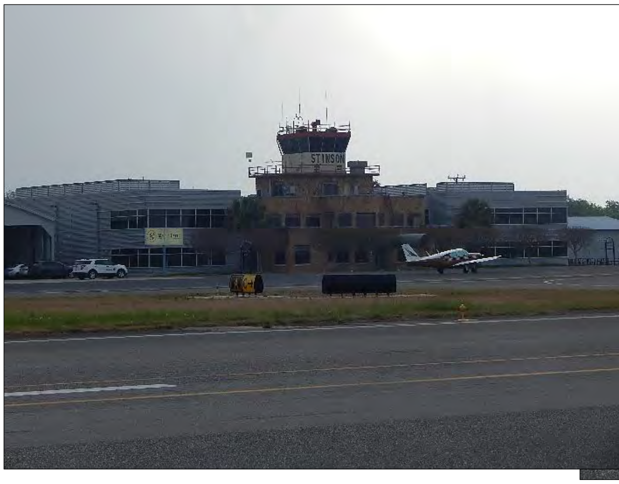


CHAPTER 1: INTRODUCTION

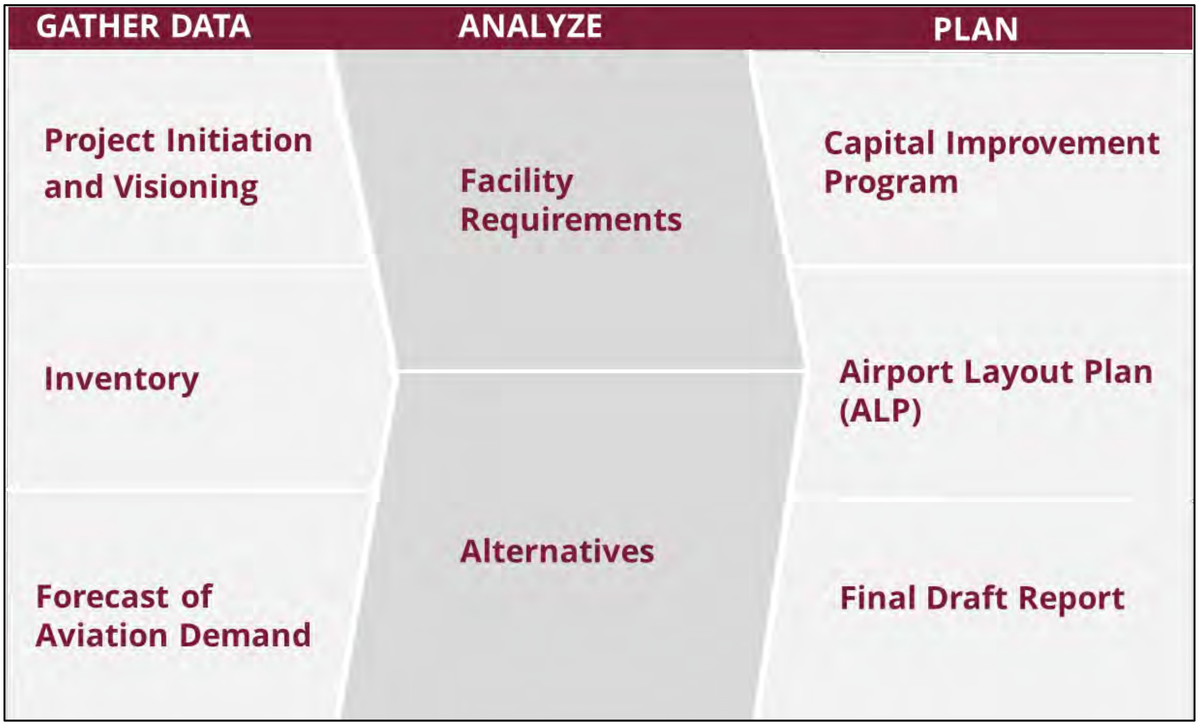
INTRODUCTION AND PURPOSE

An Airport Layout Plan (ALP) with a Narrative Report evaluates an airport's physical facilities, management principles, planned development, and financial foundation for the future. Because the aviation industry is not static, periodic updates are needed to refresh this information and identify future plans and expectations. Stinson Municipal Airport (SSF) has had some significant changes since the previous ALP was completed in 2015. These changes include changes in area economic conditions, increased based aircraft demand, and changes in the fleet mix.

This ALP narrative report will focus on examining existing facilities, forecasting future aviation demands, identifying the projects necessary to meet that demand, and examining the financial means to achieve the short- and long-term goals for SSF. Additionally, the ALP will serve as a tool to aid the City staff in their decision-making regarding SSF's upkeep and future development.

An overview of the ALP process is provided in **Figure 1-1**.

FIGURE 1-1
AIRPORT LAYOUT PLAN WITH NARRATIVE REPORT PROCESS
STINSON MUNICIPAL AIRPORT



This document, referred to as the ALP narrative or technical report, provides a detailed overview of every element of the ALP for Stinson Municipal Airport (SSF) located in San Antonio, TX.

In addition to this narrative report, an ALP drawing set was developed. The ALP is a set of drawings that details the Airport's current infrastructure and proposed development plans as well as the airspace and properties surrounding the Airport. The ALP is reviewed and conditionally approved by the FAA and TxDOT Aviation. The ALP created as part of this project complies with FAA Standard Operating Procedures (SOP) 2.00 – *Standard Operating Procedure for FAA Review and Approval of Airport Layout Plans*.

SWOT ANALYSIS

At the beginning of the ALP process, a Strengths, Weaknesses, Opportunities, and Threats (SWOT) analysis was completed to identify key items that needed to be considered during the ALP process. The SWOT analysis was completed with input from the City of San Antonio Aviation department Executive Leadership Team (ELT).

Figure 1-2 below provides an overview of the items identified during the SWOT Analysis.

FIGURE 1-2
SWOT ANALYSIS
STINSON MUNICIPAL AIRPORT

SSF SWOT Results

Strengths

- Location - High growth area
- Available land for development and competitively priced
- Mission reach and world heritage site
- Potential to be a strong community partner
- ATCT facility
- Sense of place
- Strong city council support
- Good pavement condition
- Demand for more hangars
- Management is excellent
- ARFF availability
- City resource
- Great terminal with conference/event space
- Great weather
- Potential for restaurant
- Two runways
- Great landside infrastructure

Weaknesses

- Instrument approach procedure improvements
- Land is not prepped and ready for development
- Awareness of Stinson
- Public accommodations
- Constrained runway
- Lack of hangar space available
- Roadway access and wayfinidng signage
- Perception of South Side
- Disntance from North Side to SSF
- Profitability
- No CBP
- Limited aircraft maintenance, avionics, and other services
- Very little transient hangar space
- Cemetery proximity

Opportunities

- New business and economic growth
- Workforce inclusion (STEM building and program)
- Reliever for traffic at SAT
- Hotel at airport
- Destination airport
- Cultivating community with GA pilots
- SA Tomorrow Plan
- Taxiway E development provides new development space
- Gather feedback from business community around Stinson

Threats

- Growth of Port San Antonio
- Charging infrastructure for future aircraft
- National Park Services (NPS) restrictions
- Higher noise impacts with growth
- Development encroachment
- Rising property values

Inventory

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CHAPTER 2: INVENTORY

FACILITIES INVENTORY

As the initial step in the Airport Layout Plan (ALP) process, the inventory is a systematic data collection effort that provides an understanding of past and present aviation factors associated with Stinson Municipal Airport (SSF). A comprehensive inventory, including the following major inventory tasks, was completed to form the basis for airport development recommendations throughout the remainder of the Airport Layout Plan with Narrative Report project.

- An on-site inspection of existing facilities was conducted on April 12, 2022, to ensure an accurate inventory of airport facilities, equipment, and services.
- Interviews/discussions with the airport manager, other Aviation Department staff, and airport tenants regarding airport infrastructure, trends, operations, and services.
- An online survey to gather input from Stinson's stakeholders and the community at-large.
- The collection of airport activity data and aeronautical background information including previous airport layout plans, maps, charts, environmental reports, and photographs of airport facilities.
- Review of current and planned on- and off-airport land use development and property information, including surrounding land use patterns, existing and proposed transportation developments, infrastructure, and utilities.
- The collection of environmental information related to the airport and future development.

AIRPORT ROLE

SSF's role is well documented in the FAA's National Plan of Integrated Airport Systems (NPIAS), the FAA's General Aviation Airports: A National Asset study, and the Texas Airport System Plan (TASP). SSF is classified as follows in each of the aforementioned documents:

- Designated as a "General Aviation – Reliever" airport under the TASP
- Designated as one of 250 "reliever" airports in the NPIAS. The airport is further categorized as one of 482 "regional" airports in the NPIAS
- Identified by the FAA's Asset study as a "local" general aviation airport

The TASP describes Reliever airports as general aviation airports located within major metropolitan areas that relieve congestion at larger commercial service airports. Reliever airports generally meet the following criteria:

- Accommodate various classes of aircraft from large business jets to smaller piston aircraft
- Serve population centers of 250,000 or more
- Are forecasted to have at least 100 based aircraft or 25,000 annual itinerant operations
- Relieve capacity at commercial service airports with at least 250,000 annual enplanements

Beyond the TASP, NPIAS, and FAA Asset study designations, the FAA identifies design standards for airports and their operating pavements based on FAA Advisory Circular (AC) 150/5300-13 (current edition), *Airport Design*. Pavement categorization is provided for runways through the Runway Design Code (RDC) classification system while taxiway pavements are designated separately through the Taxiway Design Group (TDG) classification system.

A runway's RDC is defined by two variables related to the designated critical design aircraft for the runway and the lowest approach visibility minimums for the runway. The critical design aircraft is the largest single aircraft or classification of aircraft the runway is expected to serve on a regular basis (500 operations per year or more).

The critical design aircraft variables used to establish a runway's RDC include:

- Aircraft Approach Category (AAC)
- Airplane Design Group (ADG)

The tables below further define the variables utilized to establish the RDC for a runway. **Table 2-1** defines the AAC categories. **Table 2-2** documents the ADG categories. **Table 2-3** describes the various visibility minimum categories.

TABLE 2-1
AIRCRAFT APPROACH CATEGORY (AAC)

AAC	V_{REF}/Approach Speed [1]
A	Approach speed less than 91 knots
B	Approach speed 91 knots or more but less than 121 knots
C	Approach speed 121 knots or more but less than 141 knots
D	Approach speed 141 knots or more but less than 166 knots
E	Approach speed 166 knots or more

Source: FAA Advisory Circular 150/5300-13 (current edition), *Airport Design*
[1] V_{REF} = Landing Reference Speed or Threshold Crossing Speed

TABLE 2-2
AIRPLANE DESIGN GROUP (ADG)

Group #	Tail Height (ft. [m])	Wingspan (ft. [m])
I	< 20' (< 6.1 m)	< 49' (< 14.9 m)
II	20' ≤ 30' (6.1 m ≤ 9.1 m)	49' ≤ 79' (14.9 m ≤ 24.1 m)
III	30' ≤45' (9.1 m ≤ 13.7 m)	79' ≤ 118' (24.1 m ≤ 36 m)
IV	45' ≤ 60' (13.7 m ≤18.3 m)	118' ≤ 171' (36 m ≤ 52 m)
V	60' ≤ 66' (18.3 m ≤ 20.1 m)	171' ≤ 214' (52 m ≤ 65 m)
VI	66' ≤ 80' (20.1 m ≤ 24.4 m)	214' ≤ 262' (65 m ≤ 80 m)

Source: FAA Advisory Circular 150/5300-13 (current edition), *Airport Design*

TABLE 2-3
VISIBILITY MINIMUMS

RVR (ft.) *	Instrument Flight Visibility Category (statute mile)
5,000	Not lower than 1 mile
4,000	Lower than 1 mile but not lower than ¾ mile
2,400	Lower than 3/4 mile but not lower than 1/2 mile
1,600	Lower than 1/2 mile but not lower than 1/4 mile
1,200	Lower than 1/4 mile

Source: FAA Advisory Circular 150/5300-13 (current edition), *Airport Design*
* RVR values are not exact equivalents

The two existing runways at SSF are Runway 14/32 and Runway 9/27. Based on the application of FAA airport design criteria, the TASP, a review of existing facilities/approaches, and a review of SSF's current Airport Layout Drawing (ALD), Runway 14/32 has an RDC of B-I(small)-5,000. Runway 9/27 has an RDC of B-II-VIS. These designations are consistent with the types of aircraft currently using the airfield as shown in the FAA's Traffic Flow Management System Counts (TFMSC) database and the Airport's established Instrument Approach Procedures (IAP).

An airport's Airport Reference Code (ARC), per FAA SOP 2.00, is based on the highest RDC of a runway at the airport minus the RDC visibility component. Based on the RDCs for Runway 14/32 and Runway 9/27, the ARC for SSF is B-II.

AIRFIELD FACILITIES AND CHARACTERISTICS

Stinson Municipal Airport is the second oldest continually operated airport in the United States. In 1915, the City of San Antonio rented approximately 500 acres of land to the Stinson family to establish the airport and the Stinson School of Flying. The Stinson School of Flying remained in operation until the beginning of World War I when a civilian ban on flying was instituted and control of the Airport returned to the City of San Antonio. After the conclusion of World War I, the Airport was used by barnstormers, experimental pilots, and to provide commercial passenger service to the San Antonio community via American, Braniff, and Eastern Airlines. The historic terminal building that is still in use at Stinson was developed in 1935/1936 as part of a Works Progress Administration (WPA) project. During World War II the US Army Air Force took over control of Stinson to use it for pilot training and built multiple buildings on the field. After World War II, the City of San Antonio resumed control of Stinson and still serves as the owner/operator of the Airport today. The current land holdings for the Airport total approximately 360 acres.

Over its history, Stinson has had additional runways beyond Runway 9/27 and 14/32 which are in operation today. Currently, as shown in **Figure 2-1**, Runway 9/27 is 5,000 feet in length and Runway 14/32 is 4,128 feet in length. Both runways are 100 feet wide.

Table 2-4 provides a summary of the airfield components and data. The airside facilities consist of the runways, taxiways, airfield lighting, weather reporting systems, and other various components.

FIGURE 2-1
GENERAL AIRPORT LAYOUT
STINSON MUNICIPAL AIRPORT

Source: Garver, 2022

TABLE 2-4
AIRFIELD FACILITIES
STINSON MUNICIPAL AIRPORT

	Runway 14/32	Runway 9/27
Length (feet)	4,128	5,000
Width (feet)	100	100
Surface Material/Treatment	Asphalt	Asphalt
Weight Bearing Capacity (pounds) Single Wheel Gear (SWG) Double Wheel Gear (DWG)	12,000 20,000	30,000 75,000
Markings	Non-Precision Instrument	Non-Precision Instrument
Runway Lighting	MIRL	MIRL
Approach/Lighting Aids Vertical Guidance Slope Indicators Approach Lighting System REILS	4- Light PAPI both RWY Ends None Yes	4- Light PAPI both RWY Ends None Yes
Visual Aids	Wind cone and Beacon	Wind cone and Beacon
Runway RSA (Width x Length)	120 ft. x 240 ft.	150 ft. x 300 ft.
Runway OFA (Width x Length)	250 ft. x 240 ft.	500 ft. x 300 ft.
Runway OFZ (Width x Length)	250 ft. x 200 ft.	400 ft. x 200 ft.
Instrument Approach Aids	None on Airport (closest instrument approach aid is the Stinson VOR which is 4.9 nautical miles south of the airfield)	None on Airport (closest instrument approach aid is the Stinson VOR which is 4.9 nautical miles south of the airfield)
Weather Reporting Aids	ASOS	ASOS

Source: FAA Airport Facility Directory, FAA 5010 Data, SSF 2013 Airport Layout Drawing (ALD)

RUNWAY 9/27

According to current FAA documentation, Runway 9/27 is 5,000 feet in length by 100 feet in width and is constructed of asphalt. According to the Airport's 2013 ALD, the runway has a published gross weight bearing capacity of 30,000 pounds single wheel and 75,000 pounds double wheel. The runway is equipped with incandescent Medium Intensity Runway Lights (MIRLs) that were last replaced in 2009. The runway is also equipped with a 4-light Precision Approach Path Indicator (PAPI) and Runway End Identifier Light System (REIL) on each runway end. The Airport would like to upgrade the MIRLs and PAPI systems to LED fixtures. The REILs are currently LED fixtures. Both runway ends have non-precision instrument markings that are in fair to good condition. As previously discussed, Runway 9/27 is considered a B-II-VIS runway under current FAA runway design standards.

The 2013 Airport Layout Drawing identifies two Runway Safety Area (RSA) and/or Runway Object Free Area (ROFA) penetrations associated with the runway that have been addressed with declared distances or a Modification to Standards (MOS). These penetrations are:

- The RSA and ROFA at the approach end of Runway 9 would penetrate the fence line and cross Roosevelt Ave. if the full length of the runway was available. Consequently, Runway 9 has a 449.7 feet displaced landing threshold and the Accelerate-Stop Distance Available (ASDA) for departures on Runway 27 has been reduced to 4,677 feet.
- A small portion of the ROFA at the approach end of Runway 27 protrudes through the perimeter fence line along Mission Rd. This penetration is approximately 42 feet long by 30 feet wide. This penetration was the subject of a MOS that was reviewed and approved by FAA on October 8, 2015. Documentation regarding the ROFA penetration is attached as **Appendix A**.

The Runway Protection Zones (RPZ) associated with each runway end protrude off airport property and extend over roadways. The RPZ discrepancies will be key considerations during the remainder of the Airport Layout Plan process.

RUNWAY 14/32

According to current FAA documentation, Runway 14/32 is 4,128 feet in length by 100 feet in width and is constructed of asphalt. According to the Airport's 2013 ALD, the runway has a published gross weight bearing capacity of 12,000 pounds single wheel and 20,000 pounds double wheel. The runway is equipped with LED Medium Intensity Runway Lights (MIRLs) that were last replaced in 2014. The runway is also equipped with a 4-light Precision Approach Path Indicator (PAPI) and Runway End Identifier Light System (REIL) on each runway end. The airport would like to upgrade the PAPI systems to LED fixtures. The REILs are currently LED fixtures. Both runway ends have non-precision instrument markings that are in fair to good condition. As previously discussed, Runway 14/32 is considered a B-I(Small)-5000 runway under current FAA runway design standards.

The 2013 Airport Layout Drawing identifies two Runway Safety Area (RSA) and/or Runway Object Free Area (ROFA) penetrations associated with the runway that have been addressed with declared distances. These penetrations are:

- The RSA and ROFA at the approach end of Runway 14 would penetrate the fence line and cross 99th Street if the full length of the runway was available. Consequently, Runway 14 has a 583.4 feet displaced landing threshold and the Accelerate-Stop Distance Available (ASDA) for departures on Runway 32 has been reduced to 3,902 feet.
- The RSA and ROFA at the approach end of Runway 32 would penetrate the fence line and cross Ashley Rd. if the full length of the runway was available. This portion of Ashley Rd. is being closed and will only be used for pedestrian and bike access. Consequently, Runway 32 has a 372.3 feet displaced landing threshold and the Accelerate-Stop Distance Available (ASDA) for departures on Runway 14 has been reduced to 3,881 feet.

The Runway Protection Zones (RPZ) associated with each runway end protrude off airport property and extend over roadways. The RPZ discrepancies will be key considerations during the remainder of the Airport Layout Plan process.

AIRPORT OPERATIONAL PATTERNS AND AIRCRAFT CIRCULATION

As a multi-runway airport with an operating Air Traffic Control Tower (ATCT), a variety of operating configurations are used based on wind direction. An interview was conducted with SSF ATCT staff to gather information related to runway end utilization and operational patterns. Runway end utilization and operational patterns are discussed for each runway end below:

- Runway 14
  - Utilization: Runway 14 is the runway end that is utilized most frequently. ATCT estimated that approximately 60 percent of total the operations that occur at SSF utilize Runway 14.
  - Departures: Aircraft departing Runway 14 will typically enter the runway via Taxiway A for departure.
  - Arrivals: When landing, small aircraft will typically turn off the runway onto Taxiway C. Some aircraft will exit onto Runway 9/27. Large aircraft will typically need to roll to the end of the runway and turn off on Taxiway A.
- Runway 32
  - Utilization: Runway 32 is the second most utilized runway end at SSF. ATCT estimated that approximately 20 percent of the total operations that occur at SSF utilize Runway 32.
  - Departures: Aircraft departing Runway 32 will typically enter the runway via Taxiway A for departure.
  - Arrivals: When landing, aircraft will typically turn off of the runway onto Taxiways B or C. Large aircraft will typically need to roll to the end of the runway and turn off on Taxiway A.
- Runway 9
  - Utilization: ATCT estimated that approximately 15 percent of the total operations that occur at SSF utilize Runway 9.
  - Departures: Aircraft departing Runway 9 will typically enter the runway via Taxiway D for departure.
  - Arrivals: When landing, aircraft will typically turn off of the runway onto Taxiways B or C. Large aircraft will sometimes need to roll to the end of the runway and turn off on Taxiway A or Runway 14/32.

- Runway 27
  - Utilization: ATCT estimated that approximately 5 percent of the total operations that occur at SSF utilize Runway 27.
  - Departures: Aircraft departing Runway 27 will typically enter the runway via Taxiway A for departure.
  - Arrivals: When landing, aircraft will typically turn off the runway onto Taxiways C or D1. Large aircraft will sometimes need to roll to the end of the runway and turn off on Taxiway D2 or D.

ATCT reported that typically a single runway is used for arrivals and departures. However, they estimated that 8 percent to 10 percent of the time the crossing runway may be used to support aircraft departures and supplement the capacity of the primary runway end in use.

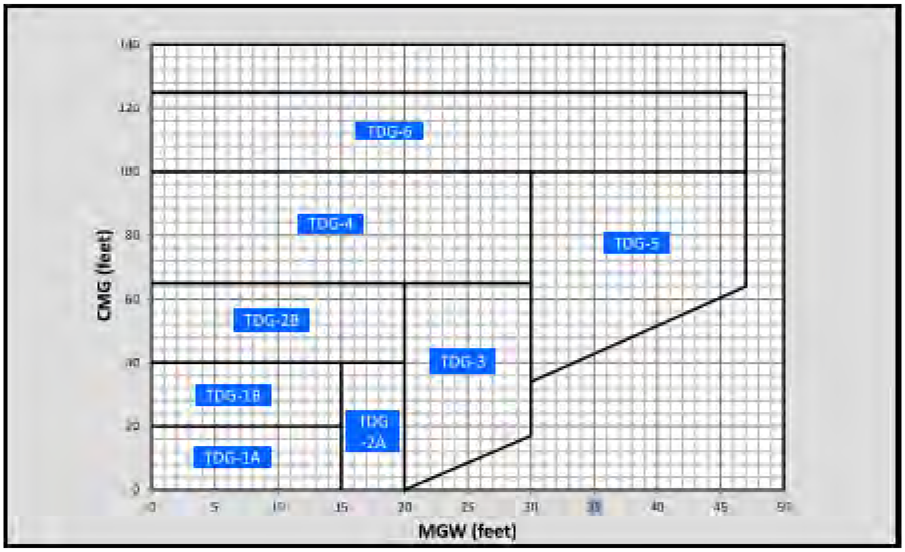
Based on discussions with ATCT and airport staff, there are currently no aircraft circulation issues related to the runway and taxiway/taxilane configuration at SSF.

It should also be noted that SSF has direct apron to runway access in one location (Taxiway D at the approach end of Runway 9), which is a prohibited configuration under current FAA design standards. This will be assessed further later in the ALP project.

TAXIWAYS/TAXILANES

Aircraft move from the runway to the businesses/hangars on the airfield via taxiways and taxilanes. Each taxiway/taxilane is typically designated with a unique name and designed to accommodate anticipated aircraft operations based on an established Taxiway Design Group (TDG). The TDG is a classification system for taxiways/taxilanes based on an airplane's landing gear dimensions. An aircraft's TDG is calculated based on its outer-to-outer main gear width and the cockpit to main gear distance. The wider the distance between the main gear struts and/or the greater the distance between the cockpit and main gear, the higher the TDG. T he TDG for a given aircraft can be identified by the use of **Figure 2-2** and the application of the specific safety parameters outlined in AC 150/5300-13 (current edition).

FIGURE 2-2
TAXIWAY DESIGN GROUPS



Source: FAA AC 150/5300-13B (Current Edition), Airport Design

SSF has a full-length parallel taxiway for Runway 14/32 that is constructed primarily of asphalt and some concrete (at the approach end of Runway 27). Runway 14/32 has four perpendicular taxiway stubs connecting the runway to the parallel taxiway. The stub taxiways are identified, from north to south, as Taxiways A, C, B, and A. The parallel taxiway is designated as Taxiway A.

Runway 9/27 has a ¾ length parallel taxiway that is constructed of concrete and is identified as Taxiway D. Prior to 2015, Taxiway D extended the full length of Runway 9/27. However, in 2015, Taxiway D was removed where it crossed Runway 14/32. This change was made to reduce the potential for runway incursions in the area. Runway 9/27 has six taxiway stubs connecting the runway to the taxiway system. The stub taxiways are identified, from west to east, as Taxiways D, D2, D1, C, B and A.

The width of the taxiways at SSF are shown in **Table 2-5**. In general, the taxiways/taxilanes follow TDG-2 design standards. However, an important aspect of taxiway design is the pavement layout where one taxiway curves to another taxiway, commonly referred to as a taxiway "fillet." The FAA changed the taxiway fillet design standards significantly in 2014. Much of the taxiway system at SSF was designed prior to 2014 and consequently does not meet many of the current taxiway fillet design standards.

TABLE 2-5
TAXIWAY WIDTHS

Taxiway Name	Width
A	Varies between 35’ and 42’
B*	Varies between 45’ and 50’
C*	Varies between 35’ and 40’
D	40’
D1	50’
D2	Varies between 35’ and 50’
E	35”

* Taxiways B and C are wider than 50’ at their intersection with Runway 9/27.
Source: Google Earth

A dedicated run-up pad has been established at the approach end of Runway 32 adjacent to Taxiway A. The airport indicated that they would like to see run-up pads established at the approach ends of Runway 27 and Runway 9.

Another aspect of taxiway layout and design is the establishment and protection of Taxiway Safety Areas (TSA) and Taxiway Object Free Areas (TOFA). The TSA is a defined surface alongside the taxiway that is prepared or suitable for reducing the risk of damage to an aircraft deviating from the taxiway. The purpose of the TSA is to protect an aircraft from damage if the aircraft leaves the taxiway for any reason. The TOFA is an area centered on a taxiway or taxilane centerline that must be kept clear of objects except those objects that need to be located in the TOFA for air navigation or aircraft ground maneuvering purposes. The size of both the TSA and TOFA are based on the ADG of the critical design aircraft expected to use each taxiway. Currently, the TSA is 79 feet wide, the TOFA is 124 feet wide and the TLOFA is 110 feet wide.

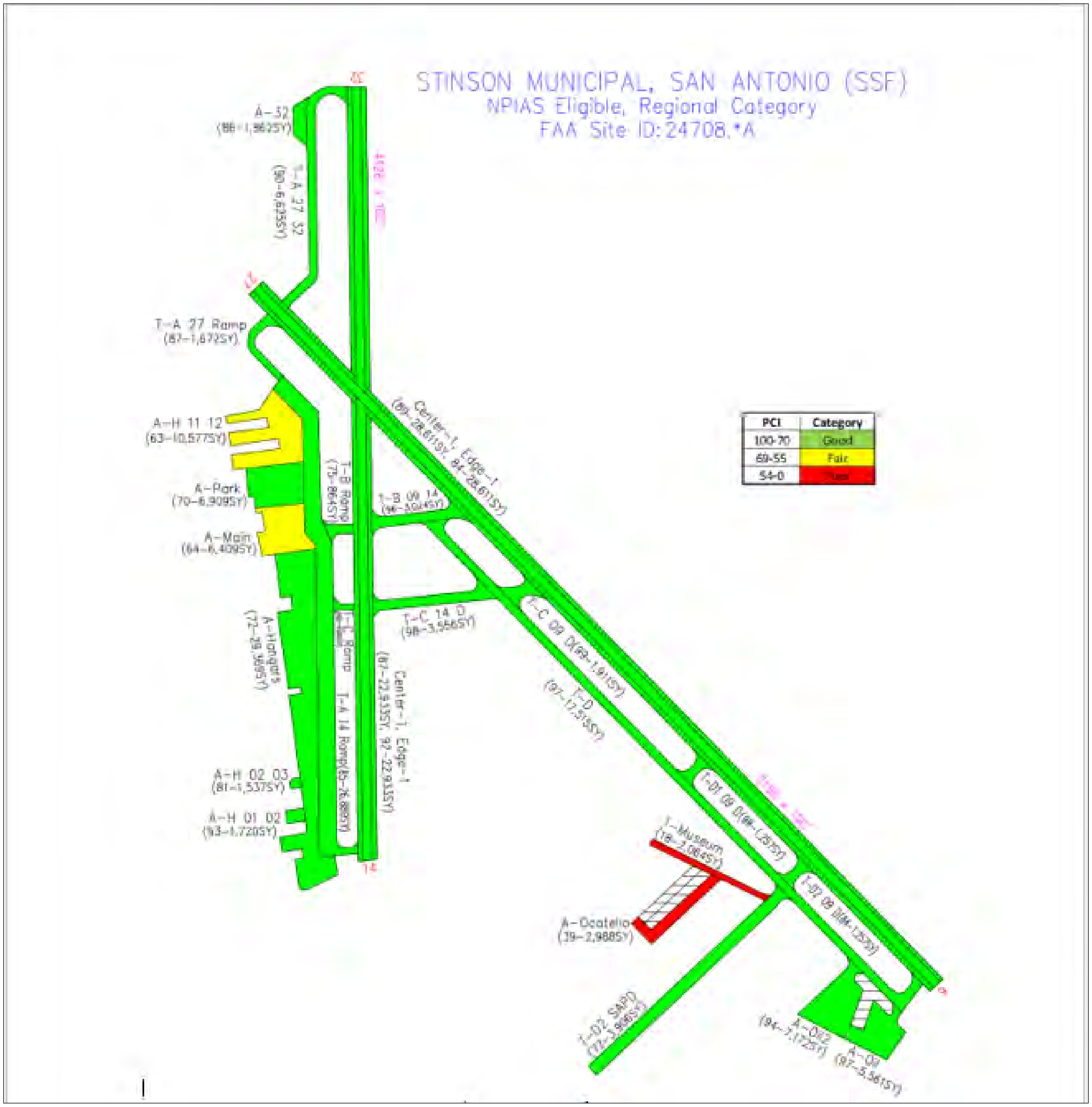
All taxiways/taxilanes at SSF have a taxiway centerline marking. The markings are generally in fair to good condition. The airport has Medium Intensity Taxiway Edge Lights (MITL) installed on all taxiways. The lights are a mixture of LED and incandescent fixtures/circuits that vary in age. There is taxiway signage present on the airfield including runway hold position signs at every runway/taxiway intersection. The existing airfield signage is in the process of being replaced on a rotating basis.

AIRFIELD PAVEMENT

The proper maintenance of airfield and terminal area pavements is critical to the safe operation of an airport. To properly maintain their pavements, airports are required to establish and maintain a pavement maintenance-management program (PMMP). Pavement condition is typically classified using the Pavement Condition Index (PCI) method set forth in FAA Advisory Circular 150/5380-7B, *Airport Pavement Management Program (PMP)*. The Texas A&M Transportation Institute completed a pavement evaluation at SSF on May 28, 2021. **Figure 2-3** shows the results of the pavement inspection.

Most of SSF's airport pavement is classified as being in good condition, but there are 3 areas that were identified as having fair and poor quality. The fair quality pavement is located near the existing T-Hangars adjacent to Mission Road and the Sky Safety Flight Academy. The pavement classified as being in poor condition is located next to the Texas Air Museum and the adjacent T-hangar.

FIGURE 2-3
PAVEMENT CONDITION
STINSON MUNICIPAL AIRPORT



Source: Texas A&M Transportation Institute, SSF Pavement Report dated May 28, 2021

AIRFIELD LIGHTING AND WIND INDICATOR

Sufficient airfield lighting is an important part of maintaining an airfield's operational status during night and inclement weather conditions. As previously discussed, SSF has MIRLs for Runway 14/32 that are LED while 9/27 is incandescent. MITLs are installed on all taxiways and are a mixture of LED and incandescent fixtures.

At night or during poor weather conditions, pilots identify an airport by locating the rotating beacon, a lighting feature designed to provide alternating white and green lights that can be seen for up to 10 miles from the airfield. SSF's beacon is located on top of the old ATCT facility that is on top of the terminal building. ATCT reported that some pilots have complained that the beacon is hard to see when approaching from the west. According to the Airport's grant history, the beacon was last replaced in 1985. The Airport plans to replace the beacon light with a new LED light to reduce maintenance costs.

The airfield electrical vault at Stinson is located adjacent to the terminal building. According to airport staff, the building is exhibiting structural failure and is in need of replacement. The Airport has plans to replace the airfield electrical vault in the next five years.

The Airport has a single windsock located in the grass area bordered by Taxiways B, C, and D and Runway 14/32. The windsock is internally illuminated. Since the Airport has an operational ATCT, a segmented circle is not provided.

NAVIGATIONAL AIDS (NAVAID)

NAVAIDs, located on the field or at other locations in the region, are specialized equipment that provide pilots with electronic guidance and visual references to execute instrument approaches and point-to-point navigation. SSF has a four light PAPI system for each end of Runway 14/32 and Runway 9/27. These systems provide pilots with a visual indication of whether they are above or below the established 3.0-degree glidepath to the runway end. The PAPIs at SSF are owned by the Airport and as previously discussed, the Airport plans to update them to LED fixtures. Stinson also has Runway End Identifier Lights (REILs) located at each end of the Runway 14/32 and Runway 9/27. The airport owns all the REIL systems at the Airport.

Additionally, a VOR (Stinson VOR) is located 4.9 nautical miles south of SSF. A VOR is a VHF Omnidirectional Range Radio Beacon that emits a signal to aid aircraft in determining the location of the VOR station from the aircraft with respect to magnetic north. The VOR is used for the VOR approach to SSF.

NAVAIDs and Global Positioning System (GPS) satellites are also critical to the development of Instrument Approach Procedures (IAPs) at an airport. Currently, there are two IAPs published for SSF. Details for these approaches are in **Table 2-6**.

Nighttime instrument approaches at Stinson are currently prohibited due to obstructions. Additionally, both the Airport staff and ATCT reported that a significant operational constraint occurs when an aircraft is flying one of the IAPs to Runway 32, but an aircraft needs to depart on Runway 14. This opposite direction traffic scenario requires the aircraft waiting for departure on Runway 14 to hold if the inbound aircraft is within 10 miles of the airport. Several respondents to the stakeholder survey completed as part of the project also identified this as an issue.

**TABLE 2-6
INSTRUMENT APPROACH PROCEDURES
STINSON MUNICIPAL AIRPORT**

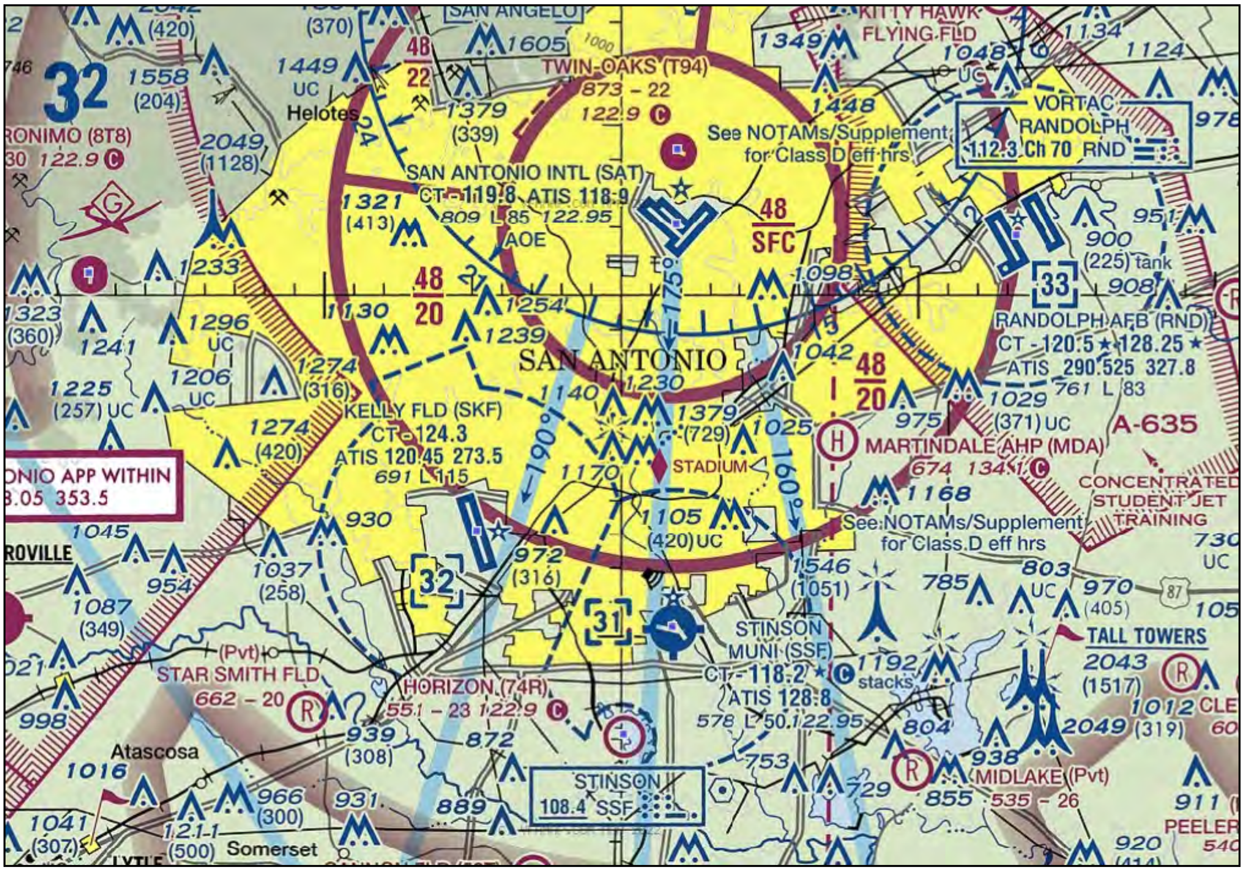
Runway End	Approach Type	Visibility Minimums	Ceiling Minimum
Runway 32	RNAV/GPS	LNAV MDA: Category A & B -1 mile LNAV MDA: Category C – 1 3/8 mile Circling: Category A – 1 mile Circling: Category B – 1 mile Circling: Category C – 2 miles	1020' MSL/449' AGL 1020' MSL/449' AGL 1040' MSL/462' AGL 1120' MSL/542' AGL 1260' MSL/682' AGL
Runway 32	VOR	S-32: Category A & B – 1 mile S-32: Category C – 1 3/8 mile Circling: Category A – 1 mile Circling: Category B – 1 mile Circling: Category C – 2 miles	1020' MSL/449' AGL 1020' MSL/449' AGL 1040' MSL/462' AGL 1120' MSL/542' AGL 1260' MSL/682' AGL

Source: FAA Digital – Terminal Procedures Publication (d-TPP) Website

AIRSPACE

The airspace surrounding the Stinson Municipal Airport is Class D airspace as shown in **Figure 2-4**. The airspace has a four-mile radius and extends up to 2,500 feet. The airspace around Stinson is congested as Kelly Field's (SKF) airspace intersects SSF's airspace approximately 2.5 nautical miles west of the approach end of Runway 9. Additionally, a portion of SSF airspace is underneath the Class C airspace associated with San Antonio International Airport (SAT).

FIGURE 2-4
SAN ANTONIO AREA AIRSPACE



Source: FAA Sectional Chart, 2022

STINSON AIR TRAFFIC CONTROL TOWER

A new ATCT was constructed for the airport and was commissioned in 2019. The new ATCT is on the south end of the airfield adjacent to Ashely Rd. The tower was constructed to resolve some line-of-sight issues that existed with the old ATCT located on top of the historic terminal building. The towers design was entitled "Wings over Stinson." The design is intended to reflect the Airport's close connection to the historic San Antonio missions that are located in the neighboring area. No line-of-sight issues exist between the new ATCT and any portions of the movement area at Stinson. However, the helicopter pinnacle located close to the intersection of Ashley Road and Roosevelt Ave. is not visible. The ATCT is in operation daily from 7 AM to 10 PM.

HELICOPTER PINNACLE

Stinson has a helicopter pinnacle that is used for helicopter training. The helicopter pinnacle is constructed of concreate and is located near the intersection of Ashley Road and Roosevelt Ave, south of Runway 9/27.

WEATHER REPORTING

SSF has an ASOS that is the primary source of wind direction, velocity, and altimeter data for weather observation purposes at the Airport. The ASOS is an automated sensor suite that reports weather conditions over a discrete radio frequency for pilots to receive real-time weather information. The SSF ASOS information can be received by tuning to 128.8 MHz (the ATIS frequency) or by calling 210-927-9391. Airport staff report that the National Weather Service (NWS) owns and maintains the ASOS.

There is also a secondary weather station located southeast of the ASOS. The secondary weather station was installed when the new ATCT was built and is maintained by the Airport.

