SAN MARCOS
REGIONAL AIRPORT

San Marcos Regional Airport Master Plan Update

October 2020(ORIGINAL)
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TABLE OF CONTENTS

CHAPTER 1 Introduction

CHAPTER 2 Inventory

CHAPTER 3 Activity Forecasts

CHAPTER 4 Facility Requirements

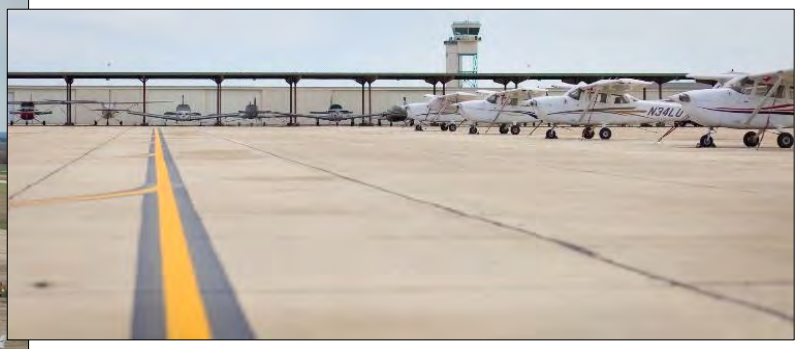
CHAPTER 5 Alternatives

CHAPTER 6 Capital Improvement Program and Financial Plan

APPENDIX A Airport Layout Plan

CHAPTER 1

Introduction



CHAPTER 1: INTRODUCTION

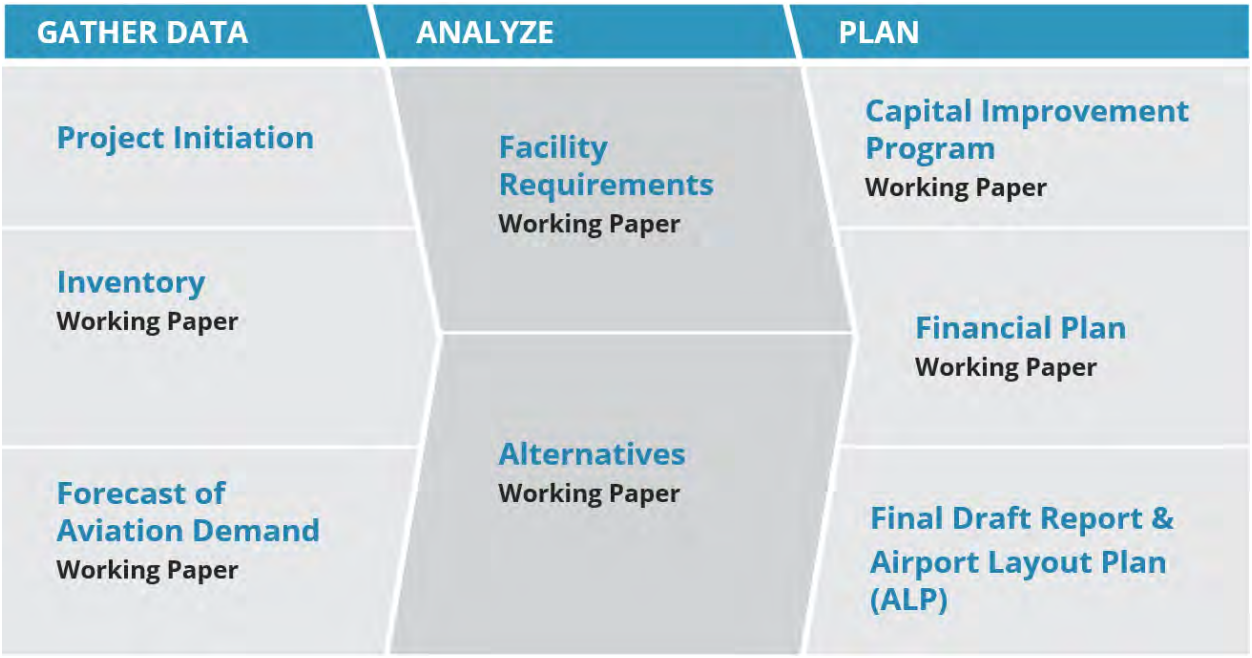
INTRODUCTION AND PURPOSE

An Airport Master Plan (AMP) evaluates an airport's physical facilities, management principals, 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. The San Marcos Regional Airport (HYI) has had some significant changes since the previous airport master plan was completed in 2001. These changes include changes in area economic conditions, increased based aircraft demand, and changes in fleet mix.

This master plan 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 San Marcos Regional Airport. Additionally, the master plan will serve as a tool to aid airport officials in their decision-making regarding San Marcos Regional Airport's upkeep and future development.

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

FIGURE 1-1
AIRPORT MASTER PLAN PROCESS
SAN MARCOS REGIONAL AIRPORT



In addition to the AMP report, an Airport Layout Plan (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 AMP process a Strengths, Weaknesses, Opportunities, and Threats (SWOT) analysis was completed to identify key items that needed to be considered during the AMP process. The SWOT analysis was completed with input from numerous stakeholders including:

- City of San Marcos
- Airport Advisory Commission
- Greater San Marcos Partnership
- TxDOT Aviation
- Texas Aviation Partners
- Airport Tenants

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

FIGURE 1-2
SWOT ANALYSIS
SAN MARCOS REGIONAL AIRPORT

CHAPTER 2

Inventory

CHAPTER 2: INVENTORY

FACILITIES INVENTORY

As the initial step in the airport master planning process, the inventory is a systematic data collection process that provides an understanding of past and present aviation factors associated with the San Marcos Regional Airport (HYI). A comprehensive inventory, including the following major inventory tasks, was completed to form the basis for airport recommendations throughout the remainder of the Airport Master Plan.

- An on-site inspection of existing facilities was conducted over the course of multiple days to ensure an accurate inventory of airport facilities, equipment, and services.
- Discussions with Airport, local officials, airport users, and airport tenants regarding recent airport trends, operations, infrastructure, and services.
- The collection of airport data and aeronautical background information; a review of historical airport documents, previous airport layout plans, maps, charts, 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.

AIRPORT OWNERSHIP

The San Marcos Regional Airport is managed by Texas Aviation Partners (TAP), a private firm, via an airport management contract with the airport's sponsor – the City of San Marcos. The City Council for the City of San Marcos provides review and approval of all major fund expenditures and development decisions related to airport infrastructure.

The airport also has an Airport Advisory Board that is appointed by the City Council. The responsibilities of the Airport Advisory Board are set forth in the City of San

Marcos' municipal code. The board's responsibility is to advise the City Council, City Manager, and airport management on the following matters:

- ✈ Methods and matters in recruiting and creating interest in the airport.
- ✈ Planning and developing airport services and expansion.

AIRPORT HISTORY

The San Marcos Regional Airport was originally developed as a military airfield (called Gary Air Force Base) in the 1940s to support military flight training operations. The airport continued to be used as a military airfield until the 1960s. In 1966, the airfield was deeded to the City of San Marcos and civil aircraft operations at the airport commenced. When the airport was originally developed, it had four runways. Three of the original runways remain. Runway 4/22 was decommissioned in 2001 and converted into a taxiway – Taxiway Juliet. The original runways were 150 feet in total width. All three of the current runways have since been narrowed to 100 feet in width.

AIRPORT BUSINESS DEVELOPMENT PLAN

An Airport Business Development Plan (ABDP) was completed for the San Marcos Regional Airport in 2013 through a federal grant administered by TxDOT Aviation. The study was led by TAP in collaboration with the City of San Marcos and other partners. The focus of the ABDP was to provide a strategic direction for infrastructure and policy development at the Airport. The ABDP included a high-level inventory of airport facilities, an analysis of the Airport's competitive position compared to other airports, and a detailed list of near term goals and development objectives. As part of the plan, the following vision statement was developed for the Airport:

"San Marcos Regional Airport will be a premier gateway to the Central Texas region acting as a catalyst for jobs, investment, and innovation by leveraging the area's emerging economic strengths."

The vision and goals established as part of the ABDP will be a key consideration throughout the master planning process.

AIRPORT ECONOMIC IMPACT

In 2018, the Texas Department of Transportation – Aviation Division (TxDOT Aviation) completed an economic impact study quantifying the economic impact of airports throughout the State of Texas. The study estimated that the total economic impact of the San Marcos Regional Airport to be:

- 664 Total Jobs
- $22.7 Million in Payroll
- $82.1 Million in Economic Output

Of the 264 general aviation airports within the State of Texas, the San Marcos Airport is within the top 15 in total economic output. This indicates that the San Marcos Regional Airport is a thriving airport surrounded by a strong business and airport user community.

AIRPORT ROLE

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

- Designated as a "Reliever" airport under the Texas Airport System Plan.
- Designated as a "National" airport in the NPIAS.
- Identified by the FAA's Asset study as a "Regional" reliever airport.

TEXAS AIRPORT SYSTEM PLAN (TASP) ROLE

The TASP describes reliever airports as those airports surrounded by a major metropolitan area that provide facilities to relieve congestion at larger commercial service airports in the area. Currently, the San Marcos Regional Airport is designated as a reliever airport for both Austin-Bergstrom International Airport (AUS) and the San Antonio International Airport (SAT). According to the TASP, reliever airports accommodate various class of aircraft (e.g. jets, twin-engine aircraft, single engine aircraft, etc.) and must currently have or be forecasted to have at least 100 based aircraft or 25,000 annual itinerant operations. The San

Marcos Regional Airport currently meets both of these requirements with approximately 200 based aircraft and 39,635 itinerant operations in FY2018.

The TASP does not have any specific minimum design standards for reliever airports. However, the TASP states that reliever airports typically have an Airport Reference Code (ARC) of C-II or D-II. According to the San Marcos Regional Airport's current Airport Layout Plan (ALP), the current ARC for the Airport is C-II.

FAA National Plan of Integrated Airport Systems (NPIAS) Role

The FAA's National Plan of Integrated Airport Systems (NPIAS) sets minimum standards used to identify airports that are critical to the national air transportation system and are consequently, eligible for federal grant funds through the FAA's Airport Improvement Program (AIP). The NPIAS report is updated bi-annually and presents a rolling five-year plan related to airport infrastructure and development needs. The most recent NPIAS plan was presented to Congress on September 26, 2018 and is for Fiscal Years (FY) 2019 – 2023. The NPIAS currently includes 3,328 airports in the United States.

Within the NPIAS, airports are classified into one of several categories. Currently, the San Marcos Regional Airport is categorized as a "National" airport under the NPIAS. The NPIAS states that national airports are located in metropolitan areas near major business centers and support flying throughout the nation and world. National airports provide pilots with attractive alternatives to busier primary airports. Of the 3,328 airports identified in the NPIAS, 88 airports in the United States are categorized as "National" airports.

FAA General Aviation Airport: A National Asset Study

Beginning in 2010, the FAA began a national review of general aviation airports and their impact within the United States. The study, released in 2012, highlighted a number of benefits of general aviation airports and their impact on the communities they serve. According to the report, the San Marcos Regional Airport is classified as a "Regional" airport. The study goes on to state that regional airports are airports located in metropolitan areas and serve relatively large populations. These airports typically have a substantial amount of charter, jet, and rotorcraft flights.

AIRPORT DESIGN STANDARDS

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. The runway with the highest RDC is used to establish an airport's Airport Reference Code (ARC).

A runway's RDC is defined by three variables:

1. Aircraft Approach Category (AAC) – The approach speed of the critical aircraft;
2. Aircraft Design Group (ADG) – The wingspan and tail height of the critical aircraft; and,
3. Approach Visibility Minimums – Lowest approach visibility minimums for the runway.

The critical 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).

Table 2-1 defines the AAC categories. **Table 2-2** documents the ADG categories. **Table 2-3** describes the various approach visibility minimums 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 m)	< 49' (< 15 m)
II	20' - < 30' (6 m - < 9 m)	49' - < 79' (15 m - < 24 m)
III	30' - < 45' (9 m - < 13.5 m)	79' - < 118' (24 m - < 36 m)
IV	45' - < 60' (13.5 m - < 18.5 m)	118' - < 171' (36 m - < 52 m)
V	60' - < 66' (18.5 m - < 20 m)	171' - < 214' (52 m - < 65 m)
VI	66' - < 80' (20 m - < 24.5 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)
5000	Not lower than 1 mile
4000	Lower than 1 mile but not lower than ¾ mile
2400	Lower than 3/4 mile but not lower than 1/2 mile
1600	Lower than 1/2 mile but not lower than 1/4 mile
1200	Lower than 1/4 mile

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

Based on the application of FAA airport design criteria, the TASP, a review of the existing facilities, and a review of the current San Marcos Regional Airport's Airport Layout Plan (ALP), the runways at the Airport carry the following RDC's:

- Runway 13/31 – C-II-2,400
- Runway 8/26 – B-II-4,000
- Runway 17/35 – B-II-4,000

With a C-II-2,400 RDC, Runway 13/31 is the runway with the highest RDC at the airport. Consequently, the Airport Reference Code (ARC) for the San Marcos Regional Airport is C-II. This designation is consistent with the types of aircraft current using the Airport.

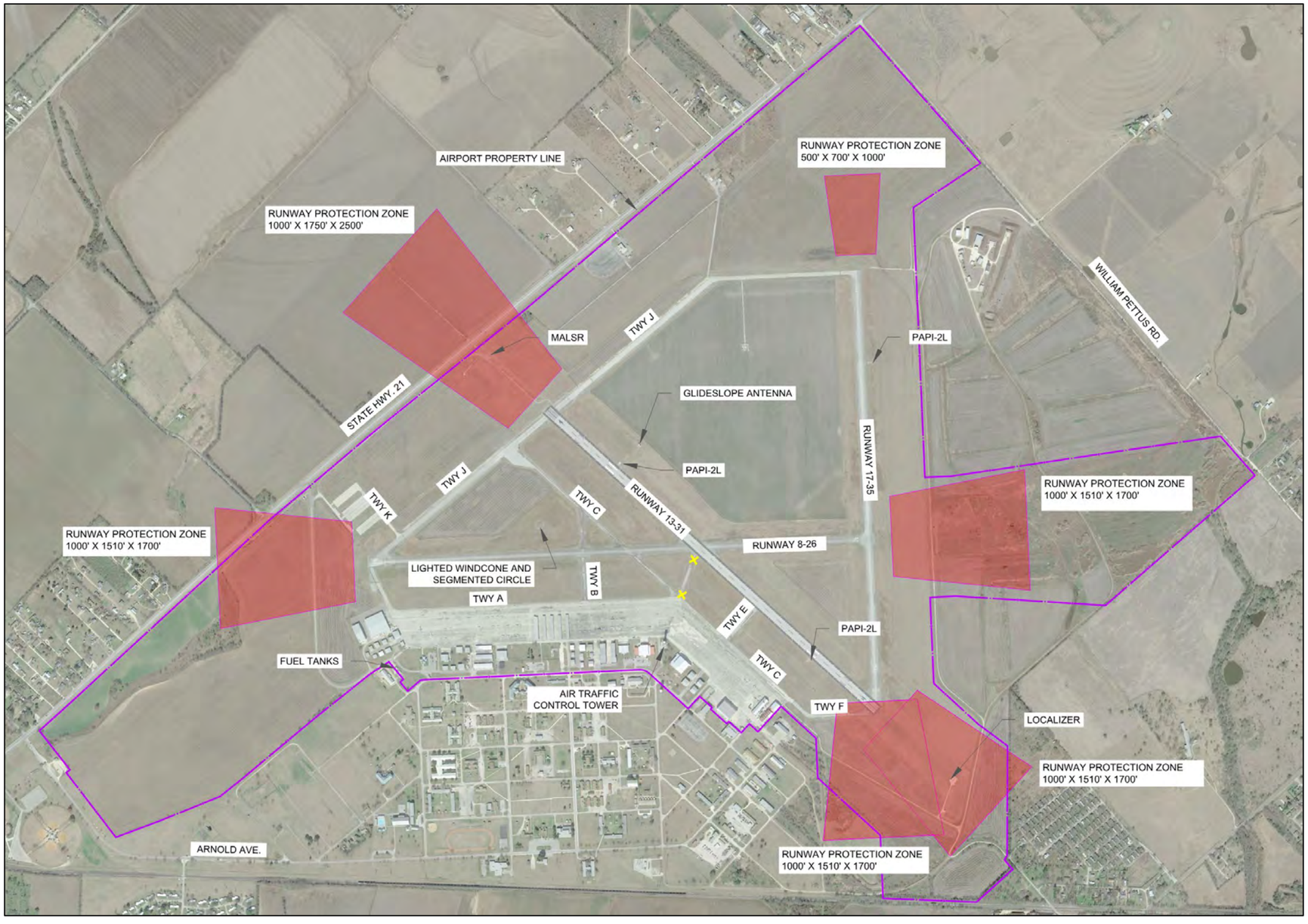
AIRFIELD FACILITIES AND CHARACTERISTICS

This section provides an inventory of the existing airside facilities at the San Marcos Regional Airport. This section specifically inventories the existing runways, taxiways, NAVAIDs, Air Traffic Control Tower (ATCT), and other airside support facilities.

AIRFIELD OVERVIEW

The San Marcos Regional Airport was initially commissioned as a military airfield in the 1940's. Since then, there have been numerous changes to the airfield. Today, as shown in **Figure 2-1**, *General Airport Layout*, the airport has three runways (Runway 8/26, 13/31 and 17/35) accompanied by seven taxiways. The airport also has numerous NAVAIDs and other support facilities that will be discussed in detail in the remainder of this section.

FIGURE 2-1
GENERAL AIRPORT LAYOUT
SAN MARCOS REGIONAL AIRPORT



RUNWAYS

The single most important asset at any airport are the runways and their associated systems and protected surfaces. **Table 2-4** provides a summary of the San Marcos Regional Airport's runways and associated systems and surfaces. The runway facilities consist of the runway pavements, markings, lighting, weather reporting systems, Navigational Aids (NAVAIDs), and protected surfaces.

TABLE 2-4
RUNWAY FACILITIES AND SYSTEMS
SAN MARCOS REGIONAL AIRPORT

	Runway 8/26	Runway 13/31	Runway 17/35
Length (feet)	6,330	5,601	5,214
Width (feet)	100	100	100
Surface Material/Treatment	Asphalt	Asphalt	Asphalt
Weight Bearing Capacity (pounds)			
Single Wheel Gear (SWG)	38,500	23,000	28,000
Dual Wheel Gear (DWG)	56,500	-	43,500
Dual Tandem Wheel (DTW)	106,000	-	-
Markings	Non-Precision	Precision	Non-Precision
Runway Lighting	MIRL	MIRL	MIRL
Approach/Lighting Aids			
Precision Approach Path Indicators	No/No	Yes/Yes	Yes/No
Runway End Identifer Lights	Yes/Yes	No/No	No/No
Approach Lights	No	MALSR - RWY 13	No
Runway Design Code (RDC)	B-II-4,000	C-II-2,400	B-II-4,000
Runway Safety Area (RSA)	150 ft. x 300 ft.	500 ft. x 1,000 ft.	150 ft. x 300 ft.
Runway Object Free Area (ROFA)	500 ft. x 300 ft.	800 ft. x 1,000 ft.	500 ft. x 300 ft.
Runway Obstacle Free Zone (OFZ)	400 ft. x 200 ft.	400 ft. x 200 ft.	400 ft. x 200 ft.
General NAVAIDS			
VOR/VORTAC	None on Airport (Closest is Randolph VORTAC - 31.4 NM)		
Weather Reporting Aids	AWOS - 3		
Air Traffic Control Tower	Attended 7 AM to 7 PM Local		

Source: FAA Airport/Facility Directory, FAA 5010 Data, Current San Marcos Airport Layout Plan (ALP), Fugro USA Land, Inc. Pavement Evaluation Report, 2019. Pavement strength numbers shown above are from a memo from Fugro USA Land, Inc. to KSA Engineers, Inc. dated February 7, 2019 discussing the structural capacity of the runways. Furgo USA Land, Inc. performed a pavement structural capacity evaluation for the airport in 2015. The pavement strength figures shown in the report differ from the figures currently shown in the current FAA Form 5010 and on the previous Airport Layout Plan.

Based on the results of an airport user/stakeholder survey and discussions with airport users and tenants, the availability of three runway to support aircraft

operations in a variety of wind conditions is a significant positive attribute of the San Marcos Regional Airport.

RUNWAY 13/31

Runway 13/31 is the primary runway at the San Marcos Regional Airport, and it is equipped with an Instrument Landing System (ILS), which provides Runway 13 with lower visibility minimums than any of the other runway end at the airport. Runway 13/31 is considered a C-II-2,400 runway under current FAA runway design standards.

Runway 13/31 is 5,601 feet in length and 100 feet in width. The runway is constructed of asphalt and is in good condition. According to the Pavement Structural Capacity Evaluation performed by Fugro USA Land, Inc. the weight bearing capacity for the runway is 23,000 lbs. single wheel. The most recent major runway rehabilitation project was completed in 2017. Runway 13/31 intersects Runway 8/26 (approximately 2,565 feet from the threshold of Runway 13) and intersects the Runway Safety Area (RSA) associated with Runway 17/35 that extends 300 ft. south of the threshold for Runway 35.

Runway 13 is equipped with an ILS system (glideslope and localizer) that is owned and maintained by the Federal Aviation Administration. Both the glideslope and the localizer appear to be in good condition. In addition to the ILS, an RNAV/GPS approach exist to Runway 13 and Runway 31. The Runway Protection Zones (RPZ) at the approach end of Runway 13 and Runway 31 protrude off airport property.

Runway 13/31 is equipped with Medium Intensity Runway Edge Lights (MIRLs), as well as a two-box Precision Approach Path Indicator (PAPI) system for each runway end. Both PAPI systems are set to a standard 3^{O} glide slope angle. Additionally, Runway 13 is equipped with a 1,400 feet Medium-Intensity Approach Light System with Runway Alignment Indicator Lights (MALSR). The MALSR is owned and maintained by the FAA. In general, the runway edge lights, PAPIs, and MALSR are in good condition. However, an issue exists with the power supply for the Runway Alignment Indicator Lights (RAILs) associated with the MALSR system. Consequently, the RAILs on the MALSR system are out of service and are expected to remain out of service in the near future due to the cost related to correcting the issue. The suspected cause of this issue is the consistent ponding that occurs south of TX-21 close to the airport fence line at the approach of Runway 13. During rain

events, water frequently ponds in this area and takes an extended amount of time to dissipate. The outage of the RAILs increases the visibility minimums of the Runway 13 ILS approach to ¾-mile. The inoperability of the RAILs system will be to be a consideration in the future development of the airport.

Both runway ends have precision instrument markings that are in good condition. The markings for Runway 13/31 supersede the markings for Runway 8/26 where the runways intersect because Runway 13/31 has lower approach minimums. The runway hold position markings associated with the runway vary from 250 feet from the runway centerline to 285 feet from the runway centerline.

Runway 13/31 is equipped with a windsock installed at the approach end of Runway 13. The windsock is located approximately 380 feet southwest of the Runway 13/31 centerline and 925 feet from the Runway 13 threshold. Additionally, a second windsock is installed close to the intersection of Runway 13/31 and Runway 8/26. This second windsock is installed southeast of the runway intersection approximately 410 feet from each runway's respective centerline.

RUNWAY 8/26

Runway 8/26 is considered a B-II-4,000 runway under current FAA runway design standards.

Runway 8/26 is 6,330 feet in length and 100 feet in width. The runway is constructed of asphalt and is in good condition. According to the Pavement Structural Capacity Evaluation performed by Fugro USA Land, Inc. the weight bearing capacity for the runway is 38,500 lbs. single wheel, 56,500 lbs. dual wheel, and 106,000 lbs. dual tandem. Runway 8/26 is the runway with the highest weight bearing capacity at the San Marcos Regional Airport. The most recent major runway rehabilitation project was completed in 1990 according to TxDOT records.

Runway 8/26 intersects Runway 13/31 (approximately 2,217 feet from the threshold of Runway 26) and intersects Runway 17/35 at the approach end of the Runway 26. It should be noted that while departures utilizing Runway 26 are infrequent, Runway 17/35 must be used as a taxiway for full-length departures on Runway 26. For this operation, Runway 17/35 is equipped with vertical runway hold position signs (a single sign on each side of Runway 8/26) but surface painted runway hold

position markings have not been installed to prevent unauthorized entry on to Runway 26.

Runway 8/26 is equipped with a RNAV/GPS approach to each runway end. The RPZ at the approach end of Runway 8 protrudes off airport property. The RPZ currently has the following dimensions - 1,000' x 1,510' x 1,700'. These dimensions correspond the to the visibility minimums for the RNAV/GPS approach procedure currently established to the end of Runway 8. However, the RPZ dimensions will be reduced and the visibility minimums increased once construction of FM 110, an elevated roadway close to the approach end of Runway 8, commences. When construction starts the RPZ will be reduced to 500' x 700' x 1,000' and the visibility minimums for the approach will be increased to 1 mile.

Runway 8/26 is equipped with MIRLs and a set of REILs at each end of the runway. The MIRLs are in good condition. The REILs are old and out of service. The need to repair/replace the REILs will be a consideration in establishing the future development plan for the airport. Neither runway end is equipped with a visual approach navigational aid such as a PAPI or a VASI (Visual Approach Slope Indicator).

Both runway ends have non-precision instrument markings that are in good condition as the runway was restriped in April 2019. The pavement markings for Runway 8/26 are superseded by the runway markings for Runway 13/31 where the two runways intersect because Runway 13/31 has lower approach minimums. The runway hold position markings associated with the runway vary from 250 feet from the runway centerline to 300 feet from the runway centerline.

Runway 8/26 is equipped with a windsock installed at the approach end of Runway 8, approximately 410 feet south of the Runway 8/26 centerline and 790 feet from the Runway 8 threshold.

RUNWAY 17/35

Runway 17/35 is considered a B-II-4,000 runway under current FAA runway design standards.

Runway 17/35 is 5,214 feet in length and 100 feet in width. The runway is constructed of asphalt and is in good condition. According to the Pavement

Structural Capacity Evaluation performed by Fugro USA Land, Inc. the weight bearing capacity for the runway is 28,000 lbs. single wheel and 43,500 lbs. dual wheel. The most recent major runway rehabilitation project was completed in 2008 according to TxDOT records. Runway 17/35 intersects Runway 8/26 approximately 1,860 feet from the threshold of Runway 35. Additionally, the RSA at the approach end of Runway 35 extends onto Runway 13/31.

The runway is equipped with MIRLs, as well as a two-box PAPI system for Runway 17. These lighting systems are in good condition.

RNAV/GPS approaches currently exist to both runway ends. The RPZ at the approach end of Runway 35 protrudes off airport property. Both runway ends have non-precision instrument markings that are in good condition as the runway was restriped in March 2019. The pavement markings for Runway 17/35 are superseded by the runway markings for Runway 8/26 where the two runways intersect because Runway 8/26 is the longer runway and because the intersection occurs close to the threshold of Runway 26. The runway hold position marking on Taxiway Juliet at the approach end of Runway 17 is approximately 200 feet from the runway centerline.

FIGURE 2-2
RUNWAY 17/35 – HOLD POSITION MARKINGS
SAN MARCOS REGIONAL AIRPORT

No runway hold position markings exist on Runway 17/35 where it intersects Runway 8/26. Since Runway 17/35 is used as a taxiway to reach the approach end of Runway 26, runway hold position markings should be installed on Runway 17/35 to protect aircraft using Runway 8/26. **Figure 2-2** identifies the locations where the additional runway hold position markings should be installed on Runway 17/35.

Runway 17/35 is equipped with a windsock installed at the approach end of Runway 17, approximately 400 feet west of the Runway 17/35 centerline and 1,010 feet from the Runway 17 threshold.

TAXIWAYS/TAXILANES

Aircraft move from the runways to the businesses/hangars on the airfield via taxiways and taxilanes. Each taxiway and taxilane is designated with a unique name and is designed to accommodate anticipated aircraft operations based on an established Taxiway Design Group (TDG) and Aircraft Design Group (ADG) for the critical aircraft expected to use the taxiway. The existing San Marcos Regional Airport's taxiway system layout, its alignment with current TDG and ADG based taxiway design standards, and the taxiway system's surface painted markings and lighting are discussed in this section.

Taxiway System Layout and Configuration

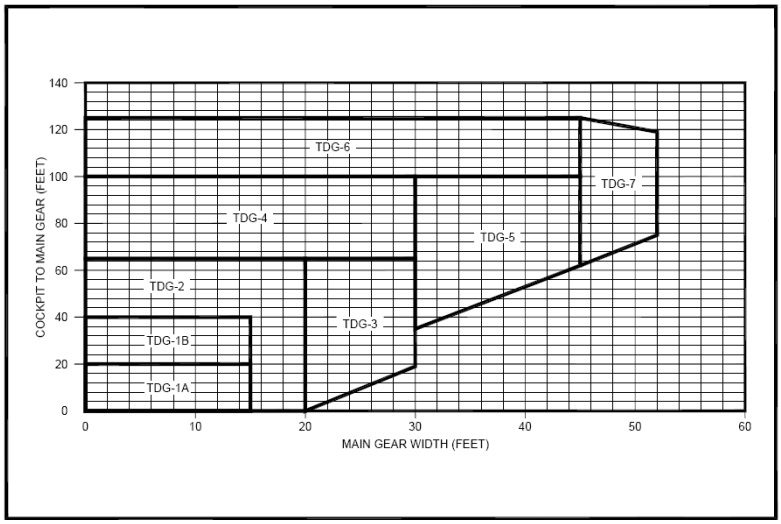
The San Marcos Regional Airport has a taxiway system that was originally designed before many of the current FAA taxiway design standards and practices were established. The airport was originally constructed as a military airfield and, consequently, many aspects of the existing airfield's taxiway layout are similar to other military fields designed around the same time (e.g. fewer taxiways, multiple runways, runways used as taxiways to reach other runways, etc.). The design standards and practices used for military airfields during that time are distinctly different from current airport design standards and practices. Current airport design standards place a strong focus on establishing the necessary runway infrastructure to meet wind coverage, capacity, and demand requirements and establishing a sophisticated taxiway system to support the safe and efficient use of the runways (e.g. full-length parallel taxiway systems, multiple runway exit taxiways, etc.).

Since the existing taxiway system at the San Marcos Regional Airport does not possess many of the attributes that make recently designed taxiway systems efficient and safer, taxiway layout is expected to be a significant consideration in the creation of the airport's future development plan.

Taxiway Design Group (TDG) Standards

The TDG is a classification system for taxiways/taxilanes based on an airplane's landing gear dimensions. Specifically, the outer to outer main gear width and the cockpit to main gear distance. The greater the distance between the main gear struts and/or the greater the distance between the nose wheel and main gear, the higher the TDG. The TDG for a given aircraft is identified by the use of **Figure 2-3,** and the application of the specific safety parameters outlined in AC 150/5300-13 (current edition).

FIGURE 2-3
TAXIWAY DESIGN GROUPS



Source: FAA AC 150/5300-13 (current edition), Airport Design

Since the taxiway system at the San Marcos Regional Airport was designed prior to the establishment of current taxiway design standards, the taxiways at the airport do not directly align with current TDG based standards for taxiway widths and fillets. However, in general, most taxiways at the airport meet the current taxiway width requirements for TDG II (35 feet in width) and TDG III (50 feet in width) standards.

Table 2-5 provides an overview of the existing taxiways at the San Marcos Regional Airport including their current width, TDG, pavement composition, pavement condition, and supporting taxiway lighting.

TABLE 2-5
TAXIWAYS
SAN MARCOS REGIONAL AIRPORT

Taxiway	Width (ft)	Material	Condition	TDG	Lighting
A (ramp area)	75	Concrete	Poor	3	MITL
A (approach of RWY 8)	50	Asphalt	Fair	3	MITL
B	40	Asphalt	Fair	2	MITL
C (north of TWY A)	42	Asphalt	Fair	2	MITL
C (south of TWY A)	50	Concrete	Poor	3	MITL
E	42	Asphalt	Fair	2	MITL
F	50	Asphalt	Fair	3	MITL
J	50	Asphalt	Good	3	MITL
K	35	Concrete	Good	2	MITL

Source: Garver.
NOTE: Pavement condition determinations were made based on general observations by Garver, input from the City of San Marcos, airport management, and TxDOT, and previous pavement studies. A Pavement Condition Index report was completed by the Texas A&M Transportation Institute in 2017 and an independent pavement evaluation was completed by Fugro USA Land, Inc. in 2015. Good, Fair, and Poor rating classifications are defined by the FAA under AC 150/5320-17A. In general, pavement classified as "good" requires minor on-going maintenance, pavement classified as "fair" requires preservative treatments, crack sealing, and surface treatment, pavement classified as "poor" requires structural improvements.

Aircraft Design Group (ADG) Standards for Taxiways

Another aspect of taxiway layout and design are 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 and 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 of the TSA and TOFA are based on the ADG (described in Table 2-2) of the critical aircraft expected to use each taxiway. Currently, the Taxiway Safety Area (TSA) is 79 feet wide and the Taxiway Object Free Area (TOFA) is 131 feet wide for all the taxiways at San Marcos Regional Airport as the airport's current critical aircraft as defined on the airport's existing Airport Layout Plan is in the ADG II category.

Taxiway Pavement Condition

As shown in Table 2-5, taxiway pavement condition will be key consideration in the development of the Airport's future development plan. The established existing taxiway pavement condition was established based on general observations by Garver, previous pavement studies, and input from TxDOT Aviation, the City of San Marcos, and Texas Aviation Partners. Multiple taxiways were classified as having "fair" or "poor" pavement condition. The taxiways aligned with the primary ramp area (e.g. Taxiway Alpha and Charlie) are in the worst condition. The airport currently is pursuing FAA supplemental discretionary funding to rehabilitate Taxiways Alpha and Charlie and has a design effort underway for the rehabilitation.

Taxiway Markings and Lighting

All taxiways at the San Marcos Regional Airport have taxiway centerline markings. The markings are generally in good to fair condition. Additionally, all taxiways at the airport have MITLs that are in good condition.

General Airfield Lighting and Signage

Sufficient airfield lighting and signage is an important part of maintaining an airfield's safe operational status. This section discusses the general airfield lighting and signage systems at the San Marcos Regional Airport that were not previously covered in the runway and taxiway sections.

Airport Beacon

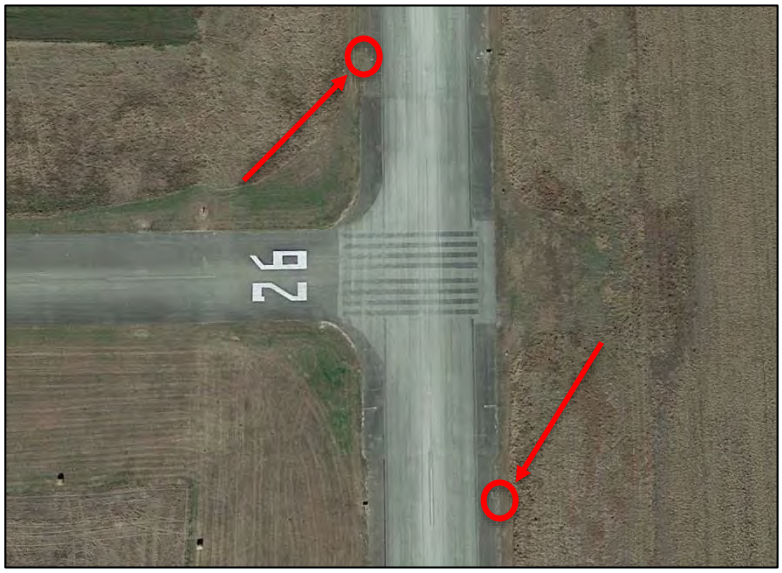
At night or in poor conditions, pilots identify an airport by locating the rotating beacon; a lighting feature designed to provide alternating white and green lights that can be seen for up to 10 miles from the airfield. The beacon at the San Marcos Regional Airport is located on top of the existing Air Traffic Control Tower (ATCT) facility and is in good condition. The airport has a back-up beacon on top of the Graham Tower, a historic World War II era control tower located at the airport, that can be used if the primary beacon fails. The back-up beacon is located approximately 1,250 ft. south of the Runway 8/26 centerline and 1,930 ft. east of the Runway 8 threshold.

Airfield Signage

Proper airfield signage is essential for promoting good situational awareness and to support pilot wayfinding as they taxi to/from the runways to other locations at the airport. Currently, the airport has an illuminated sign system across the entire airfield that generally appears to support proper wayfinding throughout the airfield environment.

There have been multiple reports of pilots taxiing northbound on Taxiway Charlie adjacent to the ramp and missing the west-bound turnoff on to Taxiway Alpha. Solutions to this issue will be evaluated in future portions of this master plan.

FIGURE 2-4
RUNWAY 17/35 – HOLD POSITION SIGNS
SAN MARCOS REGIONAL AIRPORT



Another signage consideration was noted at the approach end of Runway 26 on Runway 17/35. According to AC 150/5340-18F, *Standards for Airport Sign Systems*, runway hold position signs should be installed on both sides of a runway at its intersection with another runway if either of the runways is used as a taxiway. Runway 17/35 is typically used as a taxiway to reach the approach end of Runway 26 as no taxiway exists to the Runway 26 end. Currently, only a single runway hold position sign is installed on the north and south sides of Runway 17/35 at its intersection with Runway 8/26. Runway hold positions signs should be installed on both edges (eastern and western) of Runway 17/35 where it intersects Runway 8/26. **Figure 2-4** shows the locations where the additional signs should be installed. This will be a consideration in the establishment of the future development plan for the airport.

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 in an effort to execute instrument approaches and point-to-point navigation. This section discusses the NAVAIDs currently located at or near the San Marcos Regional Airport and/or that play a role in how the airport is used.

Precision Approach Path Indicators (PAPIs)

PAPIs are visual NAVAIDs that provide pilots with a visual indication of whether they are following an established glide path during an approach to a runway end. Based on the pilot's location relative to the established glide path, the PAPI system will provide the pilot with a visual indication of whether they are higher, lower, or on the establish glide path.

The San Marcos Regional Airport has PAPI systems on the ends of Runways 13, 31 and 17. PAPI systems are manufactured in a 2-box and a 4-box configuration. The systems currently installed at the airport are 2-box systems.

The established glide path for each of the existing PAPI systems at the San Marcos Regional Airport is 3 degrees. The PAPI's at the Airport are owned by the City of San Marcos and are generally in good condition. The PAPIs were installed in 2015.

Runway End Identifier Lights (REILs)

REILs are visual NAVAIDs that provide pilots with a visual indication of where a runway end is located. REILs are typically installed in areas where light pollution could potentially cause a pilot difficulty in identifying the threshold of a runway.

The San Marcos Regional Airport has REIL systems on the ends of Runways 8 and 26. The REILs are not operational. This will be a consideration in the establishment of the future development plan for the airport.

Very High Frequency Omni-Directional Range/Tactical Aircraft Control (VORTAC)

Currently, Very High Frequency Omni-Directional Ranges (commonly referred to as VORs) are still used for aerial navigation. These systems emit a signal that aircraft can follow or track to move from point-to-point and conduct an instrument approach for landing at an airport. Tactical Aircraft Control systems (commonly referred to as TACANs) are similar systems used for military purposes. When these systems are co-located together, they are referred to as a VORTAC.

The closest VORTAC for the San Marcos Regional Airport, the Randolph VORTAC, is located 31.4 miles southeast of the airport. The Centex VORTAC is located 33.9 miles north of the field and is used as part of the ILS/LOC approach to Runway 13. The 215-degree radial from the Centex VORTAC is used to define the outer marker for the ILS approach for Runway 13.

Non-Directional Beacon (NDB)

NDBs are an older ground based navigational technology that is still used in some places to provide redundant navigational capabilities at airports. NDBs emit a signal that aircraft can fly to when they are in close proximity to the NDB station. Currently, NDBs are used as a basis for instrument approach procedures and for marker locations (e.g. typically the outer marker) associated with ILS approaches. The San Marcos Regional Airport currently has an NDB located approximately 5.5 NM northwest of the airport directly under the flight path for Runway 13. The NDB is used as the basis for the NDB approach to Runway 13 and as the outer marker associated with the ILS approach for Runway 13.

Instrument Landing System (ILS)

ILS are the most accurate ground based runway approach navigation system currently in the industry. ILS are composed of two ground based navigation aids: a localizer (LOC) and a glide slope (GS). When conducting an ILS approach, these two systems (the LOC and the GS) provide horizontal and vertical guidance in concert to aid a pilot in executing an instrument approach to a runway end.

Currently, the San Marcos Regional Airport only has an ILS approach to Runway 13. The glideslope associated with the approach is located at the approach end of

Runway 13, approximately 450 feet northeast of the runway centerline and approximately 1,175 feet east of the Runway 13 threshold. The localizer for the approach is located at the far end of the runway approximately 1,275 feet southeast of the threshold for Runway 31. Both the localizer and the glide slope are owned and maintained by the FAA.

INSTRUMENT APPROACH PROCEDURES (IAPS)

NAVAIDs and GPS satellites are critical to the development of Instrument Approach Procedures (IAPs) at an airport. Currently, there are eight IAPs published for the San Marcos Regional Airport. Details for these approaches are in **Table 2-6**.

TABLE 2-6
INSTRUMENT APPROACH PROCEDURES
SAN MARCOS REGIONAL AIRPORT

Runway End	Approach Type	Visibility Minimums	Ceiling Minimum
Runway 13	ILS/LOC	LPV DA: Categories A, B, C, D & E – 3/4-mile* LNAV/VNAV DA: Categories A, B, C, D & E – 1-mile LNAV MDA: Categories A & B – 1-mile LNAV MDA: Categories C, D & E –1 1/2-mile Circling: Category A & B – 1–mile Circling: Category C – 1 3/4–mile Circling: Category D – 2 1/4–mile Circling: Category E – 2 3/4–mile	839′ MSL/250′ AGL 910′ MSL/321′ AGL 1,120′ MSL/531′ AGL 1,120′ MSL/531 AGL 1,120′ MSL/525′ AGL 1,240′ MSL/645′ AGL 1,320′ MSL/725′ AGL 1,340′ MSL/745′ AGL
Runway 8	RNAV/GPS	LPV DA: Categories A, B, C, D & E – 3/4-mile** LNAV/VNAV DA: Categories A, B, C, D & E – 1-mile LNAV MDA: Categories A & B – 1-mile LNAV MDA: Categories C, D & E –1 1/2-mile Circling: Category A & B – 1–mile Circling: Category C – 1 3/4–mile Circling: Category D – 2 1/4–mile Circling: Category E – 2 3/4–mile	839′ MSL/250′ AGL 910′ MSL/321′ AGL 1,120′ MSL/531′ AGL 1,120′ MSL/531 AGL 1,120′ MSL/525′ AGL 1,240′ MSL/645′ AGL 1,320′ MSL/725′ AGL 1,340′ MSL/745′ AGL
Runway 13	RNAV/GPS	LPV DA: Categories A, B, C, D & E – 1/2-mile LNAV/VNAV DA: Categories A, B, C, D & E – 5/8-mile LNAV MDA: Categories A & B – 1/2-mile LNAV MDA: Categories C, D & E –1-mile Circling: Category A & B – 1–mile Circling: Category C – 1 3/4–mile Circling: Category D – 2 1/4–mile Circling: Category E – 2 3/4–mile	793′ MSL/200′ AGL 946′ MSL/353′ AGL 1,120′ MSL/527′ AGL 1,120′ MSL/527 AGL 1,120′ MSL/525′ AGL 1,240′ MSL/645′ AGL 1,320′ MSL/725′ AGL 1,340′ MSL/745′ AGL
Runway 17	RNAV/GPS	LPV DA: Categories A, B, C, D & E – 1 1/8-mile LNAV/VNAV DA: Categories A, B, C, D & E – 1 1/2-mile LNAV MDA: Categories A & B – 1-mile LNAV MDA: Categories C, D & E –1 3/8-mile Circling: Category A – 1–mile	960′ MSL/365′ AGL 1,052′ MSL/457′ AGL 1,060′ MSL/465′ AGL 1,060′ MSL/465 AGL 1,080′ MSL/485′ AGL

Runway 17 (continued)		Circling: Category B – 1–mile	1,120′ MSL/525′ AGL
		Circling: Category C – 1 3/4–mile	1,240′ MSL/645′ AGL
		Circling: Category D – 2 1/4–mile	1,320′ MSL/725′ AGL
		Circling: Category E – 2 3/4–mile	1,340′ MSL/745′ AGL
Runway 26	RNAV/GPS	LPV DA: Categories A, B, C, D & E – 3/4-mile	837′ MSL/250′ AGL
		LNAV/VNAV DA: Categories A, B, C, D & E – 7/8-mile	866′ MSL/279′ AGL
		LNAV MDA: Categories A & B – 1-mile	1,060′ MSL/473′ AGL
		LNAV MDA: Categories C, D & E –1 3/8-mile	1,060′ MSL/473 AGL
		Circling: Category A – 1–mile	1,080′ MSL/485′ AGL
		Circling: Category B – 1–mile	1,120′ MSL/525′ AGL
		Circling: Category C – 1 3/4–mile	1,240′ MSL/645′ AGL
		Circling: Category D – 2 1/4–mile	1,320′ MSL/725′ AGL
		Circling: Category E – 2 3/4–mile	1,340′ MSL/745′ AGL
Runway 31	RNAV/GPS	LPV DA: Categories A, B, C, D & E – 7/8-mile	860′ MSL/277′ AGL
		LNAV/VNAV DA: Categories A, B, C, D & E – 1-mile	906′ MSL/323′ AGL
		LNAV MDA: Categories A & B – 1-mile	980′ MSL/397′ AGL
		LNAV MDA: Categories C, D & E –1 1/8-mile	980′ MSL/397 AGL
		Circling: Category A – 1–mile	1,080′ MSL/485′ AGL
		Circling: Category B – 1–mile	1,120′ MSL/525′ AGL
		Circling: Category C – 1 3/4–mile	1,240′ MSL/645′ AGL
		Circling: Category D – 2 1/4–mile	1,320′ MSL/725′ AGL
		Circling: Category E – 2 3/4–mile	1,340′ MSL/745′ AGL
Runway 35	RNAV/GPS	LPV DA: Categories A, B, C, D & E – 3/4-mile	833′ MSL/250′ AGL
		LNAV/VNAV DA: Categories A, B, C, D & E – 1-mile	884′ MSL/301′ AGL
		LNAV MDA: Categories A & B – 1-mile	960′ MSL/377′ AGL
		LNAV MDA: Categories C, D & E –1 1/8-mile	960′ MSL/377 AGL
		Circling: Category A – 1–mile	1,080′ MSL/485′ AGL
		Circling: Category B – 1–mile	1,120′ MSL/525′ AGL
		Circling: Category C – 1 3/4–mile	1,240′ MSL/645′ AGL
		Circling: Category D – 2 1/4–mile	1,320′ MSL/725′ AGL
		Circling: Category E – 2 3/4–mile	1,340′ MSL/745′ AGL
Runway 13	NDB	S-13: Categories A & B – 3/4-mile	1,240′ MSL/647′ AGL
		S-13: Categories C –1 1/4-mile	1,240′ MSL/647′ AGL
		S-13: Category D – 1 3/4–mile	1,240′ MSL/647′ AGL
		Circling: Categories A & B – 1-mile	1,240′ MSL/643′ AGL
		Circling: Categories C –1 3/4-mile	1,240′ MSL/643′ AGL
		Circling: Category D – 2–mile	1,240′ MSL/643′ AGL

Source: FAA Digital – Terminal Procedures Publication (d-TPP) Website. *- Due to the RAILs associated with the Runway 13 MALSR system being out of service, the current minimums for the Runway 13 ILS approach is ¾ mile. ** - When FM 110 is constructed the minimums for the Runway 8 RNAV/GPS approach will be increased to at least 1 mile.

As part of the inventory analysis for the San Marcos Regional Airport Master Plan, a survey was conducted of airport users and stakeholders seeking to understand the attributes of the Airport they felt were a strength or weakness of the airport. An attribute of the airport that was universally identified as a strength was that the Airport has RNAV/GPS approaches to all the runway ends and an ILS system. The availability of IAPs to all runway ends and the ILS ensures that the Airport is highly accessible during wide array of weather and wind conditions.

Weather Reporting

The San Marcos Regional Airport has an Automated Weather Observation System (AWOS) - 3 that is the primary source of wind direction, velocity, and altimeter data for weather observation purposes at the Airport. The AWOS-3 is an automated sensor suite that reports weather conditions over a discrete radio frequency for pilots to receive real-time weather information. The San Marcos Regional Airport's AWOS-3 information can be received by calling 512-353-8005 or obtained from the airport's Automated Terminal Information System (ATIS), which is broadcast on 120.825 MHz. However, the ATIS system has had a history of outages. When an outage occurs current weather information is not available via the ATIS frequency. The AWOS-3 is co-located with the glide slope at the approach end of Runway 13. The AWOS-3 is owned and maintained by the FAA. It is in good condition.

Wind and Traffic Indicators

While automated weather analysis and reporting systems such as an AWOS are a tremendous asset to an airport, it is important that pilots are provided with a visual indication of wind speed and direction while operating at an airport. For this purpose, airports are typically equipped with one or more wind direction indicators. The most common type of wind indicator used at airports are windsocks because they are relatively easy to install and maintain. The San Marcos Regional Airport is equipped with one primary windsock and four supplemental windsocks.

The primary windsock is located approximately 385 feet north of the Runway 8/26 centerline and approximately 2,150 feet east of the threshold of Runway 8. The windsock is lighted for nighttime operations and is equipped with a segmented circle. There are no landing strip indicators or traffic pattern indicators associated with the segmented circle. The primary windsock and segmented circle are in good condition. The location of the four supplemental windsocks are:

- Supplemental Windsock #1 – Located close to the approach end of Runway 13, approximately 380 feet southwest of the Runway 13/31 centerline and 925 feet from the Runway 13 threshold.
- Supplemental Windsock #2 – Located southeast of the intersection of Runway 8/26 and Runway 13/31. Approximately 410 feet from each runway's respective centerline.

- ✈ Supplemental Windsock #3 – Located approximately 410 feet south of the Runway 8/26 centerline and 790 feet from the Runway 8 threshold.
- ✈ Supplemental Windsock #4 – Located approximately 400 feet west of the Runway 17/35 centerline and 1,020 feet from the Runway 17 threshold.

All four of the supplemental windsocks are in good condition but are not lighted for nighttime operations.

AIR TRAFFIC CONTROL TOWER (ATCT)

The San Marcos Air Traffic Control Tower opened in October 2011 and provides air traffic control services between the hours of 7 AM and 7 PM local time 7 days a week, 365 days per year. Specifically, the facility provides ground control, tower control, and clearance delivery services for aircraft using the airport. The facility is part of the FAA's contract tower program and, consequently, is operated by Robinson Aviation Inc., commonly called RVA. There are no airfield line-of-sight issues associated with the existing tower. Based on the inventory survey conducted as part of this Airport Master Plan project, the users and stakeholders for the San Marcos Regional Airport see the existing ATCT facility as a key asset that makes the airport safer and attractive for future growth. The San Marcos ATCT facility was recently named the 7th best general aviation airport ATCT facility by FltPlan.com. There have been some reported maintenance issues with the ATCT facility since it opened in 2011 that will be a consideration in future development plans.

AIRCRAFT CIRCULATION

The efficient movement of aircraft through the airfield system of runways and taxiways is important to reducing delay and ensuring the safety of aircraft operations. Since the San Marcos Regional Airport does not have parallel runways and there is a central area for hangars and aircraft parking, aircraft primarily circulate to/from the active runway in a circular pattern which minimizes the potential for conflicts in aircraft movements. However, based on discussion with ATCT, airport tenants, and pilots the following airfield circulation issues were noted and will be a consideration in the future development plan:

- Long Taxi Route to Runway 17 – The taxi route from the central ramp area to the approach end of Runway 17 is very long as there is no direct route from the ramp area to the approach end of the runway.
- No Aircraft Run-up Available at the Approach End of Runway 17 – A run-up area for small aircraft does not exist at the approach end of Runway 17, which sometimes contributes to congestion for aircraft departures on Runway 17.
- Poor Taxiway Access to Runway 26 – There is not a taxiway that allows access to the approach end of Runway 26. Consequently, Runway 17/35 must be used as a taxiway.

TERMINAL AREA FACILITIES

The terminal area facilities are those central to the business operations of an airport. They support transition from the airfield to landside businesses and then into community infrastructure. Terminal area facilities typically include Fixed Based Operator (FBO) facilities, aircraft storage facilities of various types (e.g. T-hangars and box hangars), aeronautical businesses (e.g. maintenance, salvage, etc.), aircraft parking aprons and other support facilities like fuel storage and delivery.

FIXED BASED OPERATORS (FBOS)

The San Marcos Regional Airport has two FBO facilities – Berry Aviation and Redbird Skyport.

Berry Aviation

Berry Aviation is an FBO, flight charter, and specialized aviation services company based at the San Marcos Regional Airport. Berry was formed in 1983 and now has approximately 200 employees.

The FBO facility for Berry Aviation is located on the western side of the airport close to the approach end of Runway 8. The facility provides a full array of FBO services and facilities including a pilot's lounge, flight planning facility, conference/meeting room, WiFi, courtesy cars, aircraft ground services, and Jet A/100LL fuel service. Additionally, self-service fueling is avaliable for 100LL.

The terminal facility for the FBO is approximately 3,600 square feet and is in good condition. The facility has 40 vehicle parking spots including two American Disabilities Act (ADA) accessible spaces. Berry Aviation FBO is open seven days a week from 6 AM to 9 PM local.

Redbird Skyport

Redbird Skyport is an FBO located immediately west of the ATCT along Airport Drive. The facility was constructed and opened in late 2011 and provides a full array of FBO services and facilities including a pilot's lounge, flight planning facility, conference/meeting rooms, WiFi, courtesy cars, aircraft ground services, and Jet A/100LL fuel service. The primary facility - which is a combination FBO, hangar, classroom, and event center – is approximately 30,000 square feet and is in good condition.

Redbird Skyport has received numerous awards for their services and facilities.

The facility has a vehicle parking lot with 59 parking spots including three American Disabilities Act (ADA) accessible spaces. Redbird Skyport is open seven days a week from 6 AM to 10 PM local.

AVIATION RELATED BUSINESSES AND TENANTS

In addition to the two FBOs, the San Marcos Regional Airport has a number of aeronautical businesses and tenants that provide an array of services to the aircraft owner and pilots. The following commercial aeronautical businesses (excluding the FBOs) and tenants are currently based at the San Marcos Regional Airport:

- Blue Skies Aviation – An aircraft maintenance, inspection, and repair business. Provides specialized services such as custom interiors and propeller balancing.
- Civil Air Patrol – The Civil Air Patrol (CAP) Texas Wing 435th known as the David Lee "Tex" Hill Squadron operates from the airport.
- Coast Flight – A flight training operator.
- Commemorative Air Force – The Central Texas Wing of the Commemorative Air Force (CAF). Conducts aircraft restoration and maintenance activities on historic aircraft and hosts multiple airport events.
- E.M.A.P.A. – An aircraft parts and maintenance business.
- Gafford Aero – An aircraft maintenance, inspection, and repair business.
- Kerner Aircraft Services – Private T-hangar operation.
- McKee Avionics – An avionics sales, repair, services, and installation business. General aircraft maintenance services.
- Texas State Aviation – A flight training operator.
- Specialized Aero and Tejas AeroServices – Aircraft maintenance, inspection, salvage, and customization business.

AIRCRAFT STORAGE/HANGAR FACILITIES

With the exception of aircraft stored outdoors and tied down directly to the ramp/apron, most aircraft are typically stored in either a box hangar or a T-hangar. A box hangar is a stand-alone structure, typically in the shape of a box, that is used to store one or more aircraft. In some instances, box hangars may include buildouts for office or workshop areas that are not used for aircraft storage. Box hangars are sometimes referred to using other terms such as executive, common, maintenance, or corporate hangars depending on how the hangar is used. Box hangars can be constructed in a wide array of sizes to meet the needs of various aircraft.

T-hangars are individual aircraft storage units typically connected together as part of a single structure. T-hangars are commonly used to store smaller aircraft such as single engine piston aircraft and, in some cases, light twin-engine aircraft. The San Marcos Regional Airport has numerous box hangar and T-hangar facilities used for aircraft storage.

Tables 2-7 through **2-8** and **Figures 2-5** through **2-6** provides an overview of the hangars currently established at the San Marcos Regional Airport including their size, ownership, leaseholder, and condition.

In total, San Marcos Regional Airport has approximately 469,150 square feet of hangar space. However, a portion of this hangar space is used for non-aircraft storage purposes such as office space, workshop area, etc.

A key consideration related to hangar space is that the airport does not have any available hangar facilities large enough to accommodate many of the larger corporate jets flying today (e.g. Gulfstream, Embraer, etc.). These larger corporate jets are becoming more common as many older and smaller corporate aircraft are being retired and new and larger aircraft are being purchased. This will be a consideration as part of the alternatives process.

TABLE 2-7
WESTERN MAIN RAMP – HANGAR FACILITIES
SAN MARCOS REGIONAL AIRPORT

Building Number	Hangar Type	Hangar Address	Area (sq. ft.)	Hangar Condition	City Owned (Y/N)	Lease Holder
1	Box Hangar	1749 Airport Dr.	57,600	Good	Y	Berry Aviation
2	Box Hangar	1748 Airport Dr.	28,880	Good	N	Berry Aviation
3	Box Hangar	1747 Airport Dr.	6,300	Fair	Y	Private Non-Commercial Hangar
4	Box Hangar	1745 Airport Dr.	2,400	Fair	Y	Private Non-Commercial Hangar
5	Box Hangar	1741 Airport Dr.	2,400	Fair	Y	Private Non-Commercial Hangar
6	Box Hangar	1737 Airport Dr.	3,000	Fair	Y	Private Non-Commercial Hangar
7	Box Hangar	1735 Airport Dr.	1,800	Fair	Y	Private Non-Commercial Hangar
8	Box Hangar	1731 Airport Dr.	2,000	Fair	Y	Private Non-Commercial Hangar
9	Box Hangar	1733 Airport Dr.	2,000	Fair	Y	Private Non-Commercial Hangar
10	Box Hangar	1739 Airport Dr.	3,000	Fair	Y	Private Non-Commercial Hangar
11	Box Hangar	1743 Airport Dr.	3,500	Fair	Y	Private Non-Commercial Hangar
12	Box Hangar	1753 Airport Dr.	2,000	Fair	Y	Private Non-Commercial Hangar
13	Box Hangar	1813 Airport Dr.	7,200	Good	Y	Coast Flight
14	Box Hangar	1821 Airport Dr.	3,500	Fair	Y	Private Non-Commercial Hangar
15	Box Hangar	1823 Airport Dr.	2,400	Fair	N	Private Non-Commercial Hangar
16	Box Hangar	1825 Airport Dr.	4,800	Good	N	Redbird Skyport
17	Box Hangar	1815 Airport Dr.	6,000	Good	Y	Blue Skies Aviation
18	Box Hangar	1832 Airport Dr.	3,600	Good	Y	Private Non-Commercial Hangar
19	T-Hangar	1833 Airport Dr.	4,000	Fair	Y	Gafford Aero
20	T-Hangar	1833 Airport Dr.	6,250	Fair	Y	City-Owned T-Hangar
21	T-Hangar	1831 Airport Dr.	10,250	Fair	Y	City-Owned T-Hangar
22	T-Hangar	1829 Airport Dr.	12,900	Fair	Y	City-Owned T-Hangar
23	Box Hangar	1838 Airport Dr.	12,150	Good	Y	McKee Avionics
24	T-Shelter	1949 Airport Dr.	15,500	Fair	Y	City-Owned T-Shelter
25	T-Hangar	1951 Airport Dr.	10,800	Fair	N	Kerner Air Services
26	T-Hangar	1953 Airport Dr.	10,800	Fair	N	Kerner Air Services
27	T-Hangar	1955 Airport Dr.	10,800	Fair	N	Kerner Air Services
28	T-Hangar	1957 Airport Dr.	10,800	Fair	N	Kerner Air Services
29	Box Hangar	TBD	8,050	Good	Y	Under Construction

Source: Garver, 2019.

FIGURE 2-5
WESTERN MAIN RAMP – HANGAR FACILITIES
SAN MARCOS REGIONAL AIRPORT

Source: Garver, 2019.

TABLE 2-8
EASTERN MAIN RAMP – HANGAR FACILITIES
SAN MARCOS REGIONAL AIRPORT

Building Number	Hangar Type	Hangar Address	Area (sq. ft.)	Hangar Condition	City Owned (Y/N)	Lease Holder
30	Box Hangar	1981 Airport Dr.	3,000	Good	Y	Private Non-Commercial Hangar
31	Box Hangar	1983 Airport Dr.	2,400	Good	Y	Private Non-Commercial Hangar
32	Box Hangar	1985 Airport Dr.	3,000	Good	Y	Private Non-Commercial Hangar
33	Box Hangar	1982 Airport Dr.	5,600	Good	N	Blue Skies Aviation
34	Box Hangar	1984 Airport Dr.	3,250	Good	Y	Private Non-Commercial Hangar
35	Box Hangar	1986 Airport Dr.	2,400	Good	N	Private Non-Commercial Hangar
36	Box Hangar	1991 Airport Dr.	4,800	Good	N	Private Non-Commercial Hangar
37	Box Hangar	1993 Airport Dr.	2,000	Good	N	Redbird Skyport
38	Box Hangar	1995 Airport Dr.	3,900	Good	N	Private Non-Commercial Hangar
39	Multi Box Hangars	2000 Airport Dr.	17,500	Good	N	Officers Club
40	Multi Box Hangars	2010 Airport Dr.	12,700	Good	N	Officers Club
41	Box Hangar	2049 Airport Dr.	10,900	Poor	Y	Texas State Aviation
42	Box Hangar	2081 Airport Dr.	30,000	Good	N	Redbird Skyport
43	Box Hangar	2175 Airport Dr.	32,000	Good	N	Berry Aviation
44	Box Hangar	2191 Airport Dr.	6,300	Good	N	JSJ Aviation
45	Box Hangar	2193 Airport Dr.	5,600	Good	N	JSJ Aviation
46	Box Hangar	2192 Airport Dr.	5,600	Good	N	Caroline Aviation
47	Box Hangar	2194 Airport Dr.	5,600	Good	N	Caroline Aviation
48	Box Hangar	2249 Airport Dr.	33,330	Good	Y	Commemorative Air Force
49	Box Hangar	2275 Airport Dr.	14,640	Good	Y	Specialized Aero
50	Box Hangar	2295 Airport Dr.	10,000	Good	N	Specialized Aero

Source: Garver, 2019.

FIGURE 2-6
EASTERN MAIN RAMP – HANGAR FACILITIES
SAN MARCOS REGIONAL AIRPORT

Source: Garver, 2019.

AIRCRAFT PARKING APRON

The San Marcos Regional Airport has two primary ramp areas, the Ramp Side Development Area and the Taxiway Kilo Development Area Ramp.

Ramp Side Development Area

The Ramp Side Development Area, shown in **Figure 2-7**, was constructed when the airport was originally developed in the 1940s as a military base. In total, the ramp is approximately 2,350,000 square feet (53.95 acres) and is entirely constructed of concrete with the exception of some small areas immediately in front of hangar developments that are asphalt. The ramp is used extensively for aircraft parking and movement.

FIGURE 2-7
RAMP SIDE DEVELOPMENT AREA
SAN MARCOS REGIONAL AIRPORT

Source: Garver, 2019.

The concrete ramp area is in fair to poor condition. There are multiple areas on the ramp where the pavement is spalling and producing aggregate. The condition of the ramp was a significant concern voiced by tenants and airport users as part of the inventory survey conducted at the beginning of this Master Plan study. The Airport is developing near term solutions to mitigate safety issues related to the ramps condition. TxDOT Aviation is engaged in these discussions and in identifying potential rehabilitation options considering funding constraints. The ramp will be a primary consideration in the remainder of this plan.

As part of the inventory survey several pilots stated that there is insufficient lighting on the ramp at night.

Currently, there are 69 painted aircraft tie-down spaces on the main ramp. Some of these are used for transient aircraft while others are used for permanent aircraft parking/storage.

A large portion of the ramp close to the Commemorative Air Force (CAF) hangar is used for vehicle parking associated with events hosted by the CAF. Some hangar facilities have been constructed on top of the ramp including the Kerner T-hangar facility, the T-shades, and a hangar associated with the Specialized Aero facility.

Taxiway Kilo Development Area Ramp

The Taxiway Kilo Development Area Ramp, shown in **Figure 2-8**, is a ramp area constructed of concrete immediately adjacent to the entrance of the airport and in close proximity to TX-21.

FIGURE 2-8
TAXIWAY KILO DEVELOPMENT AREA RAMP
SAN MARCOS REGIONAL AIRPORT

Source: Garver, 2019.

This area was developed in 2013 to encourage new hangar development. The ramp is approximately 147,000 square feet and is in good condition. Currently, a new hangar is planned for construction as shown in **Figure 2-5**.

FUEL STORAGE FACILITY

Redbird Skyport and Berry Aviation both have fuel farms that have storage tanks for both 100LL and Jet A fuel. Redbird Skyport has two Above-Ground Storage Tanks (ASTs), one for Jet A and one for 100LL. Both tanks are 12,000 gallons and are in good condition.

Berry Aviation has two ASTs, one for Jet A and one for 100LL. Both tanks are 10,000 gallons and are in good condition. The tanks are owned by the City but maintained by Berry Aviation. Berry Aviation also has a small 100LL tank (1,000 gallons), which they own, located immediately adjacent to the main ramp and their FBO building that is used for self-service 100LL fueling. The existing fuel farms are in good condition and are sufficient to meet the fuel needs of existing airport users.

LANDSIDE FACILITIES

Landside facilities are those that support the movement of personnel and property to/from the airport to the surrounding community. Landside facilities typically include access roads and vehicle parking areas.

VEHICLE PARKING

Sufficient vehicle parking is critical to the operation of an airport. Typically, people arrive at the airport in a personal vehicle and park it while conducting business on airport property. With the exception of the vehicle parking associated with the FBO facilities, very little designated vehicle parking exists. Below is a list of the designated vehicle parking areas available at the airport:

- Berry Aviation Main Hangar – 16 parking spaces
- Coast Flight Building – 14 parking spaces
- CAF Hangar – 18 parking spaces
- City-Owned T-Hangar Lot – 13 parking spaces
- Texas State Aviation Hangar – Unmarked parking lot
- Civil Air Patrol Building – Unmarked parking lot
- Taxiway Kilo Development Area – 24 parking spaces

Since limited vehicle parking is avaliable, vehicles are frequently parked inside hangars or on aircraft apron/ramp areas. During interviews with airport tenants and based on the inventory survey results, the limited vehicle parking is a concern that needs to be addressed as part of the airport's future develoment plan.

ROADWAY ACCESS

Currently, the San Marcos Regional Airport only has a single access road (Airport Drive) that connects to TX-21. Airport Drive is constructed of asphalt and is generally in good condition. It was noted that sometimes areas of standing water occur along Airport Drive during periods of heavy rain.

Additionally, during interviews with airport tenants and stakeholders, several people mentioned that Airport Drive is difficult for larger vehicles to use because

the road has several sharp curves. Consequently, larger delivery vehicles (e.g. large trucks, 18-wheelers, etc.) are typically allowed onto the main ramp and then escorted to hangars or other facilities using the surface painted vehicle service roads on the ramp.

The alignment of Airport Drive is constrained by the airport's close proximity to Gary Job Corp and the presence of above ground utility lines on the northern edge of the roadway. Consequently, realigning Airport Drive would likely require the acquisition of property currently owned by Gary Job Corp and/or the relocation of utilities and airside facilities immediately north of Airport Drive.

It was also noted by several tenants that Airport Drive has several aesthetic detractors such as the chain link fence with three strains of barbed-wire immediately to the south of the roadway on the Gary Job Corp property line and the above ground utility lines north of Airport Drive. The alignment of Airport Drive and the aesthetic quality of the route will be a consideration in the future development plan.

AIRSPACE

The San Marcos Regional Airport operates in a moderately complex airspace environment as it is close to multiple other public use airports including Lockhart, New Braunfels, Luling, and Austin-Bergstrom International Airport. Additionally, there are several small private airports in the immediate area including Fentress, White Wings, Roland, and Alison.

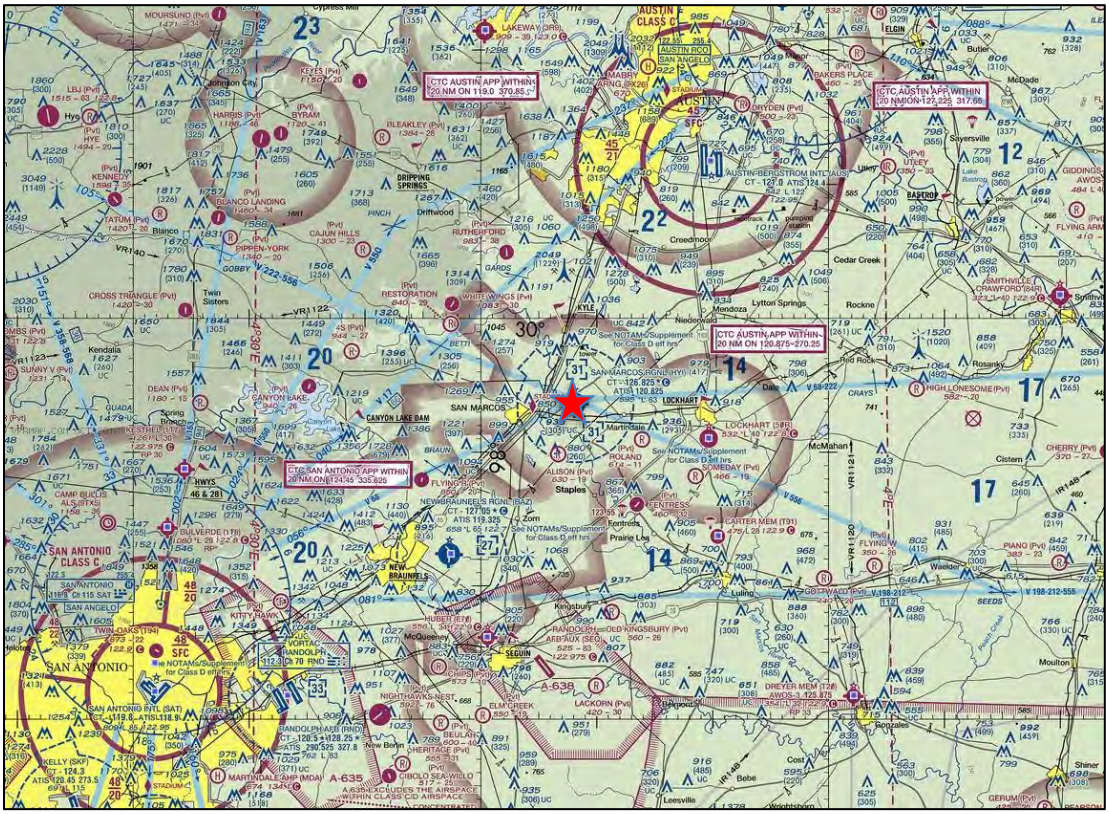
The airspace around the San Marcos Regional Airport is classified as Class D airspace during the hours the ATCT is operational (e.g. 7 AM to 7 PM, 7 days a week). When the ATCT is not in operation, the airspace reverts to Class E airspace.

Fentress Airport is home to a skydiving operation which can impact air traffic patterns at the San Marcos Regional Airport depending on wind direction. Additionally, the San Marcos Regional Airport is approximately 3.5 NM east of Texas State University's Bobcat Stadium which is used by the Texas State University's football team. During games, a Temporary Flight Restriction (TFR) is issued for the airspace surrounding the stadium. When in effect, the TFR impacts air traffic

patterns at the airport as the stadium is located directly under the flight path for Runway 8/26.

Figure 2-9 shows San Marcos Regional Airport's airspace and the surrounding area.

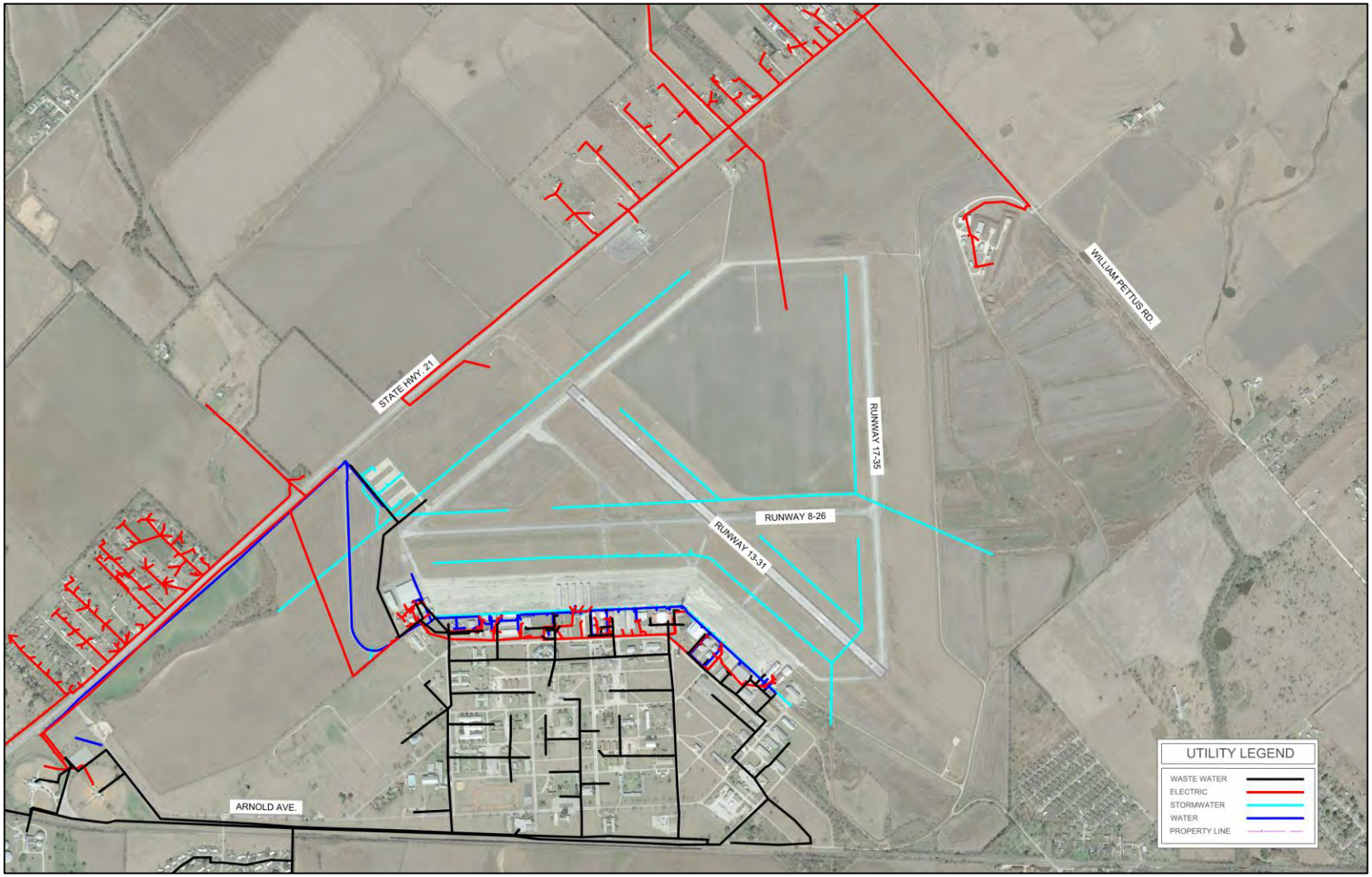
FIGURE 2-9
AIRSPACE
SAN MARCOS REGIONAL AIRPORT


SAN MARCOS
AUSTIN
SAN ANTONIO
SAN ANTONIO CLASS C
AUSTIN CLASS C
LOCKHART
CANYON LAKE DAM
CTC AUSTIN APP WITHIN 20 NM ON 119.0 370.85
CTC AUSTIN APP WITHIN 20 NM ON 127.225 317.08
CTC AUSTIN APP WITHIN 20 NM ON 120.875 270.25
CTC SAN ANTONIO APP WITHIN 20 NM ON 134.9 335.925
SAN MARCOS RGNL (HYI) 120.825
LOCKHART (5R8) 122.8
NEW BRAUNFELS RGNL (BAZ) 127.05
SAN ANTONIO INTL (SAT) 118.6
AUSTIN-BERGSTROM INTL (AUS) 127.0
Kyle
Buda
Dripping Springs
Driftwood
Creedmoor
Niederwald
Mendoza
Lytton Springs
Cedar Creek
Rockne
Rosanky
Smithville
Bastrop
Elgin
Austin
Round Rock
Georgetown
Kendalia
Boerne
Twin Sisters
Staples
Seguin
Luling
Prairie Lea
McMahan
Cistern
Moulton
Gonzales
Waelder
Seeds
Shiner
Leesville
Cost
Bebe
Sayersville
McDade
Butler
Giddings
Flying Arm
Smithville
Crawford
Piano
Cherry
Carter Mem
Dreyer Mem
Elm Creek
Old Kingsbury
Randolph AFB
Martindale AAF
Stadium
Canyon Lake
Lockhart
Gruene
Kingsbury
Luling
Waelder
Gonzales
Shiner
Moulton
Cistern

significant utility related concern identified during the inventory process was the availability of reliable telecommunications utilities including fiber to support high-speed internet access and Voice Over IP (VOIP) services. Currently, there is not an accessible fiber line available to tenants along Airport Drive. Tenants that need fiber for their facilities have had to pay for the installation of fiber lines for their facility.

The availability of water, wastewater, and telecommunications utilities are a concern related to on airport development along TX-21 as these utilities are not currently available north of the Taxiway Kilo Development Area. However, the City of San Marcos plans to begin design of a 12-inch waterline extension from Airport Drive to William Pettus Rd. in FY 2020 which will serve developments along TX-21. The City of San Marcos also has a planned capital project to extend wastewater and stormwater into the area north of the Kilo Development Area in 2024. This project will extend wastewater and stormwater utilities from the Kilo Development Area up to the MALSR for Runway 13. Design is expected to begin in 2022.

FIGURE 2-10
UTILITY LAYOUT
SAN MARCOS REGIONAL AIRPORT



Source: City of San Marcos, 2019.

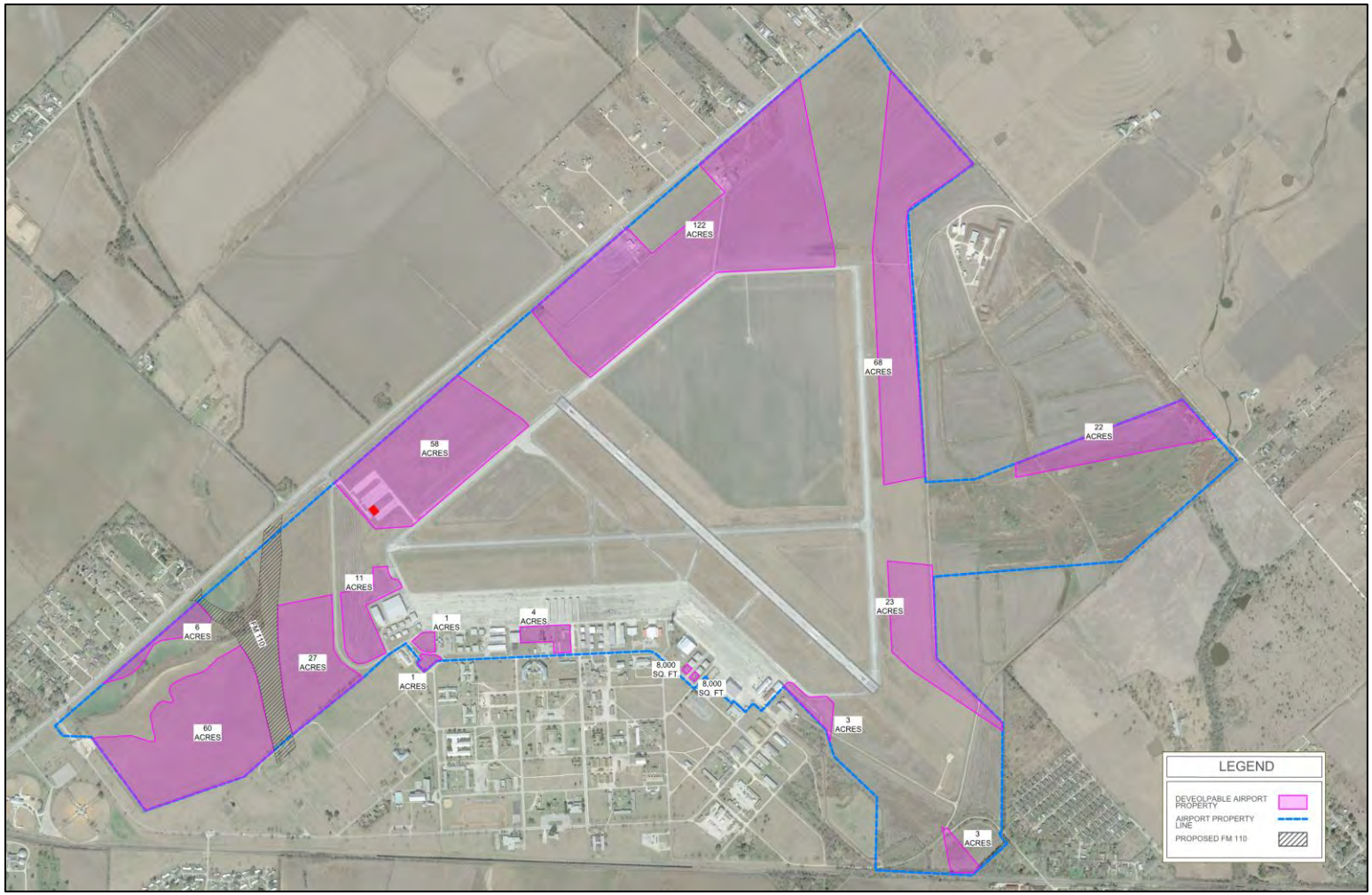
AIRPORT DEVELOPMENT AREAS

As part of the Airport Master Plan process it is critical to identify and document portions of the airport's existing property that can be used for future development. Development at airports can be either aeronautical (e.g. hangars, FBOs, aeronautical businesses, etc.) or non-aeronautical (e.g. gas stations, retail, industrial, etc.). According to FAA policy, available land should primarily be considered for aeronautical development purposes. However, in instances where the FAA agrees that aeronautical development is not likely or practical, then non-aeronautical development can be considered. Non-aeronautical developments can provide a significant source of revenue for an airport and provide financial stability during periods of low aeronautical activity.

The San Marcos Regional Airport has multiple parcels of land that could be used for future aeronautical or non-aeronautical development. **Figure 2-11** shows the various parcels of land that the airport is currently marketing for development purposes.

It should be noted that approximately 40 acres of property underneath and to the north and south of FM 110 has been designated as a Foreign Trade Zone (FTZ).

FIGURE 2-11
UTILITY LAYOUT
SAN MARCOS REGIONAL AIRPORT



Source: Texas Aviation Partners, 2019

SURROUNDING AREA DEVELOPMENT

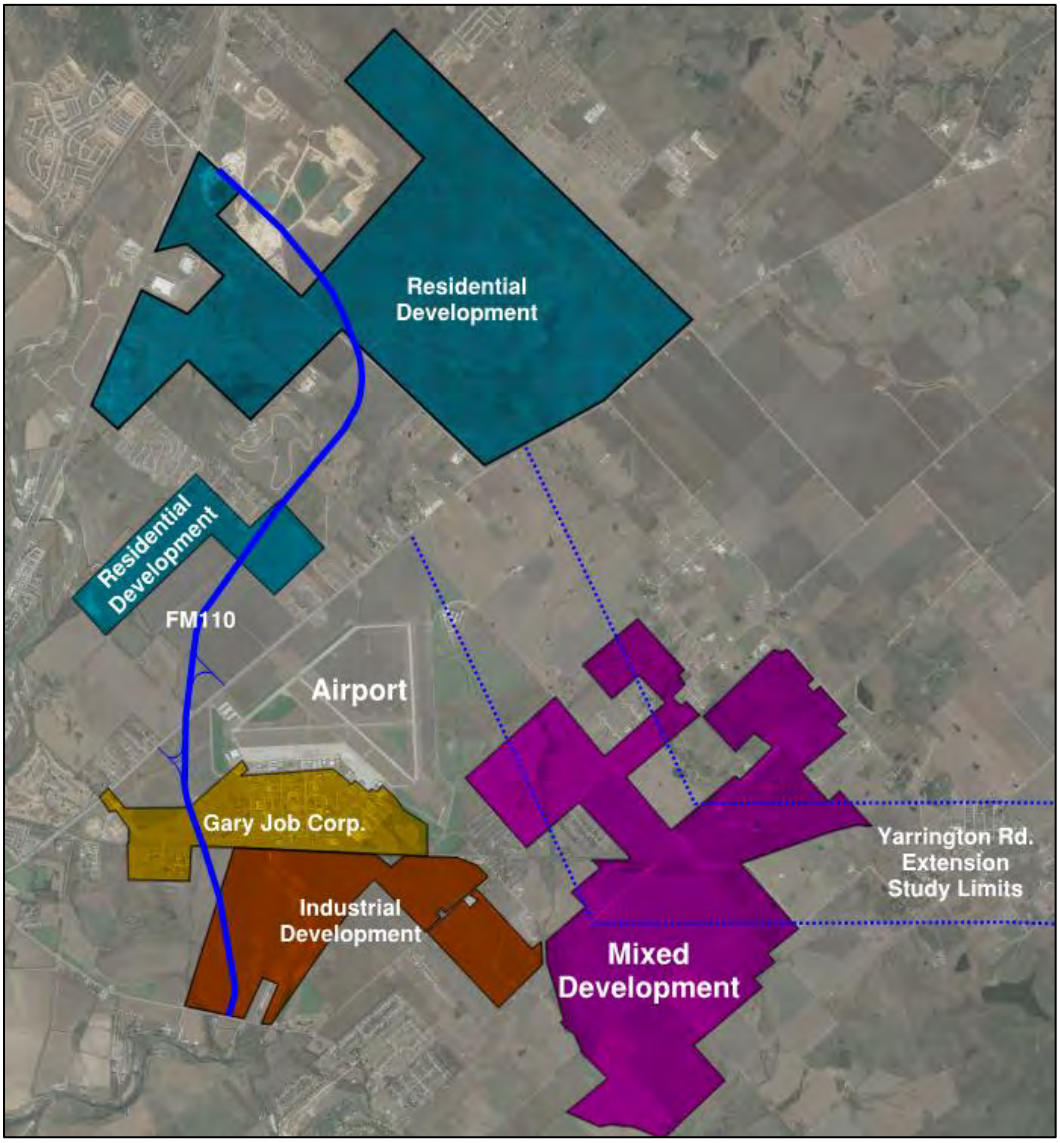
The development of properties surrounding an airport can have a significant impact on future airport development plans and opportunities. These impacts can have a positive impact on the airport as they can provide opportunities for new development and stimulate additional aeronautical activity at the airport. However, they can also have a negative impact and limit the potential to expand airport facilities in the future.

Figure 2-12 provides an overview of the planned developments in the areas surrounding the San Marcos Regional Airport. Each one of these developments is briefly described below:

- Residential Developments – There are currently two large residential developments planned immediately north of the airport. The smaller residential development is under the flight path associated with Runway 13/31. The larger residential development, further to the north, is under the flight path for Runway 17/35.
- Industrial Development – The industrial development area immediately south of Gary Job Corp. is known as the SMART Terminal development. This is an industrial development site that is expected to utilize the airport and the existing rail line.
- Mixed Development – There is a large mixed development area (e.g. residential, retail, industrial, etc.) known as the Cotton Center planned southeast of the airport.
- FM 110 Development – Farm-to-Market (FM) Road 110 is a new roadway that will pass immediately west of the airport. The City of San Marcos is in the process of completing a land release with the Federal Aviation Administration (FAA) to release the portion of airport property that the roadway will be located on to the State of Texas. FM 110 will be connected to TX-21 close to the airport entrance.
- Yarrington Rd. Extension – A study is currently underway to evaluate the potential extension of Yarrington Road south of TX-21.

These surrounding area development plans will be a consideration in the development of the ultimate development plan for the airport.

FIGURE 2-12
SURROUNDING AREA DEVELOPMENT
SAN MARCOS REGIONAL AIRPORT



Source: Garver, 2019.

AIRPORT POLICIES

Effective airport policies such as Airport Rules and Regulations, Minimum Standards, Height Hazard Zoning Ordinances, and Rates and Charges are critical to

supporting the growth and development of an airport. This section discusses the application of these documents at the San Marcos Regional Airport.

Airport Rules and Regulations

The San Marcos Regional Airport has established Airport Rules and Regulations to protect the safe, secure, and efficient operation of the airport. The Rules and Regulations have been approved by the San Marcos City Council and published as part of the City of San Marcos' municipal code. A review of the Rules and Regulations was completed as part of this Master Plan process. No significant deficiencies were identified as part of the review.

Airport Minimum Standards

The San Marcos Regional Airport has established Minimum Standards for commercial operations on the airport. The primary purpose of Airport Minimum Standards is to ensure a sufficient minimum level of service is provided to airport patrons and to support the fair and equal treatment of commercial businesses operated at the airport. A review of the current Minimum Standards was completed as part of this Master Plan process. No significant deficiencies were identified as part of the review.

Height Hazard Zoning Ordinances

The establishment of height hazard zoning ordinances are critical to prevent development that could impact the safety of air navigation and future airport development. A height hazard zoning ordinance was originally established for the San Marcos Regional Airport in 1984. However, the ordinance has not been updated since and is not a functional consideration in the evaluation of future development proposals. The establishment of a new height hazard zoning ordinance will be a complex task as four different jurisdictions are responsible for portions of the land surrounding the airport include Hays County, City of San Marcos, City of Martindale, and Caldwell County.

AIRPORT RATES AND CHARGES

This section discusses the San Marcos Regional Airport's current rates and charges policies and how they compare to other airports.

Current Rates and Charges

The establishment of uniform rates and charges are essential to promoting the financial self-sufficiency of an airport and for ensuring an airport is competitive in attracting tenants and new development. The City of San Marcos owns all the land associated with the San Marcos Regional Airport and many of the hangars and other facilities located on airport grounds. Below is a current list of the rates and charges established by the airport:

- Ground Lease Rates
  - $0.20 - $0.40 per square foot (SF) per year
  - Max Term 40 years
- Hangar Rates
  - T-Hangar - $200 per month and 1-year term
  - T-Shelter - $85 per month and 1-year term
  - Shared Hangar - $350 per month per aircraft and 1-year term
  - Private Hangar - $1.80 per SF per year and 5-year term
  - Commercial Hangar - $2.00 - $3.00 per SF per year
    - Based on term and amenities
- Other Charges
  - Storage Unit - $75 per month and 1-year term
  - Reserved Tie-Down - $50 - $75 per month and 1-year term
  - Agricultural Lease - $11.47 per acre per year

In addition to traditional facility and ground leases, the San Marcos Regional Airport also has an agricultural lease with a local farmer to conduct farming operations on 975 acres of airport property not currently being used for development.

Financial Benchmarking Assessment

As part of this inventory analysis, a financial benchmarking assessment was completed comparing the San Marcos Regional Airport's rates, charges, lease terms/methodologies, and property development practices with other Texas Airports. A total of nine airports were included in the benchmarking analysis. Those airports include:

- Local/Regional Airports – Airports in close proximity to the San Marcos Regional Airport. Some commercial service airports are included in this group but the analysis is restricted to only the general aviation aspects of those airports.
  - New Braunfels Regional Airport
  - Austin Executive Airport
  - Austin-Bergstrom International Airport
  - San Antonio International Airport
- Reliever Airports – Other designated reliever airports in the State of Texas.
  - Addison Airport
  - Dallas Executive Airport
  - Conroe North Houston Regional Airport
  - Sugar Land Regional Airport
- Airports with Foreign Trade Zones (FTZ) – Other airports with an established FTZ in the State of Texas.
  - El Paso International Airport

The results of the assessment are expected to be utilized to develop new rates, charges, lease terms/methodologies, and property development practices to make the preferred development plan, defined later in this Master Planning process, a reality.

EXISTING ENVIRONMENTAL OVERVIEW

This section provides an overview of the known environmental factors that should be considered as part of the master planning process.

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.

