3 Facility Requirements

3.1 OVERVIEW

Based on the inventory and the FAA-approved aviation forecasts, this chapter determines the airfield capacity and the additional facilities required to accommodate the projected demand. The functional areas analyzed in this chapter include the airfield and support facilities.

3.2 AIRFIELD

3.2.1 Airfield Capacity

This section presents the airfield capacity assessment based on the FAA-approved forecasts. A capacity analysis was conducted to determine the level of airfield activity the current runway configuration at Felts Field can accommodate. FAA Advisory Circular 150/5060-5: "Airport Capacity and Delay" (FAA AC 150/5060-5) was used to determine the capacity and annual service volume. The capacity of the airfield depends on several factors, including runway configuration, weather conditions, future fleet mix, and taxiway exit locations.

AIRFIELD CAPACITY METHODOLOGY

FAA AC 150/5060-5 describes and defines the assessment methodology for the airfield capacity, and contains two estimations of the airfield capacity as follows:

- Hourly Capacity: the maximum number of aircraft operations that can be accommodated on an airport during a one-hour period
- Annual Service Volume (ASV): a reasonable estimate of an airport's annual capacity. It accounts for differences in runway use, aircraft fleet mix, weather conditions, etc. that would be encountered during a year

RUNWAY CONFIGURATIONS

Runways 4L-22R (primary runway) and 4R-22L have a 500-foot separation. Consequently, the following configurations were considered for assessing the runway system capacity:

- Simultaneous takeoffs and landings on Runways 4L and 4R (and the reverse 22R and 22L) under daylight VFR conditions
- Single takeoff or landing on Runway 4L or 4R (and the reverse 22R or 22L) during IFR and nighttime VFR conditions

WEATHER CONDITIONS

The FAA distinguishes two weather conditions: Visual Meteorological Conditions (VMC) and Instrument Meteorological Conditions (IMC). IMC occur when the cloud ceilings are less than 1,000 feet AGL and/or

visibility is less than 3 miles. As described in Chapter 1, "Inventory," VMC occurs 84% of the time, whereas IMC occurs approximately 16%, per the data provided by the NCDC.

AIRCRAFT FLEET MIX

The aircraft fleet mix is the main airfield capacity factor. During arrival operations, the separations between two aircraft will differ based on the type and size of aircraft, due to wake turbulence, thus, impacting airfield capacity. FAA AC 150/5060-5 defines these aircraft classifications as the mix index, which is based on the different aircraft classes, see Table 3-1. Each aircraft class is categorized by maximum takeoff weight and the number of engines.

Table 3-1. Assumed Aircraft Classification

MAXIMUM TAKEOFF WEIGHT	FAA AC 150/5060-5 (1983)	
12,500 lb. or less	A: Single Engine	B: Multiple Engines
12,500lb. to 41,000 lb.	C	
41,000lb. to 225,000 lb.		
225,000 lb. to 300,000 lb.		
Over 300,000 lb.	D	

Note: The mix index is given by the following formula: %C + 3*%D.

Felts Field is a reliever airport, serving general aviation aircraft. Based on the FAA TFMSC from 2018 and the based aircraft, the mix calculated to be 9%. The forecasts indicate that the percentage of single-engine aircraft will decrease in the overall share in the next 20 years, whereas the share of turbine aircraft, especially corporate jet aircraft, and multi-engine aircraft will increase. Therefore, the mix index increases to 17% for 2037.

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According to the FAA AC 150/5060-5 methodology, the ASV for long-range planning is calculated based on the runway layout and the aircraft mix fleet. The diagrams provided by FAA AC 150/5060-5 consider a 20-range mix index in the computation of the ASV.