COMMUNICATION INFRASTRUCTURE

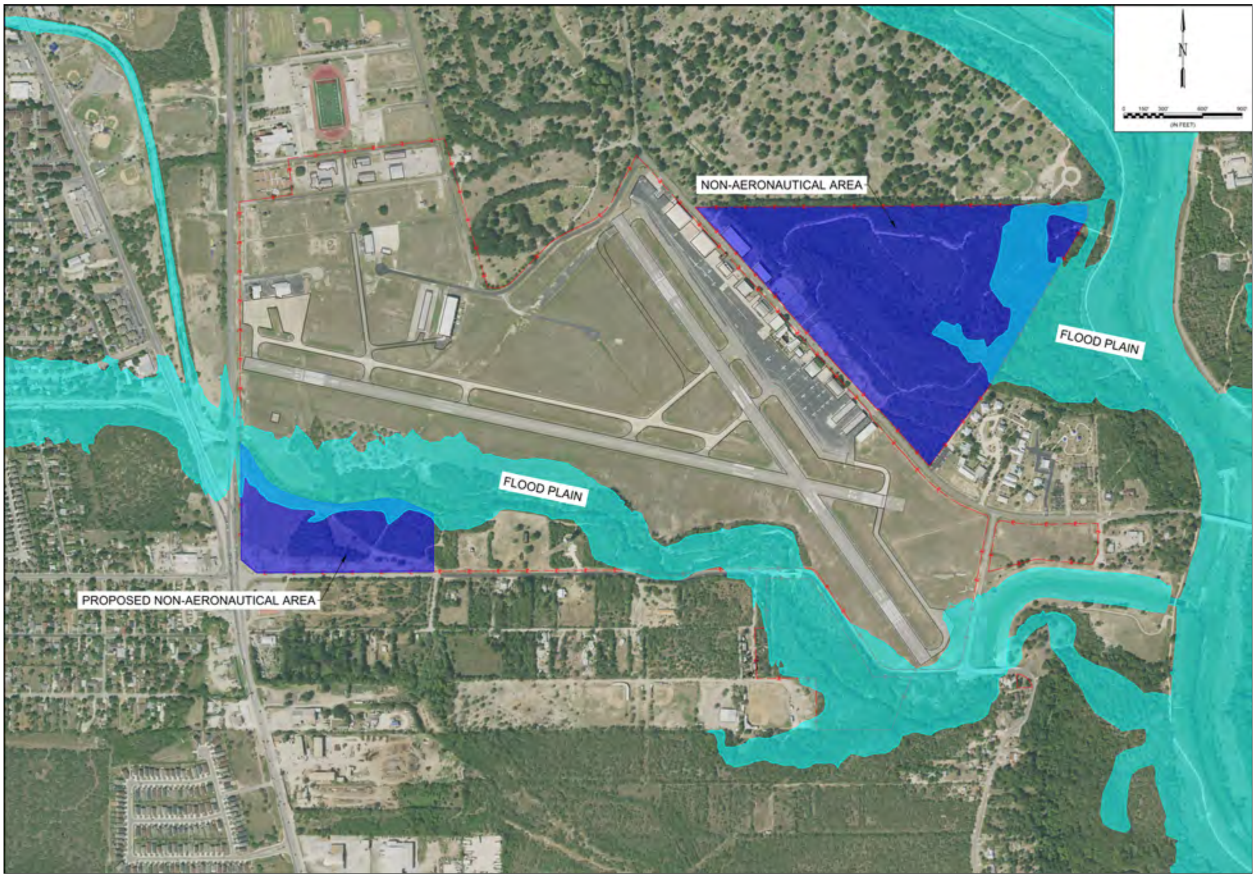
SSF has a Remote Transmitter/Receiver (RTR) site located next to the Commander's House. It is owned and maintained by the FAA. The RTR is a facility used for Air-Ground Communications between pilots and air traffic controllers.

NON-AERONAUTICAL AREAS

Stinson currently has one property parcel that is identified for non-aeronautical use in the Airport's current Airport Layout Plan (ALP). The triangular piece of property is located east of Mission Road and contains a trail that links Stinson to the San Antonio Mission Reach Trail.

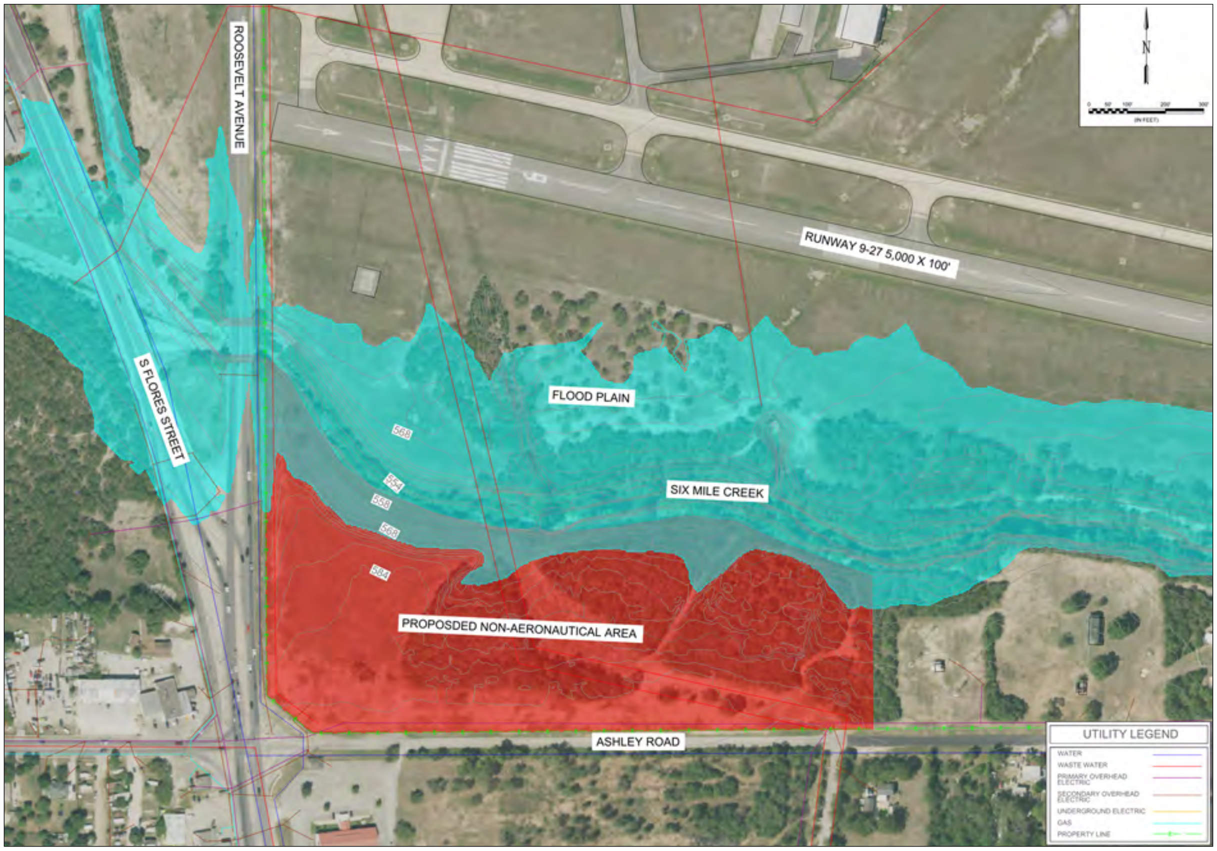
The parcel of property located at the intersection of Roosevelt Avenue and Ashley Road is well suited to be used for non-aeronautical purposes as Six Mile Creek and the floodplain are located between the property and the airfield. However, this parcel has not be identified for non-aeronautical use in the Airport's current ALP. **Figure 2-5** shows both parcels of property. **Figure 2-6** shows a more detailed view of the property adjacent to Roosevelt Avenue and Ashley Road with the FEMA floodplain overlaid to depict the portion of this parcel not suitable for development. **Figure 2-7** shows a more detailed view of the triangular property with the trail connecting Stinson to the San Antonio Mission Reach Trail.

FIGURE 2-5
NON-AERONAUTICAL AREAS
STINSON MUNICIPAL AIRPORT



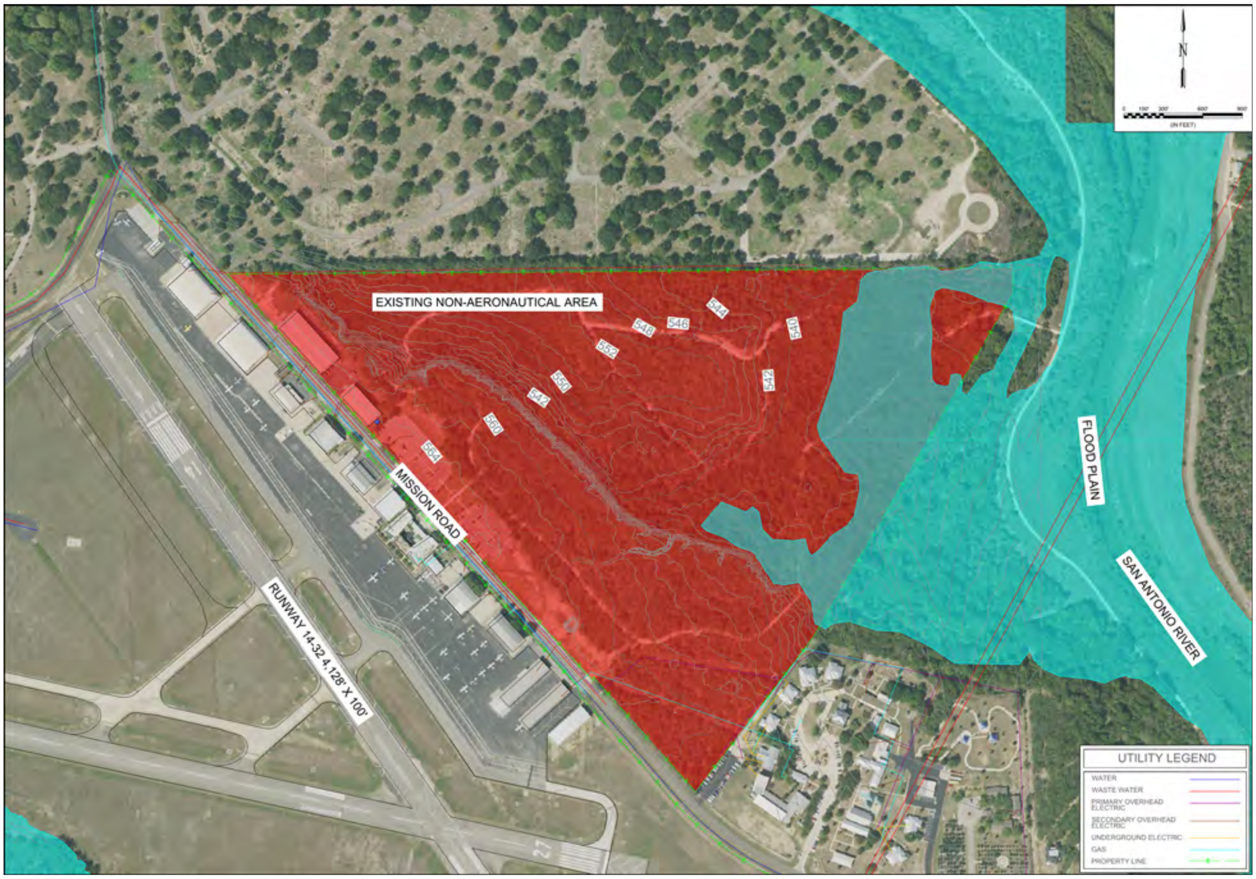
Source: Garver, 2022

FIGURE 2-6
PROPOSED NON-AERONAUTICAL AREA – ROOSEVELT AND ASHLEY
STINSON MUNICIPAL AIRPORT



Source: Garver, 2022

FIGURE 2-7
CURRENT NON-AERONAUTICAL AREA – TRAIL
STINSON MUNICIPAL AIRPORT



Source: Garver, 2022

LANDSIDE / TERMINAL AREA FACILITIES

The landside/terminal area facilities are those central to the business operations of an airport. They support the transition from the airfield to aircraft storage areas/aeronautical businesses and then into community infrastructure. Landside/terminal facilities typically include a terminal building, aircraft storage facilities of various types (e.g., T-hangars and box hangars), aircraft parking aprons and other support facilities like fuel storage and delivery.

GENERAL AVIATION TERMINAL

SSF has a GA terminal building located in the center of the main apron area. Access to the terminal building is via Mission Rd. The original GA terminal was built in 1935/1936 and was extensively renovated and expanded in 2010. It is owned and operated by the City of San Antonio. The GA terminal has a flight planning area, multiple conference rooms, a restaurant space, event center, several tenants, airport management offices, and restrooms. The terminal is approximately 30,241 square feet in size and is in good condition. Multiple respondents to the stakeholder survey completed as part of this project identified the terminal building as a positive attribute of the Airport.

FIXED BASE OPERATOR (FBO)

GateOne is the only FBO at SSF. GateOne's primary office and customer service area is located inside the GA terminal building. GateOne also leases multiple hangars at the Airport for aircraft storage and maintenance activities.

Airport customers are served by the FBO staff between the hours of 7:30 a.m. – 6:00 p.m., Monday – Friday, and 8:00 a.m. – 4:00 p.m. Saturday and Sunday. Rental cars are available. GateOne's leased area inside the GA terminal includes office space, a lobby, and lounge areas. The area GateOne leases in the terminal building is approximately 2,122 square feet in size.

Discussions with the FBO indicated that additional hangar space is needed to accommodate larger aircraft.

AIRCRAFT STORAGE/HANGAR FACILITIES

SSF supports the storage of aircraft in two primary hangar types: T-hangars and box/common hangars. Box/common hangars are generally stand-alone structures while T-hangars are individual aircraft storage units joined as one standing structure. At SSF, there are 14 box/common hangars and 3 T-hangar structures. In total, there is approximately 207,462 square feet of hangar space at SSF. These hangars are depicted in **Figure 2-8** and **Figure 2-9**. The size and use of each hangar is shown in **Table 2-7**.

TABLE 2-7
AIRCRAFT STORAGE HANGARS
STINSON MUNICIPAL AIRPORT

Building Number	Hangar Type	Area (sq. ft.)	Utilization
01	Box Hangar	22,178	GateOne
02	Box Hangar	21,955	GateOne
03	Box Hangar	6,301	GateOne
04	Box Hangar	9,201	Commemorative Air Force
06	Box Hangar	10,153	Red Wing
07	Box Hangar	8,789	GateOne
08	Box Hangar	2,807	Clayton Aircraft Services
09	Box Hangar	9,938	Sky Safety
10	Box Hangar	9,553	Sky Safety
11	T-Hangar	10,914	Ocotillo
12	T-Hangar	10,914	Ocotillo
13	Box Hangar	9,324	Ocotillo
15	T-Hangar	15,323	Ocotillo
16	Box Hangar	30,271	Texas Air Museum
17	Box Hangar	9,800	SAPD
18	Box Hangar	7,019	Falcon Aero
18A	Box Hangar	13,022	Falcon Aero

Source: 2013 Stinson ALD Linework Files. There is not a Hangar 5 or 14 designation at Stinson

FIGURE 2-8
AIRPORT HANGAR LAYOUT
STINSON MUNICIPAL AIRPORT

Source: Garver, 2022

FIGURE 2-9
AIRPORT HANGAR LAYOUT – WEST AREA
STINSON MUNICIPAL AIRPORT

Source: Garver, 2022

AIRCRAFT PARKING APRON

The Airport's main apron is approximately 560,000 square feet and is used extensively for aircraft parking and movement. The majority of the apron is constructed of asphalt, with some concrete areas. The main apron is delineated from Taxiway A by a non-movement area boundary marking. Within the main apron area, there are approximately 67 designated aircraft tie-down spaces. The existing tie-down locations at the Airport have been reconfigured several times. The majority of the tie-down spaces are within the leased areas of airport tenants. Twelve common-use tie-down spaces are located in front of the GA terminal building.

There is approximately 34,000 square feet of asphalt apron space adjacent to the Texas Air Museum and Ocotillo hangar. This apron is used primarily for aircraft movement to and from the Ocotillo T-hangar facility.

Approximately 127,000 square feet of apron space is located adjacent to the hangars leased by Falcon Aero (Hangars 18 and 18A). The majority of this apron is concrete but there are some asphalt portions. This apron is used for aircraft parking and movement.

TERMINAL PARKING AND ROADWAY ACCESS

There is a substantial amount of vehicle parking available in the vicinity of the terminal building. Along Mission Road, immediately adjacent to the terminal building there, are 11 vehicle parking spots including 4 handicap parking spaces, and one space designated for deliveries. The parking lots east of Mission Road contain 170 v ehicle parking spaces including 2 additional handicap parking spaces. The parking lots are asphalt and, according to airport management, are generally in good condition. The parking lots immediately adjacent the entrance to the hike and bike trail were construction in 2020. The northern lot was constructed between 2007 and 2008.

Roadway access to the Airport is provided via Mission Road. The road is constructed of asphalt and is in good condition. Additional upgrades to the road, to include additional lighting and sidewalks, are currently under construction.

Security

SSF has chain-link fence extending around the majority of the Airport perimeter. The fence is six feet tall with barbed wire along the top. There are two locations at Stinson where no perimeter fencing is present. The first is along Roosevelt Ave. where Six Mile Creek intersects the western edge of airport property. The second is along the pedestrian bridge on the southern edge of airport property.

The Airport does have a camera system that provides video coverage for the majority of airport access points.

Fuel Storage Facility

The fuel storage facility at SSF is located at the far north end of the main apron. The facility is owned and operated by the FBO. It consists of two 12,000 gallon Above Ground Storage Tanks (ASTs), one for Jet A and one for 100LL. According to the FBO, the facility is in good condition.

Self-service fueling is provided on a continuous basis at the main fuel farm for both Jet A and 100LL. Full service fueling is also available during FBO business hours.

EXISTING ENVIRONMENTAL OVERVIEW

This section provides an overview of the known environmental factors that should be considered as part of the Airport Layout Plan process.

PREVIOUS ENVIRONMENTAL STUDIES

An Environmental Assessment (EA) was completed for SSF in 2013 as part of a project to extend Runway 9-27 and Taxiway A. This project also included closing and rerouting a portion of 99th Street to provide access to the airfield from airport property located north of 99th Street. This EA returned a Finding of No Significant Impact (FONSI). Multiple other studies have been completed related to environmental considerations at Stinson throughout its history. Many of these studies are further discussed in the remaining subsections.

HISTORICAL, ARCHITECTURAL, ARCHAEOLOGICAL, AND CULTURAL RESOURCES

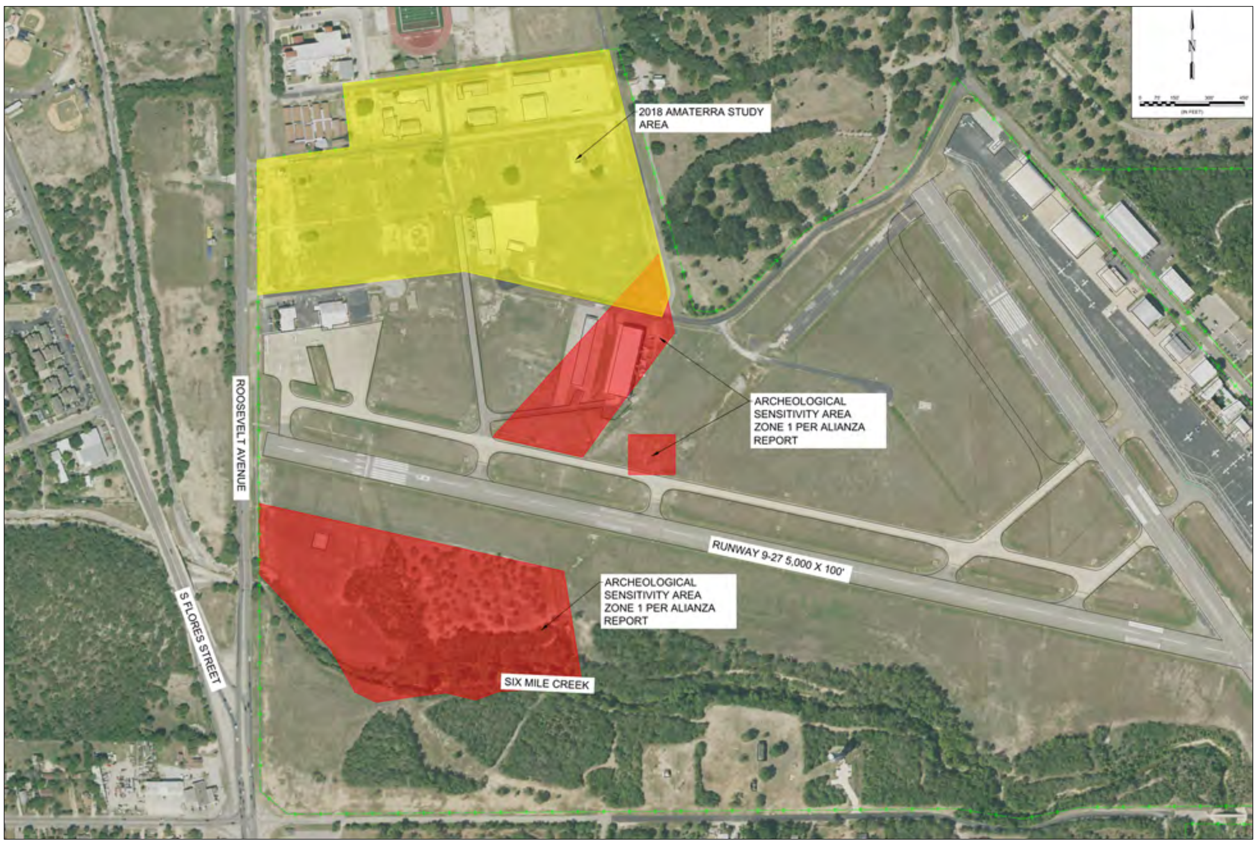
The National Historic Preservation Act of 1966 requires that an initial review be made to determine if any properties in or eligible for inclusion in the National Register of Historic Places are within the area of a proposed action's potential environmental impact. The Archaeological and Historic Preservation Act of 1974 provides for the survey, recovery, and preservation of significant scientific, pre-historic, historical, archaeological, or paleontological data when such data may be destroyed or irreparably lost due to a federal, federally funded, or federally licensed project.

SSF is located within the Mission Parkway National Register District. This district includes four of the nearby mission sites as part of a corridor that generally follows the path of the San Antonio River to the east of the Airport. As a result of this designation, the Airport is subject to specific City of San Antonio historic preservation ordinances and other requirements.

Several archaeological studies have been conducted at Stinson throughout its history. Reports from 1989, 2003, and 2018 were reviewed as part of this inventory process. The 1989 report documents a paupers' cemetery east of Roosevelt Avenue and south of Runway 9-27. The 2003 report provides a more detailed study of the area reviewed in the 1989 report and identifies areas of archaeological sensitivity north of Taxiway Delta. The 2018 report summarizes previous studies and discusses the findings of the archaeological survey completed on the 30-acre northwest development area and 500 linear meters of proposed storm sewer outfalls. This study determined that proposed hangar development projects in the northwest development area were "unlikely to impact significant intact archaeological deposits and should proceed with no further cultural resource coordination." (Page iii, Miller and Seikel, 2018)

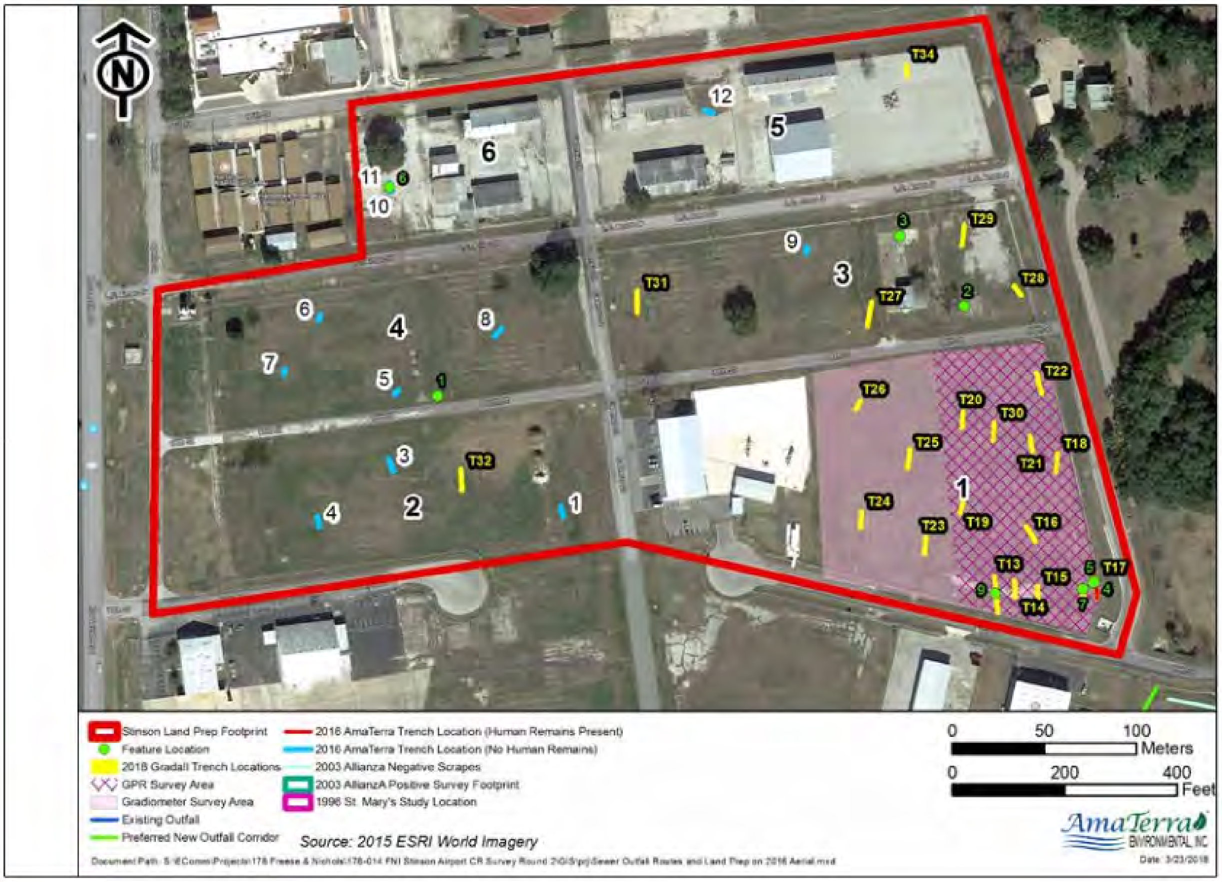
Figure 2-10 identifies areas of archaeological sensitivity at Stinson Municipal Airport as defined in the 2003 AlianzA report as well as the northwest development area that was reviewed as part of the 2018 AmaTerra report. **Figure 2-11** shows the results of the archaeological survey that was completed as part of the 2018 AmaTerra report.

FIGURE 2-10
ARCHAEOLOGICAL SENSITIVITY AREAS
STINSON MUNICIPAL AIRPORT



Source: AlianzA (2003) and AmaTerra (2018) archaeological studies

FIGURE 2-11
NORTHWEST DEVELOPMENT AREA ARCHAEOLOGICAL SURVEY
STINSON MUNICIPAL AIRPORT



Source: AmaTerra (2018) archaeological studies

FISH, WILDLIFE, AND PLANTS

The Endangered Species Act requires each federal agency to ensure that any action authorized, funded, or carried out by such agency is not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of a habitat of such species. An online query was completed utilizing the United States Fish and Wildlife Service (USFWS) Endangered Species database and the Texas Parks and Wildlife Department (TPWD) Rare, Threatened, and Endangered Species of Texas database for Bexar County. **Table 2-8** lists the threatened and endangered species identified through the online queries using both databases. Future coordination with USFWS and TPWD may be necessary prior to commencing any major construction project at SSF to confirm that no hazard to an endangered or threatened species is being created.

TABLE 2-8
BEXAR COUNTY THREATENED AND ENDANGERED SPECIES

Common Name	Genus/Species	Status
Whooping crane	Grus americana	LE
Golden-cheeked warbler	Setophaga chrysoparia	LE
No accepted common name	Rhadine exilis	LE
No accepted common name	Rhadine infernalis	LE
Helotes mold beetle	Batrisodes venyivi	LE
Government Canyon Bat Cave spider	Neoleptoneta microps	LE
Cokendolpher Cave harvestman	Texella cokendolpheri	LE
Madla Cave meshweaver	Cicurina madla	LE
Robber Baron Cave meshweaver	Cicurina baronia	LE
Braken Bat Cave meshweaver	Cicurina venii	LE
Government Canyon Bat Cave meshweaver	Cicurina vespera	LE
Piping plover	Charadrius melodus	LT
Texas salamander	Eurycea neotenes	State Listed
Cascade Caverns salamander	Eurycea latitans	State Listed
White-faced ibis	Plegadis chihi	State Listed
Wood stork	Mycteria americana	State Listed
Zone-tailed hawk	Buteo albonotatus	State Listed
Tropical parula	Setophaga pitiayumi	State Listed
Widemouth blindcat	Satan eurystomus	State Listed
Toothless blindcat	Trogloglanis pattersoni	State Listed
Black bear	Ursus americanus	State Listed
White-nosed coati	Nasua narica	State Listed
Cagle's map turtle	Graptemys caglei	State Listed
Texas tortoise	Gopherus berlandieri	State Listed
Texas horned lizard	Phrynosoma cornutum	State Listed
False spike	Fusconaia mitchelli	State Listed

Source: U.S. Fish & Wildlife Service and Texas Department of Parks and Wildlife
LE = Federally Listed Endangered; LT = Federally Listed Threatened

FEMA FLOODPLAIN MAP

Flooding can hamper the safe operation of an airport and make it difficult to develop property on or around an airport. As part of this study, an online inquiry was completed through the FEMA Flood Map Service Center to identify areas on or around the Airport affected by the existing floodplain. According to the results of the query, some portions of the outer limits of airport property, including runway ends, lie within the 100-year floodplain, as shown in **Figure 2-12**. The Airport has reported some concerns associated with the area on the south side of the airfield adjacent to Six Mile Creek. Specifically, the erosion of the creek wall abutting airport property during heavy rain events is a concern. **Figure 2-13** shows a portion of Six Mile Creek adjacent the airfield where erosion is expected to have occurred. Stinson is currently completing a drainage analysis project to determine how drainage on airport property can be improved.

FIGURE 2-12
FEMA FLOODPLAIN MAP
STINSON MUNICIPAL AIRPORT

Source: FEMA Flood Map Service Center

FIGURE 2-13
SIX MILE CREEK
STINSON MUNICIPAL AIRPORT

Source: Garver, 2022

WETLANDS

Several wetland areas are present on SSF property according to the United States Fish and Wildlife Service (USFWS) National Wetlands Inventory. Two riverines traverse the non-aeronautical area at the northeast corner of airport property. Six Mile Creek, which traverses airport property near its southern border, is also classified as a riverine. These areas are shown in blue in **Figure 2-14**.

FIGURE 2-14
USFWS NATIONAL WETLANDS INVENTORY MAP
STINSON MUNICIPAL AIRPORT

Source: USFWS National Wetlands Inventory

FARMLANDS

The Farmland Protection Policy Act (FPPA) regulates federal actions with the potential to convert farmlands to non-agricultural uses. The FPPA is intended to minimize the impact that federal programs have on the unnecessary and irreversible conversion of farmland to non-agricultural uses. According to the USDA Web Soil Survey System, some areas of SSF are considered prime farmland, as shown in green in **Figure 2-15**.

FIGURE 2-15
USDA NATURAL RESOURCES CONSERVATION SERVICE FARMLAND CLASSIFICATIONS
STINSON MUNICIPAL AIRPORT

Source: USDA Web Soil Survey System

HAZARDOUS MATERIALS, SOLID WASTE, AND POLLUTION

Based on research completed as part of this project and discussions with airport stakeholders, there are no known hazardous materials, solid waste, or pollution hazards on or immediately adjacent to the Airport. The 2013 airport master plan documents Schneck Aviation, Inc., an aircraft engine overhaul facility, formerly operated at SSF. After the facility ceased operations in the 1980s, some pollution associated with the operation was discovered. The site was cleaned and verified by the Texas Commission on Environmental Quality (TCEQ), according to a completion certificate issued on October 5, 2007. Future construction activity on airport property must be conducted in accordance with the Response Action Plan for the site dated March 7, 2006.

NOISE

The Airport receives occasional noise complaints typically related to helicopter operations at the Airport. The Airport has never completed a Part 150 study and does not have a noise monitoring system. Noise and vibration surveys have been completed related to the impact aircraft operations have on the neighboring historic mission sites. The last survey was completed by Raba Kistner in 2008. The survey identified that aircraft operations at Stinson are not expected to create any vibration impacts to the neighboring missions.

LAND USE AND CONTROLS

The land within the perimeter fence at SSF is considered aviation use. Historically, the Airport has had to trim trees along all four runway ends to protect the approaches for the Airport.

ZONING

The City of San Antonio has established an Airport Hazard Overlay District surrounding Stinson Municipal Airport and San Antonio International Airport. The overlay district protects the 14 CFR Part 77 imaginary surfaces associated with the Airport from encouragement. Additionally, the overlay district includes various use restrictions (e.g., distracting lights, electrical interference, etc.) to support the safe operation of aircraft. These requirements are codified under Article III – Zoning, Division 4 – Overlay Districts, Section 35-331 of the City of San Antonio's municipal code.

UTILITIES

As part of the scope of this ALP project, research was conducted to document utility lines located within airport property. **Figure 2-16** depicts the utilities that were identified as part of this process. Specifically, water, wastewater, gas, and electric utility lines are shown.

FIGURE 2-16
ON-AIRPORT UTILITY LOCATIONS
STINSON MUNICIPAL AIRPORT

Source: Garver, 2022

FINANCIAL OVERVIEW

As part of this project, the past five years of revenues and expenses were reviewed for Stinson Municipal Airport. Over the past five years, Stinson has consistently operated at a deficit with expenses higher than airport revenues.

HISTORICAL DEVELOPMENT

Table 2-9 provides an overview of historical development projects completed at the Airport since 2003. This data only includes projects documented as part of TxDOT's state block grant program. Project funded by sources outside of the TxDOT state block grant program are not shown.

TABLE 2-9
HISTORICAL DEVELOPMENT
STINSON MUNICIPAL AIRPORT

Year	Local Dollars	State Dollars	Federal Dollars	Project Description
2003	33,000	30,000	N/A	RAMP: Hangar roof rehab and paint
2004	28,554	28,554	N/A	RAMP: TxDOT to contract for hangar roof repair and painting
2004	39,454	N/A	355,084	Construction services to rehab RW 14-32 taxiways and apron
2005	33,000	30,000	N/A	RAMP: TxDOT to contract for paving improvements
2006	55,553	N/A	499,975	Engineering/design for Overlay RW 9-27 to 30,000 lbs (4,850 x 100); Mark RW 9-27 (w/ displace thresholds & declared distances at each ends); Replace MIRL RW 9-27 (5,250 lf); Contingency, admin.fees, etc.; Extend RW 27 (400 x 100); Install PAPI-4s RW 9-27; Replace VASI w/ PAPI-4s RW 14-32; Replace REILs & cable RW 14; Construct run-up pad RW 32 (2,200 sy); Rehabilitate & extend parallel TW "D" to RW 27 (700 x 50); Extend (1,700) & widen (1,200 lf) of TW "D-2" to 98th & Campus St.; Replace MITL TW "A" (1,400 lf); Echo Street improvements; Construct elevated helipad (50 x 50) Environmental documentation and surveying
2009	326,026	N/A	3,869,357	Overlay RW 9-27 to 30,000 lbs (4,850 x 100); Mark RW 9-27 (w/ displace thresholds & declared distances at each ends); Replace MIRL RW 9-27 (5,250 lf); Contingency, admin.fees, etc.; Extend RW 27 (400 x 100); Install PAPI-4s RW 9-27; Replace VASI w/ PAPI-4s RW 14-32; Replace REILs & cable RW 14; Construct run-up pad RW 32 (2,200 sy); Rehabilitate & extend parallel TW "D" to RW 27 (700 x 50); Extend (1,700) & widen (1,200 lf) of TW "D-2" to 98th & Campus St.; Replace MITL TW "A" (1,400 lf); Echo Street improvements; Construct elevated helipad (50 x 50) SBGP-41-2007 $1,954,646; SBGP-37-2006 $419,352; SBGP-54-2009 $1,495,359
2012	46,041	46,041	N/A	RAMP: Sponsor to contract for roof replacement hangar 4, airfield lighting repair/maintenance, purchase herbicide
2012	90,115	516,591	N/A	Relocate FAA shout line MOA; Environmental Assessment (historic & archeological); Engineering and Design for Replacement ATCT (NPE)
2013	44,026	N/A	396,238	ENGINEERING Mark RW 14-32 (NPI); Overlay TW A, B, C (to 30,000 lb SWL); Construction Admin, Testing, etc .Rehab RW 14/32; Replace MIRLs RW 14/32; Overlay RW 14-32 (2230 x 100 + 1330 x 100) (to 30,000 SWL); Replace MITLs TW A, B, C; Upgrade airfield guidance signs RW 14/32, Tws A, B, C SBGP-80-2012 $387,175.93; SBGP-86-2014 $9,062.57
2013	50,000	50,000	N/A	RAMP: Sponsor to perform airport general maintenance.
2014	50,000	50,000	N/A	RAMP: Sponsor to perform airport general maintenance.
2014	424,093	N/A	3,670,373	Mark RW 14-32 (NPI); Overlay TW A, B, C (to 30,000 lb SWL); Construction Admin, Testing, etc .Rehab RW 14/32; Replace MIRLs RW 14/32; Overlay RW 14-32 (2230 x 100 + 1330 x 100) (to 30,000 SWL); Replace MITLs TW A, B, C; Upgrade airfield guidance signs RW 14/32, Tws A, B, C SBGP-085-2013 $12,262.59; SBGP-086-2014 $1,034,891.90; SBGP-089-2015 $150,000; SBGP-090-2015 $150,000; SBGP-092-2015 $2,187,603.31; SBGP-095-2016 $127,472.51; SBPG-099-2016 $8,142.36

Continued on next page

Continued from previous page

2015	50,000	50,000	N/A	RAMP: Sponsor to perform airport general maintenance.
2015	3,711,700	N/A	1,579,641	Construct Replacement ATCT- (this is the max we can pay) for 2 mil inc design SBGP-087-2014 $346,726.42; SBGP-092-2015 $45,898.60; SBGP-095-2016 $1,906.60; SBGP-097-2016 $1,175,633.96; SBGP-099-2016 $9,475.73;
2016	50,000	50,000	N/A	RAMP: Sponsor to perform airport general maintenance.
2017	28,720	28,720	N/A	RAMP: Sponsor to perform airport general maintenance.
2018	50,000	50,000	N/A	RAMP: Sponsor to perform airport general maintenance.
2019	35,844	35,844	N/A	RAMP: Sponsor to perform airport general maintenance.
2020	50,000	50,000	N/A	RAMP: Sponsor to perform airport general maintenance.
2021	50,000	50,000	N/A	RAMP: Sponsor to perform airport general maintenance.

Source: TxDOT Aviation Division, 2022

Aviation Demand Forecast

3

CHAPTER 3: AVIATION DEMAND FORECAST

INTRODUCTION

Aviation demand forecasts at Stinson Municipal Airport (SSF or the Airport) are presented in this chapter for the 20-year planning period. These forecasts provide a basis for determining the type, size, and timing of aviation facility development. Consequently, the forecasts influence virtually all phases of the planning process.

FORECAST FRAMEWORK

The aviation demand forecast begins with data from Federal Fiscal Year (FFY) 2021 as its base year, it then makes projections for the following forecast years:

- Short-term horizon – 2026
- Mid-term horizon – 2031
- Long-term horizon – 2041

The forecast will select a preferred base case forecast and make projections in:

- Based Aircraft
- Aircraft Operations
    - Itinerant Activity
    - Local Activity
    - Military Activity
- Critical Aircraft

The aviation demand forecast included, but was not limited to the following data sources:

- Stinson Municipal Airport – Airport Traffic Control Tower Operations
- Stinson Municipal Airport – Based Aircraft Inventory
- FAA Terminal Area Forecast (TAF) 2021 (Published in March 2022)
- FAA OPSNET 2011-2021
- FAA Traffic Flow Management Systems Count (TFMSC)
- FAA Aerospace Forecast FY 2022-2042
- Woods & Poole Inc., 2021 (W&P)

Additionally, input was provided by the Stinson Municipal Airport, the SSF Airport Traffic Control Tower, local flight schools operating at SSF, and the San Antonio Airport System.

AIRPORT BACKGROUND

AIRPORT LOCATION

Stinson Municipal Airport is a highly active general aviation (GA) airport located in the City of San Antonio, Texas. Its proximal location to Interstates 37 and 410 makes it easily accessible for many local general aviation users in Bexar County and the Greater San Antonio Area. Its location is also appealing to visitors who wish to fly into San Antonio privately. Approximate driving distances from SSF to nearby San Antonio attractions include:

- Multiple Missions – 1 mile
- Brooks City Base – 1 mile
- The Alamo – 7 miles
- Holt Caterpillar – 7 miles
- San Antonio Riverwalk – 8 miles
- Toyota Manufacturing Plant – 12 miles
- Sea World – 21 miles
- University of Texas San Antonio – 23 miles
- Natural Bridge Caverns – 35 miles

Brooks City Base is a planned community adjacent to the Airport that was established in 2002.[1] Since that time, the community and revitalization along the Southwest Military Drive corridor has attracted many businesses diversifying the local economy, adding employment, and contributing to economic growth. Some of these projects include but are not limited to:

- Mission Baptist Hospital – 2011
- UIW School of Osteopathic Medicine – 2017
- Greenline Parks – 2018
- Embassy Suites by Hilton San Antonio Brooks Hotel & Spa - 2018
- VIA Brooks Transit Center – 2019

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[1] Brooks, 2022. A century of innovation. Retrieved online at: https://livebrooks.com/about-us/history/

- Amazon Delivery Station – 2021
- Southlake Housing Development Project – 2022 (anticipated)

Additionally, with the designation of the Missions as a World Heritage Site in 2015, the demand for tourism and historical/heritage tourism has increased. The Airport is in the midst of these historic attractions and is connected to the Mission Reach via a hike and bicycle trail. These developments and many others in the future will continue make Stinson Municipal Airport an invaluable point of access for the city and region.

AIRPORT ROLE

Stinson Municipal Airport is classified as a reliever airport in the National Plan of Integrated Airport Systems (NPIAS) 2021-2025.[2] As a reliever for San Antonio International Airport (SAT), the facilities and proximity to the city make it ideal for general aviation users of all types.