An online query through the Texas Historical Commission (THC) revealed that there are not any historic site locations in the immediate airport vicinity. The closest site that the query identified is approximately 1.80 miles south of the Airport on SH 80.

The City of San Marcos has its own Historic Preservation Commission focused on protecting historic structures, landmarks, and other aspects of the area pertinent to the community's history. Two facilities located at the airport have been designated as local historic structures by the City of San Marcos Historic Preservation Commission:

- Commemorative Air Force Hangar located at 2249 Airport Drive
- Graham Air Control Tower located at 1921 Airport Drive

Both of these structures were identified as local historic landmarks by the Historic Preservation Commission in 2007. Consequently, modifications to these facilities may require the review of the City of San Marcos Historic Preservation Commission.

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 any habitat of such species. As defined by the U.S. Fish and Wildlife Service (USFWS), an Endangered Species is any species of wildlife whose continued existence as a viable component of the state's wild fauna is determined to be in jeopardy. A Threatened Species is any species of wildlife that appears likely, within the foreseeable future, to become an endangered species.

As provided by the Texas Parks and Wildlife Department (TPWD), several threatened and endangered species are currently listed for Caldwell County. **Table 2-9** lists the threatened and endangered species identified through the online query for Caldwell County. None of these species have been observed on airport property. The San Marcos Regional Airport completed a Wildlife Hazard Assessment (WHA) in 2017. The results of the WHA showed no activity from any of the threatened or endangered species identified in Table 2-9. However, future coordination with USFWS and TPWD may be necessary prior to commencing any major construction project at the San Marcos Regional Airport to confirm that no hazard to an endangered or threatened species is being created.

TABLE 2-9
CALDWELL COUNTY THREATENED AND ENDANGERED SPECIES

Common Name	Genus/Species	Federal Status	State Status
Birds			
American Peregrine Falcon	*Falco peregrinus anatum*	DL	T
Artic Peregrine Falcon	*Falco peregrinus tundrius*	DL	
Bald Eagle	*Haliaeetus leucocephalus*	DL	T
Peregrine falcon	*Falco peregrinus*	DL	T
Whooping Crane	*Grus Americana*	LE	E
Wood Stork	*Mycteria americana*		T
Fishes			
Blue Sucker	*Cycleptus elongatus*		T
Mammals			
Red wolf	*Canis rufus*	LE	E
Mollusks			
False spike mussel	*Fusconaia mitchelli*		T
Golden orb	*Quadrula aurea*	C	T
Texas pimpleback	*Quadrula petrina*	C	T
Reptiles			
Cagle's map turtle	*Graptemys caglei*		T
Texas horned lizard	Phrynosoma cornutum		T
Timber Rattlesnake	Crotalus horridus		T
Plants			
Texas wild-rice	*Zizania texana*	LE	E

Source: U.S. Fish and Wildlife Service and the Texas Parks and Wildlife Department; T = State Listed Threatened; E = State Listed Endangered; DL = Federally Delisted; LE = Federally Listed Endangered; LT = Federally Listed Threatened; C = Federal Candidate for Listing.

FEMA Floodplain Map

Flooding can hamper the safe operation of an airport and make it difficult to develop property on or around an airport. The City of San Marcos is in the process of updating their floodplain maps with the Federal Emergency Management Agency (FEMA). The current Floodplain Map the City uses to regulate development is shown in **Figure 2-13**.

None of the existing airfield facilities at the San Marcos Regional Airport are located within the 100-year floodplain (shown in blue). However, a portion of the airport entrance road and the Taxiway Kilo Development Area are located within the 500-year floodplain (shown in orange). A regulatory floodway (shown in hatched red) and a 100-year floodplain do pass through the western most portion of Airport property that has not been developed.

FIGURE 2-13
FEMA FLOODPLAIN MAP
SAN MARCOS REGIONAL AIRPORT

Source: City of San Marcos

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. As part of this master plan project, an online inquiry was completed using the USDA Web Soil Survey System to determine whether any property surrounding the airport is considered prime farmland. According to the USDA Web Soil Survey System the vast majority of the property surrounding the airport is classified as prime farmland. **Figure 2-14** shows the results of the online inquiry. All areas shown in green are considered prime farmland.

FIGURE 2-14
PRIME FARMLAND MAP
SAN MARCOS REGIONAL AIRPORT

Source: USDA WebSoil Survey

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. However, an inactive landfill site is located immediately east of the airport close to the approach end of Runway 26. The landfill site has been capped. The presence of this landfill will be a consideration in future development plans at the airport.

Noise

Based on research completed as part of this project and discussions with airport stakeholders, there are no known noise related issues related to airport operations.

Air and Water Quality

The impacts that an airport can have on local air and water quality should be a major consideration in the growth and development of an airport. There are no known issues at the San Marcos Regional Airport related to water quality or air and water pollution at this time.

CHAPTER 3

Activity Forecasts

CHAPTER 3: ACTIVITY FORECASTS

INTRODUCTION

Forecasting aviation activity helps the airport sponsor identify potential changes in aeronautical activity at the airport that could drive future airport facility and equipment needs. In subsequent chapters of this Master Plan, the preferred demand forecasts described in this chapter are used to identify the type, extent, and timing of future aviation development.

Aeronautical activity levels at an airport are often influenced by the types of aviation services offered, the general business environment at the airport, and the business environment within the local/regional community. In addition, factors such as vigorous local airport marketing, tourism, increased industrialization, changes in transportation preferences, and fluctuations in the national, regional, and local economy all influence aviation demand.

As a result, aviation activity forecasts are developed in accordance with national trends and regional/local influences and, in context with the inventory findings, are developed as a guide for future development with the expectation that the facilities needed to support the forecasted demand will be available as demand dictates. This chapter examines aviation activity trends and the numerous factors that have influenced those trends in the United States, Texas, and the region the San Marcos Regional Airport serves.

FORECASTING INTERVALS AND PLANNING ACTIVITY LEVELS (PALS)

Master Plan aviation activity forecasts are traditionally completed in 5-year increments for a 20-year planning horizon. For this Master Plan, the first forecast year has been identified as 2019 and the last forecast year has been identified as 2039. As a result, aeronautical activity will be forecasted for the following years:

- 2019
- 2024
- 2029
- 2034
- 2039

However, it is important to note that aviation demand can fluctuate substantially over a 20-year period as the industry and economic condition are fluid and constantly changing. As a result, the activity levels identified for a particular forecast year may occur earlier or later in the 20-year planning horizon. Since actual changes in aeronautical activity levels should be the key driver behind making future airport capital improvement decisions, the forecasting years identified earlier have each been designated as a Planning Activity Level (PAL) as shown below:

- PAL 1 – 2019
- PAL 2 – 2024
- PAL 3 – 2029
- PAL 4 – 2034
- PAL 5 – 2039

The actual realization of the activity levels identified within each of these Planning Activity Levels should be used to guide future development as opposed to the forecasted years those activity levels are expected to occur. To perpetuate this approach, the identified PALs will be used in future chapters when discussing development decisions.

SOCIOECONOMIC DATA

An assessment of national, state, and regional economic conditions must be conducted to gain a better understanding of the relationship between historic and future aviation activity levels within an airport's area of influence. This information is essential and directly influences an airport's activity forecast. Therefore, the following socioeconomic information – population, employment, and median family income – has been collected to understand current economic conditions and influence assumptions that should be involved in the development of the aviation demand forecasts for the San Marcos Regional Airport.

For the analysis of socioeconomic information, information was reviewed for the following areas:

- Key Socioeconomic Influence Areas
  - Hays and Caldwell Counties (combined)
  - Austin-Round Rock Metropolitan Statistical Area (MSA)
  - San Antonio-New Braunfels Metropolitan Statistical Area (MSA)

- ✈ Comparative Socioeconomic Areas
  - o State of Texas
  - o United States

Hays and Caldwell Counties, the Austin-Round Rock MSA, and the San Antonio-New Braunfels MSA have all been identified as areas where socioeconomic changes could play a significant role in influencing future aeronautical activity at the airport. It should be noted that the San Marcos Regional Airport currently attracts tenants, based aircraft, and aeronautical users from all of these areas. As a result, it is important that the socioeconomic trends of each of these areas are evaluated to identify potential impacts on the airport. Socioeconomic information for the State of Texas and the United States will be used primarily for comparative purposes.

POPULATION

Population growth can be directly tied to the success and growth of an airport supporting a given population set. Consequently, population trends, and their expected rate of change, provide insight into an area's economic potential.

Table 3-1 shows the historic population figures and estimates for Hays and Caldwell counties, the San Antonio-New Braunfels Metropolitan Statistical Area (MSA), the Austin-Round Rock MSA, the State of Texas, and the United States between 2010 and 2017.

TABLE 3-1
HISTORIC POPULATION

Year	United States	Texas	Austin-Round Rock MSA	San Antonio - New Braunfels MSA	Hays and Caldwell County
2011	311,644,280	25,674,681	1,769,045	2,197,139	202,422
2012	313,644,280	26,059,203	1,805,637	2,234,964	205,732
2013	316,234,505	26,448,193	1,865,031	2,274,504	214,643
2014	318,622,525	26,956,959	1,911,175	2,321,610	223,194
2015	321,039,839	27,469,114	1,982,266	2,381,690	233,994
2016	323,405,935	27,862,596	2,036,386	2,421,643	242,107
2017	325,719,178	28,246,049	2,078,917	2,476,459	249,722
AAGR	0.75%	1.67%	2.92%	2.12%	3.89%

Source: TDC Population Estimates and Projections, US Census Population Estimates

All areas reviewed in this analysis have experienced steady growth over the seven-year period, with Hays and Caldwell counties combined experiencing the highest Average Annual Growth Rate (AAGR) of 3.89% annually. It should also be noted that the population growth rates for the Austin-Round Rock MSA (2.92% annually) and the San Antonio-New Braunfels MSA (2.12% annually) have significantly exceeded the population growth rates for the State of Texas (1.67% annually) and the United States (0.75% annually) as a whole during the same period of time.

This analysis indicates that the region where the San Marcos Regional Airport is located has grown at a rapid pace with the area immediately surrounding the airport (e.g. Hays and Caldwell County) growing faster than the region as a whole. In fact, Hays County has consistently been named one of the fastest growing counties in the United States during this time period.

While historic population trends can provide an indication of future activity, it is also important to analyze population projections for the future. **Table 3-2** shows future population projections for Hays and Caldwell counties (combined), the San Antonio-New Braunfels MSA, the Austin-Round Rock MSA, the State of Texas, and the United States between 2018 and 2050.

TABLE 3-2
FUTURE POPULATION PROJECTIONS

Year	United States	Texas	Austin-Round Rock MSA	San Antonio-New Braunfels MSA	Hays and Caldwell County
2018	327,892,000	28,716,213	2,133,977	2,527,653	259,469
2019	330,269,000	29,193,378	2,189,870	2,579,823	269,133
2024	341,963,000	31,685,217	2,480,246	2,852,257	321,335
2029	353,008,000	34,345,084	2,799,579	3,138,069	383,839
2034	363,003,000	37,142,136	3,153,488	3,430,042	458,682
2039	371,871,000	40,078,100	3,542,493	3,730,816	546,534
2044	379,861,000	43,209,927	3,969,412	4,047,608	650,853
2049	387,419,000	46,619,895	4,441,555	4,387,838	776,838
2050	388,922,000	47,342,417	4,542,827	4,459,030	805,195
AAGR	**0.58%**	**2.03%**	**3.53%**	**2.39%**	**6.57%**

Source: Source: TDC Population Estimates and Projections, US Census Population Estimates

Based on future population projections provided by the Texas Demographic Center (TDC), it is expected that the population of the region where the San Marcos

Regional Airport is located will continue to grow at a rapid pace that far exceeds the State of Texas and the United States. Hays and Caldwell counties are expected to see the highest growth rates of the areas included in this analysis by a significant margin.

Based on the analysis of historic and future population projections, it is expected that the population growth within the area will positively influence aeronautical activity at the San Marcos Regional Airport.

EMPLOYMENT

Another key socioeconomic factor that is vitally important to evaluating the aeronautical activity potential of an airport is employment data. A region's employment characteristics typically serve as a foundational element for the health of the regional economy and the health of the regional economy is closely linked to aeronautical activity.

Table 3-3 provides jobs data for Hays and Caldwell counties (combined), the San Antonio-New Braunfels MSA, the Austin-Round Rock MSA, and the State of Texas between 2010 and 2017.

TABLE 3-3
JOBS DATA

Year	Texas	Austin-Round Rock MSA	San Antonio - New Braunfels MSA	Hays and Caldwell County
2010	11,244,632	865,461	943,771	89,962
2011	11,535,095	897,490	965,023	93,183
2012	11,818,675	931,584	987,374	96,446
2013	12,052,646	966,601	1,010,632	101,105
2014	12,360,368	1,003,686	1,038,583	106,377
2015	12,493,197	1,036,120	1,063,052	111,670
2016	12,702,122	1,080,115	1,097,577	118,338
2017	12,960,595	1,116,938	1,125,240	122,328
AAGR	**2.18%**	**4.15%**	**2.75%**	**5.14%**

Source: Texas Workforce Commission - TRACER System

Table 3-4 provides additional employment data for Hays and Caldwell counties (combined), the State of Texas, and the United States between 2005 and 2016.

TABLE 3-4
EMPLOYMENT DATA

	United States		Texas		Hays and Caldwell County	
Year	Number of Establishments	Annual Payroll ($1,000)	Number of Establishments	Annual Payroll ($1,000)	Number of Establishments	Annual Payroll ($1,000)
2005	7,499,702	$4,482,722,481	497,758	315,809,126	3,176	934,012
2006	7,601,160	$4,792,429,911	509,080	347,735,827	3,260	1,019,068
2007	7,705,018	$5,026,778,232	521,408	373,037,029	3,604	1,112,802
2008	7,601,169	$5,130,509,178	522,336	394,696,044	3,596	1,186,055
2009	7,433,465	$4,855,545,239	519,028	376,646,791	3,630	1,170,949
2010	7,396,628	$4,940,983,369	522,146	386,653,791	3,720	1,235,602
2011	7,354,043	$5,164,897,905	525,420	414,113,062	3,741	1,338,651
2012	7,431,808	$5,414,255,995	537,839	446,679,425	3,981	1,505,347
2013	7,488,353	$5,621,697,325	547,190	468,417,086	4,094	1,587,994
2014	7,563,084	$5,940,186,911	557,721	501,456,595	4,240	1,711,536
2015	7,663,938	$6,253,488,252	569,091	521,095,797	4,431	1,862,309
2016	7,757,807	$6,435,142,055	579,168	526,782,643	4,638	1,986,636
AAGR	**0.31%**	**3.96%**	**1.49%**	**6.07%**	**4.18%**	**10.25%**

Source: US Census – County Business Patterns Survey

Both tables show significant and steady growth in job numbers, number of establishments (e.g. places of employment), and annual payroll. Again, Hays and Caldwell counties (combined) show the highest rate of growth in every category closely followed by the Austin-Round Rock MSA and the San Antonio-New Braunfels MSA. This information indicates that the economy of the region where the San Marcos Regional Airport is located has grown rapidly in recent years.

While historic employment data can provide an indication of recent economic growth within a region, it is important to evaluate future projections of employment growth to identify whether those trends are expected to continue in the future. Employment growth projections within the State of Texas are developed by the Texas Workforce Commission (TWC) for various Workforce Development Areas (WDAs). WDAs are composed of multiple counties with close economic ties. **Table 3-5** shows forecasted employment growth in the following WDAs:

- Rural Capital WDA – Composed of the counties surrounding Travis County including Hays and Caldwell County
- Alamo WDA – Composed of counties in the San Antonio-New Braunfels Area

- Capital WDA – Travis County
- State of Texas
- United States

TABLE 3-5
PROJECTED EMPLOYMENT GROWTH

Employment Growth 2016-2026	Total	AAGR
United States	7.40%	**0.74%**
Texas	16.60%	**1.66%**
Capital Area WDA	16.30%	**1.63%**
Alamo WDA	15.50%	**1.55%**
Rural Capital WDA*	21.20%	**2.12%**

Source: Texas Workforce Commission - TRACER System
*Hays and Caldwell County are part of the Rural Capital WDA

Once more, the growth rate of the area encompassing Hays and Caldwell counties is the highest of all areas measured.

All the employment data reviewed as part of this master plan project indicates that the economy in the region the San Marcos Regional Airport is located in has grown and is expected to continue to grow rapidly. This is expected to be a positive influence on aeronautical activity at the airport.

MEDIAN HOUSEHOLD INCOME

In addition to general employment data, household income data provides insight into the local economy. While a location's economy can be growing, it is possible for it to grow in a manner that has a limited impact on aeronautical activity (e.g. lower income jobs, businesses with little correlation to aeronautical activity, etc.).

Historically, higher levels of income have been associated with higher aeronautical activity levels. **Tables 3-6 and 3-7** show historic and projected household incomes for Hays and Caldwell counties (combined). Trends similar to these are expected in the Austin-Round Rock MSA and the San Antonio-New Braunfels MSA.

Socioeconomic studies similar to the one completed for this master plan have shown the median household income within the City of San Marcos to be lower than the figures shown in Tables 3-6 and 3-7. Since the area the San Marcos

Regional Airport serves is much wider than just the immediate City of San Marcos area, income figures for Hays and Caldwell County combined were used for this analysis and compared to similar data for the Austin-Round Rock MSA and the San Antonio – New Braunfels MSA.

TABLE 3-6
HISTORICAL HOUSEHOLD INCOMES

Income	2010	2011	2012	2013	2014	2015	2016	2017
Percentage of Household with Income $75,000 - $99,999	12.45%	12.79%	12.29%	12.25%	12.53%	12.61%	13.57%	14.34%
Percentage of Household with Income $100,000 - $149,999	14.43%	14.49%	14.60%	13.96%	13.97%	14.53%	14.49%	14.72%
Percentage of Household with Income $150,000 - $199,999	4.66%	5.35%	5.29%	5.85%	5.66%	5.35%	5.51%	6.01%
Percentage of Household with Income $200,000+	3.46%	3.73%	4.36%	4.46%	4.71%	4.46%	4.86%	5.21%
Total Percentage of Households with Income Above $75,000	**35.00%**	**36.36%**	**36.54%**	**36.53%**	**36.86%**	**36.94%**	**38.43%**	**40.28%**

Source: U.S. Census - American Community Survey (ACS)

TABLE 3-7
PROJECTED HOUSEHOLD INCOMES (2009 DOLLARS)

Income (2009 Dollars)	2018	2019	2024	2029	2034	2039	2050
Percentage of Household with Income $75,000 - $99,999	13.31%	13.51%	14.64%	15.84%	17.21%	18.29%	19.54%
Percentage of Household with Income $100,000 - $124,999	8.55%	8.68%	9.40%	10.17%	11.06%	11.98%	14.62%
Percentage of Household with Income $125,000 - $149,999	6.07%	6.16%	6.66%	7.21%	7.84%	8.48%	10.33%
Percentage of Household with Income $150,000 - $199,999	5.01%	5.08%	5.49%	5.95%	6.46%	6.99%	8.51%
Percentage of Household with Income $200,000+	4.17%	4.23%	4.57%	4.95%	5.38%	5.82%	7.10%
Total Percentage of Households with Income Above $75,000	37.11%	37.66%	40.76%	44.12%	47.95%	51.56%	60.10%

Source: Woods and Poole

Together, the tables indicate that the percentage of households earning more than $75,000 annually increased between 2010 and 2017 and is expected to continue to increase in the future. This growth is expected to be a positive influence on aeronautical activity at the San Marcos Regional Airport in the future.

It must be noted that the historic and projected household income information comes from two different sources. As such, there is a drop in percentages between the 2017 historic numbers (Table 3-6) and the 2018 projected numbers (Table 3-7). This difference is due to the different forecasting models used by each data source and because the data source used in Table 3-8 uses 2009 monetary values.

SOCIOECONOMIC SUMMARY

In general, the analysis of the socioeconomic factors for the region the San Marcos Regional Airport serves show that the regional economy is growing and is expected to continue to grow at a fast pace during the forecast period. This growth will support the growth of aeronautical activity at the airport.

SUMMARY OF AIRPORT HISTORIC OPERATIONS

Since San Marcos is a towered airport, traffic count data collected by the Air Traffic Control Tower (ATCT) was used to compile historic operations data. The San Marcos ATCT is open 7 days a week from 7 AM to 7 PM.

Table 3-8 summarizes the available historic annual operations data (IFR, VFR and Local) at HYI since Fiscal Year (FY) 2012 as recorded by the ATCT. For the purposes of this data, a fiscal year as defined as October – September.

TABLE 3-8
HISTORICAL AVIATION ACTIVITY
SAN MARCOS REGIONAL AIRPORT

	Traffic Type			
Fiscal Year	**IFR**	**VFR**	**LOCAL**	**TOTAL**
FY 2012	8,796	22,727	29,048	60,571
FY 2013	9,953	19,717	23,069	52,739
FY 2014	11,032	22,161	20,009	53,202
FY 2015	7,994	17,057	19,872	44,923
FY 2016	6,787	18,004	20,138	44,929
FY 2017	11,754	23,720	25,310	60,784
FY 2018	15,855	23,780	21,956	61,591

Source: HYI Air Traffic Control Tower Traffic Counts

The ATCT data shows fluctuations in total activity during the 7 year period, with significant growth in IFR operations but a similar decline in local traffic. Overall VFR traffic grew slightly over the cumulative period.

Based on information obtained from airport tenants, it is estimated that approximately 6,000 additional operations occur annually (500 per month) from 7 PM to 7 AM when the ATCT is closed. These additional operations are not reflected in the table above.

NATIONAL GENERAL AVIATION TRENDS

An understanding of recent and anticipated trends within the General Aviation (GA) industry is important when assessing aviation demand for the San Marcos Regional Airport. Some trends may affect aviation demand in the study area while others will have little or no appreciable impact on local/regional aviation demands.

Various data sources were examined and used to support the analysis of national GA trends. Those sources include:

- Federal Aviation Administration, FAA Aerospace Forecasts, Fiscal Years 2018 – 2038
- National Business Aircraft Association (NBAA), NBAA Business Aviation Fact Book (current edition)
- General Aviation Manufacturers Association (GAMA), 2016 General Aviation Statistical Databook and 2017 Industry Outlook

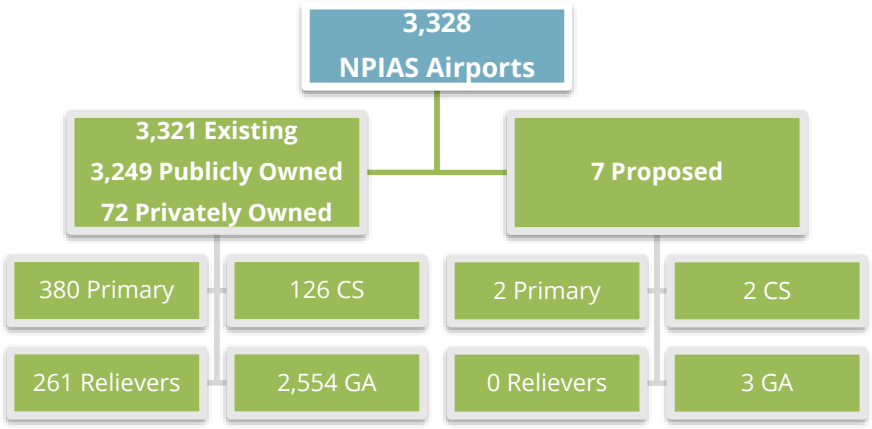
GENERAL AVIATION AIRPORT OVERVIEW

GA aircraft are defined as all aircraft not flown by commercial airlines or the military. In the FAA's *General Aviation Airports: A National Asset* report, dated May 2012, the FAA stated that general aviation serves 5 primary functions:

- Emergency Preparedness and Response
- Critical Community Access
- Commercial, Industrial, and Economic Activities
- Destination and Special Events
- Other Aviation Specific Function (e.g. self-piloted business flights, corporate, flight instruction, personal flying, etc.)

According to the current National Plan of Integrated Airport System (NPIAS), there are 19,627 public and private airports located throughout the United States, and 5,099 of these are open to public use. **Figure 3-1** displays the breakdown of airports as described in the FAA's *2019 -2023 National Plan of Integrated Airport System* (NPIAS). The number and distribution of public-use airports available to GA users provides a valuable transportation and economic resource to local communities, businesses, and individuals throughout the region, state, and nation.

FIGURE 3-1
NPIAS AIRPORT BREAKDOWN



Primary – Commercial Service airports enplaning more than 10,000 passengers per year.
CS – Non-Primary Commercial Service airports having more than 2,500 enplaned passengers per year but less than 10,000 passengers per year.

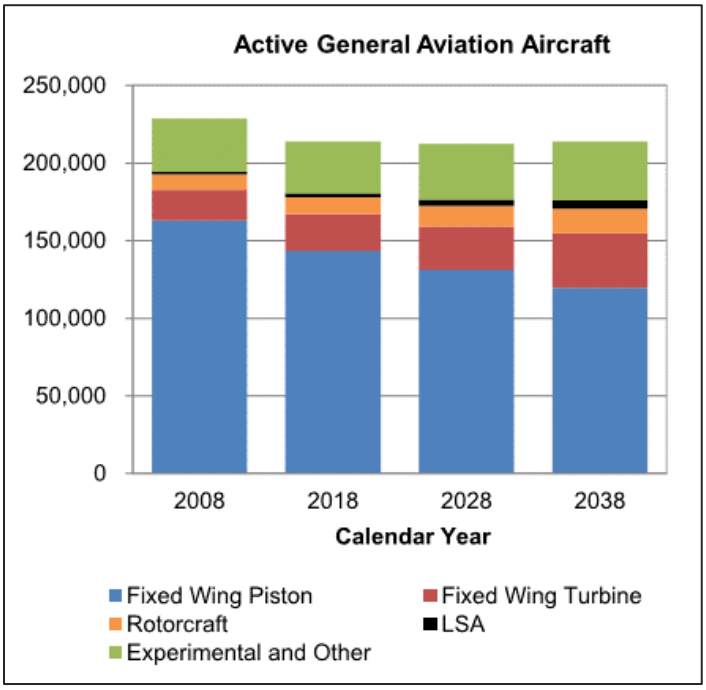
San Marcos Regional Airport is considered a "Reliever" airport for both San Antonio International Airport and Austin-Bergstrom International Airport.

Summary of National General Aviation Trends

According to the FAA's 2018 – 2038 Aerospace Forecast, the overall number of active GA aircraft is expected to remain flat between 2018 and 2038 and the number of hours flown is forecasted to grow at a rate of 0.8 percent annually during that same period. Slight declines are expected in the hours flown and number of active single engine piston and multi-engine piston aircraft. Slight growth is expected in the Light Sport Aircraft (LSA), rotorcraft, jet, turboprop, and experimental aircraft categories. **Figure 3-2** and **Figure 3-3** depict these forecasted trends.

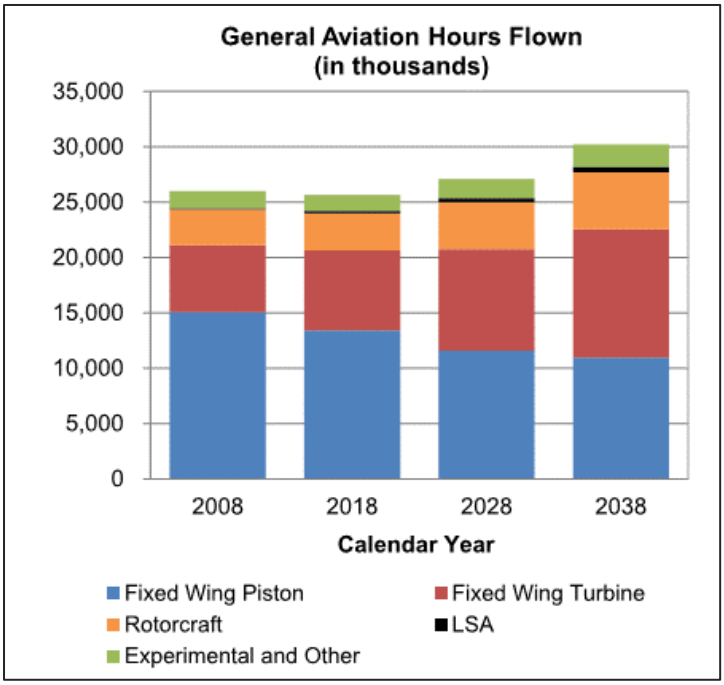
Additionally, the total number of pilots (excluding student pilots) is expected to remain flat during the same period. Declines are expected in the recreational, private, and commercial pilot categories. Increases are expected in the sport pilot and Airline Transport Pilot (ATP) categories.

FIGURE 3-2
FAA AEROSPACE FORECAST



Source: FAA Aerospace Forecast, 2018 – 2038

FIGURE 3-3
FAA AEROSPACE FORECAST



Source: FAA Aerospace Forecast, 2018 – 2038

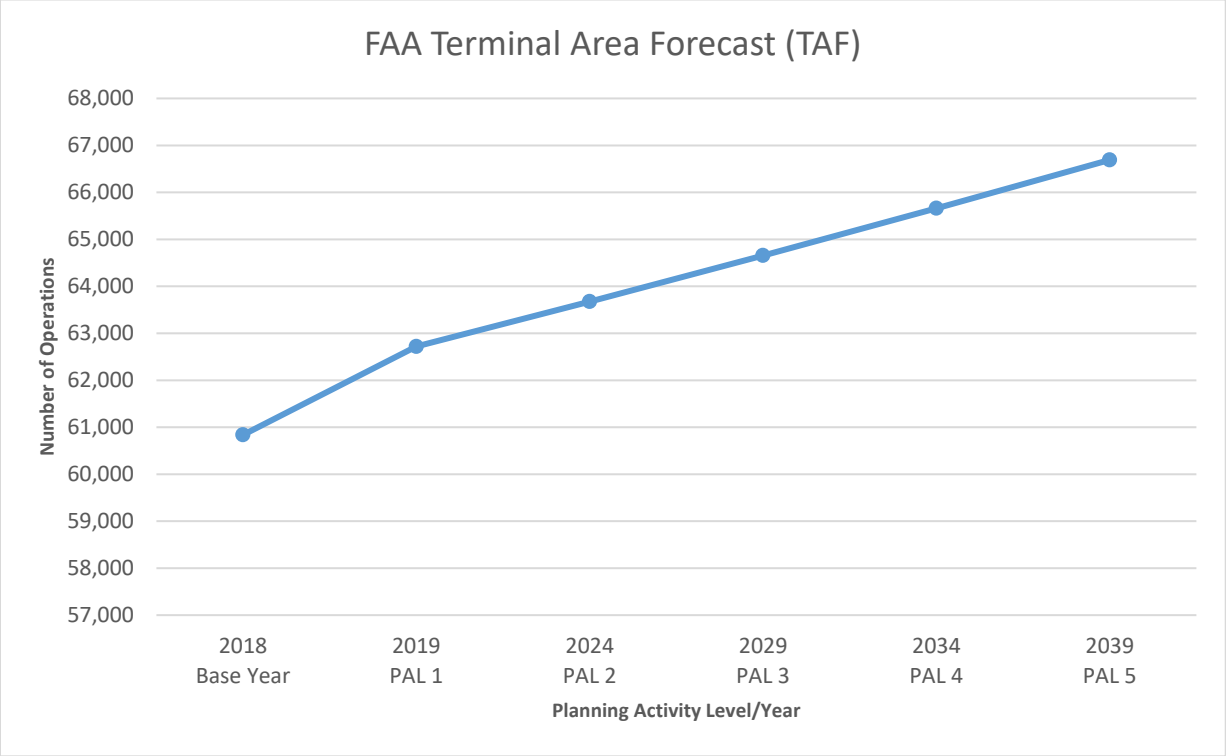
FAA TERMINAL AREA FORECAST

The Terminal Area Forecast (TAF) is a FAA forecast-planning database produced each year covering airports in the NPIAS. The TAF is prepared to assist the FAA in meeting its planning, budgeting, and staffing requirements. The TAF forecasts are made at the individual airport level and are based in part on the national FAA Aerospace Forecasts. The TAF contains historic and forecast data for enplanements, airport operations, instrument operations, and based aircraft. TAF data is developed for 264 FAA towered airport, 253 contract-towered airports, 31 terminal radar approach control facilities, and 2,814 non-towered airports as of 2017. Data in the TAF is presented on a U.S. Governmental fiscal year basis, which runs from October through September.

As its primary input, the TAF uses the *FAA Aerospace Forecasts* from the specific year. Aviation activity forecasts for FAA-towered and federal contract-towered airports are developed using historical relationships between airport passenger demand and/or activity measures and local and national factors that influence aviation activity. At airports similar to the San Marcos Regional Airport, the TAF data is generated from historical data reported by the airport air traffic control tower.

The TAF forecast for the San Marcos Regional Airport, presented in **Figure 3-4**, reflects a slow but steady growth rate through 2039. TAF forecasts showing slow and steady growth are common at towered airports.

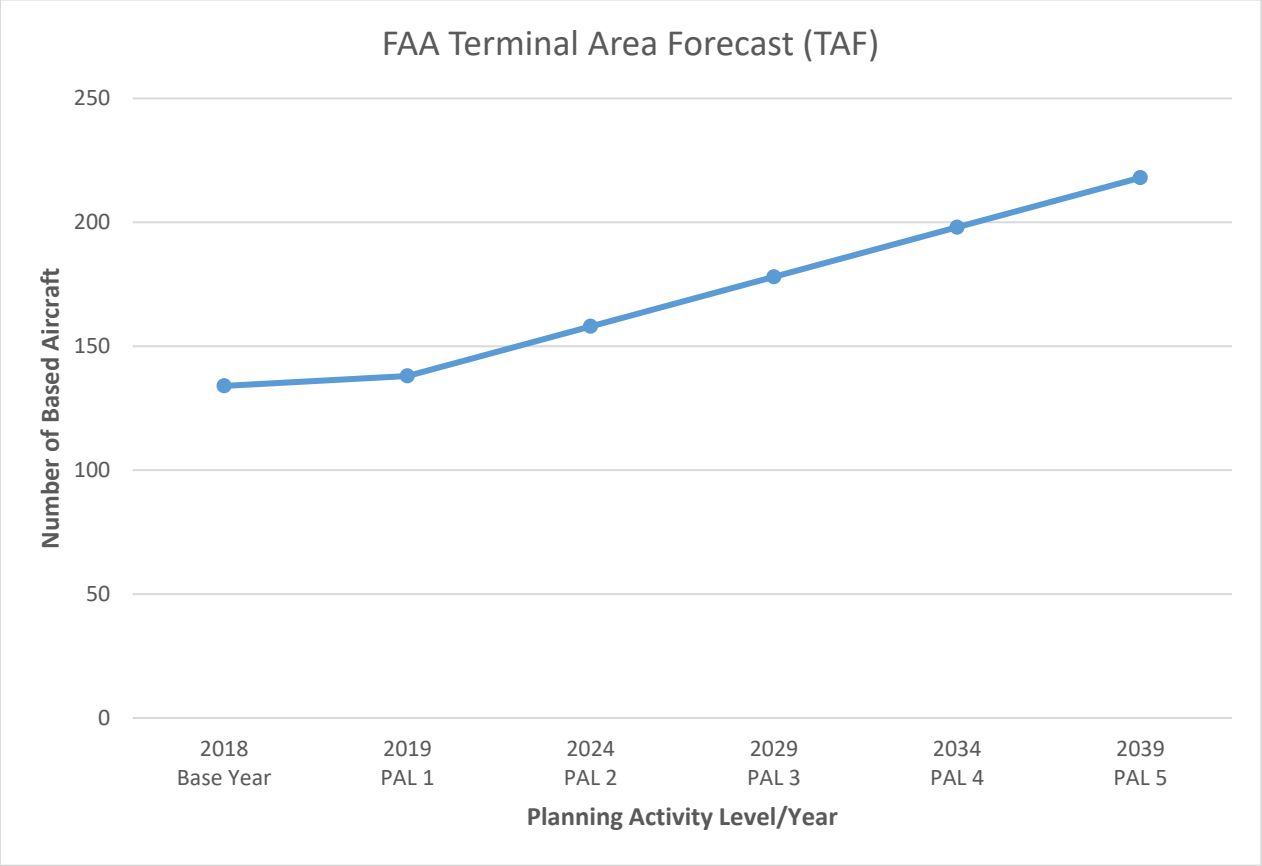
FIGURE 3-4
HYI TERMINAL AREA FORECAST – FUTURE OPERATIONS FORECAST
SAN MARCOS REGIONAL AIRPORT



Source: FAA TAF, 2019

The TAF also depicts a steady growth rate for based aircraft at San Marcos. **Figure 3-5** shows the TAF based aircraft forecast.

FIGURE 3-5
HYI TERMINAL AREA FORECAST – FUTURE BASED AIRCRAFT FORECAST
SAN MARCOS REGIONAL AIRPORT



Source: FAA TAF, 2019

AERONAUTICAL ACTIVITY DEMAND FORECASTS

Based on information obtained in the inventory analysis, the socioeconomic data presented, and national aviation trends, the following factors and assumptions have been incorporated into the forecasts of based aircraft and annual operations for the San Marcos Regional Airport:

- Future airport facilities will continue to accommodate a broad array of aircraft including business-type aircraft and helicopters.
- Changes in aeronautical activity levels and based aircraft will likely be tied to the regional economy and population changes as well as the growth of the San Antonio and Austin areas.

- An "unconstrained" forecast of aviation demand assumes facility improvements will occur as demand increases.
- Greater aircraft utilization resulting from airfield and terminal area improvements can be both directly and indirectly be linked to economic development activity.

FORECAST METHODOLOGIES

The development of an aviation activity forecast involves analytical and judgmental assumptions to realize the highest level of forecast confidence. The aircraft operations and based aircraft forecasts are developed in accordance with national and regional trends, and in context with the inventory findings and socioeconomic trends. The forecasts developed here begin with baseline information from 2018 with 2019 as the first forecast year. National trends and forecasts are provided by the *FAA Aerospace Forecasts, Fiscal Years 2018-2038*.

Various forecast techniques can be used to develop baseline forecasts including:

- Trend Analysis – Trend analysis is the simplest and most familiar form of forecasting and is also one of the most widely used. This forecasting technique uses historic data as a basis to develop a forecast for the future. An assumption of this forecast method is that historic levels of aviation demands will continue and influence similar linear progressions in the future. Though this assumption seems broad in its application, it can serve as a reliable benchmark against other forecast methods.
- Regression Analysis – In a regression model, the forecast of aviation demand (the dependent variable) is projected on the basis of one or more external indicators (the independent variables). Historic values for both the dependent and independent variables are analyzed to determine their relationship. Once defined, this relationship is used to project the dependent variable with a forecast or projection of the independent variable(s). In aviation forecasting, an example of the dependent variable is based aircraft. Population or median household income levels are commonly used independent variables that aid in the projection of aviation growth.

- Forecast Utilizing National or Regional Projections – The FAA produces an annual aerospace forecast that includes its projections regarding the growth of aviation throughout the United States. The FAA utilizes a variety of data sources to help formulate its forecast including aircraft sales/delivery data, the number of active pilots, economic growth protections, etc. The annual growth rates provided by the FAA may be utilized to formulate growth forecast for an airport. Additionally, many of these national forecasts are further segmented into regional and state level forecasts. These forecasts can also be used to formulate a growth forecast for an airport.
- Market Analysis –This forecast method typically uses an easily identifiable independent variable such as population or income, which has a high correlation or an indirect cause-and-effect relationship within certain segments of the GA industry. The market analysis technique often employs a static and dynamic variable relationship between community factors and GA trends that aids in predicting aviation growth based on forecast community indicators such as population.

The application of these forecasting techniques for based aircraft and aircraft operations at the San Marcos Regional Airport are discussed below.

FORECAST OF BASED AIRCRAFT

Determining the number and type of aircraft anticipated to be based at an airport is a vital component in creating a development plan. Depending on the potential market and forecast, the airport should tailor the development plan to the unique characteristics of the anticipated demand.

The number and type of aircraft that can be expected to base at an airport is dependent on several factors, such as available facilities, airport operator services, airport proximity and accessibility, and the local/regional economy. Many aircraft operators are particularly sensitive to both the quality and location of their basing facilities, with proximity of home and work often identified as the primary consideration in the selection of an aircraft-basing location.

In 2018, a based aircraft count was conducted at the airport. Currently, the San Marcos Regional Airport has 200 total based aircraft (160 single-engine piston

aircraft, 16 multi-engine aircraft, 9 turboprop aircraft, 14 jets and one helicopter). Consequently, 200-based aircraft was the figure used for the base year (2018) of the based aircraft forecast.

One factor that should be considered to gauge the immediate potential for based aircraft growth is whether the airport has an active hangar waiting list. Currently, the airport's hangars are 100% full and a hangar waiting list exists for available hangar space. Currently, there are 109 unique aircraft owners/operators on the hangar waiting list for the San Marcos Regional Airport. Additionally, one of the FBOs at the San Marcos Regional Airport has indicated that they receive multiple inquires each year from larger aircraft operators (e.g. turboprops, jets, etc.) seeking hangar space at the airport.

Numerous forecast methods were used to predict based aircraft growth for the San Marcos Regional Airport. Seven are presented here:

- FAA Terminal Area Forecast Growth Rate for Based Aircraft (3.03%)
- FAA Terminal Area Forecast Growth Rate for Based Aircraft with Flight School Adjustment
- FAA Terminal Area Forecast – Texas State-Wide Based Aircraft Growth Rate (1.13%)
- FAA Terminal Area Forecast – Southwest Region Based Aircraft Growth Rate (1.04%)
- Growth Rate Based on Projected Employment Growth Rate (2.12%)
- Combined Population Growth Rate for Austin-Round Rock and San Antonio-New Braunfels MSAs
- Average of All Forecasts excluding FAA TAF

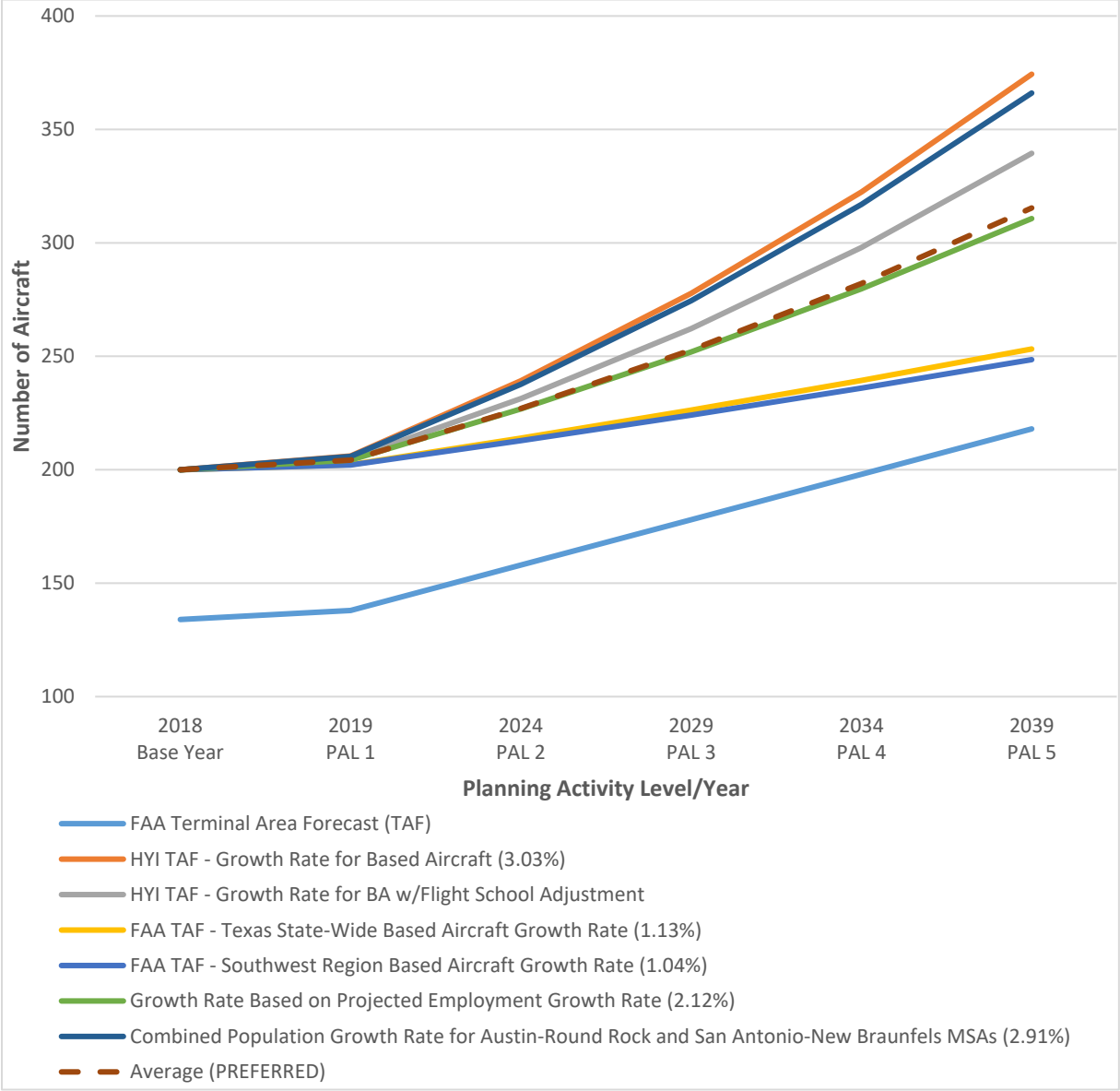
Table 3-9 and **Figure 3-6** provide a summary of the forecast models for based aircraft anticipated at the airport over the 20-year planning period.

TABLE 3-9
SUMMARY OF BASED AIRCRAFT FORECASTS, 2019-2039
SAN MARCOS REGIONAL AIRPORT

Year	FAA Terminal Area Forecast (TAF)	HYI TAF - Growth Rate for Based Aircraft (3.03%)	HYI TAF - Growth Rate for BA w/Flight School Adjustment	FAA TAF - Texas State-Wide Based Aircraft Growth Rate (1.13%)	FAA TAF - Southwest Region Based Aircraft Growth Rate (1.04%)	Growth Rate Based on Projected Employment Growth Rate (2.12%)	Combined Population Growth Rate for Austin-Round Rock and San Antonio-New Braunfels MSAs (2.91%)	Average (PREFERRED)
2018 *Base Year*	134	200	200	200	200	200	200	200
2019 *PAL 1*	138	206	205	202	202	204	206	204
2024 *PAL 2*	158	239	231	214	213	227	238	227
2029 *PAL 3*	178	278	262	226	224	252	274	253
2034 *PAL 4*	198	322	298	239	236	280	317	282
2039 *PAL 5*	218	374	339	253	249	311	366	315

Source: Garver Forecast Data for HYI, 2019 and FAA Aerospace Forecasts, Fiscal Years 2018 - 2038.

FIGURE 3-6
SUMMARY OF BASED AIRCRAFT FORECASTS, 2019-2039
SAN MARCOS REGIONAL AIRPORT



Source: Garver Forecast Data for HYI, 2019 and FAA Aerospace Forecasts, Fiscal Years 2018-2038.

The current FAA TAF shows the number of based aircraft at the San Marcos Regional Airport in 2018 to be significantly lower than the actual number determined through the 2018 aircraft count (134 based aircraft vs. 200 based aircraft). As a result, the TAF was deemed unreliable as a forecast of future based aircraft activity. Additionally, several regression and trend analysis forecasts were run but were deemed to be statistically unreliable and, as a result, were excluded.

Due to the population and economic growth expected to occur within the region and many of the airports closer to downtown Austin reaching their based aircraft capacity, it is expected that based aircraft will grow at a strong pace during the forecast period. Consequently, the "Average" forecast was selected as the preferred forecast for based aircraft growth at the airport. This forecast is aggressive but realistic for the San Marcos Regional Airport and will facilitate proper planning for the future.

Forecast Of Aircraft Mix for Based Aircraft

While establishing a baseline forecast of based aircraft growth is critical to facilitate good planning, it is also important to identify the mix of aircraft (e.g. single-engine piston, multi-engine piston, turboprop, jet, helicopter) that are expected at the airport during the planning period, as this can greatly influence the types of facilities expected to be needed at an airport. The proposed aircraft mix at a given airport is typically highly dependent on the local economy and the type of aeronautical traffic it stimulates. National trends in the aircraft fleet can also play a significant role.

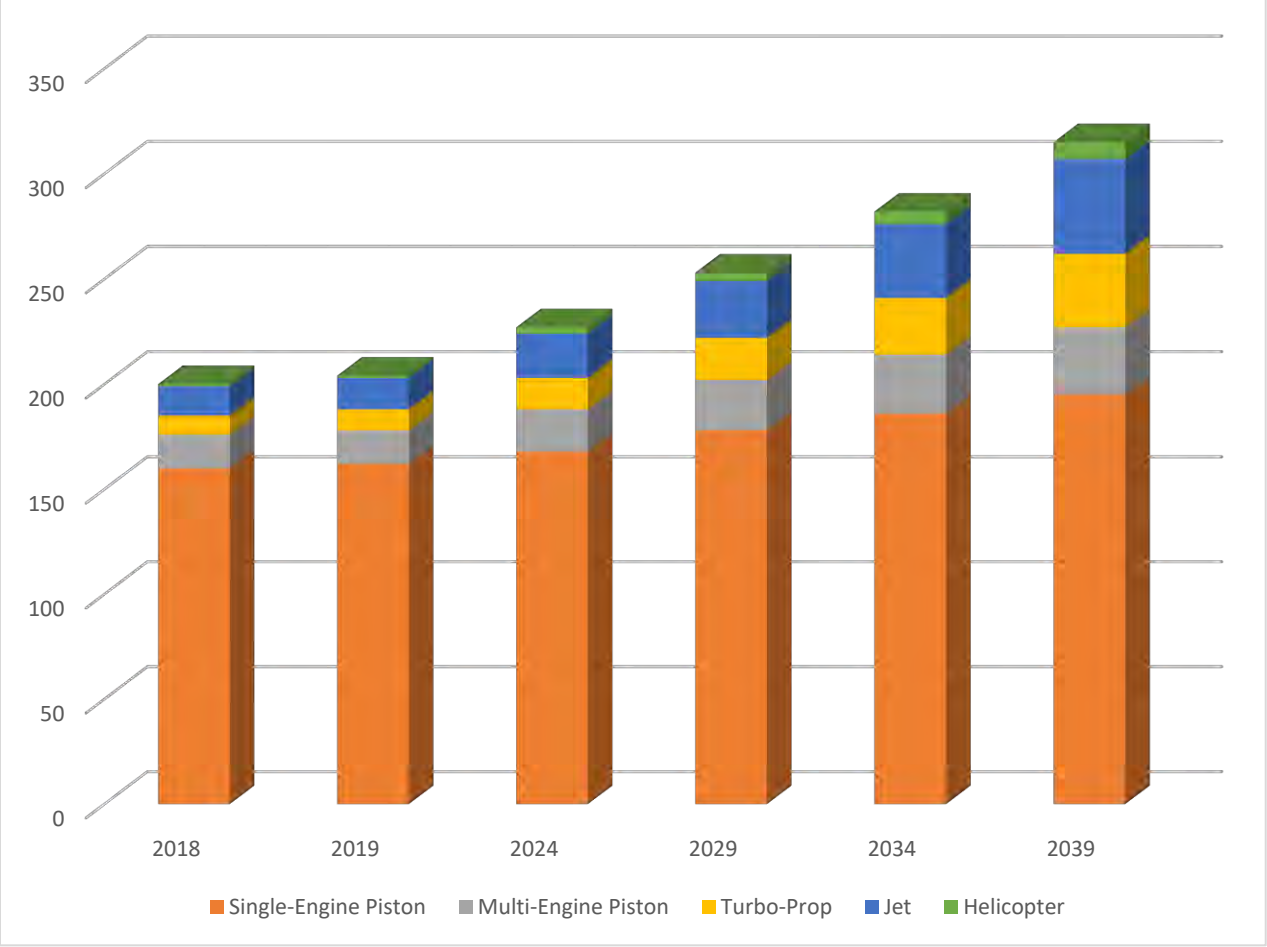
The mix of based aircraft for incremental periods throughout the planning period is illustrated in **Table 3-10** and **Figure 3-7**. Consistent with the FAA's current Aerospace Forecast, the number of single-engine piston aircraft is forecasted to stay flat with most gains of the increases expected in the turbo-prop, helicopter, experimental, and light-sport aircraft categories.

TABLE 3-10
BASED AIRCRAFT FLEET MIX, 2019-2039
SAN MARCOS REGIONAL AIRPORT

Year	2018 *Base Year*	2019 *PAL 1*	2024 *PAL 2*	2029 *PAL 3*	2034 *PAL 4*	2039 *PAL 5*
Single-Engine Piston	160	162	168	178	186	195
Multi-Engine Piston	16	16	20	24	28	32
Turbo-Prop	9	10	15	20	27	35
Jet	14	15	21	27	35	45
Helicopter	1	1	3	4	6	8
Total	200	204	227	253	282	315

Source: Garver Forecast Data for HYI, 2019

FIGURE 3-7
BASED AIRCRAFT FLEET MIX, 2019-2039
SAN MARCOS REGIONAL AIRPORT



Source: Garver Forecast Data for HYI, 2019

AIRCRAFT OPERATIONS FORECASTS

Determining the projected number and mix of future aircraft operations at an airport is a vital component in developing future infrastructure plans. Aeronautical activity at an airport is typically closely linked to the number of aircraft based at the airport and the aeronautical needs of businesses, organizations, and individuals within the surrounding area.

Numerous forecast methods were used to predict aircraft operations growth for San Marcos Regional Airport. Six are presented here:

- FAA Aerospace Forecast - Active GA and Air Taxi Fleet Hours Flown Growth Rate (0.8%)
- FAA Aerospace Forecast - Total Fuel Consumption Growth Rate (1.4%)
- Growth Rate Based on Projected Employment Growth Rate (2.12%)
- Combined Population Growth Rate for Austin-Round Rock and San Antonio-New Braunfels MSAs (2.91%)
- Growth Rate Based on Austin-Round Rock MSA Population Growth Rate (3.53%)
- Trendline Forecast Based on 2012-2018 Tower Operations Data

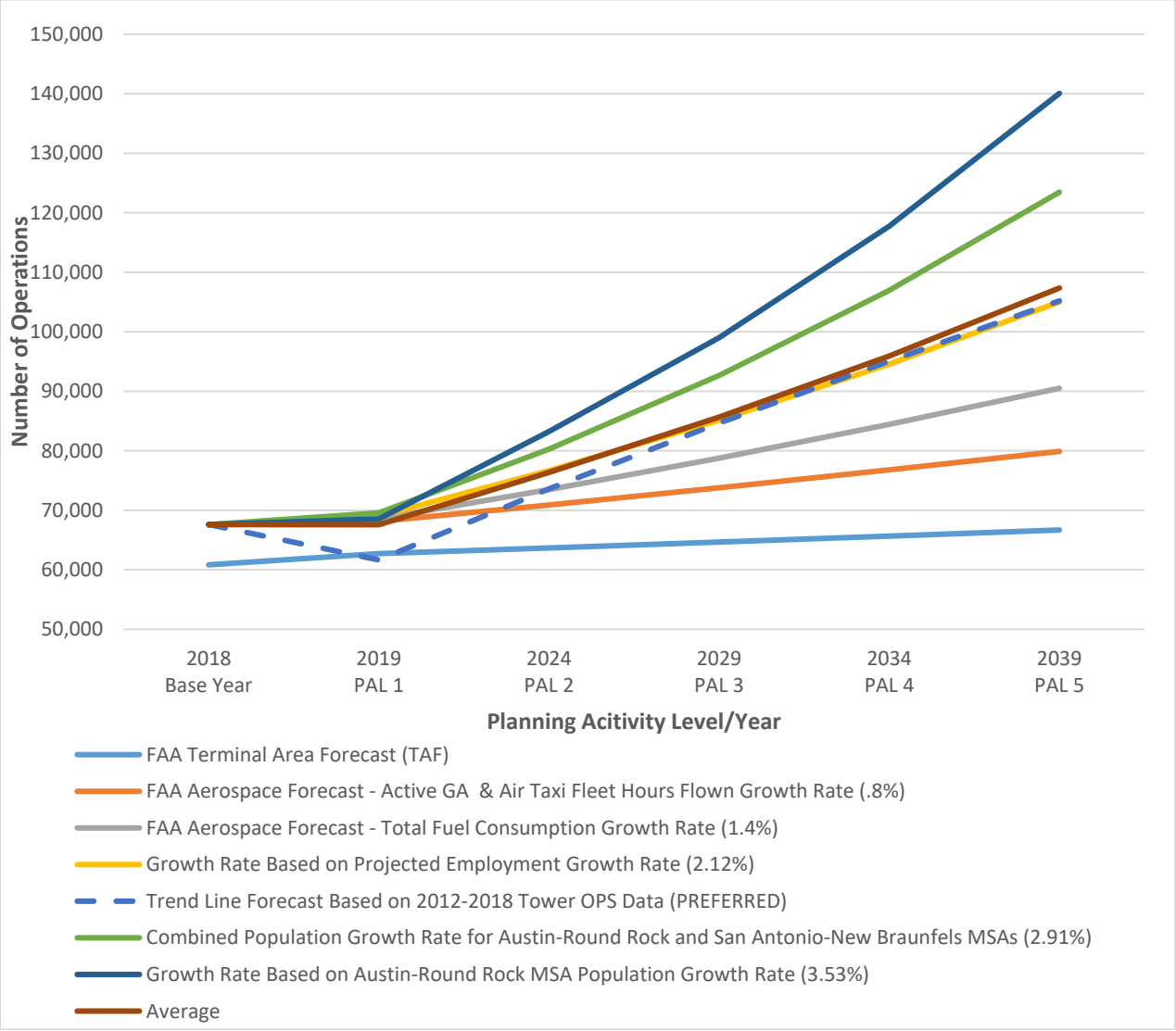
Table 3-11 and **Figure 3-8** provide a summary of the forecast models for aircraft operations anticipated at the airport over the 20-year planning period.

TABLE 3-11
AIRCRAFT OPERATIONS FORECAST
SAN MARCOS REGIONAL AIRPORT

Year	FAA Terminal Area Forecast (TAF)	FAA Aerospace Forecast - Active GA & Air Taxi Fleet Hours Flown Growth Rate (.8%)	FAA Aerospace Forecast - Total Fuel Consumption Growth Rate (1.4%)	Growth Rate Based on Projected Employment Growth Rate (2.12%)	Trend Line Forecast Based on 2012-2018 Tower OPS Data (PREFERRED)	Combined Population Growth Rate for Austin-Round Rock and San Antonio-New Braunfels MSAs (2.91%)	Growth Rate Based on Austin-Round Rock MSA Population Growth Rate (3.53%)	Average
2018 *Base Year*	60,838	67,591	67,591	67,591	67,591	67,591	67,591	67,591
2019 *PAL 1*	62,719	68,132	68,537	69,024	61,659	69,558	68,537	67,575
2024 *PAL 2*	63,675	70,901	73,471	76,657	73,597	80,285	83,231	76,357
2029 *PAL 3*	64,656	73,783	78,760	85,135	84,666	92,666	98,996	85,668
2034 *PAL 4*	65,661	76,782	84,430	94,550	95,050	106,957	117,747	95,919
2039 *PAL 5*	66,691	79,902	90,508	105,006	105,192	123,452	140,049	107,352

Source: Garver Forecast Data for HYI, 2019 and FAA Aerospace Forecasts, Fiscal Years 2018-2038.

FIGURE 3-8
AIRCRAFT OPERATIONS FORECAST
SAN MARCOS REGIONAL AIRPORT



Source: Garver Forecast Data for HYI, 2019 and FAA Aerospace Forecasts, Fiscal Years 2018-2038.

The San Marcos Regional Airport is expected to see a short-term decline in aircraft operations due to a reduced number of flight school operations. However, operations are expected to increase steadily in the long run due to economic and population increases in the region. Consequently, the trend line forecast was selected as the preferred aircraft operations forecast for the San Marcos Regional Airport as it shows a decline in operations in the short term but long term gains.

AIRCRAFT OPERATIONS FLEET MIX FORECAST

In addition to forecasting the total number of annual operations projected to occur at an airport during the forecast period, it is also critical to project the types of aircraft that will likely be operating at the airport.

An examination of historic Instrument Flight Rules (IFR) aircraft operations data at the San Marcos Regional Airport provides some guidance towards developing an accurate fleet mix forecast. Historic IFR flight data for an airport can be pulled from the FAA's Traffic Flow Management System Counts (TFMSC) database. While IFR flight records account for only a fraction of the total operations that occur at an airport, they do provide an indicator of the type of aircraft that use the airfield and the frequency. It can also be assumed that most aircraft not operating under IFR flight rules at the airport are smaller single engine and light-twin engine aircraft that typically fall in the A-I and B-I aircraft classifications.

IFR flight data from 2013 through 2018 was used to analyze the current mix of aircraft using the San Marcos Regional Airport. Based on this data, discussions with airport stakeholders, and the airport's current mix of based aircraft, the following aircraft operations fleet mix ratios were established for forecasting purposes:

- Single Engine Piston Aircraft – 79.75%
- Multi Engine Piston Aircraft – 8%
- Turbo-Prop Aircraft – 7%
- Jet – 5%
- Helicopter – .25%

For the purposes of these calculations, light sport aircraft and experimental aircraft have been included in the single-engine piston aircraft category. These ratios are expected to change during the forecast period based on national trends and expected changes in the airport's-based aircraft fleet mix. Consequently, "acceleration" and "deceleration" factors were applied progressively to these baseline ratios during each forecast interval. Acceleration factors were applied to jet, turboprop, and helicopter aircraft. A deceleration factor was applied to single engine piston aircraft.

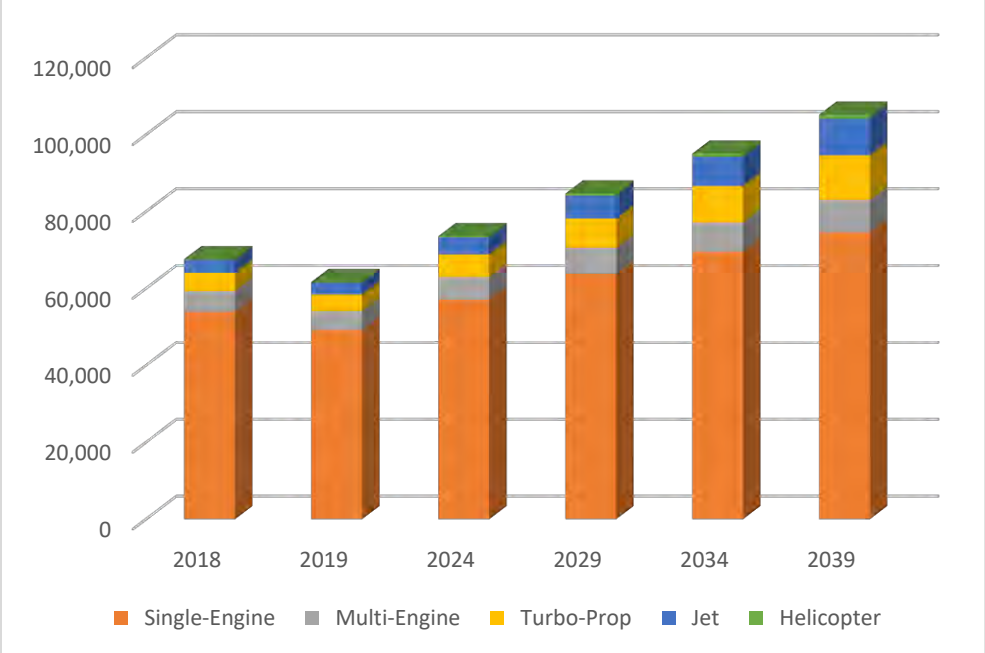
Table 3-12 and **Figure 3-9** display the aircraft operations fleet mix forecast for the San Marcos Regional Airport for each phase throughout the 20-year planning period.

TABLE 3-12
SUMMARY OF OPERATIONS BY AIRCRAFT TYPE, 2019-2039
SAN MARCOS REGIONAL AIRPORT

Operations By Type	2018 *Base Year*	2019 *PAL 1*	2024 *PAL 2*	2029 *PAL 3*	2034 *PAL 4*	2039 *PAL 5*
Single-Engine	53,905	49,173	57,074	63,796	69,530	74,634
Multi-Engine	5,407	4,933	5,888	6,773	7,604	8,415
Turbo-Prop	4,731	4,316	5,888	7,620	9,504	11,570
Jet	3,379	3,083	4,416	5,927	7,604	9,468
Helicopter	169	154	331	550	808	1,105
Total	67,591	61,659	73,597	84,666	95,050	105,192

Source: Garver Forecast Data for HYI, 2019

FIGURE 3-9
SUMMARY OF OPERATIONS BY AIRCRAFT TYPE, 2019-2039
SAN MARCOS REGIONAL AIRPORT



Source: Garver Forecast Data for HYI, 2019

Aircraft operations can be further broken down into Aircraft Approach Categories (AAC) and Airplane Design Groups (ADG). This helps to better define the types of

aircraft that will operate at the airport in the future. It also allows for better planning of future facilities and airside needs for the airport and the ability to justify such facilities when the market demands such construction. Most turboprop and jet aircraft currently using San Marcos fall into the B-II, C-I or C-II category. Since 2014, San Marcos has had a few operations in the C-III and D-I categories. The C-III activity is related primarily some to some infrequent DC-9 operations at the airport. The D-I activity is related to the utilization of some older Learjet models (e.g. models 35/36) with smaller wing surfaces and, consequently, higher approach speeds.

Based on this information, the following ratios were developed for the forecasted fleet mix:

- Aircraft Approach Category (AAC):
  - A – 88.75%
  - B – 10.00%
  - C/D – 1.0%
- Aircraft Design Group (ADG):
  - Group I – 90.65%
  - Group II – 9.00%
  - Group III – .10%
  - Group IV – Less than .01%
  - Helicopter – .25%

These ratios are expected to change during the forecast period based on national trends and expected changes in the airport's-based aircraft fleet mix. Consequently, "acceleration" and "deceleration" factors were applied progressively to these baseline ratios during each forecast interval. Acceleration factors were applied to the AAC B and C/D categories as well as the ADG II, III, and helicopter categories. A deceleration factor was applied to the AAC A and ADG I categories.

Table 3-13 displays this breakdown for the 20-year planning effort.

TABLE 3-13
FLEET MIX OPERATIONS BY DESIGN GROUP, 2019-2039
SAN MARCOS REGIONAL AIRPORT

Aircraft Approach Category	2018 *Base Year*	2019 *PAL 1*	2024 *PAL 2*	2029 *PAL 3*	2034 *PAL 4*	2039 *PAL 5*
Category A (Less Than 91 Knots)	59,987	54,722	63,698	71,416	78,083	84,101
Category B (92 – 120 Knots)	6,759	6,166	8,685	11,515	14,638	18,093
Category C/D (121 – 160 Knots)	676	617	883	1185	1521	1893
Helicopter	169	154	331	550	808	1,105
Airplane Design Group						
Group I (Less Than 49 Feet)	61,271	55,894	65,096	73,025	79,320	86,099
Group II (49 Feet To 78 Feet)	6,083	5,549	7,949	10,668	14,257	17,041
Group III (79 Feet To 117 Feet)	68	61	218	418	655	935
Group IV (118 Feet To 170 Feet)	0	1	3	5	10	12
Helicopter	169	154	331	550	808	1,105
Total	67,591	61,659	73,597	84,666	95,050	105,192

Source: Garver Forecast Data for HYI, 2019
Aircraft Approach Category is based on 1.3 times the stall speed of the aircraft at the maximum certified landing weight in the landing configuration. Representative of the anticipated operations for each aircraft approach category and airplane design group. Totals may not equal due to rounding.

LOCAL AND ITINERANT OPERATIONS FORECAST

According to FAA Order JO 7210.3AA, *Facility Operation and Administration, September 12, 2017*, a local operation is any operation performed by an aircraft that remains in the local traffic pattern, performs a simulated instrument approach, or operates to or from the Airport and a practice area within a 20-mile radius of the airport or tower. An itinerant operation is any operation that is not considered local. Based on historic operations data from the tower and discussions with airport stakeholders, on average it is estimated that 42.1% of the operations conducted at the airport are local and 57.9% percent are itinerant. These percentages are expected to remain at or near these same levels throughout the forecast period.

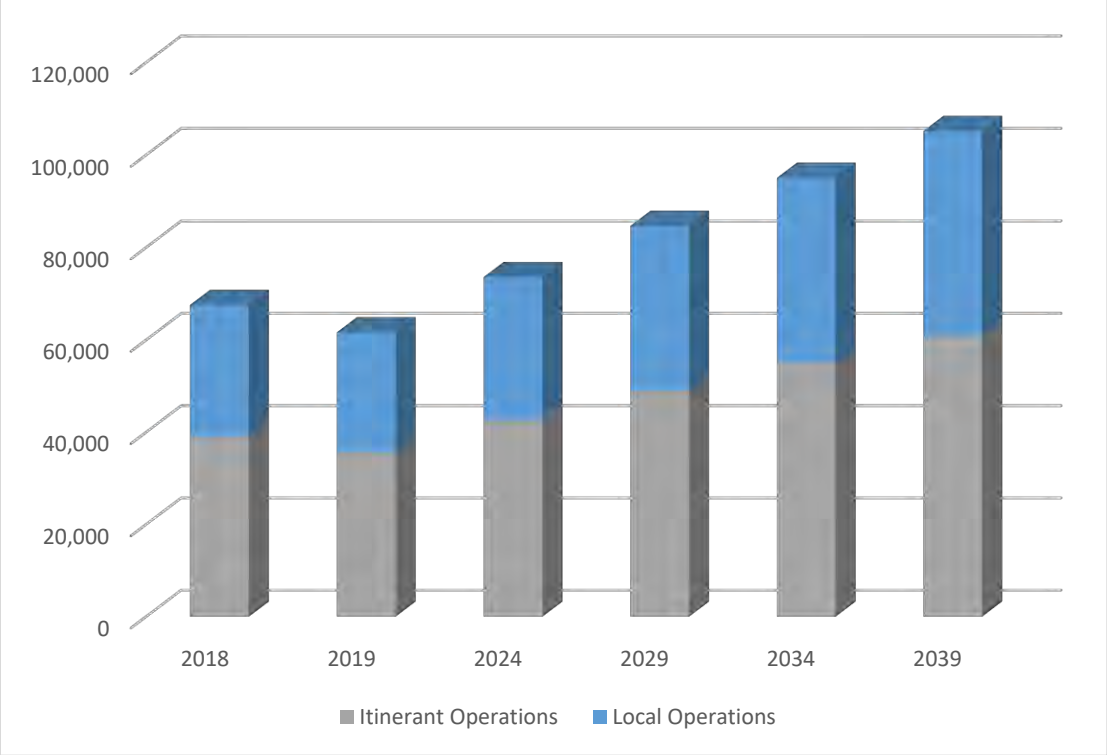
Table 3-14 and **Figure 3-10** provides a summary of this information.

TABLE 3-14
SUMMARY OF LOCAL AND ITINERANT OPERATIONS, 2019-2039
SAN MARCOS REGIONAL AIRPORT

Year	2018 *Base Year*	2019 *PAL 1*	2024 *PAL 2*	2029 *PAL 3*	2034 *PAL 4*	2039 *PAL 5*
Local Operations	28,447	25,951	30,975	35,634	40,005	44,273
Itinerant Operations	39,144	35,708	42,622	49,032	55,045	60,919
Total	67,591	61,659	73,597	84,666	95,050	105,192

Source: Garver Forecast Data for HYI, 2019

FIGURE 3-10
SUMMARY OF LOCAL AND ITINERANT OPERATIONS, 2019-2039
SAN MARCOS REGIONAL AIRPORT



Source: Garver Forecast Data for HYI, 2019

ANNUAL INSTRUMENT APPROACH FORECAST

The forecast of Annual Instrument Approaches (AIAs) provides further guidance in determining requirements for the type, extent, and timing of future navigational aid (NAVAID) equipment.

The forecast for instrument approach procedures is based on the IFR flight plan filings for the last five-year period. During the last five year period there has been an average of 9,637 IFR operations (takeoffs/landings) at the airport each year. Dividing this number in half provides an estimate on the number of IFR approaches annually.

The number of instrument approaches conducted at the airport is expected to increase during the forecast period as a result of changes in aircraft fleet mix (e.g. more jet, turboprop, etc.). Jet and turboprop aircraft typically operate on IFR flight plans. Consequently, as the number of jet and turboprop aircraft using the airport increase, the number of instrument approaches to the airport are also expected to increase.

Table 3-15 summarizes the forecast of annual instrument approaches at the Airport throughout the planning period.

TABLE 3-15
INSTRUMENT APPROACH FORECASTS, 2019-2039
SAN MARCOS REGIONAL AIRPORT

Category	2018 *Base Year*	2019 *PAL 1*	2024 *PAL 2*	2029 *PAL 3*	2034 *PAL 4*	2039 *PAL 5*
Annual Operations	67,591	61,659	73,597	84,666	95,050	105,192
Forecasted Number of Instrument Approaches	6,440	5,875	7,748	9,760	11,908	14,230

Source: Garver Forecast Data for HYI, 2019

CRITICAL AIRCRAFT

The “critical” aircraft at an airport is the largest and most demanding aircraft or category of aircraft conducting at least 500 operations per year. Determining the critical aircraft is important for assessing airport design and layout and the structural and equipment needs for both the airfield and terminal area. It is evaluated with respect to aircraft size, speed, and weight. The aircraft operating at San Marcos vary from small piston aircraft, to business jets, to cargo aircraft.

Based on the types of aircraft utilizing the airport, the existing “critical” aircraft at the airport is in the Runway Design Code (RDC) C-II category. Based on forecasting analysis shown in this chapter, the airport’s future critical aircraft could move into the C-III category.

Table 3-16 shows the most common aircraft operating at San Marcos that define its current critical aircraft category. The chart below shows the characteristics and operational frequency of some of the larger aircraft that operated at San Marcos during 2018 according to the FAA's Traffic Flow Management System (TFMSC) database.

TABLE 3-16
CRITICAL AIRCRAFT OPERATIONS
SAN MARCOS REGIONAL AIRPORT

Aircraft Type and ARC	Wingspan	Height	Max Gross Takeoff Weight	Approach Speed	# of Operations in 2018
Embraer Brasilia EMB 120 ARC B-II	65.0 ft	21.0 ft	26,433 lbs.	120 kts	818
Beech 200 Super King (BE20) ARC B-II	54.50 ft.	17.21 ft.	20,000 lbs.	98 kts	325
Cessna Citation Excel/XLS ARC B-II	56.33 ft	17.17 ft	20,200 lbs	117 kts	242
Dassault Falcon/Mystère 50 ARC B-II	61.88 ft	22.90 ft	40,780 lbs	113 kts	106
Bombardier DHC8-200 ARC B-III	85.00 ft	24.58 ft	36,300 lbs	92 kts	41
Bombardier Challenger 300 ARC B-II	63.83 ft	20.33 ft	38,850 lbs	117 kts	12
Boeing (Douglas) DC 9-10 C-III	89.40 ft	27.58 ft	90,700 lbs	132 kts	12
Gulfstream IV/G400 D-II	77.83 ft	24.42 ft	73,200 lbs	150 kts	10

Source: FAA TFMS database, Aircraft Characteristics Database

A key driver of the move from a C-II to a C-III critical aircraft will be the proposed replacement of the Embraer 120 aircraft operating at the airport with the larger and faster Bombardier Q400 aircraft. This aircraft equipment change is being strongly considered by a tenant at the airport.

AIRCRAFT OPERATIONS PEAKING FORECAST

A primary consideration for facility planning should be the peaking characteristics of an airport's activity level. To the greatest extent possible, airport facilities should be designed to be able to effectively accommodate normal peaks in aircraft traffic. Historic ATCT operational data was utilized to estimate peaks in operational activity.

For the purposes of this study, it was estimated that the peak month would have approximately 10.5% of total annual operations. The Peak Month Average Day (PMAD) forecasts were developed by dividing the peak month forecast levels by 30 days. The Peak Hour operations calculations assume that 15% of the total PMAD traffic would occur during the peak hour.

Table 3-17 depicts the forecasted peaking numbers for San Marcos.

TABLE 3-17
AIRCRAFT OPERATIONS PEAKING, 2019-2039
SAN MARCOS REGIONAL AIRPORT

Year	2018 *Base Year*	2019 *PAL 1*	2024 *PAL 2*	2029 *PAL 3*	2034 *PAL 4*	2039 *PAL 5*
Peak Month	7,097	6,474	7,728	8,890	9,980	11,045
PMAD Operations	237	216	258	296	333	368
Peak Hour Operations	35	32	39	44	50	55
Total Annual Operations	67,591	61,659	73,597	84,666	95,050	105,192

Source: Garver Forecast Data for HYI, 2019

FORECAST SUMMARY

The various forecast elements discussed in this chapter are displayed in **Table 3-18**. The forecasts, combined with the inventory data, will be used to identify "development objectives" as part of the facility requirements process. The next chapter, Facility Requirements, identifies the types and extent of facilities needed to adequately accommodate the demand levels identified in this chapter.

TABLE 3-18
AVIATION FORECAST SUMMARY, 2019-2039
SAN MARCOS REGIONAL AIRPORT

Based Aircraft By Type						
Year	2018 *Base Year*	2019 *PAL 1*	2024 *PAL 2*	2029 *PAL 3*	2034 *PAL 4*	2039 *PAL 5*
Single-Engine Piston	160	162	168	178	186	195
Multi-Engine Piston	16	16	20	24	28	32
Turboprop	9	10	15	20	27	35
Jet	14	15	21	27	35	45
Helicopter	1	1	3	4	6	8
Total	200	204	227	253	282	315
Aircraft Operations by Type						
Year	2018 *Base Year*	2019 *PAL 1*	2024 *PAL 2*	2029 *PAL 3*	2034 *PAL 4*	2039 *PAL 5*
Single-Engine	53,905	49,173	57,074	63,796	69,530	74,634
Multi-Engine	5,407	4,933	5,888	6,773	7,604	8,415
Turbo-Prop	4,731	4,316	5,888	7,620	9,504	11,570
Jet	3,379	3,083	4,416	5,927	7,604	9,468
Helicopter	169	154	331	550	808	1,105
Local Operations	28,447	25,951	30,975	35,634	40,005	44,273
Itinerant Operations	39,144	35,708	42,622	49,032	55,045	60,919
Total	67,591	61,659	73,597	84,666	95,050	105,192

Source: Garver Forecast Data for HYI, 2019

TAF COMPARISON

Table 3-19 shows the preferred baseline based aircraft and aircraft operations forecasts in comparison to the current FAA TAF for San Marcos Regional Airport.

TABLE 3-19
TAF COMPARISON, 2019-2039
SAN MARCOS REGIONAL AIRPORT

Based Aircraft			
Year	**TAF Forecast**	**Preferred Forecast**	**% Difference**
Base Year+1 (2019)	138	204	47.83%
Base Year +5 (2024)	158	227	43.67%
Base Year +10 (2029)	178	253	42.13%
Base Year +15 (2034)	198	282	42.42%
Base Year +20 (2039)	218	315	44.50%
Aircraft Operations			
Year	**TAF Forecast**	**Preferred Forecast**	**% Difference**
Base Year+1 (2019)	62,719	61,659	-1.69%
Base Year +5 (2024)	63,675	73,597	15.58%
Base Year +10 (2029)	64,656	84,666	30.95%
Base Year +15 (2034)	65,661	95,050	44.76%
Base Year +20 (2039)	66,691	105,192	57.73%

Source: Garver Forecast Data for HYI, 2019

As discussed earlier in this chapter, the TAF's forecast of based aircraft for San Marcos is significantly lower than the current based aircraft figures for the airport. This resulted in the preferred based aircraft forecast being significantly higher than the based aircraft figures shown in the TAF. However, it should be notated that the overall average annual growth rate of the preferred based aircraft forecast is actually lower than the average annual growth rate for based aircraft shown in the FAA's TAF.

The aircraft operations forecast shown in the TAF shows very slow growth during the forecast period compared to the preferred operations forecast. Due to the economic growth in the Austin and San Antonio area, many airports (especially in the Austin area) have seen significant increases in operations over the past 5 to 8 years. If the economic growth expected in the Hays and Caldwell County regions occurs as expected, similar increases in aircraft operations are expected at the San Marcos Regional Airport.

CHAPTER 4

Facility Requirements

Chapter 4 – Facility Requirements

INTRODUCTION

This chapter evaluates existing airport facilities and identifies the improvements needed to effectively meet the forecasted demand levels 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" in terms of design standards, but an improvement "option" to accommodate future aviation activity levels. Market demand will ultimately drive facility development at the San Marcos Regional Airport (HYI) and the operational levels defined in the forecast chapter (e.g. enplanements, aircraft operations, based aircraft, etc.) should be used to help guide the timing and need for future developments/improvements.

Airport facilities can be divided into two areas: airside/airspace and terminal/landside. The airside/airspace facilities include an airport's runways, taxiways, protected surfaces (e.g. safety areas, object free areas, etc.), airspace, navigational aids (NAVAIDs), airfield marking/signage, and lighting. The terminal/landside area components include the airport's hangars, terminal/FBO facilities, aircraft parking apron, fuel storage and delivery, vehicular parking, and airport vehicle access routes.

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 developed in Chapter 5.

AIRSIDE/AIRSPACE FACILITIES

RUNWAY ALIGNMENT

An evaluation of runway alignment is based on crosswind coverage and velocity using guidance provided in FAA Advisory Circular 150-5300-13 (current series), *Airport Design*. In general, the FAA deems a runway to have sufficient wind coverage when the wind coverage is 95% or better for the runway's allowable crosswind component which is based on the runway's Runway Design Code (RDC). The term

"crosswind component" refers to the average maximum wind velocity in a direction perpendicular to the runway's alignment (e.g. wind blowing across the runway) that a particular category of aircraft can safely land in. The higher the RDC for a runway, the higher the allowable crosswind component for the runway will be.

Currently, the established RDC for Runway 8/26 and Runway 17/35 is B-II which has an allowable crosswind component of 13 knots. Runway 13/31 has an established RDC of C-II which has an allowable crosswind component of 16 knots.

Table 4-1, *Runway Crosswind Coverage,* shows the crosswind coverage percentages for each runway at the San Marcos Regional Airport and the combined runway wind coverage percentage.

TABLE 4-1
RUNWAY CROSSWIND COVERAGE
SAN MARCOS REGIONAL AIRPORT

Runway	All Weather Wind Coverage %			IFR Wind Coverage %			VFR Wind Coverage %		
	10.5 Knots	13 Knots	16 Knots	10.5 Knots	13 Knots	16 Knots	10.5 Knots	13 Knots	16 Knots
8/26	79.04%	86.87%	95.35%	86.36%	92.06%	97.31%	78.10%	86.23%	95.12%
13/31	87.36%	93.23%	98.05%	88.90%	93.79%	98.21%	87.03%	93.08%	98.02%
17/35	97.28%	98.99%	99.77%	96.62%	98.56%	99.65%	97.32%	99.02%	99.79%
17/35 & 13/31	98.04%	99.40%	99.90%	97.50%	99.03%	99.77%	98.07%	99.43%	99.91%
17/35 & 8/26	98.93%	99.75%	99.95%	98.67%	99.51%	99.83%	98.95%	99.77%	99.96%
All	99.20%	99.82%	99.97%	98.94%	99.59%	99.86%	99.22.%	99.85%	99.98%

Source: FAA Airports – GIS Wind Analysis Tool using HYI wind data as generated by the FAA's GIS tool. Completed 5/3/19.

Based on this analysis, Runway 17/35 meets the FAA wind coverage requirement (95% or more) for the RDC B-II crosswind component of 13 knots and Runway 13/31 meets the same requirement for the RDC C-II crosswind component of 16 knots. Runway 8/26 does not meet the wind coverage requirement for a runway with a B-II RDC.

In general, Runway 17/35 has the best wind coverage of the three runways at the San Marcos Regional Airport with over 96.62% wind coverage in all three crosswind component categories (e.g. all-weather, IFR, and VFR). As a result, Runway 17/35

should be a key development focus for the airport moving forward and should be developed as the airport's primary runway.

Additionally, it should be noted that the additional wind coverage gained by combining Runway 13/31 or Runway 8/26 with the wind coverage provided by Runway 17/35 is incremental and no substantial difference in wind coverage exists between the wind coverage provided by all three runways as opposed to only two of the runways (e.g. Runway 17/35 and either Runway 8/26 or Runway 13/31). As a result, a third runway is not necessary for wind coverage purposes.

RUNWAY LENGTH

Runway length requirements for an airport can be evaluated utilizing a number of methodologies. To ensure a thorough and complete analysis regarding the sufficiency of the San Marcos Regional Airport's current runway length, two evaluation methodologies were used for this analysis:

1. Runway Length Evaluation based on AC 150/5325-4B
2. Runway Length Evaluation Utilizing Forecasted Fleet Mix and Airport Planning Manuals (AMP) or Manufacturer Data for Aircraft Expected to Frequently Use San Marcos Regional Airport

Runway Length Evaluation Based on AC 150/5325-4B

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. Runway length is typically predicated upon the category of aircraft using or forecasted to use the airport. By design, the primary runway at an airport is typically the longest runway, with the most favorable wind conditions, the highest pavement strength, and the lowest straight-in instrument approach minimums.

A significant factor to consider when analyzing the generalized runway length requirements for an airport is that aircraft takeoff performance is a function of an airport's elevation, temperature, and the slope of a runway as well as the aircraft's payload vs. fuel load, stage length, and general performance characteristics. As these factors change, the runway length requirements for an aircraft change accordingly. Consequently, if a runway is designed to accommodate 75% of the fleet at 60% 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.

As **Table 4-2**, *Generalized Runway Length Requirements Based on AC 150/5325-4B,* indicates all the runways at the San Marcos Regional Airport meet the runway length requirements for small aircraft (less than 12,500 lbs.) and the runway length requirements for 75% of large aircraft (12,500 lbs. to 60,000 lbs.) at 60% of the useful load.

Only Runway 8/26 currently meets the requirements for 100% of large aircraft at 60% useful load. The generalized runway length requirements shown in **Table 4-2** were derived from the nomographs contained in AC 150/5325-4B, *Runway Length Requirements for Airport Design*.

TABLE 4-2
GENERALIZED RUNWAY LENGTH REQUIREMENTS BASED ON AC 150/5325-4B
SAN MARCOS REGIONAL AIRPORT

Aircraft Category	Runway Designation	Current Runway Length	Runway Length Requirement	Deficiency
Small Aircraft: 12,500 pounds or less:				
95% GA Fleet	13/31	5,601	**3,400**	2,201
	8/26	6,330		2,930
	17/35	5,214		1,814
100% GA Fleet	13/31	5,601	**4,000**	1,601
	8/26	6,330		2,330
	17/35	5,214		1,214
100% GA Fleet with 10 or more passenger seats	13/31	5,601	**4,400**	1,201
	8/26	6,330		1,930
	17/35	5,214		814
Large Aircraft between 12,500 and 60,000 pounds:				
75% of fleet at 60% useful load	13/31	5,601	**5,047**	554
	8/26	6,330	**4,928**	1,402
	17/35	5,214	**5,045**	169
75% of fleet at 90% useful load	13/31	5,601	**7,547**	-1,946
	8/26	6,330	**7,428**	-1,098
	17/35	5,214	**7,545**	-2,331
100% of fleet at 60% useful load	13/31	5,601	**6,147**	-546
	8/26	6,330	**6,028**	302
	17/35	5,214	**6,145**	-931
100% of fleet at 90% useful load	13/31	5,601	**9,697**	-4,096
	8/26	6,330	**9,578**	-3,248
	17/35	5,214	**9,695**	-4,481

Source: AC 150/5325-4B Figures 2-1, 2-2, 3-1 and 3-2. Generalized length only. Actual lengths should be calculated based on the specific aircraft's operational nomographs. Useful load refers to all usable fuel, passengers, and cargo. Calculations based on 594.7' MSL airport elevation, mean maximum daily temperature of 97˚F. The runway end elevation differences for HYI are as follows: RWY 8/26 – 7.8 feet, RWY 13/31 – 19.7 feet, RWY 17/35 – 19.5 feet. Figures are increased 10 feet for each foot of elevation difference between high and low points of runway centerline.

Based on this analysis, there are likely times during the year when the stage length and/or payload of certain aircraft would be limited when operating from the San Marcos Regional Airport. This is primarily a concern with Runway 17/35 and Runway 13/31 as they are the shorter of the three runways and are the runways used most frequently due to their wind coverage. However, the majority of the large aircraft departing from San Marcos are flying to locations within the continental United States and, consequently, are likely not required to depart the

airport at their Maximum Takeoff Weight (MTOW) with a full load of fuel to reach their destination. As a result, a more detailed analysis utilizing the specific aircraft types expected to use the airport in the future is necessary to determine future runway length requirements. This analysis is included in the section below.

Runway Length Evaluation Based on Aircraft Planning Manuals and Manufacturer Data

The sufficiency of a runway's length can also be evaluated by reviewing the performance characteristics of aircraft that currently use or are forecasted to operate from an airport. Information regarding aircraft performance can typically be obtained by reviewing a given aircraft's Airport Planning Manual (APM) published by the aircraft's manufacturer or by contacting the aircraft manufacturer directly.

Based on discussions with airport personnel and tenants, the following aircraft makes/models were selected for an in-depth analysis to study the sufficiency of the length of the existing runways at the San Marcos Regional Airport:

- Large and Mid-Sized Corporate Jets
  - Gulfstream 450
  - Gulfstream 550
  - Gulfstream 650
  - Bombardier Challenger 650
  - Bombardier Global Express 5000
  - Bombardier Global Express 6000
- Other Potential Future Aircraft
  - Bombardier Canadair Regional Jet 200 LR
  - Bombardier Q400
  - Boeing 737-800 (cargo)

The number of aircraft operating at the airport in the large and mid-sized corporate jet category are expected to increase in the future with the continued growth of the local and regional economy and the increase in the number of aircraft in this category that are being manufactured. The aircraft types identified in the "other potential future aircraft" grouping were specifically mentioned by current airport tenants or airport stakeholders during meetings held as part of the master planning effort. The Bombardier Q400 is the expected replacement for the Embraer

120 aircraft that currently operates at the airport on a regular basis. The Bombardier Canadair Regional Jet 200 LR is a potential alternate for the Q400. The Boeing 737-800 is the short to mid-haul cargo aircraft currently being used by Amazon Air.

Table 4-3 through Table 4-5, *Aircraft Range and Maximum Runway Length Analysis*, shows the estimated maximum range that each of the nine selected aircraft can achieve when departing the San Marcos Regional Airport at 97^{O}F utilizing each of airport's three existing runways. These range calculations assume that each aircraft is operating at 80% of its maximum payload (e.g. cargo/ passengers) and carrying the maximum fuel load possible to maximize range. The table also shows the runway length necessary for the aircraft to achieve its maximum published range (e.g. a departure at the airport's published Maximum Takeoff Weight – MTOW). The aircraft range and takeoff performance calculations for each of these aircraft were developed using the Airport Planning Manuals (APM) for the aircraft and/or calculations provided by the aircraft manufacturers.