Therefore, Felts Field's ASV for the 2017–2037 period is 230,000 annual operations assuming single-runway operations only, and 335,000 annual operations considering the 1987 Modification of Standards (MOS) allowing simultaneous two-runway operations in VMC during daylight and ATCT operations.[4]

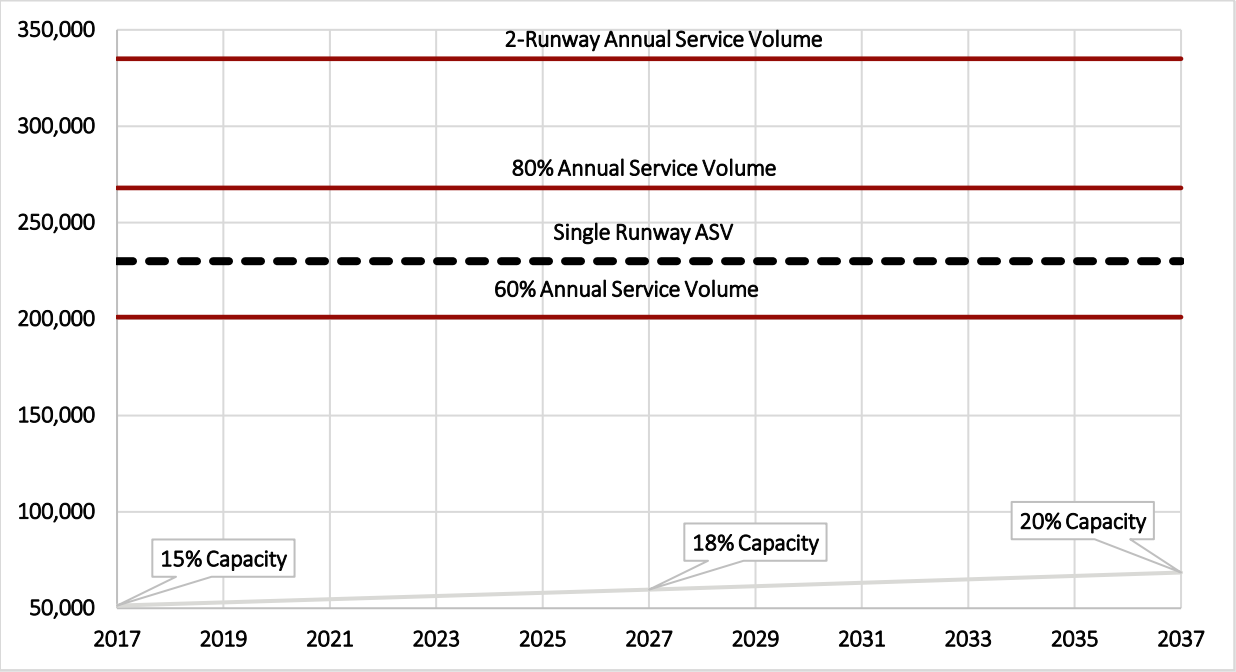
Both ASV figures exceed the long-term forecasted demand for Felts Field. For planning purposes, the desirable 80% target level of capacity reflects an acceptable level of delay and congestion. Based on the approved forecasts, the annual operations will not reach 60% of the existing and projected ASV for the next 20 years (Figure 3-1). Therefore, the existing airfield configuration is sufficient to serve the projected operations through 2037 (Table 3-2).

[4] The 2005 Airport Master Plan calculated a 230,000-operation ASV for the 2000–2020 period based on a single-runway configuration assumption.

Table 3-2. Capacity Summary Table

YEAR	2017	2027	2037
Annual Operations	51,364	59,664	68,534
Average Day Peak Month	163	189	218
Annual Service Volume – 1 runway	230,000	230,000	230,000
Annual Service Volume – 2 runways	335,000	335,000	335,000

Figure 3-1. Annual Aircraft Operations Compared to Annual Service Volume



HOURLY CAPACITY

The computation of hourly capacity considers the percentage of arrival operations, the percentage of touch-and-go's, the number of runway exits, and the location of these exits. Per FAA AC 150/5060-5, hourly capacity can be computed for VFR and IFR. The capacity of Felt Field's airfield, considering the existing aircraft fleet mix is 175 movements per hour with two-runway operations during VMC and 90 movements per hour with one-runway operations for VMC. The peak-hour capacity is 63 movements per hour with reduced visibility and cloud ceiling (IMC). For the future projected aircraft fleet mix for 2037, the hourly capacity is 157 movements per hour with two-runway operations for VMC, 79 movements per hour with one-runway operations for VMC, and 59 movements per hour during IMC conditions.

These figures are theoretical maximum capacities. Considering the conditions of the runway separation waiver in the 1987 MOS and the current level of traffic, they should not be considered as an estimate of what the existing runway systems might ultimately deliver with the current operating procedures and practices under high-intensity operations.