A historical review of FAA OPSNET data from 2011-2021 showed that the Airport's greatest group of users are local GA pilots. Over the past 10 years, local GA operations accounted for an average of 58.4 percent of the total SSF activity. The airport traffic control tower at SSF estimates that 60-70 percent of the local operations are flight training, in addition, to business, leisure, and recreation. Stinson Municipal Airport has three established flight schools that offer a variety of pilot licenses. Two of the three flight schools participated in interviews or surveys about their history, enrollment, equipment, operations, and what they anticipate over the next twenty years. The schools indicated they are not at capacity, and they expect to continue to grow in enrollment, especially with the pilot shortages being experienced nationwide. With an increase in the enrollment of the schools, there is a high likelihood that additional based aircraft used for training could also be acquired during that time.

The historical FAA OPSNET review indicated that the second most active group of users at SSF are itinerant GA and air taxi pilots, representing an average of 32.7 percent of the total SSF activity for the past 10 years.

Lastly, the OPSNET data also confirmed the Airport also experiences regular military activity, with an average of 8.9 percent of SSF operations over the past 10 years.

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[2] FAA Order 5090.5, *Formulation of the NPIAS and ACIP*, table 3-3 states a reliever is for a large or medium hub operating at 60 percent of its capacity.

SOCIOECONOMIC TRENDS

Analyzing socioeconomic trends at the local, state, and national level often yields statistical correlations that can be used to project future activity.

In order to evaluate the socioeconomic trends at the local level, an airport service area was established. An airport service area should represent the extent to which individuals would originate from as regular users or customers. To determine this, a review of the Airport's 2022 based aircraft was completed to identify the zip codes associated with each aircraft. The review showed that while the majority of the aircraft zip codes were in Texas, 66 percent were in Bexar County. Therefore, Bexar County will be identified as the Airport service area for this forecast.

A comparison of historical and forecast socioeconomic statistics and annual growth rates for Bexar County were compared with the State of Texas (Texas) and United States of America (U.S.). The data was derived from W&P 2021, with a focus on population, employment, personal income per capita (PIPC), and gross regional product (GRP)[3] metrics.[4]

A historical analysis of Bexar County showed that from 2011-2021 the annual rate of growth for population (1.6 percent), employment (2.6 percent), and GRP (3.2 percent) was greater than both the Texas and U.S. growth rates, respectively. Bexar County's (1.5%) growth was less than Texas (1.7%) and the U.S. (2.0%) for PIPC.

The forecast of these metrics indicates that much like the past 10 years, Bexar County is anticipated to grow faster than Texas and the U.S. in employment (1.8 percent) and GRP (2.9 percent). From a population perspective, Bexar County is anticipated to grow faster than the U.S. in population (1.1 percent) but similar to Texas (1.2 percent). Similarly, the annual growth rate of PIPC for Bexar County (1.6 percent) is anticipated to increase at a greater rate than the U.S. (1.5%), but less than Texas (1.8 percent).

Figure 3-1 and **Table 3-1** shows the historical and forecast socioeconomic trends for Bexar County, Texas, and the United States of America.

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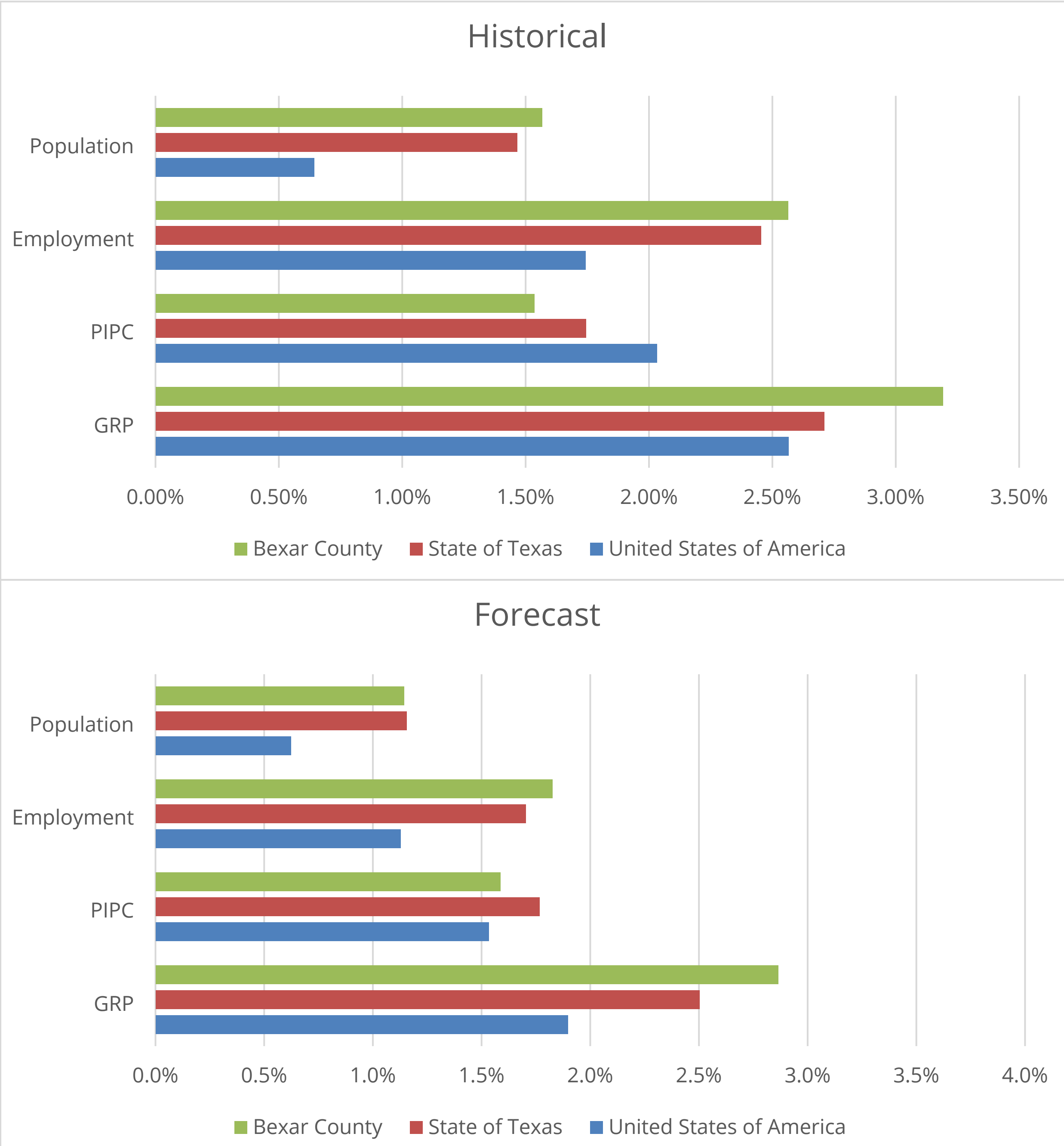
[3] Gross Domestic Product (GDP) is used for the United States of America.

[4] The last year of historical data for Woods & Poole, Inc. 2021 was 2019. Woods & Poole, Inc. also recognizes the COVID-19 pandemic in its projections.

FIGURE 3-1
SOCIOECONOMIC TRENDS



Source: Woods & Poole, Inc. 2021; RS&H, 2022

TABLE 3-1
SOCIOECONOMIC TRENDS

		2021	2022	2026	2031	2041	Annual Growth (2021-2041)
Population	Bexar County	2,050,650	2,076,988	2,182,619	2,316,145	2,581,032	1.2%
	State of Texas	29,663,785	30,032,759	31,526,291	33,445,291	37,386,758	1.2%
	United States	332,219,513	334,554,782	343,776,826	355,171,046	376,799,404	0.6%
Employment	Bexar County	1,304,726	1,331,256	1,438,940	1,579,910	1,880,333	1.8%
	State of Texas	18,711,177	19,062,017	20,484,132	22,341,348	26,307,717	1.7%
	United States	209,319,103	212,087,368	222,948,195	236,437,342	262,828,819	1.1%
Personal Income Per Capita [1]	Bexar County	$45,130	$45,891	$49,029	$53,129	$61,952	1.6%
	State of Texas	$49,970	$50,876	$54,664	$59,725	$71,020	1.8%
	United States	$53,262	$54,137	$57,739	$62,420	$72,374	1.5%
Gross Regional Product (millions) [1,2]	Bexar County	$106,157	$109,435	$123,343	$142,565	$187,557	2.9%
	State of Texas	$1,772,446	$1,819,374	$2,016,929	$2,287,269	$2,913,211	2.5%
	United States	$20,259,075	$20,683,423	$22,427,847	$24,710,678	$29,607,138	1.9%

Notes: 1) In 2012 U.S. dollars; 2) U.S. in Gross Domestic Product

Source: Woods & Poole, Inc., 2021; RS&H, 2022

Historical Activity Review

The following sections present the Airport's period recovery from the COVID-19 pandemic, recent aviation activity at Stinson Municipal Airport, as well as multiple forecasts from a variety of sources. Some of these forecasts are specific to SSF, while others are a much broader scale and focus upon the anticipated industry trends for the U.S. as a whole.

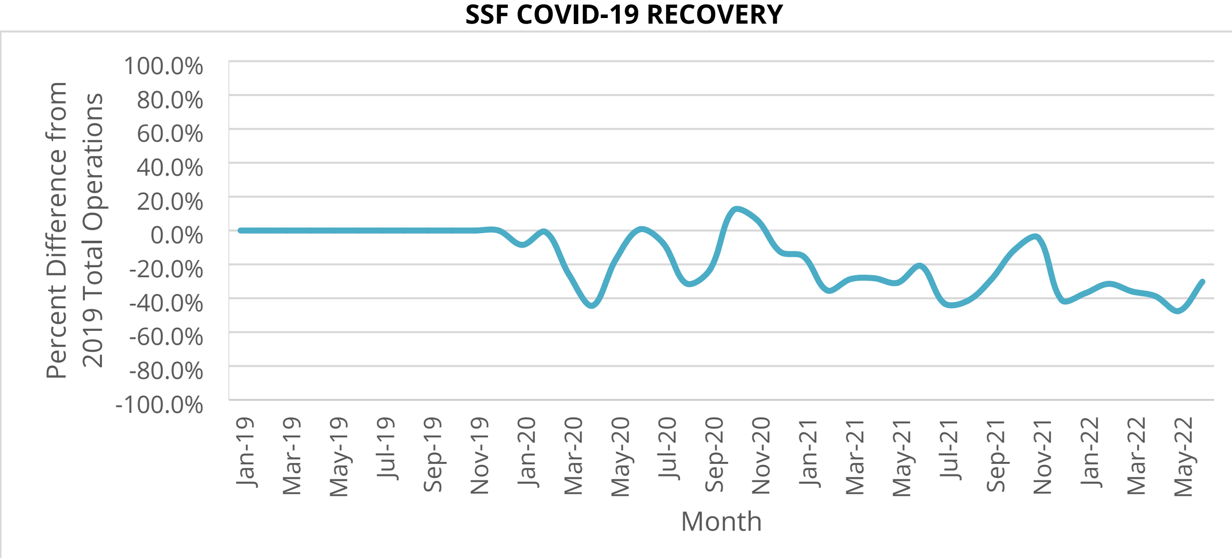
COVID-19 Pandemic Recovery

In Spring of 2020, the COVID-19 pandemic (or public health emergency) caused a sudden decrease in much of the nation's aviation industry. Since that time, SSF and other airports have been working to recover to 2019 activity levels that were experienced prior to the public health emergency.

Figure 3-2 shows that the Airport experienced a decrease in activity of more than 40 percent during March 2020 at the onset of the pandemic, it returned to 2019 totals in July 2020, before decreasing again in September 2020.

Overall, there is optimism because SSF has shown numerous monthly periods of recovery, however, there have also been returns below 2019 totals. As of June 2022, the comparison shows that the Airport's operations are trending up, although its annual totals have yet to fully recover to 2019 levels.

FIGURE 3-2
SSF COVID-19 RECOVERY



Source: FAA OPSNET, 2022

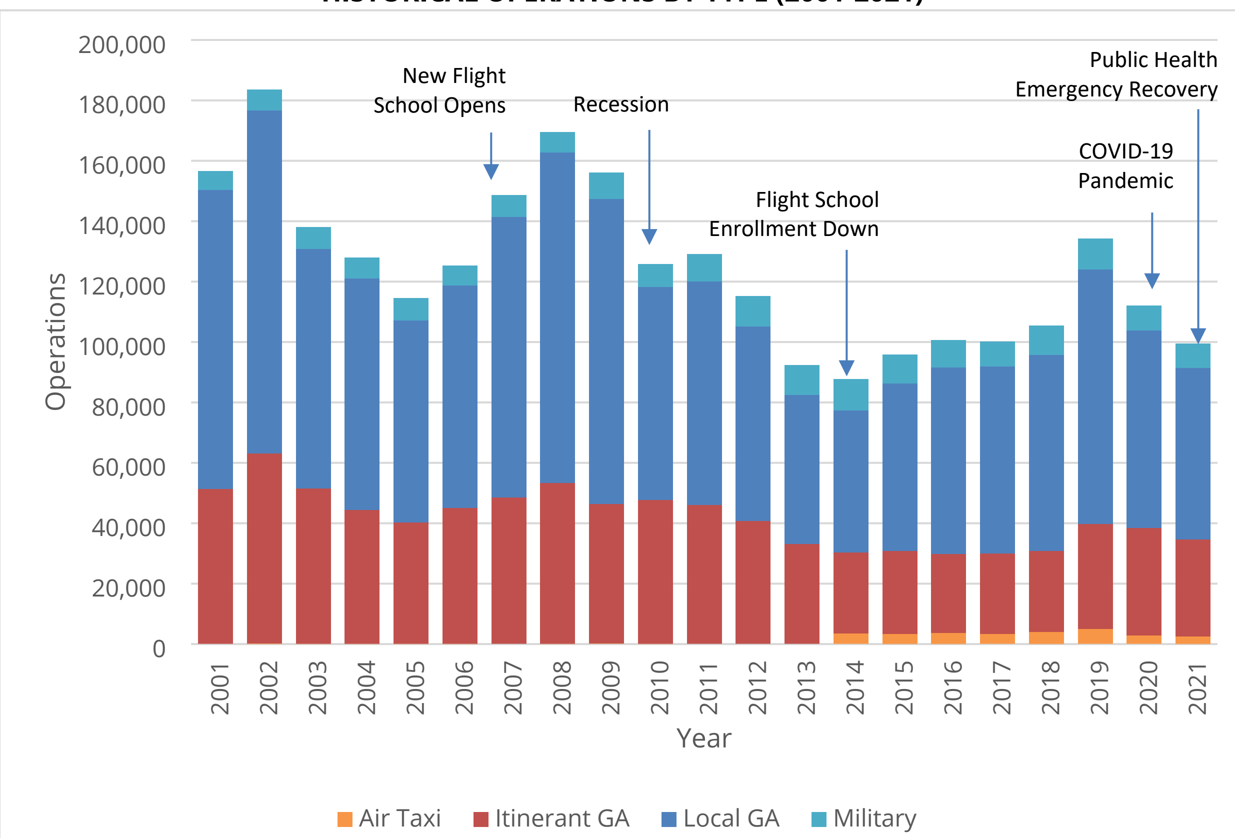
HISTORICAL BASED AIRCRAFT

Historical based aircraft totals represent the annual number of airworthy aircraft that have been based at SSF. For this review, the FAA TAF 2021 was used with attention given to the last 10 years, from 2011-2021. During that time, the number of based aircraft fluctuated from 42 in 2011 to 88 in 2022, increasing at a rate of 7.7 percent annually. During the public health emergency, the based aircraft decreased from 86 in 2019 to 74 in 2020. With its return to 2019 totals, the Airport's based aircraft have fully recovered from the pandemic.

HISTORICAL AIRCRAFT OPERATIONS

In addition to the impacts of the public health emergency in 2020, the historical review showed that SSF experienced notable fluctuations in its operations due to other significant events, shown in **Figure 3-3**.

FIGURE 3-3
HISTORICAL OPERATIONS BY TYPE (2001-2021)



Source: FAA OPSNET, 2022; RS&H, 2022

REVIEW OF OTHER FORECASTS

The forecast developed for the last master plan at SSF was reviewed for purposes of tracking the Airport's activity after it was developed. The FAA TAF 2021 was reviewed to evaluate the FAA's projected growth for the Airport. The FAA Aerospace Forecast FY 2022-2042 was analyzed to understand how industry trends could impact aviation demand at Stinson Municipal Airport.

2011 SSF MASTER PLAN FORECAST

The 2011 SSF Master Plan forecast projections for based aircraft and total operations are shown in **Figure 3-4**.

The forecast for based aircraft was projected to increase at an annual rate of 1.5 percent.

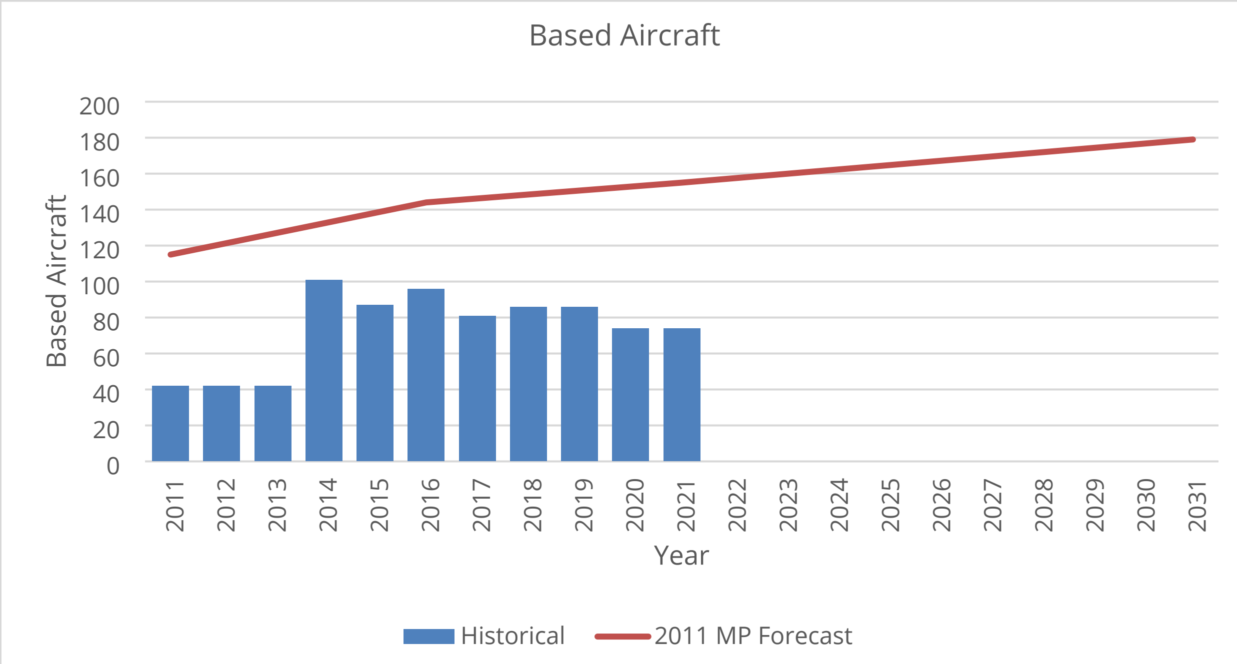
The forecast for operations was also projected to increase at an annual rate of 1.5 percent. As of 2019, the operations were trending just below what was projected, however, the impacts of the public health emergency in 2020 and 2021 caused them to decrease afterwards.

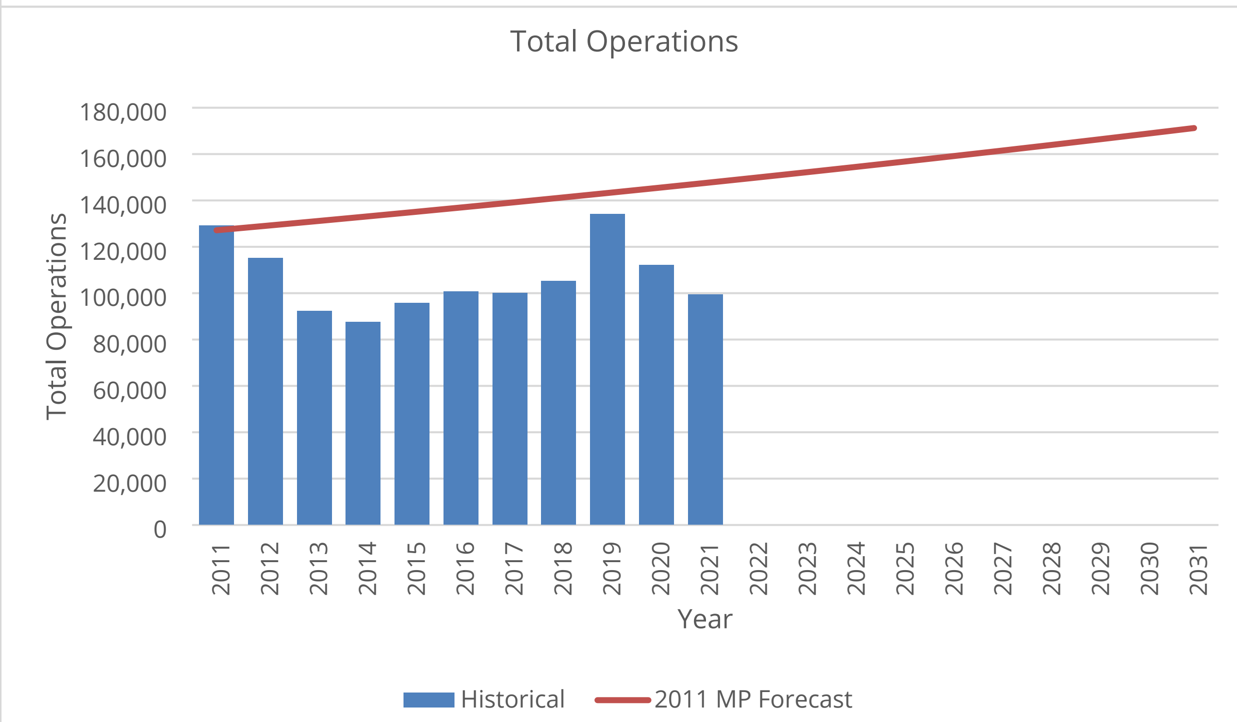
FAA TAF 2021

The FAA Terminal Area Forecast 2021 was published in March 2022. In addition to enplanements, each TAF forecast makes projections for operations by type and based aircraft. The FAA TAF 2021 projections for SSF were compared with those of the State of Texas, the FAA Southwest Region (ASW), and the U.S. respectively. **Figure 3-5** shows the annual growth rates for total operations and shows the annual growth rates for based aircraft from FY 2021-2041.

A review of the annual growth showed that SSF had greater annual growth resulting from the recovery of the pandemic that lasted into 2024, compared to Texas, the ASW, and the U.S. which saw peaks of growth occurring in 2022, indicating an earlier full recovery from the public health emergency. Because the TAF keeps the based aircraft projections at SSF constant, it differs from Texas, the ASW, and U.S. which all increase annually at 0.8 to 1.0 percent. Given these rates of growth, it is realistic to assume Stinson Municipal Airport would also increase at the same growth rates at minimum.

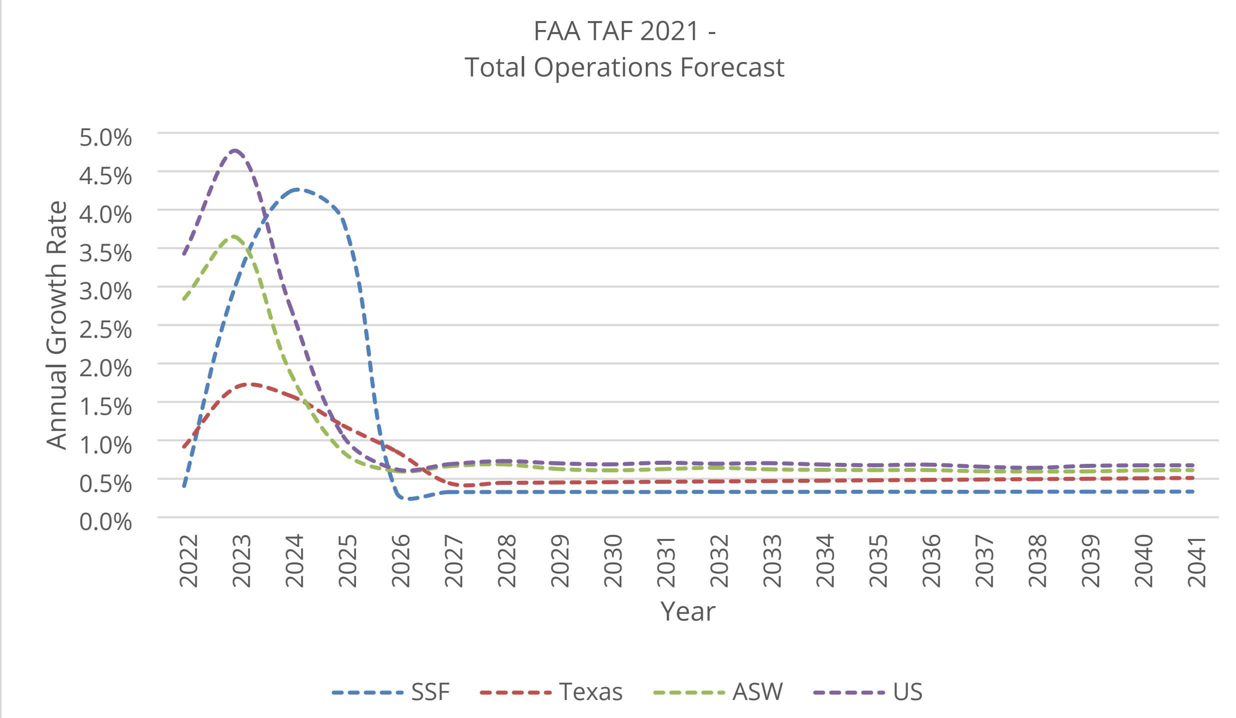
FIGURE 3-4
2011 MASTER PLAN FORECAST

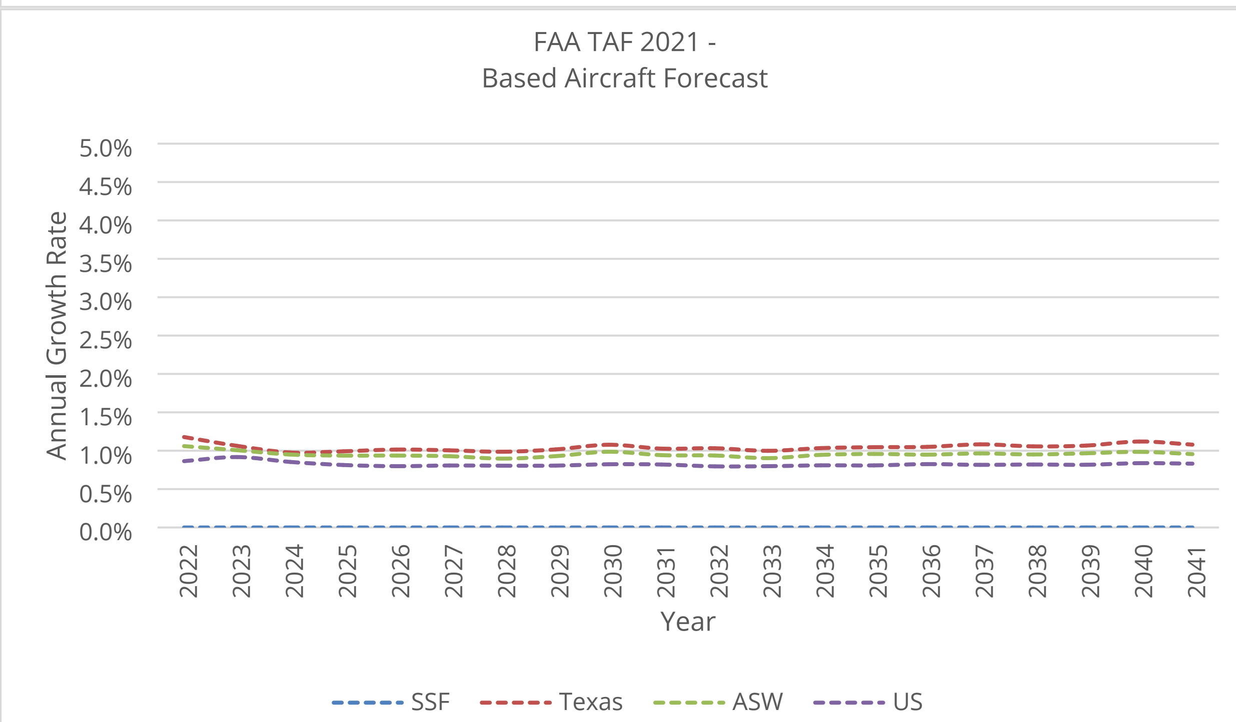




Source: Stinson Municipal Airport Master Plan Update, May 2013

FIGURE 3-5
FAA TAF 2021 COMPARISON





Source: FAA Terminal Area Forecast 2021

FAA AEROSPACE FORECAST FY 2022-2042

The FAA's Aerospace Forecast provides valuable insight on annual trends in the aviation industry over the next 20 years. The following sections identify and summarize some of the trends that are relevant to Stinson Municipal Airport, focusing on the air taxi & general aviation sector.

Air Taxi & General Aviation Active Fleet

The outlook of the active air taxi & general aviation fleet is generated through the use of new aircraft deliveries forecasts, which use the data from the General Aviation Manufacturers Association (GAMA), along with assumptions of aircraft retirement rates. The generated growth rates of the fleet by aircraft categories are then applied to the Part 135 Activity Survey (GA Survey) fleet estimates. These forecasts portray the active fleet, which represents an aircraft that flies at least one hour per year.

Overall, the results of the GA Survey (conducted in 2020) showed that the active fleet of general aviation aircraft increased by 0.1 percent in 2020 from its 2019 total. Because the general aviation sector was less impacted by the COVID-19 public health emergency than other aviation sectors, there is optimism that the decreases in the fleet, will recover to 2019 totals sooner than later. With the exception of fixed wing pistons, nearly all aircraft types are anticipated to increase in number from 2022 to 2042.

TABLE 3-2
FAA AEROSPACE FORECAST
AIR TAXI & GA ACTIVE FLEET GROWTH RATES

	Fixed Wing			Rotorcraft	Total GA Fleet
Years	Piston	Turboprop	Jet		
2022-2032	-1.0%	0.2%	2.9%	1.5%	0.0%
2022-2042	-0.9%	0.6%	2.6%	1.5%	0.1%

Source: FAA Aerospace Forecast FY 2022-2042; RS&H, 2022

Air Taxi & General Aviation Hours Flown

Similar to the number of aircraft that are in the active fleet, the Aerospace Forecast also projects the number of hours flown by each group of aircraft. While hours flown for fixed wing piston aircraft are anticipated to decline by -0.7 percent over the planning horizon, the other aircraft groups that were analyzed all show anticipated increases in flight time. Meanwhile, jet flying times are anticipated to increase by 4.3 percent in the short-term and 3.4 percent over the planning horizon.

TABLE 3-3
FAA AEROSPACE FORECAST
AIR TAXI & GA HOURS FLOWN GROWTH RATES

	Fixed Wing			Rotorcraft	Total GA Fleet
Years	Piston	Turboprop	Jet		
2022-2032	-0.9%	1.2%	4.3%	2.4%	1.1%
2022-2042	-0.7%	1.1%	3.4%	2.1%	1.0%

Source: FAA Aerospace Forecast FY 2022-2042; RS&H, 2022

FORECAST OF AVIATION ACTIVITY

METHODOLOGIES AND PROJECTIONS

Traditional forecasting methodologies were explored such as historical trend analysis; market share analysis with the State of Texas, ASW, and U.S.; operations by based aircraft (OPBA); COVID-19 recovery-based scenarios; regression analyses; and statistical correlations with local socioeconomic trends.

BASED AIRCRAFT FORECAST

An inventory of the Airport's records from 2022 identified a total of 88 based aircraft[5], with 73 single-engine fixed wing aircraft, eight multi-engine fixed wing aircraft, and seven helicopters. The Airport currently does not have any based jets, although there is adequate space to build the facilities should the demand or development initiative arise.

Because fixed-wing piston aircraft are forecast to slowly decline nationally over the next 20 years, the based aircraft forecast was developed using the historical annual growth rate (1.4 percent) of based aircraft at Stinson Municipal Airport from 2016-2021. Additionally, seven single-engine piston fixed wing aircraft were added to represent the flight schools and their plans for future growth, increasing at one per year from 2022-2029.

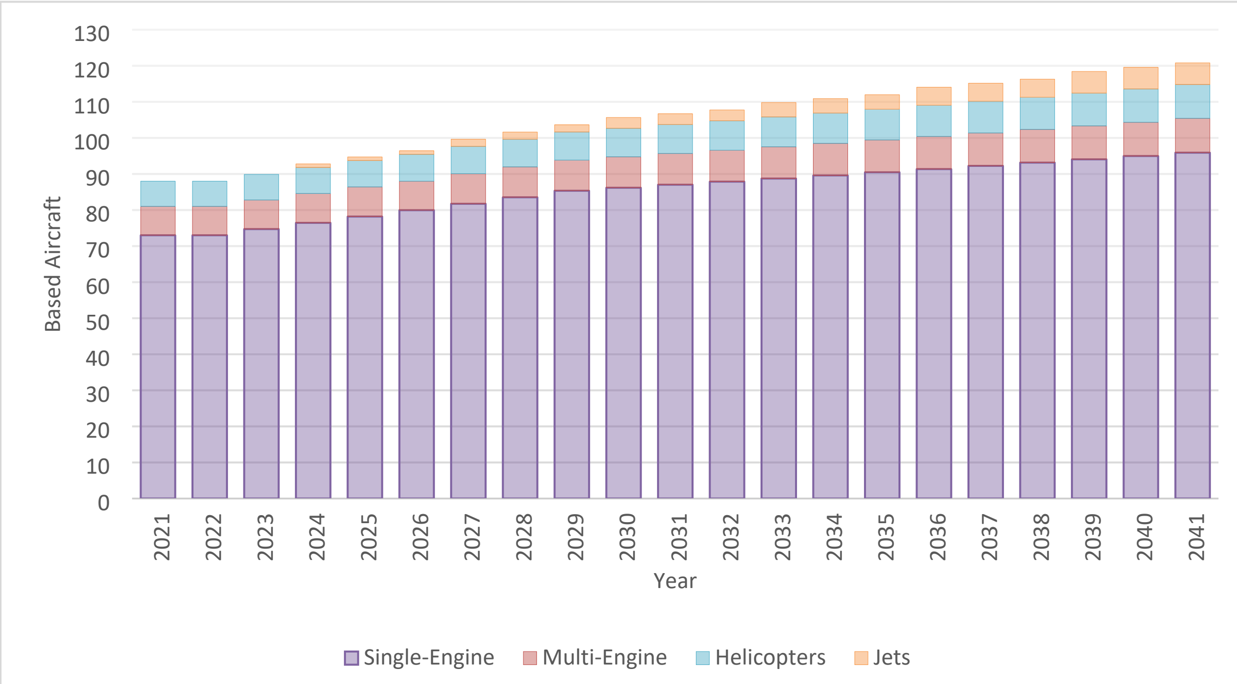
Turboprops (0.5 percent) and rotorcraft (1.3 percent) assume the annual rate of growth associated with the FAA Aerospace Forecast for the active fleet from 2022-2042. Rotorcraft are combined after being identified as piston and turboshaft types and increased at their respective rates.

Overall, the based aircraft are forecast to increase at an annual rate of 1.6 percent from 2021-2041, which is similar to the 2011 SSF Master Plan Update Forecast (1.5 percent).

Figure 3-6 and **Table 3-4** show the forecast of based aircraft by type from 2021-2041.

[5] This total differs from the FAA TAF 2021 estimate for 2021 and 2022 at 74.

FIGURE 3-6
FORECAST - BASED AIRCRAFT (2021-2041)



Source: RS&H analysis, 2022

TABLE 3-4
FORECAST - BASED AIRCRAFT (2021-2041)

Year	Single-Engine (nonjet)	Multi-Engine (nonjet)	Jets	Helicopters	Total
2021	73	8	0	7	88
2022	73	8	0	7	88
2026	80	8	1	7	96
2031	87	9	3	8	107
2036	91	9	5	9	114
2041	96	10	6	9	121
Annual Growth Rate					
2021-2041	1.4%	1.1%	NA	1.3%	1.6%

Source: Airport Records; RS&H analysis, 2022

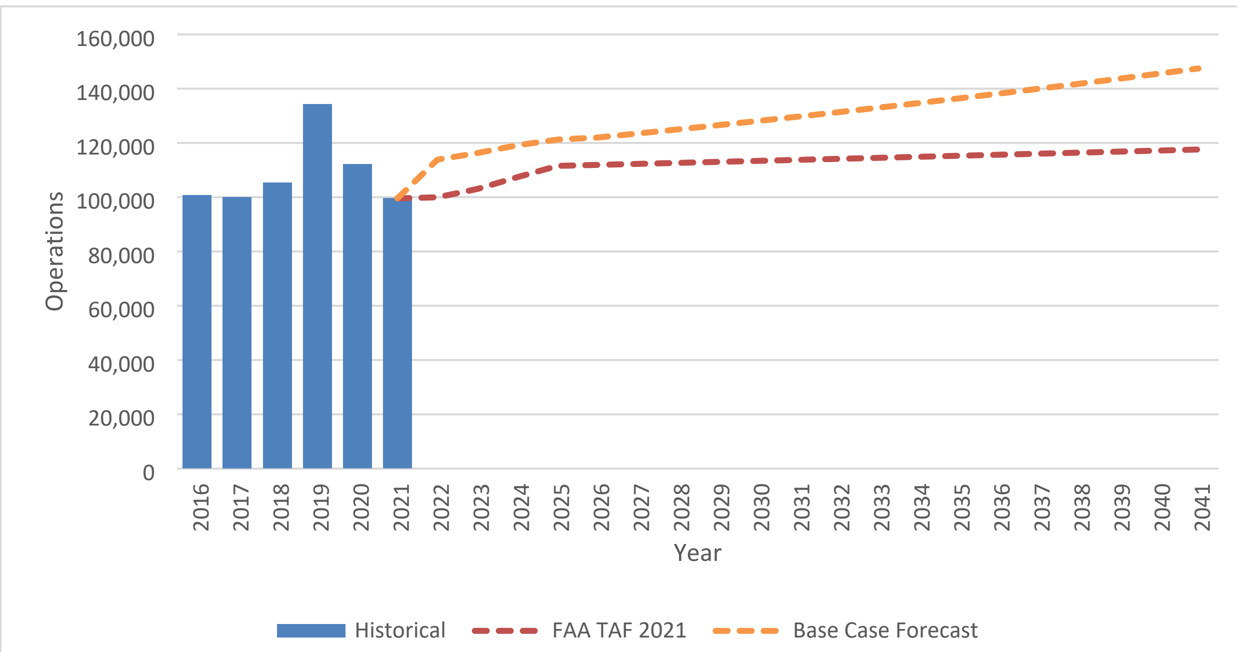
ANNUAL AIRCRAFT OPERATIONS FORECAST

The annual aircraft operations forecast was developed in a bottom-up approach as a summation of each of the Airport's operation forecasts. After selecting the base case forecasts and combining them, the Airport's total annual operations are forecast to increase at an annual growth rate of 2.0 percent from 2021-2041.

Figure 3-7 and **Table 3-5** show the total annual operations from 2021-2041.

In the summer of 2022, an interview with the SSF airport traffic control tower indicated that 10-15 percent of total operations are classified as transient.

FIGURE 3-7
FORECAST - TOTAL ANNUAL OPERATIONS



Source: RS&H analysis, 2022

TABLE 3-5
FORECAST - TOTAL ANNUAL OPERATIONS (2021-2041)

Year	Air Carrier	Air Taxi / Commuter	Itinerant GA	Local GA	Military	Total Operations	FAA TAF 2021
2021	4	2,505	32,198	56,790	8,073	99,570	99,570
2022	4	3,123	32,694	69,970	8,073	113,865	99,974
2026	4	5,199	34,678	74,045	8,073	121,999	111,913
2031	4	5,680	40,082	75,848	8,073	129,688	113,760
2036	4	6,198	46,085	77,790	8,073	138,150	115,649
2041	4	6,755	52,732	79,884	8,073	147,448	117,580
Annual Growth Rate							
2021-2026	0.0%	15.7%	1.5%	5.4%	0.0%	4.1%	2.4%
2026-2031	0.0%	1.8%	2.9%	0.5%	0.0%	1.2%	0.3%
2031-2041	0.0%	1.7%	2.8%	0.5%	0.0%	1.3%	0.3%
2021-2041	0.0%	5.1%	2.5%	1.7%	0.0%	2.0%	0.8%

Source: FAA OPSNET; FAA Terminal Area Forecast 2021; RS&H analysis, 2022

Itinerant Operations Forecast

The itinerant operations forecasts include air carrier, air taxi & commuter, and itinerant general aviation.

Air Carrier & Air Taxi Operations Forecast

In base year 2021, SSF had a total of four annual air carrier operations. Because these operations are not anticipated to change, they were kept constant over the planning horizon. In 2014, the annual number of air taxi & commuter operations was over 3,500 for the first time since 1990. Since that time, operations showed an increasing trend through 2019. In 2019, SSF reached a 30-year high with 5,107 operations, before decreasing by 42 percent in 2020 and 51 percent in 2021 as a result of the public health emergency.

The following summarizes the various forecasts that were reviewed to determine the most logical and appropriate forecast to use for this analysis.