TABLE 4-3
AIRCRAFT RANGE AND MAXIMUM RUNWAY LENGTH ANALYSIS – GULFSTREAM AIRCRAFT
SAN MARCOS REGIONAL AIRPORT

	Gulfstream 450	Gulfstream 550	Gulfstream 650
Range (NM)			
Range using Existing Runway 8/26 - 6,330 ft. Length	4,080	5,680	5,706
Range using Existing Runway 13/31 - 5,601 ft. Length	3.543	5,009	4,791
Range using Existing Runway 17/35 - 5,214 ft. Length	3,199	4,644	4,547
Runway Length (ft.)			
Total Runway Length Necessary to Depart HYI at MTOW (ft.)	6,668	7,577	7,417
Published Maximum Range (NM)	4,350	6,750	7,000

Source: Aircraft Manufacturers – Airport Planning Manuals and Gulfstream

TABLE 4-4
AIRCRAFT RANGE AND MAXIMUM RUNWAY LENGTH ANALYSIS – BOMBARDIER AIRCRAFT
SAN MARCOS REGIONAL AIRPORT

	Challenger 650	Global 5000	Global 6000
Range (NM)			
Range using Existing Runway 8/26 - 6,330 ft. Length	2,521	4,920	4,993
Range using Existing Runway 13/31 - 5,601 ft. Length	2,000	4,256	4,297
Range using Existing Runway 17/35 - 5,214 ft. Length	1,640	4,131	4,092
Runway Length (ft.)			
Total Runway Length Necessary to Depart HYI at MTOW (ft.)	6,715	7,159	9,386
Published Maximum Range (NM)	4,000	5,200	6,000

Source: Aircraft Manufacturer – Airport Planning Manuals and Bombardier

TABLE 4-5
AIRCRAFT RANGE AND MAXIMUM RUNWAY LENGTH ANALYSIS – OTHER AIRCRAFT
SAN MARCOS REGIONAL AIRPORT

	Q400	B-737-800	CRJ 200 LR
Range (NM)			
Range using Existing Runway 8/26 - 6,330 ft. Length	1,506	1,400	823
Range using Existing Runway 13/31 - 5,601 ft. Length	1,506	700	315
Range using Existing Runway 17/35 - 5,214 ft. Length	1,285	200	55
Runway Length (ft.)			
Total Runway Length Necessary to Depart HYI at MTOW (ft.)	5,450	8,300	7,910
Published Maximum Range (NM)	1,506	4,000	1,585

Source: Aircraft Manufacturers – Airport Planning Manuals and Boeing

Of the nine aircraft examined, only the Q400 can depart the San Marcos Regional Airport at its established MTOW at 97^{O}F utilizing the airport's existing runway lengths. The remaining eight aircraft cannot depart the San Marcos Regional Airport at their established MTOW at 97^{O}F and achieve their maximum range, meaning that a runway extension would enable a range increase for these aircraft. However, since most of the aircraft departing the San Marcos Regional Airport are flying domestic routes or shorter international routes, it is not expected that the existing runway length is a limiting factor for most aircraft operations.

The key driver in determining future runway length requirements at the San Marcos Regional Airport will lie with the potential operation of the Boeing 737-800 and the

CRJ 200 LR and whether the mid-size to large corporate aircraft using the airport begin flying longer stage lengths. If these operations come to fruition, increases in runway length will likely be necessary.

Runway Length Analysis Conclusions

Based on the results of this runway length analysis, a runway extension should be planned for to ensure that property and airspace are protected for a future runway extension. The primary runway that should be protected for this purpose is Runway 17/35 due to its wind coverage. As a result, it is recommended that the alternatives process evaluate the feasibility of extending Runway 17/35 to 7,000 ft.

RUNWAY STRENGTH

FAA AC 150/5320-6E, *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 the various aircraft gear loadings the pavement is expected to support. The design is based on a 20-year pavement life cycle. To establish the required pavement section, 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.

The runway pavement strength for each of the runways at the San Marcos Regional Airport is shown in **Table 4-6**, *Existing Runway Weight Bearing Capacity*.

TABLE 4-6
EXISTING RUNWAY WEIGHT BEARING CAPACITY
SAN MARCOS REGIONAL AIRPORT

Weight Bearing Capacity (pounds)	Runway 8/26	Runway 13/31	Runway 17/35
Single Wheel Gear (SWG)	38,500	23,000	28,000
Double Wheel Gear (DWG)	56,500	-	43,500
Dual Tandem Wheel (DTW)	106,000	-	-

Source: Pavement strength numbers shown above are from a memo from Fugro USA Land, Inc. to KSA Engineers, Inc. dated February 7, 2019 discussing the structural capacity of the runways. Furgo USA Land, Inc. performed a pavement structural capacity evaluation for the airport in 2015. The pavement strength figures shown in the report differ from the figures currently shown in the current FAA Form 5010 and on the previous Airport Layout Plan.

Table 4-7, *Current and Historic Fleet Mix MTOW and Gear Configurations*, shows the landing gear configuration and MTOW of the larger aircraft that are currently operating at the airport.

TABLE 4-7
CURRENT AND HISTORIC FLEET MIX MTOW AND GEAR CONFIGURATIONS
SAN MARCOS REGIONAL AIRPORT

Aircraft	Gear Configuration	MTOW (Lbs)	# of OPS (5 years)	# of OPS (2018)
Boeing (Douglas) DC-9-10	Double Wheel	90,700	37	12
Dassault Falcon/Mystère 50 (FA50)	Double Wheel	40,780	398	106
Bombardier DHC8-200/100	Double Wheel	36,300	110	41
Cessna Citation X C750	Double Wheel	36,100	105	21
Dornier 328 (D328)	Double Wheel	30,843	62	0
BAe HS 125/700-800/Hawker 800 (H25B)	Double Wheel	28,000	102	20
Embraer Brasilia E120	Double Wheel	26,433	2,499	818
Cessna Excel/XLS (C56X)	Single Wheel	20,200	957	242
Beech Super King Air 350 (B350)	Double Wheel	16,500	274	54
Cessna Citation CJ3 (C25B)	Single Wheel	13,870	694	188
Fairchild Swearingen Merlin (SW3)	Single Wheel	13,230	276	37
Beech 200 Super King (BE20)	Double Wheel	12,500	1,084	325
Dehaviland Twin Otter (DHC6)	Single Wheel	11,566	307	126
Cessna CitationJet/CJ1 (C525)	Single Wheel	10,600	911	170
HondaJet (HDJT)	Single Wheel	10,600	212	89
Pilatus PC12	Single Wheel	10,450	1,428	686
Beech King Air 90 (BE9L)	Single Wheel	9,300	2,738	129
Cessna Citation Mustang (C510)	Single Wheel	8,645	1,560	187
Piper Seminole PA44	Single Wheel	3,800	1,384	686
Cessna Skyhawk (C172)	Single Wheel	2,550	13,420	4,870

Source: Aircraft manufacturer websites, FAA Aircraft Database.

Of the aircraft shown in the current and historic fleet mix data, only the DC-9 has a higher MTOW than the current weight bearing capacity of Runway 8/26 and Runway 17/35. Based on information provided by airport tenants, the DC-9's operating at the airport typically arrive and depart with very light loads (payload and fuel) and, consequently, do not operate at a weight close to the aircraft's published MTOW.

Table 4-8, *Future Fleet Mix MTOW and Gear Configurations,* shows the landing gear configuration and MTOW of the larger aircraft that may operate at the airport in the future based on information provided by tenants and stakeholders.

TABLE 4-8
FUTURE FLEET MIX MTOW AND GEAR CONFIGURATIONS
SAN MARCOS REGIONAL AIRPORT

Aircraft	Gear Configuration	MTOW (Lbs)
Boeing 737-800	Double Wheel	174,200
Bombardier Q400	Double Wheel	65,200
CRJ 200	Double Wheel	53,000

Source: Aircraft manufacturer websites, FAA Aircraft Database.

The key driver of future runway weight bearing capacity requirements for the San Marcos Regional Airport will be the operation of the Bombardier Q400 and Boeing 737-800 aircraft at the airport. Both of these aircraft's gear configurations and MTOW's exceed the current runway weight bearing capacity limits of the existing runways. As a result, runway pavement strengthening should be a consideration in the future development of the runways. A priority for runway strengthening should be Runway 17/35 and Runway 13/31 as both of these runways are the most frequently utilized at the airport because they have the best wind coverage but have the lowest weight bearing capacity.

INSTRUMENT APPROACH PROCEDURES

Instrument Approach Procedures (IAPs) are critical to ensuring the usability of an airport during poor weather conditions. IAPs provide guidance to pilots via land-based equipment or GPS satellites that aid them in executing an approach to land on a runway when a visual approach to the runway is not possible. The types of IAPs vary widely, however, they can generally be segmented into three primary categories: precision, non-precision, and circling approaches. 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 of a mile. Non-precision instrument approaches are any straight-in instrument approaches with visibility minimums not lower than ¾ of a mile. Circling approaches are instrument approaches that do not provide an aircraft with a straight-in approach to a runway.

The San Marcos Regional Airport currently has a precision instrument approach to Runway 13 and non-precision approaches to all other runways. The precision instrument approach to Runway 13 utilizes an Instrument Landing System (ILS) and the runway is equipped with a Medium Intensity Approach Lighting System with Sequenced Flashers (MALSR) to enable visibility minimums of ½ mile. RNAV/GPS

approaches exist to all other runway ends at the airport. There is also an NDB approach to Runway 13.

All the RNAV/GPS approaches at the airport have three-quarter mile visibility minimum with the exception of the RNAV/GPS approach for Runway 17 which has 1 1/8-mile visibility minimums and the RNAV/GPS approach for Runway 31 which has 7/8-mile visibility minimums. **Table 4-9** shows the IFR wind coverage for each runway end at the San Marcos Regional Airport.

TABLE 4-9
IFR WIND COVERAGE PER RUNWAY END
SAN MARCOS REGIONAL AIRPORT

RWY	13 kts	16 kts
17	65.84%	66.19%
35	46.73%	47.36%
13	68.09%	69.37%
31	40.46%	43.13%
8	63.06%	66.32%
26	43.96%	45.40%

Source: FAA Airports – GIS Wind Analysis Tool using HYI wind data as generated by the FAA's GIS tool. Completed 5/3/19.

A key finding of this analysis is that Runway 17 is the runway end with the second highest IFR wind coverage (second only to Runway 13 which has an ILS) but has the worst visibility minimums of all the RNAV/GPS approaches for the airport. As a result, a key priority for the alternatives process should be establishing lower visibility minimums (3/4 mile) for the RNAV/GPS approach for Runway 17. Since Runway 13 has the highest IFR wind coverage, the ILS approach and MALSR system currently serving that runway should remain.

MAGNETIC DECLINATION

The current magnetic variation at San Marcos Regional Airport as shown on the FAA published airfield diagram is 4.2^{O} East with a 0.1^{O} West annual change as of January 2015. The current, established magnetic heading for each runway is shown below:

- Runway 8/26 – 083.6 ^{O} and 263.7 ^{O}
- Runway 13/31– 128.7 ^{O} and 308.7 ^{O}
- Runway 17/35 – 173.7 ^{O} and 353.7 ^{O}

Based on the established annual rate of change, runway designation changes may be needed for Runway 8/26 and/or Runway 17/35 during the long range portion (10+ years) of the planning horizon. Runway 13/31's designation was recently updated and is not anticipated to require further change during the planning period.

AIRPORT DESIGN CONSIDERATIONS

Compliance with airport design standards is vitally important because compliance with these standards aids 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). Ideally, airports should conform with all established FAA airport design standards without requiring a Modification to Standards (MOS). Frequently this is not possible as many airports have infrastructure that was designed before the current design standards were established. In these cases, airport operators are generally required to improve the facilities to the new design standards if they accept FAA grant funds to rehabilitate or improve that particular facility.

Table 4-10, *Current Runway Design,* provides an overview of the FAA Design Standards and the current runway facilities at the San Marcos Regional Airport.

TABLE 4-10
CURRENT RUNWAY DESIGN
SAN MARCOS REGIONAL AIRPORT

Item	FAA Design Standard (C-II)	Runway 13/31	FAA Design Standard (B-II)	Runway 17/35	Runway 8/26
Runway Design:					
Width (ft)	100	100	75	100	100
RSA Width (ft)	500	500	150	150	150
RSA Length beyond R/W end (ft)	1000	1000	300	300	300
OFA Width (ft)	800	800	500	500	500
OFA Length beyond R/W end (ft)	1000	1000	300	300	300
ROFZ Width (ft)	400	400	400	400	400
ROFZ Length beyond R/W end (ft)	200	200	200	200	200
Runway Setbacks -Runway Centerline to:					
Parallel Taxiway Centerline (ft)	400	630	240	N/A	630
Holdline (ft)	250	250-290	200	200	250-320
Aircraft Parking Area (ft)	500	705	250	N/A	710

Source: FAA AC 150/5300-13.

Currently, the San Marcos Regional Airport has no deficiencies related to its current runway width, Runway Safety Areas (RSA), Runway Object Free Areas (ROFA), Runway Obstacle Free Zones (ROFZ), runway to parallel taxiway separation, runway hold position marking location, and aircraft parking area separation standards

related to the current RDC for each runway. Each of these aspects of runway design are discussed in more depth in the subsections below.

Additionally, since the Forecast chapter identified the potential for the critical aircraft to move into the C-III category, an analysis was completed to determine the impacts of each of the three runways moving into the C-III category and the ability for each runway to meet C-III design standards. **Table 4-11**, *Future Runway Design*, identifies the potential limitations/constraints of shifting the critical aircraft for each runway into the C-III category.

TABLE 4-11
FUTURE RUNWAY DESIGN
SAN MARCOS REGIONAL AIRPORT

Item	FAA Design Standard (C-III)	Runway 13/31	Runway 17/35	Runway 8/26
Runway Design:				
Width (ft)	150	100	100	100
RSA Width (ft)	500	500	150	150
RSA Length beyond R/W end (ft)	1000	1000	300	300
OFA Width (ft)	800	800	500	500
OFA Length beyond R/W end (ft)	1000	1000	300	300
ROFZ Width (ft)	400	400	400	400
ROFZ Length beyond R/W end (ft)	200	200	200	200
Runway Setbacks -Runway Centerline to:				
Parallel Taxiway Centerline (ft)	400	630	N/A	630
Holdline (ft)	250	250 - 290	200	250 - 290
Aircraft Parking Area (ft)	500	705	N/A	710

Source: FAA AC 150/5300-13.

The areas where the existing infrastructure or a protected surface would have to be modified are shown in red text. The cells highlighted in yellow notate items where a potential limiting factor exists that could hamper a move to C-III standards. Each of these areas are discussed in more detail in the subsections below. An analysis of the Runway Protection Zones (RPZs) is also provided later in this chapter.

Runway Width

FAA AC 150/5300-13 (current series) delineates the requirements for runway width. At present, all runways at the San Marcos Regional Airport are 100 feet wide. This width meets the minimum runway width recommended in AC 150/5300-13 for runways with a C-II RDC (Runway 13/31) and exceeds the B-II RDC standard (Runway 8/26 and Runway 17/35) of 75 feet.

If the San Marcos Regional Airport's critical aircraft moves into the C-III category during the forecast period, the width of the runways primarily used by C-III aircraft would need to be expanded to 150 feet. Since the runways were all previously 150 feet wide, there are no known factors that would limit the ability to expand the runways back to 150 feet in width.

Runway Safety Area

The Runway Safety Area (RSA) is a two-dimensional area surrounding a runway that is centered along the runway centerline and extends beyond the edges of the useable runway pavement. RSA's are provided to reduce the risk of damage to airplanes in the event of an undershoot, overshoot, or excursion from the runway pavement. RSAs 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 frangible mounted structures with the frangible point no higher than 3 inches above grade. Under dry conditions, the RSA must support Aircraft Rescue and Fire Fighting (ARFF) equipment (if applicable), snow removal equipment, and the occasional passage of aircraft without causing damage to the aircraft.

The FAA recommends airports own the entire RSA in "fee simple" title. Based on RDC B-II design standards, the RSAs for Runways 8/26 and 17/35 should extend beyond the end of the runway for 300 feet and be 150 feet wide (75 feet each side of the runway centerline) with a grade not steeper than 3%. These standards are met on both runways. Runway 13/31 has a C-II RDC. Consequently, the required RSA for Runway 13/31 is 1,000 feet beyond the runway ends and 500 feet wide (250 feet on each side of the runway centerline) with a grade not steeper than 3%. These standards are met on Runway 13/31.

Since the Forecast Chapter identified that the San Marcos Regional Airport is expected to move to the C-III RDC during the 20-year planning horizon, improvements to the RSAs of one or more of the runways may be required. Currently, the RSA dimensional standards for a runway with a C-III RDC are identical to the standards for a Runway with a C-II RDC. Consequently, if Runway 13/31 is moved from a C-II RDC to a C-III RDC, no improvements to the existing RSA for the runway would be necessary. However, the RSA dimensional standards for a runway with a B-II RDC (e.g. Runway 17/35 and Runway 8/26) are significantly smaller than a

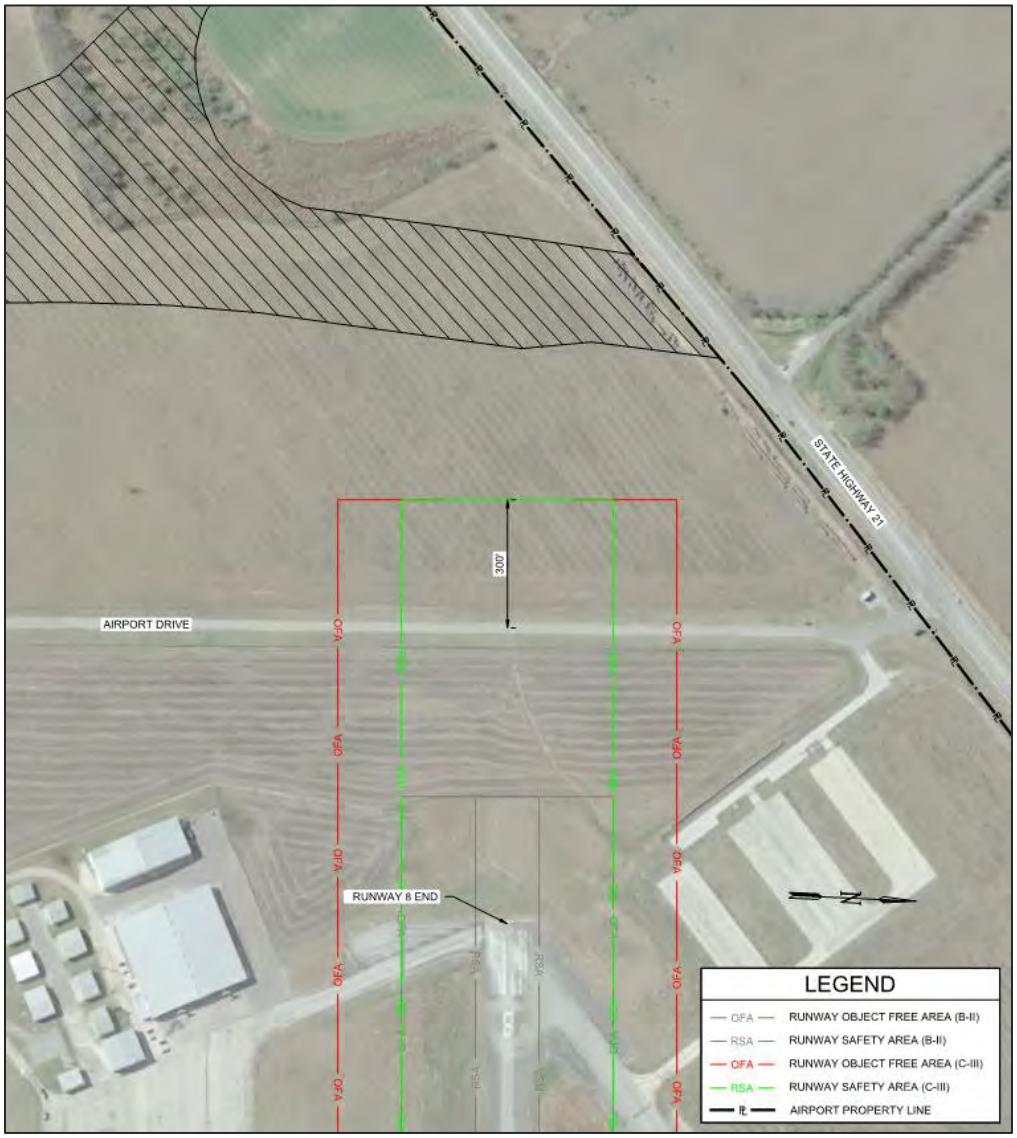
runway with a C-III RDC. As a result, some significant improvements would be required to accommodate RSA standards if Runway 17/35 or Runway 8/26 move into the C-III RDC category. **Figure 4-1** and **4-2** identify the impacts of expanding the Runway RSA and ROFA dimensions (i.e. ROFA dimension impacts are discussed in the next section) for Runway 8/26.

As **Figure 4-1** shows, the RSA and ROFA associated with the approach end of Runway 8 would extend over the existing location of Airport Drive. Consequently, Airport Drive would need to be relocated outside the RSA and ROFA or the threshold of Runway 8 would need to be relocated approximately 300 feet to the east if the runway was moved to a C-III RDC. Additionally, it should be noted that the ROFA for Runway 8/26 will extend into the ramp area for the Taxiway Kilo Development Area. Since the ROFA clearing standard precludes parked aircraft, a small portion of the ramp will not be usable for aircraft parking.

Figure 4-2 shows that a similar issue exists at the approach end of Runway 26 where the airport perimeter road passes through the C-III RSA and ROFA. In this case, the roadway would need to be closed or relocated outside of the RSA/ROFA or the threshold of Runway 26 would need to be relocated approximately 295 feet to the west. If the roadway is not close or relocated, it would be necessary to protect the RSA and ROFA from vehicle encroachment using vehicle “Stop” signs and informational signs directing vehicle desiring to cross through the RSA/ROFA to contact ATCT for permission.

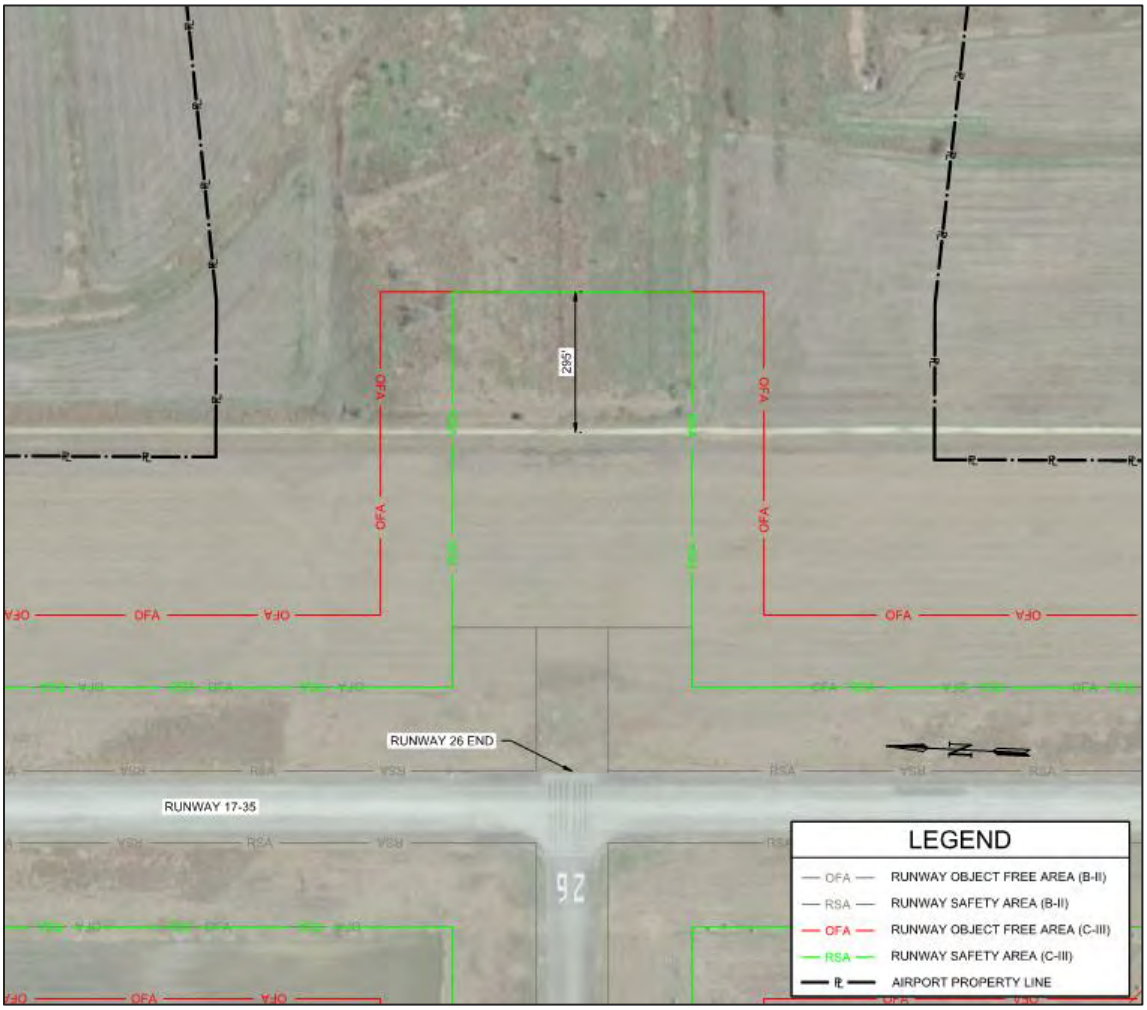
These issues would make it difficult to move Runway 8/26 to C-III standards without making significant infrastructure modifications.

FIGURE 4-1
RSA AND ROFA IMPACTS AT APPROACH OF RUNWAY 8
SAN MARCOS REGIONAL AIRPORT



Source: Garver, 2019.

FIGURE 4-2
RSA AND ROFA IMPACTS AT APPROACH OF RUNWAY 26
SAN MARCOS REGIONAL AIRPORT



Source: Garver, 2019.

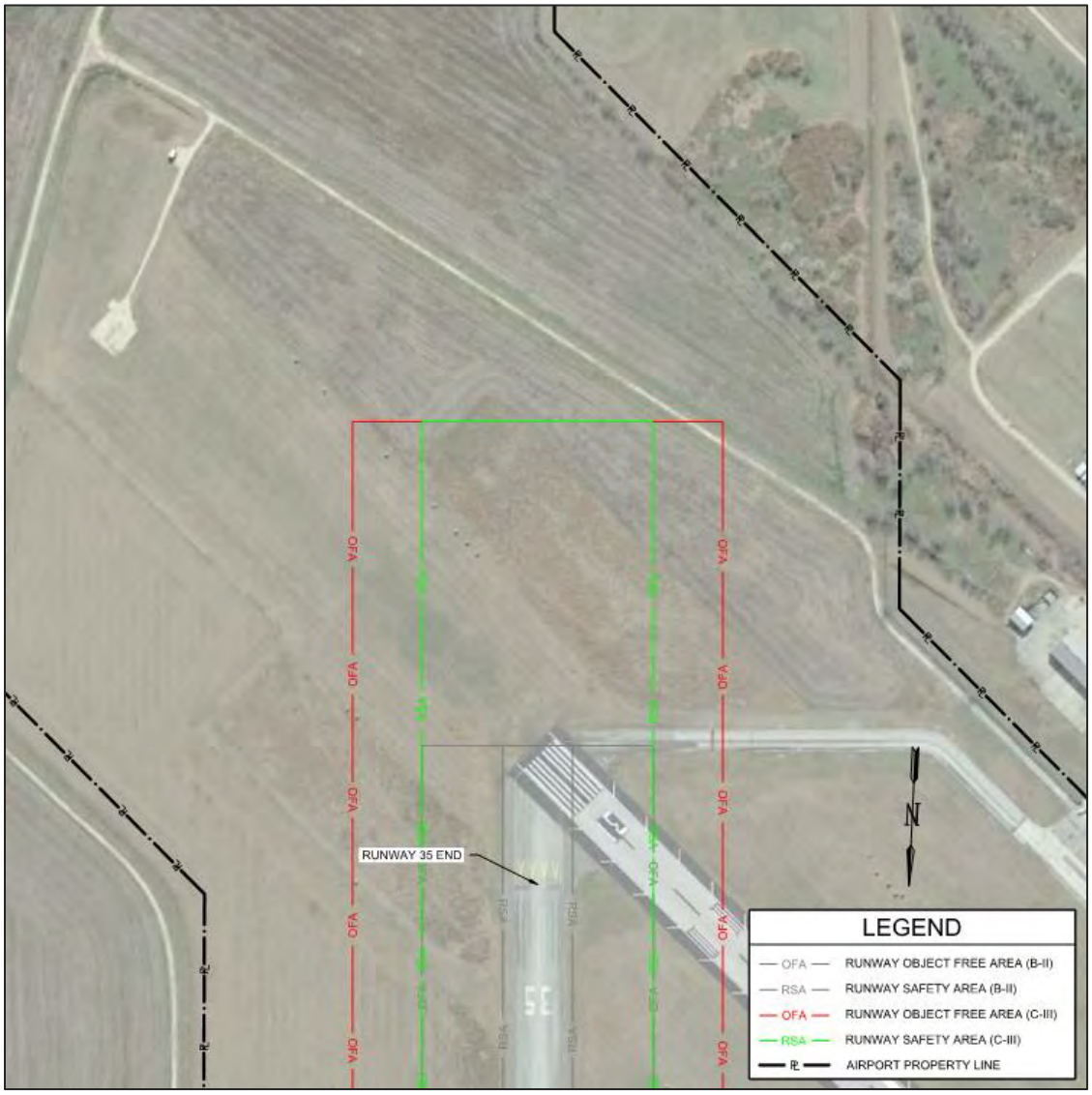
Runway Object Free Area

The Runway Object Free Area (ROFA) is a two-dimensional area surrounding a runway that is centered along the runway centerline. The ROFA must be clear of objects except those used for air navigation or aircraft ground maneuvering purposes and be clear 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, piece of equipment, or parked aircraft. The FAA recommends that an airport own the entire ROFA in "fee simple" title.

Currently, FAA Airport Design criteria for an RDC-B-II runway requires the ROFA to be 500 feet wide and extend 300 feet beyond each runway end. Runways 8/26 and 17/35 meet these requirements. FAA Airport Design criteria for an RDC C-II runway requires the ROFA to be 800 feet wide (400 feet each side of the runway centerline) and extend 1,000 feet beyond each runway end. Runway 13/31 meets this requirement.

Since the critical aircraft for the San Marcos Regional Airport is expected to move into the C-III category an analysis was completed to determine the impacts of moving each runway from its current ROFA dimensions to the ROFA dimensions required under C-III standards. In addition to the RSA and ROFA impacts discussed in the RSA section (see Figures 4-1 and 4-2), **Figure 4-3** depicts a ROFA only impact at the approach end of Runway 35. A small portion of the airport perimeter road passes through the proposed C-III ROFA at the approach end of Runway 35. This portion of the roadway would need to be realigned to move the roadway outside the proposed C-III ROFA.

FIGURE 4-3
ROFA IMPACT AT APPROACH OF RUNWAY 35
SAN MARCOS REGIONAL AIRPORT



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). The ROFZ applies to all the runways at the San Marcos Regional Airport. The inner-transitional OFZ, inner-approach OFZ, and POFZ

only apply to Runway 13 because it is the only runway with a precision instrument approach and an approach lighting system. The status of all four OFZ surfaces are discussed below.

Runway Obstacle Free Zone (ROFZ)

The length of a ROFZ is fixed at 200 feet beyond the associated runway end but the width is dependent upon the size of the aircraft using the runway (small – less than 12,500 lbs. or large – greater than 12,500 lbs.) and the visibility minimums for the lowest instrument approach to the runway. The ROFZ width for all three runways at the airport is 400 feet (200 feet each side of the runway centerline). The elevation of the ROFZ is equal to the closest point along the runway centerline. All runways at the airport meet the established ROFZ requirements. Since the dimensions of the ROFZ are not based on the RDC of a runway, no ROFZ impacts will occur if any of the runways are moved to a C-III RDC.

Inner Approach OFZ

Runway 13 has a MALSR approach lighting system. Consequently, an inner approach OFZ is applicable. The inner approach OFZ begins at the end of the ROFZ (200 feet beyond the runway end) and extends to a point 200 feet beyond the last lighting unit of the MALSR system (2,600 feet beyond the runway end). Consequently, the total inner approach OFZ is 2,400 feet in length. Additionally, the inner approach OFZ rises at a 50:1 slope from the edge of the ROFZ and remains the same width as the ROFZ (400 feet). The current inner-approach OFZ for Runway 13 meets the established FAA standards. Since the dimensions of the inner approach OFZ are not based on the RDC of a runway, no inner approach OFZ impacts will occur if Runway 13 is moved to a C-III RDC.

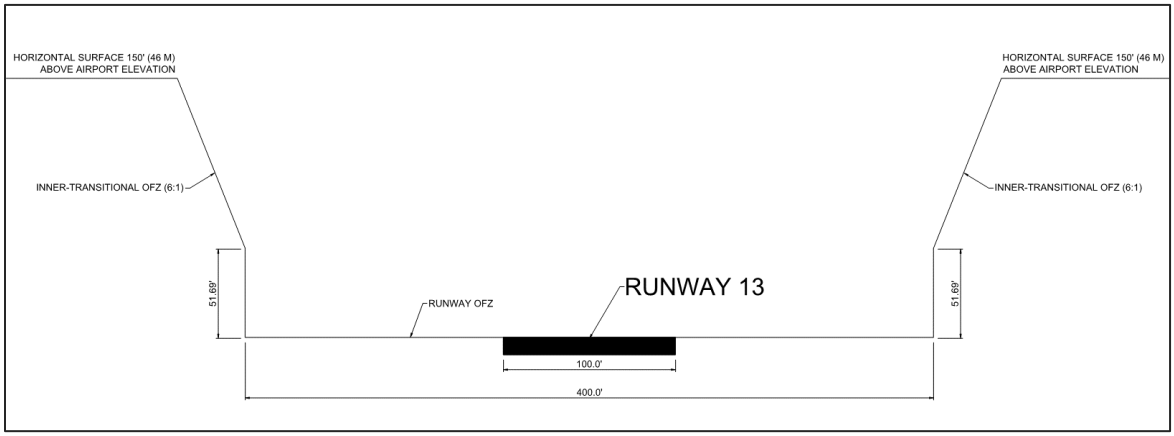
Inner Transitional OFZ

The inner transitional OFZ is a defined volume of airspace along the sides of the ROFZ and inner approach OFZ. It applies only to runways with lower than ¾ statue mile approach visibility minimums.

Runway 13 has an ILS approach with visibility minimums of ½ mile. Since these visibility minimums are below ¾ mile an inner-transitional OFZ is applicable.

Figure 4-4, *Runway 13 Inner Transitional OFZ,* displays the inner transitional OFZ configuration for Runway 13 and its relationship to the ROFZ.

FIGURE 4-4
RUNWAY 13 INNER TRANSITIONAL OFZ



Source: Garver, 2019

For Category 1 ILS runways, the inner transitional OFZ begins at the edges of the ROFZ and inner-approach OFZ and then rises vertically to a height ("H") which is calculated using the following formula:

$$H = 61 - 0.094(S) - 0.003(E)$$

"S" is equal to the most demanding wingspan of the RDC of the runways which is 118 feet (C-III standard). "E" is equal to the runway threshold elevation above sea level which is 593.1 feet. MSL. Based on this formula, "H" equals 51.69 feet for Runway 13.

After rising to a height of "H", the inner transitional OFZ then slopes outward at a 6:1 slope until reaching 150 feet above the established airport elevation (594.7 feet MSL).

The inner transitional OFZ for Runway 13 currently meets all established FAA standards. No inner transitional OFZ impacts will occur if Runway 13 is moved to a C-III RDC.

Precision OFZ (POFZ)

The final OFZ surface that applies to Runway 13 is the Precision Obstacle Free Zone (POFZ). The POFZ is a defined volume of airspace above an area beginning at the threshold of the runway that extends to 200 feet beyond the end of the runway and is 800 feet wide, centered along the extended runway centerline. The volume of airspace begins at the threshold elevation for the applicable runway end. The wing of an aircraft may penetrate the POFZ but penetrations involving an aircraft fuselage or tail are not permitted.

Runway 13 is the only runway at the San Marcos Regional Airport that requires a POFZ. The POFZ begins at the runway threshold elevation for Runway 13 which is 593.1 feet MSL. The POFZ for Runway 13 meets all established FAA standards. Since the dimensions of the POFZ are not based on the RDC of a runway, no POFZ impacts will occur if Runway 13 is moved to a C-III RDC.

Runway Hold Position Markings

The runway hold position markings (or holdlines) denote the entrance to the runway from a taxiway and the location where aircraft are supposed to stop when approaching the runway. Their location is prescribed by FAA AC 150/5300-13 (current edition). They are generally located across the centerline of a given taxiway within 10 feet of an associated runway hold position sign. According to FAA standards, the holdlines for Runways 8/26 and 17/35 (e.g. the B-II RDC runways) should be located at least 200 feet from the runway centerline. All of the runway hold position markings associated with Runways 8/26 and 17/35 are located at least 200 feet from the runway centerline.

The runway hold position markings for Runway 13/31 (e.g. the C-II RDC runway) should be located at least 250 feet from the runway centerline. All the runway hold position markings associated with Runway 13/31 meet or exceed this standard.

If any of the runways are moved from their existing RDC to a C-III RDC, the runway hold position markings would be required to be located 250 feet from the runway centerline. Based on the layout of the airfield, all runways should be able to meet this standard if necessary.

Runway to Parallel Taxiway Separation Standards

According for AC 150/5300-13 (current edition) the minimum necessary runway centerline to parallel taxiway centerline separation for a runway with an RDC of C-II is 400 feet. Currently, 630 feet of separation exists between Runway 13/31 and Taxiway Charlie, the parallel taxiway for Runway 13/31. Consequently, Runway 13/31 and Taxiway Charlie exceed the minimum centerline-to-centerline separation standard by 230 feet.

Minimum separation for a runway with an RDC of B-II is 240 feet from the runway centerline to the parallel taxiway centerline. Currently, 630 feet of separation exists between Runway 8/26 and Taxiway Alpha, the partial parallel taxiway for Runway 8/26, which exceeds the minimum required separation distance by 390 feet. No parallel taxiway exists for Runway 17/35. The minimum runway centerline to parallel taxiway centerline separation standard for a runway with a C-III RDC is 400 feet according to current FAA standards. All the runways at the San Marcos Regional Airport should be able to meet this standard without requiring any modifications.

Building Restriction Line

According to AC 150/5300-13 (current edition) the Building Restriction Line (BRL) represents the boundary where it is generally suitable or unsuitable to develop buildings such as hangars, terminals, or other facilities. The BRL is established based on an airport's FAR 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 primary surface for all the runways at the San Marcos Regional Airport are 1,000 feet wide (500 feet each side of the runway centerline) and extend 200 feet beyond each runway end.

The transitional surface slopes up at a 7:1 ratio from the edge of the primary surface to the horizontal surface which is 150 feet above airport elevation (airport elevation is 594.7 feet MSL). Buildings should not penetrate the transitional surface at any point. Based on the dimensions of the primary surface and transitional surface, the 35.0-foot BRL for all the runways at the airport are 745 feet from runway centerline.

Currently, the two Berry hangar facilities located at the approach end of Runway 8 are located within the BRL 35 feet. However, according to survey data provided by TXDOT and the FAA, neither of the facilities penetrate the transitional surface for Runway 8/26.

The new hangar being constructed in the Taxiway Kilo development area will also be located within the BRL 35 feet and is expected to penetrate both the primary surface and the transitional surface associated with Runway 8/26.

All future developments should be located outside of the BRL. Placing buildings inside the BRL is possible if the height of a building is minimized. Locating buildings inside the BRL may hamper the options for expanding the San Marcos Regional Airport in the future.

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. Proper lines of sight facilitate coordination amongst aircraft and vehicles operating on runway(s) 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 without a parallel taxiway, an acceptable runway profile permits any two points, generally each runway end, 5 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 5 feet above the runway centerline to any other point 5 feet above the runway centerline for one-half the runway length. There are no single runway line of sight issues for the runways at the San Marcos Regional Airport.

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. Runway 8/26 currently intersects Runway 13/31 and Runway 17/35. There are no intersecting runway line of sight issues at the San Marcos Regional Airport.

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. If “fee simple” interest is unachievable, the next option is controlling the heights of objects and keeping the area clear of any facilities that would support an incompatible activity (e.g., places of public assembly, etc.) via an avigation easement. An avigation easement is an agreement between the airport sponsor and a landowner that grants the airport sponsor various privileges related to the landowner’s property and limits the potential impact to aircraft operations.

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 a displaced landing threshold is present there is a need for separate approach and departure RPZs. The approach RPZ begins 200 feet from the runway threshold. The departure RPZ begins 200 feet beyond the end of runway pavement or 200 feet from the end of the Takeoff Runway Available (TORA), if established.

An FAA Interim Guidance Letter (IGL) published in September 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 road/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 4-12**, *Runway Protection Zone Dimensions*, delineates the current RPZ requirements at the San Marcos Regional Airport.

TABLE 4-12
RUNWAY PROTECTION ZONE DIMENSIONS
SAN MARCOS REGIONAL AIRPORT

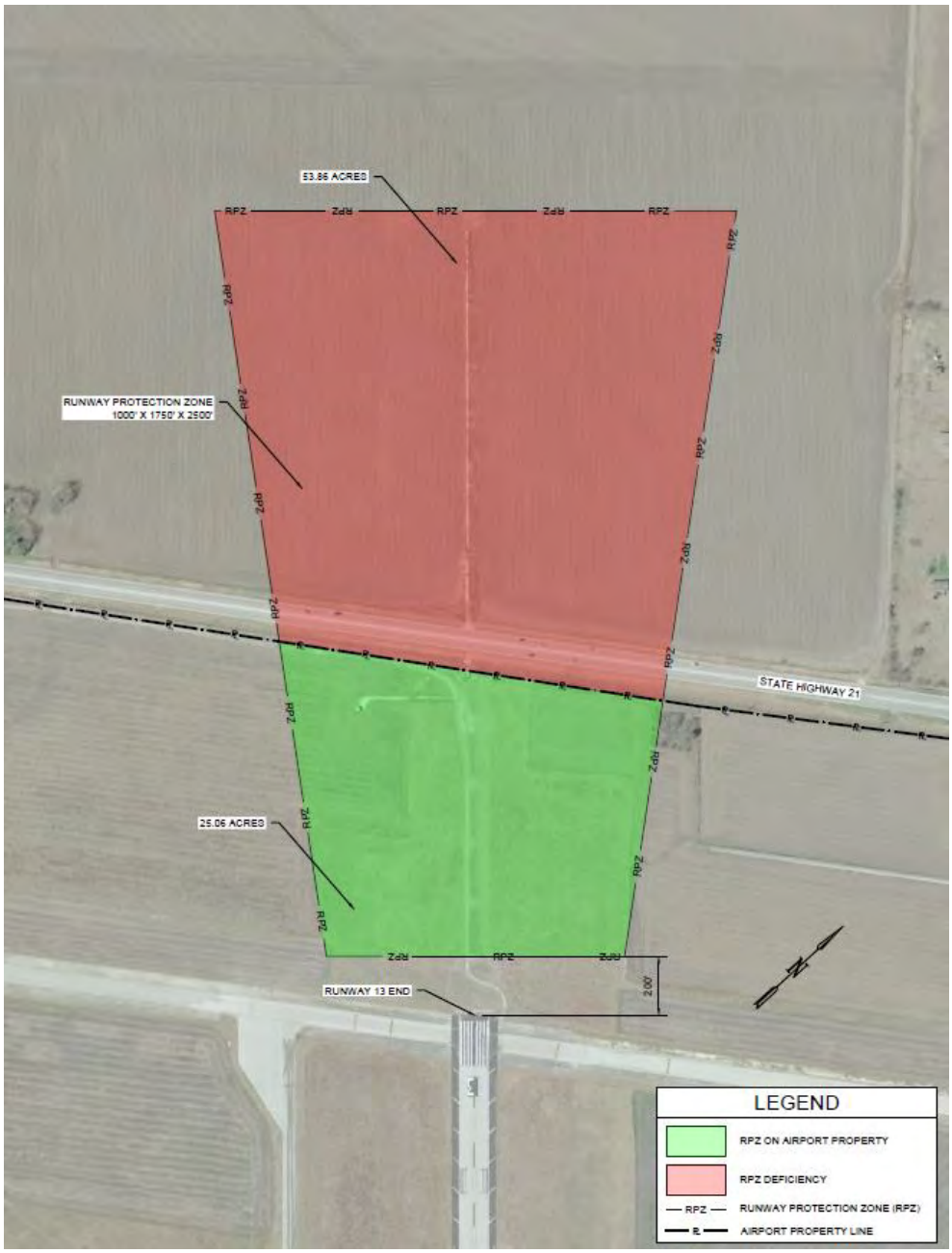
Runway End	Approach Visibility Minimums	Facilities Expected to Serve (AAC - ADG)	Length (ft)	Inner Width (ft)	Outer Width (ft)	Acres
Runway 13	Lower than 3/4 mile	C-II	2,500	1,000	1,750	78.914
Runway 31	Not lower than 3/4 mile	C-II	1,700	1,000	1,510	48.978
Runway 17	Not lower than 1 mile	B-II	1,000	500	700	13,770
Runway 35	Not lower than 3/4 mile	B-II	1,700	1,000	1,510	48.978
Runway 8	Not lower than 3/4 mile	B-II	1,700	1,000	1,510	48.978
Runway 26	Not lower than 3/4 mile	B-II	1,700	1,000	1,510	48.978

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

Currently, the RPZs at the approach ends of Runways 8, 13, 31, and 35 all extend beyond the San Marcos Regional Airport's established property line. Based on the research performed as part of this master plan, it appears that an avigation easement exists on the property north of Highway 21 that is within the RPZ associated with the approach to Runway 13. RPZs that extend outside of the airport's existing property line and that are not controlled via an avigation easement will be a key consideration in the alternatives analysis.

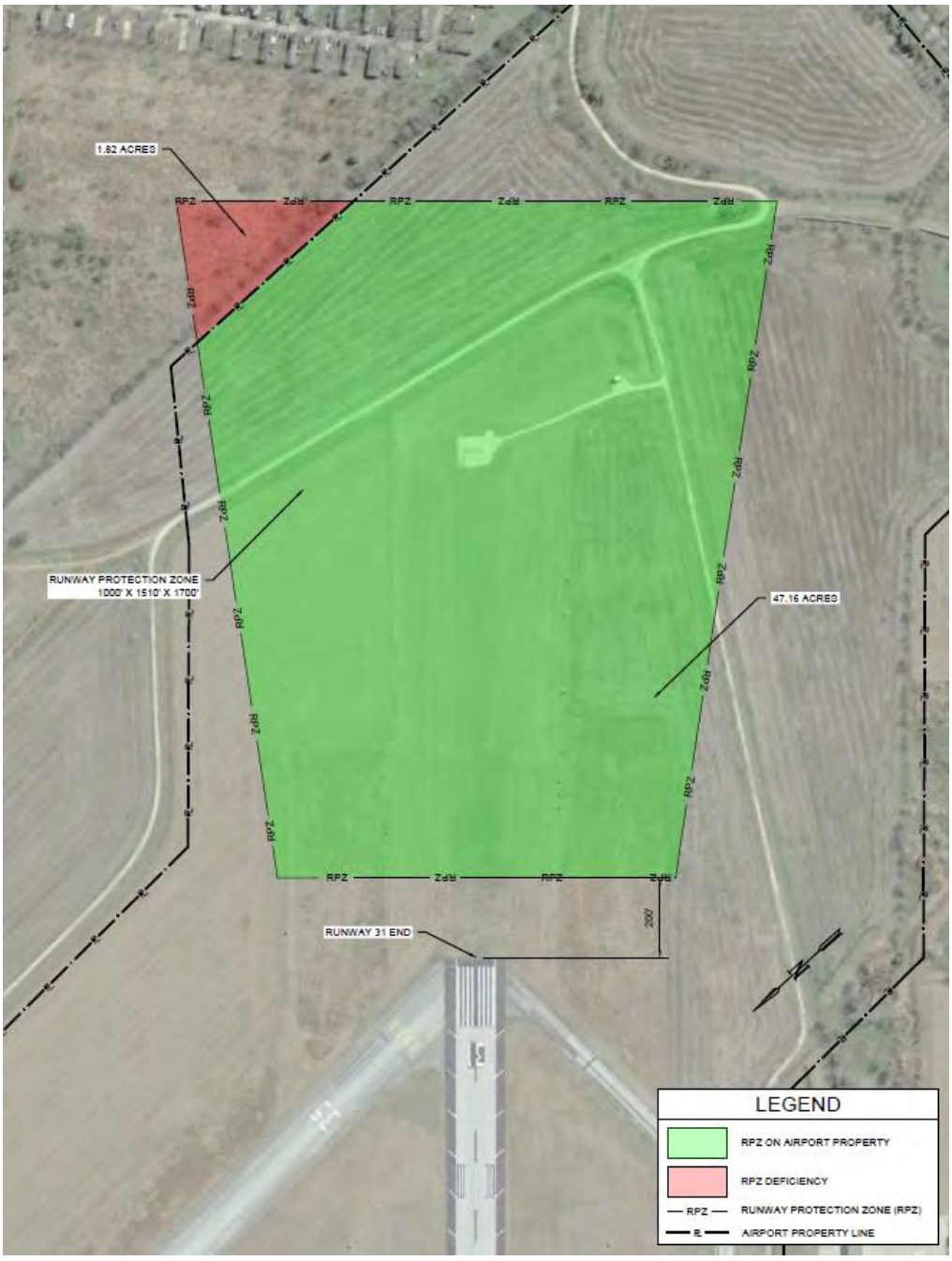
Figures 4-5, **4-6**, **4-7, and 4-8** depict the existing RPZs and highlights the portions outside of airport property.

FIGURE 4-5
RUNWAY 13 RPZ
SAN MARCOS REGIONAL AIRPORT



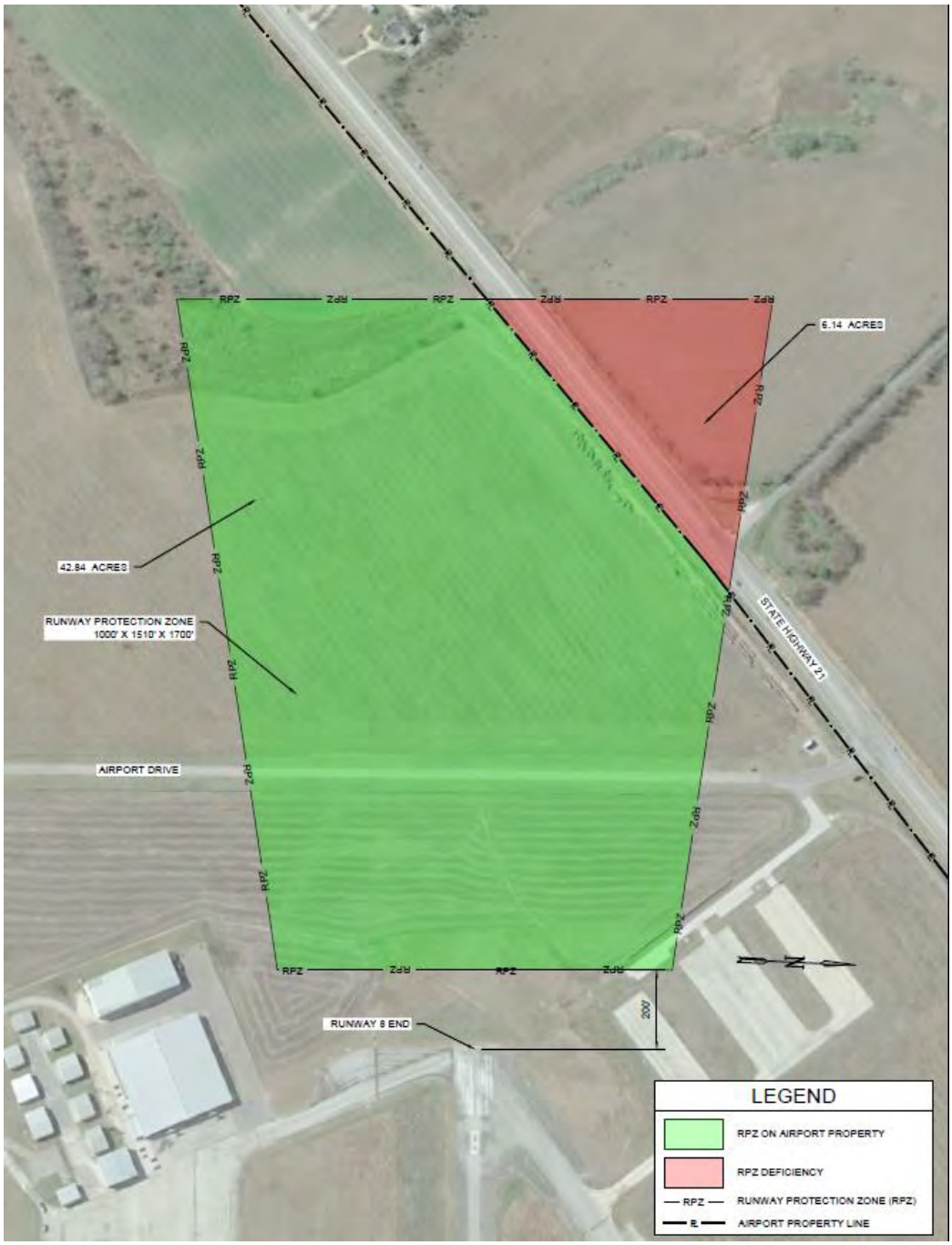
Source: Garver, 2019

FIGURE 4-6
RUNWAY 31 RPZ
SAN MARCOS REGIONAL AIRPORT



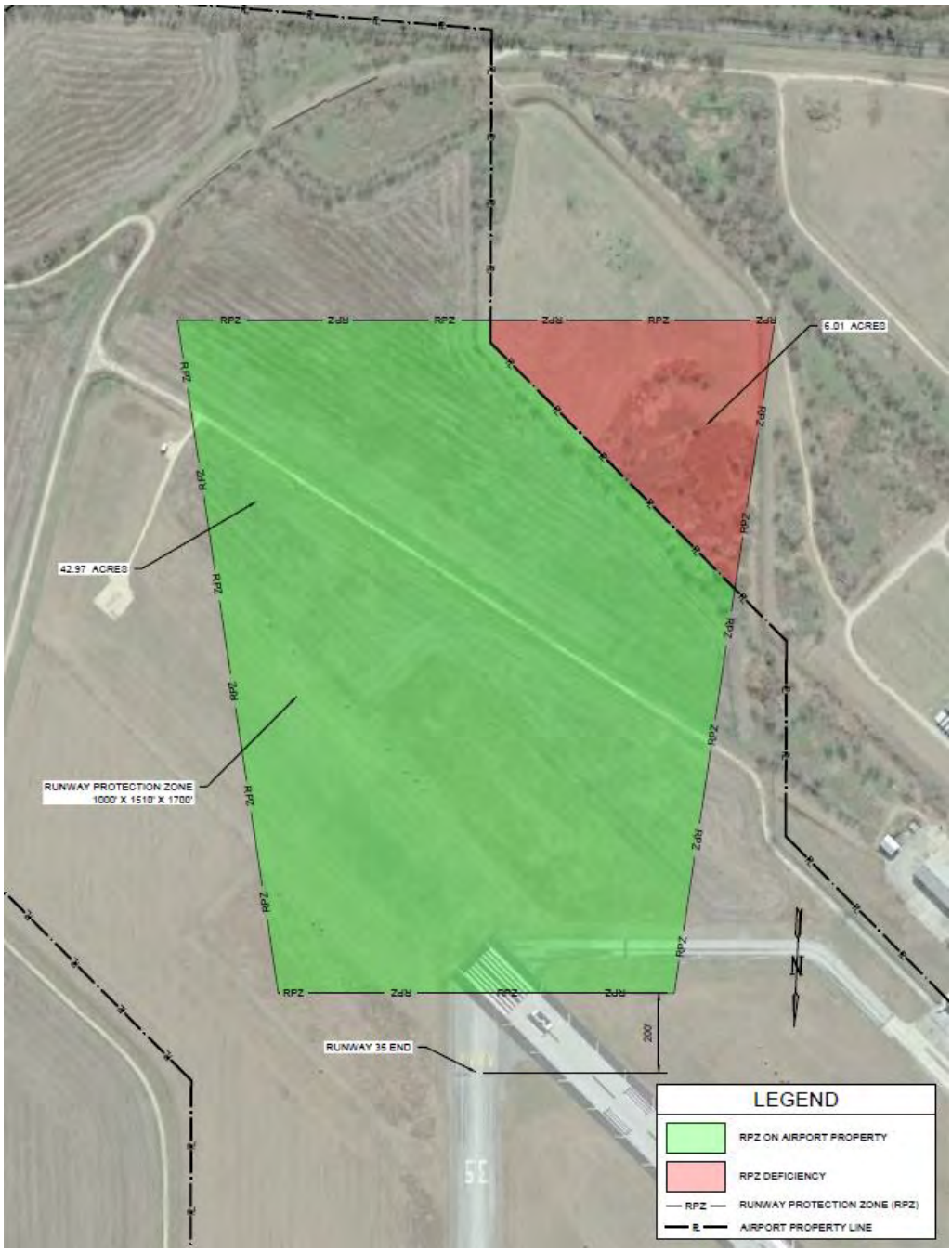
Source: Garver, 2019

FIGURE 4-7
RUNWAY 8 RPZ
SAN MARCOS REGIONAL AIRPORT



Source: Garver, 2019.
Note: The RPZ at the approach end of Runway 8 will be reduced to 500' x 700' x 1,000' when FM110 is constructed.

FIGURE 4-8
RUNWAY 35 RPZ
SAN MARCOS REGIONAL AIRPORT



Source: Garver, 2019.

TURF RUNWAY

Historically, the operators of tail-dragger aircraft sometimes prefer to utilize turf runways for their takeoff and landing operations. Since the San Marcos Regional Airport already has three paved runways with differing orientations the addition of a turf runway would further complicate the airspace and movement of aircraft on the ground. For these reasons, it is not recommended that a turf runway be considered as part of the alternatives analysis process.

AIRFIELD CAPACITY ANALYSIS

The FAA's standard method for determining airport capacity and delay for long-range planning purposes can be found in Advisory Circular (AC) 150/5060-5 (current edition), *Airport Capacity and Delay*. For this portion of the facility requirements analysis, generalized airfield capacity was calculated in terms of the airport's current percentage of its maximum Annual Service Volume (ASV). An airport's maximum ASV is the peak number of aircraft operations an airport could handle in a given year before significant delays begin to occur.

These capacity metrics are calculated based the following factors:

- Runway Configuration
- Taxiway Configuration
- Aircraft Mix Index
- Operational Characteristics
- Meteorological Conditions

When analyzed collectively, the above elements provide the basis for establishing the generalized operational capacity of an airport as expressed by Annual Service Volume. Utilizing the methodology described in AC 150/5060-5 (current edition) for long-range planning purposes, the maximum ASV possible at the San Marcos Regional Airport is between 230,000 and 260,000 annual operations depending on the runway configuration utilized for the analysis. In the Forecast Chapter, the peak of total annual operations is expected to be 105,192 operations. This places the San Marcos Regional Airport at approximately 46% of its maximum ASV. Based on the results of this analysis no capacity enhancements are expected to be needed during the 20-year planning period.

RUNWAY FACILITY REQUIREMENTS SUMMARY

When reviewing the results of the runway facility requirements analysis in its totality, three key findings were identified:

- Upgrade to C-III Standards: Runway 17/35 and Runway 13/31 are the runways that are in the best position to be upgraded to C-III standards if the critical aircraft for the San Marcos Regional Airport moves into the C-III category. While Runway 8/26 could potentially be upgraded to C-III standards it would require a significant amount of infrastructure relocation or require the runway to be shortened.
- Primary Runway: Runway 17/35 should be treated as the primary runway as it is the runway with the best wind coverage and has the best opportunity for future expansion. Currently, Runway 17/35 is the shortest runway at the San Marcos Regional Airport and has the highest approach minimums. Lengthening, strengthen, and reducing the IAP visibility minimums for Runway 17 should all be a key consideration in the alternatives analysis.
- Need for Tertiary Runway: Based on results of this facility requirements analysis, there is no substantial benefit to having a tertiary runway at the San Marcos Regional Airport. Runway 17/35 and Runway 13/31 together provide the optimal blend of wind coverage and airfield capacity and can be upgraded to C-III standards with less infrastructure impacts. As a result, the alternatives analysis will evaluate the potential decommissioning of Runway 8/26.

These three points will be a key consideration in the alternatives analysis.

TAXIWAY FACILITY REQUIREMENTS

The following section discusses facility requirements related to the taxiways at the San Marcos Regional Airport.

Taxiway Design Standards

In general, taxiway design can be segmented into two general categories:

1. Taxiway Pavement Design
2. Taxiway Layout Based on the Taxiway's Established Aircraft Design Group (ADG)

Each of these design categories play a critical role in evaluating the sufficiency of taxiway pavements at an airport both now and in the future.

Taxiway Pavement Design

Taxiway pavement design is complex because it is based on landing gear configurations which vary widely amongst different aircraft types. The FAA has classified the numerous variations of landing gear configurations into various Taxiway Design Groups (TDG) that now guide taxiway pavement design.

Additionally, taxiway pavement design standards have changed significantly over the past 10 years. Prior to 2012, taxiway pavement design was based on a taxiway's Aircraft Design Group (ADG), which categorizes aircraft based on wingspan and tail height. In 2012, when TDG based standards came into effect, taxiway pavement design and fillet dimensions changed significantly. The most significant change was that the size of taxiway fillets increased significantly. These new TDG based standards went through another minor revision in 2014.

Consequently, at many airports, any taxiway pavements that were designed prior to 2012 do not meet the current TDG based standards. As a result, as these taxiway pavements are re-constructed, they need to be re-designed to current TDG standards.

The taxiways at the San Marcos Regional Airport are no different. The taxiways at the San Marcos Regional Airport are designed to older ADG based pavement design standards that were in effect prior to the new TDG standards being instituted. Consequently, the taxiway fillets at the airport do not meet the existing TDG standards and practices.

Existing and Forecasted TDG

Table 4-13, *Existing Fleet Mix MTOW and Gear Configurations,* shows the TDG of some of the larger aircraft that have operated at the San Marcos Regional Airport over the past five years and in 2018 alone:

TABLE 4-13
EXISTING FLEET MIX MTOW AND GEAR CONFIGURATIONS
SAN MARCOS REGIONAL AIRPORT

Aircraft	TDG	# of OPS (5 years)	# of OPS (2018)
Embraer Brasilia E120	3	2,499	818
Bombardier DHC8-200/100	3	110	41
Beech 200 Super King (BE20)	2	1,084	325
Cessna Citation CJ3 (C25B)	2	694	188
Beech Super King Air 350 (B350)	2	274	54
Boeing (Douglas) DC-9-10	2	37	12
Fairchild Swearingen Merlin (SW3)	2	276	37
Cessna Excel/XLS (C56X)	1B	957	242
Dassault Falcon/Mystère 50 (FA50)	1B	398	106
Cessna Citation X (C750)	1B	105	21
BAe HS 125/700-800/Hawker 800 (H25B)	1B	102	20

Source: Aircraft manufacturer websites, FAA TFMSC database.

The majority of the large aircraft operations that occurred at the San Marcos Regional Airport during the aforementioned time periods fall into the TDG-2 and TDG-3 categories. However, the airport had over 850 operations in the TDG-3 category in 2018 alone. As a result, the taxiways at the San Marcos Regional Airport should be designed to TDG-3 pavement design standards based on the airport's current fleet mix. According to current TDG-3 pavement design standards, the width of the taxiways at the San Marcos Regional Airport should be 50 feet. **Table 4-14** depicts the existing width of the existing taxiways at the airport and the TDG category each pavement is most closely aligned to.

TABLE 4-14
TAXIWAY DESIGN GROUPS
SAN MARCOS REGIONAL AIRPORT

Taxiway	Width (ft)	TDG
A (ramp area)	75	3
A (approach of RWY 8)	50	3
B	40	2
C (north of TWY A)	42	2
C (south of TWY A)	50	3
E	42	2
F	50	3
J	50	3
K	35	2

Source: Garver, 2019.

As **Table 4-14** shows, Taxiways Bravo, Charlie (north of Taxiway Alpha), Echo, and Kilo do not have sufficient width to meet TDG-3 standards and should be widened as part of future pavement rehabilitation projects.

Additionally, the potential change from the Embraer Brasilia E120 to the Bombardier Q400 should be closely monitored as this change will have a significant impact on taxiway design. The Bombardier Q400 is a TDG-5 aircraft. Current TDG-5 taxiway design standards require a 75-foot-wide taxiway as opposed to the 50 foot width requirement necessary to meet TDG-3 standards. If the move to the Q400 occurs, taxiway routes that will be commonly utilized by the aircraft should be upgraded to TDG-5 taxiway pavement design standards.

Taxiway Layout Design Standards Based on Aircraft Design Group (ADG)

While taxiway pavement design is based on an aircraft's TDG, a taxiway's Taxiway Safety Area (TSA), Taxiway Object Free Area (TOFAs), and separation standards are based on the Aircraft Design Group (ADG) of the critical aircraft for the taxiway. These ADG based standards are based on the aircraft wingspan and tail height of the critical aircraft.

Based on the Forecast Chapter, the current critical aircraft for the San Marcos Regional Airport is in the ADG II category but there is the potential for the critical aircraft to move into the ADG III category.

Table 4-15, *Current Taxiway Standards Based on Aircraft Design Group*, below provides an overview of the ADG II taxiway design standards and the application of those standards to the San Marcos Regional Airport.

TABLE 4-15
CURRENT TAXIWAY STANDARDS BASED ON AIRCRAFT DESIGN GROUP
SAN MARCOS REGIONAL AIRPORT

Taxiway	Applicable Taxiway ADG	TSA (feet) Current	TSA (feet) FAA Standard	TSA (feet) Standard Met (Y/N)	TOFA (feet) Current	TOFA (feet) FAA Standard	TOFA (feet) Standard Met (Y/N)
A	II	79	79	Y	131	131	Y
B	II	79	79	Y	131	131	Y
C	II	79	79	Y	131	131	Y
E	II	79	79	Y	131	131	Y
F	II	79	79	Y	131	131	Y
J	II	79	79	Y	131	131	Y
K	II	79	79	Y	131	131	Y

Source: Garver, 2019

As the table indicates, all the existing taxiways at the San Marcos Regional Airport meet the current ADG II taxiway design standards.

Table 4-16, Future Taxiway Standards Based on Aircraft Design Group, provides an overview of the potential impacts of applying ADG III standards to the existing taxiways at the San Marcos Regional Airport.

TABLE 4-16
FUTURE TAXIWAY STANDARDS BASED ON AIRCRAFT DESIGN GROUP
SAN MARCOS REGIONAL AIRPORT

Taxiway	Applicable Taxiway ADG	TSA (feet) Current	TSA (feet) FAA Standard	TSA (feet) ADG III Compliant	TOFA (feet) Current	TOFA (feet) FAA Standard	TOFA (feet) ADG III Compliant
A	III	79	118	Y	131	162	Y
B	III	79	118	Y	131	162	Y
C	III	79	118	Y	131	162	Y
E	III	79	118	Y	131	162	Y
F	III	79	118	Y	131	162	Y
J	III	79	118	Y	131	162	Y
K	III	79	118	Y	131	162	Y

Source: Garver, 2019

As **Table 4-16** indicates, all the taxiways at the San Marcos Regional Airport currently have TSA and TOFA's that are dimensionally smaller than the ones required based on ADG III standards. An analysis was completed to determine if the existing taxiways at the airport could meeting ADG III TSA and TOFA standards without any substantial improvements/modifications. The results of the analysis showed that the San Marcos Regional Airport will not need to make any TSA or TOFA improvements to meet ADG III dimensional standards if the critical aircraft for the airport moves into the ADG III category.

TAXIWAY WEIGHT BEARING CAPACITY

As discussed in the Runway Strength section, the MTOW of the aircraft using the Airport is expected to increase during the forecast period, so improvements to taxiway pavement strength may need to be considered as well.

TAXIWAY CONFIGURATION REVIEW

Based on research, the FAA has identified a number of taxiway configurations that have been shown to cause pilot confusion, which can lead to safety issues such as runway incursions and incorrect runway departures.

Currently, the San Marcos Regional Airport has seven existing taxiway configurations that are not recommended by the FAA. Each of the seven areas and the configuration concern are identified later in this section.

Additionally, the intersection of Taxiway Foxtrot and the approach end of Runway 31 and Runway 35, as well as the intersection of Runway 8/26 and Runway 17/35, are considered a "hot spots" by the FAA, meaning there is an increased likelihood of runway incursions based on historical information.

- Location #1 - Taxiway Alpha intersection with Runway 8 approach end
  - Direct access from apron to runway without a turn
  - Runway/taxiway intersection is not at a 90-degree angle
  - Shown in **Figure 4-9**
- Location #2 - Taxiway Bravo intersection with Runway 8/26
  - Direct access from apron to runway without a turn
  - High energy intersection (middle 1/3 of runway)

- Shown in **Figure 4-10**

✈ Location #3 - Taxiway Charlie intersection with Runway 8/26
- Runway/taxiway intersection is not at a 90-degree angle
- High energy intersection (middle 1/3 of runway)
- Shown in **Figure 4-11**

✈ Location #4 - Taxiway Juliet intersection with Runway 8 approach end
- Runway/taxiway intersection is not at a 90-degree angle
- Shown in **Figure 4-12**

✈ Location #5 - Taxiway Echo intersection with Runway 13/31
- Direct access from apron to runway without a turn
- Shown in **Figure 4-13**

✈ Location #6 - Taxiway Foxtrot intersection with Runway 31 approach end
- Runway/taxiway intersection is not at a 90-degree angle
- Single taxiway accesses two runway ends
- Designated FAA Hot Spot
- Shown in **Figure 4-14**

✈ Location #7 - Runway 17/35 intersection with approach end Runway 26
- Runway 17/35 is used as a taxiway for access to and from approach end of Runway 26
- Designated FAA Hot Spot
- Shown in **Figure 4-15**

FIGURE 4-9
TAXIWAY ALPHA INTERSECTION WITH RUNWAY 8 APPROACH END
SAN MARCOS REGIONAL AIRPORT

Source: Garver, 2019

FIGURE 4-10
TAXIWAY BRAVO INTERSECTION WITH RUNWAY 8 APPROACH END
SAN MARCOS REGIONAL AIRPORT

Source: Garver, 2019

FIGURE 4-11
TAXIWAY CHARLIE INTERSECTION WITH RUNWAY 8/26
SAN MARCOS REGIONAL AIRPORT

Source: Garver, 2019

FIGURE 4-12
TAXIWAY JULIET INTERSECTION WITH RUNWAY 8 APPROACH END
SAN MARCOS REGIONAL AIRPORT

Source: Garver, 2019

FIGURE 4-13
TAXIWAY ECHO INTERSECTION WITH RUNWAY 13/31
SAN MARCOS REGIONAL AIRPORT

Source: Garver, 2019

FIGURE 4-14
TAXIWAY FOXTROT INTERSECTION WITH RUNWAY 13/31
SAN MARCOS REGIONAL AIRPORT

Source: Garver, 2019

FIGURE 4-15
RUNWAY 13/31 INTERSECTION WITH RUNWAY 8/26
SAN MARCOS REGIONAL AIRPORT

Source: Garver, 2019

Each of these configuration concerns will be addressed as part of the alternatives effort.

Engine Run-Up Areas

A concerned voiced by airport stakeholders in the stakeholder survey completed at the beginning of this master plan project was the lack of aircraft engine run-up areas available close to the ends of Runway 17 and Runway 31 and 35. These general areas are shown in **Figure 4-16**.

FIGURE 4-16
ENGINE RUN-UP AREAS
SAN MARCOS REGIONAL AIRPORT

Source: Garver, 2019

Since engine run-up areas are not present in these locations, aircraft congestion impacts frequently occur. Additionally, for departures on Runway 31 and Runway 35, engine run-ups are frequently completed on the ramp which presents a number of safety issues. Creation of run-up areas in these locations will be a consideration in the Alternatives Chapter.

Taxi Routes/Times

Another issue identified during stakeholder interviews and the stakeholder survey was the length of time and distance required to taxi from the main ramp area to the approach end of Runway 17 for departure. Runway 17 is the runway end that is most frequently used, yet it has the longest taxi time and distance. The taxi time is further increased because no direct taxiway route exists to the end of the runway. This will be a key consideration in the Alternatives Chapter.

Airfield Lighting, Marking, and Signage Requirements

Sufficient and accurate airfield marking, lighting and signage is essential to maintaining a high level of safety in an airport's daily operation. In this section the existing airfield lighting, marking, and signage will be reviewed in light of the established activity forecast to determine where improvements need to be made.

Runway Lighting, Marking, and Signage

Runway marking and lighting requirements vary based on the utilization characteristics of a runway including each runway's critical aircraft and instrument approaches.

Runway Lighting

All three runways at the San Marcos Regional Airport have Medium Intensity Runway Lighting (MIRLs) and all are in good condition. The airport also has Precision Approach Path Indicator (PAPI) light systems that are located on the approach ends of Runway 13, 17, and 31. The addition of PAPIs for Runway 35 should be a consideration in the future development of the airport. Runway 8/26 is equipped with Runway End Identifier Lights (REILs) on each runway end. The REIL systems are not operational and will be further evaluated as part of the alternatives analysis to determine whether they should be repaired or decommissioned.

Runway Centerline Lights and Touchdown Zone Lights (TDZ) are required on runways with Category (CAT) II or III Instrument Landing System (ILS) operations or any CAT I ILS runways with operations below 2,400 feet visibility. The lowest IAP minimum at the San Marcos Regional Airport is currently 2,400 feet visibility for the CAT I ILS approach to Runway 13. Based on the forecast it is not anticipated that

lower IAP minimums will be needed during the forecast period. As a result, it is not anticipated that the San Marcos Regional Airport will need to add runway centerline lights or touchdown zone lights during the forecast period.

Runway Markings

Runway 13/31 has precision instrument runway markings that are in good condition. Runway 8/26 and Runway 17/35 have non-precision instrument markings that were recently repainted and are in good condition. Based on an evaluation of future instrument approach needs at the airport it is not expected that the existing runway marking schemes (e.g. precision, non-precision, etc.) for any of the runways will need to be changed during the forecast period.

However, a marking deficiency was noted as part of the facility requirements analysis. Since Runway 17/35 is used as a taxiway to reach the approach end of Runway 26, painted runway hold position markings should be installed on Runway 17/35 to protect aircraft using Runway 8/26. This will be a consideration in the alternatives analysis.

Runway Signage

In general, the existing runway signage for the San Marcos Regional Airport is sufficient. However, Runway 17/35 has a single mandatory runway hold position sign on each side of its intersection with Runway 8/26. Since Runway 17/35 is used as a taxiway to taxi to/from the approach end of Runway 26, there should be two mandatory runway hold position signs on each side of Runway 17/35's intersection with Runway 8/26. This will be a consideration as part of the alternatives analysis.

Taxiway Lighting, Marking, and Signage

All taxiways at San Marcos Regional Airport have taxiway centerline markings. The markings are generally in good to fair condition. Additionally, all taxiways at the Airport have Medium Intensity Taxiway Lights (MITLs) that are in good condition. Airfield signage related to the taxiway system is generally sufficient and provides accurate wayfinding to pilots.

However, through stakeholder feedback, it was noted that additional markings and/or signage may be needed at Taxiway Alpha and Charlie intersection adjacent

to the apron, as unfamiliar pilots sometimes miss the turn to Taxiway Alpha when taxiing northwest on Taxiway Charlie. Solutions to this issue will be considered in the alternatives chapter.

Approach Lighting Systems

An Approach Lighting System (ALS) provides the basic means to transition from instrument flight to visual flight for landing. An ALS is a configuration of signal lights starting at the landing threshold and extending into the approach area for a distance of 2400-3000 feet for precision instrument runways and 1400-1500 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.

Operational requirements dictate the sophistication and configuration of the ALS for a runway. Depending on the type of approach, certain ALS are required to aide pilots in the identification of the airport environment during instrument meteorological conditions. These requirements are found in FAA AC 150/5300-13 (current edition). It should be noted that ALS systems are required for runways with precision instrument approaches.

As part of the ILS, Runway 13 has a Medium Intensity Approach Lighting System with Runway Alignment Indicator Lights (MALSR). The Runway Alignment Indicator Lights (RAILs) are currently out of service, but a project to repair them is planned. The FAA owns and maintains the MALSR.

Future consideration 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 forecast of future aeronautical activity and an analysis for future IAP needs at the airport, the MALSR for Runway 13 is expected to be sufficient during the forecast period and no additional ALS systems are expected to be needed.

Wind Cone/Segmented Circle/Airport Beacon

There are five total windsocks at the San Marcos Regional Airport. The primary windsock is located approximately 385 feet north of Runway 8/26 centerline and approximately 2,150 feet east of the threshold for Runway 8. The windsock is

lighted and is in good condition. The segmented circle associated with the windsock is in good condition.

There are four supplemental windsocks at the San Marcos Regional Airport at the following locations:

- Supplemental Windsock #1 – Located close to the approach end of Runway 13, approximately 380 feet southwest of Runway 13/31 centerline and 925 feet from Runway 13 threshold.
- Supplemental Windsock #2 – Located southeast of the intersection of Runway 8/26 and Runway 13/31. Approximately 410 feet from each runway's respective centerline.
- Supplemental Windsock #3 – Located approximately 410 feet south of Runway 8/26 centerline and 790 feet from Runway 8 threshold.
- Supplemental Windsock #4 – Located approximately 400 feet west of Runway 17/35 centerline and 1,020 feet from Runway 17 threshold.

All four supplemental windsocks are in good condition, but they are not lighted. As part of the alternatives analysis, consideration will be given to lighting the windsocks close to runway ends to improve visibility.

The primary airport beacon is located on top of the Air Traffic Control Tower and is in good condition. There is also a backup beacon located on top of the old air traffic control tower building, known as the Graham Tower. No changes to the airport beacon are expected to be needed during the forecast period.

NAVAIDs

Airport Navigation Aids (NAVAIDs) are installed on or near an airport to increase the Airport's reliability during 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 forecast in the previous chapter, approximately 28,460 instrument operations (approaches and

takeoffs) will be conducted annually under IFR flight rules by the end of the 20-year planning period. The following describes the status of existing and new NAVAIDs used at general aviation airports.

Very High Frequency Omni-Directional Radio Range

The Very High Frequency Omni-Directional Radio Range (VOR/VORTAC) system emits a very high frequency radio signal 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 it is planned to be phased-out by the FAA.

The San Marcos Regional Airport is served by the Randolph VORTAC, located 31.4 nautical miles southeast of the Airport, and the Centex VORTAC, located 33.9 nautical miles north of the Airport. The Centex VOR is utilized for the Runway 13 ILS approach to identify the outer marker. With the FAA's migration toward GPS based approaches and enroute navigation, it is not expected that any additional VORs will be needed in the area.

Global Positioning System

The Global Positioning System (GPS) is a highly accurate worldwide satellite navigational system that is unaffected by weather and provides point-to-point navigation by encoding transmissions from multiple satellites and ground-based data-link stations using an airborne receiver. GPS is presently FAA-certified for enroute and instrument approaches into numerous airports. The current program provides for GPS stand-alone and overlay approaches where GPS fixes are overlaid on top of an existing approaches (typically NDB or VOR approaches).

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). As discussed earlier in this chapter, Runway 17 should be evaluated for a GPS approach with ¾ mile visibility minimums.

Non-Directional Beacons (NDBs)

NDBs are an older ground based navigational technology that are still used in some places to provide redundant navigational capabilities at airports. NDBs emit a signal

that aircraft can fly to when they are in close proximity to the NDB station. Currently, NDBs are used as a basis for instrument approach procedures and for marker locations (e.g. typically the outer marker) associated with ILS approaches. The San Marcos Regional Airport currently has an NDB located approximately 5.5 nautical miles northwest of the Airport directly under the flight path for Runway 13. The NDB is used as the basis for the NDB approach to Runway 13 and as the outer marker associated with the ILS approach for Runway 13. It is expected that the NDB will eventually be decommissioned as the FAA plans to phase out NDB systems nationwide.

Instrument Landing System (ILS)

Instrument Landing Systems (ILS) are a ground-based navigation system, composed of a localizer and glideslope that provide vertical and horizontal guidance to pilots when conducting an instrument approach to a runway during inclement weather. Today, ILS systems are still the primary instrument approach system utilized at commercial service airports across the United States. However, with the FAA's migration to GPS based approaches and enroute navigation, the need for ILS systems is expected to decrease in the future.

Currently, San Marcos Regional Airport only has an ILS approach to Runway 13. Based on the IFR wind coverage analysis previously shown in **Table 4-9**, Runway 13 has the best IFR wind coverage of all the individual runway ends at the San Marcos Regional Airport and, consequently, is the ideal runway end to be equipped with an ILS system. The ILS system is in good condition and is maintained by the FAA. Due to the FAA's migration to GPS based instrument approach procedures, it is not expected that an additional ILS system will be needed at the San Marcos Regional Airport.

Weather Reporting 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 the pilot. The information is transmitted over the voice portion of a local NAVAID (VOR or DME), or a discrete VHF radio frequency. The transmission is broadcast in 20-30 second messages in

standard format and can be received within 25 nautical miles of the automated weather site.

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 6560.20B, *Siting Criteria for Automated Weather Observing Systems*, assists in the site planning for AWOS/ASOS systems.

The San Marcos Regional Airport is equipped with an AWOS-3 system that is owned and operated by the FAA. The AWOS is in good condition.

AIRSPACE

The term "airspace" is frequently used when discussing the areas surrounding an airport. There are a number of different categories/types of airspace that must be considered as part of the Airport master planning process. These include:

- Airspace Classification for Aeronautical Operators (e.g. Class B, C, D, etc.)
- FAR Part 77 – Imaginary Surfaces

Airspace Classification for Aeronautical Operators

The current airspace surrounding the San Marcos Regional Airport is classified as Class D airspace during times when the ATCT facility at the airport is operational (7 AM to 7 PM). When the ATCT facility is not in operation, the airspace around the airport reverts to Class E airspace.

As aircraft operations levels are not expected to change significantly during the forecast period, it is not expected that the current airspace classification will need to be changed during the 20-year planning horizon.

FAR Part 77 – Imaginary Surfaces

14 CFR Part 77, *Safe, Efficient Use, and Preservation of the Navigable Airspace*, provides standards and procedures to protect the continued safe and efficient use of airspace. 14 CFR Part 77.19, *Civil Airport Imaginary Surfaces*, defines the five civil

imaginary surfaces related to airports. To ensure the continued safe and efficient use of the airspace surrounding an airport, it is important that the five civil airport imaginary surfaces remain clear of any obstructions that could pose a hazard to air navigation. It should be noted that some objects may be located within an airport's imaginary surfaces as long as they has been properly marked/lighted and an airspace review has been completed and determined that the object will not adversely affect the safe and efficient use of the local airspace.

The five civil airport imaginary surfaces described in 14 CFR Part 77.19 are defined below:

- Primary Surface – A surface longitudinally centered on a runway. When the runway has a specially prepared hard surface, the primary surface extends 200 feet beyond each end of that runway; but when the runway has no specially prepared hard surface, the primary surface ends at each end of that runway. The elevation of any point on the primary surface is the same as the elevation of the nearest point on the runway centerline.
- Approach Surface – A surface longitudinally centered on the extended runway centerline and extending outward and upward from each end of the primary surface. An approach surface is applied to each end of each runway based upon the type of approach available or planned for that runway end.
- Horizontal Surface – A horizontal plane 150 feet above the established airport elevation, the perimeter of which is constructed by swinging arcs of a specified radii from the center of each end of the primary surface of each runway of the airport and connecting the adjacent arcs by lines tangent to those arcs.
- Conical Surface – A surface extending outward and upward from the periphery of the horizontal surface at a slope of 20 to 1 for a horizontal distance of 4,000 feet.
- Transitional Surface – These surfaces extend outward and upward at right angles to the runway centerline and the runway centerline extended at a slope of 7 to 1 from the sides of the primary surface and approach surfaces. Transitional surfaces for those portions of the precision approach surface which project through and beyond the limits of the conical surface, extend a

distance of 5,000 feet measured horizontally from the edge of the approach surface and at right angles to the runway centerline.

Based on the criteria described in 14 CFR Part 77.19, the five civil imaginary surfaces for the San Marcos Regional Airport are described below:

- Runway 8/26
  - Primary Surface - 1,000 feet wide x 200 feet past each runway end.
  - Approach Surface Runway 8 and Runway 26 - 34:1 slope for 10,000 feet. Inner width of the approach surface is 1,000 feet wide and expands to 4,000 feet wide.
- Runway 13/31
  - Primary Surface - 1,000 feet wide x 200 feet past each runway end.
  - Approach Surface Runway 13 - 50:1 slope first 10,000 feet, then 40:1 for 40,000 feet. Inner width of the approach surface is 1,000 feet wide and expands to 16,000 feet wide.
  - Approach Surface Runway 31 - 34:1 slope for 10,000 feet. Inner width of the approach surface is 1,000 feet wide and expands to 3,500 feet wide.
- Runway 17/35
  - Primary Surface - 1,000 feet wide x 200 feet past each runway end.
  - Approach Surface Runway 17 - 34:1 slope for 10,000 feet. Inner width of the approach surface is 1,000 feet wide and expands to 3,500 feet wide.
  - Approach Surface Runway 35 - 34:1 slope for both runway ends for 10,000 feet. Inner width of the approach surface is 1,000 feet wide and expands to 4,000 feet.
- Non-Runway Specific Surfaces
  - Horizontal Surface - Flat surface established at an elevation 744.7 feet (150 feet above field elevation). Perimeter is based on 10,000 feet arcs swung from all runway ends.
  - 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 until it reaches the horizontal surface and from the edges of the approach surfaces until it reaches the horizontal surface or for a horizontal distance of 5,000 feet at a 7:1 slope.

These surfaces are depicted in the Airspace Drawing that is included as part of the Airport Layout Plan. A small hill is located approximately 4,500 feet north of the existing Runway 17 threshold in close alignment with the Runway 17/35 centerline. This hill is expected to be key consideration in the future development of Runway 17/35 in the alternatives process.

AIRFIELD/AIRSPACE FACILITY REQUIREMENTS SUMMARY

Based on airfield/airspace facility requirements defined previously in this document, the following airfield/airspace development objectives have been created to guide the alternatives development process:

Runways/Approaches/Airspace:

- Runway 17/35 needs to be developed as the primary runway.
- Runway 17/35 should be protected for an extension up to 7,000 feet.
- Runway strengthening will likely be necessary for Runway 13/31 and Runway 17/35.
- Runway 17/35 and Runway 13/31 should be considered for upgrades to C-III standards as they are the most suitable for improvement.
- Runway 17 should be evaluated for lower approach minimums (¾ mile).
- Evaluate need to repair or replace Runway 8/26 REILs.
- Consider the closure of Runway 8/26 as it provides no substantial wind coverage or capacity benefits and would be difficult to upgrade to C-III runway design standards.
- Add lighted windsocks to runway ends.
- Add PAPI system to Runway 35.
- Acquire property or establish avigation easements necessary to protect the RPZs for Runway 8, 31, and 35.

- Add additional mandatory hold position signage on Runway 17/35 at the intersection of Runway 8/26 to fully conform to FAA safety standards. Painted runway hold position markings should also be installed.
- Update runway designations for Runway 17/35 and Runway 8/26 during the latter portion of the forecast period due to magnetic variation changes.

Taxiways

- Improve taxiways to TDG-3 standards as they are rehabilitated and monitor for potential fleet mix shift to Bombardier Q400 aircraft (a TDG-5 aircraft). Improve to TDG-5 standards if this fleet mix shift occurs.
- Resolve the seven identified taxiway layout configuration issues.
- Improve airfield marking and signage related to the Taxiway Alpha/Charlie intersection.
- Establish aircraft run-up areas at the approach end of Runway 17, 31 and 35.
- Improve taxiway access to the approach end of Runway 17 to reduce taxi times.
- Improve taxiway weight bearing capacity.

TERMINAL AREA/LANDSIDE FACILITY REQUIREMENTS

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.

FBO/TERMINAL BUILDING REQUIREMENTS

FBO/Terminal buildings serve both a functional and social capacity central to the operation, promotion, and visible identity of any airport. Key FBO/terminal area facility requirements are developed in consideration of the following general design concepts:

- Future terminal area development for general aviation airports serving utility and larger than utility aircraft should be centralized
- Planned development should allow for incremental linear expansion of facilities and services in a modular fashion along an established flightline
- 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 aircraft within secured access areas
- Future terminal area development should enhance safety, visibility, and be aesthetically pleasing

The San Marcos Regional Airport currently has two FBO/Terminal buildings. The FBO/terminal building operated by Berry Aviation is approximately 3,600 square feet. The FBO/terminal building operated by Redbird Skyport provides approximately 17,850 square feet of FBO/terminal space. The total amount of FBO/terminal building space is approximately 21,450 square feet.

An estimate of future building/space needs based on forecasted demand is outlined in **Table 4-17**. Public space is allocated for lounge/waiting area, flight planning, restrooms, meeting rooms, and concession. The FBO space could

accommodate FBO office space, employee breakroom, and a utility/equipment room.

TABLE 4-17
TERMINAL BUILDING SPACE REQUIREMENTS
SAN MARCOS REGIONAL AIRPORT

Facility	2018	PAL 1	PAL 2	PAL 3	PAL 4	PAL 5
Formula Factors						
- Peak Hour Operations	35	32	39	44	50	55
- % of Aircraft Using FBO Terminal Facilities	50%	50%	50%	50%	50%	50%
- Average # of Pilots/Passengers	2.5	2.5	2.5	2.5	2.5	2.5
- Sq. Ft. Allotment Per Person	150	150	150	150	150	150
Terminal Sq. Ft. Requirement for Passengers/Pilots	6,653	6,070	7,245	8,334	9,356	10,355
- Office/Support Space (25%)	1,663	1,517	1,811	2,084	2,339	2,589
Total Terminal Sq. Ft. Requirement	8,317	7,587	9,056	10,418	11,696	12,944
Current Terminal Sq. Ft.	21,450	21,450	21,450	21,450	21,450	21,450
Surplus/Deficiency (Sq. Ft.)	**13,133**	**13,863**	**12,394**	**11,032**	**9,754**	**8,506**

Source: ACRP Guidebook for GA Facility Planning and Garver, 2019

Based on this analysis it is not expected that additional FBO/terminal building facilities will be needed in the future.

AIRCRAFT STORAGE

Future hangar areas should achieve a balance between maintaining an unobstructed expansion area, minimizing pavement development, and allowing convenient airside and landside access. Typically, single-engine piston aircraft demand 1,250 square feet, twin-propeller aircraft require 3,500 square feet, business turboprop/jet aircraft require approximately 3,000 to 5,000 square feet, and helicopters typically require approximately 1,500 square feet. General hangar design considerations 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.
- Interior and exterior lighting and electrical connections on new hangar construction. Enclosed hangar storage with bi-fold doors is recommended.
- Adequate drainage with minimal slope differential between the hangar door and taxilane. A hard-surfaced hangar floor is recommended, with less than one percent downward slope to the taxilane/ramp.
- 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, the San Marcos Regional Airport has box and T-hangar storage totaling 469,150 square feet and has 200 based aircraft on the field. Currently, the hangars at the airport are at capacity and a waiting list for hangar space exists. As of May 2019, 109 individuals are on the waiting list for box hangar space, T-hangar space, or T-shelter space. Based on the forecast for based aircraft, it is expected that the need for hangar space at the San Marcos Regional Airport will need to grow as described in **Table 4-18** to accommodate both current and future demand.

TABLE 4-18
HANGAR SPACE REQUIREMENTS
SAN MARCOS REGIONAL AIRPORT

Facility	2018	PAL 1	PAL 2	PAL 3	PAL 4	PAL 5
Based Aircraft - Single Engine Piston	160	162	168	178	186	195
% of Based SE Aircraft Utilizing Hangar	75%	75%	75%	75%	75%	75%
Total Based SE Aircraft Placed in Hangar	120	122	126	134	140	146
Estimated Hangar Space per Aircraft	1,250	1,250	1,250	1,250	1,250	1,250
Total Hangar Space Required (sq. ft.)	150,000	151,875	157,500	166,875	174,375	182,813
Based Aircraft - Multi-Engine/Turboprop	25	26	35	44	55	67
% of Based ME/TP Aircraft Utilizing	95%	95%	95%	95%	95%	95%
Total Based ME/TP Aircraft Placed in	24	25	33	42	52	64
Estimated Hangar Space per Aircraft	3,000	3,000	3,000	3,000	3,000	3,000
Total Hangar Space Required (sq. ft.)	71,250	74,100	99,750	125,400	156,750	190,950
Based Aircraft - Helicopters	1	1	3	4	6	8
Estimated Hangar Space per Aircraft	1,500	1,500	1,500	1,500	1,500	1,500
Total Hangar Space Required (sq. ft.)	1,500	1,500	4,500	6,000	9,000	12,000
Based Aircraft - Jet	14	15	21	27	35	45
Estimated Hangar Space per Aircraft	5,000	5,000	5,000	5,000	5,000	5,000
Total Hangar Space Required (sq. ft.)	70,000	75,000	105,000	135,000	175,000	225,000
Annual Itinerant Aircraft Operations	39,144	35,708	42,622	49,032	55,045	60,919
Maintenance/Transient Hangar Area Demand (ft^2)	78,287	71,417	85,243	98,064	110,091	121,838
Current Unmet Demand (e.g. Hangar	60,875	60,875	45,000	32,500	20,000	12,500
Total Based Aircraft	200	204	227	253	282	315
Total Hangar Space Required (sq. ft.)	431,912	434,767	496,993	563,839	645,216	745,101
Hangar Space Lost to Exclusive Use/Office Space (estimated at 25%) (sq.	107,978	108,692	124,248	140,960	161,304	186,275
Hangar Space Required + Space Lost to Exclusive Use/Office Space (sq. ft.)	539,890	543,459	621,242	704,799	806,520	931,376
Current Hangar Space (sq. ft.)	469,150	469,150	469,150	469,150	469,150	469,150
Surplus/Deficiency (sq. ft.)	**-70,740**	**-74,309**	**-152,092**	**-235,649**	**-337,370**	**-462,226**

Source: Garver, 2019
Note: An average of 1,250 square feet per aircraft was utilized for the T-hangar area demand calculations. An average of 3,000 square feet per aircraft was utilized for based turboprop/multi-engine box hangar calculations. An average of 1,500 square feet per helicopter was utilized for based helicopter hangar demand calculations.