3.2.2 Runway Requirements

Felts Field comprises four landing areas—two of which are paved runways—one alternative landing turf strip, and a waterway for seaplanes.

Runway 4L-22R is designed with a runway design code (RDC) of B-II. It is the primary runway serving Felts Field, currently accommodating small-jet operations. It is a 140-foot-wide and 4,499-foot-long concrete runway with IAPs; thus, it can accommodate aircraft operations in a variety of weather and temperature conditions. This runway is also a valuable safety element as Felts Field is categorized as a Regional Reliever airport per the NPIAS report.

Runway 4R-22L is designed with an RDC of B-I (small) and is an asphalt runway. The runway length of 2,650 feet and width of 75 feet is adequate to serve the flight schools and smaller general aviation aircraft operating at the airport. This runway allows the student pilots to utilize a runway close to their training facilities and separate them from the larger, high-performance aircraft operations including high-performance based aircraft, such as the Pilatus operated by Life Flight, that occur on Runway 4L-22R, giving the flight schools and new pilots the safety and space they need to properly conduct flight training. It includes two areas where run-ups can be conducted, while giving other aircraft the opportunity to pass the student aircraft. This allows the flight instructors and student pilots space to conduct training without feeling rushed or pressured due to other aircraft wanting to use the runway. This runway also includes an alternative landing turf strip located adjacent to Runway 4R-22L, between the Runway 22L end and Taxiway D. The turf strip is 1,700 feet long and 60 feet wide that can be utilized by the pilots for soft field training. Additionally, the airport has numerous historic aircraft renovators and collectors that operate at the airport. The turf strip is necessary for the safety and preservation of historic aircraft, along with other aircraft—such as tail draggers that perform better on grass during landing—and the Boeing Stearman or Tiger Moth that do not have brakes to stop on an asphalt runway.

The U.S. Army Corps of Engineers maintain an adjacent 6,000-foot-long waterway. Although the water area is not controlled or maintained by Felts Field, the associated aircraft parking dock is under Felts Field's control.

According to the FAA-approved forecast for Felts Field, the future ARC is C-II based on the combination of the existing B-II jet wingspan and the future C-I jet approach speed. Since the previous master plan ARC for Felts Field is D-II, similar to C-II design standards, no long-term airport design standard changes are necessary per FAA AC 150/5300-13A, "Airport Design" (FAA AC 150/5300-13A). The design standards for the existing 2018 critical aircraft (RDC B-II) and the existing runway design code (C/D-II) are depicted in Table 3-3 along with the current Runway 4L-22R conditions.