- FAA TAF – The FAA TAF 2021 projects a full recovery to 2019 totals by 2024. However, at that point the forecast keeps the 5,107 operations constant and shows no growth over the planning horizon.
- Historical Analysis – Because the Airport's air taxi & commuter operations were not consistent to current totals until 2014, the historical analysis went five years from 2014-2019, so that it would not be impacted by the impacts of the COVID-19

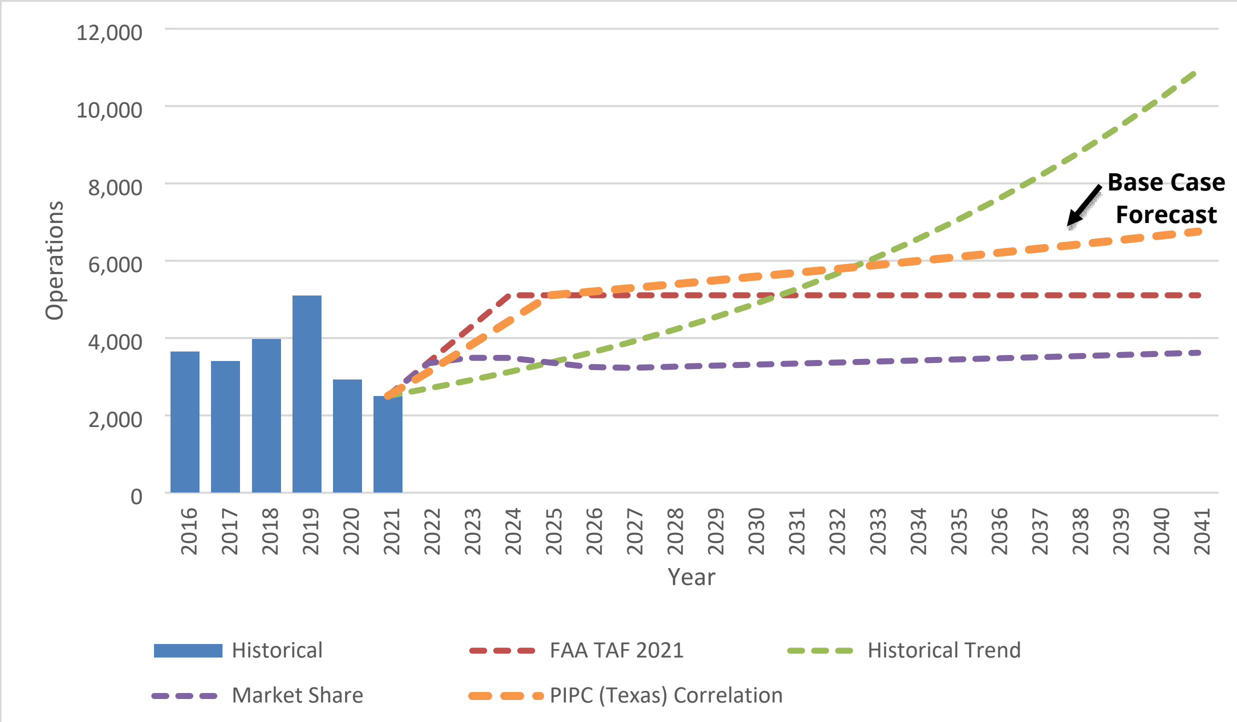
pandemic which are considered outliers in 2020 and 2021. During those years, SSF increased at an annual rate of 7.6 percent. When applying this growth rate to the base year 2021, Stinson Municipal Airport would recover to 2019 annual totals in 10 years.

- Market Share Analysis – Similarly, the market share analysis took the average share of SSF to Texas, ASW, and the U.S. and retained it over the planning horizon, growing at the level of each. Using this method, the U.S. market share applied the strongest annual growth rate for SSF at 1.9 percent annually. However, the Stinson Municipal Airport would never fully recover from the pandemic over the planning horizon in this scenario.
- Socioeconomic Correlation – The best statistical correlation (0.82) existed between historical operations and the Texas PIPC. In the scenario, it was assumed SSF would recover fully by 2025. At that point it would increase at the rate of the Texas PIPC, resulting in an annual rate of 5.1 percent over the planning horizon.

As a result, the socioeconomic correlation with the Texas PIPC forecast was selected as the base case forecast.

Figure 3-8 and **Table 3-6** show a comparison of the air taxi forecasts from 2021-2041.

FIGURE 3-8
FORECAST – AIR TAXI & COMMUTER OPERATIONS (2021-2041)



Source: RS&H analysis, 2022

TABLE 3-6
FORECAST - AIR TAXI & COMMUTER OPERATIONS (2021-2041)

Year	FAA TAF 2021	Historical Trend	Market Share	PIPC (Texas)
2021	2,505	2,505	2,505	2,505
2022	3,372	2,696	3,348	3,123
2026	5,107	3,620	3,251	5,199
2031	5,107	5,231	3,339	5,680
2036	5,107	7,560	3,476	6,198
2041	5,107	10,925	3,620	6,755
Annual Growth Rate				
2021-2026	15.3%	7.6%	5.4%	15.7%
2026-2031	0.0%	7.6%	0.5%	1.8%
2031-2041	0.0%	7.6%	0.8%	1.7%
2021-2041	3.6%	7.6%	1.9%	5.1%

Source: FAA Terminal Area Forecast 2021; RS&H analysis, 2022

Itinerant General Aviation Operations Forecast

Historical itinerant general aviation operations reached a twenty-year high in 2002 with over 62,000 operations. The average number of itinerant general aviation operations at SSF from 2014-2019 was 28,000 before it reached a five year high with 34,678 operations in 2019. Then in 2020 it increased by 2.6 percent, before decreasing by 7 percent in 2021 likely as a result of the public health emergency.

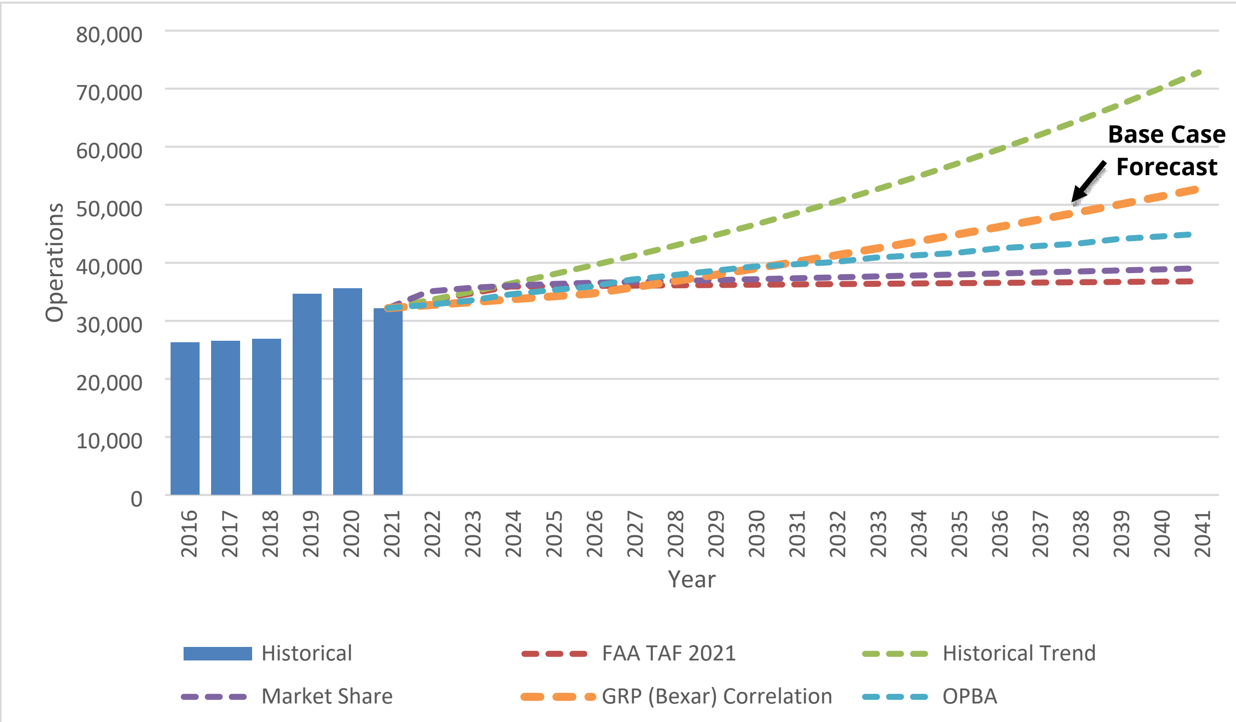
The following summarizes the various forecasts that were reviewed to determine the most logical and appropriate forecast to use for this analysis.

- <u>FAA TAF</u> – The FAA TAF 2021 projects a full recovery to 2019 totals by 2023. The operations increase at a 0.7 percent annual rate from 2021-2041.
- <u>Historical Analysis</u> – Similar to the historical analysis of the Airport's air taxi & commuter operations, the 4.2 percent annual growth rate from 2014-2019 was applied to base year 2021. Using this methodology, SSF would also fully recover to 2019 totals by 2023, producing a total of 72,817 itinerant general aviation operations by 2041.
- <u>Market Share Analysis</u> – A review of the market share analyses with SSF to Texas, ASW, and the U.S. was completed. Using this method, the Texas market share applied the strongest annual growth rate for SSF at 1.0 percent annually. While Stinson Municipal Airport would fully recover from the pandemic by 2022, it would never exceed 40,000 itinerant general aviation operations.
- <u>Operations per Based Aircraft</u> – The operations per based aircraft methodology was considered in this forecast. Using the OPBA method, the average number of itinerant general aviation operations per based aircraft from 2016-2021 was multiplied by the based aircraft forecast over the planning horizon. This results in SSF fully recovering to 2019 totals by 2026, but only reaching 44,000 operations by 2041.
- <u>Socioeconomic Correlation</u> – The best statistical correlation (0.81) existed between historical operations and the Bexar County GRP. In the scenario, it was assumed SSF would recover fully by 2026 like the OPBA methodology. At that point it would increase at the rate of the Bexar County GRP resulting in an annual rate of 2.5 percent over the planning horizon.

As a result, the statistical correlation with the Bexar GRP forecast was selected as the base case forecast.

Figure 3-9 and **Table 3-7** show a comparison of the itinerant general aviation operations forecasts from 2021-2041.

FIGURE 3-9
FORECAST - ITINERANT GA OPERATIONS (2021-2041)



Source: RS&H analysis, 2022

TABLE 3-7
FORECAST - ITINERANT GA OPERATIONS (2021-2041)

Year	FAA TAF 2021	Historical Trend	Market Share	OPBA	GRP (Bexar County)
2021	32,198	32,198	32,198	32,198	32,198
2022	33,438	33,539	35,051	32,765	32,694
2026	36,012	39,485	36,555	35,906	34,678
2031	36,277	48,421	37,325	39,729	40,082
2036	36,543	59,379	38,153	42,471	46,085
2041	36,811	72,817	39,043	44,980	52,732
Annual Growth Rate					
2021-2026	2.3%	4.2%	2.6%	2.2%	1.5%
2026-2031	0.1%	4.2%	0.4%	2.0%	2.9%
2031-2041	0.1%	4.2%	0.5%	1.2%	2.8%
2021-2041	0.7%	4.2%	1.0%	1.7%	2.5%

Source: FAA Terminal Area Forecast 2021; RS&H analysis, 2022

LOCAL GENERAL AVIATION OPERATIONS FORECAST

Historical civil (or local general aviation) operations averaged 63,000 operations from 2009 to 2019. Stinson Municipal Airport had a 10-year high for local general aviation operations with 84,238 in 2019. Then in 2020 it decreased by 22.5 percent, before decreasing further in 2021 by 32.6 percent from 2019 totals, likely as a result of the public health emergency.

The following summarizes the various forecasts that were reviewed to determine the most logical and appropriate forecast to use for this analysis.

- FAA TAF – The FAA TAF 2021 seems to view the 2019 total as an anomaly or outlier, and instead shows its recovery based on 2018 totals which is 64,000 operations or just over the 10-year average prior to the pandemic. It assumes a recovery to 2018 levels in 2033. The FAA TAF 2021 annual growth rate for civil operations is 0.9 percent from 2021-2041.
- Historical Analysis – Because SSF had consistency in its operations prior to the pandemic, the historical trend used went from 2010-2019, resulting in an annual growth rate of the 2.0 percent which was applied to base year 2021. Using this methodology, SSF would never fully recover to 2019 totals over the planning horizon. An additional historical trend analysis was also completed with the same growth rate, but it assumed a full recovery to 2019 levels by 2026 which aligns with the base case itinerant general aviation operations assumption. The historical trend without recovery has a 2.0 percent annual growth rate compared to the historical trend with recovery which has a 3.5 percent annual growth rate from 2021-2041.
- Market Share Analysis – A review of the market share analyses with SSF to Texas, ASW, and the U.S. was completed. Using this method, the Texas market share applied the strongest annual growth rate for SSF at 1.7 percent annually. Using this forecast, Stinson Municipal Airport would never fully recover from the pandemic, nor would it exceed 80,000 operations.
- Operations per Based Aircraft – The operations per based aircraft methodology was also considered in this forecast. Using the OPBA method, the average number of local general aviation operations per based aircraft from 2016-2021 was multiplied by the based aircraft forecast over the planning horizon. This results in SSF fully recovering to 2019 totals by 2030 and exceeding 96,000 local general aviation operations by 2041 at an annual rate of 2.7 percent during that time.

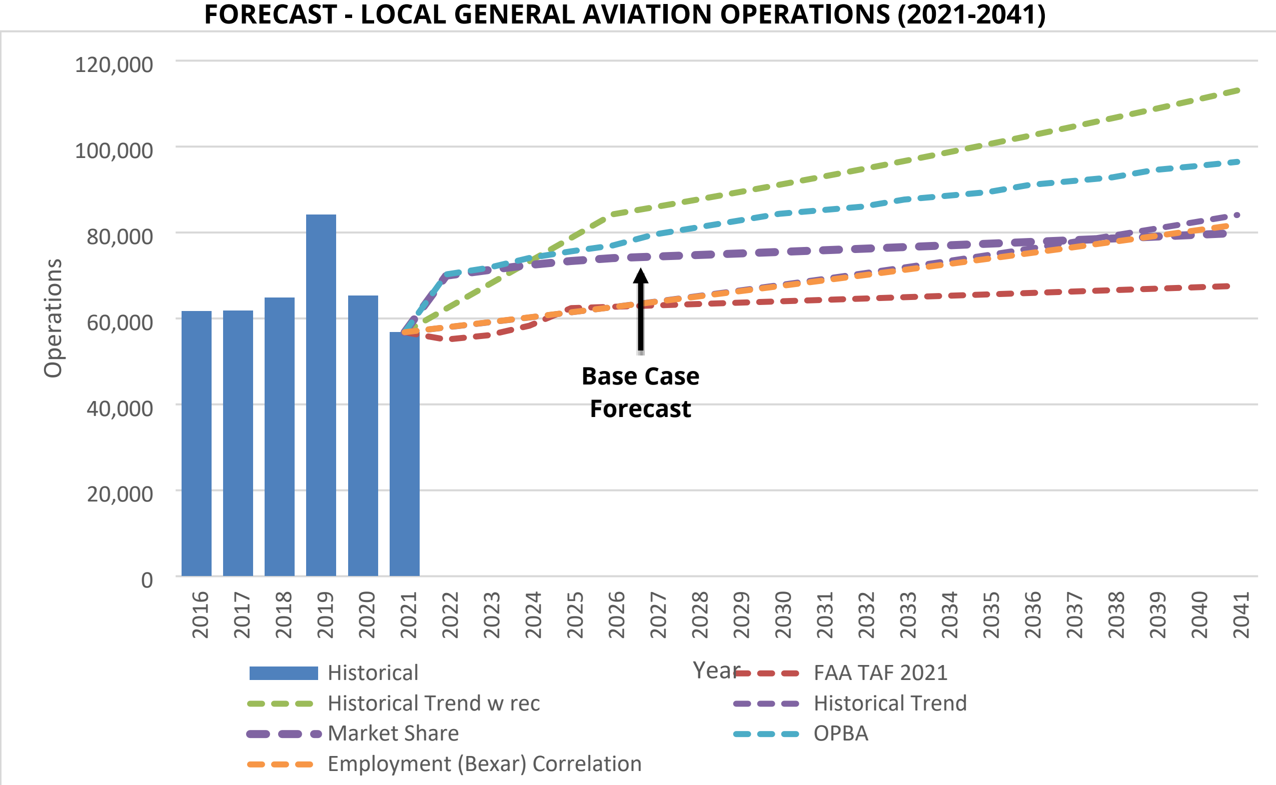
- Socioeconomic Correlation - The best statistical correlation (0.80) existed between historical operations and the Bexar County employment. In the scenario, it was assumed SSF would come close to fully recovering by 2041 resulting in an annual rate of 1.8 percent over the planning horizon.

Because the Texas market share analysis showed a recovery to 2018 levels by 2022 and steady growth over the planning horizon it was selected as the base case forecast. **Figure 3-10** and **Table 3-8** compares the civil operations forecasts from 2021-2041.

MILITARY OPERATIONS FORECAST

It is general practice that military operations are held constant throughout the forecast period since the influences and forecasts reviewed generally have no impact on their operations. So, the itinerant and local military operations from base year 2021 are held constant throughout the forecast horizon and used as the military operations base case forecast, shown in **Figure 3-11** and **Table 3-9**.

FIGURE 3-10
FORECAST - LOCAL GENERAL AVIATION OPERATIONS (2021-2041)



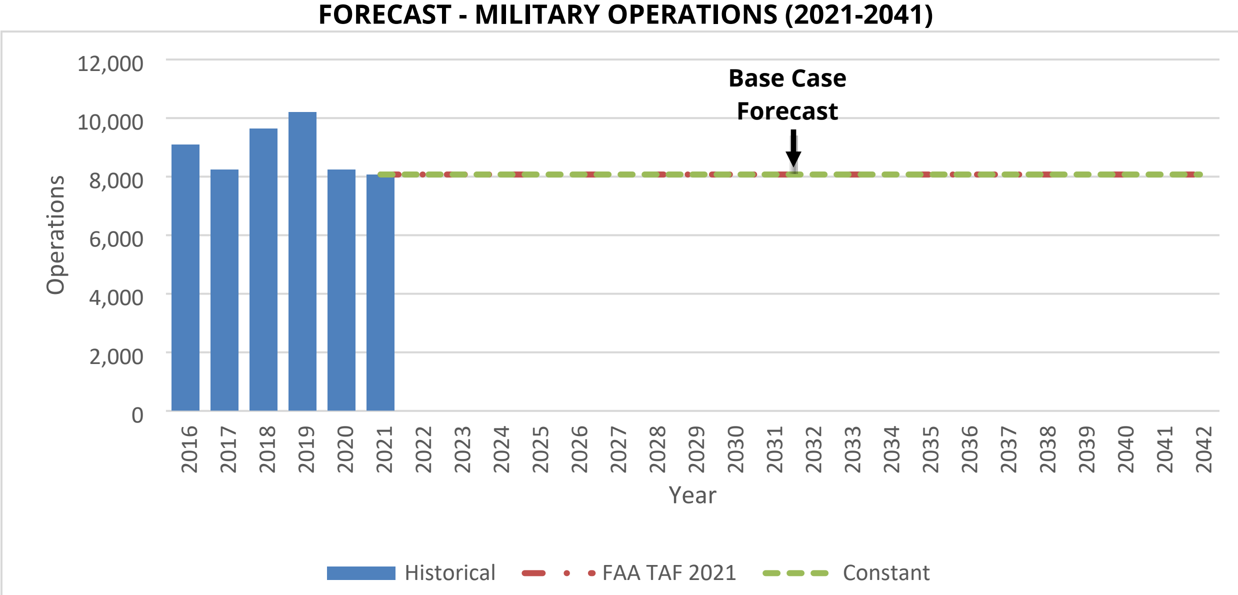
Source: RS&H analysis, 2022

TABLE 3-8
FORECAST - LOCAL GENERAL AVIATION OPERATIONS (2021-2041)

Year	FAA TAF 2021	Historical Trend with recovery	Historical Trend	OPBA	Market Share	Employment (Bexar County)
2021	56,790	56,790	56,790	56,790	56,790	56,790
2022	55,086	62,280	57,915	70,254	69,970	57,945
2026	62,715	84,238	62,643	76,989	74,045	62,632
2031	64,297	92,920	69,099	85,187	75,848	68,768
2036	65,920	102,496	76,220	91,066	77,790	75,172
2041	67,583	113,059	84,075	96,445	79,884	81,844
Annual Growth Rate						
2021-2026	2.0%	8.2%	2.0%	6.3%	5.4%	2.0%
2026-2031	0.5%	2.0%	2.0%	2.0%	0.5%	1.9%
2031-2041	0.5%	2.0%	2.0%	1.2%	0.5%	1.8%
2021-2041	0.9%	3.5%	2.0%	2.7%	1.7%	1.8%

Source: FAA Terminal Area Forecast 2021; RS&H analysis, 2022

FIGURE 3-11
FORECAST - MILITARY OPERATIONS (2021-2041)



Source: RS&H analysis, 2022

TABLE 3-9
FORECAST - MILITARY OPERATIONS (2021-2041)

Year	FAA TAF 2021	Constant
2021	8,073	8,073
2022	8,073	8,073
2026	8,073	8,073
2031	8,073	8,073
2036	8,073	8,073
2041	8,073	8,073
Annual Growth Rate		
2021-2026	0.0%	0.0%
2026-2031	0.0%	0.0%
2031-2041	0.0%	0.0%
2021-2041	0.0%	0.0%

Source: FAA Terminal Area Forecast 2021; RS&H analysis, 2022

ANNUAL INSTRUMENT APPROACHES FORECAST

Annual instrument approaches represent the number of approaches that use instrument flight rules (IFR) procedures annually. Furthermore, it is assumed that the number of annual instrument approaches would be 50 percent of the IFR operations projected keeping their ratio to total operations for base year 2021 constant over the forecast horizon. **Table 3-10** shows the forecasts for annual instrument approaches from 2021-2041.

TABLE 3-10
FORECAST – ANNUAL INSTRUMENT APPROACHES (2021-2041)

Year	Annual Instrument Approaches	Total Annual Operations
2021	3,750	99,570
2022	4,288	113,865
2026	4,595	121,999
2031	4,884	129,688
2036	5,203	138,150
2041	5,553	147,448
Annual Growth Rate		
2021-2026	4.1%	4.1%
2026-2031	1.2%	1.2%
2031-2041	1.3%	1.3%
2021-2041	2.0%	2.0%

Source: RS&H analysis, 2022

PEAK PERIODS OPERATIONS FORECAST

The peak day of operations was identified with 671 in January 2021. An average hour of the peak day (AHPD) was calculated using the base year values and keeping them constant over the planning horizon. The average hour of the peak day was 45 in 2021 and is projected to increase to 66 by 2041 as shown in **Table 3-11**.

TABLE 3-11
FORECAST - PEAK PERIODS FORECAST

Year	Annual	Month	Peak Day	AHPD
2021	99,570	9,168	671	45
2022	113,865	10,484	767	51
2026	121,999	11,233	822	55
2031	129,688	11,941	874	58
2036	138,150	12,720	931	62
2041	147,448	13,576	994	66

Source: RS&H analysis, 2022

OPERATIONS BY FLEET FORECAST

The critical aircraft of a runway or airport is essential to airport planning as it identifies the dimensional requirements, such as the separation distances and the sizes of safety areas. FAA Advisory Circular (AC) 150/5000-17 *Critical Aircraft and Regular Use Determination*, lays out the requirements for identifying a critical aircraft. The AC states that the critical aircraft is the most demanding aircraft type, or grouping of aircraft with similar characteristics, which make regular use of the Airport. It further establishes regular use as 500 annual operations, not including touch-and-goes.

After confirming the annual operations, an aircraft, or a representative aircraft for a group of aircraft with the most demanding characteristics and greater than 500 operations is identified. A two-part critical aircraft identification code is established for an airport, which define the FAA design standards that apply. The first part of the critical aircraft identification code is the Aircraft Approach Category (AAC), which groups aircraft by reference landing speed (V_{REF}) at the maximum certificated landing weight. The second part of the critical aircraft identification code is the Airplane Design Group (ADG). The ADG is based upon the dimensions of the tail height and wingspan, with the ADG being determined by whichever characteristic is more demanding.

The FAA Traffic Flow Management System Count data for FFY 2021 was analyzed and scaled up[6] to meet the total itinerant operations, minus itinerant military operations. It was assumed all visual flight rules (VFR) operations that were identified as itinerant were performed by piston aircraft. Touch-and-go's and military operations were also removed from the critical aircraft analysis.

The results of the analysis in **Table 3-12** show that the Airport is currently classified as B-II and is projected to remain so over the planning horizon.

[6] TFMSC includes data for flights that fly under IFR and are captured by the FAA's enroute computers. Most VFR and some non-enroute IFR traffic is excluded. For the purposes of determining a critical aircraft at SSF reflective of total annual aircraft operations, the TFMSC data were scaled up to meet the total operational counts provided by FAA OPSNET.

TABLE 3-12
FORECAST - OPERATIONS BY FLEET (2021-2041)

Aircraft	AAC	ADG	Annual Operations 2021	2022	2026	2031	2036	2041
A-I Aircraft	A	I	54,605	60,506	65,564	71,877	78,853	86,544
PC12 - Pilatus PC-12	A	II	100	111	149	166	186	207
C425 - Cessna 425 Corsair	B	I	135	150	201	225	251	279
Other B-I Aircraft	B	I	416	462	620	694	775	864
BE20 - Beech 200 Super King	B	II	267	296	398	445	497	554
Other B-II Aircraft	B	II	297	330	442	495	553	616
C207 - Cessna Turbo Stationair 7	B	III	2	3	4	4	5	5
C-I Aircraft	C	I	27	30	41	46	51	57
C-II Aircraft	C	II	40	44	59	67	74	83
D-I Aircraft	D	I	25	28	37	42	46	52
D-II Aircraft	D	II	5	6	7	8	9	10
Helicopters (GA)	-	-	85	94	126	141	158	176
Subtotal (included)			**55,918**	**61,966**	**67,522**	**74,068**	**81,300**	**89,271**
Touch-and-goes (not included)			*35,494*	*43,731*	*46,278*	*47,405*	*48,619*	*49,928*
Military (not included)			*8,073*	*8,073*	*8,073*	*8,073*	*8,073*	*8,073*
Subtotal (not included)			***43,567***	***51,804***	***54,351***	***55,478***	***56,692***	***58,001***
Total Operations			***99,485***	***113,771***	***121,873***	***129,546***	***137,992***	***147,272***
Subtotals								
Subtotal AAC - A	A		54,704	60,617	65,712	72,043	79,039	86,751
Subtotal AAC - B	B		1,117	1,241	1,664	1,863	2,080	2,318
Subtotal AAC - C	C		67	75	100	112	125	140
Subtotal AAC - D	D		30	33	45	50	56	62
Subtotal ADG - I		I	55,207	61,176	66,463	72,883	79,977	87,797
Subtotal ADG - II		II	708	787	1,055	1,181	1,319	1,469
Subtotal ADG - III		III	2	3	4	4	5	5
Subtotal ADG - IV		IV	0	0	0	0	0	0
Critical Aircraft								
AAC-ADG			B-II	B-II	B-II	B-II	B-II	B-II
Representative Aircraft			BE20	BE20	BE20	BE20	BE20	BE20

Source: FAA Traffic Flow Management Systems Count, 2022; RS&H, 2022

SUMMARY

FAA TAF 2021 COMPARISON

As a part of the forecast process, the Airport's forecast, which is identified here as the base case forecast, must be consistent with the FAA TAF 2021 so that the 5-year forecast is within 10 percent of the TAF, and a 10-year forecast is within 15 percent of the TAF. Because of the variation in the based aircraft for base year 2021 and 2022, (74 and 88 aircraft, respectively) the comparison of the based aircraft with the TAF at the five and 10-year marks exceed the 10 percent and 15 percent thresholds. If the TAF were to be adjusted to a total of 88 for base year 2021 and kept constant, only the 10-year base case forecast would exceed the adjusted TAF. **Table 3-13** shows a comparison with the FAA TAF 2021.

TABLE 3-13
FORECAST - BASE CASE FORECAST COMPARISON WITH FAA TAF 2021

Category	FAA TAF 2021	Base Case Forecast	Difference (%)
2021 - Base Year			
Total Operations	99,570	99,570	0.0%
Based Aircraft	74	88	18.9%
2022			
Total Operations	99,974	113,865	13.9%
Based Aircraft	74	88	18.9%
2026			
Total Operations	111,913	121,999	9.0%
Based Aircraft	74	96	30.3%
2031			
Total Operations	113,760	129,688	14.0%
Based Aircraft	74	107	44.2%
2041			
Total Operations	117,580	147,448	25.4%
Based Aircraft	74	121	63.5%

Source: FAA Terminal Area Forecast 2021; RS&H analysis, 2022

FORECAST SUMMARY

Table 3-14 shows the summary sheet for the base case forecast.

TABLE 3-14
FORECAST - SUMMARY SHEET

	Base Yr. Level	Base Yr. +1yr.	Base Yr. +5yrs.	Base Yr. +10yrs.	Base Yr. +15yrs.	Base Yr. to +1	Base Yr. to +5	Base Yr. to +10	Base Yr. to +15
Passenger Enplanements			Not Applicable						
Operations									
Itinerant									
Air carrier	4	4	4	4	4	0.0%	0.0%	0.0%	0.0%
Commuter/air taxi	2,505	3,123	5,199	5,680	6,198	24.7%	15.7%	8.5%	6.2%
Total Commercial Operations	2,509	3,127	5,203	5,684	6,202	24.6%	15.7%	8.5%	6.2%
General aviation	32,198	32,694	34,678	40,082	46,085	1.5%	1.5%	2.2%	2.4%
Military	4,509	4,509	4,509	4,509	4,509	0.0%	0.0%	0.0%	0.0%
Local									
General aviation	56,790	69,970	74,045	75,848	77,790	23.2%	5.4%	2.9%	2.1%
Military	3,564	3,564	3,564	3,564	3,564	0.0%	0.0%	0.0%	0.0%
Instrument Operations	7,500	8,577	9,189	9,769	10,406	14.4%	4.1%	2.7%	2.2%
Peak Hour Operations	45	51	55	58	62	14.4%	4.1%	2.7%	2.2%
Cargo/mail (enplaned + deplaned tons)					Not Applicable				
Based Aircraft									
Single Engine (Nonjet)	73	73	80	87	91	0.0%	1.8%	1.8%	1.5%
Multi Engine (Nonjet)	8	8	8	9	9	0.0%	0.1%	0.8%	0.8%
Jet Engine	0	0	1	3	5	-	-	-	-
Helicopter	7	7	7	8	9	0.0%	1.2%	1.4%	1.4%
Other	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%
TOTAL	**88**	**88**	**96**	**107**	**114**	**0.0%**	**1.8%**	**1.9%**	**1.7%**

B. Operational Factors

	Base Yr. Level	Base Yr. +1yr.	Base Yr. +5yrs.	Base Yr. +10yrs.	Base Yr. +15yrs.
Average aircraft size (seats)					
Air carrier			Not Applicable		
Commuter			Not Applicable		
Average enplaning load factor					
Air carrier			Not Applicable		
Commuter			Not Applicable		
GA operations per based aircraft	**1011**	**1167**	**1127**	**1086**	**1086**

Source: FAA Terminal Area Forecast 2021; RS&H analysis, 2022

Facility Requirements

4

CHAPTER 4: FACILITY REQUIREMENTS

INTRODUCTION

This chapter evaluates the existing airport facilities and identifies improvements needed to effectively meet the forecasted demand discussed in the Forecast Chapter in a manner that complies with FAA standards and best practices. Identification of a needed facility or infrastructure improvement does not necessarily constitute a "requirement", but an "option" for facility development to accommodate future aviation activity. Market demand will ultimately drive the facility development requirements at Stinson Municipal Airport (SSF) and the operational statistics discussed in the Forecast Chapter (e.g., aircraft operations, based aircraft, etc.) should be used to help guide the discussion.

Airport facilities can be divided into two areas: airside and terminal/landside. The airside facilities include runways, taxiways, protected surfaces, airspace, navigational aids (NAVAIDs), airfield markings, signage, and lighting. Terminal/landside facilities include the hangars, terminal building, FBO facilities, apron, fuel storage and delivery, vehicular parking, and airport access roads.

Each of these facilities, including their current condition and forecasted demand, will be discussed in the remainder of this chapter. The results of this chapter will be utilized to drive the alternatives that are discussed in Chapter 5.

AIRSIDE/AIRSPACE FACILITIES

RUNWAY LENGTH

FAA AC 150/5325-4B, *Runway Length Requirements for Airport Design*, provides guidance to help determine the most appropriate recommended runway lengths for an airport, which is predicated upon the category of aircraft using or forecasted to use the Airport.

A significant factor to consider when analyzing the generalized runway length requirements for an airport is that the actual length necessary for an aircraft operation is a function of airport field elevation, temperature, weather conditions, and aircraft stage length (e.g., non-stop flight distance). As temperatures, density altitude, weather, and aircraft stage length change, the runway length requirements change accordingly. Consequently, if a runway is designed to accommodate 75 percent of the fleet at 60 percent useful load, this does not prevent larger aircraft at certain times and during specific conditions from utilizing the runway. However, the amount of time such operations can safely occur is limited.

Table 4-1 indicates that Runway 09/27 currently meets the runway length requirements for 100 percent of the small GA aircraft fleet (12,500 lbs. or less) and 75 percent of the large aircraft fleet at 60 percent useful load.

Table 4-2 indicates that Runway 14/32 currently meets the runway length requirements for 100 percent of the small GA aircraft fleet (12,500 lbs. or less).

TABLE 4-1
RUNWAY 09/27 LENGTH REQUIREMENTS
STINSON MUNICIPAL AIRPORT

Aircraft Category Small Aircraft: 12,500 pounds or less:	Runway Designation	Current Runway Length	Runway Length Requirement	Deficiency
95% GA Fleet	09/27	5,000	**3,350**	1,650
100 % GA Fleet	09/27	5,000	**3,990**	1,010
100 % GA Fleet with 10 or more passenger seats	09/27	5,000	**4,400**	600
Large Aircraft between 12,500 and 60,000 pounds:				
75% of fleet at 60% useful load	09/27	5,000	**4,975**	25
75% of fleet at 90% useful load	09/27	5,000	**7,525**	-2,525
100% of fleet at 60% useful load	09/27	5,000	**6,145**	-1,145
100% of fleet at 90% useful load	09/27	5,000	**9,925**	-4,925

Source: AC 150/5325-4B, Runway Length Requirements for Airport Design, Figures 2-1, 2-2, 3-1 and 3-2. Generalized length only. Actual lengths should be calculated based on a specific aircraft's operational nomographs. Useful load refers to all usable fuel, passengers, and cargo. Calculations based on 577.6 feet airport elevation, mean maximum daily temperature of 97.5˚F and maximum difference in runway end elevation of 12.5 feet. For Large Aircraft, figures are increased 10 feet for each foot of elevation difference between the high and low points of the runway centerline.

TABLE 4-2
RUNWAY 14/32 LENGTH REQUIREMENTS
STINSON MUNICIPAL AIRPORT

Aircraft Category Small Aircraft: 12,500 pounds or less:	Runway Designation	Current Runway Length	Runway Length	Deficiency
95% GA Fleet	14/32	4,128	**3,350**	778
100 % GA Fleet	14/32	4,128	**3,990**	138
100 % GA Fleet with 10 or more passenger seats	14/32	4,128	**4,400**	-272
Large Aircraft between 12,500 and 60,000 pounds:				
75% of fleet at 60% useful load	14/32	4,128	**5,041**	-913
75% of fleet at 90% useful load	14/32	4,128	**7,591**	-3,463
100% of fleet at 60% useful load	14/32	4,128	**6,211**	-2,083
100% of fleet at 90% useful load	14/32	4,128	**9,991**	-5,863

Source: AC 150/5325-4B, Runway Length Requirements for Airport Design, Figures 2-1, 2-2, 3-1, and 3-2. Generalized length only. Actual lengths should be calculated based on a specific aircraft's operational nomographs. Useful load refers to all usable fuel, passengers, and cargo. Calculations based on 577.6 feet airport elevation, mean maximum daily temperature of 97.5˚F, and maximum difference in runway end elevation of 19.1 feet. For Large Aircraft, figures are increased 10 feet for each foot of elevation difference between the high and low points of the runway centerline.

Based on this analysis, the length of Runway 09/27 is sufficient to accommodate forecasted operations for small aircraft but may not be sufficient to accommodate some large aircraft depending on the weight of the aircraft, weather conditions, and stage length. Consequently, extending Runway 09/27 to 6,000 feet will be a consideration in the alternatives process. This proposed runway extension will provide for future airspace protection if the additional runway length is needed. Runway 14/32 is primarily used by small aircraft and the length of the runway is expected to be sufficient for those aircraft during the forecast horizon.

RUNWAY STRENGTH

FAA AC 150/5320-6G, *Airport Pavement Design and Evaluation*, provides guidance on the structural design of airport pavements. The FAA requires the use of the pavement design program, FAARFIELD, to determine the pavement section that will support various aircraft gear loadings. The design is based on a 20-year life cycle. FAARFIELD analyzes the damage to the pavement done by each aircraft and determines the final pavement thickness/ structure based on the total cumulative damage of all aircraft.

As reported in the 2015 SSF Airport Layout Drawing and the airport's current FAA form 5010, the weight bearing capacity for Runway 09/27 is 30,000 pounds for single-wheel and

75,000 pounds for dual-wheel aircraft and Runway 14/32 is 12,000 pounds for single-wheel and 20,000 pounds for dual-wheel.

Table 4-3 shows some of the larger aircraft that could be expected to operate at SSF during the planning horizon, and their maximum take-off weights (MTOW).

TABLE 4-3
LARGE AIRCRAFT MAXIMUM TAKE-OFF WEIGHTS
STINSON MUNICIPAL AIRPORT

	Beech 200 Super King Air	Bombardier Learjet 35/36	Cessna Citation II/Bravo	Embraer Phenom 300
Gear Type	DW	DW	SW	SW
Maximum Takeoff Weight (MTOW)	12,500	18,000	14,800	17,968

Source: Manufacturers data

Based on this analysis, both runways collectively can accommodate forecasted operations within the planning horizon.

RUNWAY ALIGNMENT

The evaluation of runway alignment is based on crosswind coverage and velocity. FAA Advisory Circular 150/5300-13 (current series), *Airport Design*, states that the allowable crosswind component for a runway with a B-II Runway Design Code (RDC) is 13 knots at 95 percent wind coverage. Runway 09/27 is a B-II runway. The AC also states that the allowable crosswind component for a runway with a B-I (Small) RDC is 10.5 knots at 95 percent wind coverage. Runway 14/32 is a B-I (Small) runway.

Table 4-4 shows the crosswind coverage percentages for Runway 09/27 and 14/32 at SSF. Based on this analysis, both runways currently provide sufficient wind coverage. However, there may be times during the year when crosswinds for Runway 09/27 may be too strong for some small aircraft.

TABLE 4-4
CROSSWIND COVERAGE
STINSON MUNICIPAL AIRPORT

	All Weather Wind Coverage %			IFR Wind Coverage %			VFR Wind Coverage %		
Runway	10.5 Knots	13 Knots	16 Knots	10.5 Knots	13 Knots	16 Knots	10.5 Knots	13 Knots	16 Knots
09/27	91.41%	95.83%	99.25%	96.77%	98.29%	99.60%	90.56%	95.43%	99.20%
14/32	96.66%	98.48%	99.76%	97.76%	98.92%	99.79%	96.48%	98.41%	99.76%
Combined	97.73%	99.29%	99.89%	98.58%	99.56%	99.94%	97.58%	99.25%	99.89%

Source: FAA Airports – GIS Wind Analysis Tool. Stinson Municipal Airport wind data

MAGNETIC DECLINATION

The existing magnetic declination for SSF is 3° 45' E (approximately 3.75° E) with an annual rate of change of 0° 7' W annually according to the National Oceanic and Atmospheric Administration (NOAA) Magnetic Declination Estimated Value Calculator (September 2022).

Based on the established runway end points, the true bearing of Runway 09/27 is 102.5° and 282.5°. Applying the current magnetic declination, the current magnetic headings for Runway 9/27 are 98.75° and 278.75°, respectively. Based on the current magnetic declination and the aforementioned rate of change it is expected that Runway 09/27 will need to be redesignated to Runway 10/28 during the planning horizon. This will be a consideration in the alternatives process. The reason that Runway 09/27 has not previously been identified for redesignation is because the published magnetic variation for the airport as shown in the FAA's Aeronautical Information Services (AIS) system is 3°E based on a 1980 epoch year. Once this information is updated the redesignation of the runway will be triggered.

Based on the runway end points, the true bearing of Runway 14/32 is 145.4° and 325.4°. Applying the current magnetic declination, the current magnetic headings for Runway 14/32 are 141.65° and 321.65°, respectively. Based on the aforementioned rate of change it is not expected that Runway 14/32 will need to be redesignated during the planning horizon.

AIRPORT DESIGN CONSIDERATIONS

Compliance with airport design standards is vitally important because they aid an airport in maintaining a minimum level of operational safety. The major airport design elements are established by FAA AC 150/5300-13 (current series), *Airport Design.* In general, the design of an airport should conform to FAA airport design criteria without requiring modification to standards.

Table 4-5 provides an overview of the FAA design standards for B-II-VIS and B-I(Small)-5000 runways and their application to Runway 09/27 and 14/32, respectively, at SSF.