With the expected growth of based single-engine piston, multi-engine, turboprop and jet aircraft at the Airport it is expected that both T-hangar and box hangar space will be needed in the future. However, box hangar space is expected to be in

higher demand. This will likely need to include larger hangars with taller doors to accommodate larger Group III aircraft.

AUTO PARKING, CIRCULATION, AND ACCESS REQUIREMENTS

Vehicle Parking

Airports are unique facilities with regard to vehicle 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 2.5 spaces should be allocated for each aircraft operating during peak hour activity levels and an additional 1 space for every 1,000 square feet of hangar space to account for employees and others.

Table 4-19 shows the number of required parking spaces utilizing this methodology.

TABLE 4-19
VEHICLE PARKING SPACE REQUIREMENTS
SAN MARCOS REGIONAL AIRPORT

Facility	2018	PAL 1	PAL 2	PAL 3	PAL 4	PAL 5
FBO Terminal Parking						
- Peak Hour Operations	35	32	39	44	50	55
- % of Aircraft Using FBO Terminal Facilities	50%	50%	50%	50%	50%	50%
- Peak Hour Multiplier	2.5	2.5	2.5	2.5	2.5	2.5
Parking Space Need for Passenger/Pilot	44	40	48	56	62	69
Hangar Space Parking						
- Hangar Space Requirement	371,037	373,892	451,993	531,339	625,216	732,601
- Parking Allotment Based on Hangar Space (1 space per 1,000 sf)	371	374	452	531	625	733
- Reduction for Parking Inside Hangar or Unmarked Area	75.00%	75.00%	75.00%	75.00%	75.00%	75.00%
Total Parking Needed for Hangar Space	93	93	113	133	156	183
Tie-Down Space Parking						
- Tie-Down Space Requirements	41	42	44	47	49	52
- % of A/C in Use at One-Time	10%	10%	10%	10%	10%	10%
Total Parking Needed for Tie-Down Space	4	4	4	5	5	5
Flight School Parking Space	50	50	50	50	50	50
Total # of Spaces Currently	234	234	234	234	234	184
Total Number of Parking Spaces Needed	**191**	**188**	**216**	**243**	**274**	**307**
Total Deficiency/Surplus	**43**	**46**	**18**	**-9**	**-40**	**-123**

Source: Garver, 2019

While this analysis shows that San Marcos Regional Airport will not need additional vehicle parking spaces until PAL 3 is reached it should be noted that vehicle parking is currently lacking in specific areas of the Airport while other portions of the Airport have excess vehicle parking capacity. Consequently, short-term parking improvements will be needed in specific areas to meeting current demand. This will be a consideration in the alternatives analysis.

Vehicle Access

Current vehicle access to the Airport is via Airport Drive, which connects to Highway TX-21. The road is paved and is in good condition. However, stakeholder feedback has indicated a desire to straighten the roadway and improve its aesthetics. The close proximity between airport development areas and the Gary Job Corps. property line provide a limited area to improve the roadway without modifying

other facilities. Improving the alignment and aesthetics of Airport Drive will be a consideration during the alternatives analysis.

Additionally, while it is not expected that vehicle congestion will be an issue during the forecast period, a secondary access route to the ramp side development area should be considered to improve vehicle access and flow. A secondary access route will be a consideration in the alternatives analysis.

In addition, adding a right turn lane from TX-21 to Airport Drive in order to improve traffic flow and safety will also be considered.

AIRCRAFT APRON STORAGE

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 San Marcos Regional Airport is used for a combination of transient and based aircraft parking. The apron is concrete and is in fair to poor condition. Stakeholders have expressed concern regarding the condition of the apron. Consequently, in addition to the ramp space requirements based on the calculations found later in this section, ramp condition and utilization will be considerations in the alternatives analysis.

Apron Space Requirements

Since both based and transient aircraft utilize the apron at the San Marcos Regional Airport, space requirements have been calculated to account for both, along with the space needed for general aircraft movement. For the purposes of this analysis it is assumed that aircraft will primarily be in a single row configuration, wing-to-wing, with pull-through or push-back parking as is common with itinerant aircraft.

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 the San Marcos Regional Airport, 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 the consideration. **Table 4-20** shows the results of this analysis and provides a weighted average apron space requirement per aircraft.

TABLE 4-20
VEHICLE PARKING SPACE REQUIREMENTS
SAN MARCOS REGIONAL 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	81.85%	4,911
II	55	60	9.00	115	14,664	16.20%	2,376
III	100	100	11.00	162	34,648	0.89%	308
IV	155	140	13.5	225	67,969	0.01%	7
Helicopter	35	30	12.00	0	3,186	1.05%	33
						Weighted Average:	**7,635**

Source: Garver, 2019
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 San Marcos Regional Airport peaking characteristics described in the Forecast Chapter, **Table 4-21** shows the estimated amount of apron space that will be required at the airport during the forecast period.

TABLE 4-21
APRON SPACE REQUIREMENTS
SAN MARCOS REGIONAL AIRPORT

Year	Peak Month Average Day (PMAD)	Estimated Percentage OPS on Apron at Same Time	Weighted Average Aircraft Parking Area (ft^2)	Estimated Parking Apron Required	Aircraft Circulation Factor	Long-Term Tie-Down Aircraft	Total Apron Area Required (ft^2)	Current Apron Area (ft^2)	Surplus/ Deficiency Based on Current Apron Size (ft^2)
2018	237	50.00%	6,805	806,393	483,836	82,500	1,372,728	2,498,300	**1,125,572**
PAL 1	216	50.00%	6,805	734,940	440,964	83,600	1,259,504	2,498,300	**1,238,796**
PAL 2	258	50.00%	7,012	904,548	542,729	87,500	1,534,777	2,498,300	**963,523**
PAL 3	296	50.00%	7,220	1,068,560	641,136	93,400	1,803,096	2,498,300	**695,204**
PAL 4	333	50.00%	7,480	1,245,420	747,252	98,500	2,091,172	2,498,300	**407,128**
PAL 5	368	50.00%	7,635	1,404,840	842,904	104,200	2,351,944	2,498,300	**146,356**

Source: Garver, 2019
Note: An assumption was made that no more than 50% of the total number of estimated itinerant operations during the PMAD would be on the ramp at the same time. The estimated parking apron required was calculated by multiplying the PMAD by the forecasted percentage of itinerant operations, then multiplying that result by the estimated percentage of itinerant operations on the apron at the same time, and then multiplying that result by the weighted average aircraft parking area. A factor of .6 was added to the apron space calculation to account for general aircraft circulation and movement.

These calculations show that the existing apron space will be sufficient for the duration of the planning period. Since pavement condition is a significant concern regarding the ramp, the alternatives analysis will identify portions of the main ramp that could potentially be temporarily closed in an effort to reduce the amount of pavement that has to be maintained.

Apron Lighting

Based on feedback from airport stakeholders, the main ramp area is too dark at night. Additional lighting will be a consideration in the alternatives analysis process. Light pollution from the Gary Job Corps facility contributes to this issue.

Fuel Storage Requirements

Fuel storage requirements are based on the forecast of annual operations, aircraft utilization, average fuel consumption rates, and the forecast mix of GA aircraft anticipated at the San Marcos Regional Airport. On average, the typical single-engine airplane consumes 12.0 gallons of fuel per hour and flies approximately 100 nautical miles (1.0 to 1.5 hours) per flight. Turbine aircraft generally will fly greater

distances averaging 300 nautical miles and approximately 1.5 – 2.0 hours. 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
- Locating the fuel facilities beyond the RSA and BRL
- Equipping all fuel storage tanks 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
- Maintaining adequate truck transport access to the fuel storage tanks for fuel delivery

As reported in the Inventory Chapter, both FBOs have fuel farms with storage tanks for both 100LL and Jet-A fuel. Redbird Skyport has two Above-Ground Storage Tanks (ASTs), one for Jet-A and one for 100LL. Both tanks are 12,000 gallons and are in good condition. Berry Aviation has two ASTs, one for Jet-A and one for 100LL. Both tanks are 10,000 gallons and are in good condition. Berry also has an additional 1,000 gallon tank of 100LL fuel used for self-service. Based on forecasted demand, it is not expected that a fuel farm expansion will be needed.

US Customs and Border Protection Facility

During the initiation of this Master Planning process, multiple stakeholders mentioned the need for a US Customs and Border Protection (CBP) User Fee facility at the airport. The establishment of US CBP User Fee facility requires the

construction of a Federal Inspection Station (FIS) to allow processing of international flights/passengers. The development of similar facilities at other airports in the recent past have cost between $4 and $5 million dollars.

As part of this master plan study, efforts were made to determine if a measurable demand for a CBP FIS at the San Marcos Regional Airport exists. Based on available data, no clear demand driver was identified. While it is assumed that international visitors to the San Marcos outlet malls may use a CBP FIS located at the San Marcos Regional Airport, no available data shows a link to a demand for the facility.

Consequently, the future location for a US CBP FIS facility will be considered as part of the alternatives analysis, but the facility should only be developed when a clear demand driver has been established.

UTILITIES

The primary utility need identified as part of this facility requirements analysis is the need for fiber to tenants along Airport Drive. Additionally, utility access will also be necessary to support development along TX-21. This will be a considerations in the alternatives chapter. Utility improvements along TX-21 are currently in the City of San Marcos Capital Improvement Program (CIP) for the near future.

TERMINAL AREA/LANDSIDE FACILITY REQUIREMENTS SUMMARY

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

- A significant amount of additional box hangar space is expected to be needed. This will include larger hangars with bigger doors that can accommodate larger aircraft.
- A smaller amount of additional T-hangar space will be needed.
- Portions of the existing main ramp should be closed to reduce pavement that must be maintained. Portions of the ramp that are not closed will need to be rehabilitated as necessary.
- Additional vehicle parking spaces need to be added in key areas to meet existing demand.

- Improve apron area lighting.
- Identify location for a future CBP FIS facility.
- Improved fiber access along Airport Drive.
- Improve utility access along TX-21.
- Add a secondary access route into airport.
- Straighten and improve aesthetics of Airport Drive.

FACILITY REQUIREMENTS – SUMMARY

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

RUNWAYS/APPROACHES/AIRSPACE

- Runway 17/35 needs to be developed as the primary runway.
- Runway 17/35 should be protected for an extension up to 7,000 feet.
- Runway strengthening will likely be necessary for Runway 13/31 and Runway 17/35.
- Runway 17/35 and Runway 13/31 should be considered for updates to C-III standards as they are the most suitable for improvement.
- Runway 17 should be evaluated for lower approach minimums (¾ mile)
- Evaluate need to repair or replace Runway 8/26 REILs.
- Consider the closure of Runway 8/26 as it provides no substantial wind coverage or capacity benefits and would be difficult to upgrade to C-III runway design standards.
- Add lighted windsocks to runway ends.
- Add PAPI system to Runway 35.
- Acquire property or establish avigation easements necessary to protect the RPZs for Runway 8, 31, and 35
- Add additional mandatory hold position signage on Runway 17/35 at the intersection of Runway 8/26 to fully conform to FAA safety standards.
- Update runway designations for Runway 17/35 and Runway 8/26 during the latter portion of the forecast period due to magnetic variation changes.

TAXIWAYS

- Improve taxiways to TDG-3 standards as they are rehabilitated and monitor for potential fleet mix shift to Bombardier Q400 aircraft (a TDG-5 aircraft). Improve to TDG-5 standards if this fleet mix shift occurs.
- Resolve the seven identified taxiway layout configuration issues.
- Improve airfield marking and signage related to the Taxiway Alpha/Charlie intersection.
- Establish aircraft run-up areas at the approach end of Runway 17, 31 and 35.
- Improve taxiway access to the approach end of Runway 17 to reduce taxi times.
- Improve taxiway weight bearing capacity.

TERMINAL/LANDSIDE

- A significant amount of additional box hangar space is expected to be needed. This will include larger hangars with bigger doors that can accommodate larger aircraft.
- A smaller amount of additional T-hangar space will be needed.
- Portions of the existing main ramp should be closed to reduce pavement that must be maintained. Portions of the ramp that are not closed will need to be rehabilitated as necessary.
- Additional vehicle parking spaces need to be added in key areas to meet existing demand.
- Improve apron area lighting.
- Identify location for a future CBP FIS facility.
- Improved fiber access along Airport Drive.
- Improve utility access along TX-21.
- Add a secondary access route into airport.
- Straighten and improve aesthetics of Airport Drive.

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Date: August 30, 2024 (Updated September 18, 2024)

To: City of San Marcos and Texas Aviation Partners

From: Nathan Polsgrove, Garver

RE: Memorandum Regarding Updated Facility Requirements for the 2021 Airport Master Plan

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As part of the update to the 2021 Airport Master Plan (AMP) for the San Marcos Regional Airport (HYI or Airport), new facility requirements were established related to the following infrastructure elements:

- Airport fuel farm
- Airfield electrical infrastructure

The updated facility requirements related to each of these items are discussed in the remainder of this memorandum. This memorandum will be attached to the 2021 Airport Master Plan Facility Requirements chapter for reference.

Airport Fuel Farm Facility Requirements

This section summarizes the existing fuel storage systems in place at the Airport as of August 2024 and the need to expand the facility in the future.

Existing Fuel Farm Facilities and Fuel Flowage Estimates

Berry Aviation is the current Fixed Based Operator (FBO) at the Airport. The existing fuel farm operated by Berry Aviation consists of the fuel storage tanks identified below:

- 22,000 gallons of total Jet A storage
  - 1 – 12,000 gallon above-ground tank
  - 1 – 10,000 gallon above-ground tank
- 22,000 gallons of total 100LL storage
  - 1 – 12,000 gallon above-ground tank
  - 1 – 10,000 gallon above-ground tank

In addition to the storage tanks, Berry has fuel trucks that contribute the following amounts to the Airport's fuel storage capacity:

- 8,000 gallons of Jet A storage capacity in fuel trucks
- 2,000 gallons of 100LL storage capacity in fuel trucks

Consequently, Berry Aviation currently has the total fuel storage capacities defined below:

- 30,000 gallons of Jet A (trucks and tanks)
- 24,000 gallons of 100LL (trucks and tanks)

Based on an interview conducted with Berry Aviation personnel on August 9, 2024, Berry has dispensed the following amounts of fuel on average per day since April 1, 2024:

- 1,519 gallons of Jet A per day
- 554 gallons of 100LL per day

However, as new facilities at the Airport are developed, Berry expects that this could grow to the following ultimate peak daily consumption rates:

- Up to 5,000 gallons of Jet A per day
- Up to 1,000 gallons of 100LL per day

The Airport is currently taking one to two loads of Jet A fuel per week and two to three loads of 100LL fuel per month. Each load is approximately 8,000 gallons.

It is estimated that the ultimate peak consumption rates established above won't be realized for 5 to 10 years and will only occur if significant hangar and based aircraft growth occurs at the airport. The ultimate daily peak estimates provided by Berry were based on a potential increase in cargo charter activity by Berry's aircraft fleet and their expectation of future hangar development at the airport.

It has also been noted by Texas Aviation Partners (TAP) and Berry that the existing fuel farm is past its useful life and needs to be replaced.

Fuel Farm Facility Requirements – Analysis Methodologies

To establish future facility requirements, Garver completed a review of the existing fuel farm capacity and expected future fuel flowage based on the guidance set forth in the International Air Transport Association (IATA) *Guidance on Airport Fuel Storage Capacity – Edition 1*. Additionally, Garver completed a benchmarking analysis to review existing fuel storage capacities at multiple airports within Texas with regular operations of large aircraft.

Fuel Farm Facility Requirements – IATA Analysis

The best practices contained in the IATA *Guidance on Airport Fuel Storage Capacity – Edition 1* can be used to generally assess fuel storage requirements at an airport based on factors creating delays or interruptions in the fuel supply chain. Based on information provided by Berry Aviation, the Airport is typically able to obtain a full load of Jet A fuel within 24 hours of providing notice to the fuel provider. 100LL fuel can take three to four days to obtain.

For this analysis, the following supply chain disruption assumptions were made to calculate fuel storage requirements for Jet A:

- 1 day for fuel to be delivered by the fuel provider
- 1 day disruption in fuel transport due to logistics challenges
- 4 days for severe weather events that impact the refinery's ability to manufacture aircraft fuel

According to the IATA guidance, these various parameters should be totaled and then multiplied by .85 to provide a high-level estimate of the amount of fuel that should be stored at the Airport to guard against supply chain disruptions. The result of this calculation indicates that the Airport should maintain approximately 5.1 days of fuel on hand. Based on this information, the existing Jet A fuel storage capacity at HYI should be sufficient to accommodate present consumption rates (assuming 1,519 gallons used per day). However, the existing fuel

farm capacity will be insufficient if Jet A fuel consumption grows to 5,000 gallons per day as identified by Berry Aviation in the ultimate condition (5 to 10 years).

Using a similar methodology, no shortfalls were identified related to the Airport's existing 100LL capacity.

Fuel Farm Facility Requirements – Benchmarking Analysis

A key focus of this AMP update is to evaluate how HYI may be impacted if larger aircraft begin using the Airport on a regular basis as discussed in the high and low growth scenarios documented in the *Large Aircraft Assumptions* memorandum dated August 19, 2024 that was provided to the City of San Marcos and TAP. In an effort to evaluate the future expansion needs of the fuel farm based on the low and high growth scenarios, a benchmarking assessment was completed comparing HYI's existing fuel farm to fuel farms at airports that support larger aircraft operations on a regular basis. The results of the benchmarking analysis are shown in **Table 1**.

Table 1 – Fuel Farm Benchmarking Analysis

Airport Name	FAA Hub Classification	2023 Enplanements*	Jet-A Gallons	100LL Gallons
San Marcos Regional Airport (HYI)	**N/A - GA**	0	22,000	22,000
Killeen-Ft. Hood (GRK)	**Non-Hub**	113,701	58,000	0
Corpus Christi International Airport (CRP)	**Non-Hub**	352,215	49,000	10,000
Rick Husband Amarillo International Airport (AMA)	**Non-Hub**	397,983	46,000	20,000
Lubbock Preston Smith International Airport (LBB)	**Small Hub**	543,363	107,000	10,000
Midland International Air and Space Port (MAF)	**Small Hub**	684,416	200,000	10,000
Fort Worth Alliance (AFW)	**N/A - Cargo**	0	95,000	20,000

Source: Garver, 2024.
* - An "enplanement" is generally defined as a passenger boarding a commercial service aircraft for flight.

The result of the analysis shows that the existing 100LL storage capacity at HYI exceeds the capacity at the other benchmark airports. However, the Jet A storage capacity at HYI is significantly less than the benchmark airports.

Fuel Farm Facility Requirements – Results

Based on the results of the facility requirements analysis, the following recommendations have been developed:

- Near-Term (5 to 10 years) Recommendations: Based on the results of the IATA analysis, it is recommended that HYI consider increasing their Jet A fuel storage capacity to approximately 25,000 gallons (compared to 22,000 gallons of existing Jet A fuel farm storage capacity) to account for the potential increase in fuel flowage to 5,000 gallons per day. No increase in storage capacity is recommended for 100LL. The Airport could consider decreasing 100LL fuel storage capacity to 12,000 to 15,000 gallons (compared to 22,000 gallons of existing 100LL fuel farm storage capacity). As previously mentioned, both TAP and Berry have identified that the existing fuel farm is past its useful life and needs to be replaced. The noted capacity changes would ideally be completed at the same time the existing fuel farm is replaced.
- Long-Term (10+ years) Recommendations: Based on the results of the benchmarking analysis, it is expected that HYI may need to expand their Jet A capacity to at least 50,000 gallons in the low growth scenario and potentially 100,000 gallons in the high growth scenario. A capacity increase is not expected to be needed for 100LL.

Airfield Electrical Facility Requirements

Another key aspect of the update to the 2021 AMP was to evaluate the sufficiency of the existing airfield lighting systems at HYI. This section summarizes the results of a site visit that was completed on August 22, 2024 by Matthew LeMay, P.E., an electrical engineer with Garver. This section summarizes existing conditions and recommendations for improvement.

In accordance with FAA Advisory Circular (AC) 150/5345-53D: *Airport Lighting Equipment Certification Program,* all FAA certified airport lighting equipment carries a specific alphanumeric designation. These designations range from L-801 to L-895. Each designation pertains to a particular type of light or electrical system that must be certified by the FAA. For example, L-801 is the designation provided to medium intensity airport beacons. These designations are used throughout this section to reference specific types of airfield lighting equipment that are certified by the FAA.

Airfield Lighting Vault (ALV) – Existing Conditions

The airfield lighting vault is located on the north side of Airport Drive near the backup beacon tower. It consists of a concrete-walled structure containing electrical distribution equipment, constant current regulators (CCRs) for the airfield lighting system, a control cabinet for the airfield lighting system, and air conditioning for the ALV.

The airfield lighting system contains five series circuits, each with its own CCR. The five circuits are:

- Runway 13-31 edge lights (CCR #1)
  - 10kW, 3-Step, 240V (Manairco, Manufactured c. 2013)
- Taxiway J-K edge lights (CCR #2)
  - 10kW, 3-Step, 240V (Manairco, Manufactured c. 2009)
- Runway 17-35 edge lights (CCR #3)
  - 7.5kW, 3-Step, 240V (Manairco, Manufactured c. 2003)
- Taxiway A-F edge lights (CCR#4)
  - 15kW, 3-Step, 240V (ADB-Safegate, CRF-Style, Manufactured c. 2023)
- Runway 8-26 edge lights (CCR#5)
  - 10kW, 3-Step, 240V (ADB-Safegate, CCT-Style, Manufactured c. 2014)

Each CCR has an adjacent S-1 cutout to provide for lockout control of each airfield lighting circuit. All but one of the airfield circuits has a small portion of exposed cable entering and leaving the S-1 cutout. The S-1 cutout for the Taxiway A-F circuit is contained within an enclosure and all airfield lighting cable is in conduit.

Also present in the ALV are two spare regulators, each 7.5kW in size, that were stored, but not connected as hot spares for immediate use.

A node of the Airfield Lighting Control and Monitoring System (ALCMS) is located within the ALV. The existing ALCMS is a Rural Electric, PLC-type control system that was manufactured in February 2016. There is a similar cabinet connected via fiber optic cable to this ALCMS node within the air traffic control tower (ATCT). A control system touchscreen is also present in the ATCT cab that displays which circuits are active and at what intensity overlayed with a graphic of the airfield. At the time of the site visit, the touchscreen display in the ALV was not functional and had not been functional for several years, according to Aaron Arguien, Operations Superintendent for TAP.

Also present in the ALV is an L-854 radio control system. This system has an antenna mounted to the exterior roofline of the ALV that provides pilot-control of the airfield lighting system when the ATCT is closed.

In addition, an FAA-rated photocell is located adjacent to the L-854 antenna to provide an additional control input to the ALCMS.

The ALV is fed by a dedicated overhead power service from the local electrical co-op, Pedernales Electric Coop. The service is a 400A, 240V, 1-phase electrical service. The service is protected by a breaker-style disconnect on the exterior of the ALV. Inside the ALV, “Panel A” provides overcurrent protection to most of the connected equipment. Panel A has a dedicated breaker for an externally mounted surge protection device (SPD). Panel A also provides power to a step-up transformer for Runway 13 and Runway 31 PAPI circuits. These circuits step the incoming service voltage of 240V up to 480V to distribute to the circuits in the field via 20A breakers in a 60A panelboard.

Air conditioning within the ALV is provided by a Senville Leto ECO Series split system. The interior unit of the system is located on the western wall of the ALV, and the exterior unit is mounted to the external western wall of the ALV. A means of control, such as an external thermostat was not readily apparent. The electrical distribution equipment and CCRs are very robust and do not require much temperature control, but the L-890 control system’s electronics can degrade more quickly over time if exposed to high temperatures for long periods of time.

Airfield Lighting Systems – Existing Conditions

The airfield lighting systems present at HYI consist of runway and taxiway edge lighting, precision approach path indicators (PAPIs), a primary wind cone with segmented circle, supplemental wind cones, and airport beacons.

All three runways, Runway 13-31, 17-35, and 8-26, have incandescent Medium Intensity Runway Edge Lights (MIRLs). The runway edge lights for Runways 13-31 and 17-35 are mounted to L-867, 12-inch diameter light bases with conduit interconnecting the light bases. Runway 8-26 edge lights are stake-mounted with direct-buried airfield lighting cable interconnecting the edge lights. It is not anticipated that High Intensity Runway Edge Lights (HIRLs) will be needed for any runway at HYI. HIRLs are only required when Runway Visual Range (RVR) equipment is located on a runway. RVR equipment is typically only required when the approach minimums for the runway are less than ½ mile. No runway at HYI is anticipated to have visibility minimums below ½ mile.

The taxiways at HYI consist of a mixture of incandescent, halogen, and LED light sources. The LED taxiway edge lights are located on Taxiways A and C due to the recent construction projects. The remainder of the taxiway lights are either halogen or incandescent. There are taxiway edge lights on Taxiway J that are mounted to “Brooks” boxes instead of L-867 light bases.

Signage on the airfield is a mix of flat-faced, curved-faced, and trapezoidal-style signs. The trapezoidal-style signs were discontinued approximately 15 years ago. The mandatory hold signs are components of the runway edge circuits while the taxiway direction and location signs are components of the taxiway lighting circuits. Existing signs have a Size 2 legend height.

L-881 (2 box) PAPIs are located on the ends of Runways 13, 31, and 17. All PAPI systems are voltage-powered and have associated accessory racks that contain the power and control unit (PCU) of the PAPI along with step-down transformers and disconnect switches.

An L-807 primary wind cone is present in the central area of the airfield between Runway 8-26 and Taxiway C. The wind cone is illuminated via an internal, LED light source and is located within a segmented circle. Several runway ends have supplemental wind cones, but none of these wind cones are currently lighted.

HYI has a primary beacon located on the roof of the ATCT and a backup located on a walk-up tower near the ALV. Both beacons have incandescent light sources. The photocell located at the ALV is used to turn the primary beacon off and on. The backup beacon must be turned off and on manually.

Navigational Aids (NAVAIDs) and Weather Systems – Existing Conditions

HYI has multiple NAVAIDs and weather systems including a glide slope, localizer, Automated Weather Observing System (AWOS), Medium Intensity Runway Approach Lighting System (MALS), and Remote Communications Outlet (RCO).

The Runway 13 glide slope antenna is located near the Runway 13 end and consists of the antenna tower with two antennae and the equipment shelter located behind the antenna tower. The shelter for the system is showing signs of ageing and wear. The door was locked, and the interior was not observed. The system is owned and maintained by the FAA.

The Runway 13 localizer antenna is located off the Runway 31 end along with the associated shelter. The localizer is an 8-element system that is owned and operated by the FAA.

The AWOS is located behind the glide slope shelter and has its own dedicated shelter. The AWOS system is an AWOS-3PT type system and is owned and operated by the FAA. The electrical distribution system equipment serving the AWOS is showing signs of rust and paint chipping on the exterior of the gear, but the interior of the equipment is in good condition.

The MALS is an approach lighting system located at the Runway 13 end. It consists of a threshold bar and several sets of steady-burning lights mounted in groups of five that extend to roughly 1600 feet past the Runway 13 threshold. This system is owned and operated by the FAA. The shelter for the MALS is located just west of the MALS system and just south of State Highway 21. The supports for the MALS appear to be very old and are not the low-resistant (LIR) fiberglass structures that are the current standard for support structures. Also, much of the electrical distribution equipment and control system cabinetry is heavily rusted.

The RCO antenna is located south of Taxiway J and west of the Runway 17 end. The relocation of the RCO should be considered to eliminate the need to escort the local internet provider to the system when an internet outage occurs. An equipment shelter is also located adjacent to the antenna tower. The RCO and associated equipment is owned and operated by the FAA. This site was the previous location of a now-decommissioned VORTAC system. Power utility primary conductors appear to enter the site from the north near Highway 21 to provide power to the RCO site and distribution circuits then route southwest across open farmland to power the Runway 13 glide slope and AWOS site.

Airfield Electrical – Recommendations

Based on the results of the site visit, the following recommendations are provided:

- PAPI Systems: LED PAPIs should be used to replace the existing PAPI existing systems. The new PAPIs, including an additional system on Runway 35 should be L-880 (4-box) systems which are designed for jet traffic versus the currently installed 2-box systems.
- Runway Edge Lights: LED runway edge lights should be installed for Runway 13-31 and 17-35. Runway 8-26 is shown to be decommissioned on the most recent Airport Layout Plan (ALP), so it is not recommended to invest in upgrading the runway edge lights. However, if it is determined that Runway 8-26 should remain open, LED edge lights should be installed. This would also include the replacement of remaining incandescent mandatory hold signs.
- Airfield Lighting Vault: A new airfield lighting vault should be installed. If the location of the airfield lighting vault poses an issue with future development, then the construction of a new precast ALV is recommended along with the necessary airfield circuit rerouting that would be necessary. This would also include a new air conditioning system, CCRs, and a new ALCMS based on the needs of the Airport at the time of the project. If the ALV is relocated in the future it should be placed somewhere along the

existing main apron to minimize relocation costs. The relocation of the ALV will be further discussed as part of the alternatives process.

- Taxiway Edge Lights: Install LED taxiway edge lights and new “can-and-conduit” infrastructure where needed. Whenever taxiway reconstruction or rehabilitation projects take place, Garver recommends replacing the existing taxiway edge lights with LED edge lights and replacing the existing infrastructure where lights mounted to “Brooks” boxes are encountered. This would also include the replacement of any remaining incandescent taxiway guidance signs.
- Airport Beacon: Replace the existing incandescent beacons with LED beacons.

In addition to these recommendations, the airport could consider the establishment of a backup generator for the airfield lighting circuits. The addition of a backup generator is not a requirement but would provide improved electrical resiliency. If provide, Garver estimates that the generator would need to be sized to support 150 kW to 200 kW of electrical load.

CHAPTER 5

Alternatives

CHAPTER 5: ALTERNATIVES

INTRODUCTION

This chapter describes the various runway/approach, taxiway, land-use, and ramp re-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;
- Reviews the results of the evaluation process; and,
- Provides an overview of the anticipated environmental impacts of the consolidated preferred development alternatives.

ALTERNATIVES DEVELOPMENT AND EVALUATION 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. These preliminary development alternatives were then consolidated into:

- 3 – Runway/Approach Alternatives
- 3 – Taxiway Alternatives
- 4 – Land-Use Alternatives
- 3 – Ramp Re-Development Alternatives

These alternatives were then formally evaluated using the processes described in the remainder of this chapter.

Runways are the cornerstone of an airport's infrastructure system. Typically, the location and development of all other infrastructure at an airport (e.g. taxiways, ramps, hangars, etc.) is based on the layout of the runways. As a result, the alternatives were reviewed and evaluated in the order described below with a

preferred alternative in each higher order area being identified prior to the evaluation of the alternatives in a lower order area:

- 1st Order – Runway/Approach Alternatives
- 2nd Order – Taxiway Alternatives
- 3rd Order – Land-Use Alternatives
- 4th Order – Ramp Re-Development Alternatives

The evaluation of the alternatives within each alternative area (e.g. runway/approach, taxiway, land-use, etc.) is a complex task that requires unique considerations related to the area being evaluated. For example, the criteria utilized to evaluate runway/approach alternatives is different than the criteria utilized to evaluate taxiway, land-use, or ramp re-development alternatives. The formal evaluation criteria utilized to evaluate the alternatives within each area are discussed in the remainder of this chapter.

RUNWAY/APPROACH ALTERNATIVES

The following development objectives were established related to the runway/approach alternatives at the San Marcos Regional Airport:

- Runway 17/35 needs to be developed as the primary runway.
- Runway 17/35 must be protected for an extension up to 7,000 feet.
- Runway strengthening will be necessary for Runway 13/31 and Runway 17/35.
- Runway 17/35 and Runway 13/31 should be considered for upgrades to C-III standards as they are the most suitable for improvement.
- Runway 17 should be evaluated for lower approach minimums (¾ mile).
- Evaluate the need to repair or replace the Runway 8/26 REILs.
- Consider the closure of Runway 8/26 as it provides no substantial wind coverage or capacity benefits and would be difficult to upgrade to C-III runway design standards.
- Add lighted windsocks to runway ends.
- Add PAPI system to Runway 35.

- Acquire property or establish avigation easements necessary to protect the RPZs for Runway 31.
- Add additional mandatory hold position signage on Runway 17/35 at the intersection of Runway 8/26 to fully conform to FAA safety standards.
- Update runway designations for Runway 17/35 and Runway 8/26 during the latter portion of the forecast period due to magnetic variation changes.

These development objectives were utilized as the basis for developing each of the three runway/approach alternatives for the San Marcos Regional Airport. It should be noted that the development objectives not related to the layout of the runways and approaches (e.g. adding lighted windsocks, adding PAPIs, additional runways signage, and updating the runway designations) are not depicted in the alternative drawings for clarity. However, these items will be incorporated, as appropriate, into the Airport Layout Plan (ALP) developed based on the preferred alternative.

The three runway/approach alternatives are described in the subsections below.

RUNWAY/APPROACH ALTERNATIVE #1

A key development objective identified during the facility requirements process was the need to develop Runway 17/35 into a more suitable primary runway for the San Marcos Regional Airport. As a result, the first runway/approach alternative focused on extending Runway 17/35 to the maximum length possible without requiring the relocation of any significant infrastructure (e.g. TX 21, railroad tracks, etc.). Specifically, this alternative included:

- Runway 17 was extended 500 feet to the north where the northwest corner of the Runway Protection Zone (RPZ) stops just short of TX 21; and,
- Runway 35 was extended 600 feet to the south where the southwest corner of the RPZ stops just short of a small dirt road associated with the Gary Job Corps facility.

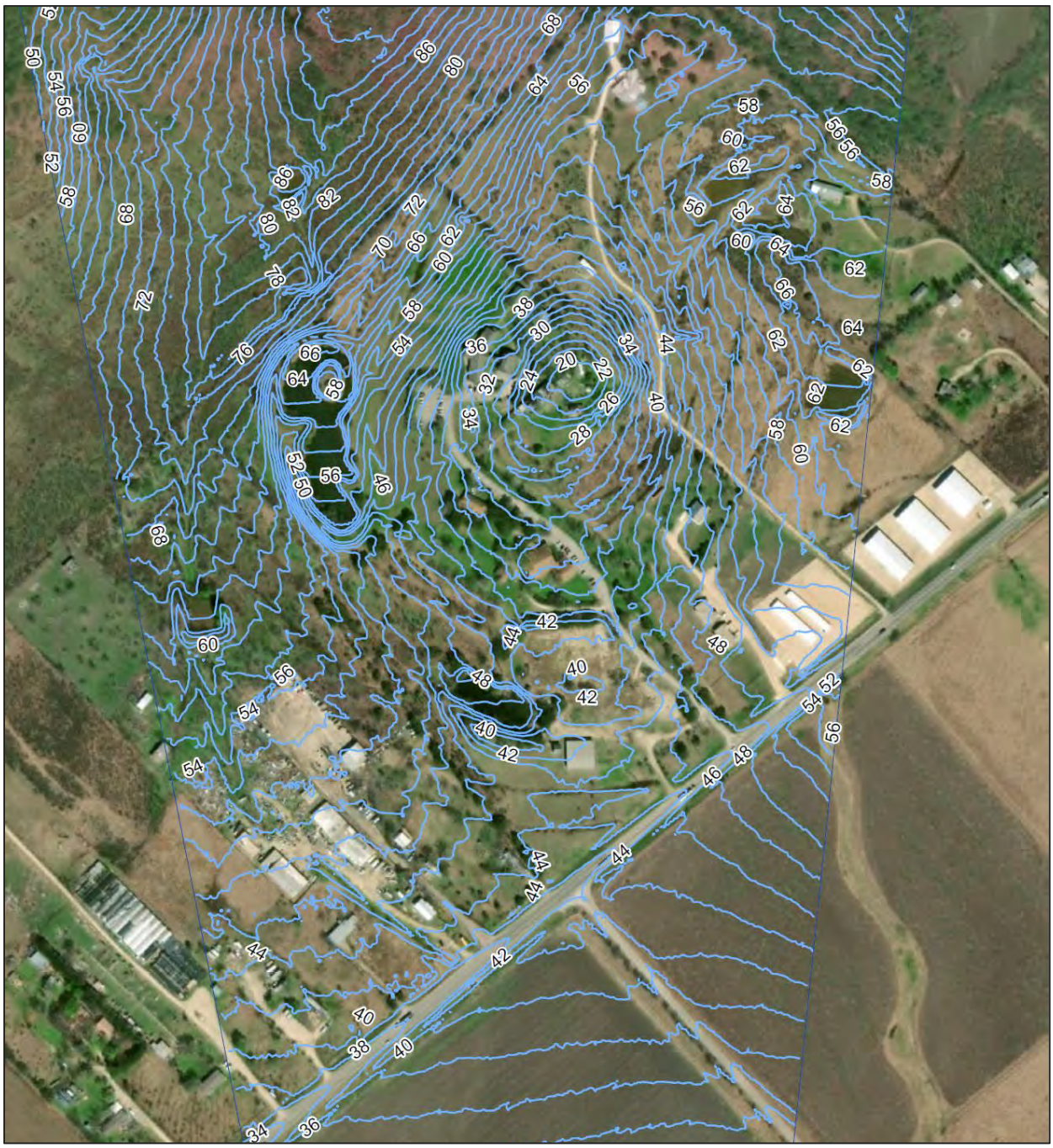
The runway was not extended further south toward the existing railroad track to allow space for a future paved roadway that would ultimately connect the Airport with the SMART Terminal facility. In total, this alternative extends Runway 17/35 to 6,314 feet in length. This was determined to be the maximum length that could be achieved for Runway 17/35 without requiring the relocation of significant

infrastructure. It should be noted that the northeast corner of the RPZ associated with Runway 17 does protrude slightly over William Pettus Rd.

This alternative also includes the establishment of a RNAV/GPS approach with ¾ mile visibility minimums for Runway 17. To evaluate the feasibility of lowering the approach minimums to ¾ mile with the northerly runway extension, an airspace analysis was completed to determine whether the rising terrain north of the TX 21 would impact the feasibility of the approach. The analysis determined that the terrain itself would not prevent the establishment of the lower approach minimums but that many of the trees and utility poles in the area would likely need to be removed or modified. The results of the analysis are shown in **Figure 5-1**. The blue lines represent LIDAR data ground elevation contours. The numbers shown indicate the vertical distance between the ground and the non-precision FAR Part 77 approach surface associated with the runway. At its closest point, the ground elevation is expected to be approximately 20 feet from the bottom of the FAR Part 77 non-precision approach surface. The visibility minimums for Runway 35 are expected to remain at ¾ mile.

It should be noted that the FAA completed a separate airspace analysis to determine the feasibility of lowering the approach minimums for Runway 17 to ¾ mile at the runway's current length. The analysis identified that there was a single utility pole that would need to be lowered by 1 foot to improve the existing approach minimums to ¾ mile. The airport has held discussions with the landowner regarding making this change.

FIGURE 5-1
RUNWAY 17 AIRSPACE ANALYSIS
SAN MARCOS REGIONAL AIRPORT



Source: Garver, 2019

This alternative also includes the ultimate widening of Runway 17/35 to meeting C-III runway design standards and the establishment of new taxiways to each runway end. Runway 8/26 is shown as ultimately being decommissioned in this alternative since it is the airport's tertiary runway.

In summary, this alternative includes the following improvements:

- Lengthens Runway 17/35 to 6,314 feet in length and establishes new taxiways to reach each end of the new runway.
- Upgrades Runway 17/35 to C-III-4000 runway design standards.
- Adds a RNAV/GPS approach with ¾ mile visibility minimums for Runway 17.
- Maintains a RNAV/GPS approach with ¾ mile visibility minimums for Runway 35 and 31.
- Widens Runway 17/35 to 150 feet in width.
- Provides for the ultimate strengthening of Runway 17/35 to 175,000 double wheel (DW).
- Adds PAPIs at the approach end of Runway 35.
- Maintains ILS approach and RNAV/GPS approach with ½ mile visibility minimums and MALSR system for Runway 13.
- Adds lighted windsocks to all runway ends.
- Provides for the ultimate decommissioning of Runway 8/26 and the REILs system associated with the runway.
- Adds additional mandatory hold position signage on Runway 17/35 at the intersection of Runway 8/26 to fully conform to FAA safety standards.
- Ultimately updates runway designations for Runway 17/35 during the latter portion of the forecast period due to magnetic variation changes.

Runway/Approach Alternative #1 is shown in **Figure 5-2**.

RUNWAY/APPROACH ALTERNATIVE #2

Runway/Approach Alternative #2 shows the extension of Runway 17/35 to its maximum feasible length and the ultimate decommissioning of Runway 8/26 as described in Runway/Approach Alternative #1. This alternative focuses on the feasibility of shortening Runway 13/31 to physically decouple it from the pavement

associated with Runway 17/35. Physically decoupling the runways will resolve the existing significant safety issue of Runway 31 and 35 sharing a single taxiway associated with each runway end. In this alternative, Runway 31 is shortened by 450 feet to place the eastern edge of the runway outside of the Runway Safety Area (RSA) for Runway 17/35. The ultimate length of Runway 13/31 under this alternative would be 5,151 feet. This reconfiguration enables Runway 31 to be utilized for departures independently of arrivals and departures on Runway 17/35. Additionally, shortening Runway 31 by 450 feet brings the RPZ associated with the runway end entirely onto airport property, eliminating that need to purchase additional land.

In summary, this alternative includes the following improvements:

- Lengthens Runway 17/35 to 6,314 feet in length and establishes new taxiways to reach each end of the new runway.
- Shortens Runway 13/31 to 5,151 feet in length and establishes a new taxiway to the approach end of Runway 31.
- Upgrades Runway 17/35 to C-III-4000 runway design standards.
- Upgrades Runway 13/31 to C-III-2400 runway design standards.
- Adds a RNAV/GPS approach with ¾ mile visibility minimums for Runway 17.
- Maintains a RNAV/GPS approach with ¾ mile visibility minimums for Runway 35 and 31.
- Maintains ILS approach and RNAV/GPS approach with ½ mile visibility minimums and MALSR system for Runway 13.
- Widens Runway 17/35 and Runway 13/31 to 150 feet in width.
- Provides for the ultimate strengthening of Runway 17/35 and Runway 13/31 to 175,000 DW.
- Adds PAPIs at the approach end of Runway 35.
- Adds lighted windsocks to all runway ends.
- Provides for the ultimate decommissioning of Runway 8/26 and the REILs system associated with the runway.
- Adds additional mandatory hold position signage on Runway 17/35 at the intersection of Runway 8/26 to fully conform to FAA safety standards.
- Ultimately updates runway designations for Runway 17/35 during the latter portion of the forecast period due to magnetic variation changes.

Runway/Approach Alternative #2 is shown in **Figure 5-3**.

RUNWAY/APPROACH ALTERNATIVE #3

Runway/Approach Alternative #3 shows the extension of Runway 17/35 to its maximum feasible length and the ultimate decommissioning of Runway 8/26 as described in Runway/Approach Alternative #1. This alternative focuses on the feasibility of extending Runway 13/31 to eliminate the single taxiway leading to the ends of Runway 31 and Runway 35. In this alternative, Runway 31 is extended 800 feet to the southeast past the eastern edge of the Runway Object Free Area (ROFA) associated with Runway 17/35. This extension brings the ultimate length for Runway 13/31 to 6,401 feet. This alternative pushes the RPZ associated with Runway 31 further off airport property and into the residential development southeast of the airfield.

In summary, this alternative includes the following improvements:

- Lengthens Runway 17/35 to 6,314 feet in length and establishes new taxiways to reach each end of the new runway.
- Lengthens Runway 13/31 to 6,401 feet in length and establishes a new taxiway to the approach end of Runway 31.
- Upgrades Runway 17/35 to C-III-4000 runway design standards.
- Upgrades Runway 13/31 to C-III-2400 runway design standards.
- Adds a RNAV/GPS approach with ¾ mile visibility minimums for Runway 17.
- Maintains a RNAV/GPS approach with ¾ mile visibility minimums for Runway 35 and 31.
- Maintains ILS approach and RNAV/GPS approach with ½ mile visibility minimums and MALSR system for Runway 13.
- Widens Runway 17/35 and Runway 13/31 to 150 feet in width.
- Provides for the ultimate strengthening of Runway 17/35 and Runway 13/31 to 175,000 DW.
- Adds PAPIs at the approach end of Runway 35.
- Adds lighted windsocks to all runway ends.
- Provides for the ultimate decommissioning of Runway 8/26 and the REILs system associated with the runway.

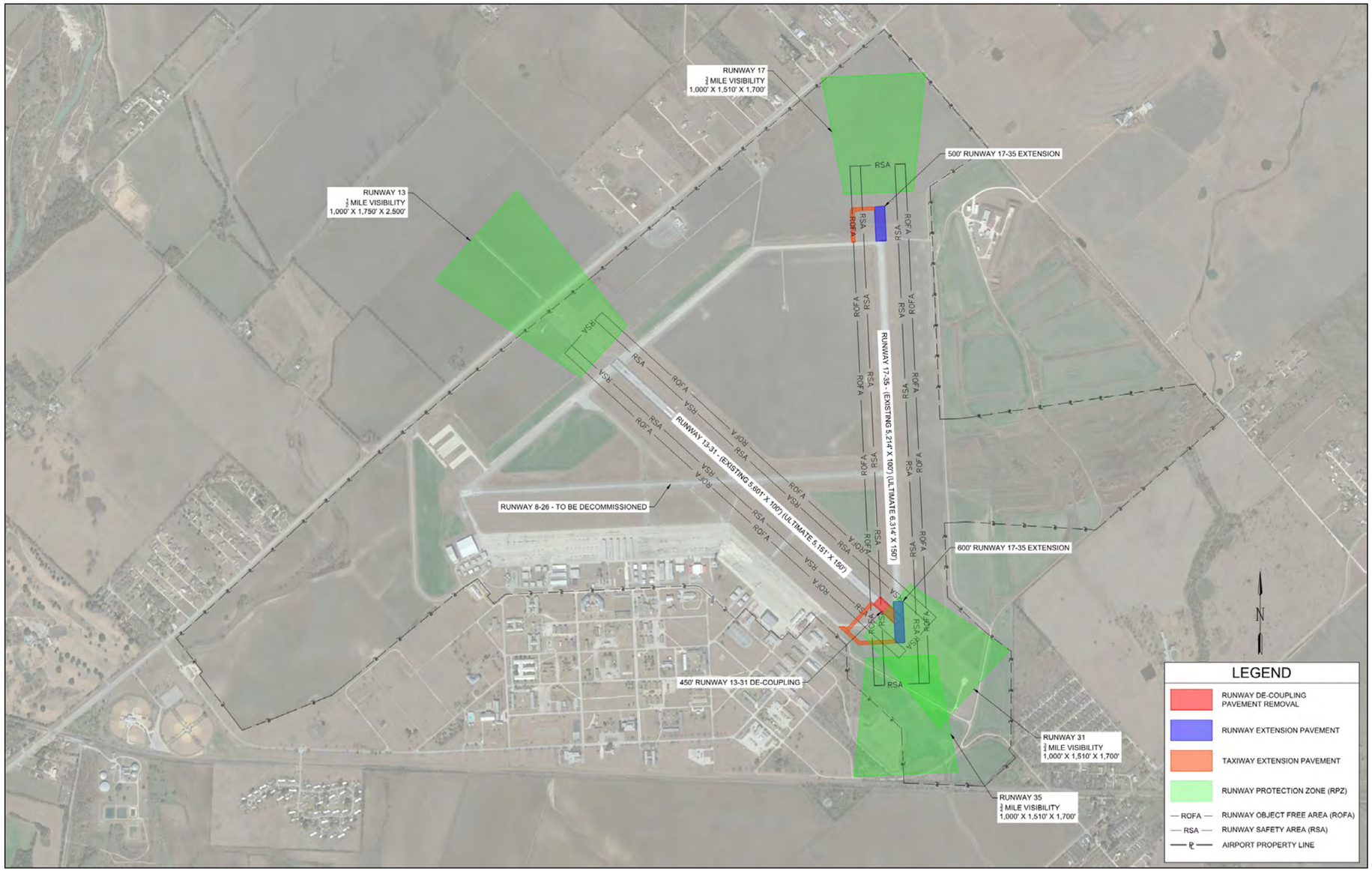
- ✈ Adds additional mandatory hold position signage on Runway 17/35 at the intersection of Runway 8/26 to fully conform to FAA safety standards.
- ✈ Ultimately updates runway designations for Runway 17/35 during the latter portion of the forecast period due to magnetic variation changes.

Runway/Approach Alternative #3 is shown in **Figure 5-4**.

FIGURE 5-2
RUNWAY/APPROACH ALTERNATIVE #1
SAN MARCOS REGIONAL AIRPORT

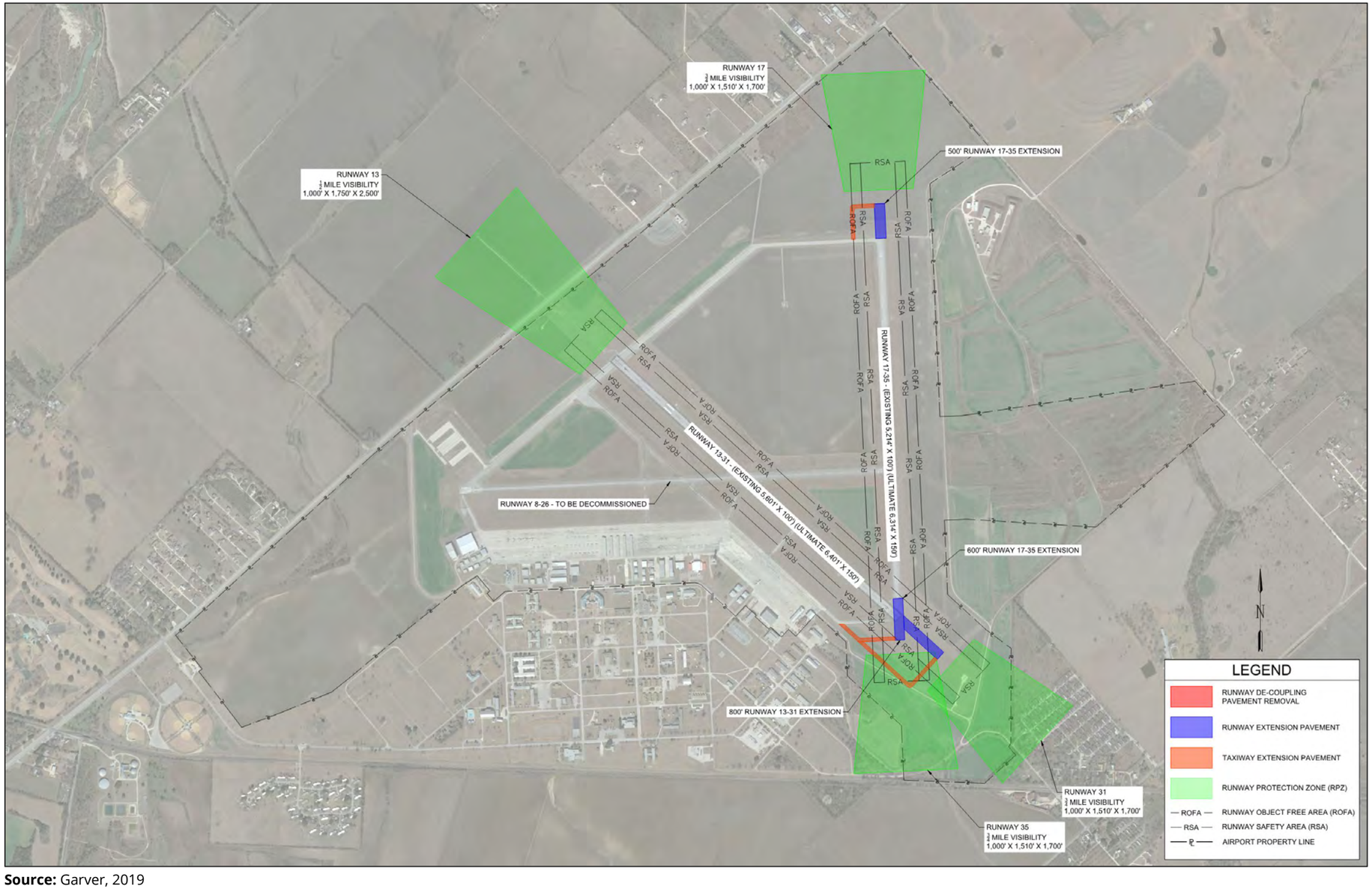
Source: Garver, 2019

FIGURE 5-3
RUNWAY/APPROACH ALTERNATIVE #2
SAN MARCOS REGIONAL AIRPORT



Source: Garver, 2019

FIGURE 5-4
RUNWAY/APPROACH ALTERNATIVE #3
SAN MARCOS REGIONAL AIRPORT



Source: Garver, 2019

RUNWAY/APPROACH ALTERNATIVES EVALUATION

Once the runway/approach alternatives were established, they were analyzed through an evaluation process to determine which alternative provided the best future development concept. To facilitate this analysis, evaluation criteria were established, and an evaluation matrix was developed showing how each runway/approach 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 alternatives should enable the airport to meet all established facility requirements.
- Resolves Safety/Non-Compliant Conditions – Does the alternative resolve existing safety issues and configuration deficiencies? Ideally, the preferred alternative should resolve any existing safety issues or configuration deficiencies in a realistic and fiscally responsible manner.
- Environmental Impacts – What impacts will the proposed runway/approach alternative have on 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 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 runway/approach 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 utilities be impacted by the development of 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.
- Geographic Constraints – Are there property or topographical challenges that are constraints for this alternative? Property lines, topographical features, and bodies of water are key considerations.
- Development Cost/Ease of Implementation – What is the significance of the development costs 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.

These criteria were utilized to evaluate the alternatives as discussed in the section below.

RUNWAY/APPROACH ALTERNATIVES EVALUATION RESULTS

Utilizing the evaluation criteria defined above, each runway/approach alternative was reviewed and assigned high (red), moderate (yellow), and low (green) ratings for each criterion. In general, the alternative with the most low (green) ratings and the least moderate (yellow) and high (red) ratings is the alternative that is deemed to be the preferred alternative based on the evaluation criteria.

Table 5-1 contains a matrix depicting the results of the evaluation process. A discussion regarding the rationale behind the ratings provided for each alternative is discussed in the following sub-sections.

TABLE 5-1
RUNWAY/APPROACH ALTERNATIVE EVALUATION
SAN MARCOS REGIONAL AIRPORT

Evaluation Criteria	Runway/Approach Alternative # 1	2	3
Ability to Satisfy Facility Requirements			
Resolves Safety/Non-Compliant Conditions			
Environmental Impacts			
Residential and/or Business Impacts			
Road Relocation, Power Line, and Utility Impacts			
Geographical Constraints			
Development Cost/Ease of Implementation			

- Low Impact **or** Meets Requirements

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

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

Source: Garver, 2019

Evaluation Commentary for Runway/Approach Alternative #1

Runway/Approach Alternative #1 received "green" ratings for its ability to satisfy facility requirements, low environmental impact, and low impact on existing residences and businesses. These ratings were given because the alternative does not require the purchase of any additional property and it develops Runway 17/35 into a suitable primary runway for the Airport.

"Yellow" ratings were given to this alternative related to its impact on utility infrastructure, geographic constraints, and development cost. These ratings were given due to the alternatives impact related to the trees and utility poles located at the approach end of Runway 17 that will likely need to be trimmed and/or relocated which increases development costs.

A "red" rating was given to this alternative related to resolving safety/non-compliant conditions. This rating was given because the end of Runway 31 would still intersect with Runway 17/35 which increases the potential for a wrong-runway departure when taxing to Runway 31 for departure.

Evaluation Commentary for Runway/Approach Alternative #2

This alternative received "green" ratings related to its ability to satisfy facility requirements, resolve safety/non-compliant conditions, low environmental impacts, and low residential/business impacts. These ratings were given because the alternative minimizes impacts related to surrounding properties, develops Runway 17/35 into a suitable primary runway, and decouples Runway 13/31 and Runway 17/35. Similar to Runway/Approach Alternative #1, this alternative received "yellow" ratings related to utility impacts, geographic constraints, and development cost. No "red" ratings were received.

Evaluation Commentary for Runway/Approach Alternative #3

Runway/Approach Alternative #3 received "green" ratings related to its ability to satisfy facility requirements and for its low environmental impact. These ratings were given because it supports the development of Runway 17/35 into a suitable primary runway and there are no expected environmental concerns related to the extension of Runway 31 by 800 feet to the southeast.

Runway/Approach Alternative #3 received "yellow" ratings related to resolving safety/non-compliant conditions and geographic constraints. These ratings were provided because while the alternative separates the ends of Runway 31 and Runway 35, the runways are not decoupled in this alternative.

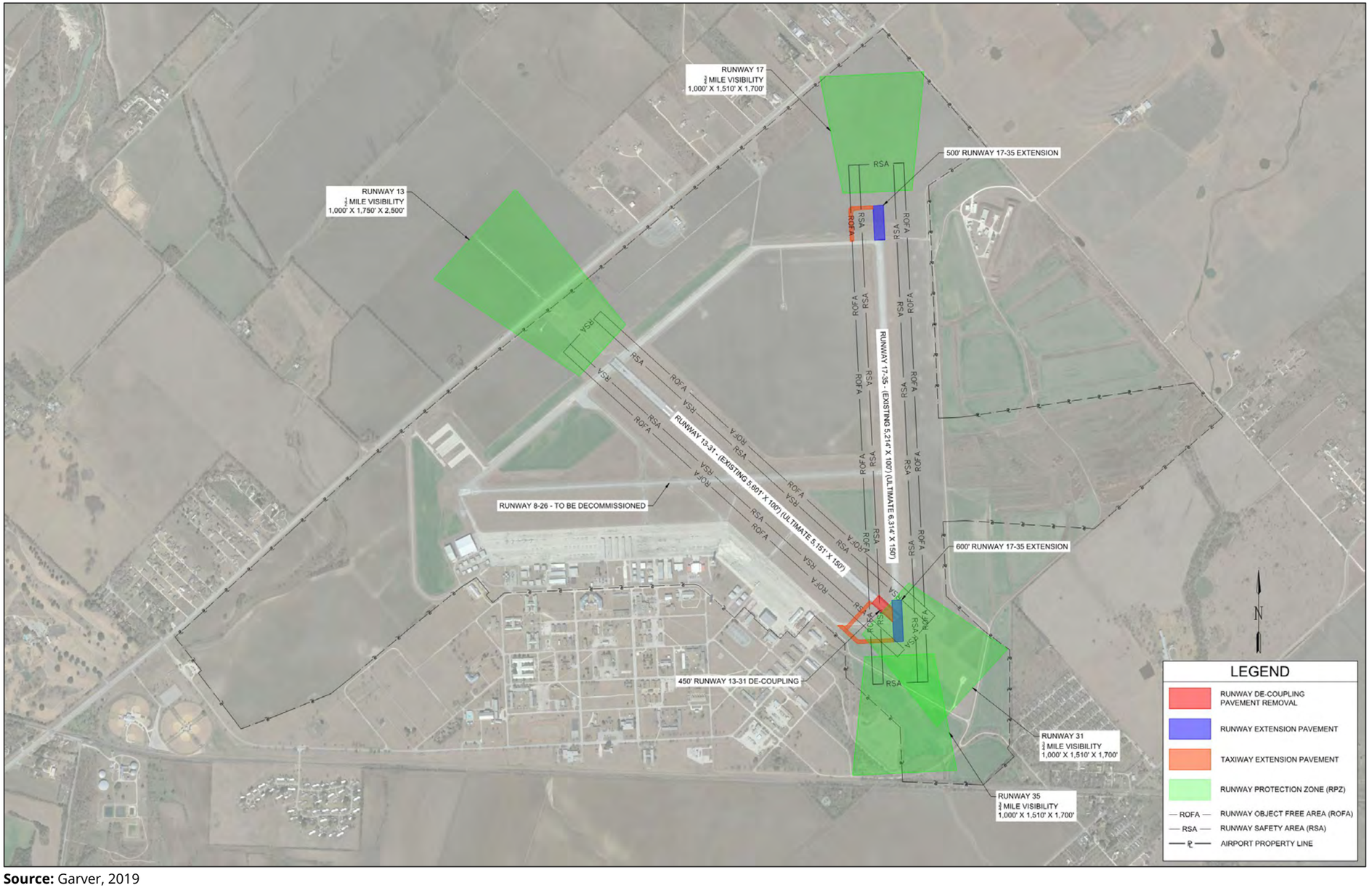
This alternative received "red" ratings related to residential/business impacts, roadway/utility impacts, and development costs. These ratings were given due to the alternative's impact on the residential community southeast of the airfield.

PREFERRED RUNWAY/APPROACH ALTERNATIVE

Alternative #2 obtained the best overall rating in the runway/approach alternative's evaluation analysis. Based on the evaluation analysis and discussions with the City of San Marcos, Texas Aviation Partners, TxDOT Aviation, and members of the Master Plan Advisory Committee (MPAC), Runway/Approach Alternative #2 was

selected as the preferred alternative for the San Marcos Regional Airport. The preferred runway/approach alternative is shown in **Figure 5-5**.

FIGURE 5-5
PREFERRED RUNWAY/APPROACH ALTERNATIVE
SAN MARCOS REGIONAL AIRPORT



Source: Garver, 2019

TAXIWAY ALTERNATIVES

Various layouts for the taxiway system were considered once the preferred runway/approach alternative was selected. The primary purpose of the taxiway system at an airport is:

- Provide for the safe and efficient movement of aircraft to/from the runways to various aircraft parking locations on the airfield (e.g. ramps, hangars, etc.).
- Minimize Runway Occupancy Time (ROT) to improve runway capacity.

The taxiway system at the San Marcos Regional Airport was analyzed extensively to identify potential changes needed during the forecast period. The taxiway development objectives established as a result of the facility requirements analysis include:

- Improve taxiways to TDG-3 standards as they are rehabilitated and monitor for potential fleet mix shift to Bombardier Q400 aircraft (a TDG-5 aircraft). Improve to TDG-5 standards if this fleet mix shift occurs.
- Resolve the seven identified taxiway layout configuration issues.
- Improve airfield marking and signage related to the Taxiway Alpha/Charlie intersection.
- Establish aircraft run-up areas at the approach end of Runway 17, 31 and 35.
- Improve taxiway access to the approach end of Runway 17 to reduce taxi times.
- Improve taxiway weight bearing capacity.

These development objectives were utilized as the basis for developing each of the three taxiway alternatives for the San Marcos Regional Airport. It should be noted that the development objectives not related to the layout of the taxiways (e.g. marking and lighting at the Taxiway Alpha/Charlie, aircraft run-up areas, and taxiway weight bearing capacity) are not depicted in the alternative drawings to reduce clutter. However, these items will be incorporated, as appropriate, into the Airport Layout Plan (ALP) developed based on the preferred taxiway alternative.

The three taxiway alternatives are described in the subsections below.

Taxiway Alternative #1

Taxiway Alternative #1 focused on establishing a partial parallel taxiway for Runway 17/35 since it is being developed as the primary runway for the San Marcos Regional Airport and the existing taxiway infrastructure associated with the runway is minimal. Due to the decommissioning of Runway 8/26, it was identified that Taxiway Alpha and Juliet at the approach end of Runway 8 could be closed to open additional area for aeronautical development between Taxiway Juliet and Taxiway Alpha. The closure of Runway 8/26 also resolves a number of non-compliant taxiway configuration conditions identified in the Facility Requirements Chapter.

A significant objective in the development of all taxiway alternatives was to reduce taxi times to/from the approach end of Runway 17. As a result, a taxi distance analysis was completed to determine how Taxiway Alternative #1 would impact taxi distances for aircraft located at various points along the main ramp. It should be noted that the taxi distance analysis for alternatives #1 and #2 are identical. The results of the analysis are shown in **Table 5-2**.

TABLE 5-2
TAXI DISTANCE ANALYSIS – TAXIWAY ALTERNATIVES #1 AND #2
SAN MARCOS REGIONAL AIRPORT

	Berry FBO (Western Portion of Main Ramp) in Linear ft.			ATCT Area (Central Portion of Main Ramp) in Linear ft.			CAF Area (Southeast Portion of Main Ramp) in Linear ft.			Total Taxi Distance from All Areas in Linear ft.		
Taxi Distance to Runway 17 Approach	**Current**	**Future**	**Diff**	**Current**	**Future**	**Diff**	**Current**	**Future**	**Diff**	**Current**	**Future**	**Diff**
Alternative 1 and 2	8,800	10,400	**-1,600**	8,500	7,728	**772**	10,200	6,896	**3,304**	27,500	25,024	**2,476**
Shortest Route	Routing - A, B, C, J, New D, New M			Routing - A, C, E, New D, New M			Routing - C, E, New D, New M					

Source: Garver, 2019

In general, the results of the analysis show that the alternative will reduce the taxi distances for aircraft located on the central and southeastern portions of the main ramp. Taxi distances for aircraft located on the western portion of the main ramp will increase.

In summary, this alternative includes the following improvements:

- ✈ Establishment of a partial parallel taxiway for Runway 17/35 to reduce ROT and reduce taxi distances to the approach end of Runway 17.

- The northeastern extension of Taxiway Echo to connect with the new partial parallel taxiway for Runway 17/35.
- A new crossing point for Runway 13/31 to reach the partial parallel taxiway system for Runway 17/35 (identified as Taxiway Foxtrot).
- A new taxiway exit for aircraft landing on Runway 31 (identified as Taxiway November).
- Closure of Taxiway Alpha and Juliet at the approach end of Runway 8.
- Resolves all non-compliant taxiway configuration issues with the exception of the direct ramp to runway access related to Taxiways Echo and Foxtrot which will be resolved with surface painted no-taxi islands as part of the ramp redevelopment alternatives.
- Provides for the ultimate strengthening of the taxiway system to 175,000 pounds DW.
- Upgrade of taxiway system to meet TDG 3 standards and ultimately TDG 5 standards.
- Includes the installation of surface painted taxiway location and directional signs related to the Taxiway Alpha and Charlie intersections where pilots have missed the turn-off from Taxiway Alpha when taxing northbound on Taxiway Charlie.
- Includes the development of engine run-up areas at the approach end of Runway 17, 31 and 35.

Taxiway Alternative #1 is shown in **Figure 5-6**. Green arrows have been added to the diagram to show the flow of outbound aircraft traffic to Runway 17. Red arrows depict the proposed route of in-bound traffic landing on Runway 17.

Taxiway Alternative #2

Taxiway Alternative #2 is identical to Taxiway Alternative #1 except Taxiway Alternative #2 includes an eastern full-length parallel taxiway for Runway 17/35 to serve aeronautical developments located east of the runway. As discussed before, the taxi distance analysis for Taxiway Alternative #2 is identical to Taxiway Alternative #1 and the results of the analysis are shown in **Table 5-2**.

In summary, this alternative includes the following improvements:

- The establishment of a full-length east side parallel taxiway for Runway 17/35.
- Establishment of a partial parallel taxiway for Runway 17/35 to reduce ROT and reduce taxi distances to the approach end of Runway 17.
- The northeastern extension of Taxiway Echo to connect with the new partial parallel taxiway for Runway 17/35.
- A new crossing point for Runway 13/31 to reach the partial parallel taxiway system for Runway 17/35 (identified as Taxiway Foxtrot).
- A new taxiway exit for aircraft landing on Runway 31 (identified as Taxiway November).
- Closure of Taxiway Alpha and Juliet at the approach end of Runway 8.
- Resolves all non-compliant taxiway configuration issues with the exception of the direct ramp to runway access related to Taxiways Echo and Foxtrot which will be resolved with surface painted no-taxi islands as part of the ramp redevelopment alternatives.
- Provides for the ultimate strengthening of the taxiway system to 175,000 pounds DW.
- Upgrade of taxiway system to meet TDG 3 standards and ultimately TDG 5 standards.
- Includes the installation of surface painted taxiway location and directional signs related to the Taxiway Alpha and Charlie intersections where pilots have missed the turn-off from Taxiway Alpha when taxing northbound on Taxiway Charlie.
- Includes the development of engine run-up areas at the approach end of Runway 17, 31 and 35.

Taxiway Alternative #2 is shown in **Figure 5-7**.

Taxiway Alternative #3

Taxiway Alternative #3 is identical to Taxiway Alternative #2 with the exception of two changes:

- Taxiway Mike is converted to a high-speed exit from Runway 17 to reduce ROT.
- Taxiway Juliet is realigned between the approach end of Runway 13 and Taxiway Delta to open up additional space north of the taxiway for development.

The re-alignment of Taxiway Juliet impacts taxi distances to the approach end of Runway 17. The results of the taxi distance analysis for this alternative is shown in **Table 5-3**.

TABLE 5-3
TAXI DISTANCE ANALYSIS – TAXIWAY ALTERNATIVE #3
SAN MARCOS REGIONAL AIRPORT

	Berry FBO (Western Portion of Main Ramp) in Linear ft.			ATCT Area (Central Portion of Main Ramp) in Linear ft.			CAF Area (Southeast Portion of Main Ramp) in Linear ft.			Total Taxi Distance from All Areas in Linear ft.		
Taxi Distance to Runway 17 Approach	**Current**	**Future**	**Diff**	**Current**	**Future**	**Diff**	**Current**	**Future**	**Diff**	**Current**	**Future**	**Diff**
Alternative 3	8,800	10,440	**-1,640**	8,500	7,728	**772**	10,200	6,896	**3,304**	27,500	25,064	**2,436**
Shortest Route	Routing - A, C, E, New D, New M			Routing - A, C, E, New D, New M			Routing - C, E, New D, New M					

Source: Garver, 2019

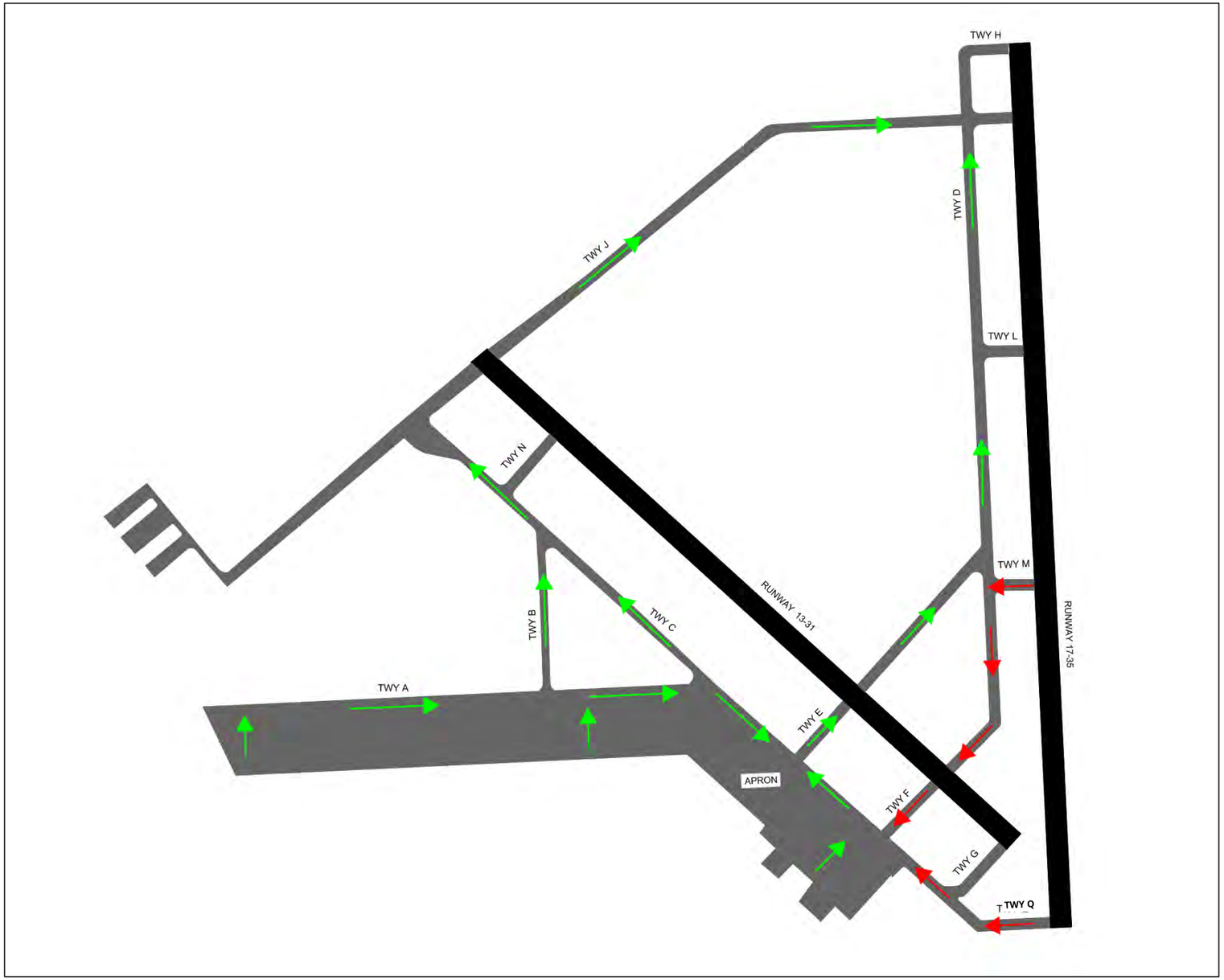
In summary, this alternative includes the following improvements:

- The establishment of a full-length east side parallel taxiway for Runway 17/35.
- Establishment of a partial parallel taxiway for Runway 17/35 reduce ROT on Runway 17/35 and reduce taxi distances to the approach end of Runway 17. This includes the establishment of Taxiway Mike as a high-speed exit from Runway 17.
- The northeastern extension of Taxiway Echo to connect with the new partial parallel taxiway for Runway 17/35.
- A new crossing point for Runway 13/31 to reach the partial parallel taxiway system for Runway 17/35 (identified as Taxiway Foxtrot).
- A new taxiway exit for aircraft landing on Runway 31 (identified as Taxiway November).

- Upgrade of taxiway system to meet TDG 3 standards and ultimately TDG 5 standards.
- Closure of Taxiway Alpha and Juliet at the approach end of Runway 8.
- Realignment of Taxiway Juliet between the approach end of Runway 13 and Taxiway Delta to open up additional development space north of the taxiway.
- Resolves all non-compliant taxiway configuration issues with the exception of the direct ramp to runway access related to Taxiways Echo and Foxtrot which will be resolved with surface painted no-taxi islands as part of the ramp redevelopment alternatives.
- Provides for the ultimate strengthening of the taxiway system to 175,000 pounds DW.
- Includes the installation of surface painted taxiway location and directional signs related to the Taxiway Alpha and Charlie intersections where pilots have missed the turn-off from Taxiway Alpha when taxing northbound on Taxiway Charlie.
- Includes the development of engine run-up areas at the approach end of Runway 17, 31 and 35.

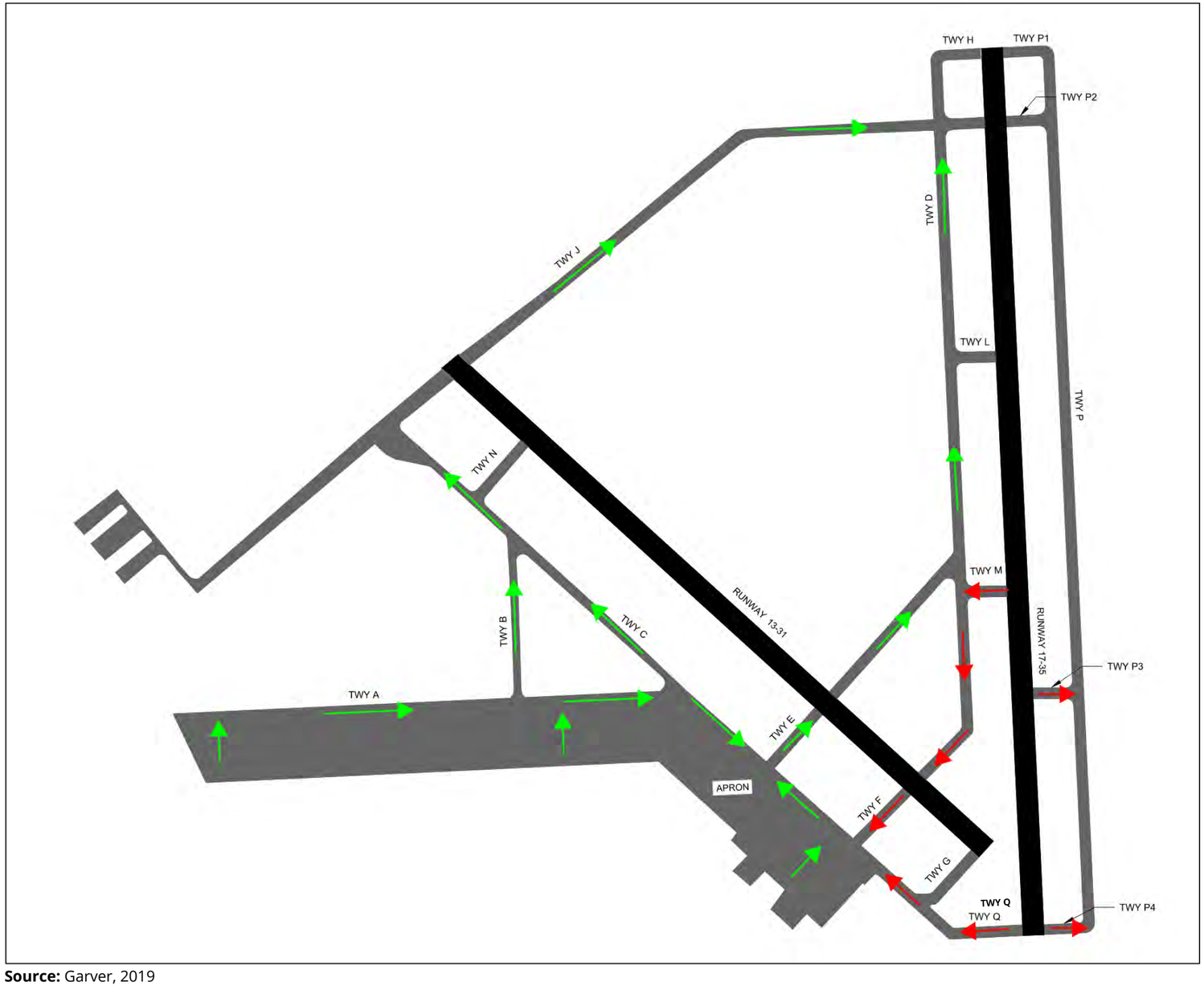
Taxiway Alternative #3 is shown in **Figure 5-8**.

FIGURE 5-6
TAXIWAY ALTERNATIVE #1
SAN MARCOS REGIONAL AIRPORT



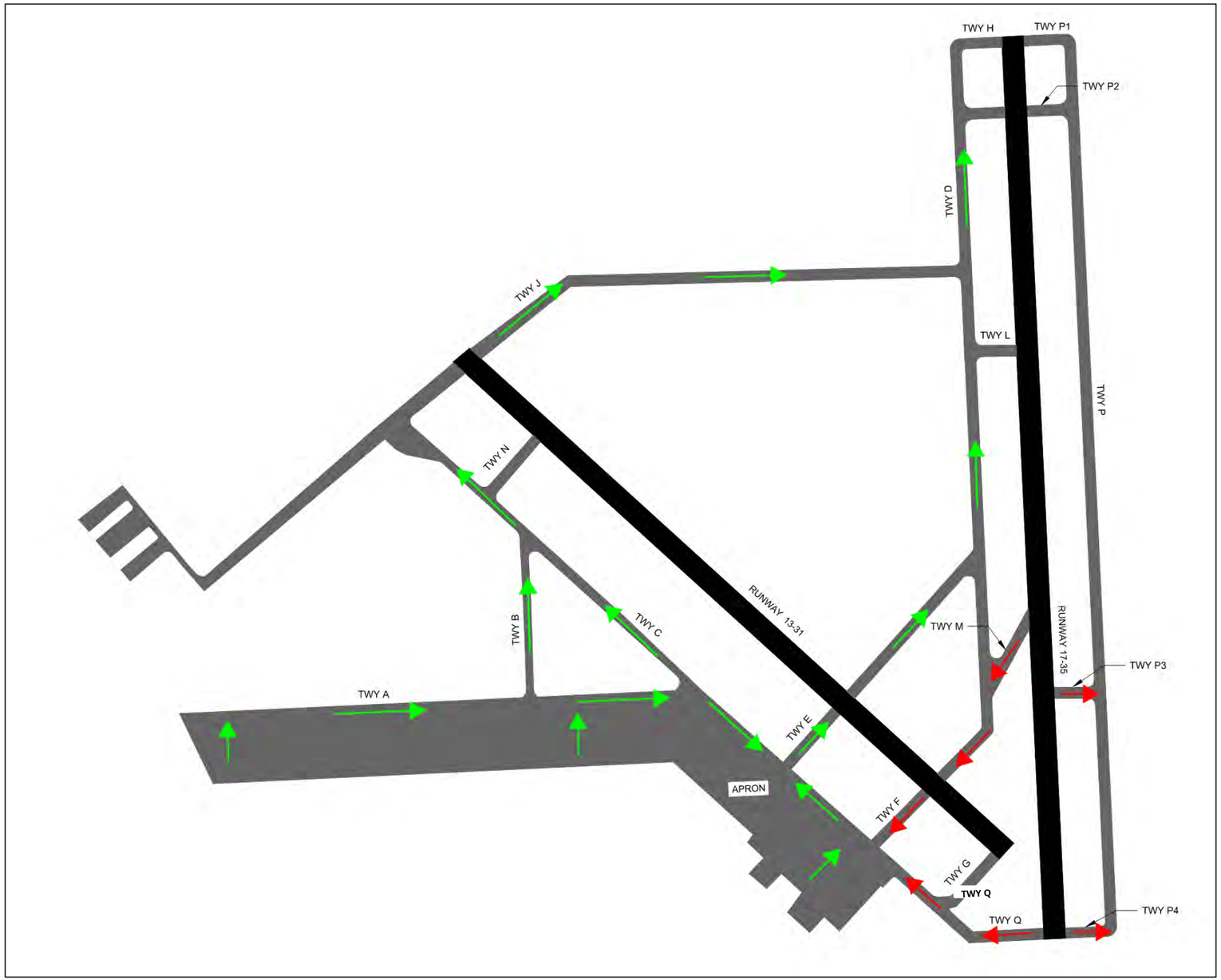
Source: Garver, 2019

FIGURE 5-7
TAXIWAY ALTERNATIVE #2
SAN MARCOS REGIONAL AIRPORT



Source: Garver, 2019

FIGURE 5-8
TAXIWAY ALTERNATIVE #3
SAN MARCOS REGIONAL AIRPORT



Source: Garver, 2019

TAXIWAY ALTERNATIVES EVALUATION AND PREFERRED ALTERNATIVE

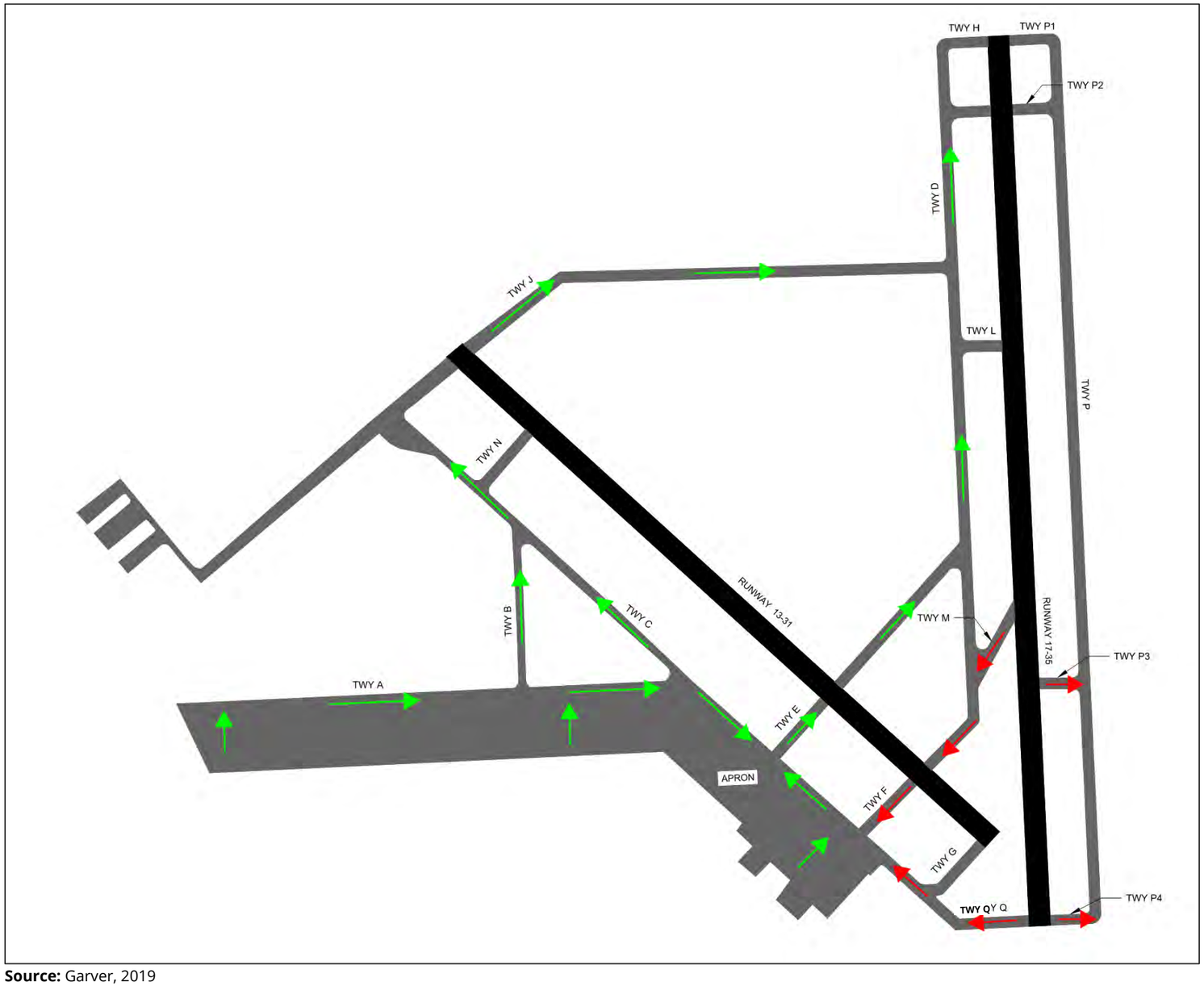
Since all three taxiway alternatives are very similar, a rating matrix was not established to determine which should be selected as the preferred taxiway alternative. Instead, the evaluation criteria below were identified and utilized to determine the preferred development alternative through discussions with airport stakeholders:

- Taxi Flow – Does the taxiway alternative provide for a safe and efficient flow of aircraft throughout the airfield? Ideally, the preferred taxiway alternative should minimize potential conflicts between arriving and departing traffic and provide direct routing to the runway ends most commonly used.
- Supports Additional Land Development – Does the alternative support the development of land holdings throughout the airport? Ideally, the preferred taxiway alternative should support the development of undeveloped and developed land surrounding the airfield.

Since all three alternatives provided a similar taxi flow and distances, the determining factor for selecting the preferred taxiway alternative was the ability of the alternative to support additional land development. **As a result, Taxiway Alternative #3 was selected as the preferred alternative. This alternative realigns Taxiway Juliet to provide additional development space for the Airport. The preferred taxiway development alternative is shown as Figure 5-9**.

It should be noted that the potential for developing a direct taxi route between the western portion of the main ramp and the approach end of Runway 17 was reviewed as part of the development and evaluation of the taxiway alternatives. Ultimately, it was determined that the establishment of a direct taxi route between the two areas was not recommended as it would likely impact the potential for redeveloping portions of Runway 8/26, would require the relocation of the glide slope and AWOS, and would have limited use compared to the cost for development.

FIGURE 5-9
PREFERRED TAXIWAY ALTERNATIVE
SAN MARCOS REGIONAL AIRPORT



Source: Garver, 2019

LAND-USE ALTERNATIVES

The focus of the land-use alternatives process was to identify the highest and best use of the land surrounding the Airport including the type of development best suited for each parcel. For this effort, land-use at the San Marcos Regional Airport was segmented into the following categories:

- Commercial Aeronautical – Commercial aeronautical development includes aeronautical businesses that provide a wide array of services to the aviation industry. This land-use category includes Maintenance Repair and Overhaul (MRO) businesses, avionics shops, flight schools, commercial charter operations, aircraft salvage, etc.
- FBO Development – FBO development includes the establishment of a Fixed Based Operator (FBO), associated hangar development, and service facilities (e.g., maintenance, aircraft washing, fueling, U.S. Customs and Border Protection Federal Inspection Station facility, etc.). This could include the relocation of the existing FBO to this area.
- Cargo Development – Cargo development includes the establishment of air cargo facilities and the facilities needed to transition air cargo to/from other means of transportation (e.g., trucking, rail, etc.).
- GA/Corporate Development – General Aviation (GA)/corporate development includes the development of private box hangars and T-hangars for aircraft storage.
- Non-Aeronautical Development – Non-aeronautical development includes the establishment of non-aeronautical facilities (e.g., gas stations, shops, storage, restaurants, industrial, etc.).

Each land-use category defined above typically has unique needs/preferences that influence whether a particular parcel of land would be well suited for that type of development. For example, commercial aeronautical businesses typically prefer better roadway access to support commercial deliveries and customer access to their facility. Conversely, many corporate hangar operators typically prefer to be located in lower profile areas that are more removed from the public eye. As a result, the following land-use needs/preferences were considered related to each land-use type in developing the four alternatives:

- Commercial Aeronautical – Commercial aeronautical businesses typically prefer to have excellent roadway access to support commercial deliveries and customer access to their facilities. Additionally, depending on the type of commercial aeronautical business, these operators typically prefer to have centralized airfield access to minimize taxi times.
- FBO Development – FBOs are similar to commercial aeronautical businesses in that they prefer to have good roadway access and a centralized location on the airfield. If the Airport only has one FBO, another key consideration is the ability for the FBO to deliver fuel to various locations throughout the Airport.
- Cargo Development – Cargo operators typically require excellent roadway access but prefer to be located separately from other operators as cargo operations typically involve larger aircraft and occur at night.
- GA/Corporate Development – GA/corporate developments typically prefer a more private location on the airfield. Additionally, roadway access to support commercial deliveries or customer access is not as important.
- Non-Aeronautical Development – The needs/preferences for non-aeronautical businesses varies significantly based on the type of business. However, in accordance with FAA policies, non-aeronautical developments should only be considered for areas not reasonably expected to be used for aeronautical developments. As a result, non-aeronautical development locations were only considered in areas where aeronautical development is not reasonably expected to be seen.

In addition to the land-use needs/preferences described above, the following development objectives from the Facility Requirements Chapter were also utilized as a basis for developing the four land-use alternatives:

- A significant amount of additional box hangar space is expected to be needed. This will include larger hangars with bigger doors that can accommodate larger aircraft.
- A lesser amount of additional T-hangar space will be needed.
- Additional vehicle parking spaces need to be added in key areas to meet existing demand.