Table 3-3. Runway Design Standards

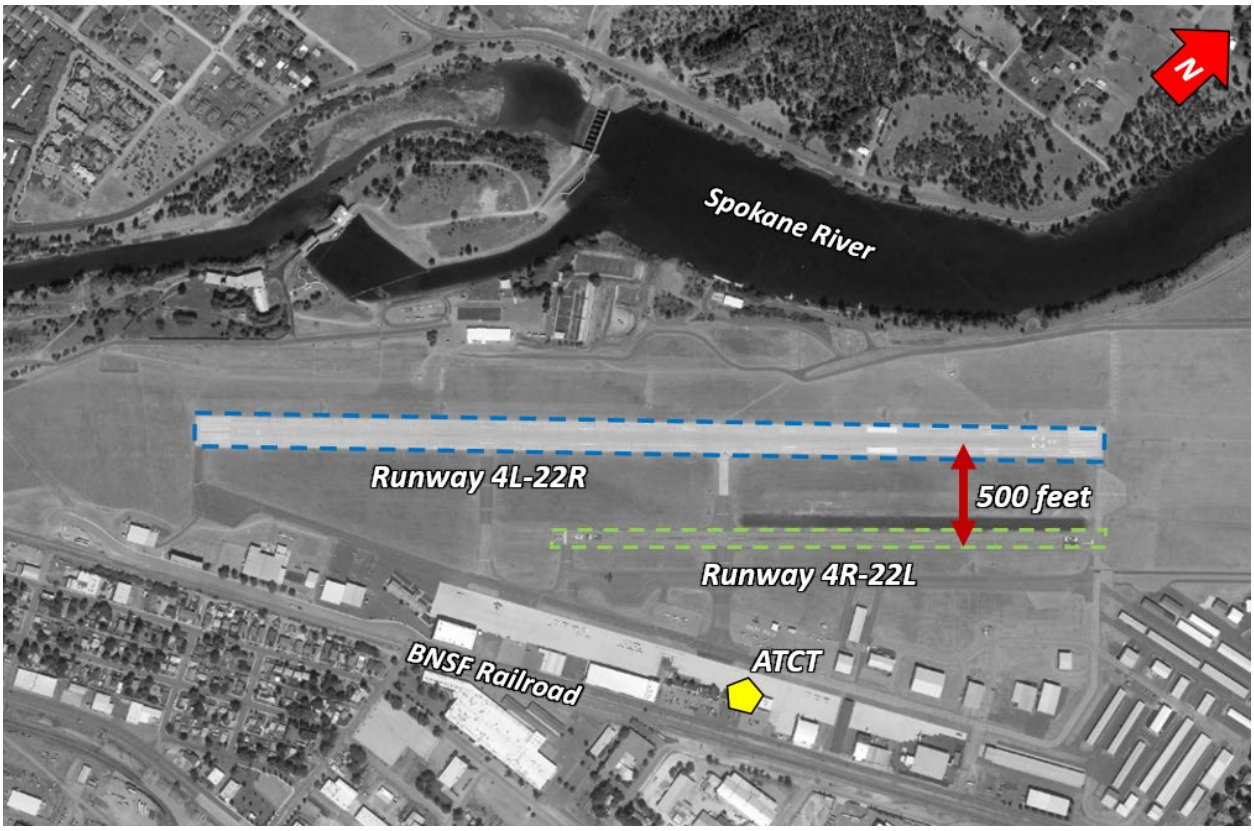
DESIGN STANDARD	EXISTING CRITICAL A/C ADG B-II	FUTURE CRITICAL A/C ADG C/D-II	RUNWAY 4L-22R*	ADG B-I SMALL A/C	RUNWAY 4R-22L
Runway Width	75 ft.	100 ft.	140 ft.	60 ft.	75 ft.
Shoulder Width	10 ft.	10 ft.	0 ft.	10 ft.	0 ft.
Blast Pad Width	95 ft.	120 ft.	0 ft.	80 ft.	75 ft.
Blast Pad Length	150 ft.	150 ft.	0 ft.	60 ft.	60 ft.
Runway Safety Area					
Length Beyond Departure End	300 ft.	1,000 ft.	1,000 ft.	240 ft.	240 ft.
Length Prior To Threshold	300 ft.	600 ft.	1,000 ft.	240 ft.	240 ft.
Width	150 ft.	500 ft.	500 ft.	120 ft.	120 ft.
Runway Object Free Area					
Length Beyond Departure End	300 ft.	1,000 ft.	600 ft./ 1,000 ft.	240 ft.	200 ft.
Length Prior To Threshold	300 ft.	600 ft.	600 ft./ 1,000 ft.	240 ft.	200 ft.
Width	500 ft.	800 ft.	800 ft.	250 ft.	250 ft.
Runway Obstacle Free Zone					
Length Beyond Runway End	200 ft.	200 ft.	200 ft.	200 ft.	200 ft.
Width	400 ft.	400 ft.	300 ft.	250 ft.	250 ft.
Precision Obstacle Free Zone					
Length	N/A	200 ft.	200 ft.	N/A	N/A
Width	N/A	800 ft.	800 ft.	N/A	N/A
Approach Runway Protection Zone (Visibility Min. > 1 SM)					
Length	1,000 ft.	1,700 ft.	1,700 ft.	1,000 ft.	1,000 ft.
Inner Width	500 ft.	500 ft.	1,000 ft.	250 ft.	250 ft.
Outer Width	700 ft.	1,010 ft.	1,510 ft.	450 ft.	450 ft.
Approach Runway Protection Zone (Visibility Min. > ¾ SM)					
Length	1,700 ft.	1,700 ft.	2,500 ft.	1,700 ft.	N/A
Inner Width	1,000 ft.	1,000 ft.	1,000 ft.	1,000 ft.	N/A
Outer Width	1,510 ft.	1,510 ft.	1,750 ft.	1,510 ft.	N/A
Approach Runway Protection Zone (Visibility Min. < ¾ SM)					
Length	2,500 ft.	2,500 ft.	2,500 ft.	2,500 ft.	N/A
Inner Width	1,000 ft.	1,000 ft.	1,000 ft.	1,000 ft.	N/A
Outer Width	1,750 ft.	1,750 ft.	1,750 ft.	1,750 ft.	N/A
Departure Runway Protection Zone					
Length	1,000 ft.	1,700 ft.	1,700 ft.	1,000 ft.	1,000 ft.
Inner Width	500 ft.	500 ft.	500 ft.	250 ft.	250 ft.
Outer Width	700 ft.	1,010 ft.	1,010 ft.	450 ft.	450 ft.
Taxiway-Runway Separation Distance					
Visibility Min. not lower than ¾ SM	240 ft.	300 ft.	N/A	150 ft.	200 ft.
Visibility Min. Lower than ¾ SM	300 ft.	400 ft.	N/A	200 ft.	N/A