TABLE 4-5
RUNWAY DESIGN
STINSON MUNICIPAL AIRPORT

Item	FAA Design Standard: B-II	Runway 09/27	FAA Design Standard: B-I-Small	Runway 14/32
Runway Design:				
Width (ft)	75	100	60	100
RSA Width (ft)	150	150	120	120
RSA Length beyond R/W end (ft)	300	300	240	240
OFA Width (ft)	500	500	250	250
OFA Length beyond R/W end (ft)	300	300*	240	240
ROFZ Width (ft)	400	400	250	250
ROFZ Length beyond R/W end (ft)	200	200	200	200
Runway Setbacks -Runway Centerline to:				
Parallel Taxiway Centerline (ft)	240	210	150	185
Holdline (ft)	200	125	125	125
Aircraft Parking Area (ft)	250	300	125	250

*The fence penetrating the ROFA is the subject of a Modification of Standards granted on October 8, 2015.
Source: FAA Advisory Circular 150/5300-13 (current series)

Currently, Taxiway D is located too close to the Runway 09/27 runway centerline (210 feet of separation) and does not meet current design standards. Additionally, due to this substandard separation, the runway hold position markings associated with Runway 09/27 are also located too close to the runway centerline (125 feet of separation instead of the required 200 feet of separation). These deficiencies are discussed in more depth in the corresponding sections. An analysis of the Runway Protection Zones (RPZs) is provided later in this chapter.

Runway 14/32 meets or exceeds all design standards for a B-I (Small) runway.

RUNWAY WIDTH

FAA AC 150/5300-13 (current series), *Airport Design*, delineates the requirements for runway width. At present, Runway 09/27 is 100 feet wide. This width exceeds the minimum runway width recommended for a runway with an RDC of B-II–VIS which is 75 feet. SSF’s critical aircraft is forecasted to remain in the B-II category (e.g., Cessna Citation XLS) throughout the planning period. Runway 14/32 is 100 feet wide. This width exceeds the minimum runway width recommended for a runway with an RDC of B-I (Small)-5000 which is 60 feet. Consequently, the existing runway widths for both runways are anticipated to be sufficient during the planning horizon.

RUNWAY SAFETY AREA

The Runway Safety Area (RSA) is a two-dimensional area surrounding and extending beyond the paved surface of the runway. The RSA is provided to reduce the risk of damage to airplanes in the event of an undershoot, overshoot, or excursion from the runway pavement. In addition, it must be free of objects, except those required for air navigation, and be graded to transverse and longitudinal standards to prevent water accumulation. Objects located in the RSA that are over 3 inches above grade must be constructed, to the extent practical, on frangibly mounted structures with a frangible point no higher than 3 inches above grade. All non-frangible items located in the RSA must have a top elevation that is between flush with the grade and a height of 1-inch above the immediate surrounding grade. Under dry conditions, the RSA must support Aircraft Rescue and Fire Fighting (ARFF) equipment (if applicable), snow removal equipment (if applicable), and the occasional passage of aircraft without causing damage to the aircraft. The airport should own all the property inside the limits of the RSA.

Based on RDC B-II-VIS design standards, the RSA for Runway 09/27 should extend beyond the end of the runway for 300 feet and be 150 feet wide. Based on RDC B-I (Small)-5000 design standards, the RSA for Runway 14/32 should extend beyond the end of the runway 240 feet and be 120 feet wide. RSA deficiencies exist for both runways but have been addressed with declared distances. Runways 9/27 and 14/32 have declared distances.

RUNWAY OBJECT FREE AREA

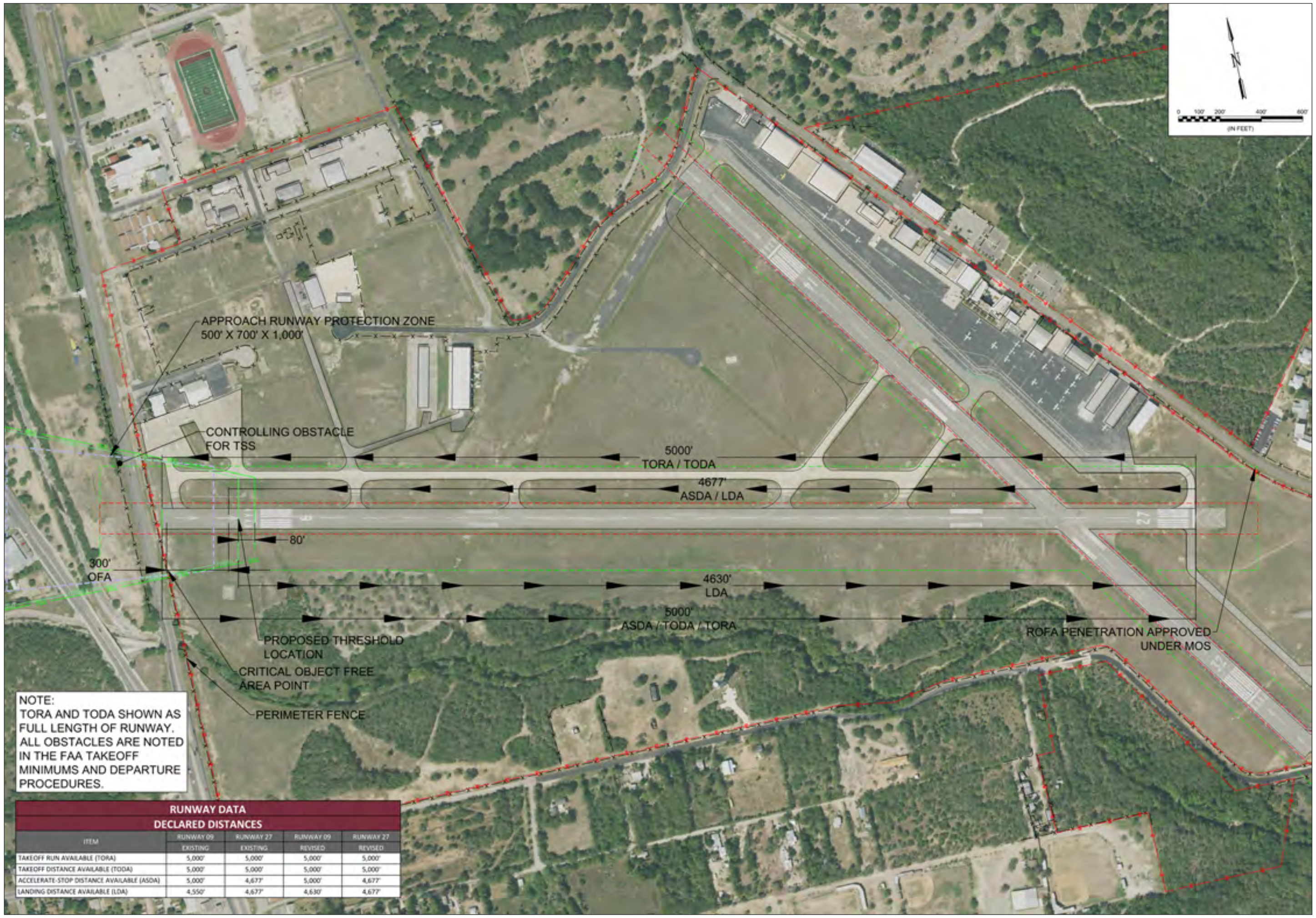
The Runway Object Free Area (ROFA) is a two-dimensional area surrounding runways. It must remain clear of objects except those used for air navigation or aircraft ground maneuvering purposes and requires clearing of above-ground objects protruding higher than the elevation of the RSA at the closest adjacent point. An object is considered any terrain, structure, navigational aid, person, equipment, or parked aircraft. The airport should own all the property inside the limits of the ROFA.

FAA Airport Design criteria for an RDC B-II-VIS runway (e.g., Runway 09/27) require the ROFA to be 500 feet wide and extend 300 feet beyond each runway end. Declared distances are being used to resolve most of the ROFA deficiencies associated with Runway 09/27. However, one deficiency is addressed via a Modification of Standards (MOS) that was reviewed and approved by the FAA on October 8, 2015. The MOS applies to a small perimeter fence line encouragement along Mission Road that penetrates the ROFA.

Runway 14/32 ROFA is required to be 250 feet wide and extend 240 feet beyond each runway end because it is an RDC B-I (Small)-5000 runway. The ROFA extends off airport property and there are trees within the ROFA on each end of the runway. These ROFA deficiencies have been addressed with declared distances.

Figures 4-1 and **4-2** depict these deficiencies and how declared distances have been used to address them. It should be noted that the exhibits depict where the RSAs and ROFAs would be located if declared distances were not utilized. The declared distance tables in the exhibits depict the existing declared distances as shown in the 2015 ALD and proposed revisions to those declared distances that will be further reviewed as part of the alternatives process.

FIGURE 4-1
RUNWAY 09/27 ROFA DEFICIENCY
STINSON MUNICIPAL AIRPORT

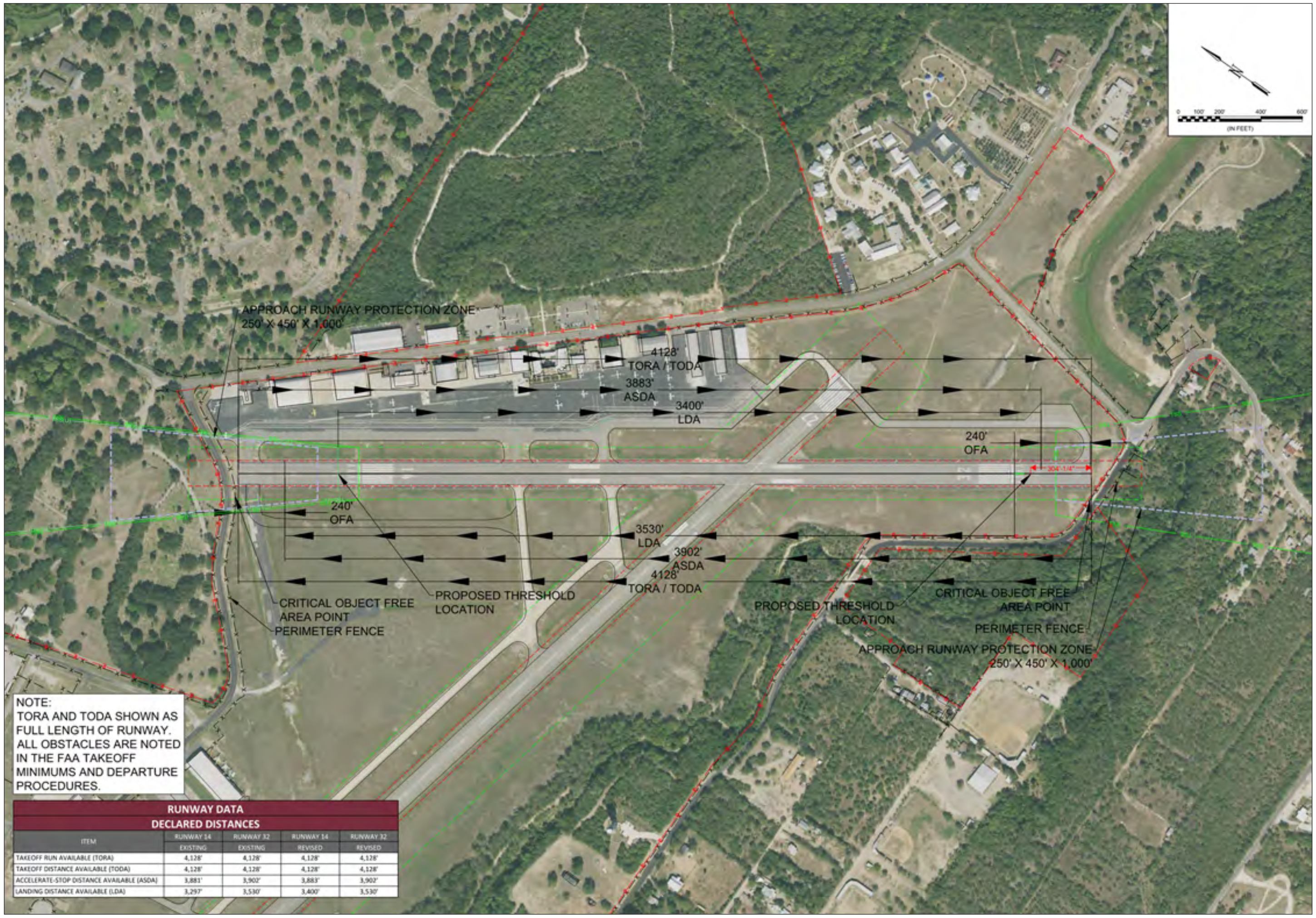


RUNWAY DATA
DECLARED DISTANCES

ITEM	RUNWAY 09 EXISTING	RUNWAY 27 EXISTING	RUNWAY 09 REVISED	RUNWAY 27 REVISED
TAKEOFF RUN AVAILABLE (TORA)	5,000'	5,000'	5,000'	5,000'
TAKEOFF DISTANCE AVAILABLE (TODA)	5,000'	5,000'	5,000'	5,000'
ACCELERATE-STOP DISTANCE AVAILABLE (ASDA)	5,000'	4,677'	5,000'	4,677'
LANDING DISTANCE AVAILABLE (LDA)	4,550'	4,677'	4,630'	4,677'

Source: Garver, 2022

FIGURE 4-2
RUNWAY 14/32 ROFA DEFICIENCY
STINSON MUNICIPAL AIRPORT



RUNWAY DATA
DECLARED DISTANCES

ITEM	RUNWAY 14 EXISTING	RUNWAY 32 EXISTING	RUNWAY 14 REVISED	RUNWAY 32 REVISED
TAKEOFF RUN AVAILABLE (TORA)	4,128'	4,128'	4,128'	4,128'
TAKEOFF DISTANCE AVAILABLE (TODA)	4,128'	4,128'	4,128'	4,128'
ACCELERATE-STOP DISTANCE AVAILABLE (ASDA)	3,881'	3,902'	3,883'	3,902'
LANDING DISTANCE AVAILABLE (LDA)	3,297'	3,530'	3,400'	3,530'

Source: Garver, 2022.

OBSTACLE FREE ZONE

The Obstacle Free Zone (OFZ) is a volume of airspace above and centered along the runway centerline. The OFZ precludes taxiing and parked airplanes and object penetrations except for objects required to be located in the OFZ due to their function. OFZs can have a number of different components including a Runway Obstacle Free Zone (ROFZ), inner-transitional OFZ, inner approach OFZ, and a Precision Obstacle Free Zone (POFZ). However, only the ROFZ is applicable at SSF.

The length of the ROFZ is fixed at 200 feet beyond the associated runway end but the width is dependent upon the size of aircraft using the runway (e.g., small aircraft – less than 12,500 pounds, or large aircraft – greater than 12,500 pounds) and the visibility minimums for the lowest instrument approach to the runway. The ROFZ width for Runway 9/27 is 400 feet wide and the elevation of the OFZ is equal to the closest point along the runway centerline. The ROFZ for Runway 14/32 is 250 feet wide and the elevation of the OFZ is equal to the closest point along the runway centerline. While penetrations to the existing ROFZs for each runway exist, these penetrations have been historically mitigated through the use of declared distances as discussed on the 2015 ALD.

Other than refining the existing declared distances associated with each runway, no improvements to the RSA, ROFA, and ROFZ are needed as long as the RDCs for each runway remain in the existing category and the instrument approach visibility minimums to any runway end are not reduced to less than 1 mile.

RUNWAY HOLD POSITION MARKINGS

The runway hold position markings (or holdlines) denote the entrance to the runway from a taxiway and the location where an aircraft is supposed to stop when approaching the runway. Their location is prescribed by FAA AC 150/5300-13 (current edition), *Airport Design*. They are generally located across the centerline of a given taxiway within 10 feet of an associated hold position sign. According to FAA standards, the holdlines for Runway 9/27 should be located at least 200 feet from the runway centerline. Currently, five holdlines are located approximately 125 feet from runway centerline. This deficiency will be considered as part of the alternatives process.

BUILDING RESTRICTION LINE

According to AC 150/5300-13 (current series), *Airport Design*, the Building Restriction Line (BRL) represents the boundary where it is suitable or unsuitable to develop buildings such as hangars, terminals, or other facilities. The BRL is established based on an airport's 14

CFR Part 77 imaginary surfaces, Runway Protection Zones (RPZs), Obstacle Free Zones (OFZ), Object Free Areas (OFA), runway visibility zones, NAVAID critical areas, and approach surfaces. Based on existing instrument approach procedures, the Runway 09/27 and Runway 14/32 primary surfaces are 500 feet wide and extend 200 feet beyond each runway end. The transitional surfaces slope up at a 7:1 ratio from the primary surface to the horizontal surface which is 150 feet above airport elevation. Based on the activity at the field, instrument approach procedures, and the runway RDCs, a BRL-0 feet are being used for SSF, meaning that the BRL follows the edge of the primary surface laterally from the runway (250 feet from the runway centerline).

RUNWAY CAPACITY

Runway capacity at SSF was reviewed using AC 150/5060-5, *Airport Capacity and Delay*. Capacity is dictated primarily by aircraft weighing more than 12,500 pounds, due to the amount of wake turbulence generated by those aircraft, which in turn requires additional separation between aircraft departing and landing at the Airport. Based on the mix of aircraft weighing more than 12,500 pounds that have operated at SSF over the past three years, as recorded in TFMSC data, and the airport's crossing runway configuration, the estimated capacity of SSF per AC 150/5060-5 is provided below:

- 98 operations per hour capacity in VFR conditions
- 59 operations per hour capacity in IFR conditions
- 230,000 operations per year is the annual service volume

As a result of these findings, no capacity concerns were identified.

RUNWAY LINE-OF-SIGHT

To ensure the safety of aircraft operations at an airport it is imperative that proper lines of sight exist along a single runway and amongst intersecting runways. These lines of sight facilitate coordination amongst aircraft and vehicles operating on a runway by allowing them to identify the position of other aircraft or vehicles operating on the same runway or on an intersecting runway.

On a single runway, an acceptable runway profile permits any two points, generally each runway end, five feet above the runway centerline, to be mutually visible for the entire runway length. If the runway offers a full-length parallel taxiway, an unobstructed line of sight should exist from any point five feet above the runway centerline to any other point five feet above the runway centerline for one-half the runway length. There are no single runway line-of-sight issues at SSF.

On intersecting runways, an acceptable runway profile permits visibility between established points on each intersecting runway so aircraft operators and vehicle operators can see other aircraft or vehicles operating on the intersecting runway. Runways 09/27 and 14/32 intersect near the approach ends of Runways 27 and 32. There is an intersecting runway line of sight issue on the south side of the Runway Visibility Zone (RVZ). A small area of trees and brush penetrate the RVZ at SSF. This issue can be resolved through tree clearing. **Figure 4-3** depicts the RVZ for SSF.

FIGURE 4-3
RUNWAY VISIBILITY ZONE
STINSON MUNICIPAL AIRPORT

Source: Garver, 2022

RUNWAY PROTECTION ZONE

The purpose of a Runway Protection Zone (RPZ) is to enhance the protection of people and property on the ground and to prevent developments that are incompatible with aircraft operations. The FAA recommends that airports own the entire RPZ in "fee simple" title and that the RPZ be clear of any non-aeronautical structure or object that would interfere with the arrival and departure of aircraft. However, if "fee simple" interest is unachievable, the next option is controlling the height of objects through an avigation easement and keeping the area clear of any facilities that would support an incompatible activity (e.g., places of public assembly, etc.).

The RPZ is a two-dimensional trapezoidal area that normally begins 200 feet beyond the paved runway end and extends along the runway centerline. When it begins somewhere other than 200 feet from a runway end, there is a need for two RPZs, an approach RPZ and a departure RPZ. The approach RPZ begins 200 feet from the runway landing threshold. A departure RPZ begins 200 feet beyond the end of the runway pavement or 200 feet from the end of the Takeoff Runway Available (TORA), if established.

An FAA Interim Guidance Letter (IGL) (Sept 2012) addressed acceptable property uses within an RPZ. The IGL was released to specify and emphasize existing use standards and indicates that if any of the following parameters are met then the RPZ ownership must be reevaluated:

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

Land uses within an RPZ that require specific and direct coordination with the FAA include:

- Buildings and structures
- Recreational land uses
- Transportation facilities
- Rail facilities
- Public roads/highways
- Vehicular parking facilities
- Fuel storage facilities
- Hazardous material storage
- Wastewater treatment facilities
- Above-ground utility infrastructure

RPZ dimensions are determined by the type/size of aircraft expected to operate at an airport and the type of approach, existing or planned, for each runway end (visual, precision, or non-precision). The recommended visibility minimums for the runway ends are determined with respect to published instrument approach procedures, the ultimate runway RDC, airfield design standards, instrument meteorological conditions, wind conditions, and physical constraints (approach slope clearance) along the extended runway centerline beyond the runway end. **Table 4-6**, *Runway Protection Zone Dimensions*, delineates the RPZ requirements for SSF.

TABLE 4-6
RUNWAY PROTECTION ZONE DIMENSIONS
STINSON MUNICIPAL AIRPORT

Runway End	Approach Visibility Minimums	Facilities Expected to Serve (AAC - ADG)	Length (ft)	Inner Width (ft)	Outer Width (ft)	Acres
Runway 09	Visual	B-II	1,000	500	700	13.770
Runway 27	Visual	B-II	1,000	500	700	13.770
Runway 14	Visual	B-I-Small	1,000	250	450	8.035
Runway 32	Not Lower Than 1 Mile	B-I-Small	1,000	250	450	8.035

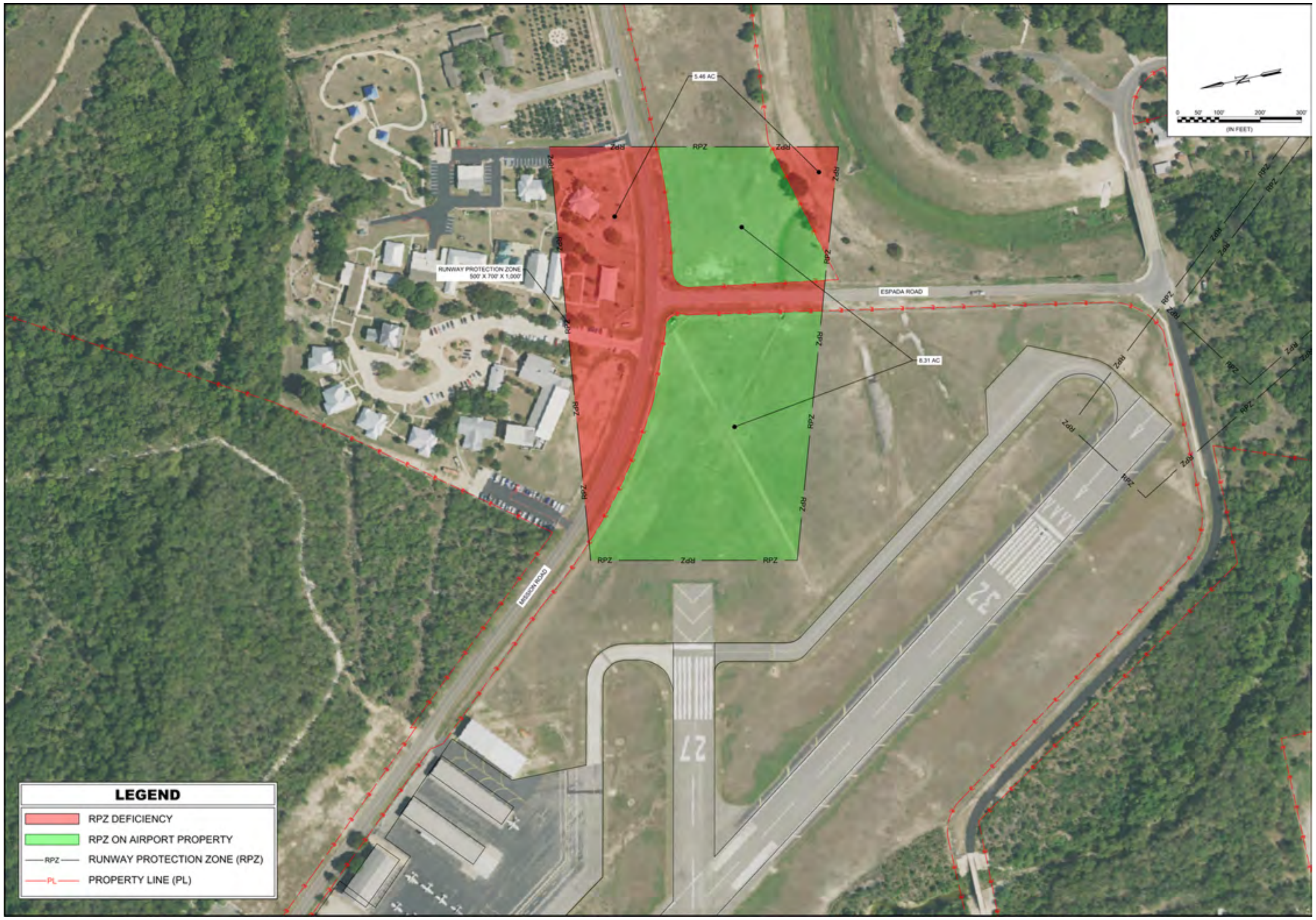
Source: FAA Advisory Circular 150/5300-13 (current series).

All four RPZs at SSF extend beyond the current airport property limits. At Runway 9 approach end, the RPZ extends across Roosevelt Avenue and South Flores Street and also encroaches on both a commercial business and a residential neighborhood (shown in **Figure 4-4**). At the Runway 27 approach end, the RPZ extends over a small portion of the land owned by Mission Road Ministries which contains a few buildings (shown in **Figure 4-5**). At the Runway 14 approach end, the RPZ extends over a cemetery and roadway (shown in **Figure 4-6**). At the Runway 32 approach end, the RPZ extends over a residential area (shown in **Figure 4-7**). This will be a consideration during the alternatives process.

FIGURE 4-4
RUNWAY 9 RPZ
STINSON MUNICIPAL AIRPORT

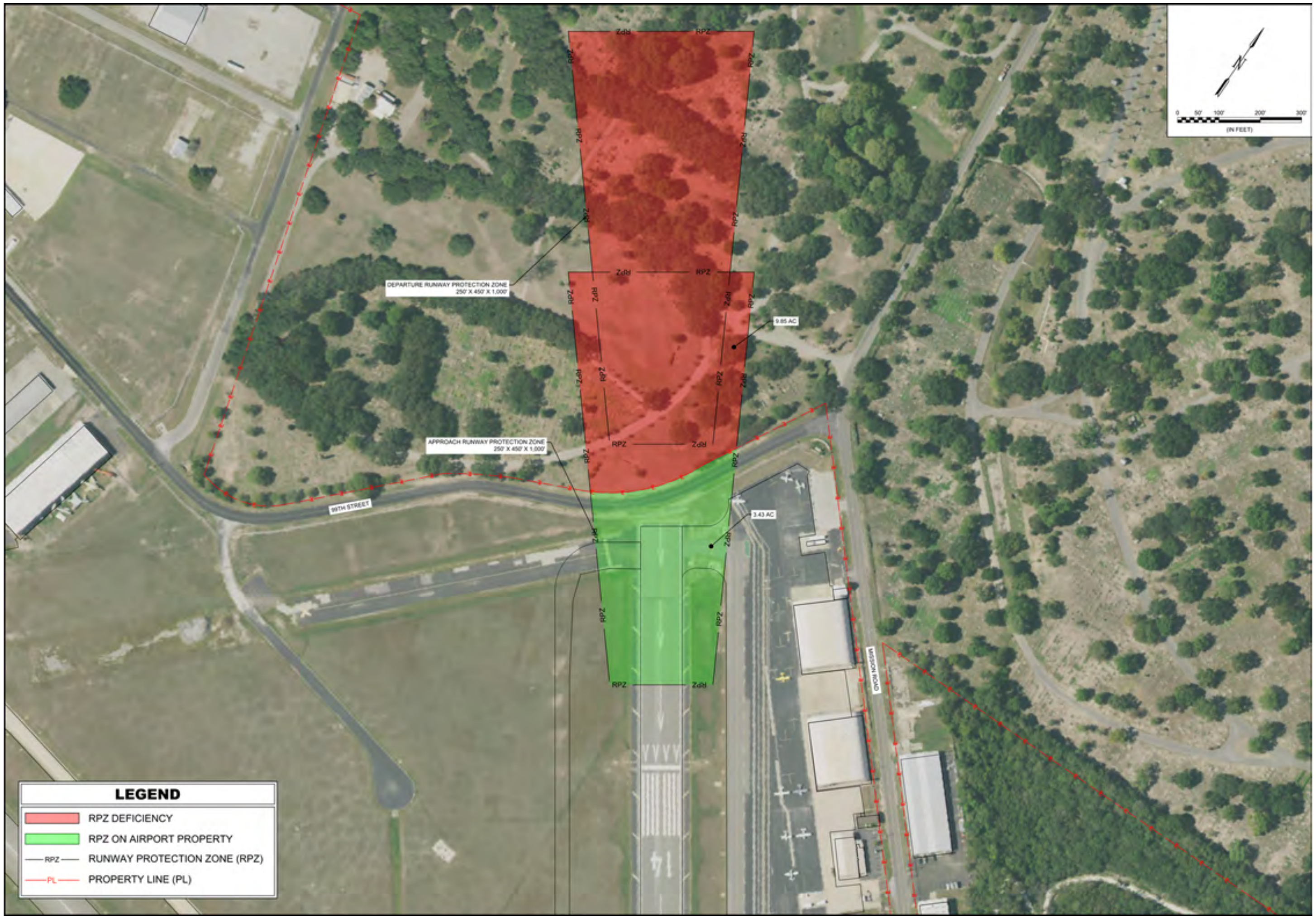
Source: Garver, 2022

TABLE 4-5
RUNWAY 27 RPZ
STINSON MUNICIPAL AIRPORT



Source: Garver, 2022

FIGURE 4-6
RUNWAY 14 RPZ
STINSON MUNICIPAL AIRPORT



Source: Garver, 2022

FIGURE 4-7
RUNWAY 32 RPZ
STINSON MUNICIPAL AIRPORT

Source: Garver, 2022

TAXIWAYS

Taxiways serve a critical function as they are the primary surface that aircraft utilize to transition to/from aircraft parking facilities (ramps, hangars, etc.) to runways. Taxiways properly laid out can provide for safe and efficient movement of aircraft to/from the runway. By contrast, poorly laid-out taxiways can increase the risk of an unintentional pavement excursion for a taxiing aircraft and cause congestion on the airfield.

TAXIWAY PAVEMENT DESIGN

Taxiway design is complex because it is largely based on landing gear configurations which vary widely between different aircraft types. The FAA has classified the numerous variations of aircraft landing gear configurations into various Taxiway Design Groups (TDG) that now guide taxiway pavement design. Generally, all taxiways at SSF follow TDG-2A design standards, and forecasted aeronautical activity is expected to remain primarily in this category. **Table 4-7** depicts the operational statistics of some common TDG-2A aircraft that have frequently operated at SSF over the last five-year period.

TABLE 4-7
TDG-2A AIRCRAFT OPERATIONS
STINSON MUNICIPAL AIRPORT

Aircraft	# of OPS (Jan 2017 - Dec 2021)
Beech 200 Super King (BE20)	572
Beech Super King Air 350 (BE350)	116
Raytheon 300 Super King Air (BE30)	42
Cessna Citation CJ3 (C25B)	42

Source: FAA TFMSC database, 2022

Based on forecasted activity at SSF during the planning horizon, TDG-2A is expected to be sufficient for operations at SSF.

All taxiways at SSF except Taxiway E (currently under construction) were designed and constructed prior to the establishment of the FAA's TDG based taxiway pavement design standards that were implemented in 2014. As a result, many of the existing taxiway fillets (e.g., pavement layout where taxiways curve) do not meet FAA design standards. These fillets should be expanded as taxiways at SSF are reconstructed. This will be a consideration in the alternatives process.

TAXIWAY DESIGN STANDARDS BASED ON AIRPLANE DESIGN GROUP (ADG)

While taxiway pavement design is based on an aircraft's TDG, Taxiway Safety Areas (TSA), Taxiway Object Free Areas (TOFAs), and taxiway separation standards are based on the Airplane Design Group (ADG) for a given taxiway. Unlike a taxiway's TDG, a taxiway's ADG is based on an aircraft's wingspan and tail height and not its landing gear configuration. All the taxiways at SSF currently fall into the ADG II category and are expected to remain in that category during the forecast period. **Table 4-8** provides an overview of the ADG requirements applicable to SSF and the dimensions that currently exist.

TABLE 4-8
TAXIWAY STANDARDS BASED ON AIRPLANE DESIGN GROUP
STINSON MUNICIPAL AIRPORT

Taxiway	Applicable Taxiway ADG	TSA (feet)			TOFA (feet)		
		Current	FAA Standard	Standard Met (Y/N)	Current	FAA Standard	Standard Met (Y/N)
A	II	79	79	Y	124	124	Y
B	II	79	79	Y	124	124	Y
C	II	79	79	Y	124	124	Y
D	II	79	79	Y	124	124	Y
D1	II	79	79	Y	124	124	Y
D2	II	79	79	Y	124	124	Y
E	II	79	79	Y	124	124	Y

Source: Garver, 2022

All taxiways at SSF meet current ADG based taxiway design standards.

TAXIWAY CONFIGURATION ISSUES

Based on research, the FAA has identified taxiway layout/configuration issues that have been shown to cause pilot confusion which can lead to safety issues such as runway incursions. As part of this Airport Layout Plan, an analysis was completed to review the existing taxiway system at SSF to identify any taxiway layout/configuration issues that need to be considered as part of the alternatives process. SSF has one apron-to-runway direct access taxiway at the approach end of Runway 9 (shown in **Figure 4-8**).

FIGURE 4-8
TAXIWAY CONFIGURATION DEFICIENCY
STINSON MUNICIPAL AIRPORT

Source: Garver, 2022

AIRFIELD LIGHTING AND MARKING REQUIREMENTS

Sufficient airfield marking, lighting, and signage are essential to maintaining a high level of safety in an airport's daily operation. Airport lighting is used to help maximize the utility of the Airport during the day, night, and adverse weather conditions. This section identifies facility requirements related to airfield markings and lighting at SSF.

RUNWAY LIGHTING/PAVEMENT MARKING

Currently, both runways are equipped with Medium Intensity Runway Lights (MIRL). The Air Traffic Control Tower has control of the lighting during their hours of operation, and they are set to medium intensity when the tower is closed. SSF has MIRLs for Runway 14/32 (last replaced in 2014) that are LED while 9/27 is incandescent (last replaced in 2009). The airport would like to upgrade the MIRLs system on Runway 9/27 to LED fixtures.

Runway pavement markings should follow the requirements prescribed in AC 150/5340-1 (current series), *Standards for Airport Markings*. All ends of the runways have non-precision instrument markings. These markings are not expected to need to be changed during the forecast horizon.

TAXIWAY LIGHTING/PAVEMENT MARKING

Effective taxiway lighting is imperative to maintain the safety of aircraft operations at night and during periods of poor visibility. All taxiways at SSF currently have edge lighting. MITLs are installed on all taxiways and are a mixture of LED and incandescent fixtures. The Airport plans to upgrade the existing incandescent taxiway lighting fixtures to LED.

All paved taxiways should be painted with standard taxiway markings as prescribed in FAA Advisory Circular 150/5340-1 (current series), *Standards for Airport Markings*. All taxiways at SSF have standard taxiway centerline markings. No significant changes are expected to be needed during the planning horizon.

APPROACH LIGHTING SYSTEM

An approach lighting system (ALS) provides the basic means to transition from instrument flight to visual flight for landing. Operational requirements dictate the sophistication and configuration of the ALS for a particular runway. Depending on the type of approach, certain ALS are required to aid pilots in the identification of the airport environment during instrument meteorological conditions. ALS are a configuration of signal lights starting at the landing threshold and extending into the approach area for a distance of 2,400-3,000 feet for precision instrument runways and 1,400-1,500 feet for non-precision instrument runways. Some systems include sequenced flashing lights that appear to the pilot as a ball of light traveling towards the runway at high speed.

There are no approach lighting systems currently installed at SSF. Future considerations for a new ALS will be predicated on user needs, instrument approach minimum requirements, and the restrictions of surrounding property and land use. Based on the aeronautical activity forecast and analysis of historical weather conditions at SSF, it is not expected that an ALS will be needed.

RUNWAY END IDENTIFIER LIGHTS

Runway End Identifier Lights (REILs) provide rapid and positive identification of the runway approach end. REILs consist of a pair of synchronized (directional) flashing white strobes located laterally along the runway threshold. They are typically installed along with threshold lights at each runway end. REILs are not commonly needed unless an airport is situated within an area of heavy light pollution or adjacent to areas that would deem them necessary at specific times such as a lighted ball field, lighted rodeo grounds, etc. REILs can also be used in undeveloped areas to help pilots find and identify the runway. REIL systems are currently located at all four runway ends at SSF.

AIRPORT SIGNS

Airport sign systems provide pilots with a visual indication of runway and taxiway location, direction, and mandatory instructions that are essential to the safe and efficient operation of aircraft. The signage at SSF is in the process of being replaced and upgraded to LED on a rotating basis.

WINDSOCK/AIRPORT BEACON

SSF has a single windsock located in the grass area bordered by Taxiways B, C, D, and Runway 14/32. Additional windsocks are not expected to be needed.

SSF's beacon is located on top of the old ATCT facility that is on top of the terminal building. The Stinson ATCT manager stated that pilots have complained that the beacon can be difficult to see when approaching from the west. The beacon was last replaced in 1985 and the Airport plans to replace the light with a new LED fixture to reduce maintenance costs. A towered mast for the beacon may be needed to improve its visibility to pilots.

NAVAIDS

Airport Navigation Aids (NAVAIDs) are installed on or near an airport to increase the Airport's reliability during the night and inclement weather conditions and to provide electronic guidance and visual references for executing an approach to the Airport or runway.

FAA Order 7031.2C, *Airport Planning Standard Number One - Terminal Air Navigation Facilities and Air Traffic Control Services*, specifies minimum activity levels to qualify for instrument approach equipment and approach procedures. As forecasted in the previous chapter, approximately 5,553 instrument approaches will be conducted annually under IFR flight rules by the end of the 20-year planning period. The following sections describe the status of existing and new NAVAIDs used at general aviation airports.

VISUAL GUIDANCE SLOPE INDICATORS

Typically, Visual Guidance Slope Indicators (VGSI) provide a system of sequenced colored light beams providing continuous visual descent guidance information along the desired final approach descent path. The system normally consists of two Precision Approach Path Indicator lamp housings (PAPI-2) or four (PAPI-4) lamp housing units installed 600 to 800 feet from the runway threshold and offset 50 feet to the left of the runway edge. Both Runway 09/27 and Runway 14/32 are equipped with a 4-light PAPI system on each runway end and the systems are in good condition. The Airport would like to upgrade the PAPI systems to LED fixtures.

VERY HIGH FREQUENCY OMNI-DIRECTIONAL RADIO RANGE

A Very High Frequency Omni-Directional Radio Range (VOR/VORTAC) system emits a very high-frequency radio signal that can be utilized for both enroute navigation and non-precision approaches. It provides an instrument-rated pilot with 360 degrees of azimuth information oriented to magnetic north. Due to the recent development of more precise navigational systems, these systems are planned to be phased out by the FAA. SSF is served by the Stinson VOR, located 4.9 nautical miles south of SSF. The VOR is used for the VOR approach to SSF. Additional VOR/VORTAC equipment is not expected to be needed in the area.

GLOBAL POSITIONING SYSTEM

The Global Positioning System (GPS) is a highly accurate worldwide satellite navigational system that provides point-to-point navigation by encoding transmissions from multiple satellites and ground-based data-link stations using an airborne receiver. GPS is presently FAA-certified for enroute and instrument approaches into numerous airports.

The Wide Area Augmentation System (WAAS) is being installed at or near airports to provide a signal correction enabling GPS precision approaches (commonly called GPS approaches with LPV minimums). An RNAV/GPS approach to Runway 32 currently exists at SSF.

INSTRUMENT LANDING SYSTEM

An instrument landing system (ILS) provides precision instrument approaches for an airport at which they are installed. The system consists of several components that are installed adjacent to the runway. Precision instrument approaches are approaches where a pilot is provided with both vertical and horizontal guidance and the visibility minimums for the approach are below ¾ mile. Based on the current and anticipated needs of the aircraft based at SSF and other aircraft utilizing the Airport, an ILS is not expected to be needed during the planning period.

WEATHER OBSERVING SYSTEM

Automated Weather Observation Systems (AWOS) and Automated Surface Observation Systems (ASOS) consist of various types of sensors, a processor, a computer-generated voice subsystem, and a transmitter to broadcast minute-by-minute weather data from a fixed location directly to pilots. The information is transmitted over the voice portion of a local NAVAID (VOR or DME) or a discrete VHF radio frequency.

AWOS/ASOS are important for airports with instrument procedures in order to relay accurate and invaluable weather information to pilots. At airports with instrument procedures, an AWOS/ASOS weather report eliminates the remote altimeter setting penalty, thereby permitting lower minimum descent altitudes (lower approach minimums). These systems should be sited within 500 to 1,000 feet of the primary runway centerline. FAA Order 6560.20C, *Siting Criteria for Automated Weather Observing Systems*, assists in the site planning for AWOS/ASOS systems.

SSF is equipped with an ASOS that meets all the parameters of FAA Order 6560.20C. The ASOS information can be obtained from the ATIS frequency of 128.8 MHZ or by calling 210-927-9391. The Airport reported that the National Weather Service owns the ASOS. A secondary weather station was installed when the new ATCT was built. This secondary station is maintained by the Airport.

INSTRUMENT APPROACH PROCEDURES

An analysis was conducted to determine the average number of days in a year where weather conditions were at or below the existing Instrument Approach Procedure (IAP) minimums. This analysis was conducted by reviewing the historic weather data at SSF captured by the Automated Surface Observing System (ASOS) located on the field. This data was obtained from the National Oceanic and Atmospheric Administration’s (NOAA) National Centers for Environmental Information (NCEI) website.

It was found that weather conditions were lower than 500 feet Above Ground Level (AGL), the existing IAP minimum, but greater than 300 feet AGL and the visibility was at ¾ mile for approximately 2.58 percent of the year. This equates to 226 hours or 9.42 days a year.

Currently, both IAPs for SSF utilize Runway 32. ATCT has stated that this creates an issue for aircraft departing Runway 14 because they must wait for aircraft landing Runway 32 if the aircraft is within 10 miles of the Airport. Numerous stakeholder interviews conducted as part of this ALP process also indicated that additional IAPs are needed to provide adequate access to the Airport. As a result, a new IAP is needed for SSF. This will be a consideration moving forward.