- Identify location for a future CBP FIS facility.
- Improve fiber access along Airport Drive.
- Improve utility access along TX 21.
- Add a secondary access route into airport.
- Straighten and improve aesthetics of Airport Drive.

It should be noted that the development objectives related to utilities, fiber access along Airport Drive, and additional parking spaces are not specifically shown in the land-use alternatives to simplify the drawings. However, it is assumed that each of these development objectives are incorporated into each land-use alternative. Additionally, it is assumed that the potential U.S. Customs and Border Protection (CBP) Federal Inspection Station (FIS) will be located in the FBO Development area in each alternative. Proposed box hangar and T-hangar layouts are not shown within each development area to ensure flexibility related to future development.

Each of the four land-use alternatives are discussed in the subsections below.

Land-Use Alternative #1

The land-use patterns shown in Alternative #1 are described below:

- Commercial Aeronautical Development – Since commercial aeronautical developments typically require excellent roadway access for commercial deliveries and customer access, the existing parcels of airport property located along TX 21 were identified for commercial aeronautical developments.
- FBO Development – The centralized development area located between Taxiways Alpha, Bravo, Charlie, and Juliet was identified as the future FBO development area. This location would provide excellent public access to the facility and centralized access to the airfield. It would also provide good access for fuel delivery to other development areas at the airport.
- Cargo Development – Cargo development is shown east of Runway 17/35 adjacent to William Pettus Rd. Locating the cargo facility in this area will provide roadway access to the SMART Terminal facility as well as TX 21 via Williams Pettus Rd.

- GA/Corporate Development – GA/corporate development is shown adjacent to the proposed FBO area to improve access to fuel and other aircraft services provided by the FBO. An additional GA/corporate development area is shown at the southern end of the airfield close to the approach end of Runway 35 and Runway 31.
- Non-Aeronautical Development – Non-aeronautical development areas are shown west of Airport Drive, north of TX 21, and immediately adjacent to William Pettus Road. A small triangle of non-aeronautical property is also shown at Airport Drive's intersection with TX 21. Due to the location and layout of this property, it is better suited for non-aeronautical use.

In addition to these land-use patterns, this alternative also extends Airport Drive and provides a secondary access route to the existing ramp area.

Land-Use Alternative #1 is shown as **Figure 5-10**.

Land-Use Alternative #2

The land-use patterns shown in Alternative #2 are described below:

- Commercial Aeronautical Development – Commercial aeronautical development is moved to a consolidated site on the east side of the Airport adjacent to Williams Pettus Road.
- FBO Development – The FBO development is moved to the property located immediately northeast of the Taxiway Kilo development area. This will provide improved public access to this facility from TX 21.
- Cargo Development – Cargo development is moved to the larger parcel of property located along TX 21. This will provide improved roadway access for cargo development but does not provide a direct connection to the SMART Terminal facility to the south.
- GA/Corporate Development – GA/corporate development is shown as occupying the entire mid-field development area created by the decommissioning of Runway 8/26. An additional GA/corporate development area is shown at the southern end of the airfield close to the approach end of Runway 35 and Runway 31.

- Non-Aeronautical Development – The non-aeronautical developments are largely unchanged from the areas identified in Alternative #1. However, a small piece of property located adjacent to the access road between FM 110 and Airport Drive has been converted to non-aeronautical use. This parcel of property is expected to have limited aeronautical development potential due to its location far away from the runways.

In addition to these land-use patterns, this alternative also straightens Airport Drive and provides a secondary access route to the existing ramp area.

Land-Use Alternative #2 is shown as **Figure 5-11**.

Land-Use Alternative #3

The land-use patterns shown in Alternative #3 are described below:

- Commercial Aeronautical Development – Commercial aeronautical development is moved to the large development area located adjacent to TX 21.
- FBO Development – The FBO development is shown in the same location as it was shown in Alternative #1.
- Cargo Development – Cargo development is shown in the same location as it was shown in Alternative #1.
- GA/Corporate Development – GA/corporate development is shown in the same location as it was shown in Alternative #1. However, the parcel of land located northeast of the existing Taxiway Kilo development area is shown for GA/corporate use.
- Non-Aeronautical Development – Non-aeronautical development is shown in the same location as it was shown in Alternative #2.

In addition to these land-use patterns, this alternative also straightens Airport Drive and provides a secondary access route to the existing ramp area.

Land-Use Alternative #3 is shown as **Figure 5-12**.

Land-Use Alternative #4

The land-use patterns shown in Alternative #4 are described below:

- Commercial Aeronautical Development – Commercial aeronautical development is shown in the large development area located adjacent to TX 21.
- FBO Development – The FBO development is shown in the same location as it was shown in Alternative #1 and #3.
- Cargo Development – Cargo development is shown in the same location as it was shown in Alternative #1 and #3.
- GA/Corporate Development – GA/corporate development is shown in the same location as it was shown in Alternative #1.
- Non-Aeronautical Development – Non-aeronautical development is shown in the same location as it was shown in Alternative #2 and #3. However, additional non-aeronautical development spaces are shown located adjacent to TX 21.
- Mix-Used Development – The land northeast of the Taxiway Kilo development area is shown as a mixed development for both GA/corporate development and commercial aeronautical businesses.

In addition to these land-use patterns, this alternative also straightens Airport Drive and provides a secondary access route to the existing ramp area.

Land-Use Alternative #4 is shown as **Figure 5-13**.

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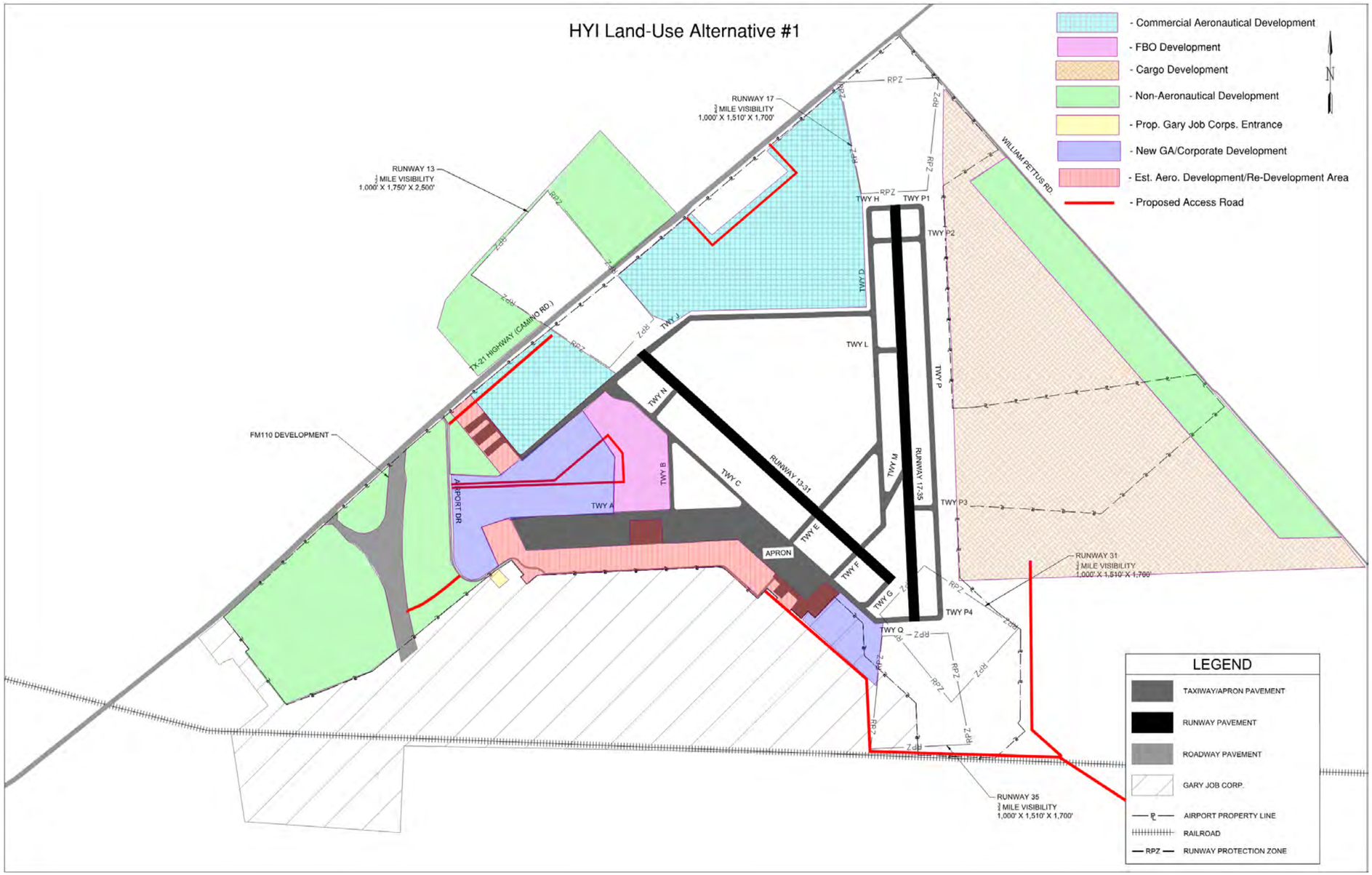
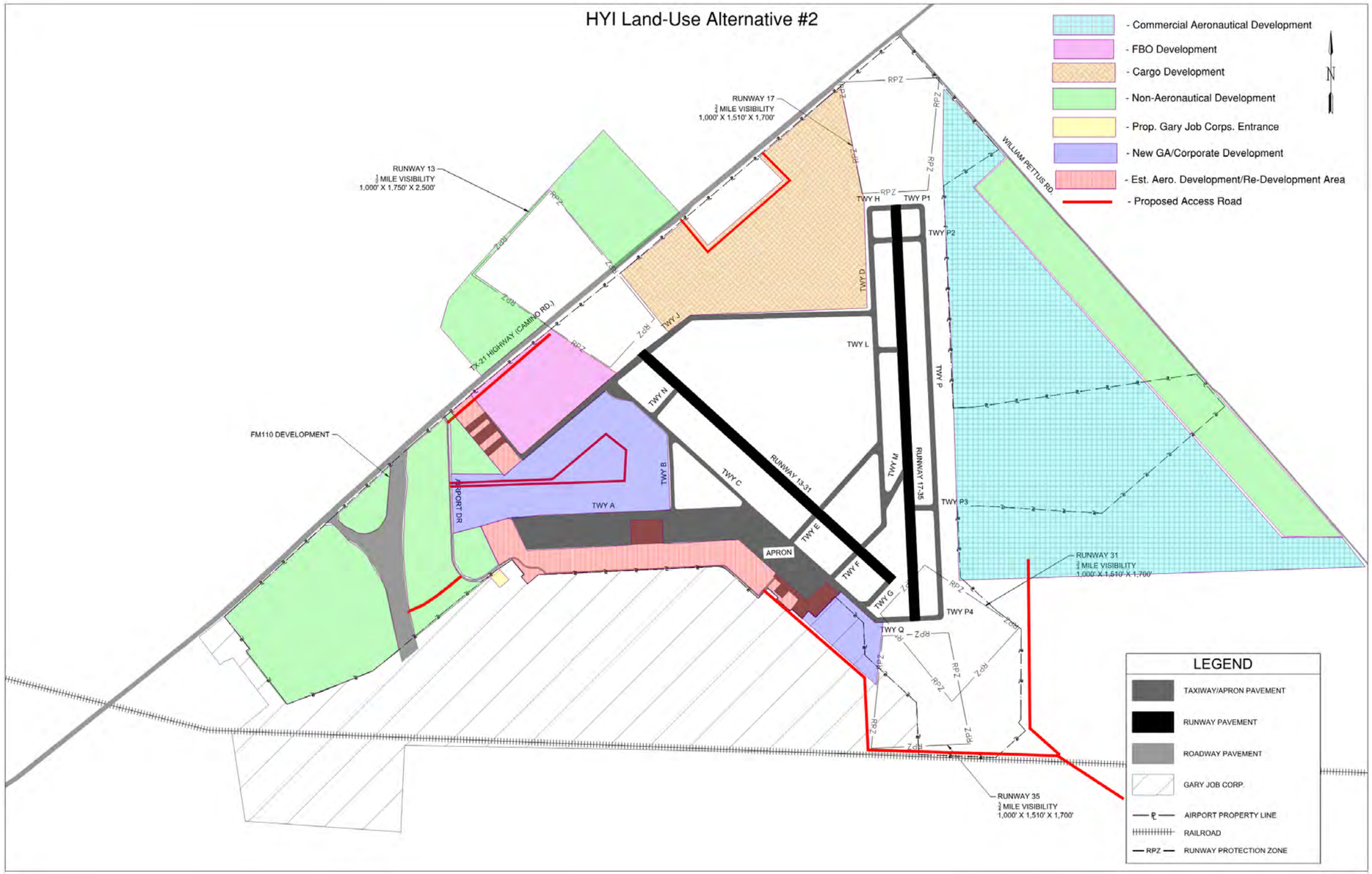
FIGURE 5-10
LAND-USE ALTERNATIVE #1
SAN MARCOS REGIONAL AIRPORT



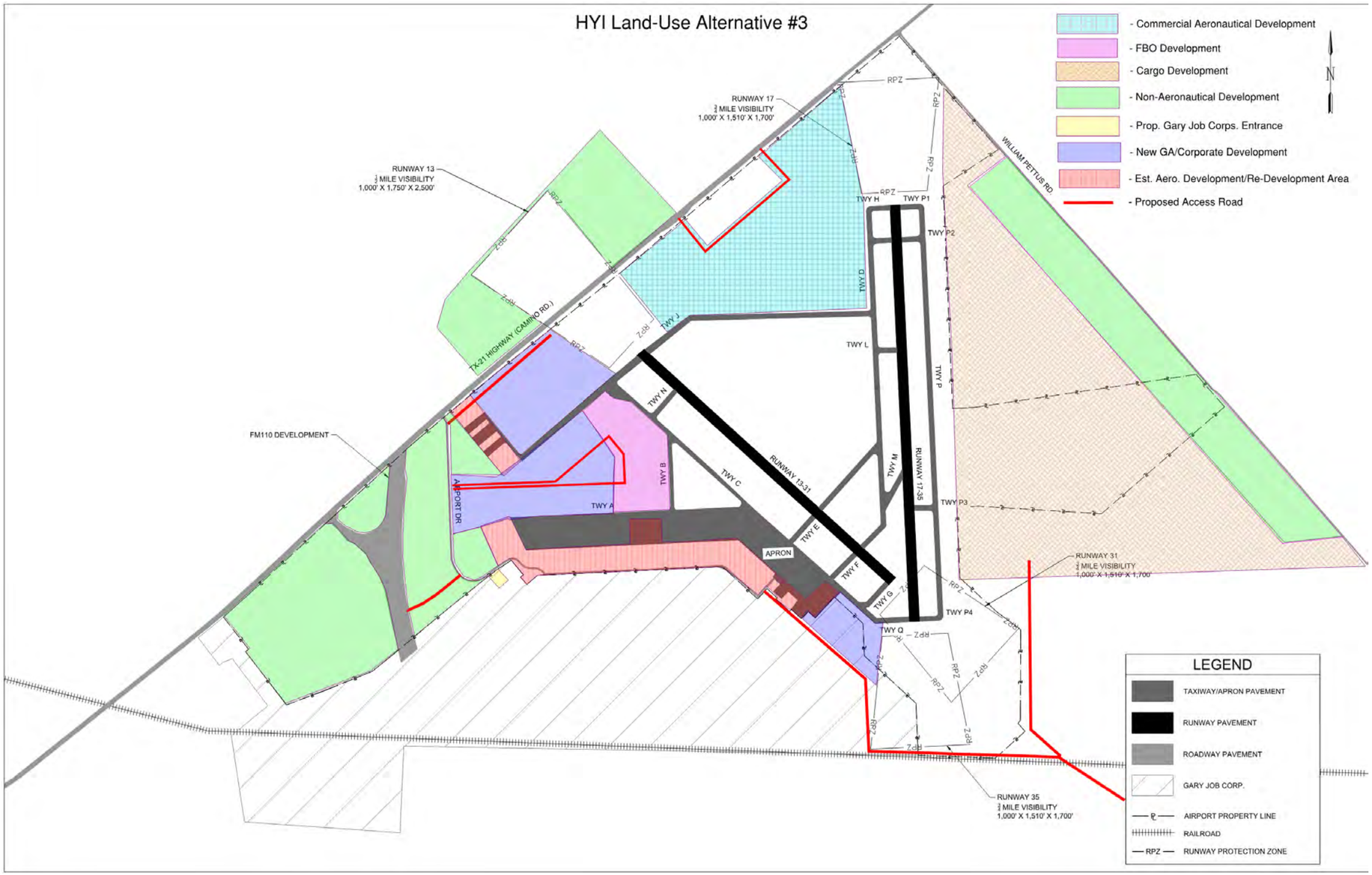
Source: Garver, 2019

FIGURE 5-11
LAND-USE ALTERNATIVE #2
SAN MARCOS REGIONAL AIRPORT



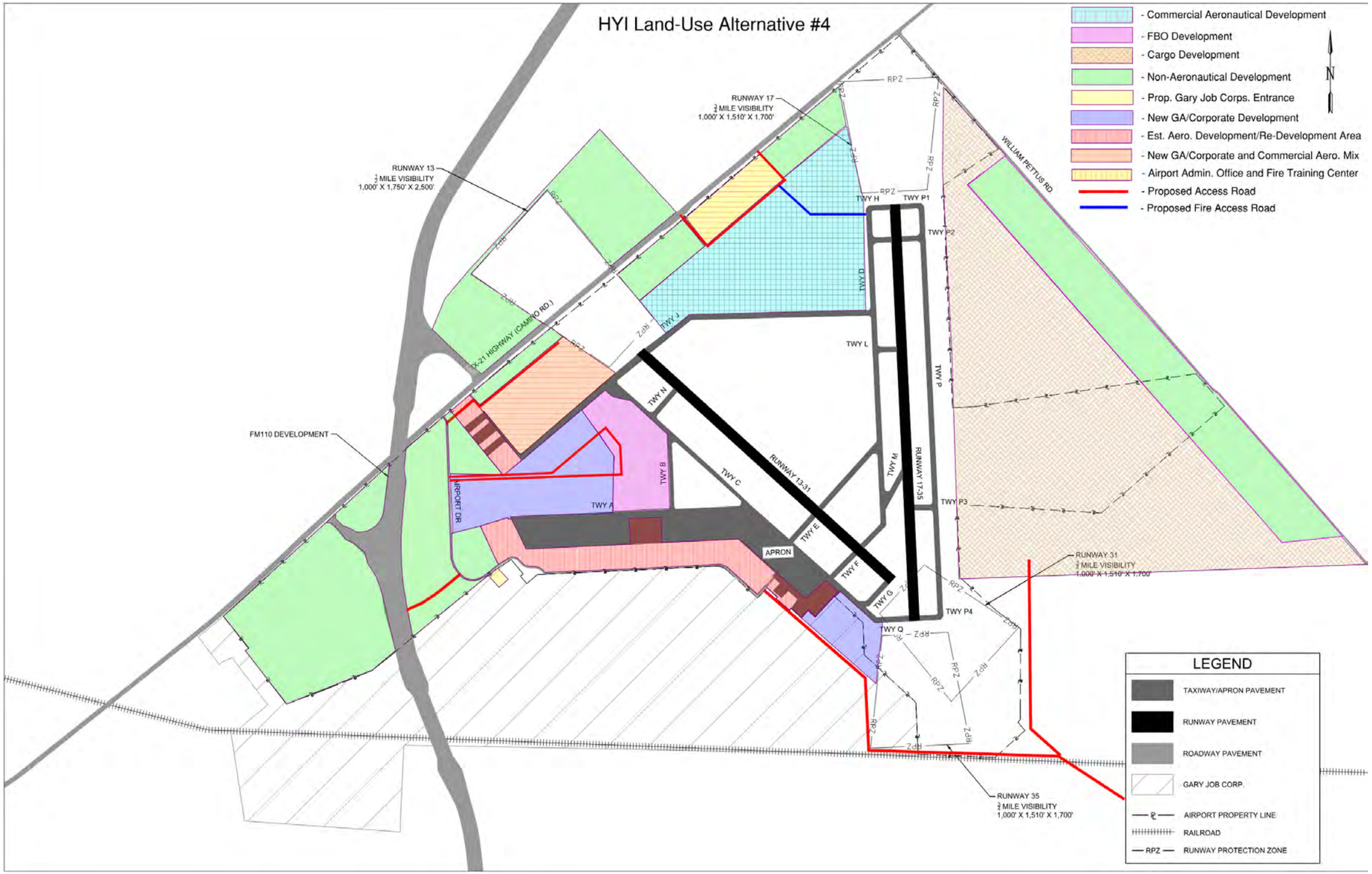
Source: Garver, 2019

FIGURE 5-12
LAND-USE ALTERNATIVE #3
SAN MARCOS REGIONAL AIRPORT



Source: Garver, 2019

FIGURE 5-13
LAND-USE ALTERNATIVE #4
SAN MARCOS REGIONAL AIRPORT



Source: Garver, 2019

LAND-USE ALTERNATIVES EVALUATION AND PREFERRED ALTERNATIVE

The land-use alternatives were analyzed through an evaluation process to determine which alternative provided the best land-use plan for future development. To facilitate this analysis, evaluation criteria were established related to each land-use category based on the development needs/preferences associated with each land-use type and other development considerations (e.g. environmental, timing, etc.). The evaluation criteria utilized for each land-use type were not the same. The general evaluation criteria used within the analysis are discussed below.

The following criteria are rated on a high (red), moderate (yellow), or low (green) level of impact scale:

- Proximity to Major Roadway Access – Would facilities located in the area have the roadway access they need? Some land-use types require good roadway access to support their operation. This includes commercial aeronautical businesses and cargo operators.
- Utility Access – Would facilities located in the area have the utility access they need? Access to utilities such as electric, sewer, water, fiber, and other telecommunication utilities are key considerations in future development. Commercial businesses typically have more stringent requirements.
- Compatibility with Existing Developments – Will the proposed land-use cause any potential compatibility issues with existing developments (e.g. mixing small and large aircraft, etc.)? Ideally the preferred land-use plan should minimize the potential for conflicts.
- Proximity to Primary Runway – Would facilities located in the area have the runway access they need? Proximity to the runway is very important for cargo operators that typically operate on a very strict timetable.
- Centralized Airfield Access – Does the facility have the airfield access it needs to serve airport users and tenants? Centralized airfield access is very important for FBOs who regularly service users at multiple locations on the airfield.

- Privacy – Does the area provide privacy to tenants who value a lower profile? Some airport users, especially corporate tenants, usually prefer to locate in areas less accessible to the public.
- Proximity to FBO – Will the area provide convenient access to the FBO? Typically, many of the users of an airport require one or more of the services provided by the FBO (e.g. fuel, aircraft washing/cleaning, lavatory servicing, etc.). As a result, it is important that some operators (especially GA and corporate operators) have good access to the FBO.
- Timing – Is land going to be available for the development in the time frame the development is expected to occur? This evaluation point includes three criteria:
  - Estimated Timeline for Development – Is the development expected to occur in the near, mid, or long term? Ideally, developments expected to be in the near and mid-term should not be dependent on the closure of Runway 8/26 or require significant land purchases.
  - Dependency of Runway 8/26 Closure – Is the development contingent on the closure of Runway 8/26?
  - Amount of Land Purchase Required – Will the development require the purchase of land the Airport currently does not own? If so, how much land?
- Environmental – Are there known environmental factors that should be considered related to development in a specific area? Ideally, near and mid-term developments should have no significant environmental impediments.

These criteria were utilized to evaluate the alternatives as discussed below.

LAND-USE ALTERNATIVES EVALUATION RESULTS

Utilizing the evaluation criteria defined above, each land-use alternative was reviewed and assigned high (red), moderate (yellow), and low (green) ratings for each criterion. In general, the alternative with the most low (green) ratings and the lease moderate (yellow) and high (red) ratings is the alternative that is deemed to be the preferred alternative based on the evaluation criteria.

Table 5-4 contains a matrix depicting the results of the evaluation process. A discussion regarding the rationale behind the ratings provided for each alternative is discussed in the following sub-sections.

TABLE 5-4
LAND-USE ALTERNATIVE EVALUATION
SAN MARCOS REGIONAL AIRPORT

Land-Use Category	Evaluation Criteria	Alternative #1 Ratings	Alternative #2 Ratings	Alternative #3 Ratings	Alternative #4 Ratings
Commercial Aeronautical Development	Proximity to Major Roadway Access				
	Utility Access				
	Compatibility with Existing Developments				
	Environmental				
	Dependency on Runway 8/26 Closure	No	Yes	No	No
	Est. Timeline for Development	Near	Near	Near	Near
	Amount of Land Purchase Required	None	Significant	None	None
FBO Development	Centralized Airfield Access				
	Utility Access				
	Compatibility with Existing Developments				
	Environmental				
	Dependency on Runway 8/26 Closure	Yes	None	Yes	Yes
	Est. Timeline for Development	Near/Mid	Near/Mid	Near/Mid	Near/Mid
	Amount of Land Purchase Required	None	None	None	None
Cargo Development	Proximity to Primary Runway				
	Proximity to Major Roadway Access				
	Utility Access				
	Compatibility with Existing Developments				
	Environmental				
	Dependency on Runway 8/26 Closure	Yes	No	Yes	Yes
	Est. Timeline for Development	Mid/Long	Mid/Long	Mid/Long	Mid/Long
	Amount of Land Purchase Required	Significant	None	Significant	Significant
GA/Corporate Development	Privacy				
	Proximity to FBO				
	Proximity to Primary Runway				
	Utility Access				
	Compatibility with Existing Developments				
	Environmental				
	Dependency on Runway 8/26 Closure	Yes	Yes	Partial - Less Avliable	Partial - More Avaliable
	Est. Timeline for Development	Near	Near	Near	Near
	Amount of Land Purchase Required	Small (South Side Extension)	Small (South Side Extension)	Small (South Side Extension)	Small (South Side Extension)
Non-Aeronautical Development	Roadway Access				
	Utility Access				
	Compatibility with Existing Development				
	Enviromental				

Source: Garver, 2019

Evaluation Commentary for Land-Use Alternative #1

In general, Land-Use Alternative #1 received "green" ratings associated with the evaluation criteria for multiple land-use categories. However, "yellow" ratings were provided related to the timing aspect of the GA/corporate development as most of the GA/corporate development shown in the alternative is contingent upon the closure of Runway 8/26. Additionally, a "yellow" rating was provided for the timing of the FBO development for the same reason. A "red" rating was provided related to utility access for the cargo development area because of the limited utilities present on Williams Pettus Road.

Evaluation Commentary for Land-Use Alternative #2

Land-Use Alternative #2 received the highest number of "red" ratings compared to all the other alternatives. A "red" rating was given regarding the timing of the cargo development because the need for a cargo development is not expected until later in the planning horizon but space that is readily available for immediate development has been allocated for it in this alternative. Similarly, a "red" rating was also given related to the timing of the commercial aeronautical development area as it is expected to be needed in the near term but the land dedicated to it in this alternative is not currently owned by the Airport and is contingent on the closure of Runway 8/26.

Evaluation Commentary for Land-Use Alternative #3

Land-Use Alternative #3 received very similar ratings to Land-Use Alternative #1. The only differences between the ratings of Alternative #1 and #3 is that Alternative #3 has a lower privacy rating and a higher utility access rating since a portion of the GA/corporate development is located along TX 21.

Evaluation Commentary for Land-Use Alternative #4

In general, Land-Use Alternative #4 received the most "green" ratings. The ratings generally follow the same ratings given to Alternative #3 but a higher rating was given related to the timing of the GA/corporate developments due to the "mixed development" area established along TX 21 that includes both GA/corporate and commercial aeronautical businesses developments.

PREFERRED LAND-USE ALTERNATIVE

Land-Use Alternative #4 received the best overall ratings in the alternative's evaluation analysis. Based on the evaluation analysis and discussions with the City of San Marcos, Texas Aviation Partners, TxDOT Aviation, and members of the Master Plan Advisory Committee (MPAC), Land-Use Alternative #4 was selected as the preferred alternative for the San Marcos Regional Airport. The preferred land-use alternative is shown in **Figure 5-14**.

As shown in the Land-Use Alternatives, a new Gary Job Corp. entrance is proposed along Airport Drive as well as an access road from FM 110 to Airport Drive. Both of these improvements are expected to occur in the next two to three years. As part of these improvements, Airport Drive will likely be realigned to improve the flow of traffic through the area. A separate planning and conceptual design analysis was completed to identify potential alternative alignments.

NON-AERONAUTICAL DEVELOPMENT STRATEGY

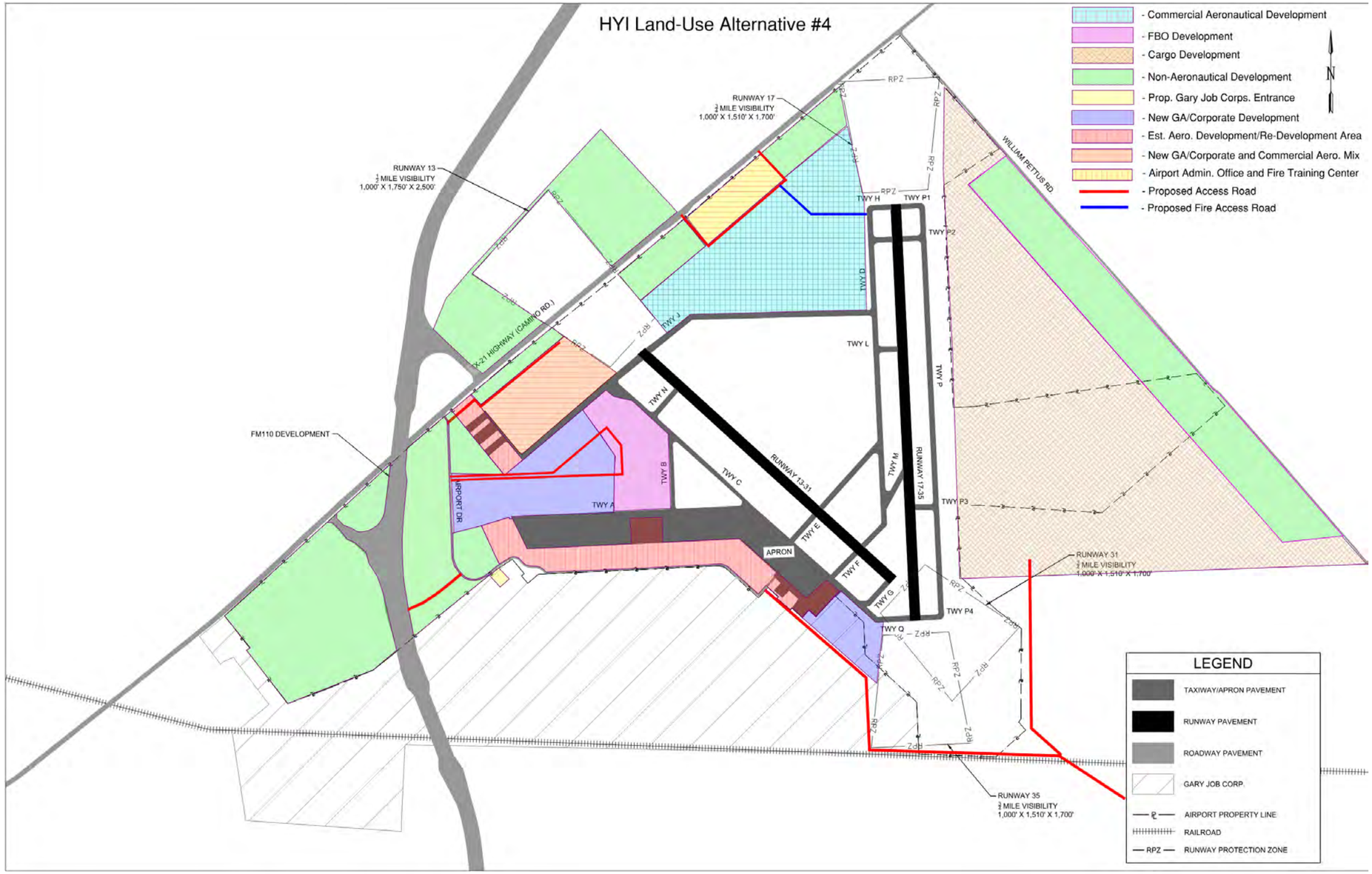
As part of this Master Plan, Paragon Project Resources Inc. (Paragon) competed a preliminary analysis to determine the types of non-aeronautical development that should be pursued at the San Marcos Regional Airport.

- Industrial/Warehousing – As discussed in the Inventory Chapter, approximately 40 acres of airport property close to FM 110 has been designated as a Foreign Trade Zone (FTZ). Due to this designation, an industrial or warehouse operation should be considered for this area that capitalizes on the FTZ. FTZ's can involve production, manufacturing, assembly, repackaging, repair, and storage of goods and equipment.
- Storage Units – An alternative development that could be considered in the 40 acres adjacent to FM 110 is the establishment of personnel storage units.
- Food Kiosk – For the non-aeronautical properties close to the intersection of FM 110, Airport Drive, and TX 21, a small food establishment should be considered. An important aspect in the development of these types of facilities is vehicle counts on the roadways leading to the facility. With

increased traffic from FM 110 the development of this type of establishment should be considered.

In general, Paragon believes an industrial development related to the FTZ has the highest likelihood of success.

FIGURE 5-14
PREFERRED LAND-USE ALTERNATIVE
SAN MARCOS REGIONAL AIRPORT



Source: Garver, 2019

RAMP RE-DEVELOPMENT ALTERNATIVES

The final step in the alternatives development and evaluation process was the creation and review of various ramp redevelopment alternatives. The primary focus of these alternatives was to:

- Create a tool to aid in the re-development of the various hangar areas along the main ramp.
- Identify area on the main ramp that could be temporarily closed, re-developed, or used for a different purpose to minimize the amount of ramp space that needs to be maintained.

In developing the ramp re-development alternatives a number of factors were considered including:

- Whether AIP funding was used to rehabilitate portions of the ramp and are therefore subject to grant assurances that could impact how the ramp is used
- Pavement condition
- Providing proper separation between aircraft/vehicle access
- Tenant activity levels and type of aircraft utilized
- Existing and ultimate taxiway and runway layout
- Protected surfaces related to the runway and taxiway system (e.g., safety areas, object free areas, etc.)

For each ramp re-development alternative, the current leased areas were color-coded green, yellow, or red based on the remaining length of the existing lease agreements within each area. The time frames represented by each color should be utilized as a tool to evaluate whether each area should be considered for re-development based on when the leases in the area will be expiring. The color-coding of these areas is identical in all three ramp re-development alternatives. As a result, the primary difference between each alternative is the portions of the ramp that are expected to be closed or re-developed. These differences will be the focus of the discussion in the remainder of this section.

Ramp Re-Development Alternative #1

Ramp Re-Development Alternative #1 focused on the closure of approximately 11 acres of existing ramp space primarily along Taxiways Alpha and Charlie. The goal of these closures was to close ramp space associated with the Taxiway Object Free Area (TOFA) associated with Taxiways Alpha and Charlie and contiguous portions of pavement that are not extensively utilized for aircraft parking. Additionally, approximately 4.7 acres of ramp space located immediately adjacent to the tower was considered for re-development as it is largely unused, and an access road is provided to the area. However, portions of this part of the ramp were replaced utilizing Airport Improvement Program (AIP) funds which makes the area subject to FAA grant assurances. As a result, portions of the ramp in this area could not be leased for re-development until the grant assurances associated with it expire.

Ramp Re-Development Alternative #1 is shown as **Figure 5-15**.

Ramp Re-Development Alternative #2

Ramp Re-Development Alternative #2 includes the closure of approximately 11.1 acres of existing ramp space utilizing a similar approach to the one discussed in Alternative #1. However, a larger closure was proposed adjacent to the former Redbird terminal facility since it is no longer being utilized as an FBO. Additionally, a 1.1-acre re-development area was proposed adjacent to the new Berry Maintenance hangar located southeast of the existing ATCT. The 4.7-acre ramp area located adjacent to the ATCT is proposed as a new common-use aircraft parking area since much of the ramp is in good condition and common-use aircraft parking is compatible with the FAA grant assurances associated with the pavement.

Ramp Re-Development Alternative #2 is shown as **Figure 5-16**.

Ramp Re-Development Alternative #3

Ramp Re-Development Alternative #3 includes the closure of approximately 7.6 acres of existing ramp space. Smaller closures are proposed along the west end of the ramp where the majority of aircraft activity currently occurs. Larger closures are proposed along the southeast end of the ramp where the pavement condition is the worst and less aircraft activity occurs. Additionally, a total of 2.02 acres of re-development space is proposed along the ramp.

Ramp Re-Development Alternative #3 is shown as **Figure 5-17**.

FIGURE 5-15
RAMP RE-DEVELOPMENT ALTERNATIVE #1
SAN MARCOS REGIONAL AIRPORT

Source: Garver, 2019

FIGURE 5-16
RAMP RE-DEVELOPMENT ALTERNATIVE #2
SAN MARCOS REGIONAL AIRPORT

Source: Garver, 2019

FIGURE 5-17
RAMP RE-DEVELOPMENT ALTERNATIVE #3
SAN MARCOS REGIONAL AIRPORT

Source: Garver, 2019

RAMP RE-DEVELOPMENT ALTERNATIVES EVALUATION AND PREFERRED ALTERNATIVE

To evaluate the ramp re-development alternatives, the following evaluation criteria were established, and an evaluation matrix was created:

- Potential for Conflicts with Grant Assurances – Will the proposed re-development of the ramp create any potential conflicts with FAA grant assurances (e.g. leasing, non-exclusive use, etc.)?
- Potential for Creating ATCT Line-of-Sight Issues – Will the proposed re-development of the ramp create any potential line-of-sight issues from the existing ATCT?
- Congruence with Current Pavement Conditions – Does the alternative maximize the amount of pavement in poor condition that is closed?
- Revenue Development Potential – Does the alternative provide opportunities to increase revenue through the re-development of the ramp?
- Ability to Support Existing Tenant Operations – Will the alternative create any negative impacts on existing tenant operations?
- Separation of Vehicle/Aircraft – Does the alternative provide for the separation of vehicle and aircraft traffic? Ideally, the preferred alternative should minimize the need for vehicles to traverse the ramp.
- Amount of Pavement Closed (Acres) – How much pavement does the alternatives close?
- Amount of Pavement Used for Hangar Development (Acres) – How much pavement does the alternative re-develop into additional hangar space?

The rating matrix showing the results of the evaluation process is shown in **Table 5-5.**

TABLE 5-5
RAMP RE-DEVELOPMENT ALTERNATIVE EVALUATION
SAN MARCOS REGIONAL AIRPORT

Evaluation Criteria	Alternative #1	Alternative #2	Alternative #3
Potential for Conflicts with Grant Assurances			
Potential for Creating ATCT Line-of-Sight Issues			
Congruence with Current Pavement Condition			
Revenue Development Potential			
Ability to Support Existing Tenant Operations			
Separation of Vehicle/Aircraft			
Amount of Pavement Closed (Acres)	11	11.1	7.6
Amount of Pavement Used for Hangar Development (Acres)	4.7	1.1	2.02

Source: Garver, 2019

Evaluation Commentary for Ramp Re-Development Alternative #1

Ramp Re-Development Alternative #1 was the lowest rated of the three alternatives. It received "yellow" ratings related to its potential for conflicts with grant assurances and for its potential to create a line of sight issue with the ATCT. Additionally, the alternative received "yellow" rating related to its ability to support existing tenant operations due to the amount of space closed in close proximity to the Berry FBO. The alternative also received a "yellow" rating related to its congruence with existing pavement conditions since the portions of the ramp that are in the worst condition are not closed in this alternative.

Evaluation Commentary for Ramp Re-Development Alternative #2

Ramp Re-Development Alternative #2 received similar ratings to Alternative #1. The alternative received "yellow" ratings related to its congruence with the ramp's current pavement condition, revenue development potential, and ability to support existing tenant operations. This alternative received a "yellow" rating related to its

revenue development potential because only 1.1 acres of existing apron space is proposed to be used for hangar development.

Evaluation Commentary for Ramp Re-Development Alternative #3

Ramp Re-Development Alternative #3 received the highest ratings of the 3 ramp re-development alternatives. While this alternative closes the least amount of pavement, it does so in congruence with the existing pavement condition while minimizing the impact on existing tenant operations. It also dedicates approximately 2.02 acres of apron space for re-development.

Preferred Land-Use Alternative

Ramp Re-Development Alternative #3 obtained the best overall ratings in the alternative's evaluation analysis. Based on the evaluation analysis and discussions with the City of San Marcos, Texas Aviation Partners, TxDOT Aviation, and members of the Master Plan Advisory Committee (MPAC), Ramp Re-Development Alternative #3 was selected as the preferred alternative for the San Marcos Regional Airport. The preferred ramp re-development alternative is shown in **Figure 5-18**.

FIGURE 5-18
PREFERRED RAMP RE-DEVELOPMENT ALTERNATIVE
SAN MARCOS REGIONAL AIRPORT

Source: Garver, 2019

PREFERRED DEVELOPMENT PLAN – ENVIRONMENTAL OVERVIEW

The preferred development alternatives depicted in **Figures 5-5** (Runway/Approach)**, 5-9** (Taxiway), **5-14** (Land-Use), and **5-18** (Ramp Re-Development) were reviewed to identify potential environmental impacts that will be a consideration during the execution of the programs/projects described in the Capital Improvement Program Chapter. The environmental review factors set forth in FAA Standard Operating Procedure (SOP) 5.1 – *CATEX Determinations* were utilized as the framework for this analysis.

The environmental factors 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 – Minimal impacts to air quality are anticipated as a result of the preferred development alternatives.
- Coastal Resources – The coast is approximately 139 miles from the Airport; therefore these resources are not affected.
- Department of Transportation Act, Section 4(f), Recreational Areas – A sports complex (baseball fields) is currently located approximately 1 mile southwest of the threshold of Runway 8. Since Runway 8/26 is expected to be decommissioned during the planning horizon, improvements at the Airport are not expected to have an adverse impact on the facility.
- Historic Facilities – There are no expected impacts to any state or federal historic sites. However, the City of San Marcos has its own Historic Preservation Commission that has designated the Commemorative Air Force Hangar and the Graham Air Traffic Control Tower as local historic sites. Any changes/modifications to these facilities will require close coordination with the City's Historic Preservation Commission.

- 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 – Future development plans are anticipated to have no impacts on areas of natural resources or energy supplies.
- Light Emissions and Visual Effects – The future development of the San Marcos Regional Airport is not expected to have an impact on light emissions or visual effects in the area.
- Wild and Scenic Rivers – There are no wild and scenic rivers in the immediate area.
- Environmental Justice – No residences are expected to be relocated as part of the future development plan. Consequently, there should be no impacts related to minority or low-income populations.
- Floodplains – None of the development shown in the preferred alternatives is expected to impact the 100-year flood plain.
- Water Quality – Water quality is not expected to be impacted by future development. However, a more in-depth review may be necessary as part of a program/project's design.
- Wetlands – None of the areas impacted by the preferred development alternative are considered "wetlands".
- Compatible Land Use – None of the areas impacted by the preferred development alternative are expected to have any land use compatibility issues.
- Farmland – Much of the area the Airport is located on is considered prime farmland. However, a minimal amount of undeveloped property is expected to be purchased during the planning horizon and none of it is used as farmland. As a result, there are minimal impacts expected to prime farmland.
- Disruption of Establish Community – No impacts to an established community are expected as part of the preferred development plan.
- Surface Transportation – The preferred development alternatives are expected to have a minimal impact on surrounding surface transportation.

Moderate Probability for Impact

- Noise – The extension of Runway 17/35 could have a nominal noise impact on the surrounding community. There are a few residences north of TX 21 that could be see increased noise levels due to the extension. Additionally, the existing residential development located at the approach end of Runway 31 could see increased noise exposure.
- Solid Waste – As discussed in the Inventory Chapter, a landfill exists east of Runway 17/35 in the area ultimately shown for cargo development. It is unclear what materials have been buried in the landfill. As a result, this area will require a more detailed site investigation before any development can take place.
- Hazardous Materials – The preferred development plan includes the acquisition of some land south of 9th Street that is currently owned by Gary Job Corps. Based on information obtained during the development of this Master Plan, some decommissioned underground storage tanks may be buried in the area to be acquired. A more detailed site investigation will be needed before purchasing the property.

Moderate to High Potential for Impact

- None anticipated.

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Date: July 25, 2025

To: City of San Marcos and Texas Aviation Partners

From: Nathan Polsgrove, Garver

RE: Alternatives Analysis for the Airport Master Plan Update 2025

This memorandum describes the airside, passenger terminal area, terminal roadway, and miscellaneous alternatives for San Marcos Regional Airport (HYI or the Airport) that were created based on the needs defined in the Facility Requirements Memorandum (dated September 18, 2024) and the Large Aircraft Assumptions Memorandum (dated August 30, 2024). This document also discusses the evaluation process used to select the preferred development alternative for each area and reviews the results of the evaluation process.

Alternatives Development Process

The various alternatives described in this document were created by exploring numerous development options that could potentially satisfy the facility requirements established in this Master Plan Update. Those development options were then consolidated into the following for this analysis:

- 2 – Airside Alternatives
- 2 – Passenger Terminal Area Alternatives
- 2 – Terminal Roadway Alternatives
- 3 – Miscellaneous Alternatives (includes siting for a new fuel farm, Air Traffic Control Tower, and Airfield Lighting Vault)

The alternatives development and review process was completed in a tiered fashion to allow for prioritized decision making on key infrastructure components such as the Airport's runways, taxiways, and passenger terminal area. Using this approach, other infrastructure decisions such as the location of the fuel farm and lighting vault were strategically developed later in alternatives process once higher priority infrastructure decisions were made. Consequently, the alternatives review and evaluation process was segmented into three tiers:

- Tier One – Airside Alternatives
- Tier Two – Passenger Terminal Area Alternatives
- Tier Three – Terminal Roadway Alternatives and Miscellaneous Alternatives

Tier One – Airside Alternatives

The existing Airport Reference Code (ARC) for San Marcos Regional Airport is C-II. The critical aircraft is forecast to increase to C-III as stated in the Large Aircraft Assumptions Memorandum. With this change, several components of the existing airside facilities will likely need to be modified or improved.

The focus of this airside alternatives analysis is to evaluate whether the preferred airside alternative defined in the 2021 Airport Master Plan should be retained (e.g., Airside Alternative 1) or whether the airport should consider closing Runway 13-31 in favor of retaining Runway 8-26 (e.g., Airside Alternative 2).

Airside Alternative #1

Airside Alternative #1 extends Runway 17-35 to the north and south, pushing its Runway Protection Zone (RPZ) boundaries to the edges of airport property. In this alternative, Runway 13-31 is shortened, decoupling it from Runway 17-35 in accordance with FAA requirements, and Runway 8-26 is decommissioned. In addition to these runway changes, Taxiway J is relocated to the south to increase the amount of space available for development and multiple new taxiways are established to support the effective utilization of Runway 17-35 as the primary runway.

Specifically, this alternative includes the following changes:

- Runway
  - Extend Runway 17-35 to 6,314 ft. from 5,214 ft. and improve to C-III design standards.
  - Reduce Runway 13-31 to 5,151 ft. from 5,601 ft. and improve to C-III design standards.
  - Decommission Runway 8-26.
  - Decouple Runway 13-31 and Runway 17-35.
  - Runway 17-35 and Runway 13-31 widened to 150 ft. and strengthened to support large air carrier type aircraft.
- Taxiway
  - Realign Taxiway J.
  - Develop additional taxiway infrastructure to support the effective utilization of Runway 17-35.

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

Airside Alternative #2

Similarly, Airside Alternative #2 extends Runway 17-35 to the north and south. However, in this alternative Runway 13-31 is decommissioned and Runway 8-26 is shortened and shifted east, moving the RPZ extending from Runway 8 away from nearby roadways. In addition to these runway changes, Taxiway J would be removed, and additional taxiway infrastructure would be established to support the effective use of Runway 17-35 and Runway 8-26.

- Runway
  - Extend Runway 17-35 to 6,314 ft. from 5,214 ft. and improve to C-III design standards.
  - Reduce Runway 8-26 to 6,186 ft. from 6,330 ft. and shift to the east. Improve to C-III design standards.
  - Decommission Runway 13-31.
  - Runway 17-35 and Runway 8-26 widened to 150 ft. and strengthened to support large air carrier type aircraft.
- Taxiway
  - Remove Taxiway J
  - Develop additional taxiway infrastructure to support the effective utilization of Runway 17-35 and Runway 8-26.

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

Figure 1 - Airside Alternative #1

Source: Garver, 2025

Figure 2 - Airside Alternative #2

Source: Garver, 2025

Airside Alternatives Evaluation

One of the tasks of an Airport Master Plan 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.

- Length of Crosswind Runway – Is the crosswind runway longer or shorter than the other airside alternative? Ideally, the preferred alternative will have a longer crosswind runway.
- Impacts to Existing Development Areas – Will the proposed airside alternative have any known impacts on existing development areas on airport property? Will it require relocation or removal? Ideally, the preferred alternative should minimize the impact on existing development areas to the greatest extent practical while still meeting the Airport's future development needs.
- Full Compliance with FAA Design Standards – Does the alternative fully comply with FAA design standards, or will it require the acceptance of any non-standard conditions by the FAA and TxDOT Aviation? Ideally, the preferred alternative will not have any non-standard conditions.
- Instrument Landing System (ILS) System Maintained – Does the proposed alternative promote the continued maintenance and utilization of the existing ILS system for Runway 13? Ideally, the preferred alternative will continue to accommodate the utilization of the existing ILS system.
- Expanded Development Space Along Texas State Highway 21 (SH 21) – Does the airside alternative offer additional development space along SH 21? Ideally, the preferred alternative will offer the most development space.
- Residential Impact – Does the proposed airside alternative have any known impacts on residential developments? Will it require their relocation? Ideally, the preferred alternative should minimize the impact to existing residences to the greatest extent practical while still meeting the Airport's future development needs.
- Potential for Environmental Impacts – What is the potential for the proposed airside alternative to 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, hazardous materials, 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.

Each alternative was compared using these evaluation criteria.

Airside Evaluation Results

Based on the evaluation criteria, the following matrix (**Table 1**) was developed showing the proposed rating of each alternative. Green is used to identify the alternative with a preferrable rating for each criterion. Red is used to identify the alternative with the lower rating for each criterion. Additionally, a cost estimate was prepared for each alternative.

Table 1 - Airside Alternative Evaluation

Evaluation Factors	Alternative #1	Alternative #2
Length of Crosswind Runway	5,151 ft.	6,136 ft.
Impacts to Existing Development Areas	None	TWY K Impacts
Full Compliance with FAA Design Standards	Yes	Airport Dr. to Remain in RPZ
ILS System Maintained	Yes	Unlikely
Expanded Development Space Along SH 21	Limited	Significant
Residential Impact	Manufactured Home Area	Reduced
Potential for Environmental Impacts	Reduced	Higher

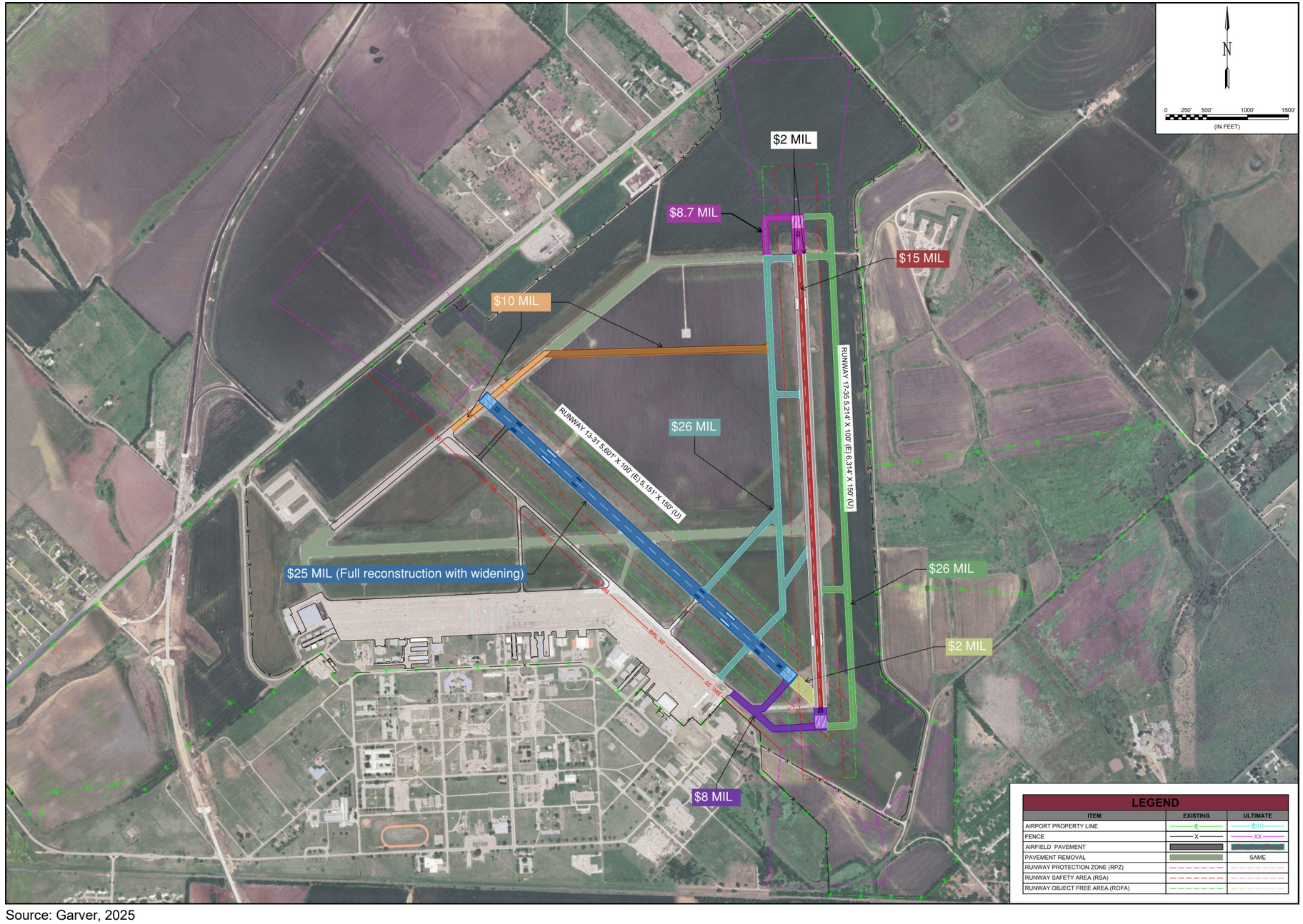
Source: Garver, 2025

Commentary regarding why the identified ratings were assigned to each alternative are described later in this document.

Cost Estimates

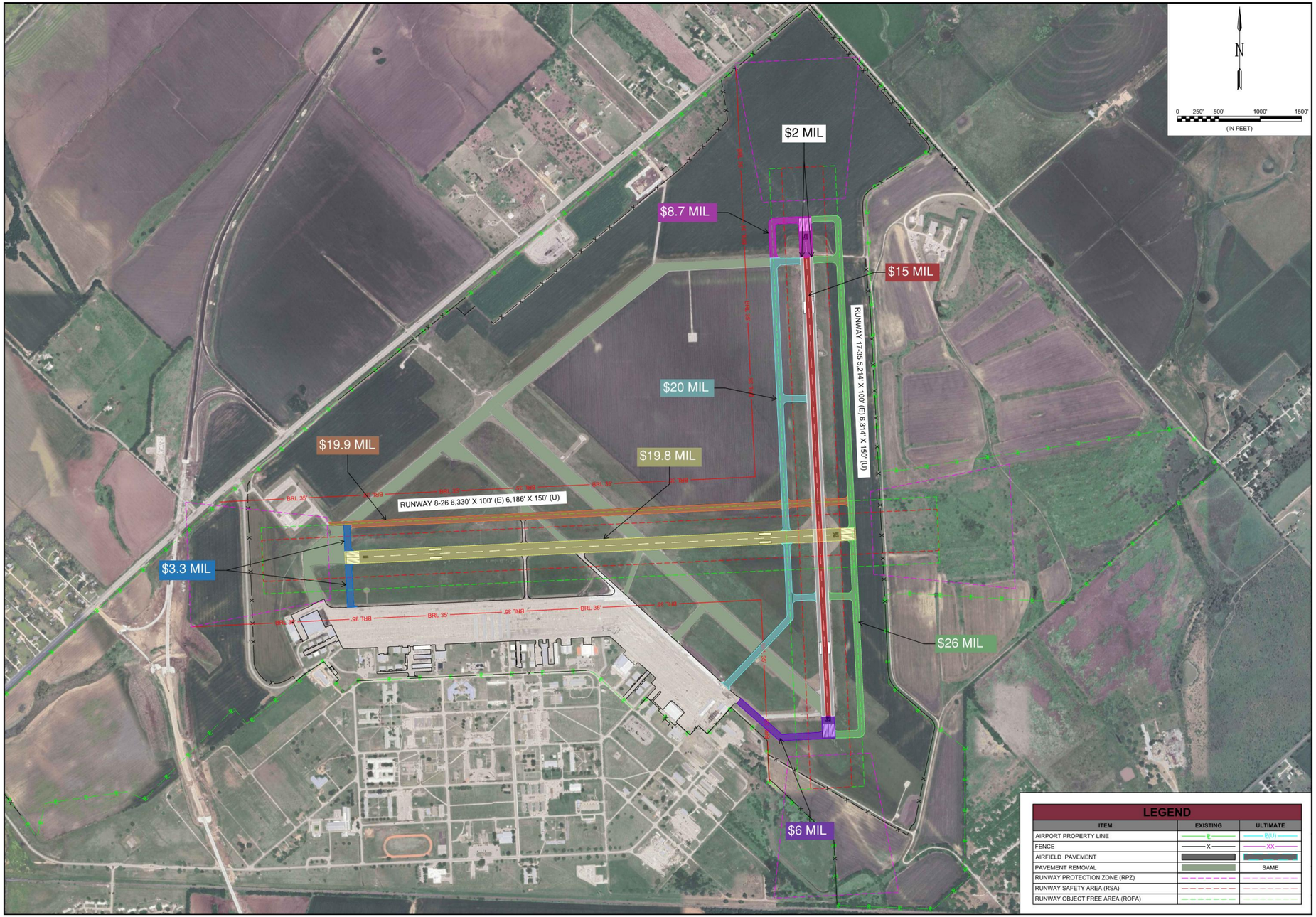
Rough order of magnitude cost estimates were developed for each major infrastructure element in each alternative. The total estimated cost for all the infrastructure elements contained in Airside Alternative #1 is $122.7 million. The total estimated cost for all the infrastructure elements contained in Airside Alternative #2 is $120.7 million. **Figure 3** and **Figure 4** provide graphics showing a color-coded cost breakdown of Airside Alternative #1 and #2, respectively. Comparatively, the cost difference between the two alternatives is negligible.

Figure 3 – Airside Alternative #1 Cost Breakdown by Infrastructure Element



Source: Garver, 2025

Figure 4 – Airside Alternative #2 Cost Breakdown by Infrastructure Element



Source: Garver, 2025

Airside Alternative – Evaluation Commentary

Airside Alternative #1 had multiple benefits compared to Airside Alternative #2 including:

- Impacts to Existing Development Areas: Airside Alternative #1 has no expected impact on existing development areas at the Airport while Airside Alternative #2 will impact existing developments in the Taxiway K development area. The relocated RPZ for Runway 8 and the C-III Runway Object Free Area (ROFA) will require the relocation of existing facilities in the Taxiway K development area including a hangar and fence.

- Full Compliance with FAA Design Standards: Airside Alternative #1 does not require any modifications to FAA standards to be implemented. The feasibility of Airside Alternative #2 is predicated on the FAA and TxDOT Aviation allowing Airport Drive to remain within the new RPZ for Runway 8.

- ILS System Maintained: Airside Alternative #1 maintains the existing ILS system that is installed for Runway 13. Airside Alternative #2 includes the decommissioning of Runway 13-31 which would likely result in the decommissioning of the ILS unless the airport pays for a new ILS to be installed on another runway.

- Potential for Environmental Impacts: Airside Alternative #1 has a reduced potential for environmental impacts compared to Airside Alternative #2. Airside Alternative #2 is expected to require surface grading in the landfill area located at the approach end of Runway 26.

The following items were identified as benefits of Airside Alternative #2, compared to Airside Alternative #1:

- Length of Crosswind Runway: Airside Alternative #2 provides a greater crosswind runway length as Runway 8-26 will be 6,136 ft in length. Runway 13-31 in Airside Alternative #1 is only 5,151 ft. in length.

- Expanded Development Space Along SH 21: Airside Alternative #2 provides for an expanded aeronautical development area along SH 21 due to the decommissioning of Runway 13-31.

- Residential Impact: Airside Alternative #2 reduces impacts to the existing manufactured home development located at the approach end of Runway 31.

Runway Length Benchmarking Analysis

Based on the results of the airside alternatives evaluation, additional analysis is needed to evaluate the potential air service limitations that may result from reducing the length of Runway 13-31 to 5,151 feet in Airside Alternative #1 compared to the ultimate length of Runway 8-26 (6,136 ft.) in Airside Alternative #2. While a runway range analysis was completed as part of the 2021 Airport Master Plan, this update to the master plan integrates a benchmarking analysis identifying the range achieved by air carrier aircraft operating from runways of similar length at air carrier airports in the United States. **Table 2** identifies the longest route flown by commercial service aircraft from commercial service airports with runways of 5,700 ft or less. This analysis was completed using flight schedules reviewed on October 4, 2024.

Table 2 - Airside Alternative Evaluation

Airport	Longest Runway Length	Airport Elevation	Longest Commercial Flight			
			Destination	Distance	Airline	Aircraft
Key West International Airport (EYW)	5,076 ft	3.4 ft	Boston, MA - BOS	1,193 NM	JetBlue	Airbus A220-300
John Wayne/Orange County (SNA)	5,700 ft	55.9 ft	New York, NY - JFK	2,132 NM	American	Airbus A321
Hilton Head Airport (HXD)	5,000 ft	19.4 ft	Dallas, TX - DFW	829 NM	American	Embraer E-175

Source: Garver, 2025

Based on the aircraft range analysis completed in the 2021 Airport Master Plan and the runway length benchmarking analysis completed as part of this master plan update, it is expected that new commercial service aircraft (e.g., Airbus 321neos, Boeing 737max, Airbus A220, etc.) could likely achieve ranges of 1,000 nautical miles or more when using the ultimate length of Runway 13-31 during International Standard Atmosphere (ISA) conditions. Limitations may exist during extreme summer temperatures and for older aircraft models.

Preferred Airside Development Alternative

The results of the alternative evaluation concluded that Alternative #1 is the preferred airside alternative for the San Marcos Regional Airport.

Tier Two – Passenger Terminal Area Alternatives

With the framework of the Airport's ultimate airside development plan identified, concepts involving the placement of a potential passenger terminal facility were prepared and analyzed. The overall objective of the passenger terminal area alternatives process is to identify the potential location for a new passenger terminal building. However, layout options for the passenger terminal are not considered. The area expected to be needed for the passenger terminal is a minimum of 30 acres.

Passenger Terminal Area Alternative #1

The location identified for the first passenger terminal alternative is adjacent to the existing Taxiway K development area located close to SH 21. This area is approximately 33.92 acres and is shown in **Figure 5**.

Passenger Terminal Area Alternative #2

The location identified for the second passenger terminal alternative is the area where the existing airport management office is located. This area is approximately 31.89 acres and is shown in **Figure 6**.

Figure 5 - Terminal Area Alternative #1

Source: Garver, 2025

Figure 6 - Terminal Area Alternative #2

Source: Garver, 2025

Passenger Terminal Area Alternatives Evaluation

To facilitate the analysis of the passenger terminal area alternatives evaluation criteria were established, and an evaluation matrix was developed showing how each passenger terminal area 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:

- Proximity to SH 21 and Farm to Market (FM) 110 – Is the alternative's location near SH 21 and FM 110? Ideally, the preferred alternative will allow for quick access to both roads and result in limited level of service (LOS) impacts these roads.

- Proximity to Existing Utilities – Is the alternative's location in close proximity to existing utilities? Ideally, the preferred alternative will provide access to existing utility lines.

- Distance from the Fire Training Center – What is the distance between the Fire Training Center and the proposed alternative site? Ideally, the preferred alternative will distance itself from the training center to reduce the potential for public perception concerns.

- Environmental Impacts – How will the proposed passenger terminal are alternative impact the surrounding environment? Ideally, the preferred alternative will create a limited environmental impact while still meeting established development needs.

- Size of Development Parcel – How large is the parcel for the passenger terminal area development? Ideally, the preferred alternative will provide the highest amount of usable land to meet the Airport's future development needs.

- Distance to Primary Runway – How far is the proposed terminal area alternative from Runway 17-35? Ideally, the preferred alternative will position the commercial service terminal as close to the primary runway as practicable, providing reduced taxi times.

- Congruence with Preferred Airside Alternative – Does the proposed passenger terminal area alternative conflict with the preferred airside alternative? Ideally, the preferred passenger terminal area alternative will not conflict with the preferred airside alternative.

- Opportunity Cost for Other Development – Is there a high potential for the passenger terminal alternative area to be utilized for other types of development (e.g., hangars)? Since the need for the passenger terminal is uncertain, areas that could be readily used for other types of aeronautical development should be avoided.

Based on the evaluation criteria, the following matrix (**Table 3**) was developed showing the proposed rating of each alternative.

Table 3 – Passenger Terminal Area Alternative Evaluation

Evaluation Factors	Alternative 1	Alternative 2
Proximity to SH 21 and FM 110		
Proximity to Existing Utilities		
Distance from Fire Training Center		
Environmental Impacts		
Size of Development Parcel		
Distance to Primary Runway		
Congruence with Preferred Airside Alternative		
Opportunity Cost for Other Development		

Source: Garver 2025

Passenger Terminal Area Alternatives – Evaluation Commentary

The alternatives received similar ratings related to multiple criteria. However, the following evaluation factors were identified as negative considerations related to Passenger Terminal Area Alternative #1:

- Distance to Primary Runway – The location of Passenger Terminal Area Alternative #1 is further from Runway 17-35 compared to Passenger Terminal Area Alternative #2. This will result in longer taxi times to/from the primary runway.

- Opportunity Cost for Other Development – Currently, there is demand for additional hangar development in the location of Passenger Terminal Area Alternative #1. Since the need and timing for a passenger terminal is uncertain, the opportunity cost of designating this location for the development of a passenger terminal was identified as a key negative consideration. Consequently, Passenger Terminal Area Alternative #1 received a “red” rating in this area. Similar demand does not currently exist in the area identified in Passenger Terminal Area Alternative #2.

The following evaluation factors were identified as negative considerations related to Passenger Terminal Area Alternative #2:

- Proximity to SH 21 and FM 110 – Passenger Terminal Area Alternative #2 is located further away from FM 110, while the location of Passenger Terminal Area Alternative #1 could enable direct access to FM 110 using existing roadway infrastructure.

- Distance from Fire Training Center – Passenger Terminal Area Alternative #2 is located adjacent to the new San Marcos Fire Training Center. With this alternative’s proximity to the Fire Training Center, the public’s perception of witnessing live fires burning from a terminal viewpoint could translate into concern.

Preferred Passenger Terminal Area Alternative

The results of the alternative evaluation concluded that Passenger Terminal Area Alternative #2 is the preferred alternative for the San Marcos Regional Airport.

Tier Three – Passenger Terminal Roadway Alternatives

Based on the Airport's ultimate airside development plan and the proposed location of the passenger terminal area, roadway concepts integrating landside access from SH 21 and FM 110 were prepared and analyzed. The primary focus of the analysis was to determine the proposed roadway layout in the passenger terminal area. However, overall landside access to the northwest portion of the airport was considered.

Passenger Terminal Roadway Alternatives

Two passenger terminal roadway concepts were prepared and analyzed:

- Passenger Terminal Roadway Alternative #1 – This alternative included a consolidated access point at the south end of the terminal area along SH 21. This alternative is shown as **Figure 6**.
- Passenger Terminal Roadway Alternative #2 – This alternative included separate entry and exit locations along SH 21. This alternative is shown as **Figure 7**.

Passenger Terminal Roadway Alternatives Evaluation

Both alternatives were evaluated based on the following criteria:

- Level of Service Impact to SH 21 – Does the alternative have a negative impact to vehicle traffic on SH 21? Ideally, the preferred alternative should have a limited impact to vehicle traffic on SH 21.
- Maneuverability of Larger Vehicles (Semi-Trucks) – Does the alternative support the efficient movement of larger vehicles (i.e., semi-trucks) through the terminal area? Ideally, the preferred alternative should support the efficient movement of larger vehicles.
- Available Vehicle Parking Space – How much surface parking space does the alternative provide? Ideally, the preferred alternative should maximize available surface parking space.
- Cost – What is the cost of the proposed alternative? Ideally, the preferred alternative should minimize development costs to the extent practical.

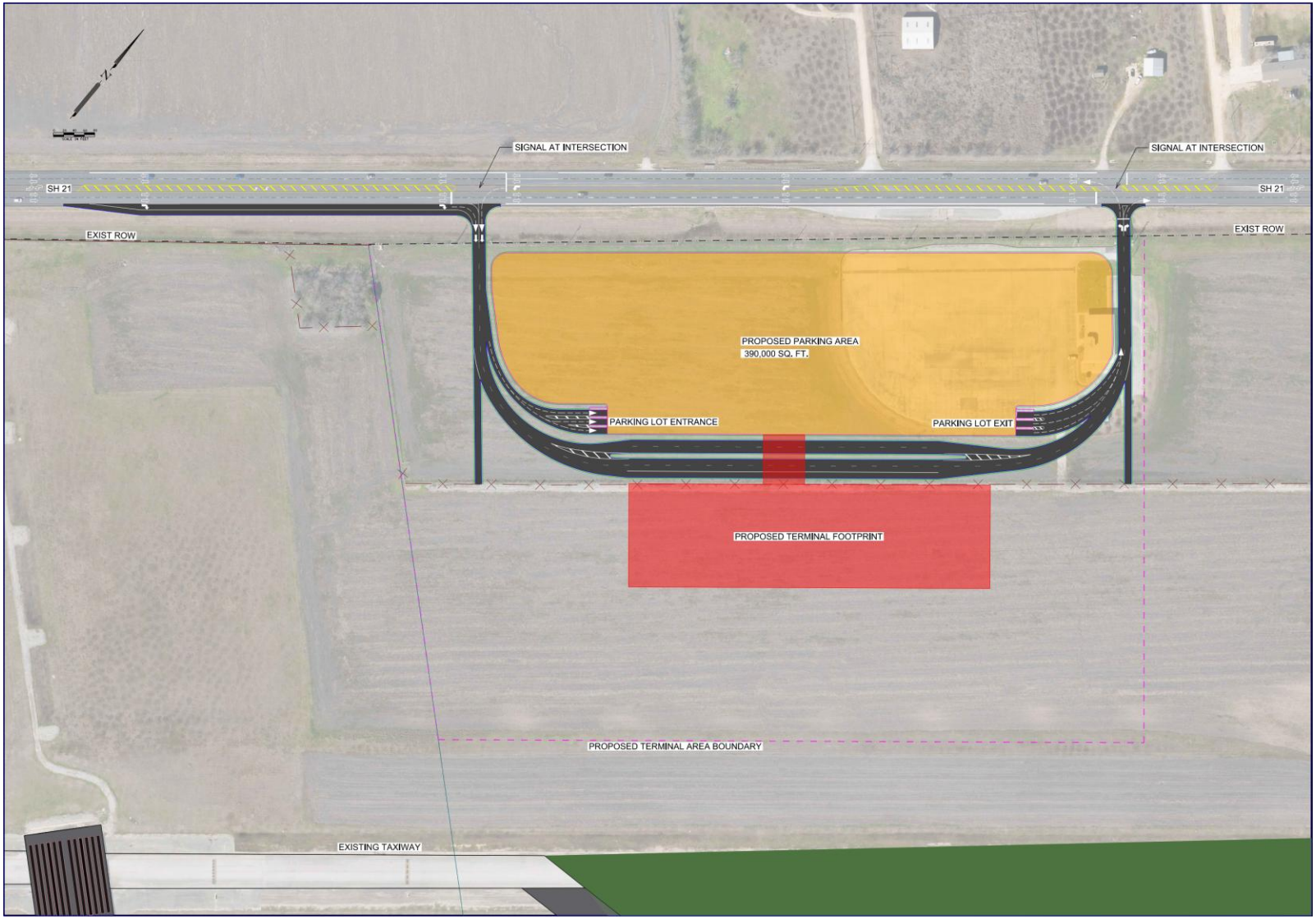
In general, both alternatives received similar ratings. During an alternative review meeting with TxDOT roadway personnel, it was noted that separate light signals for the entry and exit points for the terminal complex (as shown in Alternative #2) would not be possible as the light signals must be at least a half mile apart in accordance with TxDOT roadway standards. Consequently, Alternative #1 was selected as the preferred alternative.

The preferred roadway concept showing the location of the proposed airport perimeter road and other access points to SH 21 is shown in **Figure 9**.

Figure 7 – Passenger Terminal Roadway Alternative #1

Source: Garver 2025

Figure 8 – Passenger Terminal Roadway Alternative #2



Source: Garver 2025

Figure 9 – Preferred Passenger Roadway Alternative

Source: Garver 2025

Tier Three – Miscellaneous Alternatives

With the framework of the Airport's ultimate airside, passenger terminal area, and passenger terminal roadway identified, concepts involving the placement of several miscellaneous facilities were prepared and analyzed. The overall objective of the miscellaneous alternatives process was to identify a preferred location for the Air Traffic Control Tower (ATCT), Fuel Farm, and Airfield Lighting Vault. For this process, a single alternative exhibit was prepared that shows all the potential locations of the facilities listed (**Figure 10**).

ATCT Alternative Locations

There are three proposed ATCT locations:

- ATCT Location #1 proposes maintaining the ATCT at its current location.
- ATCT Location #2 is situated along the south side of the primary T-hangar complex at the airport.
- ATCT Location #3 is situated approximately 500' south of ATCT location 2 on property that is currently owned by the U.S. Department of Labor.

These locations are shown in yellow in Figure 10.

Fuel Farm Alternative Locations

There are two proposed Fuel Farm locations:

- Fuel Farm Location #1 is situated to the west of the primary apron area, east of Airport Drive.
- Fuel Farm Location #2 is situated to the southwest of the existing Taxiway K development area.

These locations are shown in orange in Figure 10.

Airfield Lighting Vault Alternative Locations

There are three proposed Airfield Lighting Vault locations:

- Airfield Lighting Vault Location #1 is immediately west of proposed ATCT Location #2.
- Airfield Lighting Vault Location #2 is immediately south of proposed ATCT Location #2 and north of proposed ATCT Location #3.
- Airfield Lighting Vault Location #3 is adjacent to the current Coast Flight Training building.

These locations are shown in blue in Figure 10.

Figure 10 - Miscellaneous Alternatives

Source: Garver, 2025

Miscellaneous Alternatives Evaluation

To facilitate the analysis of the miscellaneous alternatives evaluation criteria were established, and evaluation matrices for the ATCT, fuel farm, and airfield lighting vault locations were developed showing how each location compared based on the evaluation criteria. The evaluation criteria used for each analysis are discussed below.

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

ATCT Alternative Evaluation

The following evaluation criteria were established to evaluate the proposed locations of the ATCT:

- Potential for Hangar Development – Does the alternative impede potential future hangar construction? Ideally, the preferred alternative will not utilize prime land that could be used for hangar development.
- Requires Property Acquisition – Does the alternative require property acquisition? Ideally, the preferred alternative will utilize airport-owned land.
- Greater Tower Height Due to Existing Structures – Does the alternative potentially require the tower to be increased in height? Ideally, the preferred alternative will be constructed to the lowest height possible while still meeting line of sight standards.
- Cost – What is the overall cost of the alternative? Ideally, the preferred alternative will have the lowest cost of implementation while still meeting all established requirements.

Based on these evaluation criteria, the following matrix (**Table 4**) was developed showing the proposed rating of each alternative.

Table 4 – ATCT Alternative Evaluation

Evaluation Criteria	ATCT Locations 1	2	3
Potential for Hangar Development (Alternative Use)			
Requires Property Acquisition			
Greater Tower Height Due to Existing Structures			
Cost			

- Low Impact **or** Meets Requirements

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

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

Source: Garver 2025

ATCT Alternative Commentary

The following evaluation factors were identified as negative considerations related to ATCT Location #1**:**

- Potential for Hangar Development (Alt Use) – ATCT Location #1 utilizes the current placement of the ATCT at HYI, a prime area for hangar development.

The following evaluation factors were identified as negative considerations related to ATCT Location #2**:**

- Potential for Hangar Development (Alt Use) – ATCT Location #2 places the tower along the primary apron, a key area for hangar development. By locating it south of the t-hangars, it makes the area less desirable for future hangar development compared to Location #1.

- Greater Tower Height Due to Existing Structures – ATCT Location #2 places the tower in a position that will likely require a greater height than the current ATCT for it to meet line of sight requirements.

- Cost – With tower height anticipated to be greater than the existing ATCT, Location #2 is expected to have a greater cost than Location #1.

The following evaluation factors were identified as negative considerations related to ATCT Location #3**:**

- Cost – Since Location #3 will require property acquisition and the tower height is anticipated to be greater than the existing one, the cost of this alternative is anticipated to be the highest. However, the development of an ATCT in this area is not expected to impact future hangar development.

Based on the results of the analysis, ATCT Location #3 was selected as the preferred location because it would not impact future hangar development.

Fuel Farm Alternative Evaluation

The following evaluation criteria were established to evaluate the proposed locations of the fuel farm:

- Proximity to Main Roadway – How close is the location to the main roadway? Ideally, the preferred alternative will be close to the roadway, providing ease of access for fuel delivery trucks.
- Proximity to Current Fixed-Base Operator (FBO) – How close is the location to the current FBO? Ideally, the preferred alternative will be closer to the current FBO, providing greater ease of access for FBO fuel trucks.
- Distance to Hangars – How close is the location to the primary hangar area? Ideally, the preferred alternative will be closer to existing hangars, providing greater ease of access.
- Access to Primary Airport Development Areas – Does the location provide access to the future development areas of the airport? Ideally, the preferred alternative will provide sufficient accessibility to airport development areas.
- Potential for Alternative Uses – Is the location in an area that could be used for another revenue producing purpose? Ideally, the preferred alternative will not occupy a site that has a potential better use.
- Ability to Separate Airside/Landside Access – Does the alternative allow for the separation of airside and landside access to the facility? Ideally, the preferred alternative will permit separate airside and landside access to the fuel farm.

Based on the evaluation criteria for fuel farm location, the following matrix (**Table 5**) was developed showing the proposed rating of each alternative.

Table 5 – Fuel Farm Alternative Evaluation

Evaluation Criteria	Fuel Farm Locations 1	2
Proximity to Main Roadway		
Proximity to Current FBO		
Distance to Hangars		
Access to Primary Airport Development Areas		
Potential for Alternative Uses		
Ability to Separate Airside/Landside Access		

- Low Impact **or** Meets Requirements

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

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

Source: Garver 2025

Fuel Farm Alternative Commentary

The following evaluation factors were identified as negative considerations related to Fuel Farm Location #1**:**

- Potential for Alternative Uses – Due to this location's proximity to the existing apron, this alternative location could potentially interfere with future project developments.

The following evaluation factors were identified as negative considerations related to Fuel Farm Alternative #2**:**

- Potential for Alternative Uses – Due to this location's proximity to the proposed commercial service terminal, this alternative location could potentially interfere with future project developments.
- Proximity to Current FBO – With the fuel farm being placed closer to the proposed commercial service terminal, this location is farther away from the current FBO than Fuel Farm Location #1.
- Distance to Hangars – With the fuel farm being placed closer to the proposed commercial service terminal, this location is farther away from the existing hangars than Fuel Farm Location #1.

Based on these considerations, Fuel Farm Location #1 was selected as the preferred location for the fuel farm.

Airfield Lighting Vault Alternative Evaluation

The following evaluation criteria were established to evaluate the proposed locations of the airfield lighting vault:

- Proximity to Existing Vault/Cost – How close is the alternative vault site to the existing vault? Typically, the further the vault is from its existing footprint, the more costly it will be to develop a new vault. Ideally, the preferred alternative will maintain proximity to the existing vault, reducing the cost of relocation.

- Potential for Alternative Uses – Is the alternative in an area that is the best use for the site? Ideally, the preferred alternative will not occupy a site that has a potential better use.

Based on the evaluation criteria for the airfield lighting vault location, the following matrix (**Table 6**) was developed showing the proposed rating of each alternative.

Table 6 – Airfield Lighting Vault Alternative Evaluation

Evaluation Criteria	Lighting Vault Locations 1	2	3
Proximity to Existing Vault/Cost			
Potential for Alternative Uses			

- Low Impact **or** Meets Requirements

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

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

Source: Garver 2025

Airfield Lighting Vault Alternative Commentary

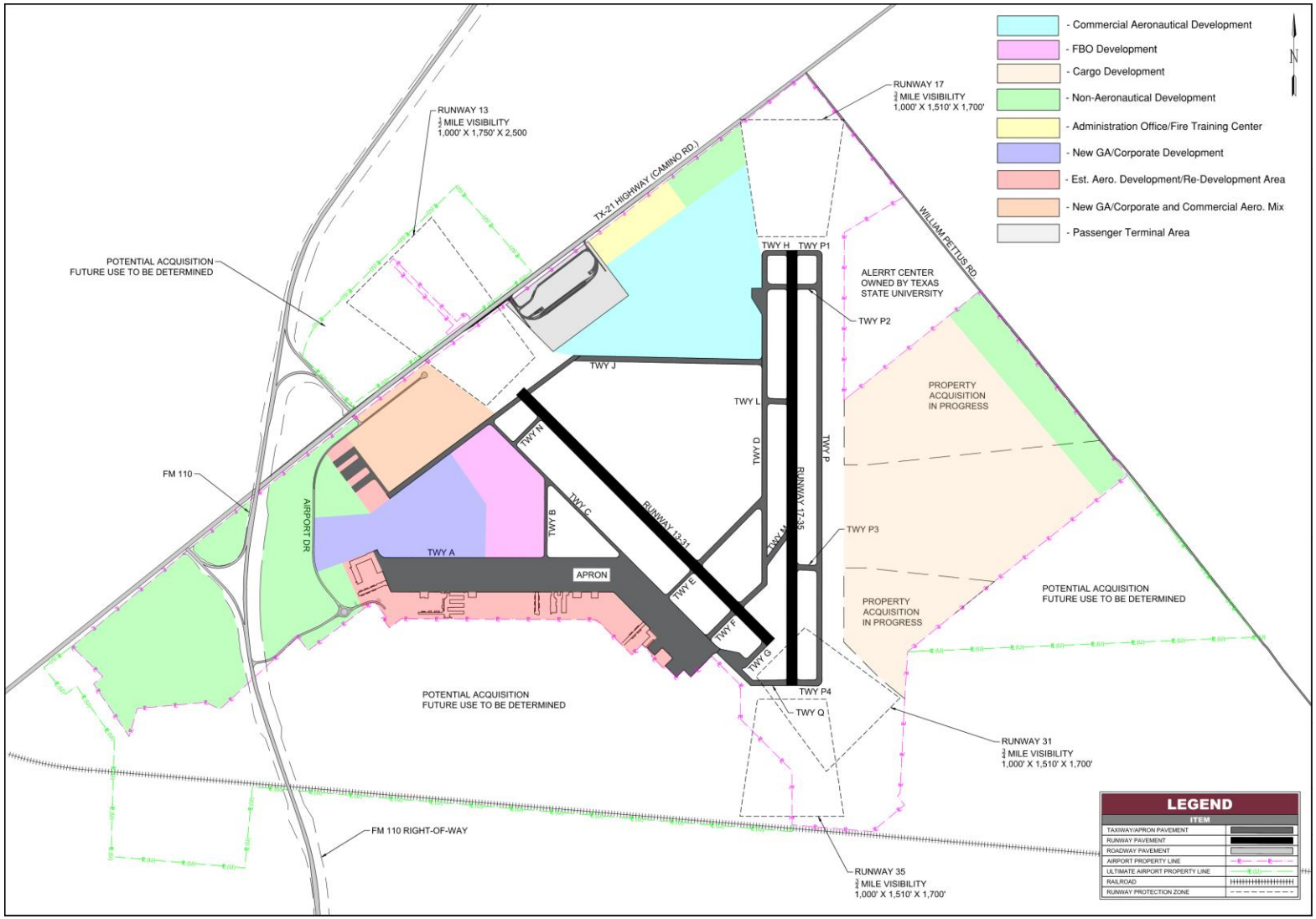
All three alternatives received identical ratings. Ultimately, Airfield Lighting Vault Location #3 was selected as the preferred location as there are limited other potential uses for this property.

Updated Land-Use Plan

Based on the preferred Airside Alternative and Passenger Terminal Area Alternative, an updated Land-Use Plan was prepared for the airport. The updated plan is shown as **Figure 11**. This plan identifies the types of development proposed for each parcel of land at the airport.

In the existing and ultimate FBO area, it is anticipated that infrastructure improvements may be necessary to support electrical aircraft or aircraft with vertical takeoff and landing capabilities. Aircraft using these technologies are primarily experimental and are currently limited in use. Consequently, the specific location(s) of the infrastructure needed to support these aircraft will be determined as specific use applications are defined for the airport.

Figure 11 – Land Use Plan



Source: Garver, 2025

CHAPTER 6

Capital Improvement Program and Financial Plan

CHAPTER 6 – CAPITAL IMPROVEMENT PROGRAM AND FINANCIAL PLAN

INTRODUCTION

This chapter provides a detailed summary of the Capital Improvement Program (CIP) and Financial Plan for the San Marcos Regional Airport. The CIP describes the near, mid, and long-term capital improvements necessary to migrate from the airport's existing infrastructure (described in the Inventory Chapter) to the future development plan set forth in the Alternatives Chapter. The Financial Plan describes the proposed funding plan for the programs/projects identified in the CIP.

CIP PROGRAM STRUCTURE AND TRIGGER MECHANISMS

The San Marcos Regional Airport CIP has been structured into fourteen improvement programs that each contain a series of projects focused on a common goal/improvement. For example, the capital projects necessary to extend Runway 17/35 to 6,314 feet and de-couple Runway 17/35 from Runway 13/31 are set forth in the "Runway 17/35 and 13/31 Physical Decoupling and Runway 17 Extension Program." This program then describes the individual projects needed to complete the program and discusses project phasing and financing.

As a general rule, programs within the CIP should be implemented based on "demonstrated demand" and not based solely on the proposed timing of the program as shown in the CIP. To aid in this effort, trigger mechanisms have been established for each program contained in the CIP. These trigger mechanisms identify the demand drivers behind each program and specify a demand threshold that, if eclipsed, should trigger the implementation of the program. It is recommended that the trigger mechanisms for each program be reviewed on an annual basis to determine which programs should be prioritized for implementation.

It should be noted that not all programs in the CIP have an activity-based trigger such as increases in based aircraft or aircraft operations. Many times, programs

have compliance or safety-based triggers when an existing piece of infrastructure creates a safety issue or does not comply with current airport design standards and needs to be corrected. An example of this is the decoupling of Runway 17/35 and Runway 13/31. Current FAA design standards identify that a single taxiway leading to the approach end of two runways has been shown to lead to wrong runway departures. As a result, the trigger for enacting the CIP program related to decoupling Runway 17/35 and 13/31 is based on improving safety at the Airport and not an activity threshold.

The programs set forth in the CIP have been organized into two general time frames:

- Short/Mid-Term Programs – 0 – 10 Years
- Long-Term Programs – 11+ Years

The CIP programs and trigger mechanisms were reviewed with Texas Aviation Partners (TAP) and the City of San Marcos to identify which programs should be included in the short/mid-term phase and the long-term phase. The Short/Mid-Term Program and Long-Term Program sections of this chapter describe the results of this effort and provides a detailed summary of the programs contained in each timeframe.

CIP Cost Estimates

Cost estimates for programs and individual projects within the CIP are in current year dollars and are based on Garver's conceptual understanding of the project and preliminary development considerations (e.g. environmental impacts, etc.). Since the cost estimates are based on current year dollars and are conceptual in nature, they are intended for planning purposes only and should not be used or construed as construction cost estimates. Formalized opinions of probable costs should be developed as a part of each project's scoping process during the design and engineering phase.

FUNDING PLAN OVERVIEW

The traditional source of funding utilized by most general aviation airports to finance capital projects is the FAA Airport Improvement Program (AIP). However, over the past 20 years the annual amount of funds authorized for the AIP program has remained relatively unchanged while construction costs have steadily increased. As a result, it has become increasingly challenging for airports to solely rely on AIP funds to meet their capital improvement needs. Non-aviation related grants (e.g. economic development, education, etc.), private financing, local funding, bonds, and other forms of debt have become necessary to develop and maintain airport infrastructure. Additionally, given the magnitude of many airport capital development programs, funding from a combination of sources is frequently required.

The sections below provide an overview of the FAA AIP program and other non-AIP funding sources that can be utilized to finance airport capital improvement programs.

A proposed funding plan, that leverages one or more of the funding sources described below, is provided for each of the fourteen capital improvement programs defined in this Master Plan for the San Marcos Regional Airport

FAA AIRPORT IMPROVEMENT PROGRAM OVERVIEW

The FAA AIP Program has been providing federal grant funds for airport development and planning projects since the passage of the Airport and Airway Improvement Act of 1982. AIP funds are drawn from the Airport and Airway Trust Fund (AATF), which is supported by a variety of user fees and fuel taxes. The FAA Reauthorization Act of 2018 provided annual AIP funding in the amount of $3.35 billion from the AATF for five years (from 2019-2023). Commercial service and general aviation airports that are part of the FAA's National Plan of Integrated Airport Systems (NPIAS) are eligible for AIP funds. According to the *Financing Airport Improvements Report* authored by the Congressional Research Service in March 2019, approximately 75% of AIP funds are allocated to commercial service airports on an annual basis.

The methodology utilized for allocating AIP funds to airports is a complex process. It is based on a combination of formula grants (also referred to as apportionments or entitlements) and discretionary funds. Each year, the entitlements funds are apportioned by formula to specific airports or types of airports. In general, larger airports with more activity are generally allocated more entitlement funds. These funds are provided individually to airports to aid them in completing eligible capital projects.

Once the entitlement allocation requirements are satisfied, the remaining funds are defined as discretionary funds. Airports apply for and compete against other airports to obtain discretionary funds for their projects. The FAA utilizes a prioritization system to rate proposed projects to allocate discretionary funding to specific projects on an annual basis. The vast majority of AIP funding is allocated for entitlement grants (typically close to 90%). In FY2018, only 9.4% of the total amount of authorized AIP funds were allocated to discretionary grants.

AIP funds can generally be used for projects that support aircraft operations such as runways, taxiways, aprons, noise abatement, land acquisition, and safety or emergency equipment. Revenue producing facilities (e.g. aircraft hangars and maintenance shops) are generally not eligible for AIP funding.

Integration of AIP Funds Within the CIP Funding Plan

The funding plans for many airfield improvement programs discussed in this chapter are anticipated to be supported with AIP funding. As a general practice, programs eligible for grant funding under the FAA's AIP program are shown as being grant funded at a 90/10 split with the FAA/TxDOT Aviation funding 90% of the project's estimated cost and the City of San Marcos funding the remaining 10%. Texas is a block grant state under the FAA's AIP program. As a block grant state, TxDOT Aviation is responsible for administering AIP grants to general aviation airports within the State of Texas.

General aviation airports receive a limited allotment of entitlement funds through the FAA AIP Program on an annual basis. Currently, the San Marcos Regional Airport receives $150,000 in Non-Primary Entitlement (NPE) funds annually through the FAA AIP Program. These funds can be banked for up to 4 years and require a 10% match by the sponsor. Any additional funding received through the AIP

program is discretionary funding which TxDOT Aviation and the FAA allocate to various airport projects throughout the State of Texas based on a project prioritization and rating system, as previously discussed.

Due to the limited amount of AIP grant funds available, the ability to implement a program within the CIP can be significantly influenced by the availability of the AIP funds necessary to enact the program. As a result, local funding (e.g. non-airport funds, general obligation bonds, etc.), TxDOT Aviation non-AIP grants, and other non-AIP funding sources (e.g. third party funds, economic development grants, etc.) can play an important role in executing projects that are necessary and are not likely to be funded with AIP discretionary grants. Consequently, the funding plan for the CIP identifies programs that are AIP eligible but may need to be funded using non-AIP money to ensure the program can be implemented when needed. An in-depth discussion on non-AIP funding mechanisms is provided in the next section.