Source: FAA Advisory Circular 150/5300-13A "Airport Design," 2014.
* FAA only participates in 75' keel section of Runway 4L-22R.

RUNWAY -TO-RUNWAY SEPARATION

Per FAA AC 150/5300-13A, the required separation for simultaneous visual operations is 700 feet. However, the existing separation between the two paved runways—Runway 4R-22L and Runway 4L-22R—is 500 feet, which was designed to meet previous standards in effect at that time and no longer meets current standards (Figure 3-2). An MOS at Felts Field was approved in 1987 based on a determination of an acceptable level of safety of the 500-foot separation and dependent upon daylight visual conditions and operations of the ATCT. Under these conditions, the MOS allows simultaneous offset takeoffs and landings on closely spaced parallel runways.

Figure 3-2. Runway Separation at Felts Field



The existing MOS allows continued operations of both runways by the ATCT to safely manage Felts Field's complex mixture of corporate and flight training operations by high/low performance aircraft. During the alternatives analysis, the runway separations will be evaluated, but with such a constrained site—with the Spokane River to the north and the BNSF railroad to the south—achieving 700 feet of runway separation is not feasible.

However, Chapter 4, "Alternatives Analysis," discusses the infeasibility of increasing the runway separation to 700 feet; therefore, the MOS will remain in effect.

3.2.3 Runway Length

A runway length analysis was conducted to determine if the current runway lengths at Felts Field are adequate to meet the existing and future critical aircraft, and to determine if any of the existing runways need to be lengthened in the future. FAA AC 150/5325-4B, "Runway Length Requirements for Airport Design" (FAA AC 150/5325-4B) was used to determine recommended runway lengths for Felts Field.

Felts Field has two paved runways. Runway 4L-22R is the primary runway and is a 4,499-foot-long and 140-foot-wide concrete runway. Runway 4R-22L is an additional asphalt utility runway that is 2,650 feet long and 75 feet wide.

RUNWAY LENGTH ANALYSIS

Based on FAA AC 150/5325-4B, the design criteria required to determine the runway length needed at Felts Field can be seen in Table 3-4.

Table 3-4. Design Criteria

CRITERIA	VALUE
Airport Elevation Above Mean Sea Level	1,956.5 feet
Mean Daily Maximum Temperature of the hottest month at the airport[1]	89.8°F
Critical Aircraft[2]	▪ Cessna Citation (Existing) ▪ Learjet 25 (Future) ▪ Hawker/Beechcraft 800 (Future)

[1] **Source:** NOAA 2018 Felts Field Station Data
[2] **Source:** Felts Field Master Plan Forecast

The critical aircraft along with the FAA TFMSC were then used to determine the percentage of fleet. The existing Cessna Citation CJ3/4 and II critical aircraft operations were up to 614 in 2017 and are forecast to increase to 1,434 annual operations in 2037. For the future critical aircraft, the Learjet 25, the number of annual operations was 6 in 2017, and is expected to reach 500 annual operations by 2037.