EMERGING TECHNOLOGIES

The aviation industry is currently experiencing the emergence of new technologies (e.g., electric aircraft, vertical takeoff and landing vehicles, etc.) that have the potential to impact airport infrastructure. While many of the specific infrastructure requirements related to these emerging technologies are not finalized, it is important that airports take steps as part of their planning efforts to identify and protect landholdings to potentially support these operations. Consequently, as part of the alternatives analysis, consideration should be given to where vertiports should be located at Stinson.

AIRSPACE

SSF is currently served by an Air Traffic Control Tower (ATCT). The current airspace surrounding SSF is classified as Class D airspace when the ATCT is open and becomes a Class E airspace when the tower is closed. That is not expected to change during the 20-year planning horizon.

The 14 CFR Part 77 Imaginary Surfaces for the Airport are defined below:

- Runway 09/27
  - Primary Surface – 500 feet wide x 200 feet past each runway end
  - Approach Surface – 20:1 slope for both runway ends for 5,000 feet
- Runway 14/32
  - Primary Surface – 500 feet wide x 200 feet past each runway end
  - Approach Surface – 20:1 slope for both runway ends for 5,000 feet
- Non-Runway Specific Surfaces
  - Horizontal Surface – Flat surface established at an elevation 727.6 feet (150 feet above field elevation). The perimeter is based on 5,000 feet arcs from each end of Runway 14/32 and Runway 9/27.
  - Conical Surface – Extends from the edges of the Horizontal surface for a horizontal distance of 4,000 feet at a 20:1 slope.
  - Transitional Surface – Extends from the edges of the primary surface at a 7:1 slope until it reaches the horizontal surface and from the edges of the approach surfaces at a 7:1 slope until it reaches the horizontal surface or for a horizontal distance of 5,000 feet.

These surfaces are depicted in the Airspace Drawing that is included as part of the Airport Layout Plan.

AIRFIELD/AIRSPACE FACILITY REQUIREMENTS SUMMARY

Based on the airfield and airspace facility requirements analysis, the following development objectives have been established for the SSF alternatives development process.

- Plan for an ultimate runway extension to 6,000 feet to better accommodate business aircraft
- Redesignation Runway 09/27 to 10/28
- Relocate runway hold lines for Runway 09/27 to 200 feet from the runway centerline
- Address Runway 09/27 centerline to taxiway separation (240 feet)
- Refine declared distances for existing runway
- Gain sufficient control of unowned RPZ property
- Address the Runway Visibility Zone discrepancy
- Improve taxiway fillets to current TDG standards when taxiways are rehabilitated
- Address the direct apron-to-runway access at the approach end of Runway 9
- Upgrade all MIRLs to LEDs
- Upgrade all MITLs to LEDs
- Upgrade airfield beacon to an LED and consider placing it on a mast to improve visibility
- Upgrade the PAPI systems to LEDs
- Establish a new Instrument Approach Procedure to a runway end other than Runway 32
- Identify potential vertiport locations

TERMINAL/LANDSIDE FACILITIES

Terminal area and landside area facilities play an important role in enabling the transition of pilots, passengers, and goods to and from the airside facilities at the airport. Terminal and landside area facilities include FBO/terminal building facilities, hangars, apron space, vehicle parking areas, and roadway access.

Key terminal/landside area facility requirements are developed in consideration of the following general planning concepts:

- Future terminal area development for general aviation airports serving utility and larger-than-utility aircraft should typically be centralized to minimize development costs;
- Future developments should be grouped based on the size of the aircraft expected to use the development to minimize wasted space;
- Planned development should allow for the incremental linear expansion of facilities and services in a modular fashion along an established flightline so development can easily scale to demand;
- Major design considerations involve minimizing earthwork/grading, avoiding flood-prone areas, and integrating existing paved areas to reduce pavement (taxilane) costs;
- Future terminal expansion should allow sufficient maneuverability and accessibility for appropriate types (mix) of general aviation aircraft; and,
- Future terminal area development should enhance safety, visibility, and be aesthetically pleasing.

These general planning concepts are integrated into this terminal and landside facilities analysis.

TERMINAL BUILDING REQUIREMENTS

The terminal building serves both a functional and social capacity central to the operation, promotion, and visible identity of an airport.

The current GA terminal building, operated by the City of San Antonio, is approximately 30,241 square feet. The terminal has a flight planning area, multiple conference rooms, space for a restaurant, an event center, several tenants, airport management offices, and restrooms. An estimate of building/space needs based on forecasted demand is outlined in **Table 4-9**.

TABLE 4-9
TERMINAL BUILDING SPACE/NEED
STINSON MUNICIPAL AIRPORT

Facility	2021	PAL 1	PAL 2	PAL 3	PAL 4	PAL 5
Formula Factors						
- Peak Hour Operations	45	51	55	58	62	66
- % of Aircraft Using FBO Terminal Facilities	30%	30%	30%	30%	30%	30%
- Peak Hour Multiplier	3	3	3	3	3	3
- Sq. Ft. Per Person	150	150	150	150	150	150
FBO Leased Space	2,122	2,122	2,122	2,122	2,122	2,122
Leased Space Less FBO Leased Space	8,875	8,875	10,206	11,538	12,869	14,200
Office Space	1,000	1,000	1,000	1,000	1,000	1,000
Total Terminal Sq. Ft. Requirement	18,072	18,882	20,753	22,490	24,361	26,232
Current Terminal Sq. Ft.	30,241	30,241	30,241	30,241	30,241	30,241
Surplus/Deficiency (Sq. Ft.)	**12,169**	**11,359**	**9,488**	**7,752**	**5,880**	**4,009**

Source: ACRP Guidebook for GA Facility Planning and Garver, 2022.

Additional terminal space is not expected to be needed during the planning horizon.

AIRCRAFT STORAGE

Establishing requirements for future hangar space is a critical component of terminal/landside facility planning. In general, future hangar areas should achieve a balance between maintaining an unobstructed expansion area, minimizing pavement development, and allowing convenient airside and landside access.

To evaluate future hangar space requirements, generalized parking area needs must be established for different types of aircraft. For this analysis it was assumed that:

- A single-engine piston aircraft demands approximately 1,250 square feet of parking space;
- A twin-engine propeller aircraft requires approximately 3,000 square feet of parking space;
- A business turboprop/jet aircraft requires approximately 3,000 to 5,000 square feet of parking space; and,
- A helicopter requires approximately 1,500 square feet.

General hangar planning considerations incorporated in this analysis include the following:

- Construction of aircraft hangars should be beyond an established building restriction line (BRL) surrounding the runway and taxiway areas, the runway OFZ, runway, and taxiway OFAs, and remain clear of the FAR Part 77 Surfaces and Threshold Siting Surfaces.
- Maintaining the minimum recommended clearance between T-hangars of 79 feet for one-way traffic and 143 feet for two-way traffic. Taxilanes supporting T-hangars should be no less than 25 feet wide. Individual paved approaches to each hangar stall are typically less costly, but not preferred to paving the entire T-hangar access/ramp area.
- Box hangar areas should provide for ADG II clearances and should generally be constructed to TDG-2A pavement design standards.
- Segregate hangar development based on the hangar type and function. From a planning standpoint, hangars should be centralized in terms of auto access, and located along the established flight line to minimize costs associated with access, drainage, utilities, and auto parking expansion.

Today, SSF has box and T-hangar storage totaling 207,462 square feet. Currently, the hangars are at capacity and a waiting list exists. There are currently 88 based aircraft. Based on the forecast for based aircraft, it is presumed that hangar space at SSF will need to grow as described in **Table 4-10** to accommodate future demand. A blend of T-hangar and box hangar space is expected to be needed.

TABLE 4-10
AIRCRAFT HANGAR STORAGE DEMAND
STINSON MUNICIPAL AIRPORT

Facility	2021	PAL 1	PAL 2	PAL 3	PAL 4	PAL 5
Based Aircraft - Single Engine Piston	73	73	80	87	91	96
% of Based SE Aircraft Utilizing Hangar Space	55%	55%	60%	60%	65%	65%
Total Based SE Aircraft Placed in Hangar	40	40	48	52	59	62
Estimated Hangar Space per Aircraft	1,250	1,250	1,250	1,250	1,250	1,250
Total Hangar Space Required (sq. ft.)	50,188	50,188	60,000	65,250	73,938	78,000
Based Aircraft - Multi-Engine/Turboprop	8	8	8	9	9	10
% of Based ME/TP Aircraft Utilizing Hangar Space	80%	80%	80%	80%	80%	80%
Total Based ME/TP Aircraft Placed in Hangar	6	6	6	7	7	8
Estimated Hangar Space per Aircraft	3,000	3,000	3,000	3,000	3,000	3,000
Total Hangar Space Required (sq. ft.)	19,200	19,200	19,200	21,600	21,600	24,000
Based Aircraft - Turbo-Jet	0	0	1	3	5	6
% of Based Jet Aircraft Utilizing Hangar Space	100%	100%	100%	100%	100%	100%
Total Based Jet Aircraft Placed in Hangar	0	0	1	3	5	6
Estimated Hangar Space per Aircraft	3,500	3,500	3,500	3,500	3,500	3,500
Total Hangar Space Required (sq. ft.)	0	0	3,500	10,500	17,500	21,000
Based Aircraft - Helicopters	7	7	7	8	9	9
Estimated Hangar Space per Aircraft	1,500	1,500	1,500	1,500	1,500	1,500
Total Hangar Space Required (sq. ft.)	10,500	10,500	10,500	12,000	13,500	13,500
Annual Itinerant Aircraft Operations	32,198	32,694	34,678	40,082	46,085	52,732
Maintenance/Transient Hangar Area Demand (ft^2)	80,495	81,735	86,695	100,205	115,213	131,830
Current Unmet Demand (e.g. Hangar Wait List)	33,750	33,750	28,125	22,500	16,875	11,250
Total Based Aircraft	88	88	96	107	114	121
Total Hangar Space Required (sq. ft.)	194,133	195,373	208,020	232,055	258,625	279,580
Hangar Space Lost to Exclusive Use/Office Space (estimated at 20%) (sq. ft.)	38,827	39,075	41,604	46,411	51,725	55,916
Hangar Space Required + Space Lost to Exclusive Use/Office Space (sq. ft.)	232,959	234,447	249,624	278,466	310,350	335,496
Current Total Hangar Space (sq. ft.)	207,462	207,462	207,462	207,462	207,462	207,462
Surplus/Deficiency (sq. ft.)	**-25,497**	**-26,985**	**-42,162**	**-71,004**	**-102,888**	**-128,034**

Source: Garver, 2022

AUTO PARKING, CIRCULATION, AND ACCESS REQUIREMENTS

TERMINAL PARKING

General aviation terminals are unique facilities with regard to parking requirements because they are used by a number of aeronautical and non-aeronautical users and for a variety of purposes. Consequently, a calculation on the number of required parking spaces was completed using the best practices established in Airport Cooperative Research Program's (ACRP) *Guidebook for General Aviation Facility Planning*. Under the best practices established in that document, a total of 3 spaces should be allocated for each peak hour aircraft operation and an additional 1 space for every 1,000 square feet of hangar space. The Airport also allows for long-term parking of several vehicles, which is accounted for in the analysis. **Table 4-11** shows the number of required parking spots utilizing this methodology.

TABLE 4-11
PARKING SPACE NUMBER REQUIREMENTS BASED ON ACRP GUIDEBOOK FOR GA FACILITY PLANNING
STINSON MUNICIPAL AIRPORT

Facility	2021	PAL 1	PAL 2	PAL 3	PAL 4	PAL 5
FBO Terminal Parking						
- Peak Hour Operations	45	51	55	58	62	66
- % of Aircraft Using FBO Terminal Facilities	30%	30%	30%	30%	30%	30%
- Peak Hour Multiplier	3	3	3	3	3	3
Parking Space Need for Passenger/Pilot	41	46	50	52	56	59
Hangar Space Parking						
- Hangar Space Requirement	194,133	195,373	208,020	232,055	258,625	279,580
- Parking Alottment Based on Hangar Space (1 space per 1,000 sf)	194	195	208	232	259	280
- Reduction for Parking Inside Hangar	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%
Total Parking Needed for Hangar Space	49	49	52	58	65	70
Tie-Down Space Parking						
- Tie-Down Space Requirements	34	34	34	37	34	36
- % of A/C in Use at One-Time	15%	15%	15%	15%	15%	15%
Total Parking Needed for Tie-Down Space	5	5	5	5	5	5
Total # of Spaces Currently	181	181	181	181	181	181
Total Number of Parking Spaces Needed	**94**	**100**	**107**	**116**	**126**	**135**
Total Deficiency/Surplus	**87**	**81**	**74**	**65**	**55**	**46**

Source: Garver, 2022

As mentioned in the Inventory Chapter, there is an 11-space parking lot immediately adjacent to the terminal building and two parking lots east of Mission Road that contain 170 parking spots total. Based on this analysis, additional vehicle parking is not expected to be needed during the planning horizon. However, additional vehicle parking will likely be needed in locations where additional hangars are developed.

VEHICLE ACCESS

Current vehicle access to SSF is provided via Mission Road. The Airport access road is constructed of asphalt and is in good condition. An additional airport access road off Roosevelt Avenue has been considered to improve access to the northwest development area. This proposed improvement will be a consideration in the alternatives process.

The signage surrounding the Airport is generally sufficient. Additional upgrades to the road, including additional lighting and sidewalks, are currently under construction.

AIRCRAFT APRON

COMPOSITION, LAYOUT, AND CONDITION

Aircraft apron areas are provided for aircraft maneuvering and parking. Typically, aprons utilized for aircraft parking have a blend of based aircraft utilizing the apron as a permanent parking location and itinerant aircraft that are using the apron as a temporary parking location. Currently, the apron at SSF is used for a combination of tenant and itinerant aircraft parking. There are 67 designated tie-downs on the ramp, twelve of which are common-use tie-down spaces located in front of the GA terminal building. The apron is mostly considered to be in good condition and constructed of mostly asphalt with a few concrete areas. The last PCI study for the Airport is discussed in the Inventory Chapter. The amount of apron space is currently sufficient to meet the needs of the existing airport users. However, forecasted growth in operations indicates that additional apron space will be needed during the planning horizon. Consequently, apron space requirements based on the calculations found later in this section will be a consideration in the Alternatives Chapter.

APRON SPACE REQUIREMENTS

Since the apron at SSF is used for a combination of tenant and itinerant aircraft parking, the calculations regarding the need for future ramp space consider both current and future based aircraft demand as well as the space needed to park itinerant aircraft and the space needed for general aircraft movement.

To begin the analysis, a weighted average for the number of square feet of pavement needed to park an aircraft was calculated. Additionally, for these calculations considerations were made for the fleet mix at SSF, the movement of the aircraft into and out of the parking area, and the movement of other aircraft around the parked aircraft.

Required clearances on all sides of the aircraft were also taken into consideration. **Table 4-12** provides a weighted average apron space requirement per aircraft.

TABLE 4-12
AIRCRAFT APRON SPACE – WEIGHTED AVERAGE CALCULATION
STINSON MUNICIPAL AIRPORT

ADG	Average Length (ft)	Average Wingspan (ft)	Additional Clearance (ft)	TOFA Clearance (ft)	Average Parking Area Required (ft^2)	Fleet Mix	Weighted Average Parking Area (ft^2)
I	26	35	7.50	79	6,000	98.58%	5,915
II	55	60	9.00	110	14,274	1.26%	180
III	100	100	11.00	158	34,160	0.01%	3
Helicopter	35	30	12.00	0	3,186	0.15%	5
					Weighted Average:		**6,103**

Source: Garver, 2022
Note: These calculations take into account the TOFA required for another aircraft to pass by the parked aircraft. The average parking area required was calculated by multiplying the average aircraft length plus 2 times the additional clearance margin by the average aircraft wingspan plus 2 times the additional clearance margin and then adding that number to the TOFA plus the aircraft's average wingspan plus 2 times the additional clearance margin.

Based on these calculations and the SSF peaking characteristics described in the Forecast Chapter, **Table 4-13** shows the estimated amount of apron space that will be required at SSF during the forecast period.

TABLE 4-13
AIRCRAFT PARKING SPACE REQUIRED CALCULATION
STINSON MUNICIPAL AIRPORT

Year	Peak Hour Operations	Forecasted % of Itinerant Operations Parking on Apron	Estimated Percentage of Itinerant Ops on Apron at Same Time	Permanemt Tie-Down Aircraft	Weighted Average Aircraft Parking Area (ft^2)	Estimated Parking Apron Required	Aircraft Circulation Factor	Total Apron Area Required (ft^2)	Current Apron Area (ft^2)	Surplus/ Deficiency Based on Current Apron Size
2021	45	75%	25%	35	6,103	110,993	443,971	554,964	560,000	**5,036**
PAL 1	51	75%	25%	35	6,103	117,858	471,434	589,292	560,000	**-29,292**
PAL 2	55	75%	25%	34	6,153	121,251	485,005	606,256	560,000	**-46,256**
PAL 3	58	75%	25%	37	6,203	130,356	521,424	651,780	560,000	**-91,780**
PAL 4	62	75%	25%	34	6,253	130,489	521,957	652,447	560,000	**-92,447**
PAL 5	66	75%	25%	36	6,303	139,198	556,791	695,989	560,000	**-135,989**

Source: Garver, 2022
Note: An assumption was made that no more than 75 percent of the total number of estimated itinerant operations during the peak hour would be on the ramp at the same time. The estimated parking apron required was calculated by multiplying the peak hour by the forecasted percent of itinerant operations, then multiplying that result by the estimated percentage of itinerant OPS on the apron at the same time, and then multiplying that result by the weighted average aircraft parking area. It was also assumed that a total of 36 tie-down spaces would be occupied by long-term leases by PAL 5. A factor of 4 was added to the apron space calculation to account for general aircraft circulation and movement and taxilanes on the apron.

These calculations show that the apron will likely need to be expanded in the near, mid, and long-term portions of the forecast period, particularly as more hangars are developed. This will be a consideration in the alternatives process.

FUEL STORAGE REQUIREMENTS

Fuel storage requirements are based on the forecast of annual operations, aircraft utilization, average fuel consumption rates, and the forecasted mix of aircraft anticipated at SSF. Market conditions will determine the ultimate need for fuel tanks and their size. The following guidelines should be implemented when planning future airport fuel facilities:

- Aircraft fueling facilities should remain open continually (24-hour access), remain visible and be within close proximity to the terminal building or FBO to enhance security and convenience;
- Fuel storage capacity should be sufficient for average peak-hour month activity;
- Fueling systems should permit adequate wing-tip clearance to other structures, designated aircraft parking areas (tie-downs), maneuvering areas, and OFAs associated with taxilane and taxiway centerlines;
- Fuel facilities should be located beyond the RSA and BRL;
- All fuel storage tanks should be equipped with monitors to meet current state and federal environmental regulations, and be sited in accordance with local fire codes;
- Have a dedicated fuel truck for Jet-A delivery to minimize the liability associated with towing and maneuvering expensive aircraft up to and in the vicinity of fueling facilities; and,
- Maintain adequate truck transport access to the fuel storage tanks for fuel delivery.

As reported in the Inventory Chapter, SSF is equipped with two 12,000-gallon above-ground fuel storage tanks for 100LL and Jet-A. Self-service fueling is continuously available and full-service fueling is available during FBO business hours. The facility is in good condition according to the FBO. Based on forecasted demand, the fuel farm capacity is expected to be sufficient during the planning period. If additional development occurs on the other side of the airfield, an additional fuel farm will likely be needed. Additionally, the existing and new fuel farms will likely need to be able to accommodate unleaded fuel.

AIRPORT TERMINAL/LANDSIDE AREA FACILITY REQUIREMENTS SUMMARY

Based on the terminal/landside area requirements analysis, the following development objectives have been established for the SSF alternatives development process.

- Additional box and T-hangar space will be needed
- Improve access to the northwestern development area via the Roosevelt Access Parkway
- Additional apron space will be needed and will likely grow with hangar development
- Additional apron space is needed to support itinerant aircraft
- Additional fuel farm for hangar development west of Runway 14/32. Existing and ultimate fuel farms will need to be able to support unleaded fuel.

FACILITY REQUIREMENTS – SUMMARY

Based on the analysis completed in this chapter, the primary development objectives for the Alternatives Chapter are the items defined below:

- Airside
    - Plan for an ultimate runway extension to 6,000 feet to better accommodate business aircraft
    - Redesignation Runway 09/27 to 10/28
    - Relocate runway hold lines for Runway 09/27 to 200 feet from the runway centerline
    - Address Runway 09/27 centerline to taxiway separation (240 feet)
    - Refine declared distances for existing runway
    - Gain sufficient control of unowned RPZ property
    - Address the Runway Visibility Zone discrepancy
    - Improve taxiway fillets to current TDG standards when taxiways are rehabilitated
    - Address the direct apron-to-runway access at the approach end of Runway 9
    - Upgrade all MIRLs to LEDs
    - Upgrade all MITLs to LEDs
    - Upgrade airfield beacon to an LED and consider placing it on a mast to improve visibility
    - Upgrade the PAPI systems to LEDs

  - Establish a new Instrument Approach Procedure to a runway end other than Runway 32
  - Identify potential vertiport locations
- Terminal/Landside
  - Additional box and T-hangar space will be needed
  - Improve access to the northwestern development area via the Roosevelt Access Parkway
  - Additional apron space will be needed and will likely grow with hangar development
  - Additional apron space is needed to support itinerant aircraft
  - Additional fuel farm for hangar development west of Runway 14/32. Existing and ultimate fuel farms will need to be able to support unleaded fuel.

Alternatives Analysis

5

Chapter 5: Alternatives Analysis

Introduction

This chapter describes the various airside and terminal/landside area development alternatives that were created based on the needs defined in the Facility Requirements Chapter. This chapter also discusses the evaluation process used to select the preferred development alternative for each area (e.g., airside and terminal/landside), reviews the results of the evaluation process, and provides an overview of the anticipated environmental impacts of the preferred development alternative.

Alternatives Development Process

The various alternatives described in this chapter were created by reviewing the facility requirements defined in Chapter 4 and devising numerous development options that could potentially satisfy those requirements. Those development options were then consolidated into two airside and four terminal/landside development alternatives that went through the formal evaluation process described herein to select the preferred alternative for each area.

Airside facilities are those that are used for supporting the active movement and circulation of aircraft on the airfield which includes the runways, taxiways, and approach facilities/equipment. Terminal/landside area facilities include the terminal building/FBO facilities, fuel storage/delivery systems, aircraft parking aprons, aircraft hangars, and automobile access and parking.

Evaluation Overview

As part of the formal evaluation process, the impact each alternative had in the following areas was considered:

- Ability to Satisfy Established Facility Requirements
- Environmental Impacts
- Development Cost/Ease of Implementation
- Limits Ultimate Development Potential (Airside Alternatives only)
- Residential and/or Business Impacts (Airside Alternatives only)
- Road Relocation, Power Line, and Utility Impacts (Airside Alternatives only)

- Geographical Constraints (Airside Alternatives only)
- Protects for Emerging Aviation Trends (Terminal/Landside Alternatives only)
- Provides Additional T-Hangar Facilities (Terminal/Landside Alternatives only)
- Provides for Large Scale Aeronautical Businesses (Terminal/Landside Alternatives only)
- Congruence with Preferred Airside Alternative (Terminal/Landside Alternatives only)

These evaluation criteria will be discussed in-depth later in this chapter as well as their application to each alternative.

Since all airport functions relate to and revolve around the runway/taxiway system, airside development alternatives are evaluated before terminal/landside development alternatives. When terminal/landside development alternatives are evaluated, their compatibility with the preferred airside development alternative is also considered.

AIRSIDE ALTERNATIVES

The existing Airport Reference Code (ARC) for Stinson Municipal Airport (SSF) is B-II, and the critical aircraft for SSF is expected to remain in that category for the duration of the planning horizon. Several components of the existing airside facilities will likely need to be improved based on the facility requirements analysis. These improvements were used to create development objectives for SSF for the 20-year planning horizon. Each of the established airside development objectives are discussed below:

- Plan for an ultimate runway extension to 6,000 feet (Runway 9/27) to better accommodate business aircraft
- Redesignation of Runway 09/27 to 10/28
- Relocate runway hold lines for Runway 09/27 to 200 feet from the runway centerline
- Address Runway 09/27 to Taxiway Delta centerline separation (240 feet)
- Refine declared distances for existing runway
- Gain sufficient control of unowned Runway Protection Zone (RPZ) property
- Address the Runway Visibility Zone discrepancy with tree trimming
- Improve taxiway fillets to current TDG standards when taxiways are rehabilitated
- Address the direct apron-to-runway access at the approach end of Runway 9
- Upgrade all medium intensity runway lights (MIRLs) to LEDs
- Upgrade all medium intensity taxiway lights (MITLs) to LEDs

- Upgrade airfield beacon to an LED and consider placing it on a mast to improve visibility
- Upgrade the precision approach path indicator (PAPI) systems to LEDs
- Establish a new Instrument Approach Procedure to a runway end other than Runway 32
- Identify potential vertiport locations (to be discussed in Terminal/Landside section)

With these development objectives identified, the following alternatives were developed:

- **Airside Alternative #1**

  Airside Alternative #1 is a status quo alternative that focuses primarily on resolving FAA design standard deficiencies. Taxiway Delta would be relocated to provide 240 feet of separation from the Runway 9/27 centerline as required per current FAA design standards. A new instrument approach procedure to Runway 27 would be developed, and the property encompassing the Runway 32 runway protection zones would be acquired.
  - Runway
    - Runway 32 RPZ property acquisition
    - Instrument approach procedure developed for Runway 27
    - Runway 9/27 redesignated to Runway 10/28
    - Relocate all Taxiway D hold position markings for Runway 9/27 to 200 feet from runway centerline (with relocation of Taxiway D)
    - Upgrade all MIRLs to LEDs
    - Upgrade the PAPI systems to LEDs
    - Remove vegetation south of the runway intersection to resolve Runway Visibility Zone discrepancy
  - Taxiway
    - Relocate Taxiway Delta to 240 feet from Runway 9/27
    - Eliminate Runway 9 approach end (Taxiway D) and Taxiway D2 direct access to Runway 9/27 (D2 change addressed in terminal/landside alternatives)
    - Upgrade taxiway fillets to TDG-2A standards as taxiways are rehabilitated
    - Upgrade all MITLs to LEDs

- Upgrade airfield beacon to LED
- Relocate ASOS to accommodate new terminal area development (to be discussed in Terminal/Landside section)

Airside Alternative #1 is shown in **Figure 5-1**.

- **Airside Alternative #2**

  Airside Alternative #2 includes all projects discussed in Alternative #1, as well as a 1,000-foot extension for Runway 9/27. As a result of the runway extension, the property encompassing both Runway 9 and Runway 27 RPZs would be acquired.
  - Runway
    - Extend Runway 9/27 by 1,000 feet
    - Runway 9, 27 and 32 RPZ property acquisition
    - Remove Runway 9 displaced threshold
    - Instrument approach procedure developed for Runway 27
    - Runway 9/27 redesignated to Runway 10/28
    - Relocate all Taxiway D hold position markings for Runway 9/27 to 200 feet from runway centerline (with relocation of Taxiway D)
    - Upgrade all MIRLs to LEDs
    - Upgrade the PAPI systems to LEDs
    - Remove vegetation south of the runway intersection to resolve Runway Visibility Zone discrepancy
  - Taxiway
    - Relocate Taxiway Delta to 240 feet from Runway 9/27
    - Eliminate Runway 9 approach end (Taxiway D) and Taxiway D2 direct access to Runway 9/27 (D2 change addressed in terminal/landside alternatives)
    - Upgrade taxiway fillets to TDG-2A standards as taxiways are rehabilitated.
    - Upgrade all MITLs to LEDs
  - Upgrade airfield beacon to LED
  - Relocate ASOS to accommodate new terminal area development (to be discussed in Terminal/Landside section)

Airside Alternative #2 is shown in **Figure 5-2**.

FIGURE 5-1
AIRSIDE ALTERNATIVE #1
STINSON MUNICIPAL AIRPORT

Source: Garver, 2023

FIGURE 5-2
AIRSIDE ALTERNATIVE #2
STINSON MUNICIPAL AIRPORT

Source: Garver, 2023

Runway 27 Instrument Approach Procedure Development

As part of the scope of this ALP project, specific focus was given to studying the feasibility of developing an additional instrument approach procedure (IAP) for SSF to a runway end other than Runway 32, which already has a 1-mile RNAV/GPS approach. When considering wind coverage and other FAA design criteria, it was determined that Runway 27 is the most viable runway for which to develop an IAP due to area airspace restrictions associated with Runway 14 and Runway 9. An airspace management committee was formed as part of the IAP development process to facilitate stakeholder input and evaluate the feasibility of the approach.

Airside Alternatives Evaluation

One of the tasks of an ALP with Narrative Report Update is to analyze the airside alternatives to determine which alternative provides a realistic and feasible plan that will allow the Airport to meet future demand in a safe and efficient manner while also protecting for future growth beyond the 20-year planning horizon. To facilitate this analysis, evaluation criteria were established, and an evaluation matrix was developed showing how each airside alternative compared based on the evaluation criteria. The evaluation criteria used for this analysis are discussed below.

The following evaluation criteria are rated on a High (red), Moderate (yellow), or Low (green) level of impact scale:

- Ability to Satisfy Established Facility Requirements – Does the alternative meet the facility requirements established based on the forecast of future aeronautical activity? Ideally, the preferred alternative should enable the Airport to meet all established facility requirements.
- Environmental Impacts – How will the proposed airside alternative impact the environment and how might these impacts influence the feasibility of future development? Environmental factors that should be evaluated for impacts include farmland, wetlands, floodplains, soil, wildlife, noise, and cultural environmental factors as well as any other factors applicable to the Airport. Ideally, the preferred alternative should minimize environmental impacts to the greatest extent practical while still meeting the Airport's future development needs.
- Residential and/or Business Impacts – Will the proposed airside alternative have any known impacts on residential or business areas? Will it require their relocation? Ideally, the preferred alternative should minimize the impact to existing residences or

businesses to the greatest extent practical while still meeting the Airport's future development needs.

- Road Relocation, Power Line, and Utility Impacts – Will any roadways, power lines, or other utilities be impacted by the alternative? Ideally, the preferred alternative should minimize the impact to existing roadways, power lines, and utilities to the greatest extent practical while still meeting the Airport's future development needs.
- Geographical Constraints – Are there property or topographical challenges that are constraints for this alternative? Property lines, topographical features and bodies of water are key considerations and impacts to them should ideally be minimized.
- Development Cost/Ease of Implementation – What is the significance of the development cost associated with the alternative and how challenging will it be to implement? Anticipated cost, funding eligibility, and funding availability are considerations. Ideally, the preferred alternative should limit development costs to the extent practical.
- Limits Ultimate Development Potential – Does implementation of this alternative create barriers to future development during or after the 20-year planning horizon? Ideally, the preferred alternative should not create a condition that will limit opportunities for future development.

AIRSIDE EVALUATION RESULTS

Based on the evaluation criteria, the following matrix was developed showing the proposed rating of each alternative. Green indicates a "low" impact. Yellow indicates a "moderate" impact. Red indicates a "high" impact.

TABLE 5-1
AIRSIDE EVALUATION
STINSON MUNICIPAL AIRPORT

Evaluation Criteria	Airside Development Alternative # 1	2
Ability to Satisfy Facility Requirements		
Environmental Impacts		
Residential and/or Business Impacts		
Road Relocation, Power Line, and Utility Impacts		
Geographical Constraints		
Development Cost/Ease of Implementation		
Limits Ultimate Development Potential		

- Low Impact **or** Meets Requirements

- Moderate Impact **or** Fails to Meet Some Requirements

- High Impact **or** Fails to Meet Most Requirements

Source: Garver, 2023

EVALUATION COMMENTARY FOR ALTERNATIVE #1

Alternative #1 primarily preserves existing conditions and as a result would have minimal environmental, residential/business, and road/utility impacts. These criteria all received "green" ratings. This alternative also has a relatively low implementation cost, as the number of projects required to fulfill this alternative are limited in number and scope, and accordingly this criterion also received a "green" rating. Conversely, this alternative does not fully satisfy facility requirements because it does not provide for a runway extension or provide for control of all runway protection zones. Consequently, this alternative received a "yellow" rating related to its ability to meet established facility requirements. This alternative is also impacted by geographical constraints where RPZs extend beyond airport property and declared distances must be maintained to meet FAA design standards. Consequently, this alternative received a "yellow" rating in this area. As a result of the considerations discussed here, this alternative limits ultimate development potential for the Airport resulting in a "yellow" rating in this area.

EVALUATION COMMENTARY FOR ALTERNATIVE #2

The extension of the runway as depicted in this alternative would encroach on existing commercial and residential developments to the east of the existing runway and require the realignment of several roads. As a result, this alternative received "red" ratings for residential and/or business impacts and road relocation, power line, and utility impact. Some environmental impact is also anticipated due to the runway extension as well as acquisition of property within the RPZs at both ends of Runway 9/27, resulting in a "yellow" rating. Similar to Alternative #1, geographical constraints received a "yellow" rating because although this alternative does provide for additional land acquisition, geographical constraints of the surrounding area, including numerous adjacent properties, will be a consideration in the implementation of this alternative. Consideration of the factors discussed here also resulted in a "yellow" rating for development cost and ease of implementation.

This alternative satisfies the identified facility requirements, and also is not likely to limit ultimate development potential because of the additional infrastructure that this alternative provides to support future growth. As a result, both of these criteria received a "green" rating.

PREFERRED AIRSIDE DEVELOPMENT ALTERNATIVE

While results of the airside alternative evaluation analysis showed that Alternative #1 has a better overall rating, Alternative #2 has been selected as the preferred alternative because of the criteria in which it received the best ratings. Selecting this alternative maintains the same runway extension shown in the previous airport layout plan and is prudent for future planning purposes and airspace protection.

TERMINAL/LANDSIDE DEVELOPMENT CONCEPTS

With the framework of the Airport's ultimate airside development plan identified, concepts involving the placement of terminal/landside facilities were prepared and analyzed. The overall objective of terminal/landside development is to identify and illustrate the highest and best use of existing land holdings and surrounding land for new development or redevelopment.

The primary objectives that were considered during the development of the terminal/landside alternatives were:

- Additional box and T-hangar space will be needed
- Improve access to the northwestern development area via the Roosevelt Access Parkway
- Additional apron space will be needed and will likely grow with hangar development
- Additional apron space is needed to support itinerant aircraft
- Additional fuel farm for hangar development west of Runway 14/32. Existing and ultimate fuel farms will need to be able to support unleaded fuel.
- Reserve space to support vertiport operations

These items were identified and discussed in-depth in the Facility Requirements Chapter.

The following terminal/landside alternatives were developed:

- **Terminal/Landside Alternative #1**
  - 2 nested 10 bay T-hangars
    - Apron providing ADG I clearances
  - 18 – 60 feet x 60 feet box hangars
  - 1 – 80 feet x 50 feet hangar
  - 9 – 80 feet x 80 feet box hangars
  - 15 – 100 feet x 100 feet box hangars
  - 1 – 210 feet x 120 feet hangar
  - 2 vertiport locations
  - Removal of Taxiway D2 direct access to Runway 9/27 with new parallel taxilanes
  - Relocate ASOS
  - New FBO building
  - New fuel farm
  - Additional vehicle parking

- Enact Roosevelt Access Parkway
- Provide for temporary blimp mooring location

Terminal/Landside Alternative #1 is shown in **Figure 5-3**.

- **Terminal/Landside Alternative #2**
  - 1 nested 10 bay T-hangar
  - 10 – 50 feet x 50 feet box hangars
    - Apron providing ADG I clearances
  - 1 – 80 feet x 50 feet hangar
  - 18 – 80 feet x 80 feet box hangars
  - 16 – 100 feet x 100 feet box hangars
  - 4 – 150 feet x 100 feet hangars
  - 1 vertiport location
  - Removal of Taxiway D2 direct access to Runway 9/27 with new parallel taxilanes
  - Relocate ASOS
  - New FBO building with fuel farm
  - New self-service fuel farm
  - Additional vehicle parking
  - Enact Roosevelt Access Parkway
  - Provide for temporary blimp mooring location

Terminal/Landside Alternative #2 is shown in **Figure 5-4.**

- **Terminal/Landside Alternative #3**
  - 2 nested 10 bay T-hangars
    - Apron providing ADG I clearances
  - 1 – 80 feet x 50 feet hangar
  - 8 – 80 feet x 80 feet box hangars
  - 15 – 100 feet x 100 feet box hangars
  - 7 – 150 feet x 100 feet hangars
  - 2 – 250 feet x 210 feet hangars
  - 3 vertiport locations
  - Removal of Taxiway D2 direct access to Runway 9/27 with new parallel taxilanes
  - Relocate ASOS
  - New FBO building and fuel farm

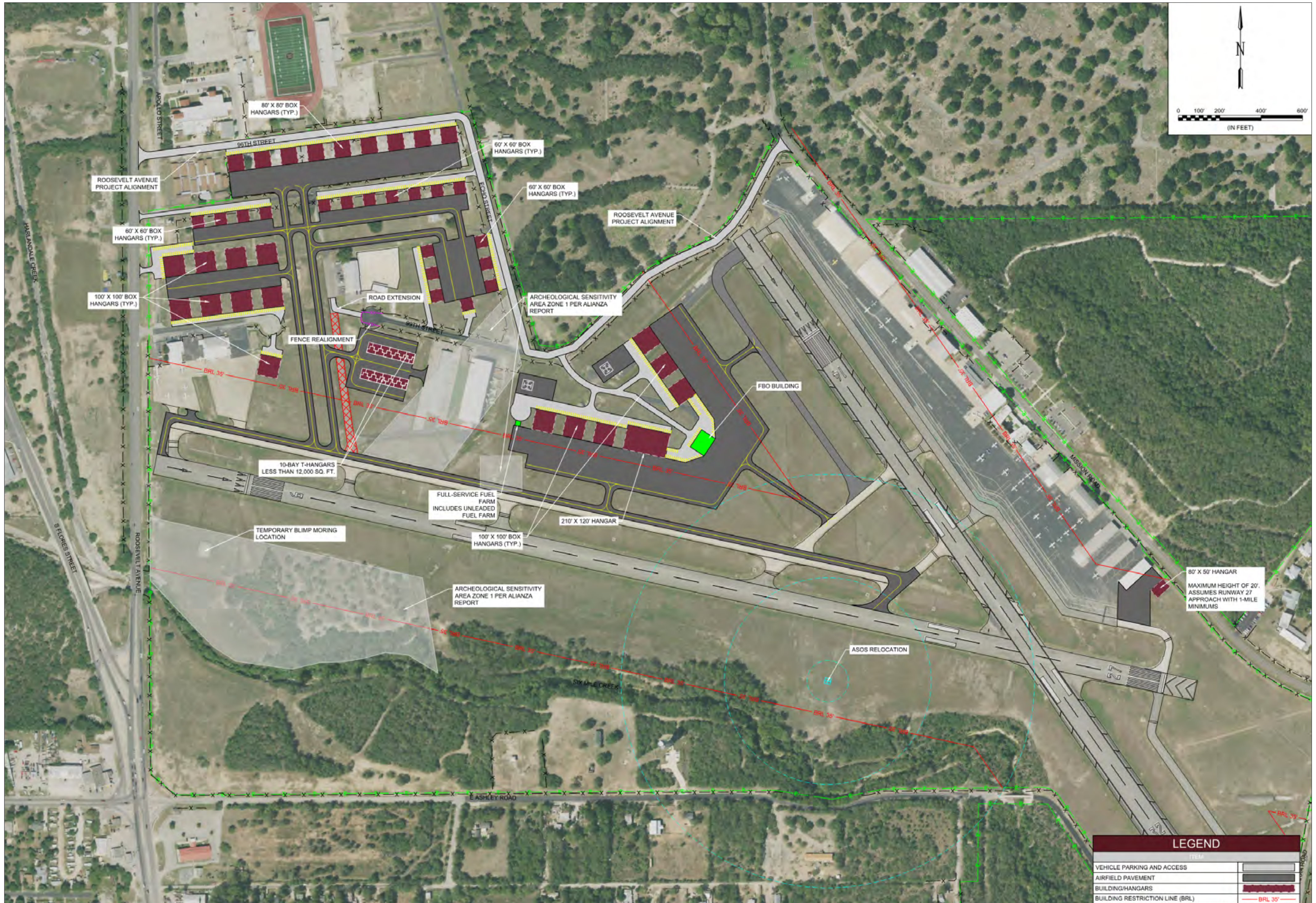
- New self-service fuel farm
- Additional vehicle parking
- Enact Roosevelt Access Parkway
- Provide for temporary blimp mooring location

Terminal/Landside Alternative #3 is shown in **Figure 5-5**.