It is important to note that this financial plan does not represent an obligation of local, state, or federal funds for any of the programs/projects discussed in this document. The obligation and allocation of funds to support the programs/projects included in this CIP are expected to be a function of the normal budgeting and grant administration cycles of the City of San Marcos, TxDOT Aviation, and the FAA.

NON-AIP CAPITAL FUNDING SOURCES

As mentioned previously, it has become increasingly important for airports to utilize non-AIP funding sources to meet their financial needs for capital improvements. These funding sources include but are not limited to:

- Non-AIP Grants (e.g. economic development, education, etc.)
- Local Funding
- Private Investment
- Bonds

Each of these non-AIP funding sources are discussed in the subsections below.

NON-AIP GRANTS

Many times, national, state, or regional grants are available for economic development activities and related capital improvements. Historically, these grant programs have successfully been leveraged to finance airport capital improvements. These grants can be particularly helpful to airports seeking to develop revenue producing facilities that are not eligible for AIP funding (e.g. hangars). However, economic development grant programs are typically competitive in nature which means proposed airport related projects must compete with a broad array of other projects for funding.

In addition to economic development grants, education centric grants have been utilized to help fund the development of education related facilities at airports including flight school, aircraft maintenance schools, and other aviation related activities.

LOCAL FUNDING

The most common source of non-AIP funding typically utilized to finance capital programs at an airport is local funding provided by municipalities such as city and county governments. With rising construction costs limiting the availability of AIP funding, local funding is being increasingly utilized to fund airport improvement programs that are AIP eligible but are unlikely to receive an AIP discretionary grant. As a result, it is essential that city and county governments provide funding support to their local airports to ensure necessary capital improvement programs can be implemented. Depending on the financial position of the municipality, these funds can come from a variety of sources including dedicated taxes to provide revenue to the airport, general fund revenues, and municipal debt (e.g. bonds). In general, general fund revenues and municipal debt are the most common local funding sources utilized to support airport capital improvement programs.

PRIVATE INVESTMENT

Private investment is typically leveraged at airports to develop revenue producing facilities such as hangars or commercial businesses. As a result, most private investment at general aviation airports occurs in the form of a developer/tenant constructing building improvements on airport land subject to a long-term ground

lease. Ground leases are unique real estate investments that present sophisticated challenges for both the developer/tenant and landlord. When the airport creates a ground lease, it grants the tenant the right to use, possess, and improve the land subject to terms and conditions outlined in the lease agreement for a specified duration. The airport, as landlord, retains all other ownership rights plus the right to regain possession when the lease expires, which is often referred to as its "right of reversion." With long-term leases covering land only, the tenant is generally expected to construct building improvements on the site or replace/redevelop those already in existence. Rent for long-term leases are generally "net" to the airport, with the tenant obligated to pay all construction costs, taxes and insurance, maintenance, and operating costs over the term of the lease. At the end of the lease term, in absence of any arrangement to the contrary, the improvements made to the land revert to the landlord.

BONDS

Airports will frequently turn to debt financing (bonds) to bridge their capital requirements for major capital programs or for those that are not eligible for AIP grants. Airports of all sizes are major and regular participants in the municipal bond markets. According to *Bond Buyer*, a trade publication, airports raised $17.4 billion in 84 separate bond issues in 2018.

There are three basic types of bonds available for funding airport capital development:

- General Obligation (GO) bonds supported by the overall tax base of the issuing entity (typically a local municipality).
- General Airport Revenue Bonds (GARBs) secured by the revenues of the airport and other revenues as may be defined in the bond indenture.
- Special facility bonds backed solely by revenues from a facility constructed with proceeds of the bond.

In general, GO bonds are the most common bonds leveraged by GA airports where limited opportunity exists to utilize GARBs and special facility bonds. GO bonds can be especially helpful to finance capital programs with a high cost and are unlikely to be funded with AIP grants.

Integration of Non-AIP Funds Within the CIP Funding Plan

Where appropriate, the various non-AIP financial options are incorporated in the funding plan sections for each CIP Program.

Short/Mid-Term CIP Programs and Funding Plan

This section discusses the CIP programs identified for inclusion in the short/mid-term planning horizon (e.g. years 0 – 10) including each program's proposed funding plan, trigger mechanism, and a year-by-year implementation strategy. The CIP programs included in the short/mid-term planning horizon are:

- Program #1 – Runway 17/35 and 13/31 Physical Decoupling and Runway 17 Extension
- Program #2 – Taxiway A and C Reconstruction
- Program #3 – Apron Reconstruction and Improvement
- Program #4 – Taxiway Rehabilitation and Standards Upgrade
- Program #5 – Runway Weight Bearing Capacity Evaluation

Each of these CIP programs are discussed in the subsections below.

Program #1 – Runway 17/35 and 13/31 Physical Decoupling and Runway 17 Extension

This program includes the physical decoupling of Runway 17/35 and Runway 13/31 and the northerly extension of Runway 17/35 by 500 feet as shown in Figure 5-4 of the Alternatives Chapter. As part of the decoupling, Runway 17/35 will be extended an additional 600 feet to the south and Runway 13/31 will be shortened by 450 feet at the approach end of Runway 31. Once the program is complete, the ultimate length of Runway 17/35 will be 6,314 feet and the ultimate length of Runway 13/31 would 5,151 feet. A new Instrument Approach Procedure (IAP) with ¾ mile visibility minimums would also be established for Runway 17 as part of this program. The program also includes the design and construction of taxiways to the new ends of the runways and new run-up pads.

Program Trigger Mechanism

Currently, there is a single taxiway (Taxiway Foxtrot) that leads to the approach end of Runway 31 and Runway 35. The presence of a single taxiway leading to two runway ends in close proximity to each other has been shown to be a contributing factor to wrong runway departures and the configuration should be corrected wherever it exists. As a result, the trigger mechanism for this program is the need to resolve the existing non-compliant configuration to improve operational safety at the San Marcos Regional Airport.

Program – Projects and Phasing

Table 6-1 provides an overview of the projects and proposed phasing for the program. The program begins with a detailed planning and environmental review effort to prepare for the design and construction of the decoupling. Once design is complete, the first phase of construction will be the extension of Runway 17/35 by 600 feet to the south followed by the shortening of Runway 13/31 by 450 feet. The next phases of the program includes the planning/environmental, design, and construction of the 500 feet extension of Runway 17 to the north.

TABLE 6-1
RUNWAY 17/35 AND 13/31 PHYSICAL DECOUPLING AND RUNWAY 17 EXTENSION
SAN MARCOS REGIONAL AIRPORT

Program #	Program Title	Project #	Project Title	Project Description	Year	Cost
1	Runway 17/35 and 13/31 Physical Decoupling and Runway 17 Extension	1	PLANNING/ENVIRONMENTAL - Runway 17/35 and Runway 13/31 Decoupling - Planning and Enviromental	Detailed phasing development and enviromental clearance (e.g. EA assumed) for Runway 17/35 and Runway 13/31 decoupling.	2024	$500,000
		2	DESIGN - Runway 17/35 and Runway 13/31 Decoupling	Design of the Runway 17/35 and Runway 13/31 Decoupling including Taxiway F and Q to the new approach ends of Runway 31 and Runway 35. New run-up pad for Runway 17/35. Mill and overlay of existing runway.	2025	$1,004,800
		3	CONSTRUCTION - Runway 17/35 and Runway 13/31 Decoupling (Extension of Runway 35 by 600 ft.)	The construction of the 600 ft. southerly extension of Runway 17/35.	2026	$7,168,000
		4	CONSTRUCTION - Runway 17/35 and Runway 13/31 Decoupling (Shortening of Runway 13/31 by 450 ft.)	The construction of the 450 ft. shortening of Runway 13/31 and the developing of a new run-up pad for the Runway 31 and 35 Runway ends.	2027	$2,880,000
		5	PLANNING/ENVIROMENTAL - Runway 17/35 - 500 ft. Extension to North	Environmental/planning work related to the extension of Runway 17/35 by 500 ft. to the north.	2028	$500,000
		6	DESIGN - Runway 17/35 - 500 ft. Extension to North	Design of Runway 17/35 500 ft. extension to the north including the design of a new engine run-up pad at the approach end of Runway 17.	2029	$416,200
		7	CONSTRUCTION - Runway 17/35 - 500 ft. Extension to North	The construction of the 500 ft. northern extension of Runway 17/35.	2030	$4,162,000

Source: Garver, 2020

Funding

The total estimated cost for this program is $16,631,000. The program is proposed to be funded through FAA AIP discretionary grants. Runway safety related projects rate highly in the discretionary prioritization process which positions this program well for discretionary funding. However, since it is unlikely the San Marcos Regional Airport will be able to obtain $16,631,000 in discretionary funding over a 2- or 3-year period, the program has been broken up to be implemented over 7 years. If necessary, it is feasible to complete the northerly extension of Runway 17/35 as part of a separate program.

PROGRAM #2 – TAXIWAY A AND C RECONSTRUCTION

This program includes the full-depth reconstruction of Taxiways A and C along the main apron. This program has already been designed and is expected to be completed in one phase.

Program Trigger Mechanism

The trigger mechanism for this program is the existing condition of the pavement on Taxiways A and C along the main apron area. Currently, the taxiway pavement is in poor condition and is producing Foreign Object Debris (FOD). As a result, a full-depth reconstruction of the taxiway pavement is necessary to allow aircraft to safely use the taxiways. This program does not include the reconstruction of Taxiway A at the approach end of Runway 8 or the reconstruction of Taxiway C north of Taxiway A.

Program – Projects and Phasing

Table 6-2 provides an overview of the projects and proposed phasing for the program. Currently, the program is shown as being constructed in a single phase in 2022. Airport personnel have been in discussions with TxDOT Aviation and the FAA regarding the appropriation of a discretionary grant for the project.

TABLE 6-2
TAXIWAY A AND C RECONSTRUCTION
SAN MARCOS REGIONAL AIRPORT

Program #	Program Title	Project #	Project Title	Project Description	Year	Cost
2	Taxiway A and C Reconstruction	1	CONSTRUCTION - Taxiway A and C Rehabilitation	Reconstruction of Taxiways A and C.	2022	$11,678,000

Source: Garver, 2020

Total: $11,678,000

Funding

The total estimated cost for this program is $11,678,000. The program is proposed to be funded through FAA AIP discretionary grants. Taxiway reconstruction projects rate highly in the discretionary prioritization process which positions this program well for discretionary funds.

Program #3 – Apron Reconstruction and Improvement

The reconstruction of the existing apron is expected to be an ongoing effort throughout the short/mid and long-term phases of the master plan. The primary focus of this program is to install "no-taxi" islands to close portions of the apron that are in poor condition and/or are not utilized significantly as shown in Figure 5-18 of the Alternatives Chapter. As part of this effort, minor repairs to the pavement within the no-taxi islands will be completed to prevent the pavement from further

deteriorating. In addition to the installation of the no-taxi islands, this program includes the reconstruction of approximately 1 acre of apron space that is in very poor condition located on the eastern portion of the apron and the reconstruction of approximately .84 acres of apron space close to the ATCT facility. These projects (e.g. the no-taxi islands and pavement rehabilitation) will address the pavement areas that are in the worst condition. Additional pavement maintenance (e.g. joint seal replacement, pavement repairs, etc.) will be needed throughout the planning horizon.

Program Trigger Mechanism

The trigger mechanism for this program is the existing condition of the apron pavement. Currently, portions of the apron are in poor/failed condition and produce FOD, which creates a safety hazard. As a result, portions of the apron that are in poor condition and not extensively utilized should be closed so they do not have to be maintained and the portions that are utilized should be rehabilitated.

Program – Projects and Phasing

Table 6-3 provides an overview of the projects and proposed phasing for the program. The installation of the no-taxi islands and the rehabilitation of the eastern portion of the apron should be the first priorities (projects 1 and 2). The rehabilitation of the apron area close to the ATCT should be the next priority (projects 3 and 4).

TABLE 6-3
APRON RECONSTRUCTION AND IMPROVEMENT
SAN MARCOS REGIONAL AIRPORT

Program #	Program Title	Project #	Project Title	Project Description	Year	Cost
3	Apron Reconstruction and Improvement	1	DESIGN - Installation of "No-Taxi Islands" and Replacement of 1 Acre of Pavement on Eastern Portion of Ramp	Design of "No-Taxi Islands" to be installed along the apron. Replacement of 1 acre of pavement in poor condition on the eastern side of the ramp.	2021	$188,000
		2	CONSTRUCTION - Installation of "No-Taxi Islands" and Replacement of 1 Acre of Pavement on Eastern Portion of Ramp	Construction of "No-Taxi Islands" to be installed along the apron. Replacement of 1 acre of pavement in poor condition on the eastern side of the ramp.	2022	$2,012,000
		3	DESIGN - Apron Reconstruction by ATCT	Design for the reconstruction of .84 acres of apron pavement adjacent to the ATCT facility.	2023	$126,000
		4	CONSTRUCTION - Apron Reconstruction by ATCT	Construction of .84 acres of apron pavement adjacent to the ATCT facility.	2024	$1,389,000

Source: Garver, 2020

Funding

The total estimated cost for this program is $3,715,000. While apron rehabilitation projects are eligible for AIP funding, they typically hold a lower priority than the runway and taxiway projects that receive the bulk of the available AIP discretionary funding. While it is recommended that AIP funding be pursued for this program, local funding of the project through a General Obligation Bond (GO Bond) should be considered if AIP funding cannot be obtained.

Program #4 – Taxiway Rehabilitation and Standards Upgrade

This program includes the rehabilitation of the remaining taxiways at the San Marcos Regional Airport that will not be rehabilitated as part of the Taxiway A and C Reconstruction program or the Runway 17/35 and 13/31 Physical Decoupling and Runway Extension program. Additionally, any taxiways that currently do not meet TDG 3 design standards will be upgraded to meet the standard as part of this program. Pavement condition information provided by the City of San Marcos was utilized to estimate the extent of the pavement maintenance required (e.g., routine maintenance, mill and overlay, reconstruction, etc.) on each taxiway surface.

Program Trigger Mechanism

The trigger mechanism for this program is the existing condition of the taxiway pavement. Portions of the existing taxiway system are in fair to poor condition and need to be rehabilitated soon while others are in good condition and only require routine maintenance.

Program – Projects and Phasing

Table 6-4 provides an overview of the projects and proposed phasing for the program. Portions of the existing taxiway system that are in fair or poor condition have been prioritized as part of this program.

TABLE 6-4
TAXIWAY REHABILITATION AND STANDARDS UPGRADE
SAN MARCOS REGIONAL AIRPORT

Program #	Program Title	Project #	Project Title	Project Description	Year	Cost
4	Taxiway Rehabilitation and Standards Upgrade	1	DESIGN - Reconstruction of Taxiway C North of Taxiway A	Design of the reconstruction of Taxiway C North of Taxiway A and upgrade to TDG 3 standards	2024	$315,000
		2	CONSTRUCTION - Reconstruction of Taxiway C North of Taxiway A	Construction of the reconstruction of Taxiway C North of Taxiway A and upgrade to TDG 3 standards.	2025	$3,360,000
		3	DESIGN - Mill and Overlay of Taxiway B	Design of mill and overlay of Taxiway B and upgrade to TDG 3 standards	2026	$70,000
		4	CONSTRUCTION - Mill and Overlay of Taxiway B	Construction of mill and overlay of Taxiway B and upgrade to TDG 3 standards	2027	$809,000
		5	DESIGN - Routine Maintenance on Taxiway J	Design of routine pavement maintenance (seal coat) on Taxiway J	2028	$160,000
		6	CONSTRUCTION - Routine Maintenance on Taxiway J	Construction of routine pavement maintenance (seal coat) on Taxiway J	2029	$1,755,000
		7	DESIGN - Routine Maintenance on Taxiway A at Approach of Runway 8	Design of routine pavement maintenance (seal coat) on Taxiway A at the approach end of Runway 8 and upgrade to TDG 3 standards	+10 Years Out	$148,000
		8	CONSTRUCTION - Routine Maintenance on Taxiway A at Approach of Runway 8	Construction of routine pavement maintenance (seal coat) on Taxiway A at the approach end of Runway 8 and upgrade to TDG 3 standards	+10 Years Out	$1,626,000
		9	DESIGN - Routine Maintenance on Taxiway E Between Taxiway C and Runway 13/31	Design of routine pavement maintenance (seal coat) on Taxiway E between Taxiway C and Runway 13/31	+10 Years Out	$95,000
		10	CONSTRUCTION - Routine Maintenance on Taxiway E Between Taxiway C and Runway 31/31	Construction of routine pavement maintenance (seal coat) on Taxiway E between Taxiway C and Runway 13/31	+10 Years Out	$1,010,000

Source: Garver, 2020

Funding

The total estimated cost for this program is $9,348,000. It should be noted that projects 7-10 of this program are expected to occur in the long-term portion of the CIP, leaving $6,469,000 to be funded in the short/mid-term portion of the CIP. As previously discussed, taxiway rehabilitation projects compete well for AIP discretionary funding. As a result, AIP discretionary funding is proposed to be used for this program.

PROGRAM #5 – RUNWAY WEIGHT BEARING CAPACITY EVALUATION

This program includes a single project to determine the existing weight bearing capacity of Runway 17/35 and Runway 13/31.

Program Trigger Mechanism

The existing weight bearing capacity of the runway pavement at the San Marcos Regional Airport has not been clearly defined. Therefore, it is a priority to accurately define the existing weight bearing capacity to determine what changes may need to

be made in the future when larger aircraft (Q400 which is a possibility outlined in prior chapters) begin using the Airport on a more frequent basis.

Program – Projects and Phasing

Table 6-5 provides an overview of the only project associated with this program.

TABLE 6-5
RUNWAY WEIGHT BEARING CAPACITY EVALUATION
SAN MARCOS REGIONAL AIRPORT

Program #	Program Title	Project #	Project Title	Project Description	Year	Cost
5	Runway Weight Bearing Capacity Evaluation	1	DESIGN - Pavement Weight Bearing Capacity Evaluation	This includes a pavement structure evaluation for the existing runway pavements to determine their weight bearing capacity.	2021	$50,000

Source: Garver, 2020

Funding

The total estimated cost for this program is $50,000. Due to the low cost of this program, it is recommended the TxDOT Aviation RAMP grant program be utilized for funding.

Short/Mid-Term Phasing Summary

Figure 6-1 provides an overview of the proposed phasing for all the projects set forth in the five programs that are part of the short/mid-term phase of the CIP. The colors used in the figure correspond to the colors utilized in Table 6-1 through 6-5. The first number in the "Program/Project" column refers to the program number and the second number refers to the project number shown in the aforementioned tables.

FIGURE 6-1
SHORT/MID-TERM PHASING SUMMARY
SAN MARCOS REGIONAL AIRPORT

Program/ Project	Short/Mid-Term Programs Years									
	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030+
1-1				$0.5M						
1-2					$1M					
1-3						$7M				
1-4							$3M			
1-5								$0.5M		
1-6									$0.4M	
1-7										$4M
2-1										
2-2		$11.7M								
2-3										
3-1	$.18M									
3-2		$2M								
3-3			$.13M							
3-4				$1.4M						
4-1				$0.3M						
4-2					$3.3M					
4-3						$.07M				
4-4							$.8M			
4-5								$.16M		
4-6									$1.8M	
4-7										$.14M
4-8										$1.6M
4-9										$.09M
4-10										$1M
5-1	$.05M									
Totals	$.23M	$13.7M	$.13M	$2.2M	$4.3M	$7.07M	$3.8M	$.66M	$2.2M	$6.83M

LONG-TERM CIP PROGRAMS AND FUNDING PLAN

This section discusses the CIP programs identified for inclusion in the long-term planning horizon (e.g. years 11+) including each program's proposed funding plan and implementation trigger. A year-by-year breakdown of the projects and phasing of each program is not included for these programs since they are part of the long-term timeframe. The CIP programs included in the long-term phase are:

- Program #6 – Western Partial Parallel Taxiway for Runway 17/35 (Proposed Taxiway D, H, P2, L, M, F, and E)
- Program #7 – Eastern Full-Length Parallel Taxiway for Runway 17/35 (Proposed Taxiway P, P1 – P4)
- Program #8 – Taxiway Juliet Realignment (Southerly)
- Program #9 – Taxiway November Connector to Runway 13/31
- Program #10 – Runway 17/35 Strengthening and Widening
- Program #11 – Runway 13/31 Strengthening and Widening
- Program #12 – Decommissioning of Runway 8/26
- Program #13 – Roadway Improvement Program
- Program #14 – Utilities and Aesthetic Improvements Program

Each of these CIP programs are discussed in the subsections below. Individual costs for the projects within each of these programs have been provided to the City of San Marcos to support future planning and implementation.

PROGRAM #6 – WESTERN PARTIAL PARALLEL TAXIWAY FOR RUNWAY 17/35 (PROPOSED TAXIWAY D, H, P2, L, M, F, AND E)

This program includes the development of the western partial parallel taxiway for Runway 17/35 (proposed to be called Taxiway Delta) including the development of the new Taxiway Foxtrot, Taxiway Echo north of Runway 13/31, and the new high-speed taxiway exit (Taxiway Mike) for aircraft landing on Runway 17.

Program Trigger Mechanism

This program should be implemented when taxi times to and from Runway 17/35 begin creating operational delays at the Airport. This is likely to occur as aircraft operations increase closer to 100,000 operations annually as is expected toward the end of the 20-year planning horizon.

Program – Projects and Phasing

The parallel taxiway and the new crossing points for Runway 13/31 (e.g. Taxiways Echo and Foxtrot) should be constructed first. Taxiway Mike could be constructed separately as part of a separate phase, if needed.

Funding

The total estimated cost for this program is $23,211,100. This program is AIP eligible. However, capacity improvement projects are typically rated lower when competing for discretionary funding. As a result, AIP funding should be pursued but local debt financing of the program may be necessary if the program is needed and AIP funding cannot be obtained.

PROGRAM #7 – EASTERN FULL-LENGTH PARALLEL TAXIWAY FOR RUNWAY 17/35 (PROPOSED TAXIWAY P, P1 – P4)

This program includes the development of the eastern full-length parallel taxiway for Runway 17/35 (proposed to be called Taxiway Papa) including four stub taxiways connecting the runway to the new parallel taxiway.

Program Trigger Mechanism

This program should be implemented if there is demand for development in the cargo development area identified east of Runway 17/35. This area is not expected to be developed until close to the end of the 20-year planning horizon. The ALEERT Center area would likely need to be purchased to support development in this area. It should be purchased if the area becomes available.

Program – Projects and Phasing

The parallel taxiway and the new crossing points (e.g. Taxiways P1 and P4) should be constructed first. Taxiway P2 and P3 could be constructed as part of a separate phase, if needed.

Funding

The total estimated cost for this program is $23,424,022. This program is AIP eligible. However, capacity improvement projects are typically rated lower when competing for discretionary funding. As a result, AIP funding should be pursued but local debt financing of the program may be necessary if the program is needed and AIP funding cannot be obtained.

PROGRAM #8 – TAXIWAY JULIET REALIGNMENT (SOUTHERLY)

This program includes the realignment of Taxiway Juliet to the south to open up additional land for development south of TX 21.

Program Trigger Mechanism

This program should be implemented if there is demand for development in the commercial aeronautical business development area south of TX 21 beyond what can be accommodated on the existing land.

Program – Projects and Phasing

The project is expected to be completed in a single phase.

Funding

The total estimated cost for this program is $7,122,930. This program is AIP eligible. However, since the project is being undertaken to open up additional land for development, obtaining AIP funding is expected to be difficult. If there is demand for additional commercial aeronautical development in the area that requires the realignment of Taxiway Juliet, it is recommended that the realignment project be incorporated as part of the third party development financing used to develop the site.

PROGRAM #9 – TAXIWAY NOVEMBER CONNECTOR TO RUNWAY 13/31

This program includes the addition of a new taxiway exit for Runway 31 identified as Taxiway November.

Program Trigger Mechanism

This program should be implemented if the number of aircraft operations increases on Runway 31 and operational delays begin occurring due to Runway Occupancy Time (ROT). This is not expected to occur until late in the 20-year planning horizon.

Program – Projects and Phasing

The project is expected to be completed in a single phase.

Funding

The total estimated cost for this program is $3,341,000. This program is AIP eligible. However, capacity improvement projects are typically rated lower when competing for discretionary funding. As a result, AIP funding should be pursued but local debt financing of the program may be necessary if the program is needed and AIP funding cannot be obtained.

PROGRAM #10 – RUNWAY 17/35 STRENGTHENING AND WIDENING

This program includes the widening of Runway 17/35 to 150 feet and the strengthening of the runway to accommodate double wheel (DW) aircraft up to 175,000 pounds.

Program Trigger Mechanism

This program would be triggered if there is demand for mid-sized cargo aircraft (e.g., similar to the B-737-800's operated by Amazon) to begin regularly operating at the Airport.

Program – Projects and Phasing

The project is expected to be completed in a single phase.

Funding

The total estimated cost for this program is $26,275,700. This program is AIP eligible. It is recommended that AIP discretionary funding be pursued.

Program #11 – Runway 13/31 Strengthening and Widening

This program includes the widening of Runway 13/31 to 150 feet and the strengthening of the runway to accommodate DW aircraft up to 175,000 pounds.

Program Trigger Mechanism

This program would be triggered if there is demand for mid-sized cargo aircraft (e.g., similar to the B-737-800's operated by Amazon) to begin regularly operating at the Airport.

Program – Projects and Phasing

The project is expected to be completed in a single phase.

Funding

The total estimated cost for this program is $21,623,800. This program is AIP eligible. It is recommended that AIP discretionary funding be pursued.

Program #12 – Decommissioning of Runway 8/26

This program includes the decommissioning of Runway 8/26 and the decommissioning of Taxiway Alpha and Juliet at the approach end of Runway 8.

Program Trigger Mechanism

This program should be implemented when Runway 17/35 is extended to 6,314 feet or when it becomes infeasible to maintain Runway 8/26.

Program – Projects and Phasing

The project is expected to be completed in a single phase.

Funding

The total estimated cost for this program is $1,441,000. This program is AIP eligible. It is recommended that AIP discretionary funding be pursued. Since the cost of this program is relatively low compared to other programs, it may be feasible to use AIP discretionary funds to supplement NPE funds for this project.

PROGRAM #13 – ROADWAY IMPROVEMENT PROGRAM

This program includes multiple new roadways at different locations around the airport as shown in Figure 5-14 of the Alternatives Chapter. Specifically, it includes new roadways in each of the land-use development areas (e.g. Taxiway K, Taxiway J, and Runway 8/26 re-development area), a new roadway connecting Airport Drive to the SMART Terminal facility, the airport access road from FM 110, and a roadway connection from the SMART Terminal to the proposed cargo development area. All roadways are expected to have a single lane in each direction.

Program Trigger Mechanism

The trigger mechanism for each roadway project contained in this program will be tied to the demand for development in the area(s) the roadway serves. As demand for development in a particular area is realized, roadway(s) to serve that development area should be considered. The development of the roadway connecting FM 110 and Airport Drive is expected to occur during the short-term planning horizon due to the potential relocation of the Gary Job Corp. entrance.

Program – Projects and Phasing

Each roadway contained in the program is expected to be completed individually.

Funding

The total estimated cost for this program is $14,049,000. This program is not AIP eligible. Roadway projects will likely need to be locally funded or funded by third party financing as part of the development of the area the roadway will serve. The development of new roadways will likely occur throughout the planning horizon.

PROGRAM #14 – UTILITIES AND AESTHETIC IMPROVEMENTS PROGRAM

This program includes multiple utility and aesthetic improvements at the Airport. Specifically, this program includes:

- The installation of a common-use fiber optic cable along Airport Drive.
- Relocation of all the existing above ground utilities along Airport Drive to underground utilities.
- The replacement of the Gary Job Corp fencing along Airport Drive to a fence type that is more refined in appearance.
- The relocation of the Graham Air Traffic Control Tower and airfield electrical controls vault.

Program Trigger Mechanism

The trigger mechanism for each project contained in this program will be different. The installation of common-use fiber optic cable will be important for the continued development of the main apron area and should be implemented when able as existing tenants have identified it as a need. The relocation of the Graham Air Traffic Control Tower and electrical vault will be triggered by demand to develop the area where these facilities are currently located. The relocation of the above ground utilities to an underground location and the replacement of the fence are aesthetic improvements that do not have a specific trigger.

Program – Projects and Phasing

Each project contained in the program is expected to be completed individually.

Funding

The total estimated cost for this program is $5,295,000. This program is not AIP eligible. All projects are expected to be locally funded with the exception of the common-use fiber. The City of San Marcos should work with local fiber utility providers to install common-use fiber along Airport Drive. These improvements are expected to occur throughout the planning horizon.

CIP PHASING SUMMARY

Figure 6-2 provides an overview of the short/mid and long-term CIP phasing for all the programs shown within the CIP.

FIGURE 6-2
CIP PHASING SUMMARY
SAN MARCOS REGIONAL AIRPORT

Short/Mid-Term Programs										
Program/ Project	Years									
	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030+
1-1				$0.5M						
1-2					$1M					
1-3						$7M				
1-4							$3M			
1-5								$0.5M		
1-6									$0.4M	
1-7										$4M
2-1										
2-2		$11.7M								
2-3										
3-1	$.18M									
3-2		$2M								
3-3			$.13M							
3-4				$1.4M						
4-1				$0.3M						
4-2					$3.3M					
4-3						$.07M				
4-4							$.8M			
4-5								$.16M		
4-6									$1.8M	
4-7										$.14M
4-8										$1.6M
4-9										$.09M
4-10										$1M
5-1	$.05M									
Totals	$.23M	$13.7M	$.13M	$2.2M	$4.3M	$7.07M	$3.8M	$.66M	$2.2M	$6.83M

Long Term Programs										
Program	Years									
	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030+
6										
7										
8										
9										
10										
11										
12										
13										
14										

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Date: September 26, 2025

To: City of San Marcos and Texas Aviation Partners

From: Nathan Polsgrove, Garver

RE: Capital Improvement Plan (CIP) and Financial Plan for the Airport Master Plan Update 2025

This memorandum provides an updated Capital Improvement Plan (CIP) and Financial Plan for San Marcos Regional Airport (HYI or Airport). The purpose of this CIP and Financial Plan Chapter is to provide a methodical, actionable, and prioritized plan for programming future infrastructure projects. This CIP and Financial Plan Chapter integrates the findings of previous planning studies at the Airport including the following:

- San Marcos Regional Airport Master Plan (AMP) Update – October 2020
- San Marcos Regional Airport Gap Analysis Study – February 13, 2024

The contents of this chapter updates and integrates the CIPs established in the aforementioned documents and, consequently, should be used as the primary CIP guidance for the Airport moving forward. This CIP has been structured into seventeen (17) capital improvement programs that are based on six (6) development priorities.

Capital Improvement Program – Development Priorities

Capital projects at airports may be enacted based on a variety of factors including, but not limited to, maintaining existing infrastructure, meeting Federal Aviation Administration (FAA) design standards, improving safety and security, increasing airport capacity, and meeting the needs of current and proposed airport users. The importance of each of these factors and how they influence project prioritization within an airport's CIP can change over time. To aid in prioritizing the capital improvement programs within this HYI CIP, the following development priorities were established:

- Priority A - Development of Runway 17-35 Into the Primary Runway – As discussed in the October 2020 AMP Update, Runway 17-35 should be developed as the primary runway at the Airport due to prevailing winds. However, Runway 17-35 is currently the shortest runway, has the lowest pavement strength, and has no parallel taxiway infrastructure. Priority A focuses on programs and projects that will improve Runway 17-35 to conditions that are more consistent with a primary runway designation.

- Priority B – Improvements to Enable Regular Use by Large Aircraft – As economic and population growth continues within the I-35 corridor, demand for the regular operation of large narrowbody aircraft such as the Boeing 737 Max and Airbus A320neo series may occur at the Airport. Priority B focuses on programs and projects that will improve the airfield design standards so that it can accommodate the regular operation of these large narrowbody aircraft.

- Priority C – Airport Maintenance and Rehabilitation – Airfield pavements (e.g., runways, taxiways, aprons, etc.) and other infrastructure elements (e.g., drainage, NAVAIDs, fencing, etc.) must be properly maintained and improved to support the safety and efficiency of aircraft operations. Priority C focuses on programs and projects that will improve existing pavements and other infrastructure at the Airport to support the safety and efficiency of aircraft movements and enhance capacity.

- Priority D – Eastern Development Area – As discussed in the October 2020 AMP Update, HYI property east of Runway 17-35 is a long-range development area. This area has been identified as a long-term development area due to its limited landside access and environmental considerations. If demand for aeronautical development in this area is realized, an eastern parallel taxiway for Runway 17-35 will be needed.

- Priority E – Northwest Roadway Development – The primary near-term development area for HYI is on-Airport property along State Highway (SH)-21 in the northwest quadrant of the Airport. As demand for additional development is realized, the public and internal airport roadway infrastructure in this area will need to be expanded to support future development. Priority E focuses on programs and projects that will improve vehicle access to these development areas.

- Priority F – Safety and Security – Safety and security are always a paramount consideration related to airport infrastructure projects. However, some projects have a specific objective of improving safety and security. Priority F focuses on programs and projects that will improve safety and/or security at the Airport.

Based on current demand, it is anticipated that Development Priorities A, C, E, and F will be the primary factors that drive the sequencing of capital projects over the next 10 years. However, that could change if demand for the regular use of large narrowbody aircraft or demand for development in the Eastern Development Area occurs earlier than anticipated.

Capital Improvement Program – Program Overview

In developing this CIP, seventeen (17) development programs were identified. Typically, each program includes a series of projects that align with one or more of the development priorities discussed in the previous section. The seventeen (17) development programs and their alignment with the development priorities are displayed in **Table 1. Figure 1** visually depicts the location of thirteen (13) of the seventeen (17) development programs. Programs 11, 13, 14, and 15 are not displayed in Figure 1 as their locations are not explicitly defined and may vary.

It should be noted that a single development program can be tied to more than one development priority. For example, the program related to the decoupling of Runway 17-35 and 13-31 is related to the following development priorities:

- Priority A - Development of Runway 17-35 Into the Primary Runway
- Priority B – Improvements to Enable Regular Use by Large Aircraft
- Priority C – Airport Maintenance and Rehabilitation
- Priority F – Safety and Security

Development programs that are related to multiple development priorities are typically strategic improvements and be prioritized when developing and refining the Airport's CIP.

The following sub-sections provide an overview of each of the seventeen (17) development programs including a description of the program, anticipated timing, anticipated costs, and the proposed funding mechanism. Cost estimates for programs and individual projects within the CIP are in current year dollars and are based on Garver's conceptual understanding of the project and preliminary development considerations (e.g. environmental impacts, etc.). Since the cost estimates are based on current year dollars and are conceptual in nature, they are intended for planning purposes only and should not be used or construed as construction cost

estimates. Formalized opinions of probable cost should be developed as a part of each project's scoping process during the design and engineering phase of each respective project.

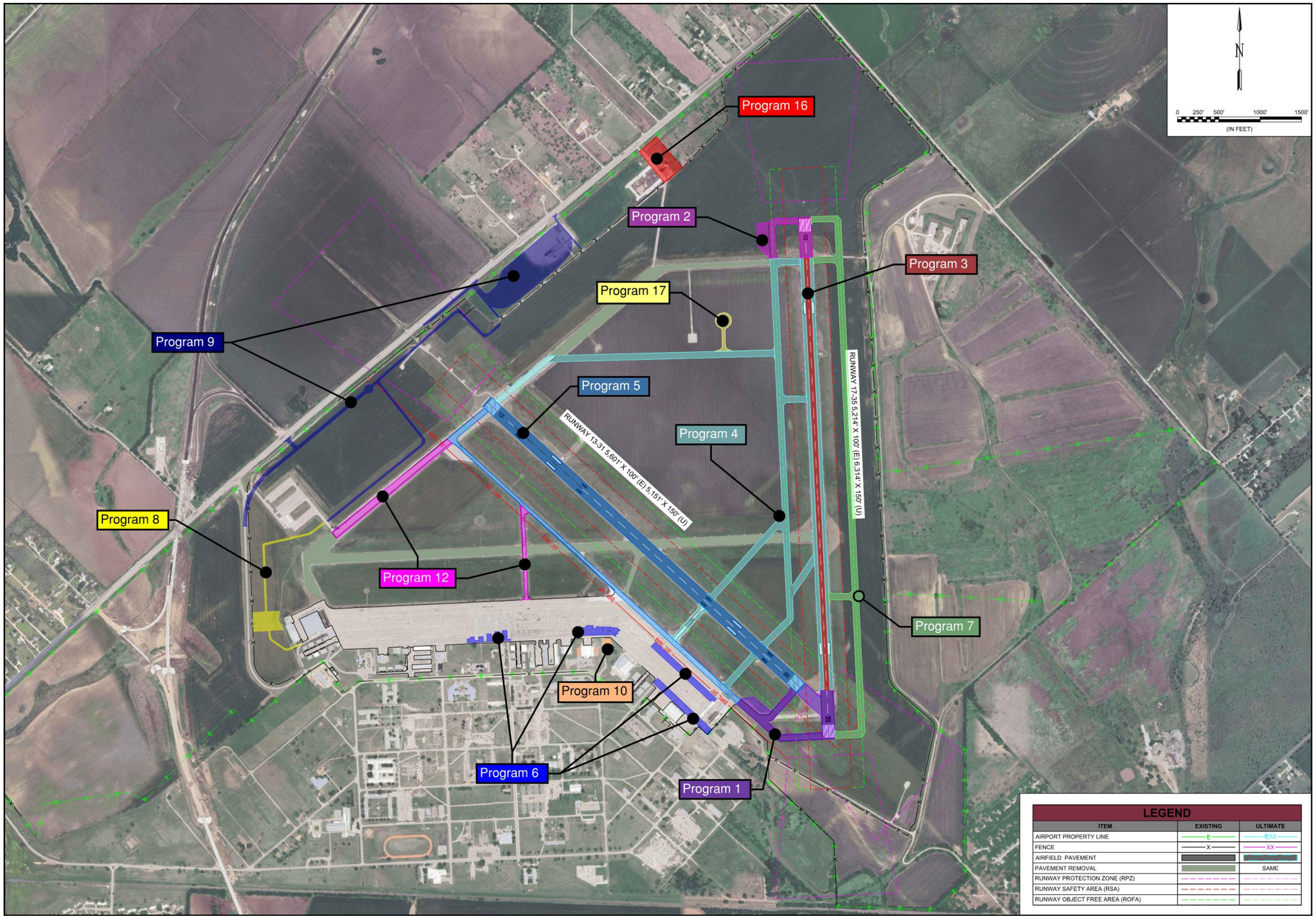
Table 1 – CIP Program Alignment with Established Development Priorities

CIP Programs	Development Priorities					
	A Primary Runway Development (Runway 17-35)	B Larger Aircraft	C Airport Maintenance and Rehabilitation	D Eastern Development Area	E Roadway Development	F Safety and Security
1 - Runway 17-35 and Runway 13-31 Physical De-Coupling	X	X	X*			X
2 - Runway 17-35 - 500 ft. Extension to North	X	X	X*			X
3 - Runway 17-35 - Keel Section Strengthening	X	X	X*			X
4 - Larger Aircraft - Airfield Strengthening Capacity Program (Phase 1 - Runway 17-35)		X	X*			
5 - Larger Aircraft - Airfield Strengthening Capacity Program (Phase 2 - Runway 13-31)		X	X*			
6 - Existing Apron Pavement Reconstruction Program			X			X
7 - Eastern Full-Length Parallel Taxiway for Runway 17/35				X		
8 - Fuel Farm and Perimeter Road - Phase 1					X	X
9 - SH 21 Roadway, Terminal Roadway, and Perimeter Road - Phase 2					X	X
10 - Existing ATCT Rehabilitation Program			X			
11 - Terminal Area Utilities and Fencing Improvements			X			
12 - Taxiway Rehabilitation Program			X			X
13 - Airport Security Improvement Program						X
14 - Wildlife Fencing Improvements			X			X
15 - Airport Stormwater Drainage Improvements Program			X			
16 - Air Carrier Non-Pavement Infrastructure Improvements		X				
17 - Aircraft Engine Run-Up Area						X

* - Programs including airfield pavement strengthening or expansion for large aircraft also play a key role in the execution of the airport's pavement rehabilitation program.

Source: Garver, 2025

Figure 1– CIP Program Overview



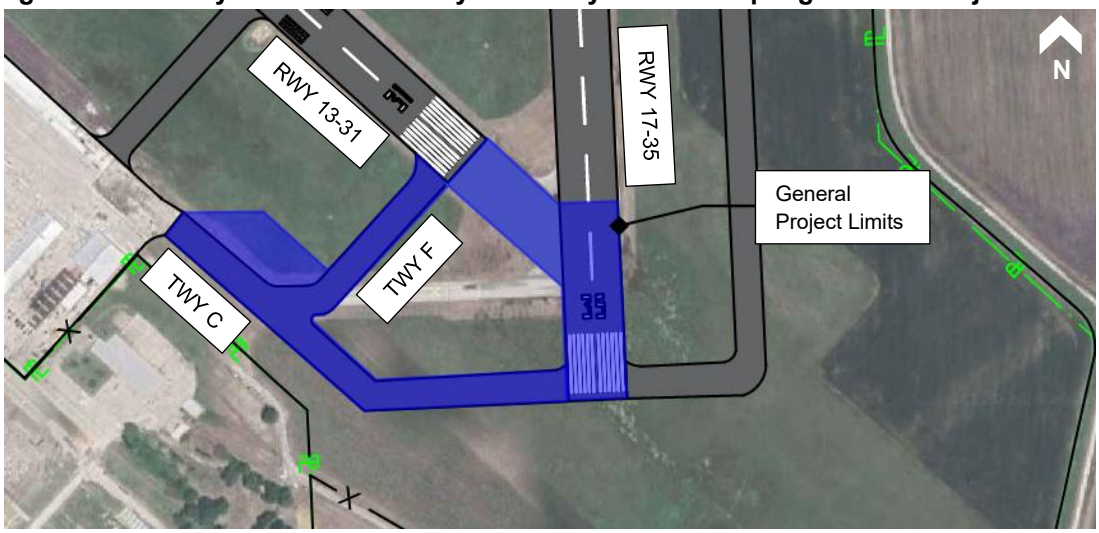
Source: Garver, 2025

Development Program #1 – Runway 17-35 and Runway 13-31 Physical De-Coupling

This program includes the physical de-coupling of Runway 17-35 and 13-31 and the necessary modifications to provide new connecting taxiway infrastructure to each of the proposed runway ends. This project will extend Runway 17-35 by 600 ft. to the south and will shorten Runway 13-31 by 450 ft.to the northwest. The new runway and taxiway pavement will be strengthened to support regular operations of aircraft up to 80,000 lbs. with single wheel landing gear configurations. This strengthening is necessary to enable the ultimate decommissioning of Runway 8-26. The new taxiways are planned to be 50 ft. in width to support regular Taxiway Design Group (TDG) 3 operations. This project also includes the addition of a new engine run-up pad adjacent to Taxiway F and the relocation of all necessary markings, signs, and lighting. The program's design, environmental clearances, and aerial survey work are not included as they have already been funded as a FY25 project in the Texas Department of Transportation (TxDOT) Aviation CIP. The general limits of the program are shown in **Figure 2**.

- Why Does this Program Need to Be Enacted – According to FAA AC 150/5300-13B, *Airport Design*, paragraph I.7 – "Runway configurations resulting in a runway threshold being located in close proximity to another runway or runway threshold, create an elevated risk for runway incursions and wrong surface events." Currently, the pavement associated with Runway 35 and Runway 31 intersect. Consequently, the current configuration does not meet FAA design standards.
- When Does this Program Need to Be Enacted – Short-Term (0-5 Years)
- Construction Cost Estimate- $11,550,000
- Funding Mechanism – Combination of FAA discretionary and state funding. Because the project is runway and safety related, it should compete well for FAA discretionary funds.

Figure 2 – Runway 17-35 and Runway 13-31 Physical Decoupling General Project Limits



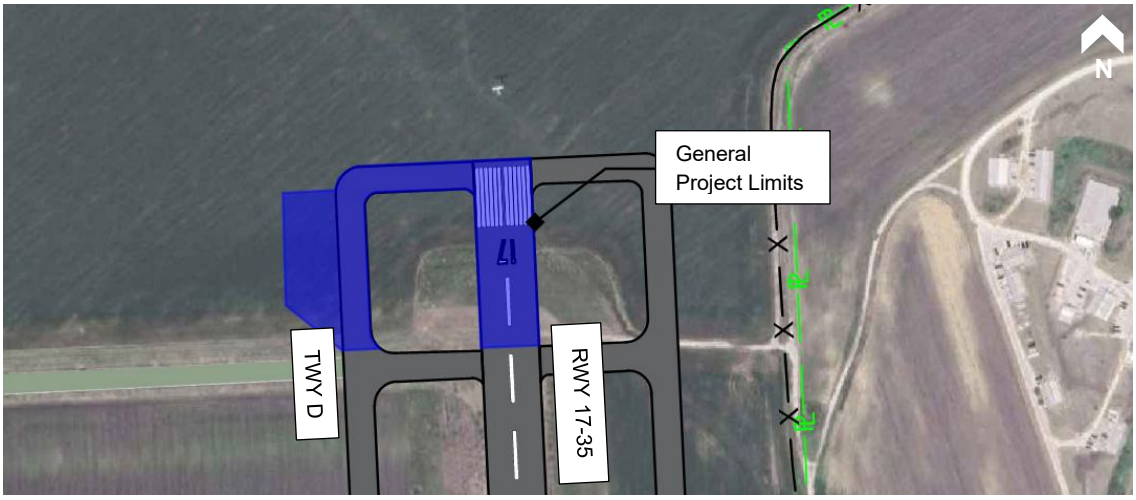
Source: Garver, 2025

Development Program #2 – Runway 17-35 500 ft. Extension to North

This program includes the extension of Runway 17-35 by 500 ft. to the north and the addition of new connecting taxiway infrastructure to the proposed runway end. The new runway and taxiway pavement will be strengthened to support regular operations of aircraft up to 80,000 lbs. with single wheel landing gear configurations. This strengthening is necessary to enable the ultimate decommissioning of Runway 8-26. The new taxiway is anticipated to be 50 ft. wide to support regular TDG-3 operations. This project also includes the addition of a new engine run-up pad adjacent to the taxiway and the relocation of all necessary markings, signs, and lighting. The program's design and aerial survey work are included in the cost estimate. Environmental documentation is assumed to be accomplished as part of Development Program #1. The general limits of the project are shown in **Figure 3**.

- Why Does this Program Need to Be Enacted – According to FAA AC 150/5300-13B, *Airport Design*, paragraph I.4 – "Using runways as a taxiway introduces an elevated risk to operational safety. Performing taxi operations on a runway can lead to potential pilot confusion due to the wider pavement surface and the lack of standard taxiway pavement markings, signage, and lighting." Currently, Runway 17-35 must be used to access the approach end of Runway 26. Consequently, the current configuration does not meet FAA design standards. The extension and strengthening of Runway 17-35 will enable the ultimate decommissioning of Runway 8-26 which would eliminate this deficiency.
- When Does this Program Need to Be Enacted – Short-Term (0-5 Years)
- Project Cost Estimate - $11,220,000
- Funding Mechanism – State Budget Rider

Figure 3 – Runway 17-35 Northern Extension General Project Limits



Source: Garver, 2025

Development Program #3 – Runway 17-35 Keel Section Strengthening

This program includes the strengthening of the 50 ft. keel section of Runway 17-35 to support aircraft operations up to 80,000 lbs. with single wheel landing gear configurations. This strengthening is necessary to enable the ultimate decommissioning of Runway 8-26. The program's design costs are included, but environmental documentation is assumed to be accomplished as part of Development Program #1.

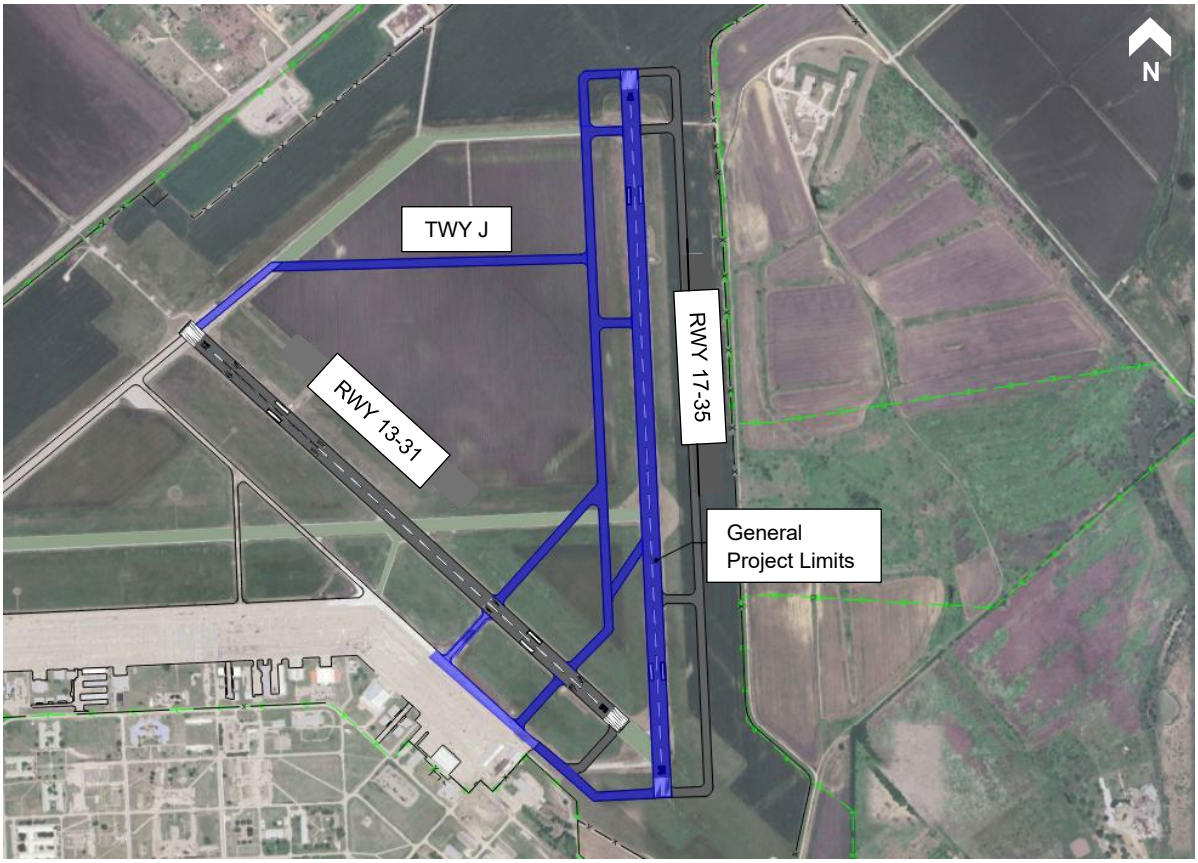
- Why Does this Program Need to Be Enacted – According to FAA AC 150/5300-13B, *Airport Design*, paragraph I.4 – "Using runways as a taxiway introduces an elevated risk to operational safety. Performing taxi operations on a runway can lead to potential pilot confusion due to the wider pavement surface and the lack of standard taxiway pavement markings, signage, and lighting." Currently, Runway 17-35 must be used to access the approach end of Runway 26. Consequently, the current configuration does not meet FAA design standards. The extension and strengthening of Runway 17-35 will enable the ultimate decommissioning of Runway 8-26 which would eliminate this deficiency.
- When Does this Program Need to Be Enacted – Short-Term (0-5 Years) or Mid-Term (6-10 Years)
- Project Cost Estimate - $17,500,000
- Funding Mechanism – State Budget Rider

Development Program #4 – Large Aircraft – Airfield Strengthening Capacity Program (Phase 1 – Runway 17-35)

This program includes the strengthening of Runway 17-35 and associated taxiways to support regular B-737-8Max (or equivalent aircraft) operations. The project includes widening Runway 17-35 to 150 ft. including the relocation of all markings, signs, and lighting. The project also includes the development of the westside parallel taxiway infrastructure for Runway 17-35. The improved taxiways are expected to be 50 ft. wide to support regular TDG-3 operations. Taxiway J will be relocated to the south as part of this program and all taxiways connecting to the proposed terminal area will be strengthened to support large aircraft operations. The program's design and environmental documentation is included in the cost estimate. The general limits of the program are shown in **Figure 4**.

- Why Does this Program Need to Be Enacted – This will program will need to be enacted when regular demand is anticipated for large narrowbody aircraft.
- When Does this Program Need to Be Enacted – Long-Term (11-20 Years)
- Project Cost Estimate - $56,600,000
- Funding Mechanism – State Budget Rider or Federal Earmark Funding – Due to this program's significant cost, state or federal earmark funding is anticipated to be needed.

Figure 4 – Large Aircraft – Airfield Strengthening Capacity Program (Phase 1 – Runway 17-35)



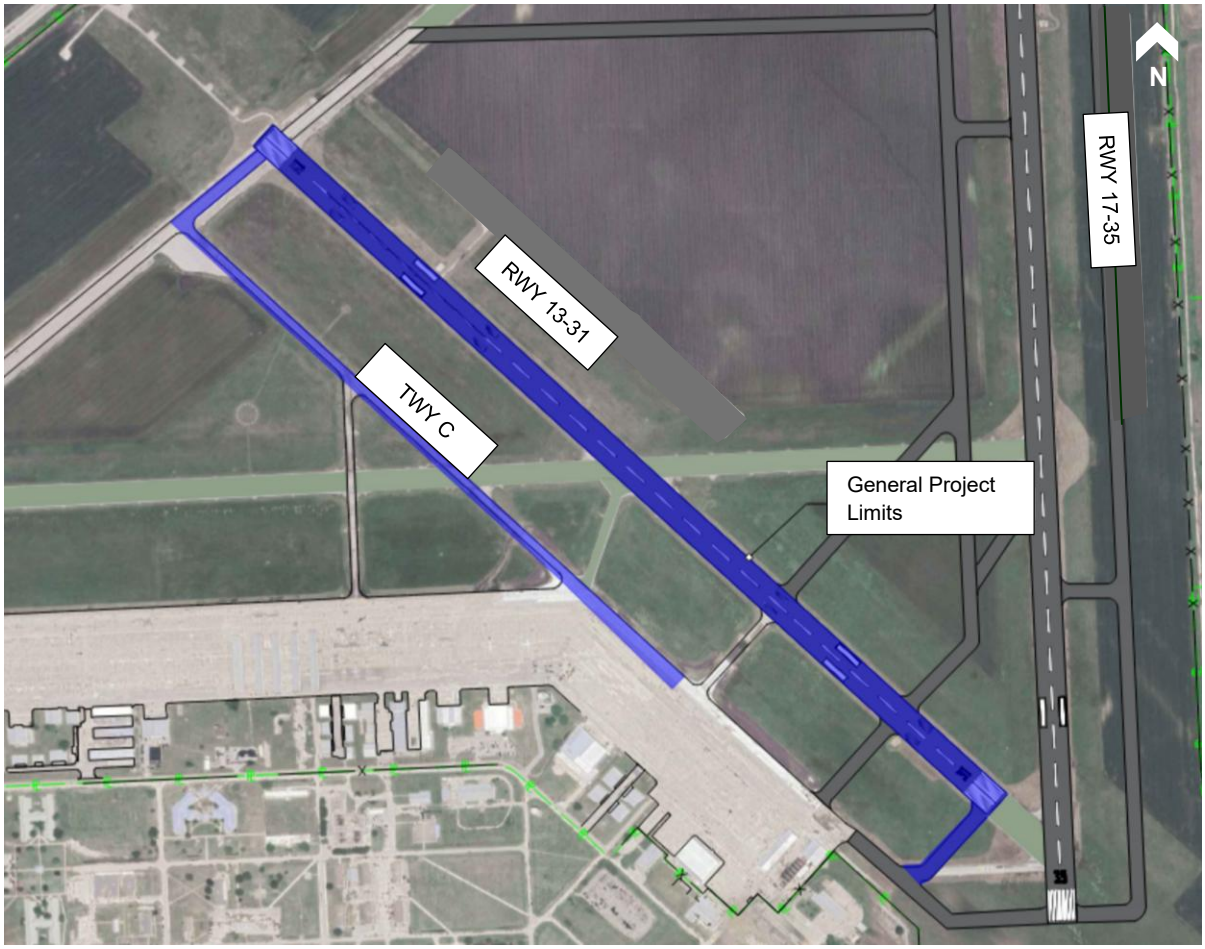
Source: Garver, 2025

Development Program #5 – Large Aircraft – Airfield Strengthening Capacity Program (Phase 2 – Runway 13-31)

This program includes the strengthening of Runway 13-31 and associated taxiways to support regular B-737-8Max operations or equivalent aircraft. The project includes widening Runway 13-13 to 150 ft. and includes the relocation of all markings, signs, and lighting. The project also includes the strengthening of the southwest parallel taxiway infrastructure for Runway 13-31. The improved taxiways are expected to be 50 ft. wide to support regular TDG-3 operations. The program's design and environmental documentation are included in the cost estimate. The general limits of the project are shown in **Figure 5**.

- Why Does this Program Need to Be Enacted – This will program will need to be enacted when regular demand is anticipated for large aircraft. It is anticipated that Development Program #4 will be initiated before this program is initiated as Runway 17-35 is the primary runway based on wind coverage.
- When Does this Program Need to Be Enacted – Long-Term (11-20 Years)
- Project Cost Estimate - $34,700,000
- Funding Mechanism – State Budget Rider or Federal Earmark Funding – Due to this program's significant cost, state or federal earmark funding is anticipated to be needed.

Figure 5 – Large Aircraft – Airfield Strengthening Capacity Program (Phase 2 – Runway 13-31)



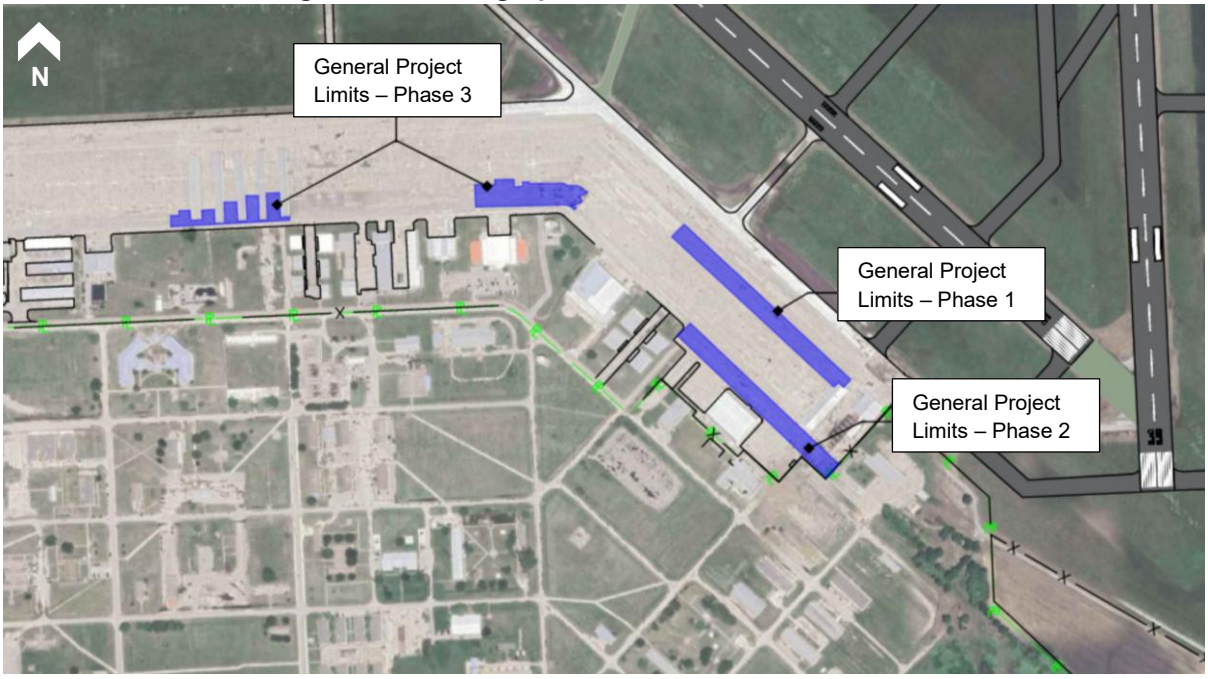
Source: Garver, 2025

Development Program #6 – Existing Apron Pavement Reconstruction

This program includes the reconstruction of approximately 19,700 sq. yards of failed apron pavement in the existing Airport Drive development area. The program's design and environmental documentation are included in the cost estimate. The program is anticipated to be segmented into three construction projects. The general limits of the program and each construction phase are shown in **Figure 6**.

- Why Does this Program Need to Be Enacted – Pavement in these areas has failed and produces Foreign Object Debris (FOD).
- When Does this Program Need to Be Enacted – Mid-Term (6-10 Years)
- Project Cost Estimate - $7,000,000
- Funding Mechanism – FAA Entitlement Funds and State Funding – Apron projects typically do not complete well for FAA discretionary funding, consequently a combination of entitlement funds and state funding will likely be necessary for this project.

Figure 6 – Existing Apron Pavement Reconstruction



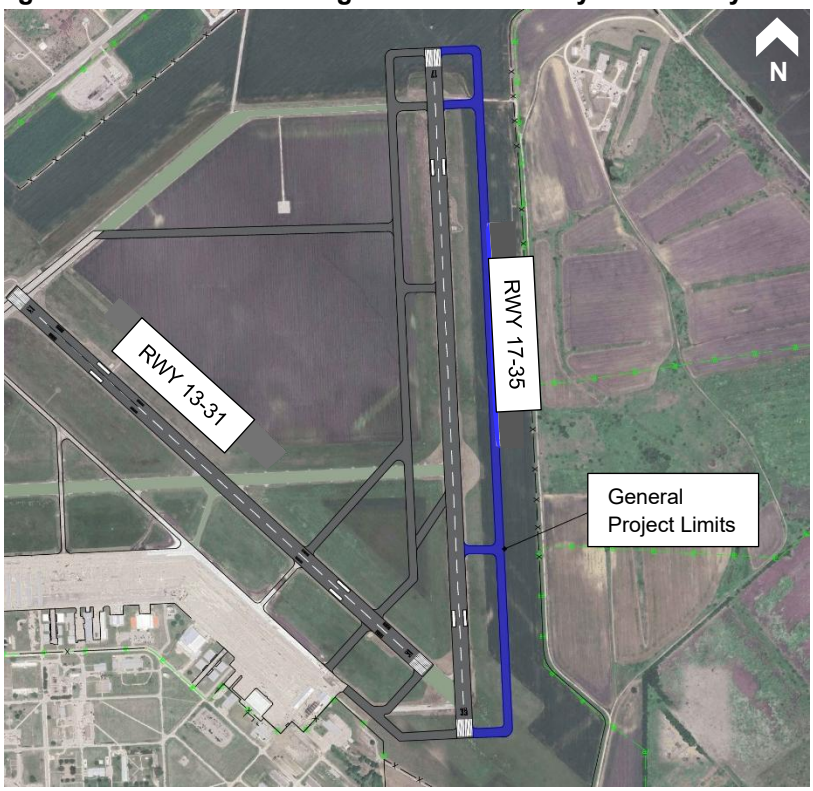
Source: Garver, 2025

Development Program #7 – Eastern Full-Length Parallel Taxiway for Runway 17-35

This program includes the development of a full-length eastern parallel taxiway and associated connector taxiways for Runway 17-35. The new taxiways are anticipated to be 50 ft. wide to support regular TDG-3 operations. The program's design and environmental documentation are included in the cost estimate. The general limits of the program are shown in **Figure 7**.

- Why Does this Program Need to Be Enacted – This program will be implemented when demand is present for aeronautical development east of Runway 17-35.
- When Does this Program Need to Be Enacted – Long-Term (11+ Years)
- Project Cost Estimate - $26,000,000
- Funding Mechanism – FAA Discretionary Funding

Figure 7 – Eastern Full-Length Parallel Taxiway for Runway 17-35



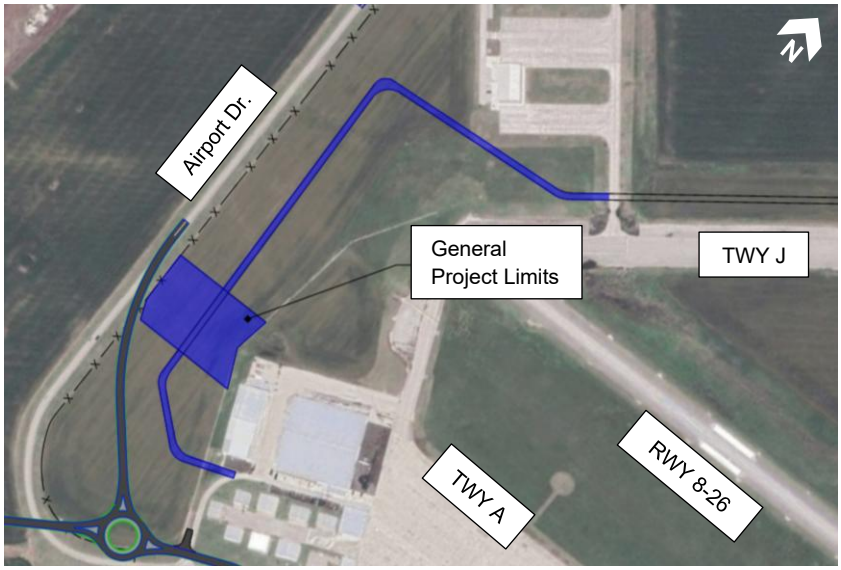
Source: Garver, 2025

Development Program #8 – Fuel Farm and Perimeter Road – Phase 1

This program includes the development of a new fuel farm with at least one 25,000-gallon Jet A above ground storage tank and one 15,000-gallon 100LL above ground storage tank. The fuel farm will be accessible via Airport Drive for fuel deliveries. A perimeter roadway will be constructed from the Airport Drive development area to the Taxiway K development area to support fuel truck movement. The perimeter road is expected to be 12 ft. wide to minimize cost. The program's design and environmental documentation is included in the cost estimate. The general limits of the program are shown in **Figure 8**. The fuel farm is expected to be constructed in a manner where additional 25,000-gallon Jet A above ground storage tanks could be added to increase capacity as warranted by demand. It is assumed that the Jet A capacity could ultimately be expanded to 100,000 gallons (4 – 25,000-gallon tanks).

- Why Does this Program Need to Be Enacted – The existing fuel farm at the Airport is beyond its useful life and needs to be replaced. A perimeter road is required to allow fuel trucks to access the Taxiway K development area without using public roadways or crossing Runway 8-26.
- When Does this Program Need to Be Enacted – Short-Term (0-5 Years)
- Project Cost Estimate - $2,750,000
- Funding Mechanism – FAA Infrastructure Investments and Jobs Act (IIJA) funding

Figure 8 – Fuel Farm and Perimeter Road – Phase 1



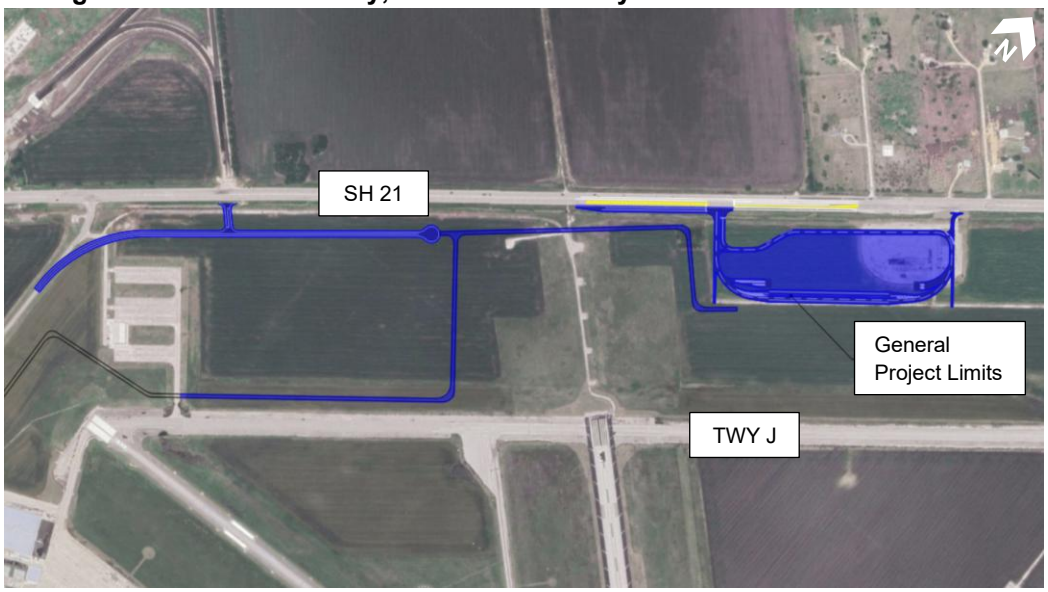
Source: Garver, 2025

Development Program #9 – SH-21 Roadway, Terminal Roadway and Perimeter Road Phase 2

This program includes the realignment of Airport Drive, the development of the passenger terminal roadway, and the extension of the perimeter road to the proposed passenger terminal area. The program's design and environmental documentation are included in the cost estimate. The general limits of the program are shown in **Figure 9**.

- Why Does this Program Need to Be Enacted – This program will need to be enacted when the passenger terminal needs to be built and/or when roadway access to the Taxiway Kilo development area needs to be expanded.
- When Does this Program Need to Be Enacted – Long-Term (11+ Years)
- Project Cost Estimate - $5,300,000
- Funding Mechanism – Blend of State/Federal, Local and Third-Party Funding

Figure 9 – SH-21 Roadway, Terminal Roadway and Perimeter Road Phase 2



Source: Garver, 2025

Development Program #10 – Existing Airport Traffic Control Tower (ATCT) Rehabilitation Program

This program replaces and improves aging digital voice recording/communication processing systems, deteriorating cables, and antennas that are causing ongoing interference issues, a deficient HVAC system, electrical and plumbing system improvements, exterior creak seal and building repairs, and repairs to the roof mounted beacon.

- Why Does this Program Need to Be Enacted – The identified systems in the ATCT are past their useful life and need to be replaced.
- When Does this Program Need to Be Enacted – Short-Term (0-5 Years)
- Project Cost Estimate - $3,000,000
- Funding Mechanism – FAA IIJA Air Traffic Facilities Funding

Development Program #11 – Airport Drive Utilities and Fencing Improvements

This program includes the installation of common-use fiber along Airport Drive, relocation all above ground utilities along Airport Drive to underground, relocation of the WWII Tower, relocation of the existing airfield electrical vault, and replacement of the fencing along Airport Drive and Gary Job Corp.

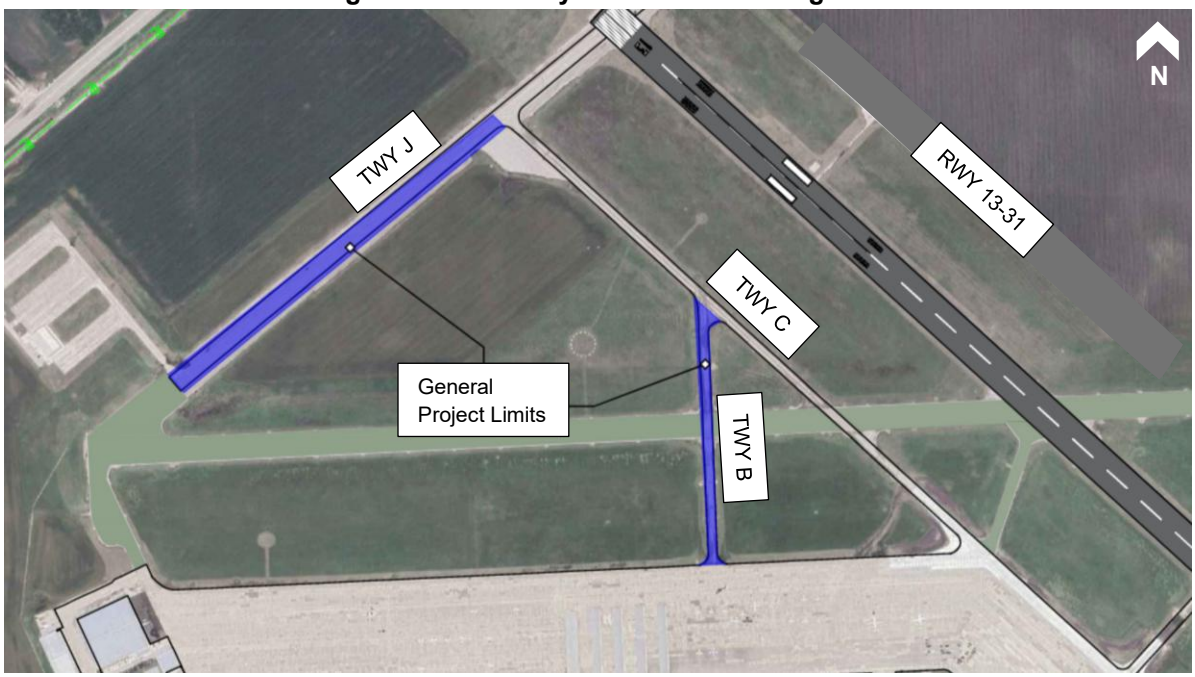
- Why Does this Program Need to Be Enacted – Elements of this program are likely to be implemented separately as individual projects based on a variety of needs. The airfield electrical vault should be replaced and relocated when it reaches the end of its useful life. The installation of common-use fiber along Airport Drive is needed to support the business needs of existing tenants.
- When Does this Program Need to Be Enacted – Long-term (11+ years)
- Project Cost Estimate - $7,250,000
- Funding Mechanism – Variable. FAA/state entitlement funds may be used for the airfield electrical vault. The other remaining improvements listed above may be locally or third party funded.

Development Program #12 – Taxiway and Airfield Lighting Rehabilitation Program

This program includes the rehabilitation of Taxiway B and the remaining portion of Taxiway J (portions not included in Program #4). This program also includes replacement of the existing lighting systems for Runway 17-35 and Runway 13-31. The project includes design and environmental documentation in the cost estimate. The general limits of the program are shown in **Figure 10**.

- Why Does this Program Need to Be Enacted – This program will need to be enacted to maintain and improve the pavement condition and lighting system to support aircraft operations.
- When Does this Program Need to Be Enacted – Mid-Term (6-10 Years) or Long-Term (11+ Years)
- Project Cost Estimate - $3,950,000
- Funding Mechanism – FAA/state entitlement funds.

Figure 10 – Taxiway Rehabilitation Program



Source: Garver, 2025

Development Program #13 – Airport Security Improvement Program

This program adds multiple devices for improving the Airport's security including a common security access control system on eight airport-controlled gates; 20 security cameras along the Airport Drive development area; and a license plate reader camera at the entrance to the Airport Drive development area. It also replaces the existing fence with a new chain-link fence and adds additional fencing along the Airport Drive development area

- Why Does this Program Need to Be Enacted – Project needs to be enacted to improve security in the Airport Drive development area.
- When Does this Program Need to Be Enacted – Short-Term (0-5 Years) or Mid-Term (6-10 Years)
- Project Cost Estimate - $5,500,000
- Funding Mechanism – Variable. Local funding and IIJA for the access control system, security cameras, and license plate reader. The fencing to be funded with federal/state entitlement funds.

Development Program #14 – Wildlife Fencing Improvements

This program includes the replacement of approximately 20,000 linear ft. of fence with wildlife fence. The program is expected to be split into three phases. The fencing will include the addition of subgrade wildlife deterrents. The exact location of the fencing has yet to be determined.

- Why Does this Program Need to Be Enacted – The project needs to be enacted to mitigate wildlife hazards on the airfield.
- When Does this Program Need to Be Enacted – Mid-Term (6-10 Years) or Long-Term (11+ Years)
- Project Cost Estimate - $5,150,000
- Funding Mechanism – FAA/state entitlement funds.

Development Program #15 – Airport Stormwater Drainage Improvements Program

This program includes undefined stormwater drainage improvements throughout the Airport's property. The City of San Marcos currently has a city-wide stormwater master plan underway that will further define the necessary drainage improvement projects at San Marcos Regional Airport.

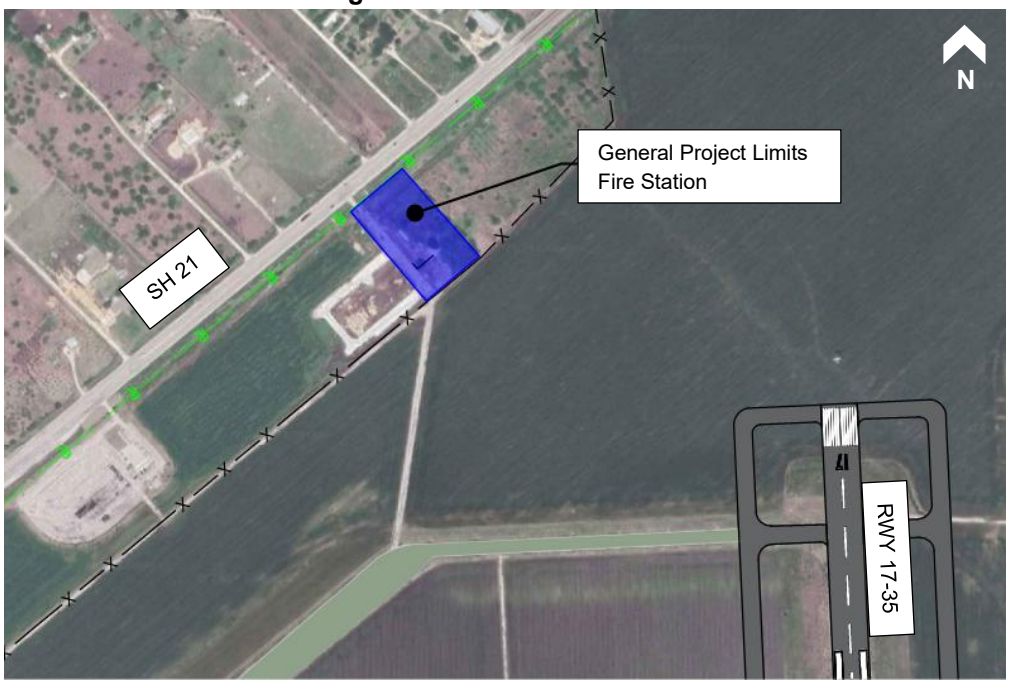
- Why Does this Program Need to Be Enacted – The program needs to be enacted to mitigate drainage issues at the Airport.
- When Does this Program Need to Be Enacted – Improvements are expected to last over the short-term (0-5 years), mid-term (6-10 years) and long-term (11+ year) phases.
- Project Cost Estimate - $18,250,000
- Funding Mechanism – Funding for these improvements will vary based on the location. Airfield related drainage improvements are expected to be funded by FAA/state entitlement or discretionary funds. Non-airfield drainage improvement are expected to be locally funded.

Development Program #16 – Air Carrier Non-Pavement Infrastructure Improvements

The February 2024 Gap Analysis Study identified multiple non-pavement infrastructure improvements that would be necessary to support air carrier operations at the Airport. These improvements included the establishment of a new Aircraft Rescue and Fire Fighting (ARFF) station and, at minimum, a single ARFF truck. The ARFF station may be developed as a multi-functional facility that can support both ARFF and structural firefighting units. If this occurs, the estimated size of the fire station is anticipated to be 20,000 to 22,000 square feet. The estimated cost, provided by the City of San Marcos, for the multifunctional fire station is $19,000,000. The general location of the fire station is shown in **Figure 11**. This program also assumes some minor modifications/improvements to runway safety areas on Runway 17-35 and 13-31 to obtain compliance for 14 CFR Part 139 standards.

- Why Does this Program Need to Be Enacted – This will program will need to be enacted when regular demand is anticipated for air carrier operations as defined in 14 CFR Part 139.
- When Does this Program Need to Be Enacted – Long-Term (11-20 Years)
- Project Cost Estimate - $22,865,000 ($19,000,000 for multifunctional fire station)
- Funding Mechanism – FAA entitlement and discretionary funds can be used to fund the airfield and ARFF related improvements. Local funding will be needed for non-airport related fire station components.

Figure 11 – Fire Station Area



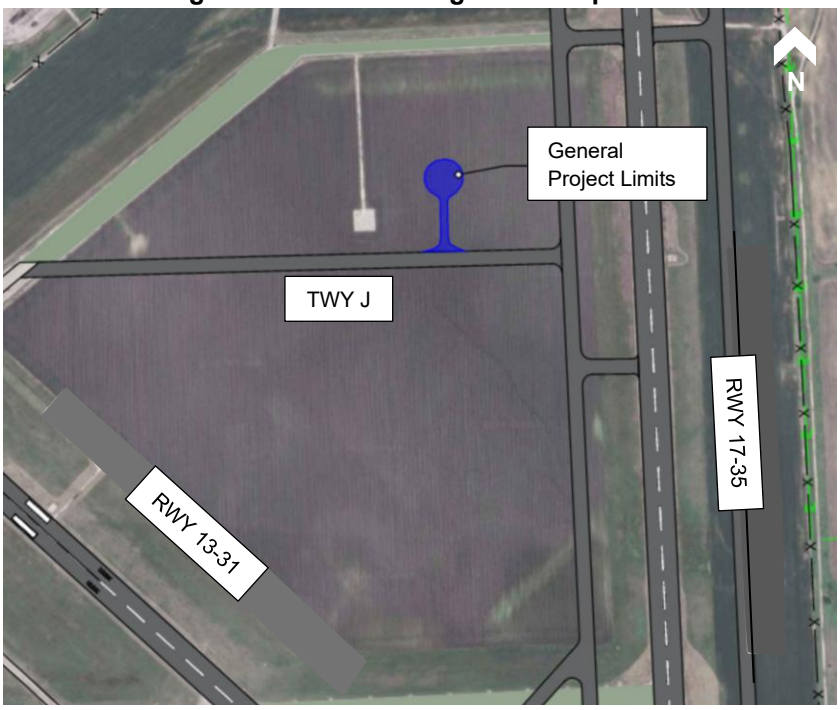
Source: Garver, 2025

Development Program #17 – Aircraft Engine Run-Up Area

This program includes the establishment of a centralized engine run-up area for aircraft maintenance activities. The general limits of the program are shown in **Figure 12**.

- Why Does this Program Need to Be Enacted – This will program will need to be enacted to support engine run-ups for aircraft maintenance purposes.
- When Does this Program Need to Be Enacted – Long-Term (11-20 Years)
- Project Cost Estimate - $2,700,000
- Funding Mechanism – FAA/state entitlement and discretionary funds.

Figure 12 – Aircraft Engine Run-Up Area



Source: Garver, 2025

Development Program Timing and Funding Plan

The prioritization of the proposed development programs, and projects within each program, is critical to establishing an actionable funding strategy to implement capital improvements at an airport. The fiscal totality of capital improvement needs at an airport traditionally exceeds the amount of federal, state, and local funding available to execute those improvements. Consequently, many times funding becomes the constraining factor that dictates the timing of when various capital projects can be enacted. The capital phasing and funding strategy provided in this chapter is an optimal plan that limits funding related implementation delays. The various traditional capital funding sources available to airports and their application to different types of projects is discussed in the CIP and Financial Plan Chapter of the October 2020 Airport Master Plan Update.

Table 2 shows the estimated funding needs for the next 10 years (short and mid-term) and the sequencing of proposed projects.

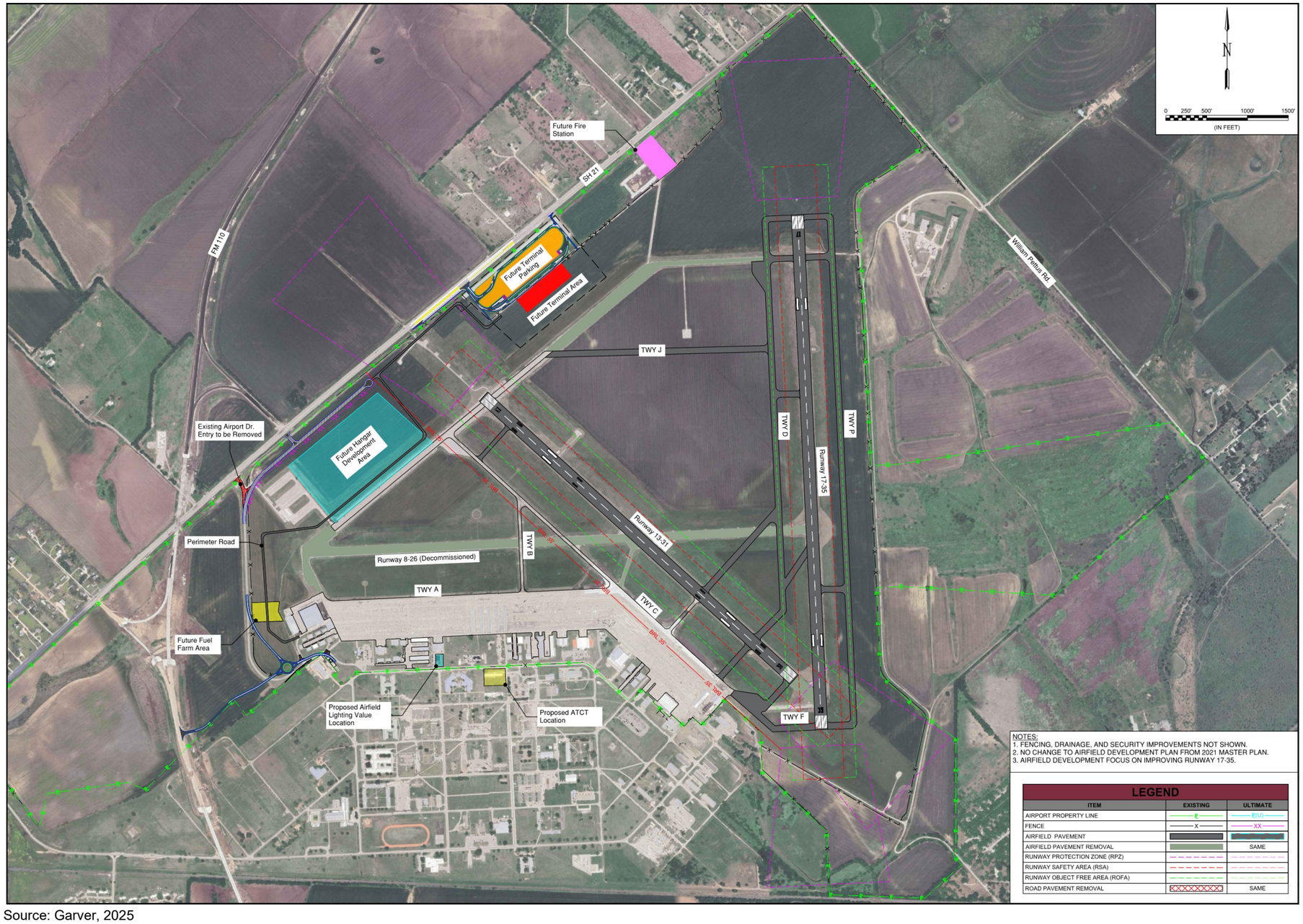
Figure 13 shows a consolidated graphic of the proposed development plan for the airport.

Table 2 – 10 Year Capital Improvement Program

Program #	Project Name	10 Year CIP (Fiscal Year)											Justification	Funding Strategy	Estimated City Match
		2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036+			
#8	Fuel Farm and Perimeter Road - Phase 1 (Design/Construction)	$2.75M											Safety	95% - IIJA 5% - Local	$137,500.00
#10	Existing ATCT Rehabilitation Program (Design/Construction)		$3M										Useful Life	100% - IIJA (ATP Discretionary)	$0.00
#13	Airport Security Improvement Program - Phase 1 (Design/Construction)		$0.8M										Security	95% - IIJA 5% - Local	$40,000.00
#1	Runway 17-35 and Runway 13-31 Physical De-Coupling (Construction)			$11.5M									Safety	90% - FAA Discretionary, NPE (2), State 10% - Local	$1,150,000.00
#15	Airport Stormwater Drainage Improvements Program (Design)			$2.4M									Rehabilitation	90% - State Apportionment/NPE (1) 10% - Local	$240,000.00
#15	Airport Stormwater Drainage Improvements Program (Construction)				$6.51M								Rehabilitation	90% - State Apportionment/NPE (3) 10% - Local	$651,000.00
#2	Runway 17-35 - 500 ft. Extension to North (Design)			$1.02M									Safety	90% - State Rider 10% - Local	$102,000.00
#2	Runway 17-35 - 500 ft. Extension to North (Construction)				$10.2M								Safety	90% - State Rider 10% - Local	$1,020,000.00
#3	Runway 17-35 - Keel Section Strengthening (Design)					$1.75M							Safety	90% - State Rider 10% - Local	$175,000.00
#3	Runway 17-35 - Keel Section Strengthening (Construction)						$15.75M						Safety	90% - State Rider 10% - Local	$1,575,000.00
#13	Airport Security Improvement Program - Phase 2 (Design/Construction)							$4.8M					Security	90% - State Apportionment, NPE (3) 10% - Local	$480,000.00
#6	Existing Apron Pavement Reconstruction Program - Phase 1 (Design/Construction)								$2M				Rehabilitation	90% - State Apportionment, NPE (1) 10% - Local	$200,000.00
#6	Existing Apron Pavement Reconstruction Program - Phase 2 (Design/Construction)									$1.8M			Rehabilitation	90% - State Apportionment, NPE (1) 10% - Local	$180,000.00
#6	Existing Apron Pavement Reconstruction Program - Phase 3 (Design/Construction)										$3.2M		Rehabilitation	90% - State Apportionment, NPE (1) 10% - Local	$320,000.00
Long-Term CIP (11+ Years)														**10 Year City CIP Match:**	**$6,270,500.00**
#4	Larger Aircraft - Airfield Strengthening Capacity Program (Phase 1 - Runway 17-35)											$56.6M	Capacity Improvement	90% - State Rider/Federal Earmark 10% - Local	
#5	Larger Aircraft - Airfield Strengthening Capacity Program (Phase 2 - Runway 13-31)											$34.7M	Capacity Improvement	90% - State Rider/Federal Earmark 10% - Local	
#7	Eastern Full-Length Parallel Taxiway for Runway 17/35											$26M	Development Improvement	90% - FAA Discretionary, State 10% - Local	
#9	SH 21 Roadway, Terminal Roadway, and Perimeter Road - Phase 2											$5.3M	Development Improvement	To Be Determined - Blend of Federal, State, Local, and Private	
#11	Airport Drive Utilities and Fencing Improvements											$7.25M	Development Improvement	To Be Determined - Blend of Federal, State, Local	
#12	Taxiway and Airfield Lighting Rehabilitation Program											$3.95M	Rehabilitation	90% - FAA Discretionary, State 10% - Local	
#14	Wildlife Fencing Improvements											$5.15M	Safety	90% - State Apportionment 10% - Local	
#15	Airport Stormwater Drainage Improvements Program											$9.34M	Rehabilitation	90% - State Apportionment 10% - Local	
#16	Air Carrier Non-Pavement Infrastructure Improvements											$22.87M	Capacity Improvement	To Be Determined - Blend of Federal, State, Local	
#17	Aircraft Engine Run-Up Area											$2.7M	Capacity Improvement	90% - FAA Discretionary, State 10% - Local	
Total:		**$2.75M**	**$3.8M**	**$14.92M**	**$16.71M**	**$1.75M**	**$15.75M**	**$4.8M**	**$2M**	**$1.8M**	**$3.2M**	**$173.86M**			

Source: Garver, 2025

Figure 13 – Consolidated Preferred Development Plan



Source: Garver, 2025

APPENDIX A

Airport Layout Plan

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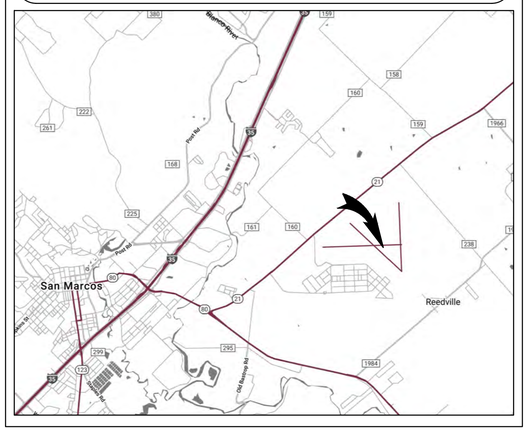
Airport Layout Plan

San Marcos Regional Airport

San Marcos, Texas

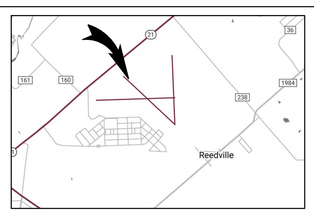
DECEMBER, 2020

LOCATION MAP



STATE AND COUNTY MAP

VICINITY MAP



Sheet List Table

Sheet Number	Sheet Title	Revision Date
1	COVER SHEET	
2	AIRPORT DATA SHEET	
3	AIRPORT DATA SHEET 2	
4	AIRPORT LAYOUT DRAWING	
5	AIRPORT AIRSPACE DRAWING	
6	AIRPORT AIRSPACE DRAWING 2	
7	AIRSPACE DRAWING TABLES	
8	AIRPORT AIRSPACE DRAWING PROFILES	
9	AIRPORT RUNWAY PROFILE	
10	INNER PORTION APPROACH SURFACE - RUNWAY 8	
11	INNER PORTION APPROACH SURFACE - RUNWAY 26	
12	INNER PORTION APPROACH SURFACE - RUNWAY 13	
13	INNER PORTION APPROACH SURFACE - RUNWAY 31	
14	INNER PORTION APPROACH SURFACE - RUNWAY 17	
15	INNER PORTION APPROACH SURFACE - RUNWAY 35	
16	IPASD TABLES	
17	IPASD TABLES 2	
18	DEPARTURE SURFACE - RUNWAY 8	
19	DEPARTURE SURFACE - RUNWAY 26	
20	DEPARTURE SURFACE - RUNWAY 13	
21	DEPARTURE SURFACE - RUNWAY 31	
22	DEPARTURE SURFACE - RUNWAY 17	
23	DEPARTURE SURFACE - RUNWAY 35	
24	TERMINAL AREA DRAWING	
25	TERMINAL AREA DRAWING 2	
26	LAND USE DRAWING	
27	EXHIBIT A PROPERTY MAP	
28	EXHIBIT A PROPERTY TABLE	

THE PREPARATION OF THESE DOCUMENTS WAS FINANCED IN PART THROUGH A PLANNING GRANT FROM THE FEDERAL AVIATION ADMINISTRATION AS PROVIDED UNDER SECTION 505 OF THE AIRPORT AND AIRWAY IMPROVEMENT ACT OF 1982, AS AMENDED. THE CONTENTS DO NOT NECESSARILY REFLECT THE OFFICIAL VIEWS OR POLICY OF THE FAA. ACCEPTANCE OF THESE DOCUMENTS BY THE FAA DOES NOT IN ANY WAY CONSTITUTE A COMMITMENT ON THE PART OF THE UNITED STATES TO PARTICIPATE IN ANY DEVELOPMENT DEPICTED HEREIN NOR DOES IT INDICATE THAT THE PROPOSED DEVELOPMENT IS ENVIRONMENTALLY ACCEPTABLE IN ACCORDANCE WITH APPROPRIATE PUBLIC LAWS.