- **Terminal/Landside Alternative #4**
  - 2 nested 10 bay T-hangars
    - Apron providing ADG I clearances
  - 1 – 80 feet x 50 feet hangar
  - 8 – 80 feet x 80 feet box hangars
  - 22 – 100 feet x 100 feet box hangars
  - 2 – 250 feet x 210 feet hangars
  - 3 vertiport locations
  - Removal of Taxiway D2 direct access to Runway 9/27 with new parallel taxilanes
  - Relocate ASOS
  - New FBO building
  - New fuel farm
  - Additional vehicle parking
  - Enact Roosevelt Access Parkway
  - Provide for temporary blimp mooring location

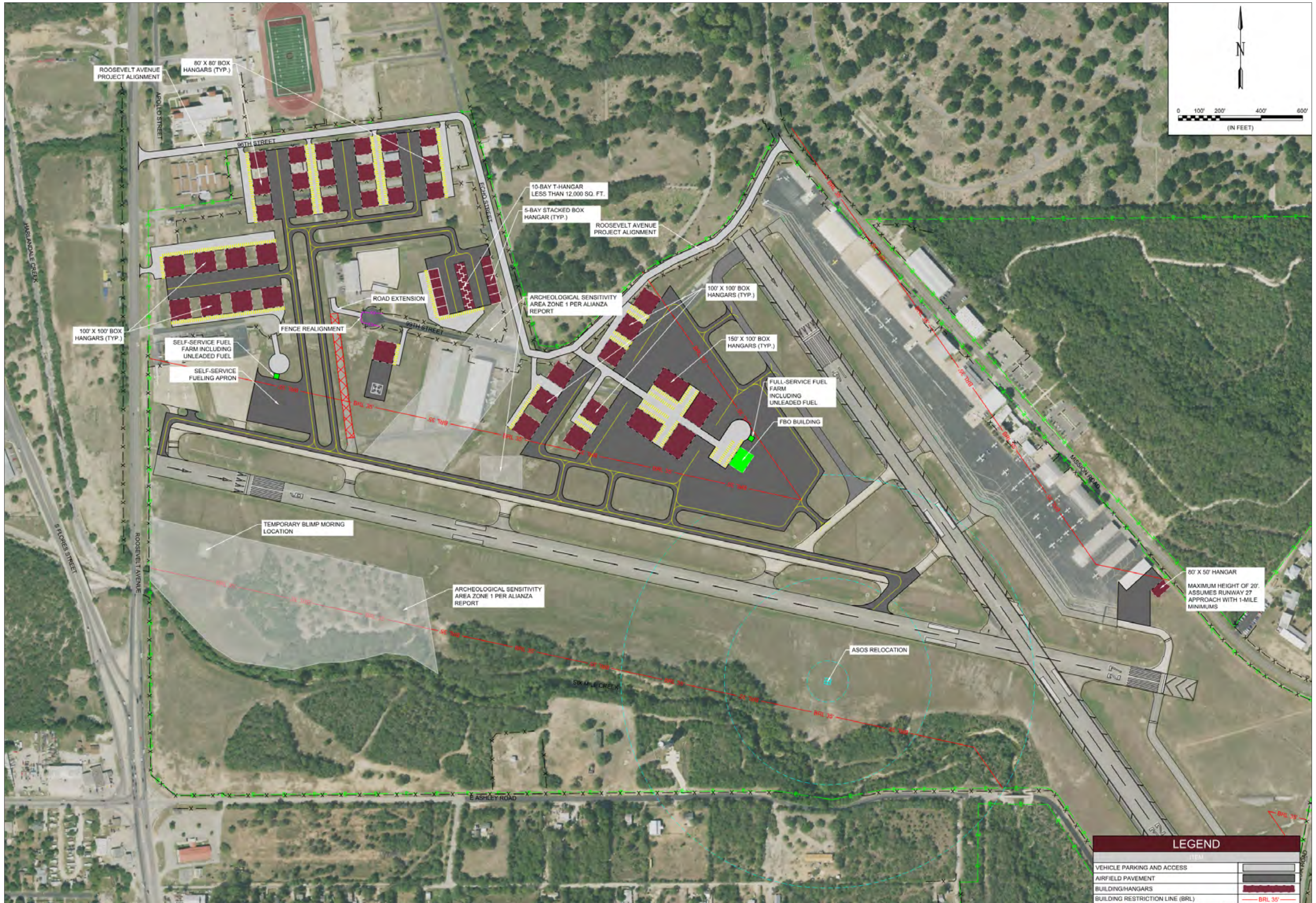
Terminal/Landside Alternative #4 is shown in **Figure 5-6**.

FIGURE 5-3
TERMINAL/LANDSIDE ALTERNATIVE #1
STINSON MUNICIPAL AIRPORT



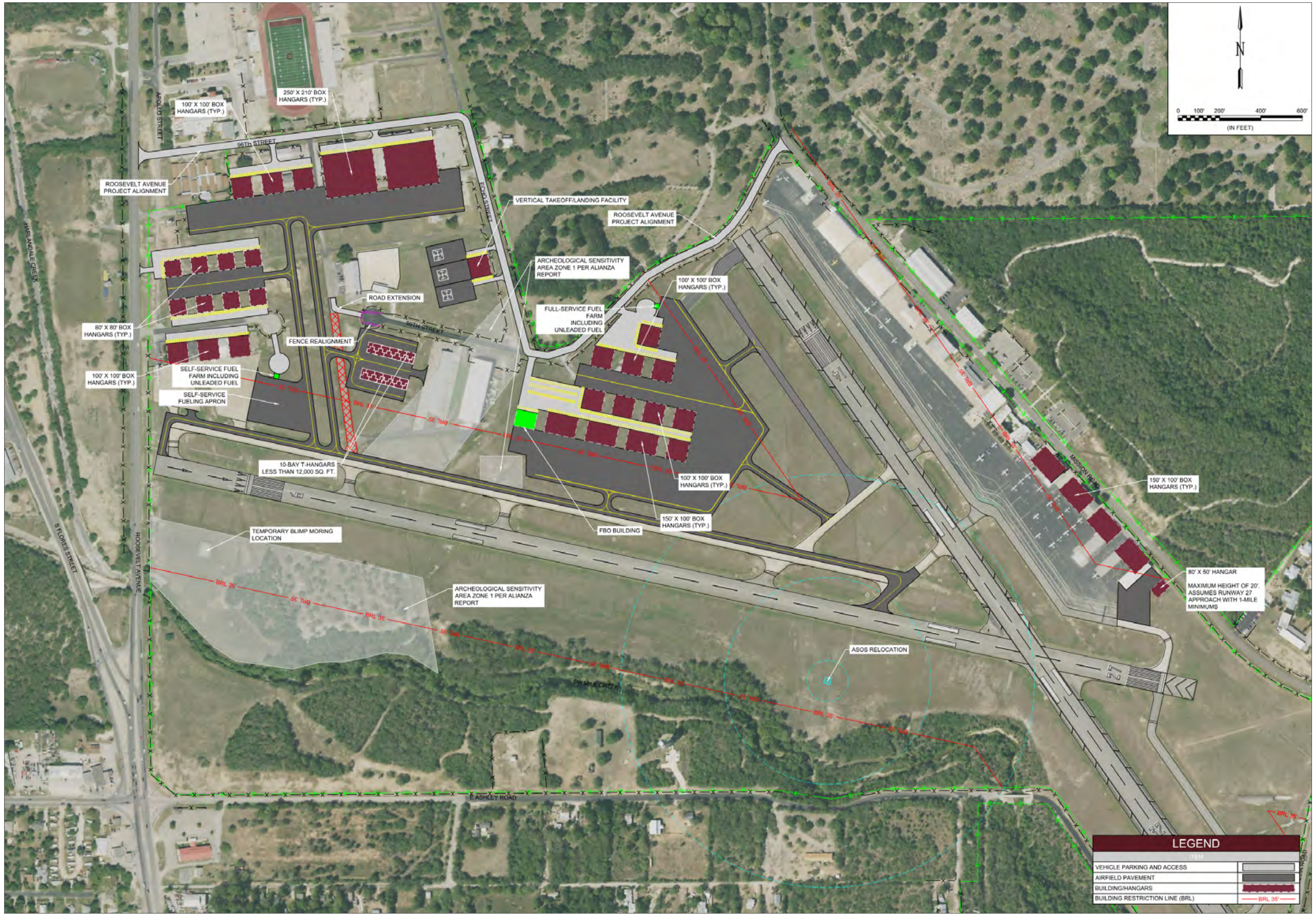
Source: Garver, 2023

FIGURE 5-4
TERMINAL/LANDSIDE ALTERNATIVE #2
STINSON MUNICIPAL AIRPORT



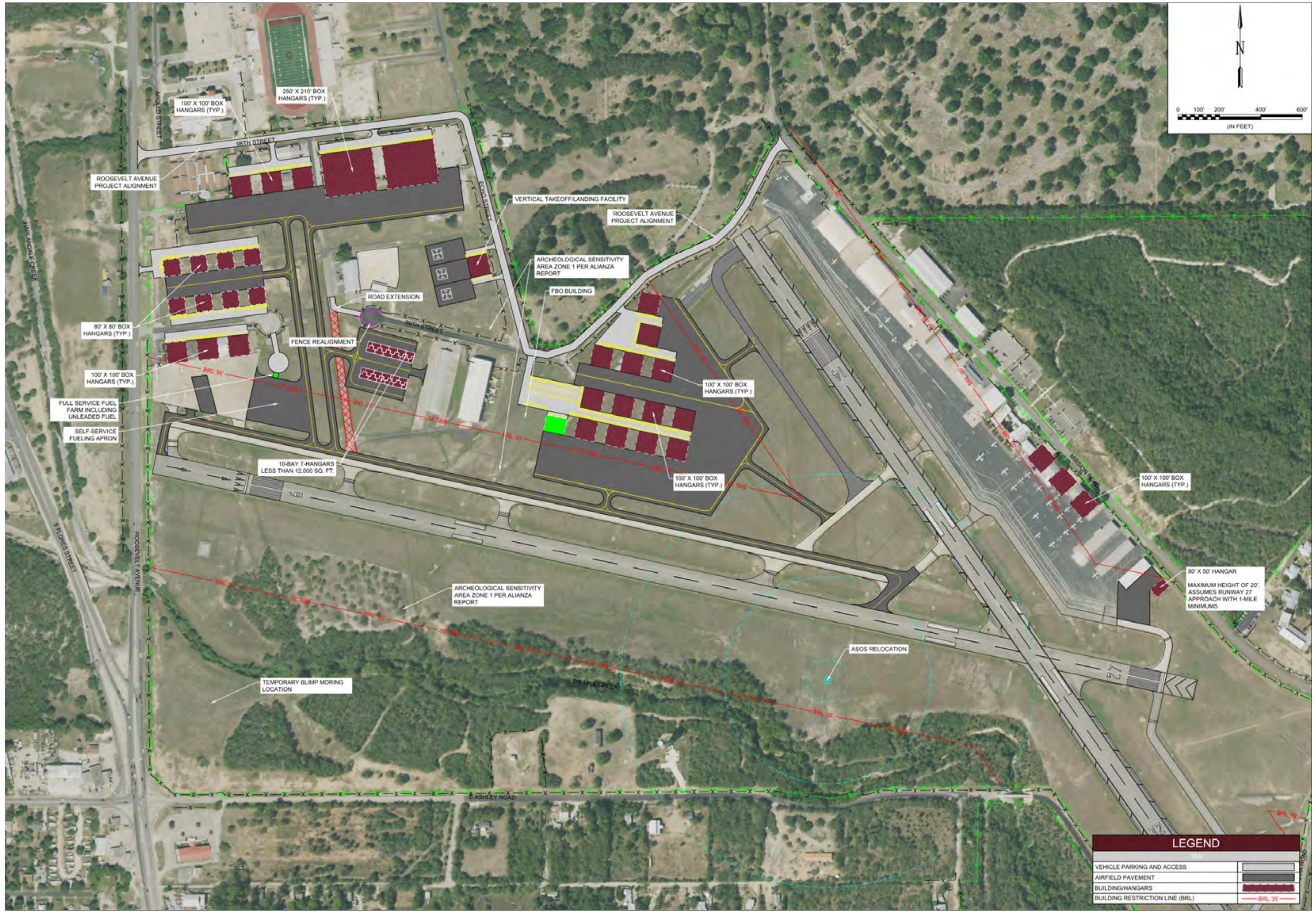
Source: Garver, 2023

FIGURE 5-5
TERMINAL/LANDSIDE ALTERNATIVE #3
STINSON MUNICIPAL AIRPORT



Source: Garver, 2023

FIGURE 5-6
TERMINAL/LANDSIDE ALTERNATIVE #4
STINSON MUNICIPAL AIRPORT



Source: Garver, 2023

TERMINAL/LANDSIDE ALTERNATIVES EVALUATION

One of the tasks of an ALP Update with Narrative Report is to analyze the terminal/landside alternatives to determine which alternative provides a realistic and feasible plan that will allow the Airport to meet future demand in a safe and efficient manner. To facilitate this analysis, evaluation criteria were established, and an evaluation matrix was developed showing how each terminal/landside alternative compared based on the evaluation criteria. The evaluation criteria are discussed below.

The following criteria are rated on a High (red), Moderate (yellow), or Low (green) level of impact scale:

- Ability to Satisfy Established Facility Requirements – Does the alternative meet the facility requirements established based on the forecast of future aeronautical activity? Ideally, the preferred alternative should enable the Airport to meet all established facility requirements.
- Environmental Impacts – How will the proposed terminal/landside alternative impact the environment and how might these impacts influence the feasibility of future development? Environmental factors that should be evaluated for impacts include farmland, wetlands, floodplains, soil, wildlife, noise, and cultural environmental factors as well as any others factors applicable to the Airport. Ideally, the preferred alternative should minimize environmental impacts to the greatest extent practical while still meeting the Airport's future development needs.
- Protects for Emerging Aviation Trends – Does the proposed terminal/landside alternative consider emerging aviation trends such as accommodations for advanced air mobility and alternative fuel supplies? Ideally, the preferred alternative will provide sufficient vertiport facilities and infrastructure to supply additional/alternative aircraft fuels.
- Provides Additional T-Hangar Facilities – Does the proposed alternative provide sufficient additional T-hangar facilities? Given the strong local demand for T-hangars, the preferred alternative will ideally provide sufficient additional T-hangar capacity to address this demand.
- Development Cost/Ease of Implementation – What is the significance of the development cost associated with the alternative and how challenging will it be to implement? Anticipated cost, funding eligibility, and funding availability are

considerations. Ideally, the preferred alternative should limit development costs to the extent practical.

- Provides for Large Scale Aeronautical Businesses – Does the proposed alternative include consideration for large scale aeronautical businesses, such as maintenance repair and overhaul operations? Ideally, the preferred alternative will include facilities to attract and support these types of businesses.
- Congruence with Preferred Airside Alternatives – Does this alternative fit with the preferred airside development alternative? Ideally, the preferred terminal/landside alternative should not require substantial modifications to the preferred airside alternative or impact the ability to meet airside facility requirements.

TERMINAL/LANDSIDE EVALUATION RESULTS

Based on the evaluation criteria discussed above, the following matrix was developed showing the proposed rating of each terminal/landside alternative. Green indicates a "low" impact. Yellow indicates a "moderate" impact. Red indicates a "high" impact.

TABLE 5-2
TERMINAL/LANDSIDE EVALUATION
STINSON MUNICIPAL AIRPORT

Evaluation Criteria	Terminal/Landside Development Alternative # 1	2	3	4
Ability to Satisfy Facility Requirements				
Environmental Impacts				
Protects for Emerging Aviation Trends				
Provides Additional T-Hangar Facilities				
Development Cost/Ease of Implementation				
Provides For Large Scale Aeronautical Businesses				
Congruence with Preferred Airside Alternatives				

- Low Impact **or** Meets Requirements

- Moderate Impact **or** Fails to Meet Some Requirements

- High Impact **or** Fails to Meet Most Requirements

Source: Garver, 2023

EVALUATION COMMENTARY ALTERNATIVE #1

Alternative #1 exceeds the development objectives identified in the Facility Requirements Chapter and, consequently, was given a “green” rating for its ability to meet facility requirements. The alternative is also not expected to have notable environmental impacts and, as a result, was given a “green” rating for this criterion. This alternative provides two vertiport facilities and an additional fuel farm, as well as two additional T-hangar buildings. As a result, both the emerging aviation trends and T-hangar facilities criteria received “green” ratings. Development cost/ease of implementation and congruence with preferred airside alternatives were also both given “green” ratings. This alternative does not provide specific consideration for large scale aeronautical businesses, and as a result this criterion received a “yellow” rating.

EVALUATION COMMENTARY FOR ALTERNATIVE #2

Alternative #2 also exceeds the development objectives identified in the Facility Requirements Chapter and, consequently, was given a “green” rating for its ability to meet facility requirements. The alternative is also not expected to have notable environmental impacts and was given a “green” rating for this criterion. Development cost/ease of implementation and congruence with preferred airside alternatives were also both given “green” ratings. This alternative provides a single vertiport facility. As demand for advanced air mobility operations increases over time, a single facility may not be sufficient. As a result, this criterion received a “yellow” rating. This alternative also includes only one new T-hangar building, and as a result this criterion received a “yellow” rating.” This alternative does not provide specific consideration for large scale aeronautical businesses, and as a result this criterion received a “yellow” rating.

EVALUATION COMMENTARY FOR ALTERNATIVE #3

Alternative #3 also exceeds the development objectives identified in the Facility Requirements Chapter and, consequently, was given a “green” rating for its ability to meet facility requirements. The alternative is also not expected to have notable environmental impacts and was given a “green” rating for this criterion. This alternative provides three vertiport facilities and a standalone secondary fuel facility. As a result, the emerging aviation trends criterion received a “green” rating. This alternative includes two large hangar buildings for large scale aeronautical businesses, and as a result this criterion received a “green” rating. Congruence with the preferred alternative also received a "green" rating. This alternative also includes two new T-hangar buildings but would also include the removal of three existing T-hangar buildings as part of redevelopment of an existing area, and as a result this criterion received a “yellow” rating.” Development cost/ease of implementation also received a “yellow” rating because of the larger hangar facilities included in this alternative, along with the redevelopment of the existing hangar area.

EVALUATION COMMENTARY FOR ALTERNATIVE #4

Alternative #4 also exceeds the development objectives identified in the Facility Requirements Chapter and, consequently, was given a “green” rating for its ability to meet facility requirements. The alternative is also not expected to have notable environmental impacts and was given a “green” rating for this criterion. This alternative also provides three vertiport facilities and a standalone secondary fuel facility. As a result, the emerging aviation trends criterion received a “green” rating. This alternative includes two large hangar buildings for large scale aeronautical businesses, and as a result this criterion received a “green” rating. Congruence with the preferred alternative also received a "green" rating. This alternative also includes two new T-hangar buildings, and as a result this criterion received a “green” rating.” Development cost/ease of implementation received a “yellow” rating because of the larger hangar facilities included in this alternative, along with the redevelopment of the existing hangar area.

PREFERRED TERMINAL/LANDSIDE DEVELOPMENT ALTERNATIVE

While both Alternative #1 and Alternative #4 received the same overall ratings ratio, the results of the rating analysis showed that Alternative #4 is the preferable terminal/landside alternative, because it prioritizes consideration of large-scale aeronautical businesses, which are considered an important component of future development at SSF.

PREFERRED DEVELOPMENT CONCEPT – ENVIRONMENTAL OVERVIEW

The preferred development concept as outlined in **Figures 5-2** (preferred airside) and **5-6** (preferred terminal/landside) have been reviewed to identify as early as possible any potential environmental issues. FAA orders and SOPs related to environmental clearances were used to conduct the analysis described below.

The environmental resources evaluated are grouped into the following three categories: 1) No Impact or Minor/Temporary Impact, 2) Moderate Impacts, and 3) Moderate/High Impact potential.

NO IMPACT OR MINOR/TEMPORARY

- Air Quality – Temporary impacts during construction are expected. An air emissions inventory may be required by the Texas Commission on Environmental Quality (TCEQ) and, if necessary, will be completed as part of the preliminary engineering/design processes prior to construction activities taking place.
- Coastal Barriers & Coastal Zone Barriers – The coast is approximately 132 miles from the Airport; therefore, these resources are not affected.
- Federally Listed Endangered and Threatened Species – There are no known protected species at the Airport. However, future coordination may be required with the U.S. Fish and Wildlife Service (USFWS) and the Texas Parks and Wildlife Department (TPWD) to confirm this as part of future projects.
- Energy Supplies, Natural Resources and Sustainable Design – The project is anticipated to have minimal impacts on the area's natural resources and energy supplies.
- Light Emissions and Visual Effects – The future development of SSF is not expected to have a significant impact on light emissions or other visual effects in the area.
- Historical and Archeological – While there are multiple documented archaeological sites within and adjacent to airport property, the preferred development plan does not include any projects within these identified areas, and as a result, no impacts are anticipated. However, impacts are possible with the Taxiway Delta relocation project.
- Wild and Scenic Rivers – There are no wild and scenic rivers in the project area.
- Hazardous Materials – There are no known hazardous material sites in the area.

- Solid Waste – There are no known locations involved in the preferred development alternative where solid waste is present.
- Water Quality – Water quality is not expected to be impacted by the development. However, a more in-depth review may be necessary for specific development projects.
- Compatible Land Use – None of the areas impacted by development are expected to have any land use compatibility issues outside of those noted elsewhere in this analysis.
- Biotic Resources – No new impacts to biotic resources are anticipated, however additional review may be necessary prior to project design.
- Farmlands – Parts of existing SSF property and some areas proposed for acquisition are considered prime farmland on the USDA Natural Resource Conservation Service – Web Soil Survey. However, since these areas are already allocated for airport use or are already otherwise developed, there are no expected impacts to prime farmland.
- Floodplains – While there are some areas of floodplain within airport property, development related to the preferred alternative is not expected to directly impact these areas.
- Wetlands – While there are several wetland areas located on airport property, these areas are not expected to be impacted by the preferred development alternative.

MODERATE PROBABILITY FOR IMPACT

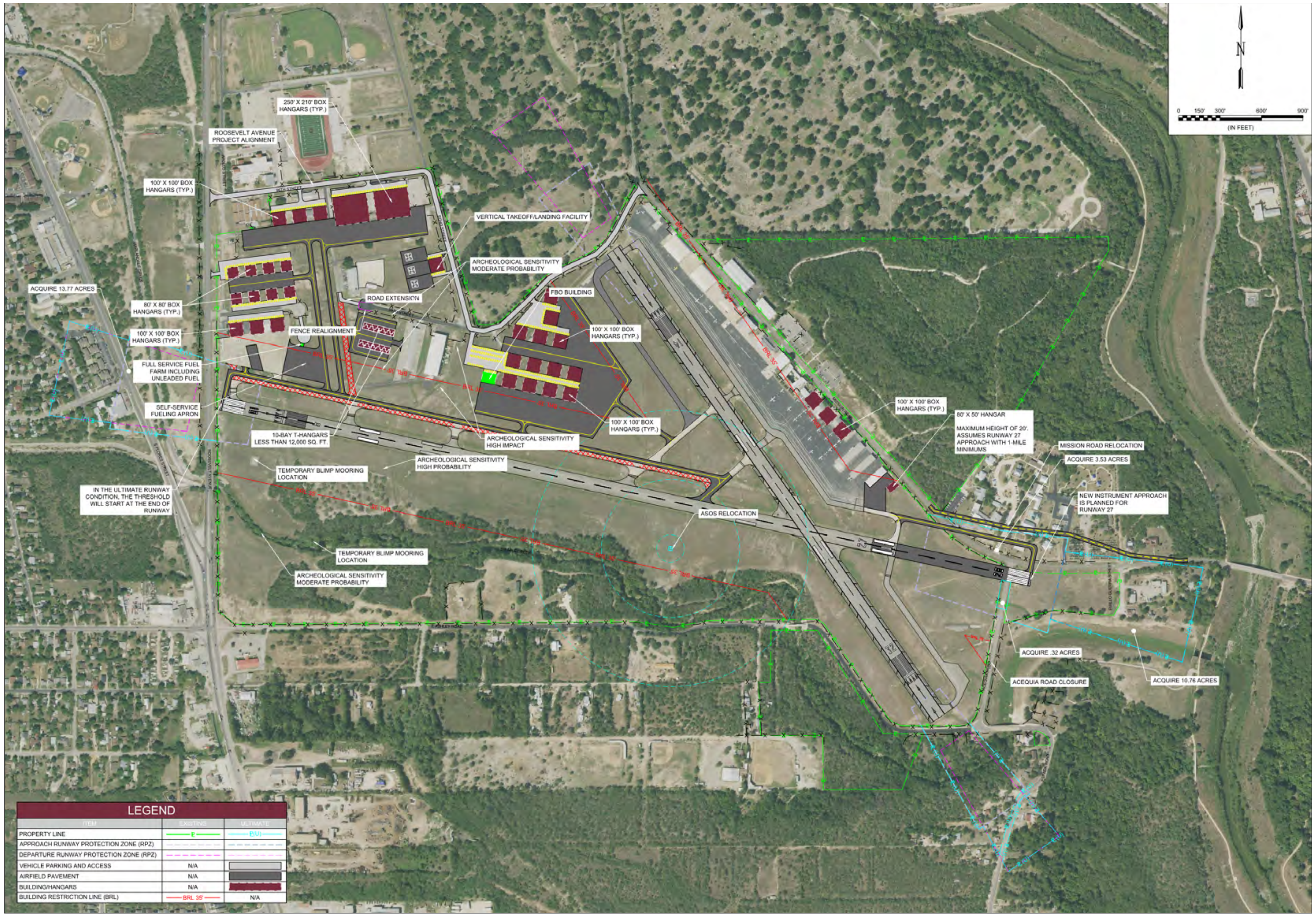
- Department of Transportation Act, Section 4(f) – Mission San Juan, part of the San Antonio Missions National Historical Park, and a UNESCO World Heritage Site, is located west of the Airport. As part of the environmental work that would be completed in preparation for the extension of Runway 27, potential impacts on the historic site would need to be evaluated.
- Induced Socioeconomic – Properties at both ends of Runway 9/27 would be impacted by the runway extension and RPZ property acquisition. These properties are primarily residential at the approach end of Runway 9 and primarily commercial at the approach end of Runway 27.
- Noise – Residences located east of the Airport may experience elevated noise levels if larger aircraft begin using Stinson.

MODERATE TO HIGH POTENTIAL FOR IMPACT

- Social Impacts – Since several commercial entities and residences are located within areas proposed for acquisition or development, there may be significant social impacts associated with the preferred alternative. These impacts would need to be evaluated further before Runway 9/27 is extended.
- Environmental Justice – Since several businesses and residences are located within areas proposed for acquisition as part of the runway extension, there will likely be environmental justice impacts associated with the preferred alternative. These impacts would need to be evaluated further before Runway 9/27 is extended.

A composite showing the combined preferred development alternative is shown in **Figure 5-7**.

FIGURE 5-7
PREFERRED COMBINED ALTERNATIVE
STINSON MUNICIPAL AIRPORT



Source: Garver, 2023

Capital Improvement Program and Financial Plan

6

Chapter 6: Capital Improvement Program and Financial Plan

The Capital Improvement Program (CIP) Chapter breaks down the preferred development alternative into a series of capital projects for implementation and funding purposes. As a result, the chapter describes the phasing, planning level cost estimates, and trigger mechanisms associated with each capital project needed to achieve the preferred development concept and a proposed funding strategy for each project.

Capital Funding Sources

Airport capital projects can be funded by several sources. These sources include Federal Aviation Administration (FAA) Airport Improvement Program (AIP) grants, state aviation grants, private/third party financing, local funding, local development grants, and economic/community development grants. Each of these capital funding sources are described in the following sections.

FAA Airport Improvement Program

The FAA's grant funding program for improving, maintaining, and developing airport infrastructure is commonly referred to as the Airport Improvement Program (AIP). The program was originally established in the early 1980's when Congress passed the Airport and Airway Improvement Act of 1982. Under the AIP Program, the FAA provides grant funds to airports based on numerous factors including the Airport's size, activity level, and development needs. The FAA typically provides 90 percent of the funding for AIP projects with the remainder of the funds supplied by the state aviation agency and the Airport's sponsor.

Texas is a block grant state under the FAA's AIP program. As a block grant state, the Texas Department of Transportation - Aviation Division (TxDOT) is responsible for administering AIP grants to general aviation airports within the State of Texas. In Texas, AIP grant funded capital projects at general aviation airports that are part of the National Plan of Integrated Airport Systems (NPIAS) are generally eligible for 90 percent federal funding with a 10 percent local match provided by the Airport sponsor.

The FAA classifies airports with annual passenger enplanements of 10,000 or less as Non-Primary Airports for funding purposes. Currently, Stinson Municipal Airport (SSF) qualifies as a Non-Primary Airport. As a Non-Primary Airport, SSF is eligible to receive Non-Primary

Entitlement (NPE) funds that are appropriated on an annual basis. NPEs were originally created as part of the Aviation Investment and Reform Act (AIR-21) that was passed by Congress in April 2000. The NPE program was revised in 2018 as part of the FAA Reauthorization Act. Under the NPE Program, Non-Primary Airports with less than 8,000 enplanements receive NPE funding equal to 20 percent of the eligible cost of their five-year capital improvement program up to a maximum of $150,000 per year. NPEs are available in the year granted and can be carried over for up to three additional years (e.g., four years of funding in total). Currently, SSF receives a $150,000 annually in NPE funds. Unless modified by Congress, it is expected that SSF will continue to accrue NPE funds at a rate of $150,000 per year throughout the planning horizon.

In addition to NPEs, SSF is eligible to receive AIP discretionary grants. AIP discretionary funds are distributed based on a project prioritization process developed by the FAA. It is reasonable to assume that SSF will receive discretionary funding during the planning period for higher priority, eligible projects, such as runway, taxiway, safety, and security improvements. However, since the future availability of AIP discretionary grants is not certain until an actual grant is awarded, it should be noted that any future capital projects requiring AIP discretionary funds may need to be delayed until the funds become available.

Bi-Partisan Infrastructure Law Program

In 2021, Congress passed the Bi-Partisan Infrastructure Law (BIL) which supplies additional capital funding opportunities for airports. The BIL will provide Airport Infrastructure Grants (AIG) for five years (starting in 2021) to airports listed in the National Plan of Integrated Airport System (NPIAS). This money can be used for runways, taxiways, safety, and sustainability projects, as well as terminal, airport-transit connections, and roadway projects. SSF is classified as a “local” airport in the NPIAS and therefore it is expected to receive $145,000 per year for the next four years including this year (2023), however this amount may fluctuate from year to year. Additional BIL grants are similar to AIP discretionary grants, in that airports must compete for them.

The CIP assumes the Airport will receive a combination of AIP/BIL grants in the amount of $19.24 million in the short-term phase (0-5 years), $11.37 million in the mid-term phase (6-10 years), and $47.08 million in the long-term phase (11+ years). The CIP further assumes that the current AIP funding levels will continue to be extended during the planning horizon and that future program authorizations will provide similar funding levels. BIL funding is assumed to only be available for the next four years including this year.

TxDOT Aviation Division Grants

TxDOT sponsors the Routine Airport Maintenance Program (RAMP) that provides partial funding for lower cost projects and airport maintenance activities. RAMP funding is limited to $50,000 per year per airport. The Airport sponsor is required to match the RAMP grant funds dollar for dollar up to a total of $50,000. The CIP assumes that TxDOT RAMP grant program will continue during the planning horizon.

TxDOT also provides partial funding for general aviation terminal building improvements and parking lots. The maximum grant available is $600,000 ($500,000 for the terminal building and $100,000 for the parking lot). Grants are limited to 50 percent of total project costs up to $1.2 million with costs over $1.2 million remaining the responsibility of the sponsor.

Additionally, TxDOT provides state grants, that are separate from the FAA AIP program, to support other aeronautical development needs at the Airport including items which may have limited eligibility under the FAA AIP Program (e.g., revenue producing facilities).

The CIP assumes that most RAMP grant funds will be utilized for airport maintenance activities and will not be utilized for the development of new infrastructure. State grants may be received for non-AIP eligible developments, but this is expected to be limited.

Private/Third Party Financing

Many airports use private/third party financing when the planned improvements will be primarily used by a private business and/or are not grant eligible. Projects of this kind typically include private hangars, FBO facilities, exclusive use aircraft parking aprons, industrial development areas, non-aviation related commercial areas, and various other projects.

The AIP eligibility of revenue-producing projects is very limited and sometimes comes with future funding restrictions. Consequently, the use of federal funds for revenue producing projects should only be considered under special circumstances.

The CIP assumes private/third parties will provide $18.89 million in funding to support private aircraft hangar developments and related projects in the short-term phase, $29.61 million in the mid-term phase, and $50.35 in the long-term phase. The availability of private/third-party funds are highly dependent on the type of development being pursued and the availability of a private equity source interested in financing the project. As a result, some of the projects identified for private/third-party funding may require other funding sources (e.g., other grants, local funds, etc.) if private equity is not available.

OTHER GRANTS

Sometimes airports are eligible to apply for economic development or community development grants that can be used to improve various airside and landside aspects of the Airport. However, since airports commonly compete with other non-aviation agencies for these grants, they are typically difficult to obtain. Consequently, the CIP assumes very limited grant funds will be received from non-aviation agencies. However, it is highly recommended that the Airport pursue non-aviation specific grants because, if successful, the awarding of these grants will reduce the airport's dependence on aviation grant funds.

LOCAL FUNDING

As previously discussed, airport capital projects funded under the FAA's AIP and BIL grant programs typically require a local match that is funded by the Airport's revenues or by the municipality that owns the Airport. For projects that are not funded under the FAA's AIP or BIL grant programs, airports are typically required to bear the full cost of the capital project unless another source of financing (e.g., state grant funding, private/third party financing, or other non-aviation grant funds) can be secured. Since local funding is often constrained, it is generally recommended that other non-local funding sources should be pursued to the greatest extent possible for capital projects that are not eligible under the AIP program. As a result, the 20-year CIP set forth in this Airport Layout Plan Narrative Report focuses on the use of local funds for AIP grant matches and uses other funding sources for non-AIP eligible projects. However, during the implementation of this CIP, it may become necessary to fund some non-AIP eligible projects with local funds if other funding mechanisms are not available at the time the facility is needed.

CAPITAL IMPROVEMENT PLAN (CIP)

The CIP and phased development plan establish an orderly series of improvements intended to support the growth and development of SSF in alignment with the preferred development alternative defined in the Alternatives Chapter.

It is important to note market demand, instead of the passage of time, should be the driver for when facilities are constructed, making this CIP flexible to changes that may occur during the 20-year planning horizon. Consequently, "trigger mechanisms" have been established to help guide SSF on when they should consider implementing the various improvement projects set forth in the CIP. These "trigger mechanisms" should be reviewed annually by TxDOT Aviation and the City of San Antonio to determine if any of the project "triggers" could feasibly be reached in the next 1-5 years. If it is expected that a project trigger could be reached within the next 5 years, the project should be included in the

Airport's 5-year CIP. This exercise will aid TxDOT Aviation and the City of San Antonio in building and updating the rolling 5-year CIP for SSF based on market demand.

In developing the Stinson Municipal Airport's CIP and phased development plan, the following guidelines were used:

- The scheduling of projects is prioritized to permit improvements in a coordinated approach. The phasing and priority of each project has been determined with respect to airport safety, demand, compatibility with other airport projects, and FAA/TxDOT programming schedules.
- Overall, the CIP has been structured to provide the flexibility to meet short and long-range goals.
- The development plan does not represent an obligation of any funds, nor does it imply a funding commitment without justification of sufficient demand or need.

The Phased Development Plan is divided into the following phases:

- Short-Term Phase – 2024-2028
- Mid-Term Phase – 2029-2033
- Long-Term Phase – 2034-2043

Each phase consists of projects and improvements categorized by the following areas: 1) airside improvements and 2) terminal/landside improvements. The airside and terminal/landside development projects within each phase and their associated trigger mechanisms are shown in **Table 6-1** through **Table 6-6**. The projects within the short-term phase of the CIP have also been segmented into separate "design" and "construction" projects to make them easier to use for future CIP planning. Land acquisition projects are also included.

It should be noted that each project has a unique identifier that consists of the phase the project is associated with (e.g., S, M, or L) followed by a project number (e.g., 1, 2, 3, etc.). These project identifiers have been established to make it easier for users to reference specific projects. The project numbers do not provide an indication of a project's prioritization within the CIP.

TABLE 6-1
AIRSIDE PROJECTS – SHORT-TERM
STINSON MUNICIPAL AIRPORT

Project Reference #	Design/Construction/Land Acquisition/Easement/Other	Airside or Terminal/Landside	Project Name/Description	Trigger Mechanism	Has Trigger Already Been Reached?
S1	**LAND ACQUISITION**	**Airside**	Runway 32 RPZ Property Acquisition	Property within the Runway 32 RPZ is not owned by the airport.	Yes
S2	**DESIGN**	**Airside**	Perimeter Fence Improvements (Six Mile Creek)	Previous security issues related to security vulnerability.	Yes
S3	**CONSTRUCTION**	**Airside**	Perimeter Fence Improvements (Six Mile Creek)	Previous security issues related to security vulnerability.	Yes
S10	**DESIGN**	**Airside**	Taxiway D realignment	Taxiway does not meet FAA runway separation standards. Current offset is 210', FAA standard is 240'	Yes
S11	**CONSTRUCTION**	**Airside**	Taxiway D realignment	Taxiway does not meet FAA runway separation standards. Current offset is 210', FAA standard is 240'	Yes
S14	**DESIGN**	**Airside**	New taxilane for T-hangars, decommission existing taxilane	Existing taxilane geometry provides direct runway access; non-compliant with FAA standards	Yes
S15	**CONSTRUCTION**	**Airside**	New taxilane for T-hangars, decommission existing taxilane	Existing taxilane geometry provides direct runway access; non-compliant with FAA standards	Yes
S18	**DESIGN**	**Airside**	(1) 100 x 100' box hangar with vehicle parking - West apron	Box hangar demand exceeds existing capacity	No
S19	**CONSTRUCTION**	**Airside**	(1) 100 x 100' box hangar with vehicle parking - West apron	Box hangar demand exceeds existing capacity	No
S20	**DESIGN**	**Airside**	Replace airfield lighting vault	Existing airfield lighting vault is exhibiting signs of structural failure and needs to be replaced.	Yes
S21	**CONSTRUCTION**	**Airside**	Replace airfield lighting vault	Existing airfield lighting vault is exhibiting signs of structural failure and needs to be replaced.	Yes
S22	**DESIGN**	**Airside**	Runway 9/27 MIRL and PAPI replacement (LED)	Existing lighting systems have reached end of useful life	Yes
S23	**CONSTRUCTION**	**Airside**	Runway 9/27 MIRL and PAPI replacement (LED)	Existing lighting systems have reached end of useful life	Yes
S26	**DESIGN**	**Airside**	Relocate ASOS	Relocation is required to support hangar development in the mid-field area	No
S27	**CONSTRUCTION**	**Airside**	Relocate ASOS	Relocation is required to support hangar development in the mid-field area	No

Source: Garver, 2023

The airside projects within this phase of the CIP primarily focus on pavement and lighting rehabilitation and safety improvements (RPZ property acquisition, perimeter fence, taxiway/taxilane alignment). Currently, the safety improvements and some of the rehabilitation projects have hit their implementation triggers.

TABLE 6-2
TERMINAL/LANDISDE PROJECTS – SHORT-TERM
STINSON MUNICIPAL AIRPORT

Project Reference #	Design/Construction/Land Acquisition/Easement/Other	Airside or Terminal/Landside	Project Name/Description	Trigger Mechanism	Has Trigger Already Been Reached?
S4	DESIGN	Terminal/Landside	West apron rehab/infill	Pavement gap requires infill to support apron ingress and egress.	Yes
S5	CONSTRUCTION	Terminal/Landside	West apron rehab/infill	Existing apron pavement has deteriorated and needs to be rehabilitated. Cut out area between existing hangars to be filled to support redevelopment of the area.	Yes
S6	DESIGN	Terminal/Landside	(1) 100 x 100' box hangar with vehicle parking - West apron	Box hangar demand exceeds existing capacity	Yes
S7	CONSTRUCTION	Terminal/Landside	(1) 100 x 100' box hangar with vehicle parking - West apron	Box hangar demand exceeds existing capacity	Yes
S8	DESIGN	Terminal/Landside	(1) 100 x 100' box hangar with vehicle parking - West apron	Box hangar demand exceeds existing capacity	Yes
S9	CONSTRUCTION	Terminal/Landside	(1) 100 x 100' box hangar with vehicle parking - West apron	Box hangar demand exceeds existing capacity	Yes
S12	DESIGN	Terminal/Landside	Rehabilitate Texas Air Museum taxilane	Taxilane pavement condition is poor last PCI report	Yes
S13	CONSTRUCTION	Terminal/Landside	Rehabilitate Texas Air Museum taxilane	Taxilane pavement condition is poor last PCI report	Yes
S16	DESIGN	Terminal/Landside	(2) 10-bay T-hangars with apron and taxilane connection	T-hangar demand exceeds existing capacity	Yes
S17	CONSTRUCTION	Terminal/Landside	(2) 10-bay T-hangars with apron and taxilane connection	T-hangar demand exceeds existing capacity	Yes
S24	DESIGN	Terminal/Landside	80'x 50' hangar and apron, rehab adjacent T-hangar apron (10,577 SY)	Box hangar demand exceeds existing capacity	No
S25	CONSTRUCTION	Terminal/Landside	80'x 50' hangar and apron, rehab adjacent T-hangar apron (10,577 SY)	Box hangar demand exceeds existing capacity	No

Source: Garver, 2023

The terminal/landside projects identified in this phase focus on addressing aircraft storage demand and pavement rehabilitation. Some of the aircraft storage projects in Table 6-2 have hit their implementation triggers. All others will be predicated on increased aircraft operations and storage demand. The pavement rehabilitation projects have hit their implementation triggers.

TABLE 6-3
AIRSIDE PROJECTS – MID-TERM
STINSON MUNICIPAL AIRPORT

Project Reference #	Design/Construction/Land Acquisition/Easement/Other	Airside or Terminal/Landside	Project Name/Description	Trigger Mechanism	Has Trigger Already Been Reached?
M7	**DESIGN/CONSTRUCTION**	**Airside**	Taxiway B & C pavement and lighting rehabilitation	Taxiway pavement condition is likely to reach fair condition in the near future and lighting has reached end of useful life	No
M9	**DESIGN/CONSTRUCTION**	**Airside**	Runway 14/32 PAPI replacement (LED)	PAPI system has reached end of useful life	No

Source: Garver, 2023

Neither of the airside projects identified in this phase have hit their implementation triggers.

TABLE 6-4
TERMINAL/LANDSIDE PROJECTS – MID-TERM
STINSON MUNICIPAL AIRPORT

Project Reference #	Design/Construction/Land Acquisition/Easement/Other	Airside or Terminal/Landside	Project Name/Description	Trigger Mechanism	Has Trigger Already Been Reached?
M1	**DESIGN/CONSTRUCTION**	**Terminal/Landside**	Apron taxilane to serve subsequent hangars and connection to Taxiway E	Hangar demand requires development of mid-field area	No
M2	**DESIGN/CONSTRUCTION**	**Terminal/Landside**	(2) 100 x 100' box hangars with vehicle access and parking & non-eligible apron	Hangar demand requires development of mid-field area	No
M3	**DESIGN/CONSTRUCTION**	**Terminal/Landside**	South Main apron rehabilitation (13,318 SY)	Apron pavement condition is likely to reach fair condition in the near future	No
M4	**DESIGN/CONSTRUCTION**	**Terminal/Landside**	(1) 100 x 100' box hangar (redevelopment)	Box hangar demand exceeds existing capacity	No
M5	**DESIGN/CONSTRUCTION**	**Terminal/Landside**	(1) 100 x 100' box hangar (redevelopment)	Box hangar demand exceeds existing capacity	No
M6	**DESIGN/CONSTRUCTION**	**Terminal/Landside**	(1) 100 x 100' box hangar (redevelopment)	Box hangar demand exceeds existing capacity	No
M8	**DESIGN/CONSTRUCTION**	**Terminal/Landside**	Vertical Take-off and Landing Facility	Demand for regular VTOL operations	No
M10	**DESIGN/CONSTRUCTION**	**Terminal/Landside**	(3) 100 x 100' box hangars with vehicle parking & non-eligible apron	Box hangar demand exceeds existing capacity	No
M11	**DESIGN/CONSTRUCTION**	**Terminal/Landside**	Apron and taxilane with connection to Taxiway C	Additional airside access required to support additional hangar and FBO development	No
M12	**DESIGN/CONSTRUCTION**	**Terminal/Landside**	(4) 100 x 100' box hangars with vehicle access and parking & non-eligible apron	Box hangar demand exceeds existing capacity	No

Source: Garver, 2023

None of the terminal/landside projects identified in this phase have hit their implementation triggers.

TABLE 6-5
AIRSIDE PROJECTS – LONG-TERM
STINSON MUNICIPAL AIRPORT

Project Reference #	Design/Construction/Land Acquisition/Easement/Other	Airside or Terminal/Landside	Project Name/Description	Trigger Mechanism	Has Trigger Already Been Reached?
L3	**DESIGN/CONSTRUCTION**	**Airside**	Taxiway A pavement and lighting rehabilitation	Taxiway pavement condition is likely to reach fair condition in the near future and lighting has reached end of useful life	No
L4	**DESIGN/CONSTRUCTION**	**Airside**	Runway 14/32 pavement and lighting rehabilitation	Runway pavement condition is likely to reach fair condition in the near future and lighting has reached end of useful life	No
L9	**DESIGN/CONSTRUCTION**	**Airside**	Runway 9/27 pavement and lighting rehabilitation	Runway pavement condition is likely to reach fair condition in the near future and lighting has reached end of useful life	No
L10	**DESIGN/CONSTRUCTION**	**Airside**	Taxilane connection from 80x80' hangars to TWY D	Additional airside access required to support additional hangar development	No
L23	**DESIGN/CONSTRUCTION**	**Airside**	Taxiway E pavement and lighting rehabilitation	Taxiway pavement condition is likely to reach fair condition in the near future and lighting has reached end of useful life	No
L24	**LAND ACQUISITION**	**Airside**	Runway 27 Extension and RPZ Property Acquisition	Additional runway length required to support regular jet operations, extension requires airport control of RPZ property	No
L25	**LAND ACQUISITION**	**Airside**	Runway 9 RPZ Property Acquisition	Additional runway length required to support regular jet operations, extension requires airport control of RPZ property	No
L26	**DESIGN/CONSTRUCTION**	**Airside**	Runway 27 extension with parallel taxiway, realign Mission Road	Additional runway length required to support regular jet operations, extension requires airport control of RPZ property	No

Source: Garver, 2023

None of the airside projects identified in this phase have hit their implementation triggers.

TABLE 6-6
TERMINAL/LANDSIDE PROJECTS – LONG-TERM
STINSON MUNICIPAL AIRPORT

Project Reference #	Design/Construction/Land Acquisition/Easement/Other	Airside or Terminal/Landside	Project Name/Description	Trigger Mechanism	Has Trigger Already Been Reached?
L1	DESIGN/CONSTRUCTION	Terminal/Landside	Central Apron rehabilitation (29,369 SY)	Apron pavement condition is likely to reach fair condition in the near future	No
L2	DESIGN/CONSTRUCTION	Terminal/Landside	North Apron rehabilitation (3,257 SY)	Apron pavement condition is likely to reach fair condition in the near future	No
L5	DESIGN/CONSTRUCTION	Terminal/Landside	FBO and vehicle parking, non-eligible apron	FBO services demand exceeds existing capacity	No
L6	DESIGN/CONSTRUCTION	Terminal/Landside	Remaining center sod apron with taxilane and connection to Taxiway D	Additional airside access required to support additional hangar and FBO development	No
L7	DESIGN/CONSTRUCTION	Terminal/Landside	Fuel farm and apron	Fuel demand exceeds existing capacity	No
L8	DESIGN/CONSTRUCTION	Terminal/Landside	(4) 100 x 100' box hangars with vehicle parking & non-eligible apron	Box hangar demand exceeds existing capacity	No
L11	DESIGN/CONSTRUCTION	Terminal/Landside	(2) 80 x 80' hangars with apron and vehicle access and parking	Hangar demand exceeds existing capacity	No
L12	DESIGN/CONSTRUCTION	Terminal/Landside	(2) 80 x 80' hangars with apron and vehicle parking	Hangar demand exceeds existing capacity	No
L13	DESIGN/CONSTRUCTION	Terminal/Landside	(2) 80 x 80' hangars with apron and vehicle parking	Hangar demand exceeds existing capacity	No
L14	DESIGN/CONSTRUCTION	Terminal/Landside	(2) 80 x 80' hangars with apron and vehicle parking	Hangar demand exceeds existing capacity	No
L15	DESIGN/CONSTRUCTION	Terminal/Landside	Taxilane extension to 210 x 250' hangars	Demand for large box hangars	No
L16	DESIGN/CONSTRUCTION	Terminal/Landside	(1) 210x250' hangar with vehicle access & parking, non-eligible apron	Demand for large box hangars	No
L17	DESIGN/CONSTRUCTION	Terminal/Landside	(1) 210x250' hangar with vehicle parking, non-eligible apron	Demand for large box hangars	No
L18	DESIGN/CONSTRUCTION	Terminal/Landside	99th St Access Road Extension with Gate	New landside access needed to support hangar developments when existing access is closed for hangar development	No
L19	DESIGN/CONSTRUCTION	Terminal/Landside	Taxilane extension to 100 x 100' hangars	Box hangar demand exceeds existing capacity	No
L20	DESIGN/CONSTRUCTION	Terminal/Landside	(1) 100x100' hangar with vehicle access & parking, non-eligible apron	Box hangar demand exceeds existing capacity	No
L21	DESIGN/CONSTRUCTION	Terminal/Landside	(1) 100x100' hangar with vehicle parking, non-eligible apron	Box hangar demand exceeds existing capacity	No
L22	DESIGN/CONSTRUCTION	Terminal/Landside	(1) 100x100' hangar with vehicle parking, non-eligible apron	Box hangar demand exceeds existing capacity	No

Source: Garver, 2023

None of the terminal/landside projects identified in this phase have hit their implementation triggers.

PROJECT COST ESTIMATES AND FUNDING SOURCES

Rough Order of Magnitude (ROM) cost estimates for each individual project identified in Tables 6-1 through 6-6 were prepared as part of the development of the 20-year SSF CIP. These cost estimates are based on current year (2023) dollars and are intended for planning purposes only and should not be used or construed as formal construction cost estimates. Formalized opinions of probable cost will be developed as part of each project's scoping process during the design and engineering phase.

SHORT-TERM PHASE

Short-term phase cost estimates are shown in **Table 6-7** and a funding breakdown is shown in **Figure 6-1.** A breakdown of these costs indicates a need for approximately $19.24 million in capital funding assistance from state/federal aviation grants. The matching share for these grants from the Airport sponsor total $2.14 million. The grant funding in the short- term phase is used primarily for pavement rehabilitation/improvements, lighting improvements, safety improvements, and the realignment of taxiways and taxilanes. Projects with significant associated costs include the Taxiway D realignment (projects S10,11) and airfield lighting vault replacement (S20,21).

Private funding for the hangar developments in this phase totals $18.89 million.

MID-TERM PHASE

Mid-term phase cost estimates are shown in **Table 6-8** and a funding breakdown is shown in **Figure 6-2**. A breakdown of these costs indicates a need for approximately $11.37 million in capital funding assistance from state/federal aviation sources. The matching share for these grants from the Airport sponsor total $1.26 million. Grant funding in this phase supports construction of new aprons and taxilanes and pavement and lighting rehabilitation.

Private funding for two hangar developments totals $29.61 million in this phase.

LONG-TERM PHASE

Long-term phase cost estimates are shown in **Table 6-9** and a funding breakdown is shown in **Figure 6-3**. A breakdown of these costs indicates a need for approximately $47.08 million in capital funding assistance from state/federal aviation sources. The matching share for these grants from the Airport sponsor total $5.71 million. Grant funding in this phase supports additional pavement and lighting rehabilitation, apron and taxilane construction, and the extension of Runway 27 and associated projects.

Private funding for two hangar developments totals $50.35 million in this phase.

TABLE 6-7
SHORT TERM DEVELOPMENT COSTS
STINSON MUNICIPAL AIRPORT

Project Reference #	Project Name/Description	Estimated Cost	State/Federal Grant Funding	Local Funding	Private Funding
S1	Runway 32 RPZ Property Acquisition	$1,500,000.00	$1,350,000.00	$150,000.00	
S2	Perimeter Fence Improvements (Six Mile Creek)	$200,000.00	$180,000.00	$20,000.00	
S3	Perimeter Fence Improvements (Six Mile Creek)	$1,190,000.00	$1,071,000.00	$119,000.00	
S4	West apron rehab/infill	$76,000.00	$68,400.00	$7,600.00	
S5	West apron rehab/infill	$947,000.00	$852,300.00	$94,700.00	
S6	(1) 100 x 100' box hangar with vehicle parking - West apron	$213,000.00			$213,000.00
S7	(1) 100 x 100' box hangar with vehicle parking - West apron	$2,254,000.00			$2,254,000.00
S8	(1) 100 x 100' box hangar with vehicle parking - West apron	$214,000.00			$214,000.00
S9	(1) 100 x 100' box hangar with vehicle parking - West apron	$2,266,000.00			$2,266,000.00
S10	Taxiway D realignment	$357,000.00	$321,300.00	$35,700.00	
S11	Taxiway D realignment	$9,135,000.00	$8,221,500.00	$913,500.00	
S12	Rehabilitate Texas Air Museum taxilane	$120,000.00	$108,000.00	$12,000.00	
S13	Rehabilitate Texas Air Museum taxilane	$1,366,000.00	$1,229,400.00	$136,600.00	
S14	New taxilane for T-hangars, decommission existing taxilane	$113,000.00	$101,700.00	$11,300.00	
S15	New taxilane for T-hangars, decommission existing taxilane	$1,465,000.00	$1,318,500.00	$146,500.00	
S16	(2) 10-bay T-hangars with apron and taxilane connection	$311,000.00			$311,000.00
S17	(2) 10-bay T-hangars with apron and taxilane connection	$5,819,000.00			$5,819,000.00

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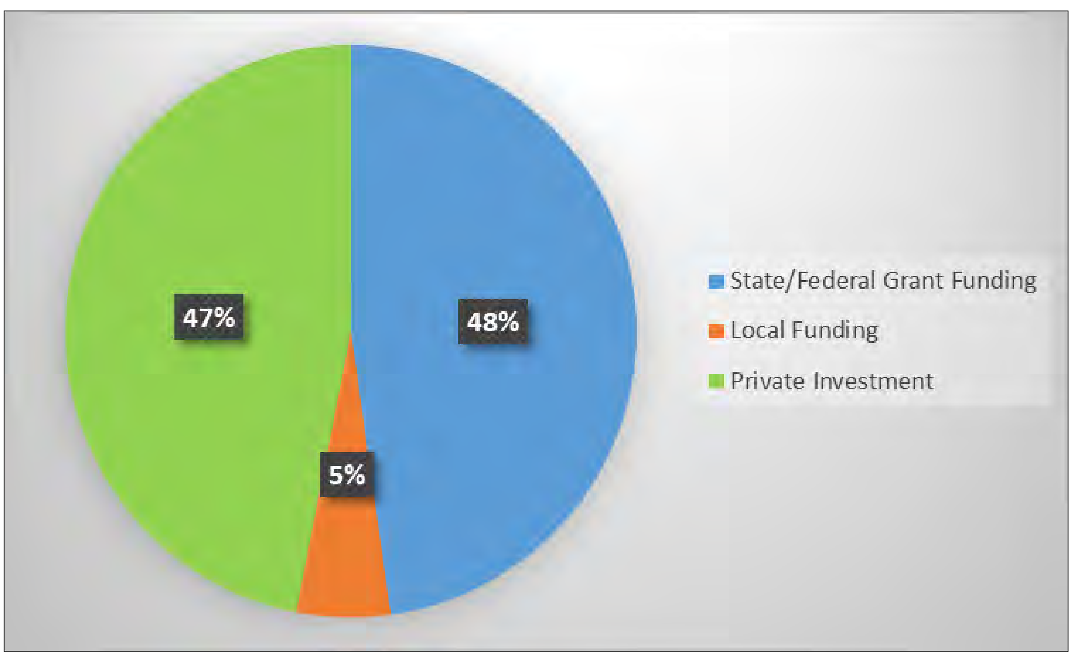
Project Reference #	Project Name/Description	Estimated Cost	State/Federal Grant Funding	Local Funding	Private Funding
S18	(1) 100 x 100' box hangar with vehicle parking - West apron	$192,000.00			$192,000.00
S19	(1) 100 x 100' box hangar with vehicle parking - West apron	$2,059,000.00			$2,059,000.00
S20	Replace airfield lighting vault	$280,000.00	$252,000.00	$28,000.00	
S21	Replace airfield lighting vault	$2,585,000.00	$2,326,500.00	$258,500.00	
S22	Runway 9/27 MIRL and PAPI replacement (LED)	$66,000.00	$59,400.00	$6,600.00	
S23	Runway 9/27 MIRL and PAPI replacement (LED)	$459,000.00	$413,100.00	$45,900.00	
S24	80'x 50' hangar and apron, rehab adjacent T-hangar apron (10,577 SY)	$370,000.00			$370,000.00
S25	80'x 50' hangar and apron, rehab adjacent T-hangar apron (10,577 SY)	$5,192,000.00			$5,192,000.00

Source: Costs reflect current 2023 dollars without any inflation factor applied for out years and should be used for planning purposes only. Engineering/design and construction costs are inclusive. All hangar development is shown as being privately financed. However, the Airport may choose to utilize NPE funds if all other aeronautical needs are met.

FIGURE 6-1
SHORT TERM PHASE DEVELOPMENT COSTS
STINSON MUNICIPAL AIRPORT



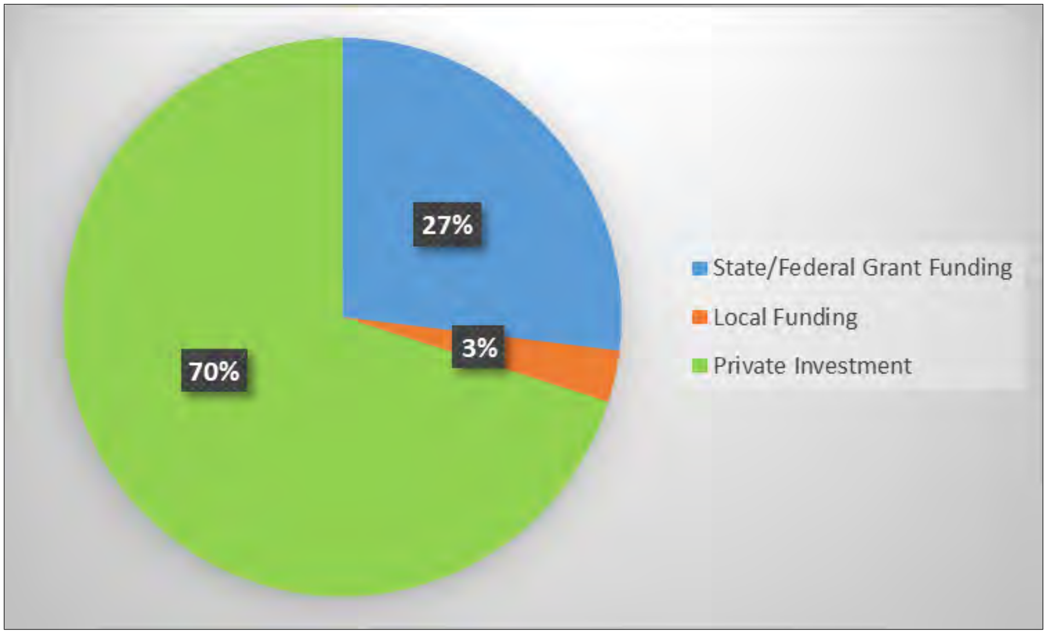
Source: Garver, 2023

TABLE 6-8
MID TERM PHASE DEVELOPMENT COSTS
STINSON MUNICIPAL AIRPORT

Project Reference #	Project Name/Description	Estimated Cost	State/Federal Grant Funding	Local Funding	Private Funding
M1	Apron taxilane to serve subsequent hangars and connection to Taxiway E	$2,648,000.00	$2,383,200.00	$264,800.00	
M2	(2) 100 x 100' box hangars with vehicle access and parking & non-eligible apron	$4,958,000.00			$4,958,000.00
M3	South Main apron rehabilitation (13,318 SY)	$1,415,000.00	$1,273,500.00	$141,500.00	
M4	(1) 100 x 100' box hangar (redevelopment)	$2,660,000.00			$2,660,000.00
M5	(1) 100 x 100' box hangar (redevelopment)	$2,699,000.00			$2,699,000.00
M6	(1) 100 x 100' box hangar (redevelopment)	$2,545,000.00			$2,545,000.00
M7	Taxiway B & C pavement and lighting rehabilitation	$1,051,000.00	$945,900.00	$105,100.00	
M8	Vertical Take-off and Landing Facility	$3,383,000.00			$3,383,000.00
M9	Runway 14/32 PAPI replacement (LED)	$498,000.00	$448,200.00	$49,800.00	
M10	(3) 100 x 100' box hangars with vehicle parking & non-eligible apron	$6,319,000.00			$6,319,000.00
M11	Apron and taxilane with connection to Taxiway C	$7,022,000.00	$6,319,800.00	$702,200.00	
M12	(4) 100 x 100' box hangars with vehicle access and parking & non-eligible apron	$7,043,000.00			$7,043,000.00

Source: Costs reflect current 2023 dollars without any inflation factor applied for out years and should be used for planning purposes only. Engineering/design and construction costs are inclusive. All hangar development is shown as being privately financed. However, the Airport may choose to utilize NPE funds if all other aeronautical needs are met.

FIGURE 6-2
MID TERM PHASE DEVELOPMENT COSTS
STINSON MUNICIPAL AIRPORT



Source: Garver, 2023

TABLE 6-9
LONG TERM PHASE DEVELOPMENT COSTS
STINSON MUNICIPAL AIRPORT

Project Reference #	Project Name/Description	Estimated Cost	State/Federal Grant Funding	Local Funding	Private Funding
L1	Central Apron rehabilitation (29,369 SY)	$2,571,000.00	$2,313,900.00	$257,100.00	
L2	North Apron rehabilitation (3,257 SY)	$555,000.00	$499,500.00	$55,500.00	
L3	Taxiway A pavement and lighting rehabilitation	$2,098,000.00	$1,888,200.00	$209,800.00	
L4	Runway 14/32 pavement and lighting rehabilitation	$6,029,000.00	$5,426,100.00	$602,900.00	
L5	FBO and vehicle parking, non-eligible apron	$4,457,000.00			$4,457,000.00
L6	Remaining center sod apron with taxilane and connection to Taxiway D	$4,759,295.20	$4,283,365.68	$475,929.52	
L7	Fuel farm and apron	$3,031,000.00			$3,031,000.00
L8	(4) 100 x 100' box hangars with vehicle parking & non-eligible apron	$7,040,000.00			$7,040,000.00
L9	Runway 9/27 pavement and lighting rehabilitation	$5,253,000.00	$4,727,700.00	$525,300.00	

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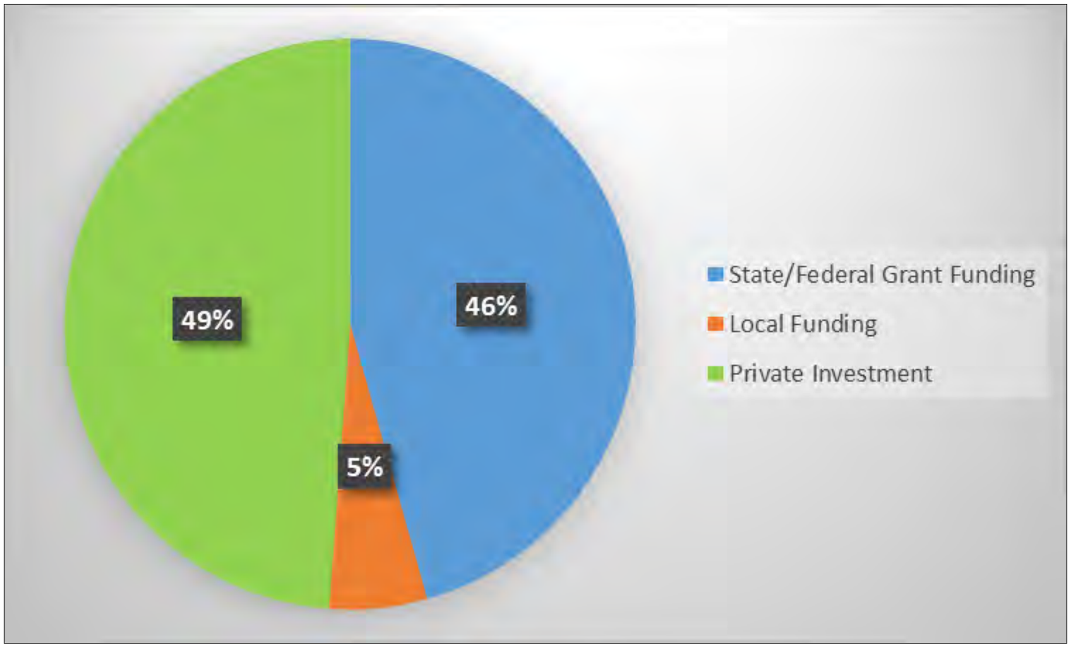
Project Reference #	Project Name/Description	Estimated Cost	State/Federal Grant Funding	Local Funding	Private Funding
L10	Taxilane connection from 80x80' hangars to TWY D	$2,110,000.00	$1,899,000.00	$211,000.00	
L11	(2) 80 x 80' hangars with apron and vehicle access and parking	$3,525,000.00			$3,525,000.00
L12	(2) 80 x 80' hangars with apron and vehicle parking	$3,525,000.00			$3,525,000.00
L13	(2) 80 x 80' hangars with apron and vehicle parking	$3,525,000.00			$3,525,000.00
L14	(2) 80 x 80' hangars with apron and vehicle parking	$3,525,000.00			$3,525,000.00
L15	Taxilane extension to 210 x 250' hangars	$3,783,000.00	$3,404,700.00	$378,300.00	
L16	(1) 210x250' hangar with vehicle access & parking, non-eligible apron	$6,201,000.00			$6,201,000.00
L17	(1) 210x250' hangar with vehicle parking, non-eligible apron	$6,201,000.00			$6,201,000.00
L18	99th St Access Road Extension with Gate	$479,000.00		$479,000.00	
L19	Taxilane extension to 100 x 100' hangars	$1,786,000.00	$1,607,400.00	$178,600.00	
L20	(1) 100x100' hangar with vehicle access & parking, non-eligible apron	$3,107,000.00			$3,107,000.00
L21	(1) 100x100' hangar with vehicle parking, non-eligible apron	$3,107,000.00			$3,107,000.00
L22	(1) 100x100' hangar with vehicle parking, non-eligible apron	$3,107,000.00			$3,107,000.00

Source: Costs reflect current 2023 dollars without any inflation factor applied for out years and should be used for planning purposes only. Engineering/design and construction costs are inclusive. All hangar development is shown as being privately financed. However, the Airport may choose to utilize NPE funds if all other aeronautical needs are met.

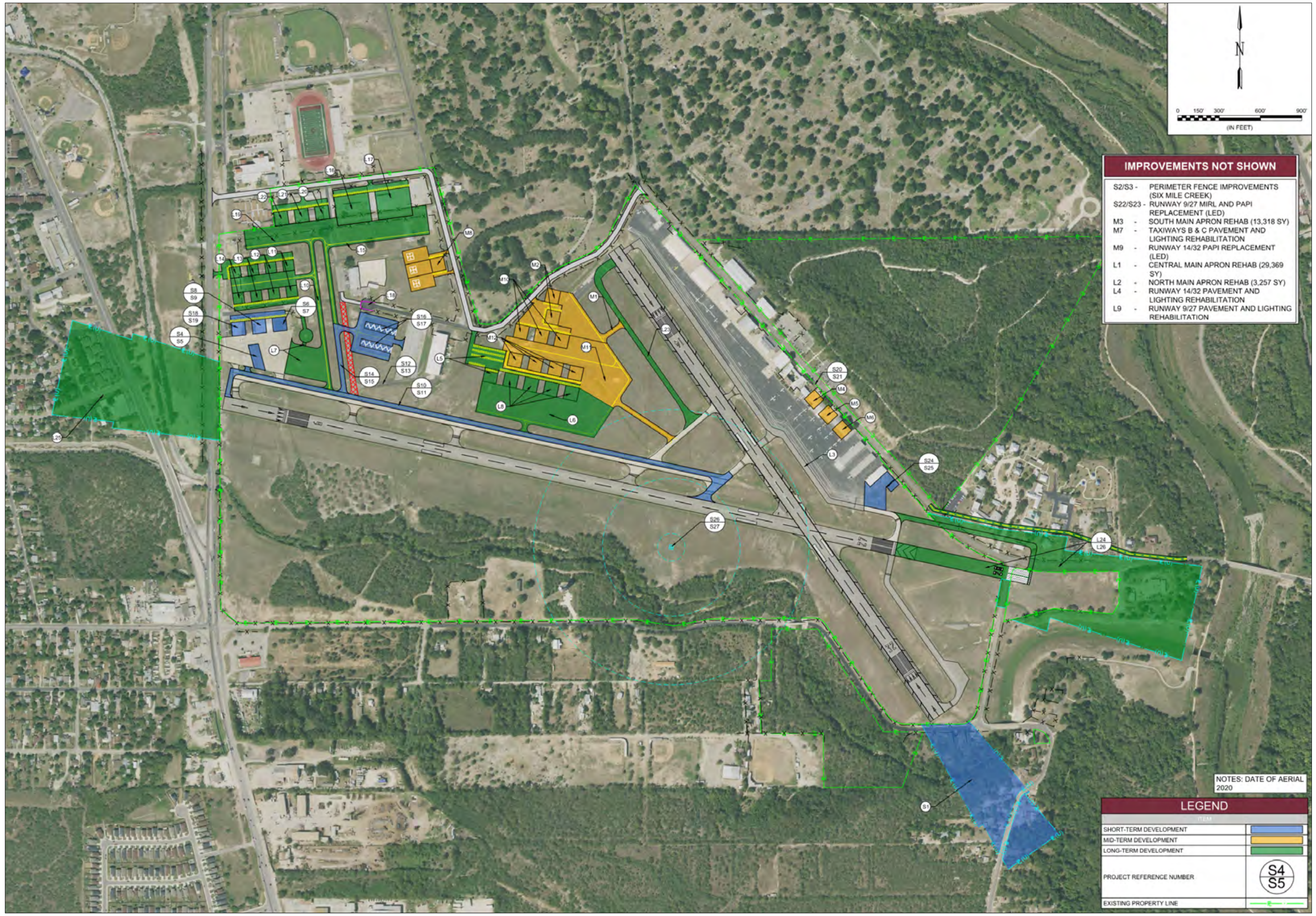
FIGURE 6-3
LONG TERM PHASE DEVELOPMENT COSTS
STINSON MUNICIPAL AIRPORT



Source: Garver, 2023

To supplement the information provided by the phased project list and development cost estimates, a composite CIP graphic has been created that depicts the development projects shown in the CIP (**Figure 6-4**).

FIGURE 6-4
CIP COMPOSITE DRAWING
STINSON MUNICIPAL AIRPORT



Source: Garver, 2023

CIP 2024-2028

Table 6-10 provides a year-by-year CIP for SSF for key projects from 2024–2028. The trigger point for all of these projects has already been achieved. These projects primarily focus on improving airfield safety and security, including resolution of FAA design deficiencies, and pavement rehabilitation.

TABLE 6-10
5 YEAR CIP
STINSON MUNICIPAL AIRPORT

CIP Year	Project Type	Project Name	Total Cost	Federal/ State Grants	Local Funding	Trigger
FY 24	CONSTRUCTION	**Replace airfield lighting vault**	$2,585,000	$0	$2,585,000	Existing airfield lighting vault is exhibiting signs of structural failure and needs to be replaced.
	DESIGN	**Perimeter Fence Improvements (Six Mile Creek)**	$200,000	$180,000	$20,000	Previous security issues related to security vulnerability.
FY 25	LAND ACQUISITION	**Runway 32 RPZ Property Acquisition**	$1,500,000	$1,350,000	$150,000	Property within the Runway 32 RPZ is not owned by the airport.
	CONSTRUCTION	**Perimeter Fence Improvements (Six Mile Creek)**	$1,190,000	$1,071,000	$119,000	Previous security issues related to security vulnerability.
FY 26	DESIGN	**West apron rehab/infill**	$76,000	$68,400	$7,600	Existing apron pavement has deteriorated and needs to be rehabilitated. Cut out area between existing hangars to be filled to support redevelopment of the area.
	DESIGN	**Mid-Field Apron and Taxilane Rehab**	$233,000	$209,700	$23,300	Existing apron pavement surrounding the Texas Air Museum and T-hangar area is considered to be in poor condition. Additionally, Taxiway D2 to be realigned to eliminate direct apron to runway access and to support development of new taxilane to T-hangar development area.
FY 27	CONSTRUCTION	**West apron rehab/infill**	$947,000	$852,300	$94,700	Existing apron pavement has deteriorated and needs to be rehabilitated. Cut out area between existing hangars to be filled to support redevelopment of the area.
FY 28	CONSTRUCTION	**Mid-Field Apron and Taxilane Rehab**	$2,831,000	$2,547,900	$283,100	Existing apron pavement surrounding the Texas Air Museum and T-hangar area is considered to be in poor condition. Additionally, Taxiway D2 to be realigned to eliminate direct apron to runway access and to support development of new taxilane to T-hangar development area.
		Totals:	**$9,562,000**	**$6,279,300**	**$3,282,700**	

Source: Garver, 2023

Runway 27 ROFA MOS

A

U.S. Department
of Transportation

**Federal Aviation
Administration**

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Federal Aviation Administration
Fort Worth, TX 76137

October 08, 2015

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125 E. 11th St.
Austin, TX 78701
ksnodgr@dot.state.tx.us

RE: *(See attached Table 1 for referenced case(s))*
FINAL DETERMINATION

Table 1 - Letter Referenced Case(s)

ASN	Prior ASN	Location	Latitude (NAD83)	Longitude (NAD83)	AGL (Feet)	AMSL (Feet)
2015-ASW-5310-NRA		SAN ANTONIO, TX	29-20-13.14N	98-28-15.76W	1	578

Description: Request for modification of standards to the OFA.

We do not object to the construction described in this proposal provided:

You comply with the requirements set forth in FAA Advisory Circular 150/5370-2, "Operational Safety on Airports During Construction."

A separate notice to the FAA is required for any construction equipment, such as temporary cranes, whose working limits would exceed the height and lateral dimensions of your proposal.

This determination does not constitute FAA approval or disapproval of the physical development involved in the proposal. It is a determination with respect to the safe and efficient use of navigable airspace by aircraft and with respect to the safety of persons and property on the ground.

In making this determination, the FAA has considered matters such as the effects the proposal would have on existing or planned traffic patterns of neighboring airports, the effects it would have on the existing airspace structure and projected programs of the FAA, the effects it would have on the safety of persons and property on the ground, and the effects that existing or proposed manmade objects (on file with the FAA), and known natural objects within the affected area would have on the airport proposal.

When your Airport Layout Plan is updated, please include this new development. In the meantime, we will show this feature on your current ALP approved on 1/31/2008.

This determination expires on April 8, 2017 unless:
(a) extended, revised or terminated by the issuing office.
(b) the construction is subject to the licensing authority of the Federal Communications Commission (FCC) and an application for a construction permit has been filed, as required by the FCC, within 6 months of the date of this determination. In such case, the determination expires on the date prescribed by the FCC for the completion of construction, or the date the FCC denies the application.

NOTE: Request for extension of the effective period of this determination must be obtained at least 15 days prior to expiration date specified in this letter.

If you have any questions concerning this determination contact Steven Cooks (817) 222-5608 steven.cooks@faa.gov.

Steven Cooks
ADO

FAA SOUTHWEST REGION
MODIFICATION OF AIRPORT STANDARDS

BACKGROUND

1. AIRPORT:	2. LOCATION (CITY, STATE):	3. LOC ID:
Stinson Municipal Airport	**San Antonio, Texas**	**KSSF**
4. EFFECTED RUNWAY/TAXIWAY: **Runway 9-27**	5. APPROACH (EACH RUNWAY): ☐ PIR ☒ NPI (32) ☒ VISUAL (9-27 & 14)	6. AIRPORT REF. CODE (ARC): **B-II**
7. DESIGN AIRCRAFT (EACH RUNWAY/TAXIWAY): **Citation 550 (Runway 9-27)**	8. DATE OF LATEST FAA SIGNED ALP: **January 2008**	

MODIFICATION OF STANDARDS

9. TITLE OF STANDARD BEING MODIFIED (CITE REFERENCE DOCUMENT):

Runway Object Free Area (AC 150/5300-13A, *Airport Design,* Change 1)

10. STANDARD/REQUIREMENT:

Per AC 150/5300-13A, the Runway Object Free Area (ROFA) for a B-II visual runway must meet the following geometric standards:

Width – 500 feet (250 feet from centerline)
Length Beyond/Prior to Runway end – 300 feet

Per the prescribed standards, the ROFA must be cleared of items of items non-essential for air navigation.

11. DESCRIBE PROPOSED MODIFICATION:

Allow for a corner crossing of the perimeter fence on the northeast corner of the ROFA for Runway 9-27 (see attached Exhibit).

12. EXPLAIN WHY STANDARD CANNOT BE MET (FAA ORDER 5300.1F):

The dimensional standards depicted on the most recently approved ALP are B-I. Runway 9-27's current and projected activity indicates a B-II RDC. In recognition of this change in operations, the ALP is being revised to reflect existing B-II design standards, which results in a larger ROFA.

There is currently a fence associated with the property line that crosses the outer corner of the B-II ROFA off the departure end of Runway 9/approach end of Runway 27.

13. DISCUSS VIABLE ALTERNATIVES (FAA ORDER 5300.1F):

There are 2 alternatives to the proposed modification of standards:

1) **The fence could be relocated to allow the ROFA to be unimpeded. However, the fence mirrors the property line of the airport and the Right of Way limits of Mission Road, which is part of a historical district. The distance between the fence and the road pavement is approximately 27 feet, and contains a steep drainage ditch. Moving the fence would require acquisition of easements or potential roadway relocation, and placing the fence such that it crosses through a steep ditch.**
2) **The threshold of Runway 27 could be displaced by 42 feet to allow the ROFA to clear the fence. This action would reduce landing distance available on Runway 27 and reduce accelerate-stop distance available on Runway 9, which lessens the viability and usability of the 5,000-foot runway, which was recently extended. Displacement of the threshold also involves additional costs such as lighting and electrical infrastructure relocation for the edge and threshold lights, installation of additional threshold lights, relocation of the PAPI, and pavement marking removal and reinstallation.**

14. STATE WHY MODIFICATION WOULD PROVIDE ACCEPTABLE LEVEL OF SAFETY FOR MODIFICATION TO AIRPORT DESIGN STANDARDS OR ACCEPTABLE FINISHED PRODUCT WILL PERFORM FOR INTENDED DESIGN LIFE FOR MODIFICATIONS TO MATERIAL, CONSTRUCTION OR EQUIPMENT STANDARDS OR NECESSARY TO CONFORM TO LOCAL LAWS (FAA ORDER 5300.1F): **The proposed modification would provide an acceptable level safety due to the fact that the area of the ROFA impacted by the fence is on the farthest corner of the surface from the runway threshold, well away from the central portion of the ROFA and the Runway Safety Area, which is unaffected.**		
ATTACH ADDITIONAL SHEETS AS NECESSARY – INCLUDE SKETCH/PLAN		
15. SIGNATURE OF ORIGINATOR:	16. ORIGINATOR'S ORGANIZATION: Kimley-Horn and Associates Inc.	17. TELEPHONE: (678) 533-3944
18. SIGNATURE OF SPONSOR (Authorized Representative)		19. TELEPHONE: (210) 207-1800
Typed Name of Sponsor **Morris Martin,** Airport Manager, Stinson Municipal Airport		

USER'S GUIDE
FAA SOUTHWEST REGION
MODIFICATION OF AIRPORT DESIGN STANDARDS FORM

ITEMS 1-19 ARE TO BE COMPLETED BY THE AIRPORT SPONSOR(ORIGINATOR). ALL OTHER ITEMS WILL BE COMPLETED BY THE FAA.

THE COMPLETED FORM WILL BE TRANSMITTED BY THE ORIGINATOR TO THE APPLICABLE ADO/AFO. THE ADO/AFO WILL TRANSMIT THE FINAL FAA DETERMINATION TO THE ORIGINATOR.

MODIFICATION TO AIRPORT DESIGN STANDARDS REQUESTS SHOULD INCLUDE SKETCHES OR DRAWINGS WHICH CLEARLY ILLUSTRATE THE NONSTANDARD CONDITION.

ITEMS

1. LEGAL NAME OF AIRPORT.

2. ASSOCIATED CITY.

3. AIRPORT LOCATION IDENTIFIER (SEE APPROACH PLATES/AIRPORT FACILITY DIRECTORY).

4. IDENTIFY THE RUNWAY(S), TAXIWAY(S) OR OTHER FACILITIES EFFECTED BY THE PROPOSED MODIFICATION TO STANDARDS REQUEST.

5. IDENTIFY THE MOST CRITICAL APPROACH FOR EACH RUNWAY IDENTIFIED IN #4.

6. AIRPORT REFERENCE CODE - SEE PARAGRAPH 2, PAGE 1 AC 150/5300-13(CHANGE 4) - I.E. C-II, B-II, A-I (SMALL).

7. NOTE THE DESIGN AIRCRAFT (ARC OR SPECIFIC AIRCRAFT) FOR EACH FACILITY IDENTIFIED IN #4. A DESIGN AIRCRAFT MUST MAKE REGULAR USE OF THE FACILITY. NORMALLY, FAA CONSIDERS REGULAR USE TO BE 500 OR MORE ANNUAL INTINERANT OPERATIONS.

IF THE AIRPORT SERVES A WHOLE FAMILY OF AIRCRAFT IN A PARTICULAR GROUP, THE ARC (I.E. B-II) SHOULD BE SPECIFIED. IF, HOWEVER, THE AIRPORT IS USED BY ONLY 1 OR 2 OF A FAMILY OF AIRCRAFT (IX- BEECH KING AIR C90), THE MOST DEMANDING (APPROACH SPEED, WINGSPAN) AIRCRAFT SHOULD BE SPECIFIED.

8. SELF-EXPLANATORY.

9. IDENTIFY THE SPECIFIC NAME OF THE STANDARD THAT IS PROPOSED TO BE MODIFIED FOR THE SUBJECT LOCAL CONDITION.

10. DESCRIBE (WORDS AND NUMBERS) THE DIMENSIONS AND REQUIREMENTS OF THE STANDARD AS PROVIDED IN AC 150/5300-13.

11. STATE THE PROPOSED MODIFICATION TO THE STANDARD.

12. DISCUSS THE LOCAL CONDITIONS THAT MAKE IT IMPRACTICAL OR IMPOSSIBLE TO MEET THE STANDARD.

13. IDENTIFY ALTERNATIVES TO THE SUBJECT PROPOSED MODIFICATION, AND SHOW WHY THESE ALTERNATIVES ARE NOT VIABLE.

14. DISCUSS HOW THE PROPOSED MODIFICATION WOULD IMPACT AIRPORT SAFETY AND EXPLAIN WHY AN ACCEPTABLE LEVEL OF SAFETY WOULD STILL EXIST.

15. TYPED NAME AND SIGINATURE OF AIRPORT AUTHORITY REPRESENTATIVE.

16. SELF-EXPLANATORY.

17. SELF-EXPLANATORY.

18. SELF-EXPLANATORY.

19. SELF-EXPLANATORY

20. TO BE COMPLETED BY FAA.

FAA SOUTHWEST REGION
MODIFICATION OF AIRPORT STANDARDS

20. ADO RECOMMENDATION:	21. SIGNATURE:	22. DATE:

23. FAA DIVISIONAL REVIEW (AT, AF, FS):

ROUTING SYMBOL	SIGNATURE	DATE	CONCUR	NON-CONCUR

COMMENTS:

24. AIRPORTS' DIVISION FINAL ACTION:

☐ UNCONDITIONAL APPROVAL	☐ CONDITIONAL APPROVAL	☐ DISAPPROVAL

DATE:	SIGNATURE:	TITLE:

CONDITIONS OF APPROVAL:

Scale: 1" = 100'

STINSON MUNICIPAL AIRPORT

Exhibit 1

Runway 27 - Proposed ROFA Modification of Standard

Stinson Municipal Airport

Airport Layout Plan

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