AIRPORT SPONSOR BLOCK

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Project Engineer

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Kirk Abbott
SIGNATURE — 2/23/2021
TITLE: AIRPORT SPONSOR'S REPRESENTATIVE — DATE

REV.	DATE	DESCRIPTION	BY

TxDOT APPROVAL BLOCK

Director, Aviation Division

DocuSigned by:
2/22/2021
SIGNATURE

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RUNWAY DATA

ITEM	EXISTING		EXISTING		EXISTING		ULTIMATE		ULTIMATE		ULTIMATE	
	8	26	13	31	17	35	8	26	13	31	17	35
APPROACH TYPE	NON-PRECISION	NON-PRECISION	PRECISION	NON-PRECISION	NON-PRECISION	NON-PRECISION	DECOMMISIONED	DECOMMISIONED	PRECISION	NON-PRECISION	NON-PRECISION	NON-PRECISION
PART 77 APPROACH SURFACES	(34:1)	(34:1)	(50:1)	(34:1)	(34:1)	(34:1)	DECOMMISIONED	DECOMMISIONED	(50:1)	(34:1)	(34:1)	(34:1)
APPROACH VISIBILITY MINIMUMS	1-MILE	3/4 MILE	1/2 MILE	3/4 MILE	1 1/8 MILE	3/4 MILE	DECOMMISIONED	DECOMMISIONED	1/2 MILE	3/4 MILE	3/4 MILE	3/4 MILE
AERONAUTICAL SURVEY TYPE	VGS	VGS	VGS	VGS	VGS	VGS	DECOMMISIONED	DECOMMISIONED	VGS	VGS	VGS	VGS
DEPARTURE SURFACE	(40:1)	(40:1)	(40:1)	(40:1)	(40:1)	(40:1)	DECOMMISIONED	DECOMMISIONED	(40:1)	(40:1)	(40:1)	(40:1)
PRECISION OBSTACLE FREE ZONE	NONE	NONE	200' x 800'	NONE	NONE	NONE	DECOMMISIONED	DECOMMISIONED	200' x 800'	NONE	NONE	NONE
RUNWAY OBJECT FREE AREA	500' (W) x 300' (L)	500' (W) x 300' (L)	800' (W) x 1,000' (L)	800' (W) x 1,000' (L)	500' (W) x 300' (L)	500' (W) x 300' (L)	DECOMMISIONED	DECOMMISIONED	800' (W) x 1,000' (L)	800' (W) x 1,000' (L)	800' (W) x 1,000' (L)	800' (W) x 1,000' (L)
RUNWAY PROTECTION ZONE	500' X 1,000' X 700'	1,000' X 1,700' X 1,510'	1,000' X 2,500' X 1,750'	1,000' X 1,700' X 1,510'	500' X 1,000' X 700'	1,000' X 1,700' X 1,510'	DECOMMISIONED	DECOMMISIONED	1,000' X 2,500' X 1,750'	1,000' X 1,700' X 1,510'	1,000' X 1,700' X 1,510'	1,000' X 1,700' X 1,510'
OBSTACLE FREE ZONE*	400' (W) x 200' (L)	400' (W) x 200' (L)	400' (W) x 200' (L)	400' (W) x 200' (L)	400' (W) x 200' (L)	400' (W) x 200' (L)	DECOMMISIONED	DECOMMISIONED	400' (W) x 200' (L)	400' (W) x 200' (L)	400' (W) x 200' (L)	400' (W) x 200' (L)
THRESHOLD SITTING SURFACE	TYPE 4 (20:1)	TYPE 4 (20:1)	TYPE 5 (34:1)	TYPE 4 (20:1)	TYPE 4 (20:1)	TYPE 4 (20:1)	DECOMMISIONED	DECOMMISIONED	TYPE 5 (34:1)	TYPE 4 (20:1)	TYPE 4 (20:1)	TYPE 4 (20:1)
VISUAL APPROACH AIDS	REILS	REILS	MALSR/P2L	P2L	P2L	N/A	DECOMMISIONED	DECOMMISIONED	MALSR/P2L	P2L	P2L	P2L
INSTRUMENT APPROACH AIDS	RNAV/GPS	RNAV/GPS	ILS	RNAV/GPS	RNAV/GPS	RNAV/GPS	DECOMMISIONED	DECOMMISIONED	ILS	RNAV/GPS	RNAV/GPS	RNAV/GPS
TOUCHDOWN ZONE ELEVATION	587.1'	583.0'	594.8'	583.08'	594.7'	582.9'	DECOMMISIONED	DECOMMISIONED	SAME	583.9'	596.5'	581.4'
% WIND COVERAGE	50.82% 13 kts	40.88% 13 kts	63.99% 16 kts	57.28% 16 kts	64.71% 13 kts	64.47% 13 kts	DECOMMISIONED	DECOMMISIONED	SAME	SAME	64.99% 16 kts	64.79% 16 kts

*NOTE: THE OBSTACLE FREE ZONE DIMENSIONS SHOWN IN THE TABLE ARE THE RUNWAY OBSTACLE FREE ZONE DIMENSIONS FOR EACH RUNWAY. RUNWAY 13 ALSO HAS AN INNER APPROACH OBSTACLE FREE ZONE THAT BEGINS 200 FT FROM THE RUNWAY 13 THRESHOLD AND EXTENDS TO 200 FT BEYOND THE LAST LIGHT UNIT OF THE MALSR SYSTEM FOR THE RUNWAY. THE INNER APPROACH OBSTACLE FREE ZONE RISES AT A 50:1 SLOPE. RUNWAY 13 ALSO HAS AN INNER TRANSITIONAL OBSTACLE FREE ZONE. THE INNER TRANSITIONAL OBSTACLE FREE ZONE BEGINS AT THE EDGES OF THE RUNWAY OBSTACLE FREE ZONE AND INNER APPROACH OBSTACLE FREE ZONE AND RISES VERTICALLY TO A HEIGHT OF 51.69 FT AND THEN SLOPES OUTWARD AT A 6:1 SLOPE UNTIL IT REACHES THE HORIZONTAL SURFACE 150 FT ABOVE FIELD ELEVATION. TDZE REPRESENTS THE HIGHEST ELEVATION WITHIN THE FIRST 3000' FROM A RUNWAY END.ALL RUNWAY END AND TOUCHDOWN ZONE ELEVATIONS ARE BASED ON SURVEY DATA PROVIDED BY TXDOT AVIATION AS PART OF THIS PROJECT. GARVER PERFORMED NO AERONAUTICAL OR GROUND SURVEYS AS PART OF THIS PROJECT.

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AIRPORT SPONSOR BLOCK

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Project Engineer

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Earl Abbott
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TITLE OF AIRPORT SPONSOR'S REPRESENTATIVE

2/23/2021
DATE

TxDOT APPROVAL BLOCK

Director, Aviation Division

DocuSigned by:
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2/22/2021

RUNWAY DATA

ITEM	RUNWAY 8-26		RUNWAY 13-31		RUNWAY 17-35	
	EXISTING	ULTIMATE	EXISTING	ULTIMATE	EXISTING	ULTIMATE
RUNWAY DESIGN CODE (RDC)	B-II-4000	DECOMMISIONED	C-II-2400	C-III-2400	B-II-4000	C-III-4000
APPROACH REFERENCE CODE (APRC)	D/VI/4000	DECOMMISIONED	D/VI/2400	SAME	D/VI/4000	D/V/4000
DEPARTURE REFERENCE CODE (DPRC)	D/VI	DECOMMISIONED	D/VI	SAME	D/VI	D/V
PAVEMENT STRENGTH*	38.5 SW 56.5 DW 106 DT	DECOMMISIONED	23 SW	175 DW	28 SW 43.5 DW	175 DW
PAVEMENT CLASSIFICATION NUMBER	N/A	DECOMMISIONED	N/A	N/A	N/A	N/A
SURFACE TREATMENT	N/A	DECOMMISIONED	N/A	N/A	N/A	N/A
PAVEMENT TYPE / MATERIAL	ASPH	DECOMMISIONED	ASPH	ASPH	ASPH	ASPH
EFFECTIVE RUNWAY GRADIENT %	0.15%	DECOMMISIONED	0.36%	SAME	0.38%	SAME
RUNWAY WIDTH AND LENGTH	100' x 6,330'	DECOMMISIONED	100' x 5,601'	150' x 5,151'	100' x 5,214'	150' x 6,314'
RUNWAY SAFETY AREA	150' (W) x 300' (L)	DECOMMISIONED	500' (W) x 1,000' (L)	500' (W) x 1,000' (L)	150' (W) x 300' (L)	500' (W) x 1,000' (L)
RUNWAY LIGHTING	MIRL	DECOMMISIONED	MIRL	HIRL	MIRL	SAME
RUNWAY MARKING	NPI	DECOMMISIONED	PIR	SAME	NPI	SAME

*NOTE: EXISTING PAVEMENT STRENGTH NUMBERS SHOWN ABOVE ARE FROM A MEMO FROM FUGRO USA LAND, INC. TO KSA ENGINEERS, INC. DATED FEBRUARY 7, 2019 DISCUSSING THE STRUCTURAL CAPACITY OF THE RUNWAYS. FURGO USA LAND, INC. PERFORMED A PAVEMENT STRUCTURAL CAPACITY EVALUATION FOR THE AIRPORT IN 2015. THE PAVEMENT STRENGTH FIGURES SHOWN IN THE REPORT DIFFER FROM THE FIGURES PREVIOUS SHOWN IN THE CURRENT FAA FORM 5010 AND ON THE PREVIOUS AIRPORT LAYOUT PLAN. GARVER DID NOT COMPLETE ANY PAVEMENT STRENGTH EVALUATION WORK AS PART OF THIS MASTER PLAN.

RUNWAY END COORDINATES

RUNWAY END	EXISTING COORDINATES		EXISTING ELEVATION	ULTIMATE COORDINATES		ULTIMATE ELEVATION
RWY 08	LAT.	29° 53' 30.50" N	587.1'	LAT.	DECOMMISSIONED	N/A
	LONG.	97° 52' 37.50" W		LONG.	DECOMMISSIONED	
RWY 26	LAT.	29° 53' 32.85" N	580.0'	LAT.	DECOMMISSIONED	N/A
	LONG.	97° 51' 25.64" W		LONG.	DECOMMISSIONED	
RWY 13	LAT.	29° 53' 49.31" N	594.8'	LAT.	SAME	SAME
	LONG.	97° 52' 12.08" W		LONG.	SAME	
RWY 31	LAT.	29° 53' 11.58" N	572.3'	LAT.	29° 53' 14.61" N	573.3'
	LONG.	97° 51' 25.45" W		LONG.	97° 51' 29.20" W	
RWY 17	LAT.	29° 54' 06.07" N	593.7'	LAT.	29° 54' 11.02" N	596.5'
	LONG.	97° 51' 27.90" W		LONG.	97° 51' 28.11" W	
RWY 35	LAT.	29° 53' 14.50" N	573.2'	LAT.	29° 53' 08.56" N	571.3'
	LONG.	97° 51' 25.70" W		LONG.	97° 51' 25.45" W	

NOTE: THE SAN MARCOS REGIONAL AIRPORT CURRENTLY DOES NOT HAVE ANY DISPLACED THRESHOLDS AND NONE ARE ANTICIPATED AS PART OF THE FUTURE DEVELOPMENT PLAN.

RUNWAY DATA
DECLARED DISTANCES

ITEM	RUNWAY 08	RUNWAY 26	RUNWAY 13	RUNWAY 31	RUNWAY 17	RUNWAY 35
	EXISTING	EXISTING	EXISTING	EXISTING	EXISTING	EXISTING
TAKEOFF RUN AVAILABLE (TORA)	6330'	6330'	5601'	5601'	5214'	5214'
TAKEOFF DISTANCE AVAILABLE (TODA)	6330'	6330'	5601'	5601'	5214'	5214'
ACCELERATE-STOP DISTANCE AVAILABLE (ASDA)	6330'	6330'	5601'	5601'	5214'	5214'
LANDING DISTANCE AVAILABLE (LDA)	6330'	6330'	5601'	5601'	5214'	5214'
ITEM	RUNWAY 08	RUNWAY 26	RUNWAY 13	RUNWAY 31	RUNWAY 17	RUNWAY 35
	ULTIMATE	ULTIMATE	ULTIMATE	ULTIMATE	ULTIMATE	ULTIMATE
TAKEOFF RUN AVAILABLE (TORA)	DECOMMISIONED	DECOMMISIONED	5151'	5151'	6314'	6314'
TAKEOFF DISTANCE AVAILABLE (TODA)	DECOMMISIONED	DECOMMISIONED	5151'	5151'	6314'	6314'
ACCELERATE-STOP DISTANCE AVAILABLE (ASDA)	DECOMMISIONED	DECOMMISIONED	5151'	5151'	6314'	6314'
LANDING DISTANCE AVAILABLE (LDA)	DECOMMISIONED	DECOMMISIONED	5151'	5151'	6314'	6314'

GENERAL NOTES:
1. ALL COORDINATES AND ELEVATIONS HORIZONTAL NAD83, VERTICAL NAVD 88.

AIRPORT DATA

ITEM	EXISTING	ULTIMATE
AIRPORT REFERENCE CODE	C-II	C-III
MEAN MAX, TEMP, HOTTEST MONTH	97°F	SAME
AIRPORT ELEVATION (AMSL)	594.7'	596.5'
NAVIGATION AIDS	PAPI, ILS, GPS, BEACON	SAME
AIRPORT REFERENCE POINT (ARP)	29° 53' 33.9" N	29° 53' 27.80" N
	97° 51' 46.8" W	97° 51' 37.50" W
MISC. FACILITIES	AWOS-3PT, TAXIWAY EDGE LIGHTS, LIGHTED WINDCONE W/ SEGMENTED CIRCLE	SAME
CRITICAL AIRCRAFT	C-II (CHALLENGE 650)	C-III (BOMBARDIER Q400)
NPIAS SERVICE LEVEL/STATE EQUIVILENT ROLE	GA-NATIONAL/RELIEVER	SAME
MAGNETIC VARIATION	3° 41' E ± 0° 21'	CHANGING BY 0° 7' W PER YEAR

NOTE: MAGNETIC VARIATION INFORMATION OBTAINED ON 4/2019 USING THE NOAA NATIONAL CENTERS FOR ENVIRONMENTAL INFORMATION - MAGNETIC DECLINATION ESTIMATED VALUE CALCULATOR.

MODIFICATION TO STANDARD

NONE REQUIRED

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REV.	DATE	DESCRIPTION	BY

SAN MARCOS REGIONAL AIRPORT
SAN MARCOS, TX

AIRPORT LAYOUT PLAN

AIRPORT DATA SHEET

JOB NO.: 14181110
DATE: DEC. 2020
DESIGNED BY: NRP
DRAWN BY: DLM

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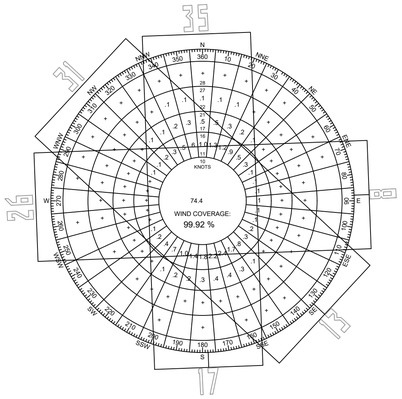
ALL WEATHER WIND ROSE

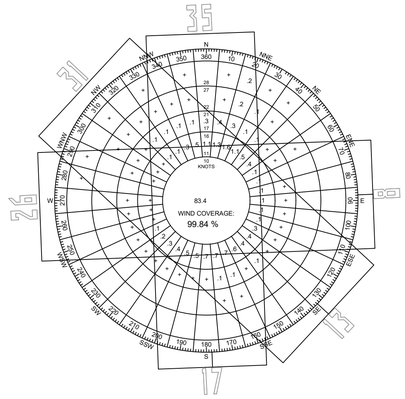


ALL WEATHER WIND COVERAGE
(INCL CALMS)

RUNWAY	10.5 KNOT	13 KNOT	16 KNOT	20 KNOT
08	43.30%	48.39%	53.87%	56.24%
26	38.72%	42.12%	45.86%	47.33%
COMBINED	77.41%	85.84%	94.99%	98.78%
13	57.87%	61.36%	63.77%	64.37%
31	32.99%	35.86%	38.67%	39.80%
COMBINED	86.37%	92.70%	97.90%	99.62%
17	61.54%	69.39%	62.76%	62.82%
35	39.89%	40.88%	41.36%	41.50%
COMBINED	97.07%	98.91%	99.76%	99.95%
ALL COMBINED	99.14%	99.81%	99.97%	100.00%

SOURCE: SAN MARCOS REGIONAL AIRPORT AWOS
NATIONAL CLIMATIC DATA CENTER, HOURLY OBSERVATIONS - 12979
PERIOD: 2010 - 2019, LOCATION : SAN MARCOS REGIONAL AIRPORT

IFR WIND ROSE



IFR WIND COVERAGE
(INCL CALMS)

RUNWAY	10.5 KNOT	13 KNOT	16 KNOT	20 KNOT
08	59.42%	63.06%	66.32%	67.55%
26	42.53%	43.96%	45.40%	45.83%
COMBINED	87.90%	92.95%	97.61%	99.26%
13	66.49%	68.09%	69.37%	69.56%
31	37.71%	40.46%	43.13%	43.96%
COMBINED	90.14%	94.48%	98.41%	99.42%
17	65.15%	66.85%	66.19%	66.25%
35	45.70%	46.73%	47.36%	47.55%
COMBINED	97.00%	98.72%	99.69%	99.94%
ALL COMBINED	99.06%	99.63%	99.88%	99.98%

SOURCE: SAN MARCOS REGIONAL AIRPORT AWOS
NATIONAL CLIMATIC DATA CENTER, HOURLY OBSERVATIONS - 12979
PERIOD: 2010 - 2019, LOCATION : SAN MARCOS REGIONAL AIRPORT

TAXIWAY DATA

NAME	EXISTING						ULTIMATE					
	TDG	WIDTH	SHOULDER	TESM	TSA	OFA	TDG	WIDTH	SHOULDER	TESM	TSA	OFA
A (ramp area)	3	75	-	10	79	131	5	75	30	15	118	186
A (approach of RWY 8)	3	50	-	10	79	131	5	75	30	15	118	186
B	2	40	-	7.5	79	131	5	75	30	15	118	186
C (north of TWY A)	2	42	-	7.5	79	131	5	75	30	15	118	186
C (south of TWY A)	3	50	-	10	79	131	5	75	30	15	118	186
E	2	42	-	7.5	79	131	5	75	30	15	118	186
F	3	50	-	10	79	131	5	75	30	15	118	186
J	3	50	-	10	79	131	5	75	30	15	118	186
K	2	35	-	7.5	79	131	5	75	30	15	118	186
D	N/A	N/A	N/A	N/A	N/A	N/A	5	75	30	15	118	186
H	N/A	N/A	N/A	N/A	N/A	N/A	5	75	30	15	118	186
G	N/A	N/A	N/A	N/A	N/A	N/A	5	75	30	15	118	186
L	N/A	N/A	N/A	N/A	N/A	N/A	5	75	30	15	118	186
M	N/A	N/A	N/A	N/A	N/A	N/A	5	75	30	15	118	186
N	N/A	N/A	N/A	N/A	N/A	N/A	5	75	30	15	118	186
P	N/A	N/A	N/A	N/A	N/A	N/A	5	75	30	15	118	186
P1	N/A	N/A	N/A	N/A	N/A	N/A	5	75	30	15	118	186
P2	N/A	N/A	N/A	N/A	N/A	N/A	5	75	30	15	118	186
P3	N/A	N/A	N/A	N/A	N/A	N/A	5	75	30	15	118	186
P4	N/A	N/A	N/A	N/A	N/A	N/A	5	75	30	15	118	186

NOTE: DISTANCE FROM TAXIWAY TO FIXED OR MOVEABLE OBJECT IS 65.5' FOR ALL EXISTING TAXIWAYS. ALL EXISTING TAXIWAYS EQUIPPED WITH MEDIUM INTENSITY TAXIWAY EDGE LIGHTS. NO EXISTING OR PROPOSED TAXILANES.

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REV.	DATE	DESCRIPTION	BY

SAN MARCOS REGIONAL AIRPORT
SAN MARCOS, TX

AIRPORT LAYOUT PLAN

AIRPORT DATA SHEET 2

JOB NO.: 14181110
DATE: DEC. 2020
DESIGNED BY: NRP
DRAWN BY: DLM

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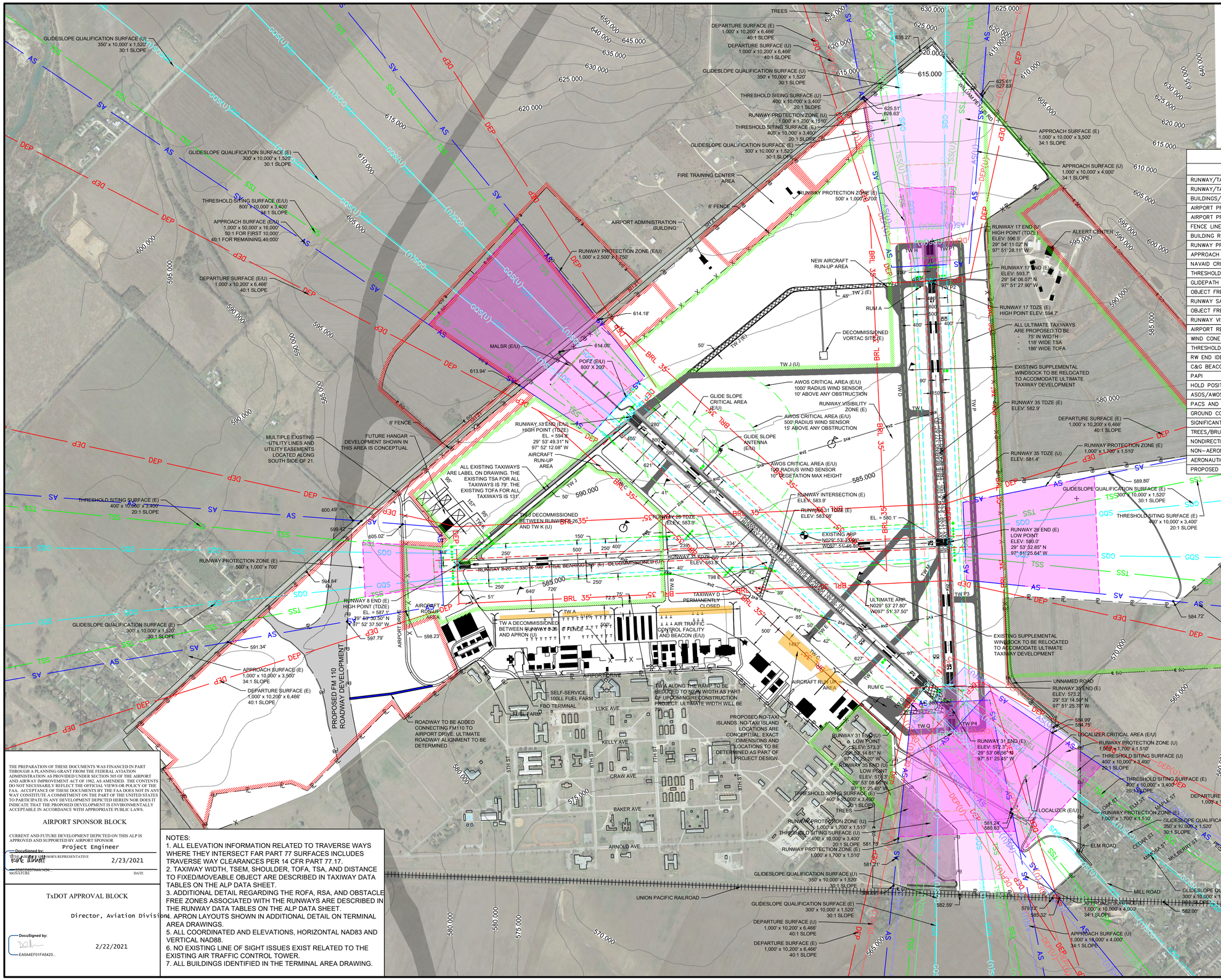

ALD LEGEND

FEATURE	EXISTING	ULTIMATE
RUNWAY/TAXIWAY OUTLINE		
RUNWAY/TAXIWAY TO BE REMOVED		
BUILDINGS/FACILITIES		
AIRPORT PROPERTY LINE		
AIRPORT PROPERTY LINE w/FENCE		
FENCE LINE		
BUILDING RESTRICTION LINE (BRL)		
RUNWAY PROTECTION ZONE		
APPROACH SURFACE		
NAVAID CRITICAL AREA		
THRESHOLD SITING SURFACE		
GLIDEPATH QUALIFICATION SURFACE		
OBJECT FREE AREA		
RUNWAY SAFETY AREA		
OBJECT FREE ZONE		
RUNWAY VISIBILITY ZONE		
AIRPORT REFERENCE POINT		
WIND CONE & SEGMENTED CIRCLE		
THRESHOLD LIGHTS		
RW END IDENTIFIER LIGHTS (REILS)		
C&G BEACON		
PAPI		
HOLD POSITION AND SIGN		
ASOS/AWOS		
PACS AND SACS MARKERS		
GROUND CONTOURS		
SIGNIFICANT OBJECT LOCATION		
TREES/BRUSH		
NONDIRECTIONAL BEACON (NDB)		
NON-AERONAUTICAL DEVELOPMENT		
AERONAUTICAL DEVELOPMENT		
PROPOSED NO-TAXI ISLAND		

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Project Engineer

DocuSigned by:
Eric Abbott
2C0C8357B6A1452...

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SIGNATURE

2/23/2021
DATE

TxDOT APPROVAL BLOCK

Director, Aviation Division

DocuSigned by:
EA0A4EF01FA5423...

2/22/2021

NOTES:
1. ALL ELEVATION INFORMATION RELATED TO TRAVERSE WAYS WHERE THEY INTERSECT FAR PART 77 SURFACES INCLUDES TRAVERSE WAY CLEARANCES PER 14 CFR PART 77.17.
2. TAXIWAY WIDTH, TSEM, SHOULDER, TOFA, TSA, AND DISTANCE TO FIXED/MOVEABLE OBJECT ARE DESCRIBED IN TAXIWAY DATA TABLES ON THE ALP DATA SHEET.
3. ADDITIONAL DETAIL REGARDING THE ROFA, RSA, AND OBSTACLE FREE ZONES ASSOCIATED WITH THE RUNWAYS ARE DESCRIBED IN THE RUNWAY DATA TABLES ON THE ALP DATA SHEET.
4. APRON LAYOUTS SHOWN IN ADDITIONAL DETAIL ON TERMINAL AREA DRAWINGS.
5. ALL COORDINATED AND ELEVATIONS, HORIZONTAL NAD83 AND VERTICAL NAD88.
6. NO EXISTING LINE OF SIGHT ISSUES EXIST RELATED TO THE EXISTING AIR TRAFFIC CONTROL TOWER.
7. ALL BUILDINGS IDENTIFIED IN THE TERMINAL AREA DRAWING.

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SAN MARCOS REGIONAL AIRPORT
SAN MARCOS, TX

AIRPORT LAYOUT PLAN

AIRPORT LAYOUT DRAWING

JOB NO.: 14181110
DATE: DEC. 2020
DESIGNED BY: NRP
DRAWN BY: DLM

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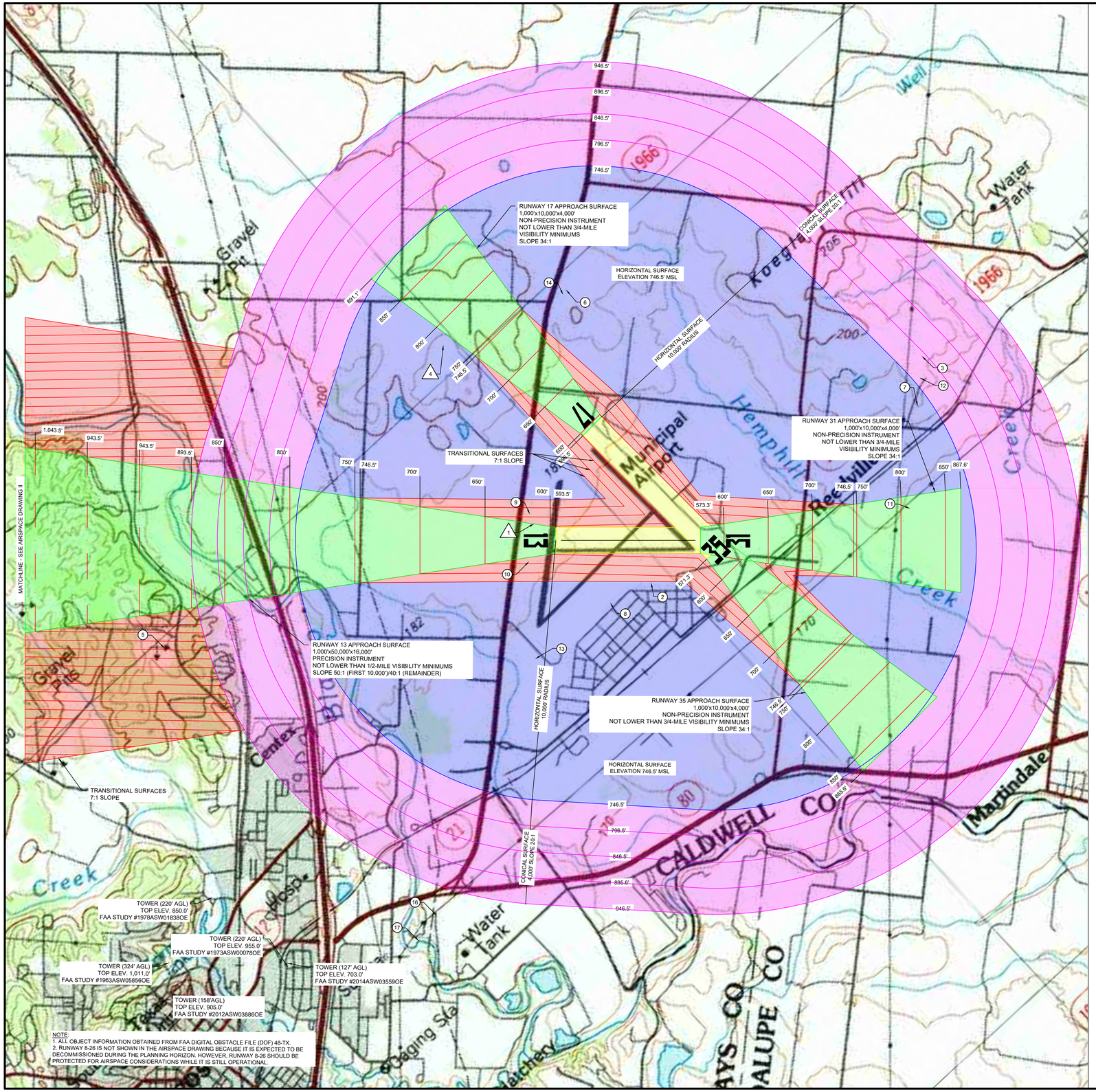

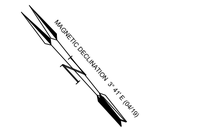

0 1000' 2000' 4000' 6000'

(IN FEET)

LEGEND

- ZONE A: PRIMARY SURFACE
- ZONE B: APPROACH SURFACE
- ZONE C: TRANSITIONAL SURFACES
- ZONE D: HORIZONTAL SURFACE
- ZONE E: CONICAL SURFACES
- DENOTES OBSTRUCTION
- DENOTES OBJECT CLEAR OF AIRSPACE

NOTE:
1. ALL OBJECT INFORMATION OBTAINED FROM FAA DIGITAL OBSTACLE FILE (DOF) 48-TX.
2. RUNWAY 8-26 IS NOT SHOWN IN THE AIRSPACE DRAWING BECAUSE IT IS EXPECTED TO BE DECOMMISSIONED DURING THE PLANNING HORIZON. HOWEVER, RUNWAY 8-26 SHOULD BE PROTECTED FOR AIRSPACE CONSIDERATIONS WHILE IT IS STILL OPERATIONAL.

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Project Engineer

TITLE: (AIRPORT SPONSOR'S REPRESENTATIVE)

DocuSigned by: Sara Hurst
2C4C0837AAA145A...

2/23/2021

DATE

TxDOT APPROVAL BLOCK

Director, Aviation Division

DocuSigned by:
EA0A4EF01FA5423...

2/22/2021

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SAN MARCOS, TX

AIRPORT LAYOUT PLAN

AIRPORT AIRSPACE DRAWING

JOB NO.: 14181110
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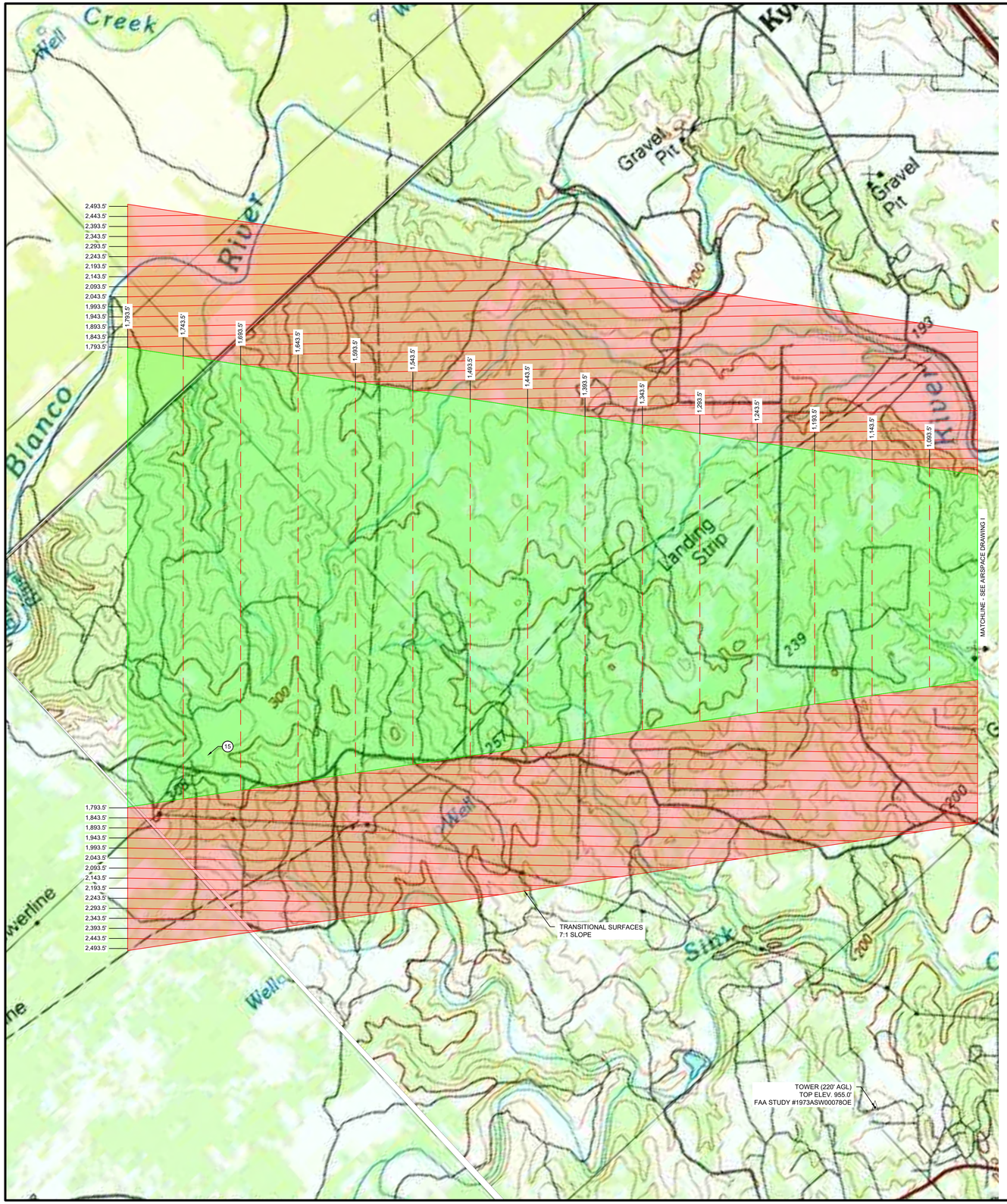

0° 7' CHANGE PER YEAR

0 1000' 2000' 4000' 6000'

(IN FEET)

LEGEND

- ZONE A: PRIMARY SURFACE
- ZONE B: APPROACH SURFACE
- ZONE C: TRANSITIONAL SURFACES
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- ZONE E: CONICAL SURFACES
- DENOTES OBSTRUCTION
- DENOTES OBJECT CLEAR OF AIRSPACE

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Project Engineer

TITLE, AIRPORT SPONSOR'S REPRESENTATIVE

DocuSigned by:
Kirk Abbott
SIGNATURE

2/23/2021
DATE

TxDOT APPROVAL BLOCK

Director, Aviation Division

DocuSigned by:
EA0A4EF01FA5423...

2/22/2021

SAN MARCOS REGIONAL AIRPORT
SAN MARCOS, TX

AIRPORT LAYOUT PLAN

AIRPORT AIRSPACE DRAWING 2

JOB NO.: 14181110
DATE: DEC. 2020
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AIRSPACE DRAWING TABLES

OBJECTS PENETRATING FAR PART 77 SURFACES

NO.	DESCRIPTION	LATITUDE	LONGITUDE	TOP ELEVATION	PENETRATION IN FEET	OBSTRUCTION REMEDIATION	FAA STUDY NUMBER
1	POLE	29°54'01.00" N	97°52'16.00" W	621.0'	10.4'	OBSTRUCTION LIGHTING	N/A
4	TANK	29°55'14.00" N	97°51'52.00" W	763.0'	18.3'	OBSTRUCTION LIGHTING	N/A

OBJECTS CLEAR OF FAR PART 77 SURFACES

NO.	DESCRIPTION	LATITUDE	LONGITUDE	TOP ELEVATION	CLEARANCE IN FEET	SURFACE CLEARED	FAA STUDY NUMBER
2	TANK	29°53'14.00" N	97°51'56.00" W	673.0'	71.7'	HORIZONTAL	N/A
3	T-L TWR	29°53'07.00" N	97°49'22.00" W	759.0'	22.0'	CONICAL	N/A
5	TOWER	29°55'02.00" N	97°54'51.00" W	880.0'	254.5'	TRANSITIONAL	N/A
6	POLE	29°54'57.60" N	97°50'56.10" W	679.0'	65.7'	HORIZONTAL	2011ASW04379OE
7	T-L TWR	29°52'54.68" N	97°49'38.02" W	709.0'	35.7'	HORIZONTAL	N/A
8	TOWER	29°53'18.93" N	97°52'14.93" W	653.0'	38.4'	TRANSITIONAL	N/A
9	POLE	29°54'04.90" N	97°52'14.22" W	623.0'	43.8'	TRANSITIONAL	N/A
10	POLE	29°53'51.71" N	97°52'28.88" W	619.0'	19.5'	TRANSITIONAL	N/A
11	T-L TWR	29°52'28.08" N	97°50'11.17" W	711.0'	85.4'	APPROACH	N/A
12	T-L TWR	29°53'01.55" N	97°49'28.99" W	749.0'	2.8'	CONICAL	N/A
13	POLE	29°53'23.65" N	97°52'49.70" W	607.0'	9.7'	TRANSITIONAL	N/A
14	POLE	29°54'57.50" N	97°50'58.40" W	681.0'	63.7'	HORIZONTAL	2011ASW04380OE
15	TOWER	29°58'23.49" N	97°59'34.99" W	1,274.0'	449.2'	APPROACH	2014ASW03560OE
16	T-L TWR	29°52'37.00" N	97°54'43.24" W	668.0'	183.5'	CONICAL	2016ASW03591OE
17	T-L TWR	29°52'34.62" N	97°54'56.48" W	671.0'	238.2'	CONICAL	2016ASW03592OE

ALL CLEARANCES HAVE BEEN ADJUSTED FOR HEIGHT OF NATURAL OBJECTS, AND 10' FOR PRIVATE ROADS, 15' FOR PUBLIC ROADS, 17' FOR INTERSTATE HIGHWAYS, AND 23' FOR RAILROADS. SEE INNER PORTION OF THE APPROACH SURFACE DRAWINGS FOR CLOSE IN OBSTRUCTION INFORMATION. OBSTRUCTION DATA WAS OBTAINED USING THE FAA'S .DAT FILE.

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(972) 377-7480

REV.	DATE	DESCRIPTION	BY

SAN MARCOS REGIONAL AIRPORT
SAN MARCOS, TX

AIRPORT LAYOUT PLAN

AIRSPACE DRAWING TABLES

JOB NO.: 14181110
DATE: DEC. 2020
DESIGNED BY: NRP
DRAWN BY: DLM

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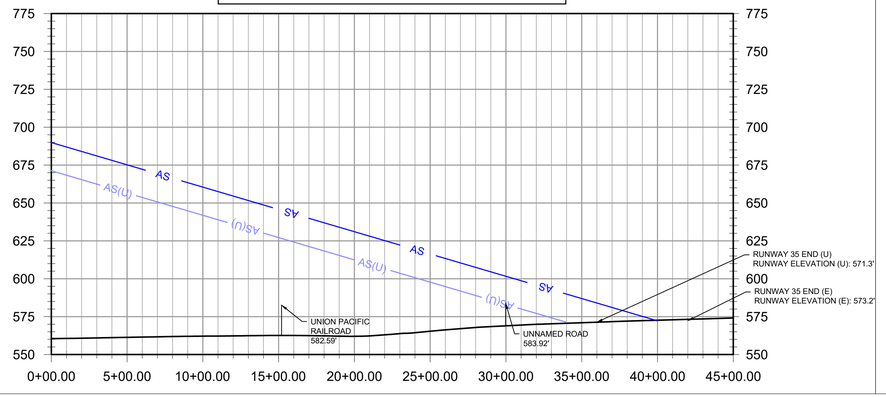
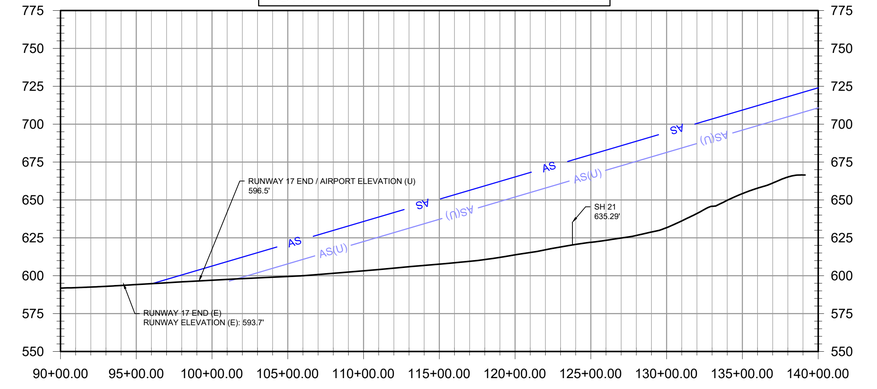
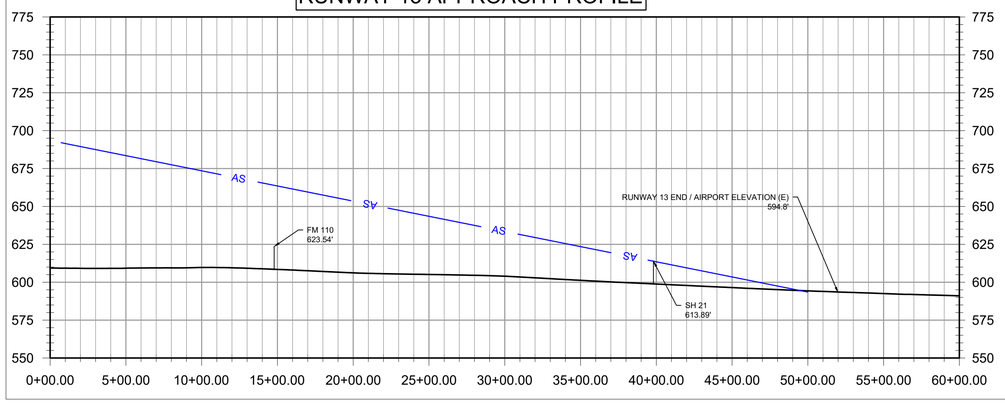
RUNWAY 35 APPROACH PROFILE



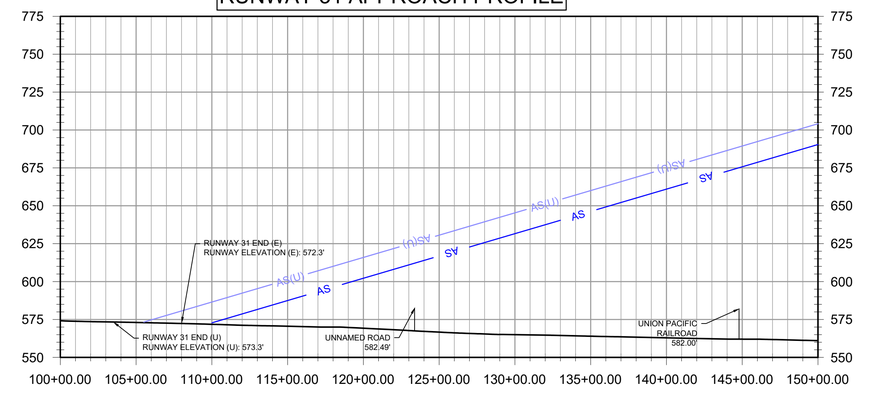
RUNWAY 17 APPROACH PROFILE



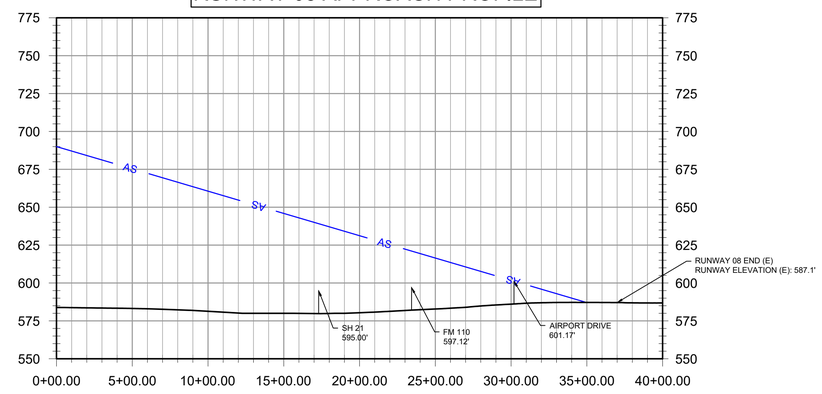
RUNWAY 13 APPROACH PROFILE



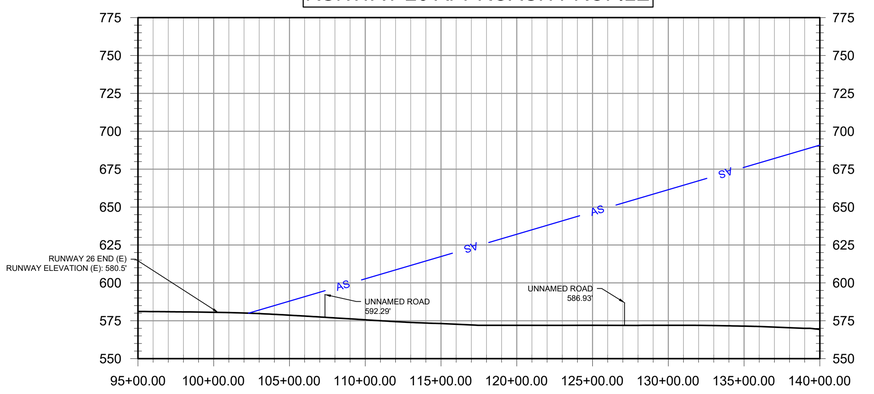
RUNWAY 31 APPROACH PROFILE



RUNWAY 08 APPROACH PROFILE



RUNWAY 26 APPROACH PROFILE



NOTES:

ALL APPROACH SURFACES ARE 34:1 EXCEPT FOR RUNWAY 13 WHICH IS 50:1.
"TW" STANDS FOR TRAVERSE WAY. SEE SHEET 9-14 FOR TRAVERSE WAY DESCRIPTIONS.
ALL CLEARANCES HAVE BEEN ADJUSTED FOR HEIGHT OF NATURAL OBJECTS, AND 10' FOR PRIVATE ROADS, 15' FOR PUBLIC ROADS, 17' FOR INTERSTATE HIGHWAYS, AND 23' FOR RAILROADS.

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REV.	DATE	DESCRIPTION	BY

SAN MARCOS REGIONAL AIRPORT
SAN MARCOS, TX

AIRPORT LAYOUT PLAN

AIRPORT AIRSPACE DRAWING PROFILES

JOB NO.: 14181110
DATE: DEC. 2020
DESIGNED BY: NRP
DRAWN BY: DLM

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AIRPORT SPONSOR BLOCK

SIGNATURE

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

Project Engineer

DocuSigned by:
Eric Dunn
2D6CD827A4A1464...
TITLE: AIRPORT OR AIRPORT'S REPRESENTATIVE
2/23/2021
DATE

TxDOT APPROVAL BLOCK

Director, Aviation Division

DocuSigned by:
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2/22/2021

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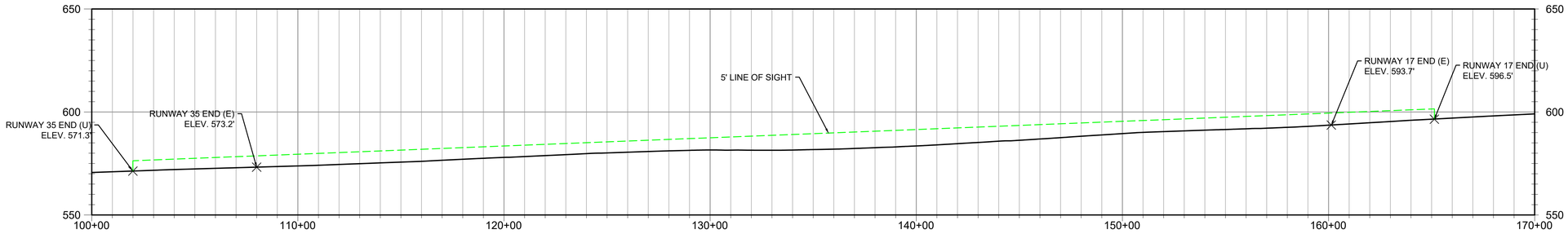
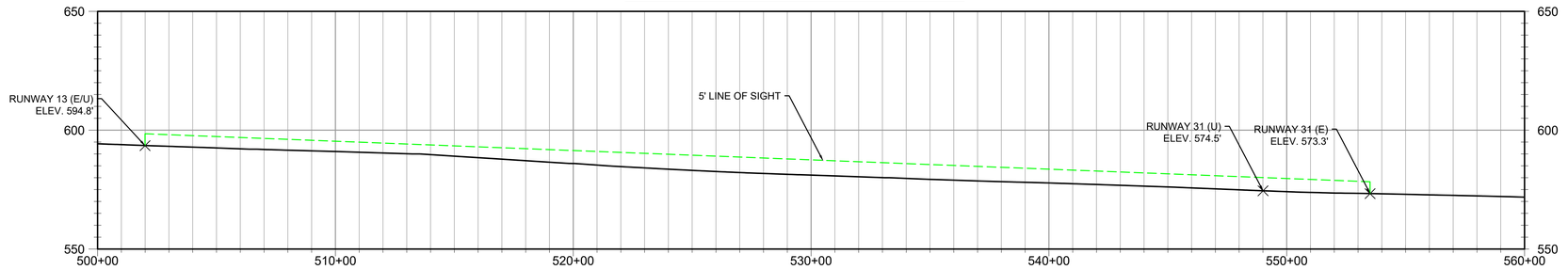
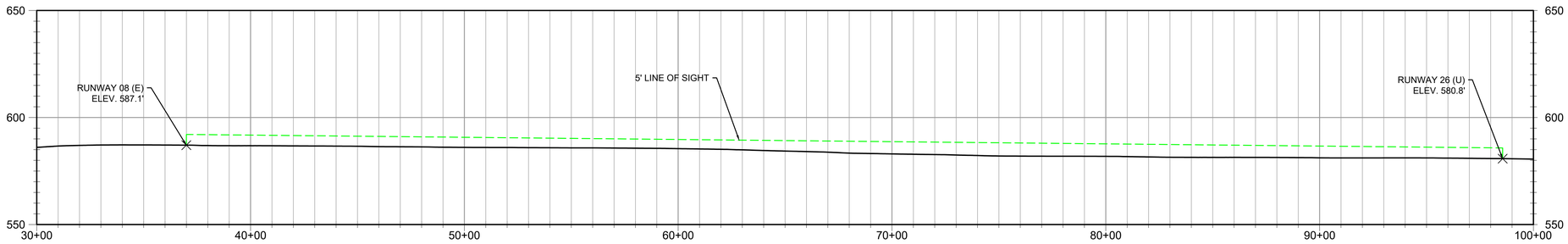
RUNWAY 17-35 RUNWAY PROFILE



RUNWAY 13-31 RUNWAY PROFILE



RUNWAY 8-26 RUNWAY PROFILE



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Project Engineer
TITLE OF AIRPORT SPONSOR'S REPRESENTATIVE

DocuSigned by:
Luke Illbott
2D0D5837A6A7452...
SIGNATURE

2/23/2021
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Director, Aviation Division

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REV.	DATE	DESCRIPTION	BY

SAN MARCOS REGIONAL AIRPORT
SAN MARCOS, TX

AIRPORT LAYOUT PLAN

AIRPORT RUNWAY PROFILE

JOB NO.: 14181110
DATE: DEC. 2020
DESIGNED BY: NRP
DRAWN BY: DLM

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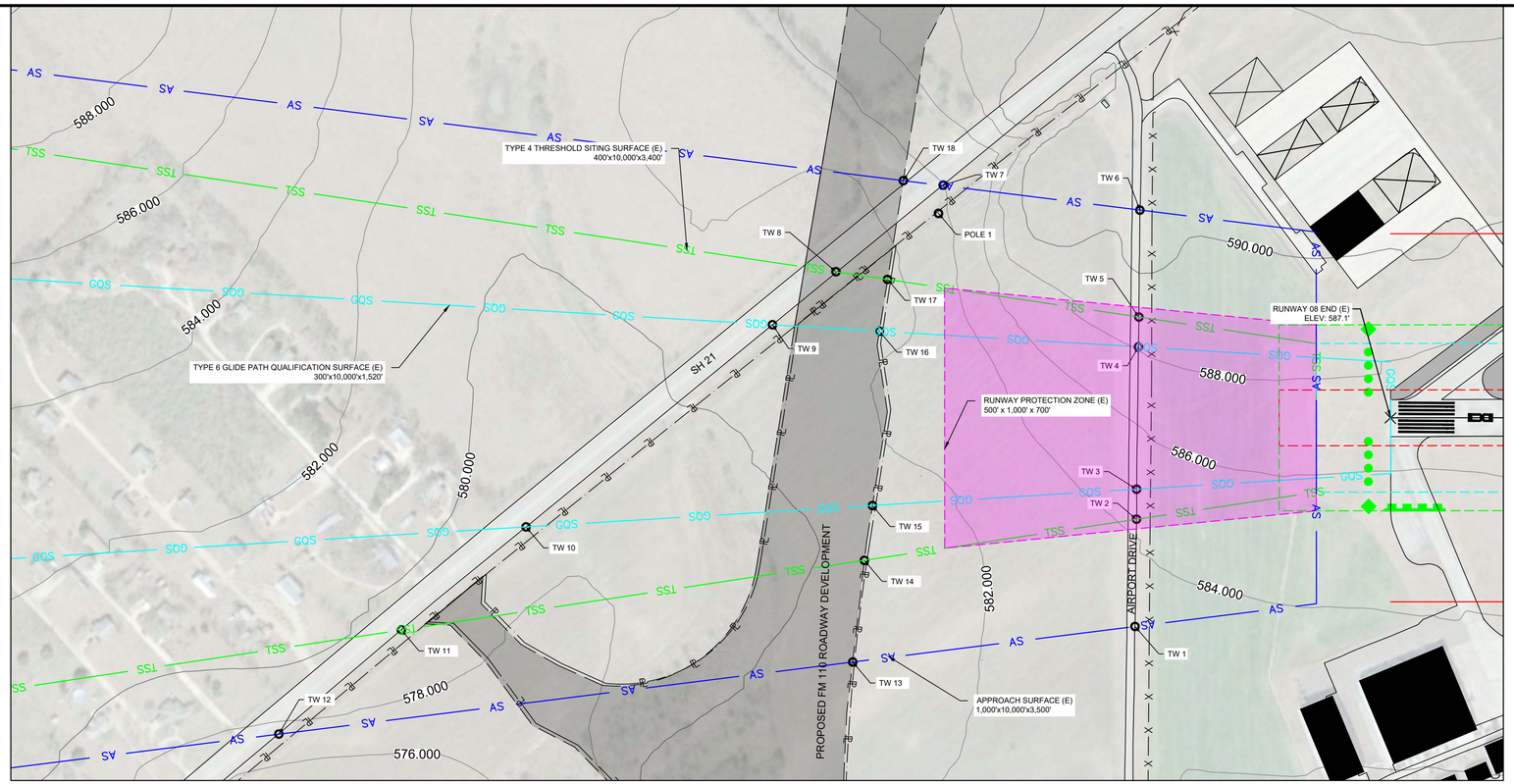

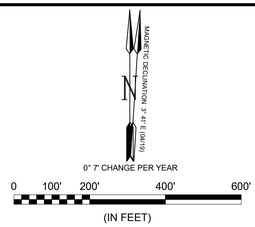

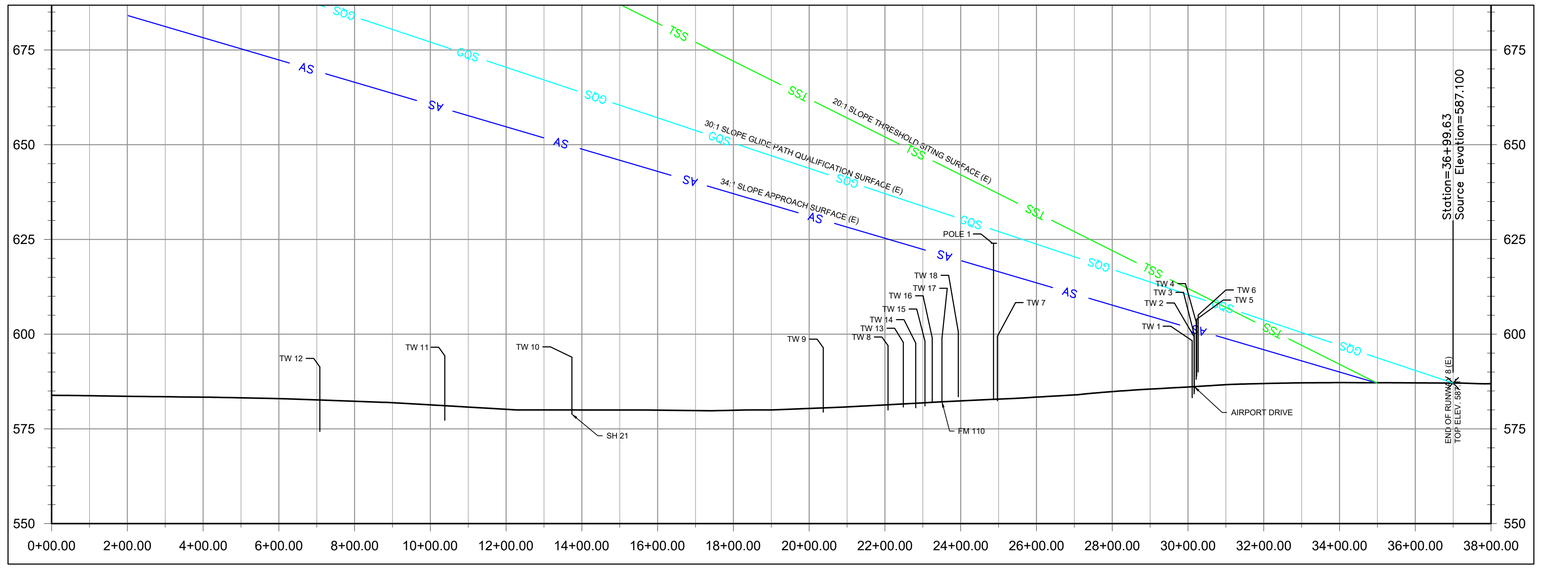

IPASD LEGEND

FEATURE	EXISTING	ULTIMATE
RUNWAY/TAXIWAY OUTLINE		
RUNWAY/TAXIWAY TO BE REMOVED		
BUILDINGS/FACILITIES		
AIRPORT PROPERTY LINE		
AIRPORT PROPERTY LINE w/FENCE		
APPROACH SURFACE	AS	AS (U)
THRESHOLD SITING SURFACE	TSS	TSS (U)
GLIDEPATH QUALIFICATION SURFACE	GQS	
OBJECT FREE AREA		
RUNWAY SAFETY AREA		
OBJECT FREE ZONE		
FENCE LINE		
THRESHOLD LIGHTS		
RW END IDENTIFIER LIGHTS (REILS)		
GROUND CONTOURS	1205	
SIGNIFICANT OBJECT PLAN VIEW		
SIGNIFICANT OBJECT PROFILE VIEW		
TREES/BRUSH		

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Project Engineer

TITLE AUTHORIZED AIRPORT REPRESENTATIVE

DocuSigned by:
Eric Lupfer
EDCCB37A6A1424...

2/23/2021

SIGNATURE DATE

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Director, Aviation Division

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REV	DATE	DESCRIPTION	BY

SAN MARCOS REGIONAL AIRPORT
SAN MARCOS, TX

AIRPORT LAYOUT PLAN

INNER PORTION APPROACH SURFACE - RUNWAY 8

JOB NO.: 14181110
DATE: DEC. 2020
DESIGNED BY: NRP
DRAWN BY: DLM

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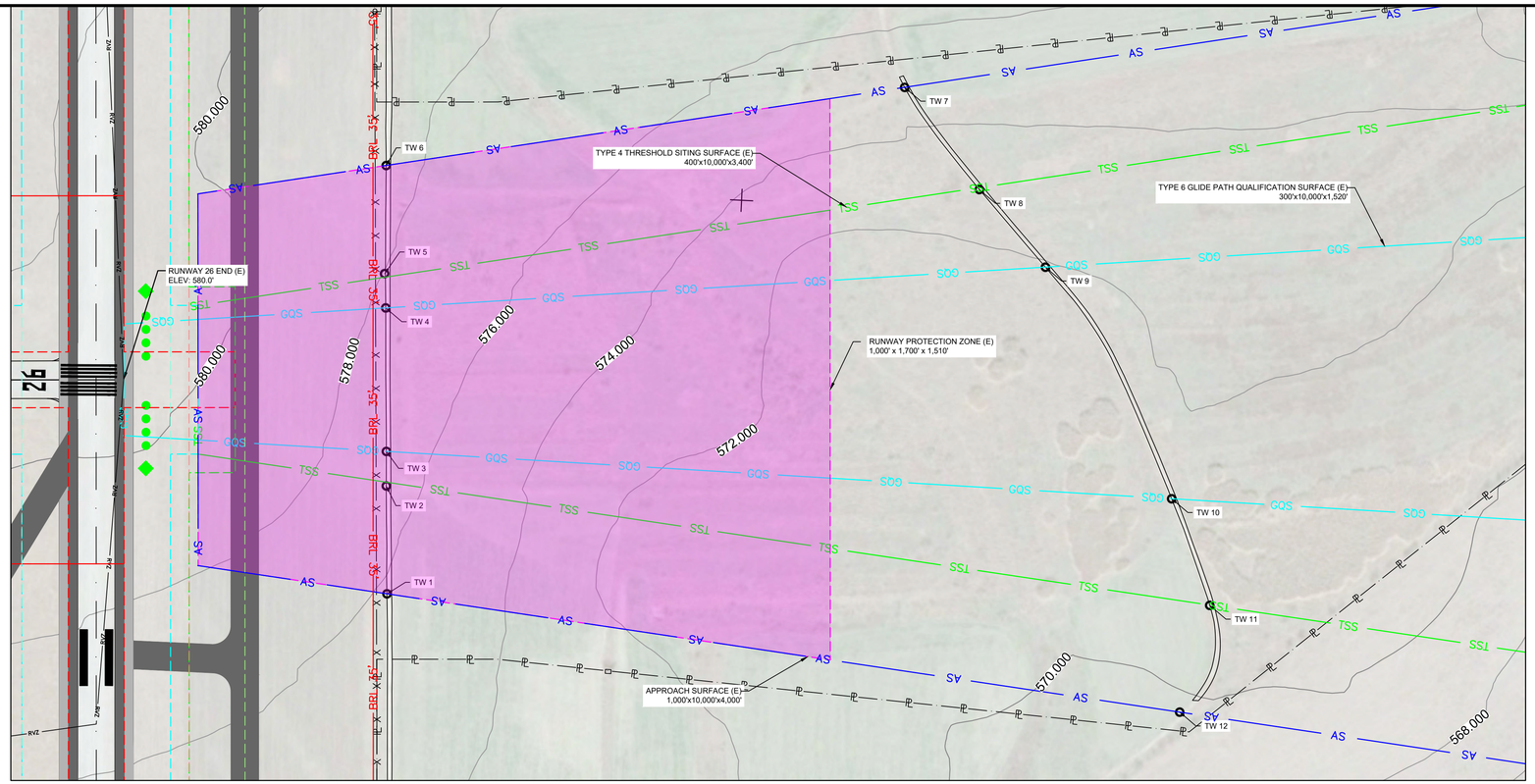

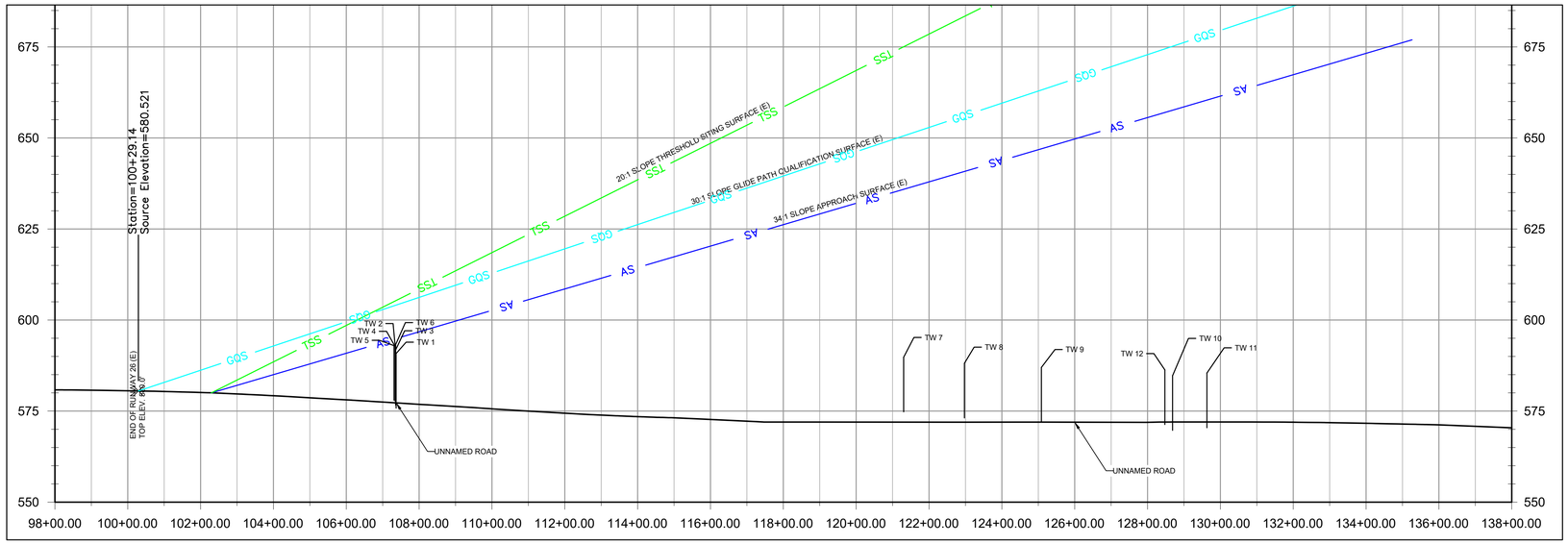

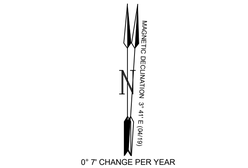

IPASD LEGEND		
FEATURE	EXISTING	ULTIMATE
RUNWAY/TAXIWAY OUTLINE		
RUNWAY/TAXIWAY TO BE REMOVED		
BUILDINGS/FACILITIES		
AIRPORT PROPERTY LINE		P (U)
AIRPORT PROPERTY LINE w/FENCE		P (U)
APPROACH SURFACE	AS	AS (U)
THRESHOLD SITING SURFACE	TSS	TSS (U)
GLIDEPATH QUALIFICATION SURFACE	GQS	GQS (U)
OBJECT FREE AREA		
RUNWAY SAFETY AREA		
OBJECT FREE ZONE		
FENCE LINE		
THRESHOLD LIGHTS		
RW END IDENTIFIER LIGHTS (REILS)		
GROUND CONTOURS	100	
SIGNIFICANT OBJECT PLAN VIEW		
SIGNIFICANT OBJECT PROFILE VIEW		
TREES/BRUSH		

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AIRPORT SPONSOR BLOCK

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Project Engineer

DocuSigned by:
Eric Abbott
11E1...AIRPORT DIRECTOR'S REPRESENTATIVE SIGNATURE

2/23/2021
DATE

TxDOT APPROVAL BLOCK

Director, Aviation Division

DocuSigned by:
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2/22/2021

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BY	DESCRIPTION	DATE	REV.

SAN MARCOS REGIONAL AIRPORT
SAN MARCOS, TX

AIRPORT LAYOUT PLAN

INNER PORTION APPROACH SURFACE - RUNWAY 26

JOB NO.: 14181110
DATE: DEC. 2020
DESIGNED BY: NRP
DRAWN BY: DLM

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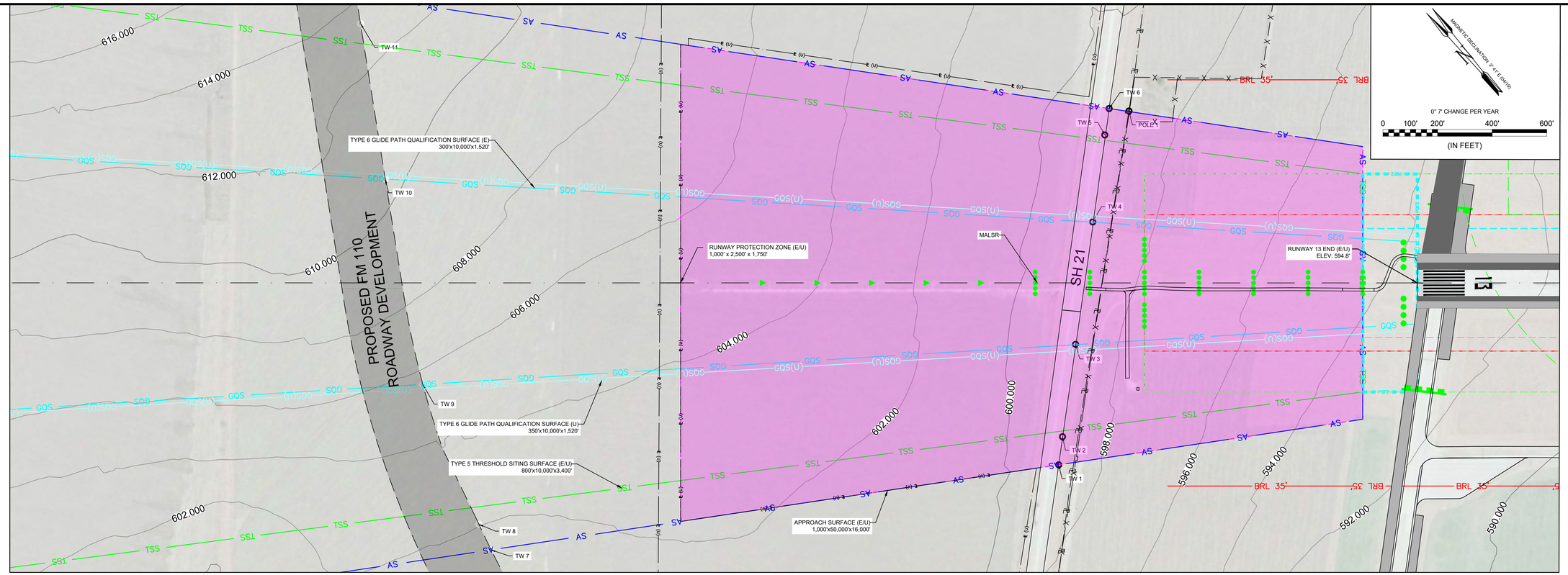

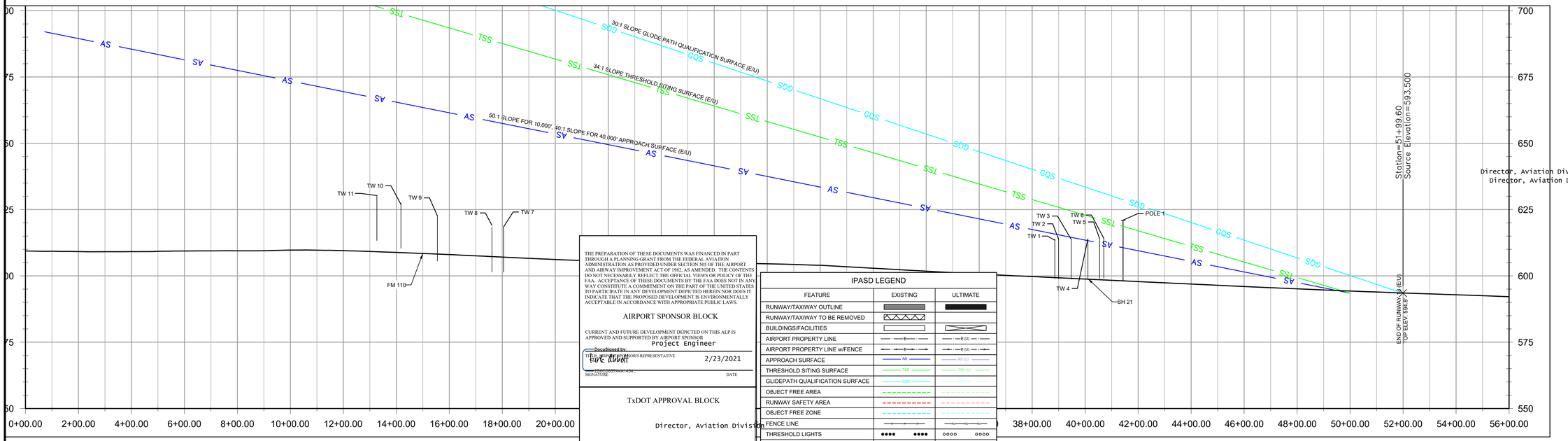

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Project Engineer

TITLE OF AIRPORT SPONSOR'S REPRESENTATIVE

DocuSigned by:
Eric Abbott
7A0A4837A6A14A2...
SIGNATURE

2/23/2021
DATE

TxDOT APPROVAL BLOCK

Director, Aviation Division

DocuSigned by:
EA0A4EF01FA5423...

2/22/2021

IPASD LEGEND

FEATURE	EXISTING	ULTIMATE
RUNWAY/TAXIWAY OUTLINE		
RUNWAY/TAXIWAY TO BE REMOVED		
BUILDINGS/FACILITIES		
AIRPORT PROPERTY LINE		
AIRPORT PROPERTY LINE w/FENCE		
APPROACH SURFACE	AS	AS (U)
THRESHOLD SITING SURFACE	TSS	TSS (U)
GLIDEPATH QUALIFICATION SURFACE	GQS	
OBJECT FREE AREA		
RUNWAY SAFETY AREA		
OBJECT FREE ZONE		
FENCE LINE		
THRESHOLD LIGHTS		
RW END IDENTIFIER LIGHTS (REILS)		
GROUND CONTOURS	1025	
SIGNIFICANT OBJECT PLAN VIEW		
SIGNIFICANT OBJECT PROFILE VIEW		
TREES/BRUSH		

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REV.	DATE	DESCRIPTION	BY

SAN MARCOS REGIONAL AIRPORT
SAN MARCOS, TX

AIRPORT LAYOUT PLAN

INNER PORTION APPROACH SURFACE - RUNWAY 13

JOB NO.: 14181110
DATE: DEC. 2020
DESIGNED BY: NRP
DRAWN BY: DLM

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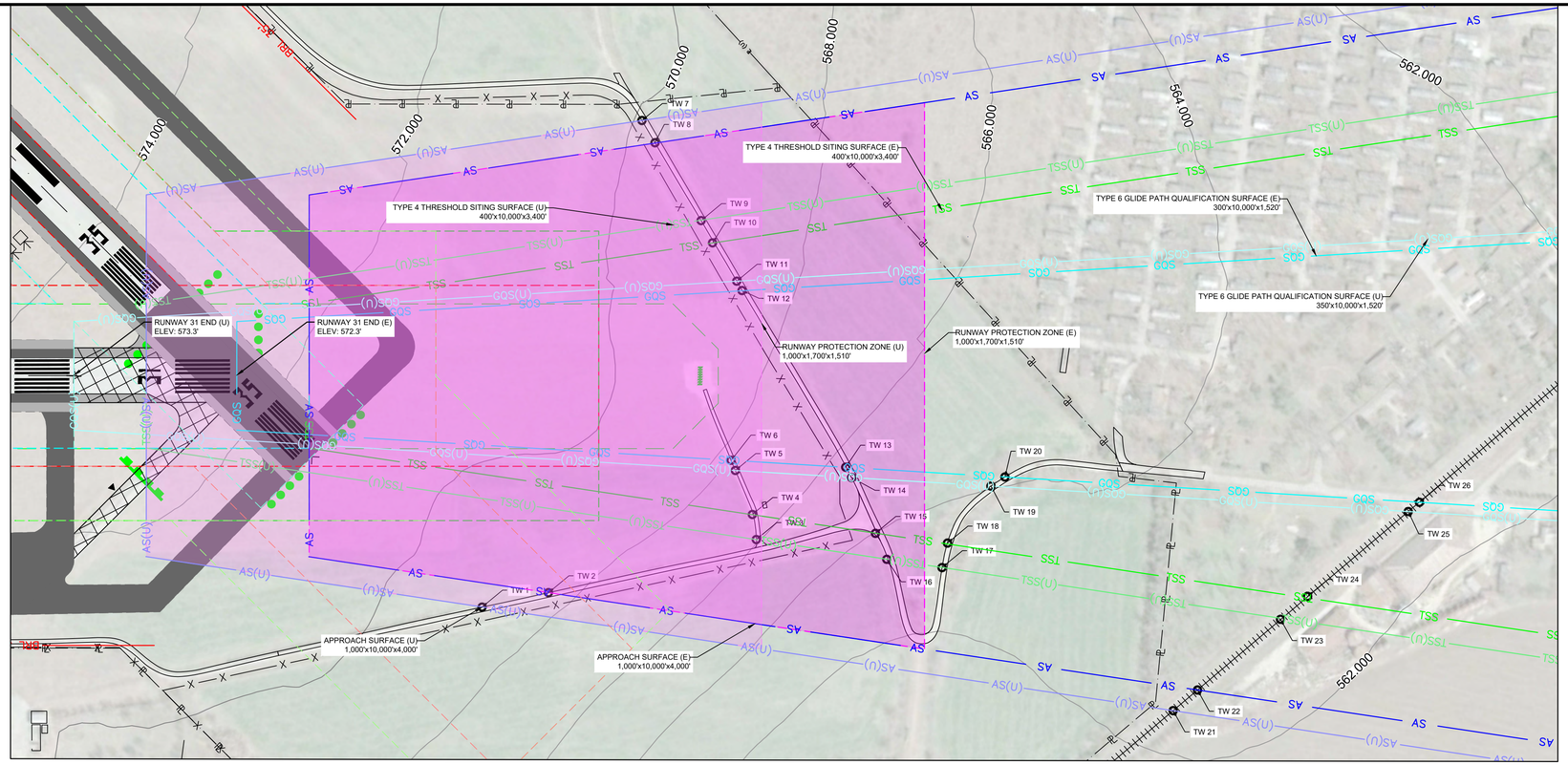

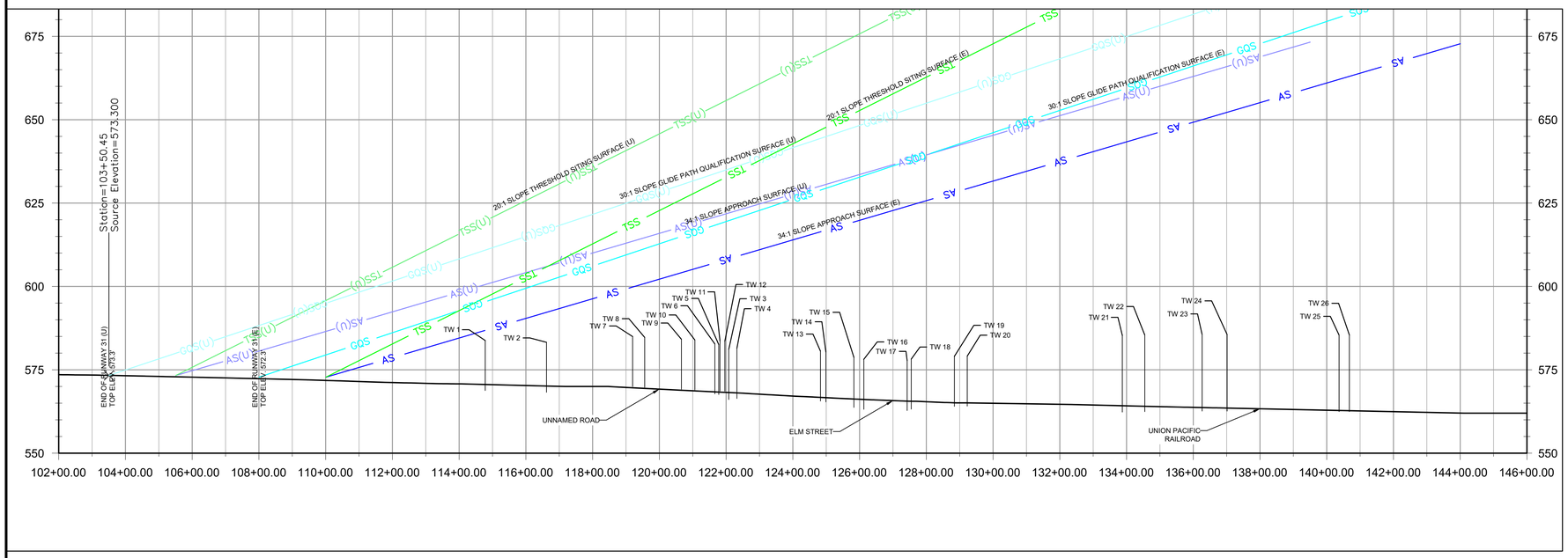

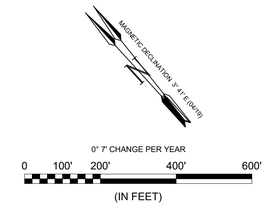

IPASD LEGEND		
FEATURE	EXISTING	ULTIMATE
RUNWAY/TAXIWAY OUTLINE		
RUNWAY/TAXIWAY TO BE REMOVED		
BUILDINGS/FACILITIES		
AIRPORT PROPERTY LINE		
AIRPORT PROPERTY LINE w/FENCE		
APPROACH SURFACE	AS	AS (U)
THRESHOLD SITING SURFACE	TSS	TSS (U)
GLIDEPATH QUALIFICATION SURFACE	GQS	
OBJECT FREE AREA		
RUNWAY SAFETY AREA		
OBJECT FREE ZONE		
FENCE LINE		
THRESHOLD LIGHTS		
RW END IDENTIFIER LIGHTS (REILS)		
GROUND CONTOURS	1025	
SIGNIFICANT OBJECT PLAN VIEW		
SIGNIFICANT OBJECT PROFILE VIEW		
TREES/BRUSH		

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AIRPORT SPONSOR BLOCK

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Project Engineer

TITLE OF AUTHORIZED SPONSOR'S REPRESENTATIVE

DocuSigned by: Curt Duvall
Signature: 837A4A1454...

2/23/2021
DATE

TxDOT APPROVAL BLOCK

Director, Aviation Division

DocuSigned by:
EA0A4EF01FA5423...

2/22/2021

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REV.	DATE	DESCRIPTION	BY

SAN MARCOS REGIONAL AIRPORT
SAN MARCOS, TX

AIRPORT LAYOUT PLAN

INNER PORTION APPROACH SURFACE - RUNWAY 31

JOB NO.: 14181110
DATE: DEC. 2020
DESIGNED BY: NRP
DRAWN BY: DLM

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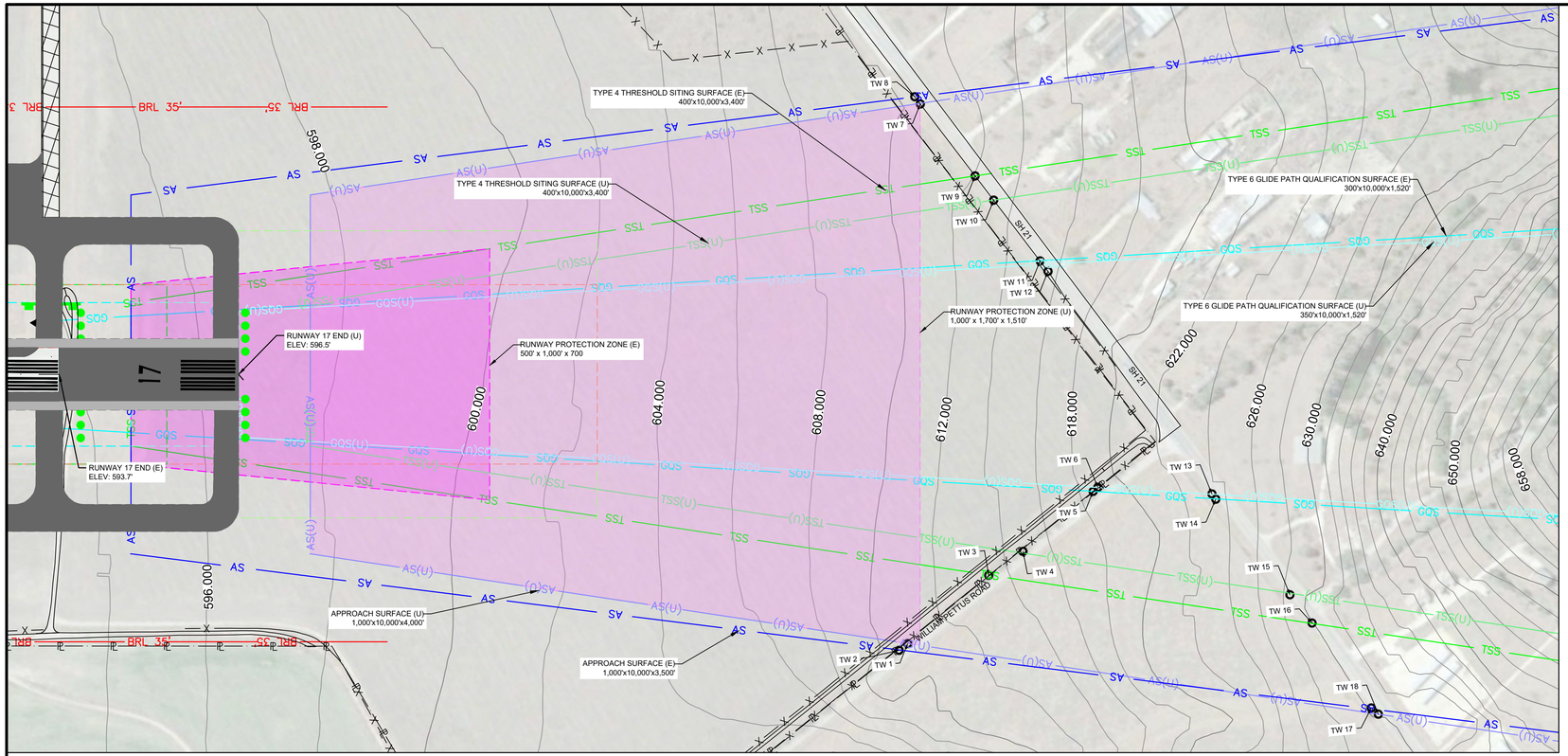

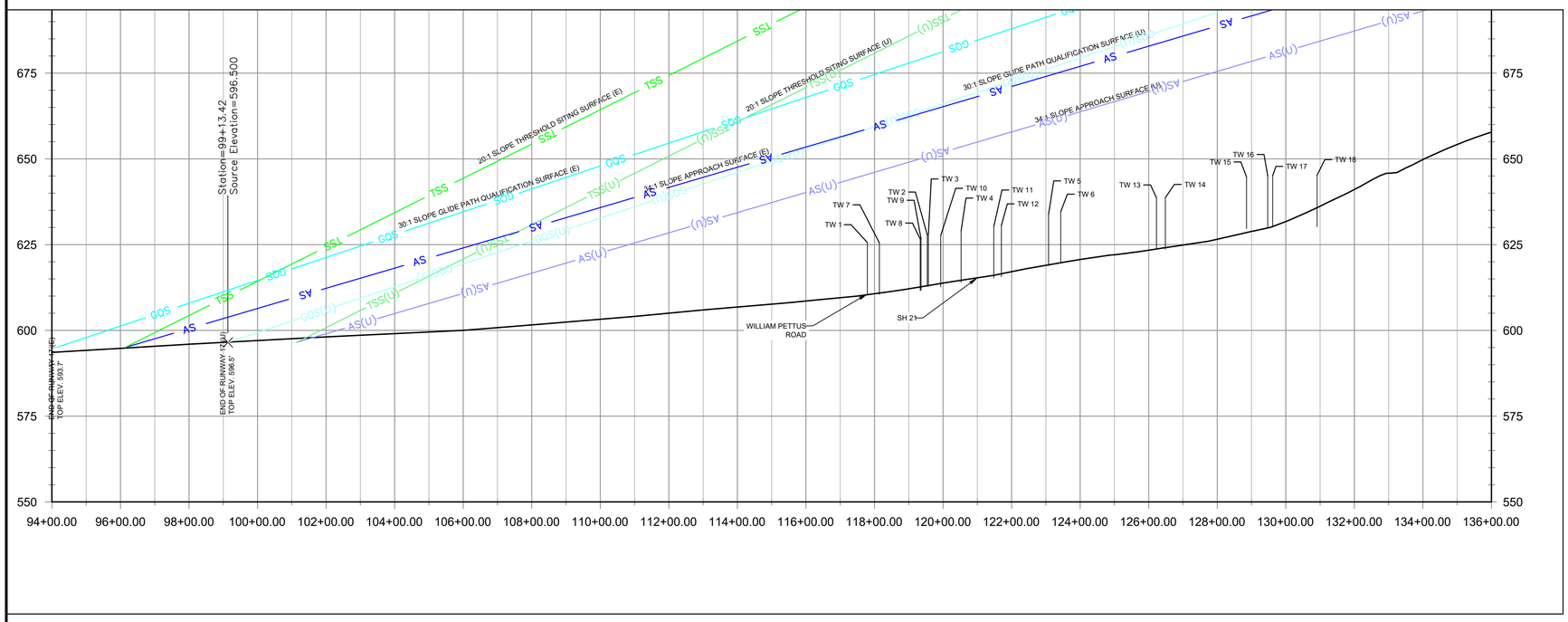

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AIRPORT SPONSOR BLOCK

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Project Engineer

DocuSigned by:
Eric Abbott
000DB897A4A1456...
SIGNATURE

2/23/2021
DATE

TxDOT APPROVAL BLOCK

Director, Aviation Division

DocuSigned by:
EA0A4EF01FA5423...

2/22/2021

MAGNETIC DECLINATION 3° 41' E (04/19)

0° 7' CHANGE PER YEAR

0 100' 200' 400' 600'

(IN FEET)

IPASD LEGEND

FEATURE	EXISTING	ULTIMATE
RUNWAY/TAXIWAY OUTLINE		
RUNWAY/TAXIWAY TO BE REMOVED		
BUILDINGS/FACILITIES		
AIRPORT PROPERTY LINE		E(U)
AIRPORT PROPERTY LINE w/FENCE		E(U)
APPROACH SURFACE	AS	AS (U)
THRESHOLD SITING SURFACE	TSS	TSS (U)
GLIDEPATH QUALIFICATION SURFACE	GQS	GQS (U)
OBJECT FREE AREA		
RUNWAY SAFETY AREA		
OBJECT FREE ZONE		
FENCE LINE		
THRESHOLD LIGHTS		
RW END IDENTIFIER LIGHTS (REILS)		
GROUND CONTOURS	1000	
SIGNIFICANT OBJECT PLAN VIEW		
SIGNIFICANT OBJECT PROFILE VIEW		
TREES/BRUSH		

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REV.	DATE	DESCRIPTION	BY

SAN MARCOS REGIONAL AIRPORT
SAN MARCOS, TX

AIRPORT LAYOUT PLAN

INNER PORTION APPROACH SURFACE - RUNWAY 17

JOB NO.: 14181110
DATE: DEC. 2020
DESIGNED BY: NRP
DRAWN BY: DLM

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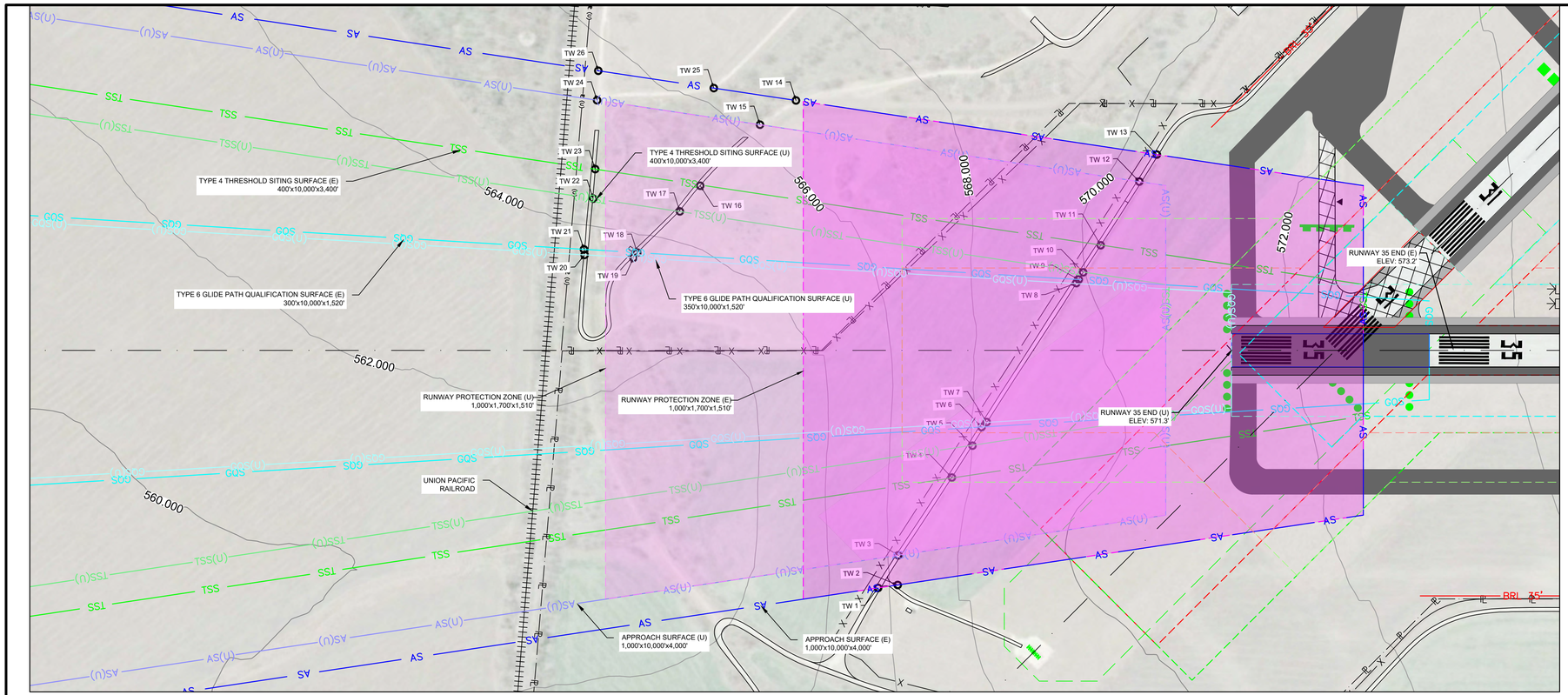

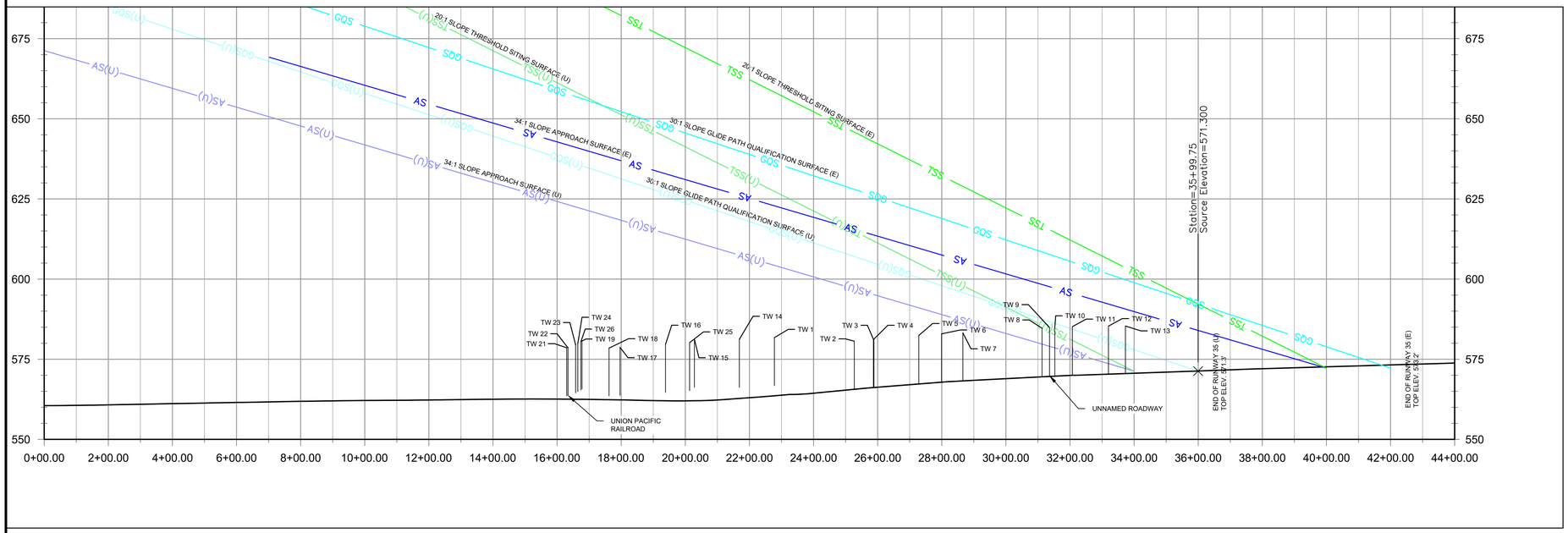

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AIRPORT SPONSOR BLOCK

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Project Engineer

DocuSigned by:
Eric Turner
3DEC0837A4A145E...
TITLE OF AIRPORT SPONSOR'S REPRESENTATIVE
SIGNATURE

2/23/2021
DATE

TxDOT APPROVAL BLOCK

Director, Aviation Division

DocuSigned by:
EA0A4EF01FA5423...

2/22/2021

MAGNETIC DECLINATION 3° 41' E (04/19)
0° 7' CHANGE PER YEAR
0 100' 200' 400' 600'
(IN FEET)

IPASD LEGEND

FEATURE	EXISTING	ULTIMATE
RUNWAY/TAXIWAY OUTLINE		
RUNWAY/TAXIWAY TO BE REMOVED		
BUILDINGS/FACILITIES		
AIRPORT PROPERTY LINE		
AIRPORT PROPERTY LINE w/FENCE		
APPROACH SURFACE	AS	AS (U)
THRESHOLD SITING SURFACE	TSS	TSS (U)
GLIDEPATH QUALIFICATION SURFACE	GQS	GQS (U)
OBJECT FREE AREA		
RUNWAY SAFETY AREA		
OBJECT FREE ZONE		
FENCE LINE		
THRESHOLD LIGHTS		
RW END IDENTIFIER LIGHTS (REILS)		
GROUND CONTOURS	100	
SIGNIFICANT OBJECT PLAN VIEW		
SIGNIFICANT OBJECT PROFILE VIEW		
TREES/BRUSH		

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REV	DATE	DESCRIPTION	BY

SAN MARCOS REGIONAL AIRPORT
SAN MARCOS, TX

AIRPORT LAYOUT PLAN

INNER PORTION APPROACH SURFACE - RUNWAY 35

JOB NO.: 14181110
DATE: DEC. 2020
DESIGNED BY: NRP
DRAWN BY: DLM

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RUNWAY 08 OBSTRUCTION TABLE

OBJECTS PENETRATING APPROACH SURFACES

NO.	DESCRIPTION	TOP ELEVATION	SURFACE	SURFACE ELEVATION	PENETRATION IN FEET	DISPOSITION
POLE 1	POLE	624.00'	AS (E)	622.86'	1.14'	REMOVE
TW 6	AIRPORT DRIVE	605.02'	AS (E)	601.02'	4.00'	REGRADE

OBJECTS CLEAR OF APPROACH SURFACE

NO.	DESCRIPTION	TOP ELEVATION	SURFACE	SURFACE ELEVATION	CLEARANCE IN FEET	DISPOSITION
TW 1	AIRPORT DRIVE	598.23'	AS (E)	607.36'	9.13'	N/A
TW 2	AIRPORT DRIVE	599.25'	TSS (E)	607.21'	7.96'	N/A
TW 3	AIRPORT DRIVE	599.84'	GQS (E)	609.88'	10.04'	N/A
TW 4	AIRPORT DRIVE	603.08'	GQS (E)	609.71'	6.63'	N/A
TW 5	AIRPORT DRIVE	603.91'	TSS (E)	620.96'	17.05'	N/A
TW 7	STATE HIGHWAY 21	599.42'	AS (E)	621.80'	22.38'	N/A
TW 8	STATE HIGHWAY 21	596.98'	TSS (E)	660.27'	63.29'	N/A
TW 9	STATE HIGHWAY 21	596.42'	GQS (E)	642.53'	46.12'	N/A
TW 10	STATE HIGHWAY 21	593.88'	GQS (E)	664.66'	70.79'	N/A
TW 11	STATE HIGHWAY 21	594.29'	TSS (E)	723.94'	129.64'	N/A
TW 12	STATE HIGHWAY 21	591.34'	AS (E)	678.14'	86.80'	N/A
TW 13	FM 110	597.79'	AS (E)	629.80'	32.01'	N/A
TW 14	FM 110	597.56'	TSS (E)	658.04'	60.48'	N/A
TW 15	FM 110	598.05'	GQS (E)	633.58'	35.53'	N/A
TW 16	FM 110	598.99'	GQS (E)	632.94'	33.95'	N/A
TW 17	FM 110	599.00'	TSS (E)	654.58'	55.58'	N/A
TW 18	FM 110	600.49'	AS (E)	625.52'	25.03'	N/A

OBSTRUCTION DATA WAS OBTAINED USING THE FAA'S DAILY DIGITAL OBSTACLE FILE

EXISTING OBSTRUCTIONS TO BE REMEDIATED AS FACILITIES IMPROVED

RUNWAY 26 OBSTRUCTION TABLE

OBJECTS PENETRATING APPROACH SURFACES

NO.	DESCRIPTION	TOP ELEVATION	SURFACE	SURFACE ELEVATION	PENETRATION IN FEET	DISPOSITION
NO OBSTRUCTIONS						

OBJECTS CLEAR OF APPROACH SURFACE

NO.	DESCRIPTION	TOP ELEVATION	SURFACE	SURFACE ELEVATION	CLEARANCE IN FEET	DISPOSITION
TW 1	UNNAMED ROAD	590.83'	AS (E)	600.78'	9.95'	N/A
TW 2	UNNAMED ROAD	591.65'	TSS (E)	615.25'	23.60'	N/A
TW 3	UNNAMED ROAD	591.83'	GQS (E)	603.50'	11.67'	N/A
TW 4	UNNAMED ROAD	592.73'	GQS (E)	603.47'	10.74'	N/A
TW 5	UNNAMED ROAD	592.96'	TSS (E)	615.19'	22.23'	N/A
TW 6	UNNAMED ROAD	593.33'	AS (E)	600.68'	7.35'	N/A
TW 7	UNNAMED ROAD	589.80'	AS (E)	641.78'	51.98'	N/A
TW 8	UNNAMED ROAD	588.13'	TSS (E)	693.40'	105.27'	N/A
TW 9	UNNAMED ROAD	587.00'	GQS (E)	662.61'	75.61'	N/A
TW 10	UNNAMED ROAD	586.31'	GQS (E)	673.91'	87.60'	N/A
TW 11	UNNAMED ROAD	585.43'	TSS (E)	726.64'	141.21'	N/A
TW 12	UNNAMED ROAD	584.72'	AS (E)	663.49'	78.77'	N/A

OBSTRUCTION DATA WAS OBTAINED USING THE FAA'S DAILY DIGITAL OBSTACLE FILE

EXISTING OBSTRUCTIONS TO BE REMEDIATED AS FACILITIES IMPROVED

NOTE:
"TW" STANDS FOR TRAVERSE WAY.

RUNWAY 17 OBSTRUCTION TABLE

OBJECTS PENETRATING APPROACH SURFACES

NO.	DESCRIPTION	TOP ELEVATION	SURFACE	SURFACE ELEVATION	PENETRATION IN FEET	DISPOSITION
NO OBSTRUCTIONS						

OBJECTS CLEAR OF APPROACH SURFACE

NO.	DESCRIPTION	TOP ELEVATION	SURFACE	SURFACE ELEVATION	CLEARANCE IN FEET	DISPOSITION
TW 1	ELM ST	583.79'	AS (U)	606.47'	22.68'	N/A
TW 2	ELM ST	583.26'	AS (E)	597.58'	14.32'	N/A
TW 3	PRIVATE ROAD	581.09'	TSS (U)	666.18'	85.09'	N/A
TW 4	PRIVATE ROAD	581.39'	TSS (E)	643.88'	62.49'	N/A
TW 5	PRIVATE ROAD	582.60'	GQS (U)	634.22'	51.62'	N/A
TW 6	PRIVATE ROAD	582.78'	GQS (E)	632.83'	50.05'	N/A
TW 7	UNNAMED ROAD	584.99'	AS (U)	619.46'	34.47'	N/A
TW 8	UNNAMED ROAD	584.75'	AS (E)	619.52'	34.77'	N/A
TW 9	UNNAMED ROAD	584.17'	TSS (U)	659.08'	74.91'	N/A
TW 10	UNNAMED ROAD	583.98'	TSS (E)	660.09'	76.11'	N/A
TW 11	UNNAMED ROAD	583.66'	GQS (U)	634.34'	50.68'	N/A
TW 12	UNNAMED ROAD	583.58'	GQS (E)	633.83'	50.25'	N/A
TW 13	UNNAMED ROAD	582.49'	GQS (E)	643.38'	60.89'	N/A
TW 14	UNNAMED ROAD	580.63'	GQS (U)	644.92'	64.29'	N/A
TW 15	UNNAMED ROAD	580.37'	TSS (E)	683.93'	103.56'	N/A
TW 16	UNNAMED ROAD	578.72'	TSS (U)	686.41'	107.69'	N/A
TW 17	MILL ROAD	578.15'	TSS (U)	692.93'	114.78'	N/A
TW 18	MILL ROAD	577.79'	TSS (E)	692.52'	114.73'	N/A
TW 19	MILL ROAD	578.21'	GQS (U)	657.76'	79.55'	N/A
TW 20	MILL ROAD	579.04'	GQS (E)	658.04'	79.00'	N/A
TW 21	UNION PACIFIC RAILROAD	579.12'	AS (U)	662.62'	83.50'	N/A
TW 22	UNION PACIFIC RAILROAD	585.32'	AS (E)	663.59'	78.27'	N/A
TW 23	UNION PACIFIC RAILROAD	585.46'	TSS (U)	737.10'	151.64'	N/A
TW 24	UNION PACIFIC RAILROAD	585.63'	TSS (E)	739.85'	154.22'	N/A
TW 25	UNION PACIFIC RAILROAD	585.62'	GQS (U)	696.18'	110.56'	N/A
TW 26	UNION PACIFIC RAILROAD	585.44'	GQS (E)	696.23'	110.79'	N/A

OBSTRUCTION DATA WAS OBTAINED USING THE FAA'S DAILY DIGITAL OBSTACLE FILE

EXISTING OBSTRUCTIONS TO BE REMEDIATED AS FACILITIES IMPROVED

RUNWAY 35 OBSTRUCTION TABLE

OBJECTS PENETRATING APPROACH SURFACES

NO.	DESCRIPTION	TOP ELEVATION	SURFACE	SURFACE ELEVATION	PENETRATION IN FEET	DISPOSITION
TW 8	UNNAMED ROAD	584.68'	AS (U)	579.78'	4.90'	REGRADE
TW 9	UNNAMED ROAD	584.86'	AS (U)	578.46'	6.40'	REGRADE
TW 10	UNNAMED ROAD	584.98'	AS (U)	578.58'	6.40'	REGRADE
TW 11	UNNAMED ROAD	585.17'	AS (U)	576.97'	8.20'	REGRADE
TW 12	UNNAMED ROAD	585.33'	AS (U)	573.63'	11.70'	REGRADE

OBJECTS CLEAR OF APPROACH SURFACE

NO.	DESCRIPTION	TOP ELEVATION	SURFACE	SURFACE ELEVATION	CLEARANCE IN FEET	DISPOSITION
TW 1	UNNAMED ROAD	580.63'	AS (E)	622.40'	41.77'	N/A
TW 2	UNNAMED ROAD	581.24'	AS (E)	620.65'	39.41'	N/A
TW 3	UNNAMED ROAD	581.30'	AS (U)	601.05'	19.75'	N/A
TW 4	UNNAMED ROAD	582.39'	TSS (E)	646.79'	64.40'	N/A
TW 5	UNNAMED ROAD	582.91'	TSS (U)	611.34'	28.43'	N/A
TW 6	UNNAMED ROAD	583.14'	GQS (E)	618.49'	35.35'	N/A
TW 7	UNNAMED ROAD	583.23'	GQS (U)	595.77'	12.54'	N/A
TW 13	UNNAMED ROAD	585.37'	AS (E)	580.17'	5.20'	N/A
TW 14	ELM STREET	581.75'	AS (E)	629.53'	47.78'	N/A
TW 15	ELM STREET	581.20'	AS (U)	613.40'	32.20'	N/A
TW 16	ELM STREET	580.17'	TSS (E)	682.54'	102.37'	N/A
TW 17	ELM STREET	580.61'	TSS (U)	654.39'	73.78'	N/A
TW 18	ELM STREET	578.71'	GQS (E)	653.33'	74.62'	N/A
TW 19	ELM STREET	578.53'	GQS (U)	632.57'	54.04'	N/A
TW 20	ELM STREET	578.56'	GQS (U)	636.96'	58.40'	N/A
TW 21	ELM STREET	578.70'	GQS (E)	658.73'	80.03'	N/A
TW 22	ELM STREET	579.49'	TSS (U)	668.41'	88.92'	N/A
TW 23	ELM STREET	579.89'	TSS (E)	699.97'	120.08'	N/A
TW 24	ELM STREET	580.40'	AS (U)	645.59'	65.19'	N/A
TW 25	ELM STREET	581.21'	AS (E)	637.07'	55.86'	N/A
TW 26	ELM STREET	584.69'	AS (E)	647.39'	62.70'	N/A

OBSTRUCTION DATA WAS OBTAINED USING THE FAA'S DAILY DIGITAL OBSTACLE FILE

EXISTING OBSTRUCTIONS TO BE REMEDIATED AS FACILITIES IMPROVED

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Frisco, TX 75034
(972) 377-7480

REV.	DATE	DESCRIPTION	BY

SAN MARCOS REGIONAL AIRPORT
SAN MARCOS, TX

AIRPORT LAYOUT PLAN

IPASD TABLES

JOB NO.: 14181110
DATE: DEC. 2020
DESIGNED BY: NRP
DRAWN BY: DLM

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RUNWAY 13 OBSTRUCTION TABLE

OBJECTS PENETRATING APPROACH SURFACES

NO.	DESCRIPTION	TOP ELEVATION	SURFACE	SURFACE ELEVATION	PENETRATION IN FEET	DISPOSITION
POLE 1	POLE	621.00'	AS (E)	614.64'	6.36'	REMOVE
TW 4	STATE HIGHWAY 21	613.97'	AS (E)	613.37'	0.60'	REGRADE
TW 5	STATE HIGHWAY 21	614.03'	AS (E)	612.43'	1.60'	REGRADE
TW 6	STATE HIGHWAY 21	614.18'	AS (E)	612.18'	2.00'	REGRADE

OBJECTS CLEAR OF APPROACH SURFACE

NO.	DESCRIPTION	TOP ELEVATION	SURFACE	SURFACE ELEVATION	CLEARANCE IN FEET	DISPOSITION
TW 1	STATE HIGHWAY 21	613.94'	AS (E)	619.79'	5.85'	N/A
TW 2	STATE HIGHWAY 21	613.87'	TSS (E)	631.73'	17.86'	N/A
TW 3	STATE HIGHWAY 21	613.76'	GQS (E)	635.22'	21.46'	N/A
TW 7	FM 110	618.44'	AS (E)	661.38'	42.94'	N/A
TW 8	FM 110	619.04'	TSS (E)	694.65'	75.61'	N/A
TW 9	FM 110	622.61'	GQS (E)	715.00'	92.38'	N/A
TW 10	FM 110	627.45'	GQS (E)	719.58'	92.13'	N/A
TW 11	FM 110	630.32'	TSS (E)	707.42'	77.10'	N/A

OBSTRUCTION DATA WAS OBTAINED USING THE FAA'S DAILY DIGITAL OBSTACLE FILE

EXISTING OBSTRUCTIONS TO BE REMEDIATED AS FACILITIES IMPROVED

RUNWAY 31 OBSTRUCTION TABLE

OBJECTS PENETRATING APPROACH SURFACES

NO.	DESCRIPTION	TOP ELEVATION	SURFACE	SURFACE ELEVATION	PENETRATION IN FEET	DISPOSITION

NO OBSTRUCTIONS

OBJECTS CLEAR OF APPROACH SURFACE

NO.	DESCRIPTION	TOP ELEVATION	SURFACE	SURFACE ELEVATION	CLEARANCE IN FEET	DISPOSITION
TW 1	ELM ST	583.79'	AS (U)	606.47'	22.68'	N/A
TW 2	ELM ST	583.26'	AS (E)	597.58'	14.32'	N/A
TW 3	PRIVATE ROAD	581.09'	TSS (U)	666.18'	85.09'	N/A
TW 4	PRIVATE ROAD	581.39'	TSS (E)	643.88'	62.49'	N/A
TW 5	PRIVATE ROAD	582.60'	GQS (U)	634.22'	51.62'	N/A
TW 6	PRIVATE ROAD	582.78'	GQS (E)	632.83'	50.05'	N/A
TW 7	UNNAMED ROAD	584.99'	AS (U)	619.46'	34.47'	N/A
TW 8	UNNAMED ROAD	584.75'	AS (E)	619.52'	34.77'	N/A
TW 9	UNNAMED ROAD	584.17'	TSS (U)	659.08'	74.91'	N/A
TW 10	UNNAMED ROAD	583.98'	TSS (E)	660.09'	76.11'	N/A
TW 11	UNNAMED ROAD	583.66'	GQS (U)	634.34'	50.68'	N/A
TW 12	UNNAMED ROAD	583.58'	GQS (E)	633.83'	50.25'	N/A
TW 13	UNNAMED ROAD	582.49'	GQS (E)	643.38'	60.89'	N/A
TW 14	UNNAMED ROAD	580.63'	GQS (U)	644.92'	64.29'	N/A
TW 15	UNNAMED ROAD	580.37'	TSS (E)	683.93'	103.56'	N/A
TW 16	UNNAMED ROAD	578.72'	TSS (U)	686.41'	107.69'	N/A
TW 17	MILL ROAD	578.15'	TSS (U)	692.93'	114.78'	N/A
TW 18	MILL ROAD	577.79'	TSS (E)	692.52'	114.73'	N/A
TW 19	MILL ROAD	578.21'	GQS (U)	657.76'	79.55'	N/A
TW 20	MILL ROAD	579.04'	GQS (E)	658.04'	79.00'	N/A
TW 21	UNION PACIFIC RAILROAD	579.12'	AS (U)	662.62'	83.50'	N/A
TW 22	UNION PACIFIC RAILROAD	585.32'	AS (E)	663.59'	78.27'	N/A
TW 23	UNION PACIFIC RAILROAD	585.46'	TSS (U)	737.10'	151.64'	N/A
TW 24	UNION PACIFIC RAILROAD	585.63'	TSS (E)	739.85'	154.22'	N/A
TW 25	UNION PACIFIC RAILROAD	585.62'	GQS (U)	696.18'	110.56'	N/A
TW 26	UNION PACIFIC RAILROAD	585.44'	GQS (E)	696.23'	110.79'	N/A

OBSTRUCTION DATA WAS OBTAINED USING THE FAA'S DAILY DIGITAL OBSTACLE FILE

EXISTING OBSTRUCTIONS TO BE REMEDIATED AS FACILITIES IMPROVED

NOTE:
"TW" STANDS FOR TRAVERSE WAY.

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REV.	DATE	DESCRIPTION	BY

SAN MARCOS REGIONAL AIRPORT
SAN MARCOS, TX

AIRPORT LAYOUT PLAN

IPASD TABLES 2

JOB NO.: 14181110
DATE: DEC. 2020
DESIGNED BY: NRP
DRAWN BY: DLM

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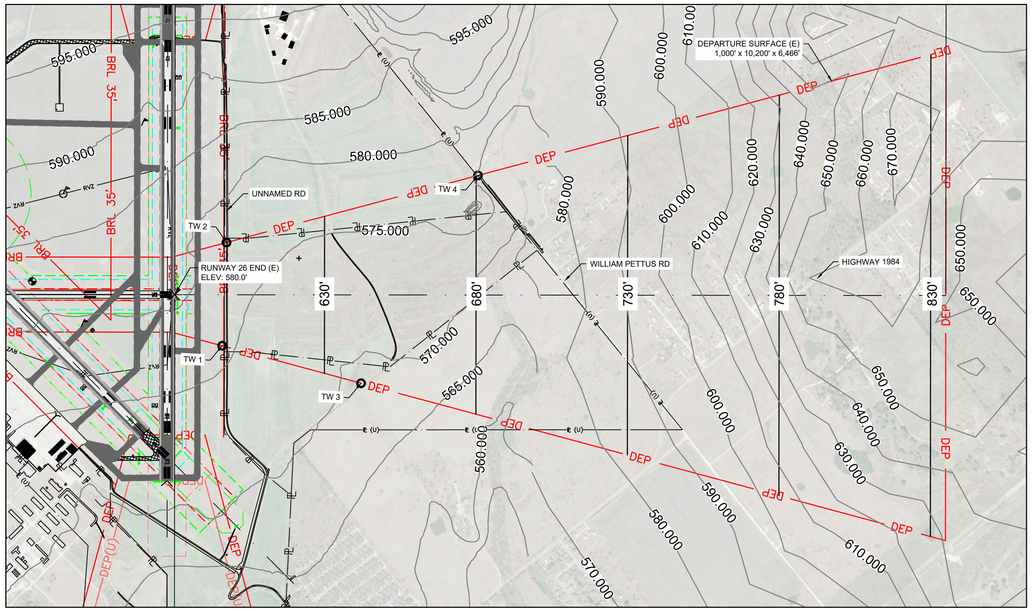

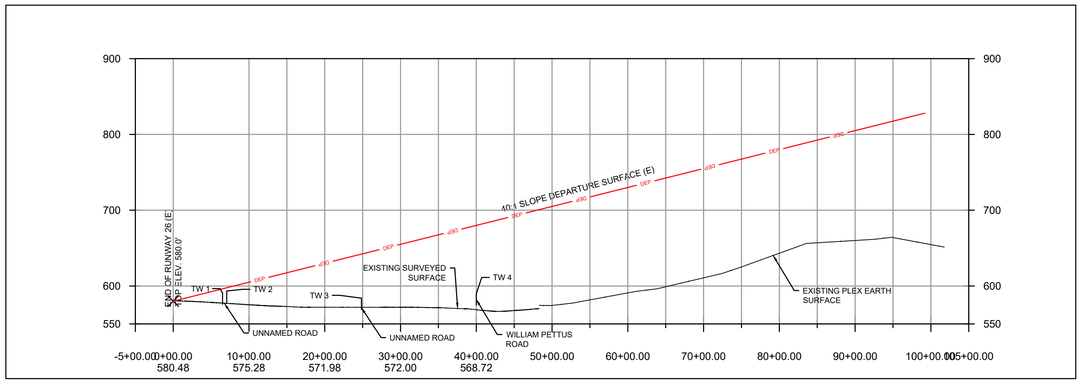

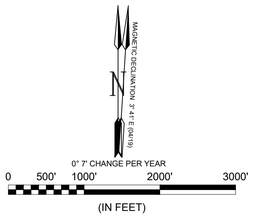

DEP LEGEND		
FEATURE	EXISTING	ULTIMATE
RUNWAY/TAXIWAY OUTLINE		
RUNWAY/TAXIWAY TO BE REMOVED		
BUILDINGS/FACILITIES		
AIRPORT PROPERTY LINE		
AIRPORT PROPERTY LINE w/FENCE		
DEPARTURE SURFACE	DEP	DEP (U)
RUNWAY SAFETY AREA		
RUNWAY OBJECT FREE AREA		
OBJECT FREE ZONE		
FENCE LINE		
THRESHOLD LIGHTS		
RW END IDENTIFIER LIGHTS (REILS)		
GROUND CONTOURS		
SIGNIFICANT OBJECT PLAN VIEW		
SIGNIFICANT OBJECT PROFILE VIEW		
TREES/BRUSH		

RUNWAY 08 OBSTRUCTION TABLE

OBJECTS PENETRATING DEPARTURE SURFACES

NO.	DESCRIPTION	TOP ELEVATION	SURFACE	SURFACE ELEVATION	PENETRATION IN FEET	DISPOSITION
NO OBSTRUCTIONS						

OBJECTS CLEAR OF DEPARTURE SURFACES

NO.	DESCRIPTION	TOP ELEVATION	SURFACE	SURFACE ELEVATION	CLEARANCE IN FEET	DISPOSITION
TW 1	UNNAMED ROAD	590.77'	DEP (E)	595.67'	4.90'	N/A
TW 2	UNNAMED ROAD	593.41'	DEP (E)	597.03'	3.62'	N/A
TW 3	UNNAMED ROAD	584.00'	DEP (E)	641.50'	57.50'	N/A
TW 4	WILLIAM PETTUS ROAD	589.70'	DEP (E)	680.00'	90.30'	N/A

ALL CLEARANCES HAVE BEEN ADJUSTED FOR HEIGHT OF NATURAL OBJECTS, AND 10' FOR PRIVATE ROADS,
15' FOR PUBLIC ROADS, 17' FOR INTERSTATE HIGHWAYS, AND 23' FOR RAILROADS.

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Project Engineer

DocuSigned by:
TITLE (PRINCIPAL OFFICER'S REPRESENTATIVE
Eric Hurst
C90C0997AAA1464...
SIGNATURE

2/23/2021
DATE

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Director, Aviation Division

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REV.	DATE	DESCRIPTION	BY

SAN MARCOS REGIONAL AIRPORT
SAN MARCOS, TX

AIRPORT LAYOUT PLAN

DEPARTURE SURFACE - RUNWAY 8

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DATE: DEC. 2020
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DRAWN BY: DLM

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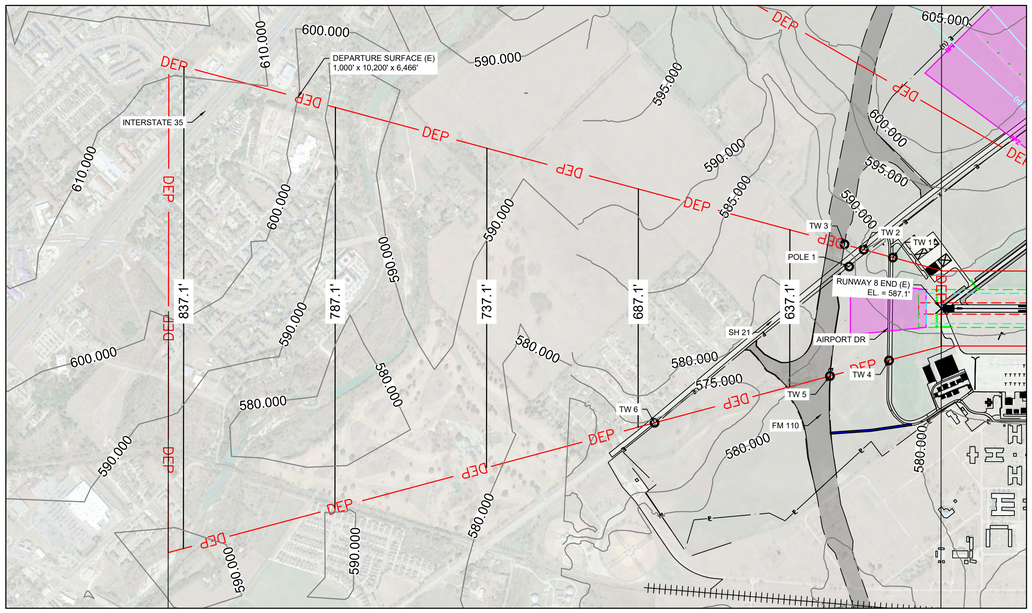

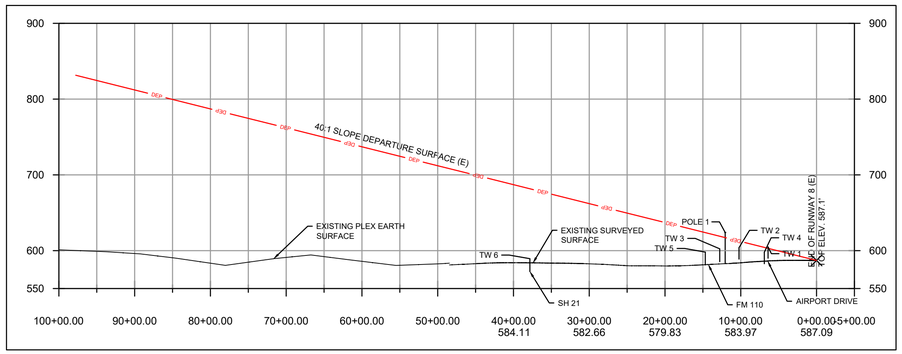

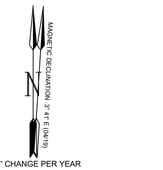

0 500' 1000' 2000' 3000'

(IN FEET)

DEP LEGEND		
FEATURE	EXISTING	ULTIMATE
RUNWAY/TAXIWAY OUTLINE		
RUNWAY/TAXIWAY TO BE REMOVED		
BUILDINGS/FACILITIES		
AIRPORT PROPERTY LINE		
AIRPORT PROPERTY LINE w/FENCE		
DEPARTURE SURFACE	DEP	DEP (U)
RUNWAY SAFETY AREA		
RUNWAY OBJECT FREE AREA		
OBJECT FREE ZONE		
FENCE LINE		
THRESHOLD LIGHTS		
RW END IDENTIFIER LIGHTS (REILS)		
GROUND CONTOURS	1620	
SIGNIFICANT OBJECT PLAN VIEW		
SIGNIFICANT OBJECT PROFILE VIEW		
TREES/BRUSH		

RUNWAY 26 OBSTRUCTION TABLE

OBJECTS PENETRATING DEPARTURE SURFACES

NO.	DESCRIPTION	TOP ELEVATION	SURFACE	SURFACE ELEVATION	PENETRATION IN FEET	DISPOSITION
POLE 1	POLE	624.00'	DEP (E)	617.50'	6.50'	REMOVE
TW 1	AIRPORT DRIVE	605.03'	DEP (E)	603.28'	1.75'	REGRADE

OBJECTS CLEAR OF DEPARTURE SURFACES

NO.	DESCRIPTION	TOP ELEVATION	SURFACE	SURFACE ELEVATION	CLEARANCE IN FEET	DISPOSITION
TW 2	STATE HIGHWAY 21	603.85'	DEP (E)	612.70'	8.85'	N/A
TW 3	FM 110	602.40'	DEP (E)	619.05'	16.65'	N/A
TW 4	AIRPORT DRIVE	597.80'	DEP (E)	604.34'	6.55'	N/A
TW 5	FM 110	598.12'	DEP (E)	623.81'	25.69'	N/A
TW 6	STATE HIGHWAY 21	589.43'	DEP (E)	679.60'	90.17'	N/A

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15' FOR PUBLIC ROADS, 17' FOR INTERSTATE HIGHWAYS, AND 23' FOR RAILROADS.

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Project Engineer

DocuSigned by:
TITLE - AIRPORT SPONSOR'S REPRESENTATIVE
Eric Dibrell
2/23/2021
SIGNATURE: DATE

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Director, Aviation Division

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SAN MARCOS REGIONAL AIRPORT
SAN MARCOS, TX

AIRPORT LAYOUT PLAN

DEPARTURE SURFACE - RUNWAY 26

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DATE: DEC. 2020
DESIGNED BY: NRP
DRAWN BY: DLM

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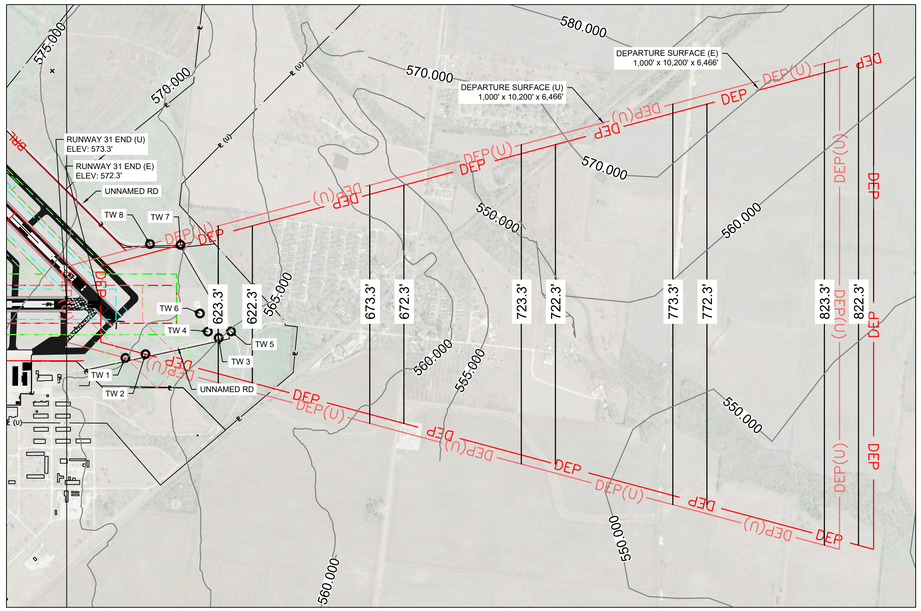

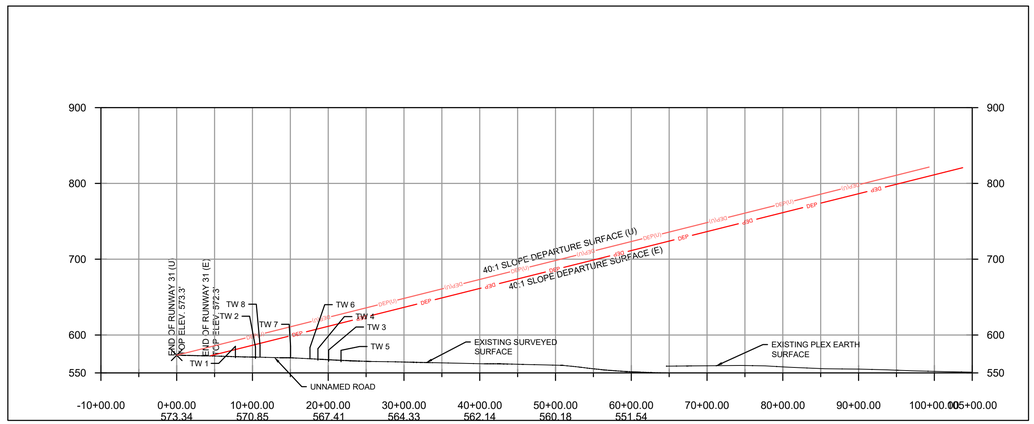

DEP LEGEND		
FEATURE	EXISTING	ULTIMATE
RUNWAY/TAXIWAY OUTLINE		
RUNWAY/TAXIWAY TO BE REMOVED		
BUILDINGS/FACILITIES		
AIRPORT PROPERTY LINE		
AIRPORT PROPERTY LINE w/FENCE		
DEPARTURE SURFACE	DEP	DEP (U)
RUNWAY SAFETY AREA		
RUNWAY OBJECT FREE AREA		
OBJECT FREE ZONE		
FENCE LINE		
THRESHOLD LIGHTS		
RW END IDENTIFIER LIGHTS (REILS)		
GROUND CONTOURS	1605	
SIGNIFICANT OBJECT PLAN VIEW		
SIGNIFICANT OBJECT PROFILE VIEW		
TREES/BRUSH		

RUNWAY 13 OBSTRUCTION TABLE

OBJECTS PENETRATING DEPARTURE SURFACES

NO.	DESCRIPTION	TOP ELEVATION	SURFACE	SURFACE ELEVATION	PENETRATION IN FEET	DISPOSITION
TW 1	UNNAMED ROAD	596.37'	DEP (U)	592.17'	4.20'	REGRADE

OBJECTS CLEAR OF DEPARTURE SURFACES

NO.	DESCRIPTION	TOP ELEVATION	SURFACE	SURFACE ELEVATION	CLEARANCE IN FEET	DISPOSITION
TW 2	UNNAMED ROAD	584.02'	DEP (E)	587.98'	3.97'	N/A
TW 3	UNNAMED ROAD	580.23'	DEP (U)	622.44'	42.21'	N/A
TW 4	UNNAMED ROAD	581.82'	DEP (U)	618.88'	37.06'	N/A
TW 5	UNNAMED ROAD	579.76'	DEP (E)	616.22'	36.46'	N/A
TW 6	UNNAMED ROAD	583.43'	DEP (E)	605.96'	22.53'	N/A
TW 7	UNNAMED ROAD	585.24'	DEP (E)	599.57'	14.33'	N/A
TW 8	UNNAMED ROAD	586.55'	DEP (U)	599.79'	13.24'	N/A

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15' FOR PUBLIC ROADS, 17' FOR INTERSTATE HIGHWAYS, AND 23' FOR RAILROADS.

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Project Engineer

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Dave Abbott
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SIGNATURE

2/23/2021
DATE

TITLE OF AIRPORT SPONSOR'S REPRESENTATIVE

TxDOT APPROVAL BLOCK

Director, Aviation Division

DocuSigned by:
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SAN MARCOS REGIONAL AIRPORT
SAN MARCOS, TX

AIRPORT LAYOUT PLAN

DEPARTURE SURFACE - RUNWAY 13

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DATE: DEC. 2020
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DRAWN BY: DLM

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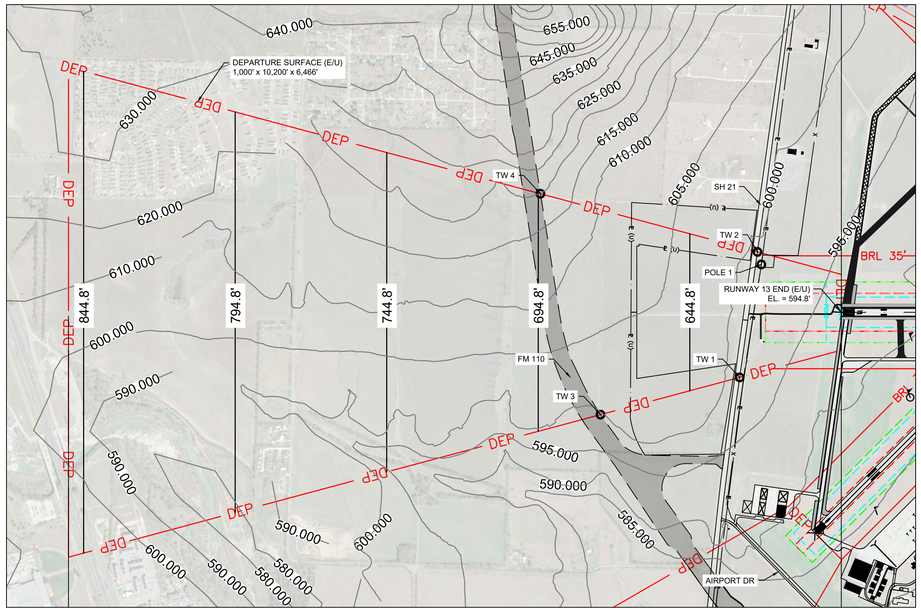

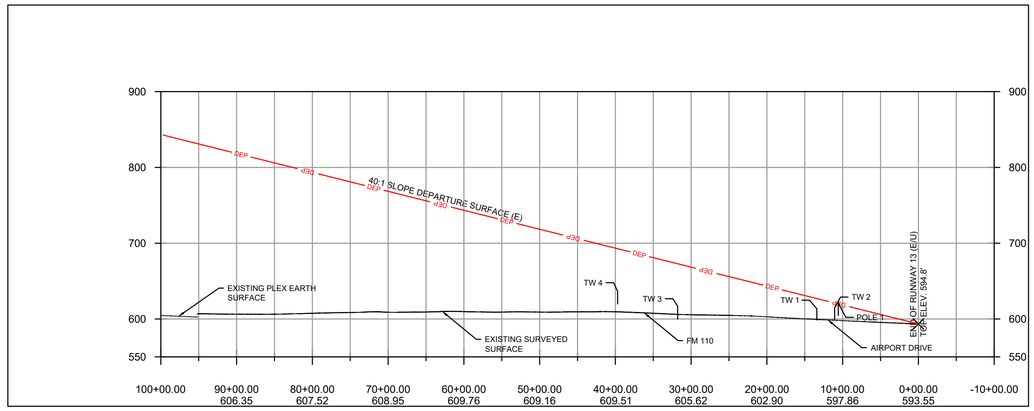

DEP LEGEND		
FEATURE	EXISTING	ULTIMATE
RUNWAY/TAXIWAY OUTLINE		
RUNWAY/TAXIWAY TO BE REMOVED		
BUILDINGS/FACILITIES		
AIRPORT PROPERTY LINE		
AIRPORT PROPERTY LINE w/FENCE		
DEPARTURE SURFACE	DEP	DEP (U)
RUNWAY SAFETY AREA		
RUNWAY OBJECT FREE AREA		
OBJECT FREE ZONE		
FENCE LINE		
THRESHOLD LIGHTS		
RW END IDENTIFIER LIGHTS (REILS)		
GROUND CONTOURS	1525	
SIGNIFICANT OBJECT PLAN VIEW		
SIGNIFICANT OBJECT PROFILE VIEW		
TREES/BRUSH		

RUNWAY 31 OBSTRUCTION TABLE

OBJECTS PENETRATING DEPARTURE SURFACES

NO.	DESCRIPTION	TOP ELEVATION	SURFACE	SURFACE ELEVATION	PENETRATION IN FEET	DISPOSITION
POLE 1	POLE	596.37'	DEP (U)	592.17'	4.20'	REGRADE

OBJECTS CLEAR OF DEPARTURE SURFACES

NO.	DESCRIPTION	TOP ELEVATION	SURFACE	SURFACE ELEVATION	CLEARANCE IN FEET	DISPOSITION
TW 1	STATE HIGHWAY 21	613.56'	DEP (E)	626.97'	13.41'	N/A
TW 2	STATE HIGHWAY 21	614.43'	DEP (E)	621.18'	6.75'	N/A
TW 3	FM 110	614.83'	DEP (E)	672.95'	58.12'	N/A
TW 4	FM 110	634.90'	DEP (E)	692.78'	57.88'	N/A

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15' FOR PUBLIC ROADS, 17' FOR INTERSTATE HIGHWAYS, AND 23' FOR RAILROADS.

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Project Engineer

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ERIC DUGAT
TITLE OF AIRPORT SPONSOR'S REPRESENTATIVE
2/23/2021
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Director, Aviation Division

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REV.	DATE	DESCRIPTION	BY

SAN MARCOS REGIONAL AIRPORT
SAN MARCOS, TX

AIRPORT LAYOUT PLAN

DEPARTURE SURFACE - RUNWAY 31

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DATE: DEC. 2020
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DRAWN BY: DLM

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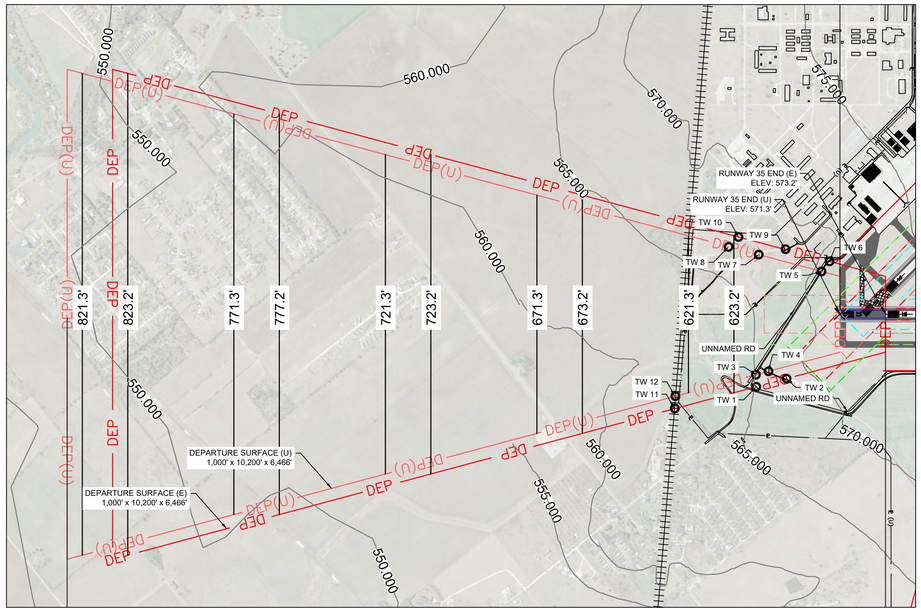

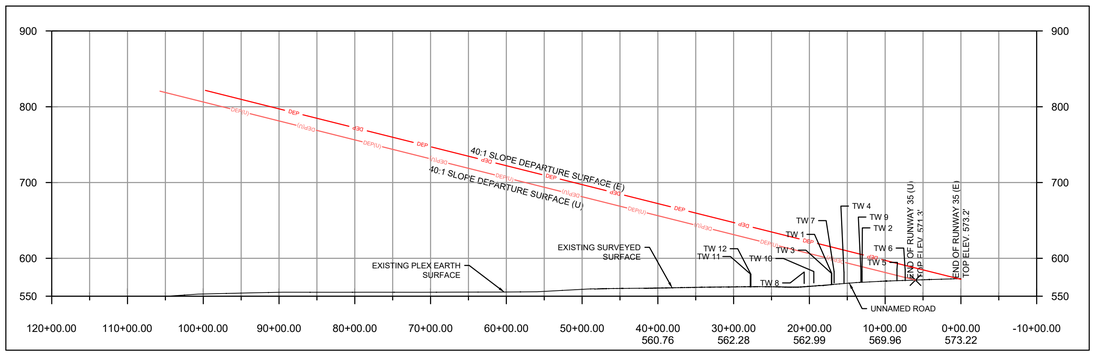

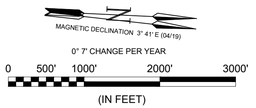

DEP LEGEND		
FEATURE	EXISTING	ULTIMATE
RUNWAY/TAXIWAY OUTLINE		
RUNWAY/TAXIWAY TO BE REMOVED		
BUILDINGS/FACILITIES		
AIRPORT PROPERTY LINE		
AIRPORT PROPERTY LINE w/FENCE		
DEPARTURE SURFACE	DEP	DEP (U)
RUNWAY SAFETY AREA		
RUNWAY OBJECT FREE AREA		
OBJECT FREE ZONE		
FENCE LINE		
THRESHOLD LIGHTS		
RW END IDENTIFIER LIGHTS (REILS)		
GROUND CONTOURS	105	
SIGNIFICANT OBJECT PLAN VIEW		
SIGNIFICANT OBJECT PROFILE VIEW	T	
TREES/BRUSH		

RUNWAY 17 OBSTRUCTION TABLE

OBJECTS PENETRATING DEPARTURE SURFACES

NO.	DESCRIPTION	TOP ELEVATION	SURFACE	SURFACE ELEVATION	PENETRATION IN FEET	DISPOSITION
TW 5	UNNAMED ROAD	585.36'	DEP (U)	577.40'	7.96'	REGRADE

OBJECTS CLEAR OF DEPARTURE SURFACES

NO.	DESCRIPTION	TOP ELEVATION	SURFACE	SURFACE ELEVATION	CLEARANCE IN FEET	DISPOSITION
TW 1	UNNAMED ROAD	580.27'	DEP (E)	615.83'	35.56'	N/A
TW 2	UNNAMED ROAD	583.44'	DEP (E)	605.83'	22.39'	N/A
TW 3	UNNAMED ROAD	580.22'	DEP (U)	599.04'	18.82'	N/A
TW 4	UNNAMED ROAD	581.89'	DEP (U)	594.89'	13.00'	N/A
TW 6	UNNAMED ROAD	585.53'	DEP (E)	590.71'	5.18'	N/A
TW 7	UNNAMED ROAD	582.54'	DEP (U)	599.15'	16.61'	N/A
TW 8	UNNAMED ROAD	581.77'	DEP (U)	609.20'	27.43'	N/A
TW 9	UNNAMED ROAD	583.73'	DEP (E)	606.31'	22.58'	N/A
TW 10	UNNAMED ROAD	582.60'	DEP (E)	621.75'	39.15'	N/A
TW 11	UNNAMED ROAD	585.41'	DEP (E)	642.70'	57.29'	N/A
TW 12	UNNAMED ROAD	585.41'	DEP (U)	626.61'	41.20'	N/A

ALL CLEARANCES HAVE BEEN ADJUSTED FOR HEIGHT OF NATURAL OBJECTS, AND 10' FOR PRIVATE ROADS,
15' FOR PUBLIC ROADS, 17' FOR INTERSTATE HIGHWAYS, AND 23' FOR RAILROADS.

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AIRPORT SPONSOR BLOCK

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

Project Engineer

SITE ENGINEER OR SPONSOR'S REPRESENTATIVE

DocuSigned by: Kirk Abbott 2/23/2021

SIGNATURE DATE

TxDOT APPROVAL BLOCK

Director, Aviation Division

DocuSigned by: 2/22/2021

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Frisco, TX 75034
(972) 377-7480

REV.	DATE	DESCRIPTION	BY

SAN MARCOS REGIONAL AIRPORT
SAN MARCOS, TX

AIRPORT LAYOUT PLAN

DEPARTURE SURFACE - RUNWAY 17

JOB NO.: 14181110
DATE: DEC. 2020
DESIGNED BY: NRP
DRAWN BY: DLM

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SHEET NUMBER 22

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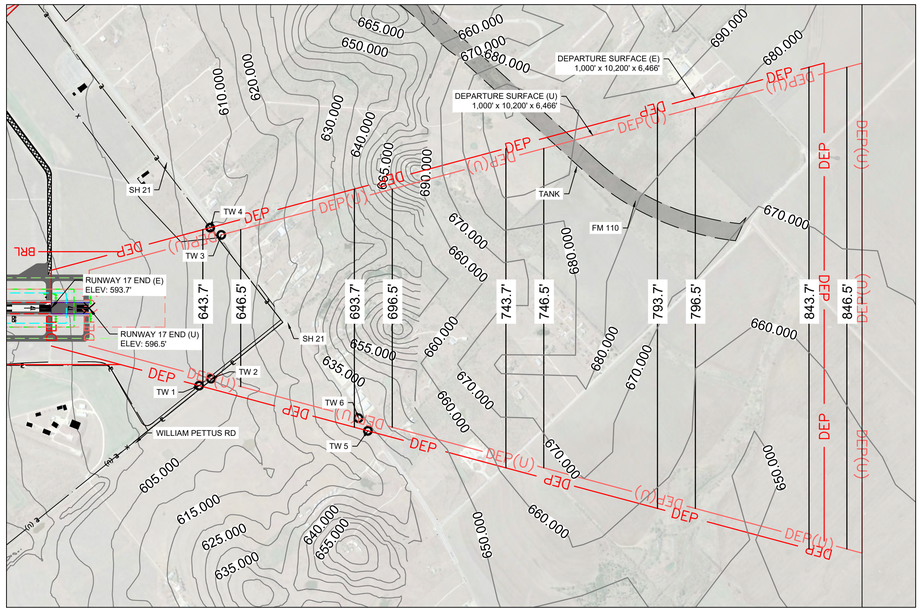

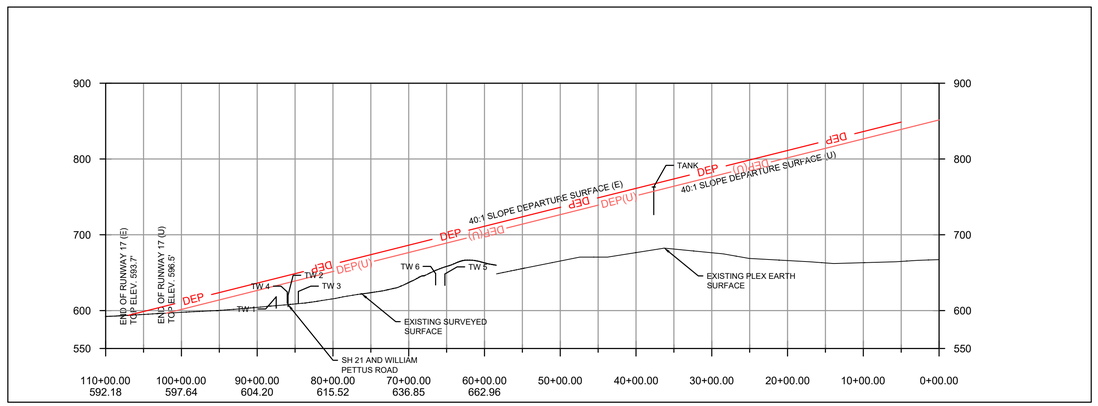

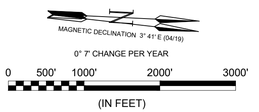

DEP LEGEND		
FEATURE	EXISTING	ULTIMATE
RUNWAY/TAXIWAY OUTLINE		
RUNWAY/TAXIWAY TO BE REMOVED		
BUILDINGS/FACILITIES		
AIRPORT PROPERTY LINE		
AIRPORT PROPERTY LINE w/FENCE		
DEPARTURE SURFACE	DEP	DEP (U)
RUNWAY SAFETY AREA		
RUNWAY OBJECT FREE AREA		
OBJECT FREE ZONE		
FENCE LINE		
THRESHOLD LIGHTS		
RW END IDENTIFIER LIGHTS (REILS)		
GROUND CONTOURS	1625	
SIGNIFICANT OBJECT PLAN VIEW		
SIGNIFICANT OBJECT PROFILE VIEW		
TREES/BRUSH		

RUNWAY 35 OBSTRUCTION TABLE

OBJECTS PENETRATING DEPARTURE SURFACES

NO.	DESCRIPTION	TOP ELEVATION	SURFACE	SURFACE ELEVATION	PENETRATION IN FEET	DISPOSITION
TANK	TANK	763.00'	DEP (U)	757.39'	5.61'	REMOVE

OBJECTS CLEAR OF DEPARTURE SURFACES

NO.	DESCRIPTION	TOP ELEVATION	SURFACE	SURFACE ELEVATION	CLEARANCE IN FEET	DISPOSITION
TW 1	WILLIAM PETTUS ROAD	618.14'	DEP (E)	642.48'	24.34'	N/A
TW 2	WILLIAM PETTUS ROAD	620.23'	DEP (U)	649.19'	28.96'	N/A
TW 3	STATE HIGHWAY 21	625.21'	DEP (U)	658.00'	32.79'	N/A
TW 4	STATE HIGHWAY 21	624.64'	DEP (E)	646.13'	21.49'	N/A
TW 5	STATE HIGHWAY 21	648.24'	DEP (E)	698.15'	49.91'	N/A
TW 6	STATE HIGHWAY 21	648.75'	DEP (U)	697.88'	49.13'	N/A

ALL CLEARANCES HAVE BEEN ADJUSTED FOR HEIGHT OF NATURAL OBJECTS, AND 10' FOR PRIVATE ROADS,
15' FOR PUBLIC ROADS, 17' FOR INTERSTATE HIGHWAYS, AND 23' FOR RAILROADS.

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AIRPORT SPONSOR BLOCK

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

DocuSigned by: Project Engineer
TITLE OF AIRPORT SPONSOR'S REPRESENTATIVE
Cole Abbott 2/23/2021
SIGNATURE DATE

TxDOT APPROVAL BLOCK

Director, Aviation Division

DocuSigned by: 2/22/2021
SIGNATURE DATE

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REV.	DATE	DESCRIPTION	BY

SAN MARCOS REGIONAL AIRPORT
SAN MARCOS, TX

AIRPORT LAYOUT PLAN

DEPARTURE SURFACE - RUNWAY 35

JOB NO.: 14181110
DATE: DEC. 2020
DESIGNED BY: NRP
DRAWN BY: DLM

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RUNWAY 8-26

TAXIWAY A

TAXIWAY B

AIRCRAFT PARKING APRON

AIRPORT DR

AIRPORT DRIVE

SEE TERMINAL AREA DRAWING 2

BRL-35' ASSOCIATED WITH RUNWAY 8/26 WILL NOT BE APPLICABLE WHEN RUNWAY 8/26 IS DECOMMISSIONED.

EXISTING VEHICLE PARKING

AIRPORT ACCESS GATE

FUTURE VEHICLE PARKING OR AERONAUTICAL DEVELOPMENT AREA

SELF-SERVICE FUEL FARM

FUEL FARM

ULTIMATE DIRECT ACCESS ROAD TO FM 110 IS OUTSIDE OF AREA SHOWN. SEE ALD FOR ALIGNMENT

ALD LEGEND

FEATURE	EXISTING	ULTIMATE
RUNWAY/TAXIWAY OUTLINE		
RUNWAY/TAXIWAY TO BE REMOVED		
BUILDINGS/FACILITIES		
AIRPORT PROPERTY LINE		
AIRPORT PROPERTY LINE w/FENCE		
FENCE LINE		
BUILDING RESTRICTION LINE (BRL)		BRL 35'
RUNWAY PROTECTION ZONE		
APPROACH SURFACE	AS	AS (U)
THRESHOLD SITING SURFACE	TSS	TSS (U)
GLIDEPATH QUALIFICATION SURFACE	GQS	GQS (U)
OBJECT FREE AREA		
RUNWAY SAFETY AREA		
OBSTACLE FREE ZONE		
RUNWAY VISIBILITY ZONE	RVZ	
AIRPORT REFERENCE POINT		
WIND CONE & SEGMENTED CIRCLE		
THRESHOLD LIGHTS		
RW END IDENTIFIER LIGHTS (REILS)		
C&G BEACON		
VGSI		
HOLD POSITION AND SIGN		
ASOS/AWOS		
PACS AND SACS MARKERS		
GROUND CONTOURS	1620	
SIGNIFICANT OBJECT LOCATION		
TREES/BRUSH		
NONDIRECTIONAL BEACON (NDB)		
TAXIWAY SAFETY AREA (TSA)		
TAXIWAY OBJECT FREE AREA (TOFA)		
PROPOSED NO-TAXI ISLAND		

MAGNETIC DECLINATION 3° 41' E (04/19)
0° 7' CHANGE PER YEAR

0 50' 100' 200' 300'
(IN FEET)

NOTES:

THE FOLLOWING FACILITIES HAVE OBSTRUCTION LIGHTS:
27 - CITY OWNED T-SHELTER
45 - AIR TRAFFIC CONTROL TOWER

THE PREPARATION OF THESE DOCUMENTS WAS FINANCED IN PART THROUGH A PLANNING GRANT FROM THE FEDERAL AVIATION ADMINISTRATION AS PROVIDED UNDER SECTION 505 OF THE AIRPORT AND AIRWAY IMPROVEMENT ACT OF 1982, AS AMENDED. THE CONTENTS DO NOT NECESSARILY REFLECT THE OFFICIAL VIEWS OR POLICY OF THE FAA. ACCEPTANCE OF THESE DOCUMENTS BY THE FAA DOES NOT IN ANY WAY CONSTITUTE A COMMITMENT ON THE PART OF THE UNITED STATES TO PARTICIPATE IN ANY DEVELOPMENT DEPICTED HEREIN NOR DOES IT INDICATE THAT THE PROPOSED DEVELOPMENT IS ENVIRONMENTALLY ACCEPTABLE IN ACCORDANCE WITH APPROPRIATE PUBLIC LAWS.

AIRPORT SPONSOR BLOCK

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Project Engineer

DocuSigned by:
Eric Nimer
E4C4C2E3F7A0D7E54...
SIGNATURE

2/23/2021
DATE

TxDOT APPROVAL BLOCK

Director, Aviation Division

DocuSigned by:
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2/22/2021

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REV.	DATE	DESCRIPTION	BY

SAN MARCOS REGIONAL AIRPORT
SAN MARCOS, TX

AIRPORT LAYOUT PLAN

TERMINAL AREA DRAWING

JOB NO.: 14181110
DATE: DEC. 2020
DESIGNED BY: NRP
DRAWN BY: DLM

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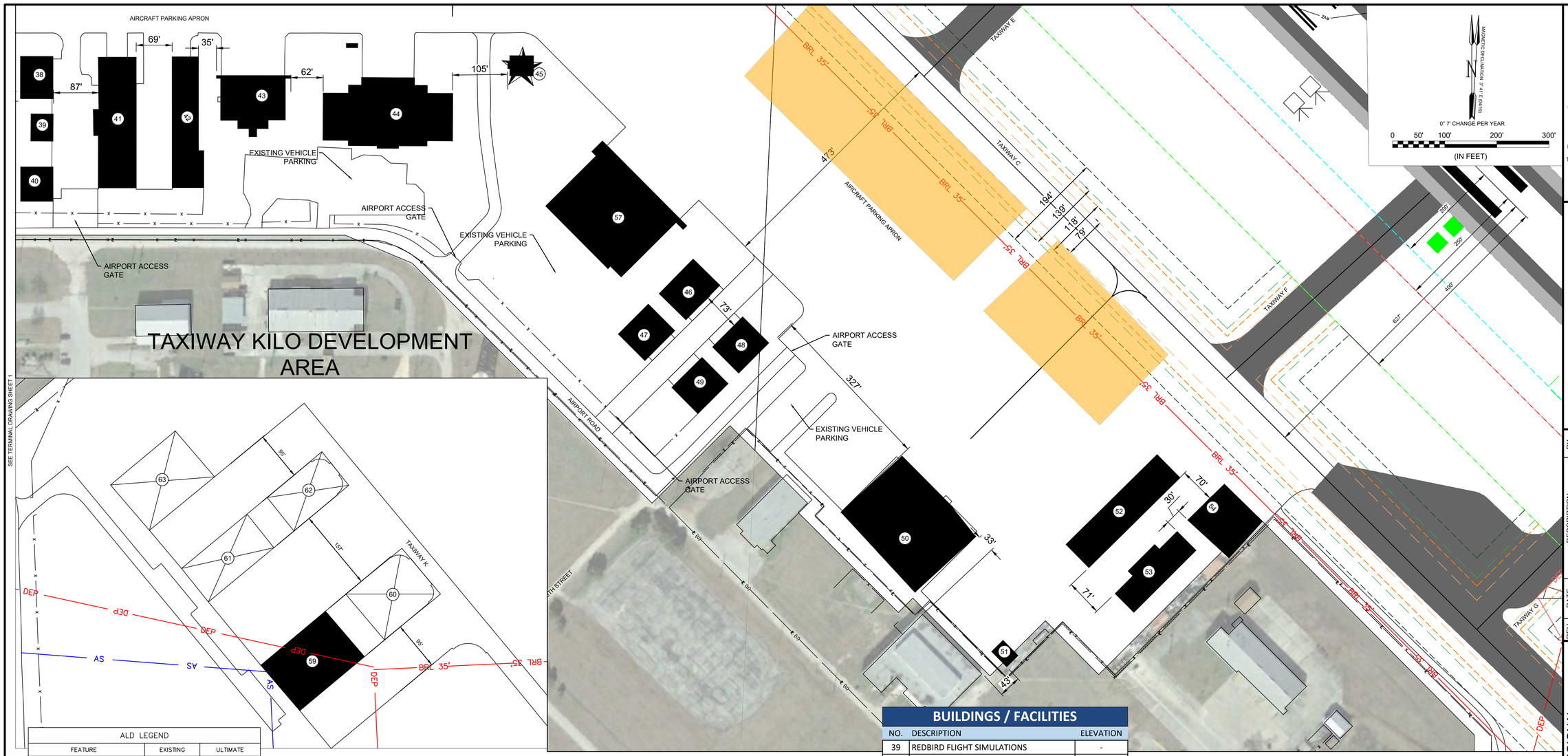

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BY	DESCRIPTION	DATE	REV.

SAN MARCOS REGIONAL AIRPORT
SAN MARCOS, TX

AIRPORT LAYOUT PLAN

TERMINAL AREA DRAWING 2

JOB NO.: 14181110
DATE: DEC. 2020
DESIGNED BY: NRP
DRAWN BY: DLM

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SHEET NUMBER 25

ALD LEGEND		
FEATURE	EXISTING	ULTIMATE
RUNWAY/TAXIWAY OUTLINE		
RUNWAY/TAXIWAY TO BE REMOVED		
BUILDINGS/FACILITIES		
AIRPORT PROPERTY LINE		
AIRPORT PROPERTY LINE w/FENCE		
FENCE LINE		
BUILDING RESTRICTION LINE (BRL)		BRL 35'
RUNWAY PROTECTION ZONE		
APPROACH SURFACE	AS	AS (U)
THRESHOLD SITING SURFACE	TSS	TSS (U)
GLIDEPATH QUALIFICATION SURFACE	GQS	GQS (U)
OBJECT FREE AREA		
RUNWAY SAFETY AREA		
OBSTACLE FREE ZONE		
RUNWAY VISIBILITY ZONE	RVZ	
AIRPORT REFERENCE POINT		
WIND CONE & SEGMENTED CIRCLE		
THRESHOLD LIGHTS		
RW END IDENTIFIER LIGHTS (REILS)		
C&G BEACON		
VGSI		
HOLD POSITION AND SIGN		
ASOS/AWOS		
PACS AND SACS MARKERS		
GROUND CONTOURS	1620	
SIGNIFICANT OBJECT LOCATION		
TREES/BRUSH		
NONDIRECTIONAL BEACON (NDB)		
TAXIWAY SAFETY AREA (TSA)		
TAXIWAY OBJECT FREE AREA (TOFA)		
PROPOSED NO-TAXI ISLAND		

BUILDINGS / FACILITIES

NO.	DESCRIPTION	ELEVATION
1	BERRY AVIATION HANGAR	605'
2	BERRY AVIATION HANGAR	612'
3	BOX HANGAR	604'
4	BOX HANGAR	-
5	BOX HANGAR	-
6	BOX HANGAR	-
7	BOX HANGAR	-
8	BOX HANGAR	-
9	BOX HANGAR	-
10	BOX HANGAR	-
11	BOX HANGAR	-
12	BOX HANGAR	596'
13	BERRY AVIATION FBO BUILDING	-
14	COAST FLIGHT	615'
15	BOX HANGAR	-
16	BOX HANGAR	-
17	REDBIRD FLIGHT SIMULATIONS	-
18	BLUE SKIES AVIATION	597'

BUILDINGS / FACILITIES

NO.	DESCRIPTION	ELEVATION
19	REDBIRD FLIGHT SIMULATIONS	-
20	GAFFORD AERO	601'
21	GAFFORD AERO	596'
22	CITY-OWNED T-HANGAR	-
23	CITY-OWNED T-HANGAR	-
24	CITY-OWNED T-HANGAR	-
25	MCKEE AVIONICS	606'
26	CIVIL AIR PATROL	-
27	CITY OWNED T-SHELTER	-
28	KERNER AIR SERVICES T-HANGAR	-
29	KERNER AIR SERVICES T-HANGAR	-
30	KERNER AIR SERVICES T-HANGAR	-
31	KERNER AIR SERVICES T-HANGAR	-
32	BOX HANGAR	-
33	BOX HANGAR	-
34	BOX HANGAR	-
35	BLUE SKIES AVIATION	-
36	BOX HANGAR	-
37	BOX HANGAR	-
38	BOX HANGAR	-

BUILDINGS / FACILITIES

NO.	DESCRIPTION	ELEVATION
39	REDBIRD FLIGHT SIMULATIONS	-
40	BOX HANGAR	-
41	OFFICERS CLUB	-
42	OFFICERS CLUB	-
43	TEXAS STATE AVIATION	-
44	BERRY AVIATION BUILDING	-
45	AIR TRAFFIC CONTROL TOWER	-
46	JSJ AVIATION	-
47	JSJ AVIATION	-
48	CAROLINE AVIATION	-
49	CAROLINE AVIATION	-
50	COMMEMORATIVE AIR FORCE	-
51	COMMEMORATIVE AIR FORCE	-
52	SPECIALIZED AERO	-
53	SPECIALIZED AERO	-
54	SPECIALIZED AERO	-
55	GRAHAM AIR TRAFFIC CONTROL TOWER	-
56	ELECTRICAL VAULT	-
57	BERRY AVIATION MAINTENANCE HANGAR	-
58	COAST FLIGHT	-
59	BOX HANGAR	
60	FUTURE HANGAR	
61	FUTURE HANGAR	
62	FUTURE HANGAR	
63	FUTURE HANGAR	

NOTES:

THE FOLLOWING FACILITIES HAVE OBSTRUCTION LIGHTS:
27 - CITY OWNED T-SHELTER
45 - AIR TRAFFIC CONTROL TOWER
57 - BERRY AVIATION MAINTENANCE HANGAR

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AIRPORT SPONSOR BLOCK

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Project Engineer

DocuSigned by:
Eric Abbott
SIGNATURE

2/23/2021
DATE

TxDOT APPROVAL BLOCK

Director, Aviation Division

DocuSigned by:
EA0A4EF01FA5423...

2/22/2021

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LEGEND

ITEM	LAND USE
RUNWAY PROTECTION ZONE (RPZ) - NO DEVELOPMENT AREA	
AERONAUTICAL DEVELOPMENT AREA	
NON-AERONAUTICAL DEVELOPMENT AREA	
NON-MOVEMENT AREA	
MOVEMENT AREA	

NOTE:
1. THE ENTIRITY OF THE AIRPORT IS LOCATED WITHIN THE LIMITS OF THE CITY OF SAN MARCOS.
2. NO HEIGHT HAZARD ZONING ORDINANCES HAVE BEEN ESTABLISHED REGARDING THE SAN MARCOS REGIONAL AIRPORT.
3. THE AIRPORT IS ZONED AS "PUBLIC" UNDER THE CITY OF SAN MARCOS ZONING CODE.

RESIDENTIAL AND COMMERCIAL

WILLIAM PETTUS RD

COUNTY BOUNDARY BETWEEN HAYS COUNTY(NORTH OF SH21) AND CALDWELL COUNTY(SOUTH OF SH 21)

FIRE TRAINING CENTER AREA

AIRPORT ADMINISTRATION BUILDING

AGRICULTURAL

ALERT CENTER

FUTURE COMMERCIAL/INDUSTRIAL DEVELOPMENT

SH 21

ULTIMATE AERONAUTICAL AND NON-AERONAUTICAL DEVELOPMENT AREA ONCE RUNWAY 8/26 IS DECOMMISSIONED

RESIDENTIAL

AIRPORT RD

CURRENTLY USED FOR AGRICULTURAL PURPOSES. ULTIMATE USE MAY INCLUDE COMMERCIAL/INDUSTRIAL DEVELOPMENT

RUNWAY 8-26 - 6,330' X 100' - TRUE BEARING 268° (E) - DECOMMISSIONED (U)

RUNWAY 13-31 - 5,601' X 100' - TRUE BEARING 132.88° (E)

RUNWAY 13-31 - 5,151' X 150' - TRUE BEARING 132.88° (U)

RUNWAY 17-35 - 5,214' X 100' - TRUE BEARING 177.87° (E)

RUNWAY 17-35 - 5,314' X 150' - TRUE BEARING 177.87° (U)

TERMINAL AREA

GARY JOB CORPS FACILITY AREA - GATED ACCESS TO FACILITY

CITY OF SAN MARCOS CITY LIMITS AND EXISTING AIRPORT PROPERTY BOUNDARY.

RESIDENTIAL AREA

TW A, TW B, TW C, TW F, TW G, TW H, TW J (E), TW J (U), TW K, TW L, TW M, TW P1, TW P2, TW P3, TW P4, TW Q

BRL 35'

MAGNETIC DECLINATION 3° 34' E (06/19)

0° 7' CHANGE PER YEAR

0 300' 600' 1200' 1800'

(IN FEET)

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Suite 190
Frisco, TX 75034
(972) 377-7480

REV.	DATE	DESCRIPTION	BY

SAN MARCOS REGIONAL AIRPORT
SAN MARCOS, TX

AIRPORT LAYOUT PLAN

LAND USE DRAWING

THE PREPARATION OF THESE DOCUMENTS WAS FINANCED IN PART THROUGH A PLANNING GRANT FROM THE FEDERAL AVIATION ADMINISTRATION AS PROVIDED UNDER SECTION 505 OF THE AIRPORT AND AIRWAY IMPROVEMENT ACT OF 1982, AS AMENDED. THE CONTENTS DO NOT NECESSARILY REFLECT THE OFFICIAL VIEWS OR POLICY OF THE FAA. ACCEPTANCE OF THESE DOCUMENTS BY THE FAA DOES NOT IN ANY WAY CONSTITUTE A COMMITMENT ON THE PART OF THE UNITED STATES TO PARTICIPATE IN ANY DEVELOPMENT DEPICTED HEREIN NOR DOES IT INDICATE THAT THE PROPOSED DEVELOPMENT IS ENVIRONMENTALLY ACCEPTABLE IN ACCORDANCE WITH APPROPRIATE PUBLIC LAWS.

AIRPORT SPONSOR BLOCK

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

Project Engineer

DocuSigned by:
Kirk Talbot
SIGNATURE

2/23/2021
DATE

TxDOT APPROVAL BLOCK

Director, Aviation Division

DocuSigned by:
EA0A4EF01FA5423...

2/22/2021

JOB NO.: 14181110
DATE: DEC. 2020
DESIGNED BY: NRP
DRAWN BY: DLM

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SHEET NUMBER 26

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LEGEND

ITEM	EXISTING	ULTIMATE
RUNWAY PROTECTION ZONE (RPZ)		
RUNWAY SAFETY AREA (RSA)		
RUNWAY OBSTACLE FREE ZONE (OFZ)		
RUNWAY OBJECT FREE AREA (OFA)		

MAGNETIC DECLINATION 3° 4'1" E (04/19)
0° 7' CHANGE PER YEAR
0 300' 600' 1200' 1800'
(IN FEET)

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3010 Gaylord Parkway
Suite 190
Frisco, TX 75034
(972) 377-7480

REV.	DATE	DESCRIPTION	BY

SAN MARCOS REGIONAL AIRPORT
SAN MARCOS, TX

AIRPORT LAYOUT PLAN

EXHIBIT A
PROPERTY MAP

JOB NO.: 14181110
DATE: DEC. 2020
DESIGNED BY: NRP
DRAWN BY: DLM

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THE PREPARATION OF THESE DOCUMENTS WAS FINANCED IN PART THROUGH A PLANNING GRANT FROM THE FEDERAL AVIATION ADMINISTRATION AS PROVIDED UNDER SECTION 505 OF THE AIRPORT AND AIRWAY IMPROVEMENT ACT OF 1982, AS AMENDED. THE CONTENTS DO NOT NECESSARILY REFLECT THE OFFICIAL VIEWS OR POLICY OF THE FAA. ACCEPTANCE OF THESE DOCUMENTS BY THE FAA DOES NOT IN ANY WAY CONSTITUTE A COMMITMENT ON THE PART OF THE UNITED STATES TO PARTICIPATE IN ANY DEVELOPMENT DEPICTED HEREIN NOR DOES IT INDICATE THAT THE PROPOSED DEVELOPMENT IS ENVIRONMENTALLY ACCEPTABLE IN ACCORDANCE WITH APPROPRIATE PUBLIC LAWS.

AIRPORT SPONSOR BLOCK

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

Project Engineer

DocuSigned by:
CHRISTOPHER'S REPRESENTATIVE
Kirk Abbott
2/23/2021
SIGNATURE DATE

TxDOT APPROVAL BLOCK

Director, Aviation Division

DocuSigned by:
2/22/2021
SIGNATURE DATE

FM 110 OUTLINE IN GREEN HAS BEEN RELEASED BY THE AIRPORT FOR THE DEVELOPMENT OF FM 110 INFORMATION REGARDING THE RELEASE IS INCLUDED IN THE PROPERTY DATA TABLE

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AIRPORT PROPERTY AND APPURTENANCES

TRACT/PARCEL	GRANTOR	GRANTEE	INTEREST TYPE	ACREAGE	CONVEYANCE INSTRUMENT	DATE ACQUIRED	RECORD	USE/PURPOSE
1	USA	City of San Marcos	Fee Simple	1,303.055	Deed	2/14/1966	313/463	Original airport parcel
2*	USA	City of San Marcos	Easement	21.350	Easement	2/14/1966	313/63	Clear zone easement
3	USA	City of San Marcos	Fee Simple	22.350	Deed	1/27/1970	335/523	Amend #1 to Deed w/o Warranty
4	USA	City of San Marcos	Fee Simple	1.203	Deed	10/22/1975	372/217	Amend #2 to Deed w/o Warranty
5	USA	City of San Marcos	Fee Simple	11.050	Deed	2/26/1976	376/257	Amend #3 to Deed w/o Warranty
6	USA	City of San Marcos	Fee Simple	20.751	Deed	2/26/1976	376/257	Amend #3 to Deed w/o Warranty
7	Maude T. Patterson Trust	City of San Marcos	Fee Simple	2.923	Resolution	3/5/1984	Res 1984-014	ILS Light Lane
8	Maude T. Patterson Trust	City of San Marcos	Easement	45.762	Resolution	3/5/1984	Res 1984-014	Rwy 13 clear zone easement
9	US DOL	City of San Marcos	Fee Simple	42.472	Deed	12/19/1990	77/628	Ramp
10	City of San Marcos	USA	Lease	0.780	Resolution	9/25/2000	Res 2000-168	RTR and access road
11	Texas State University	City of San Marcos	Deed	17.290	Deed	8/28/2013	NO. 134724	Management offices
12	Texas State University	City of San Marcos	Deed	25.000	Deed	8/28/2013	NO. 134724	Management offices
13**	USA	City of San Marcos	Fee Simple	196.959	Future Aqusition	Future Acquisition	See GSA Transfer Document (Attached)	Future Property Aquistion for Development
14**	USA	City of San Marcos	Fee Simple	47.951	Future Aqusition	Future Acquisition	See GSA Transfer Document (Attached)	Future Property Aquistion for Development
15**	Walton Texas LP	City of San Marcos	Fee Simple	133.411	Future Aqusition	Future Acquisition	NO. 124324	Future Property Aquistion for Development
16**	USA	City of San Marcos	Fee Simple	26.492	Future Aqusition	Future Acquisition	See GSA Transfer Document (Attached)	Future Property Aquistion for Development
17**	Spooner John H Etal	City of San Marcos	Fee Simple	56.884	Future Aqusition	Future Acquisition	965/376	Future Property Aquistion for Development

Property Released

TRACT/PARCEL	GRANTOR	GRANTEE	INTEREST TYPE	ACREAGE	CONVEYANCE INSTRUMENT	DATE OF RELEASE AND DATE OF DISPOSAL	RECORD	USE/PURPOSE
18	City of San Marcos	Hays County	Fee Simple	29.160	Deed	2/2/2020(Released) and Expected to Be Disposed of in March 2021	TBD	This property is being conveyed by the City of San Marcos to Hays County for the development of FM 110. The federal land release for the property was approved by the FAA on 2/2/20. The property is expected to be conveyed (disposed) to Hays County in March 2021. The City of San Marcos will maintain an access easement through the released property. The conveyance documents will be attached to this Exhibit A once complete.

*CITY OF SAN MARCOS CURRENTLY HOLDS AN EASEMENT FOR THIS PROPERTY. CITY WILL ULTIMATELY SEEK TO PURCHASE THE PROPERTY FEE SIMPLE.

**FUTURE PROPERTY AQUISITION

NOTE: ALL PROPERTY INFORMATION WAS PROVIDED BY THE AIRPORT. NO KNOWN ENCUMBERANCES ON AIRPORT PROPERTY. ROW WAS RELEASED ON JANUARY 28, 2016.

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(972) 377-7480

REV.	DATE	DESCRIPTION	BY

SAN MARCOS REGIONAL AIRPORT
SAN MARCOS, TX

AIRPORT LAYOUT PLAN

EXHIBIT A
PROPERTY TABLE

JOB NO.: 14181110
DATE: DEC. 2020
DESIGNED BY: NRP
DRAWN BY: DLM

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SHEET NUMBER **28**

Certificate Of Completion

Envelope Id: EB177F036FC3458B8A4D1E4EB474CE27
Status: Completed
Subject: Please DocuSign: San Marcos ALP - February 2021 - APPROVED.pdf
Source Envelope:
Document Pages: 28
Signatures: 46
Certificate Pages: 5
Initials: 0
AutoNav: Enabled
EnvelopeId Stamping: Enabled
Time Zone: (UTC-06:00) Central Time (US & Canada)

Envelope Originator:
Ben Breck
125 E. 11th Street
Austin, TX 78701
Ben.Breck@txdot.gov
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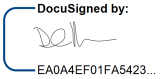
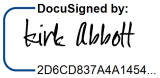
Signer Events	Signature	Timestamp
Dan Harmon Dan.Harmon@txdot.gov Director, Aviation Division TXDOT Security Level: Email, Account Authentication (None)	DocuSigned by:  EA0A4EF01FA5423... Signature Adoption: Uploaded Signature Image Using IP Address: 204.64.21.50	Sent: 2/22/2021 1:55:40 PM Viewed: 2/22/2021 2:03:29 PM Signed: 2/22/2021 2:04:20 PM
Electronic Record and Signature Disclosure: Accepted: 2/7/2017 11:28:24 AM ID: 26db7597-49b9-4513-aae9-87b1dcbe1f1e		
Kirk Abbott KAbbott@sanmarcostx.gov Security Level: Email, Account Authentication (None)	DocuSigned by:  2D6CD837A4A1454... Signature Adoption: Pre-selected Style Using IP Address: 24.155.188.114	Sent: 2/22/2021 2:04:27 PM Viewed: 2/23/2021 4:29:59 PM Signed: 2/23/2021 4:32:24 PM
Electronic Record and Signature Disclosure: Accepted: 2/23/2021 4:29:59 PM ID: 12e2fd7b-b00f-411d-9a4b-fe816c948049		

In Person Signer Events	Signature	Timestamp

Editor Delivery Events	Status	Timestamp

Agent Delivery Events	Status	Timestamp

Intermediary Delivery Events	Status	Timestamp

Certified Delivery Events	Status	Timestamp

Carbon Copy Events	Status	Timestamp

Witness Events	Signature	Timestamp

Notary Events	Signature	Timestamp

Envelope Summary Events	Status	Timestamps
Envelope Sent	Hashed/Encrypted	2/22/2021 1:55:40 PM

Envelope Summary Events	Status	Timestamps
Certified Delivered	Security Checked	2/23/2021 4:29:59 PM
Signing Complete	Security Checked	2/23/2021 4:32:24 PM
Completed	Security Checked	2/23/2021 4:32:24 PM

Payment Events	Status	Timestamps

Electronic Record and Signature Disclosure

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Required hardware and software

Operating Systems:	Windows2000? or WindowsXP?
Browsers (for SENDERS):	Internet Explorer 6.0? or above
Browsers (for SIGNERS):	Internet Explorer 6.0?, Mozilla FireFox 1.0, NetScape 7.2 (or above)
Email:	Access to a valid email account
Screen Resolution:	800 x 600 minimum
Enabled Security Settings:	•Allow per session cookies •Users accessing the internet behind a Proxy Server must enable HTTP 1.1 settings via proxy connection

** These minimum requirements are subject to change. If these requirements change, we will provide you with an email message at the email address we have on file for you at that time providing you with the revised hardware and software requirements, at which time you will have the right to withdraw your consent.

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SAN MARCOS
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