Table 3-5 shows the critical aircraft along with other jet aircraft with the same design codes that operated at Felts Field from September 2017 through August 2018. Jet aircraft are the focus, because they require longer takeoff runway lengths compared to turboprop aircraft with the same design codes. The projected critical aircraft to operate at Felts Field would be jet aircrafts that are under the 60,000 pounds maximum certified takeoff weight, which occur in conjunction with operations by small aircraft that are under 12,500 pounds maximum certified takeoff weight. Table 3-6 and Table 3-7 were selected to determine the aircraft fleet percentage. Table 3-6 shows the aircrafts that make up 75% of the fleet, and Table 3-7 shows the aircraft that make up the remaining 25% of the fleet, which includes the Hawker 800.

Table 3-5. B-II and C-I Jet Aircraft Operating at Felts Field

AIRCRAFT	FAA DESIGN CODE
Cessna Citation CJ3	B-II
Cessna Citation CJ4	B-II
Cessna Citation II	B-II
Cessna Citation Bravo	B-II
Cessna XL Citation Excel	B-II
Dassault Falcon 50	B-II
Embraer Phenom 300	B-II
Learjet 25	C-I
Learjet 31	C-I
Hawker 800	C-I

Source: FAA TFMSC, 9-1-17 through 8-31-2018

Table 3-6. Aircraft Making Up 75 Percent of the Fleet

Manufacturer	Model	Manufacturer	Model
Aerospatiale	Sn-601 Corvette	Dassault	Falcon 10
Bae	125-700	Dassault	Falcon 20
Beech Jet	400A	Dassault	Falcon 50/50 EX
Beech Jet	Premier I	Dassault	Falcon 900/900B
Beech Jet	2000 Starship	Israel Aircraft Industries (IAI)	Jet Commander 1121
Bombardier	Challenger 300	IAI	Westwind 1123/1124
Cessna	500 Citation/501Citation Sp	Learjet	20 Series
Cessna	Citation I/II/III	Learjet	31/31A/31A ER
Cessna	525A Citation II (CJ-2)	Learjet	35/35A/36/36A
Cessna	550 Citation Bravo	Learjet	40/45
Cessna	550 Citation II	Mitsubishi	Mu-300 Diamond
Cessna	551 Citation II/Special	Raytheon	390 Premier
Cessna	552 Citation	Raytheon Hawker	400/400 XP
Cessna	560 Citation Encore	Raytheon Hawker	600
Cessna	560/560 XL Citation Excel	Sabreliner	40/60
Cessna	560 Citation V Ultra	Sabreliner	75A
Cessna	650 Citation VII	Sabreliner	80
Cessna	680 Citation Sovereign	Sabreliner	T-39

Source: FAA AC 150/5325-4B

Table 3-7. Aircraft Making Up Remaining 25 Percent of Fleet

Manufacturer	Model
Bae	Corporate 800/1000
Bombardier	600 Challenger
Bombardier	601/601-3A/3ER Challenger
Bombardier	604 Challenger
Bombardier	BD-100 Continental
Cessna	S550 Citation S/II
Cessna	650 Citation III/IV
Cessna	750 Citation X
Dassault	Falcon 900C/900EX
Dassault	Falcon 2000/2000EX
Israel Aircraft Industries (IAI)	Astra 1125
IAI	Galaxy 1126
Learjet	45 XR
Learjet	55/55B/55C
Learjet	60
Raytheon/Hawker	Horizon
Raytheon/Hawker	800/800 XP
Raytheon/Hawker	1000
Sabreliner	65/75

Source: FAA AC 150/5325-4B

The critical aircraft along with other jet aircraft with the same design code operating at the airport, shown in Table 3-5, are part of the aircraft making up 75% of the fleet, with the exception of the Hawker 800, which is in the remaining 25% of the fleet aircraft category. Because there were only two total operations by this aircraft in 2018, the 75% fleet was selected to be the most applicable for the runway length determination. Based on the 75% fleet mix, Figure 3-3 and Figure 3-4 are presented in FAA AC 150/5325-4B for determination of runway length. Figure 3-2 shows the requirements for aircraft that are 75% of fleet (Table 3-5), at 60% useful load and Figure 3-3 shows the requirements for these same aircraft at 90% useful load. Figure 3-5 and Figure 3-6 show the same requirements as Figure 3-2 and Figure 3-3, respectively, based on the 100% fleet mix.

Figure 3-3. Aircraft Making Up 75 Percent of the Fleet at 60 Percent Useful Load

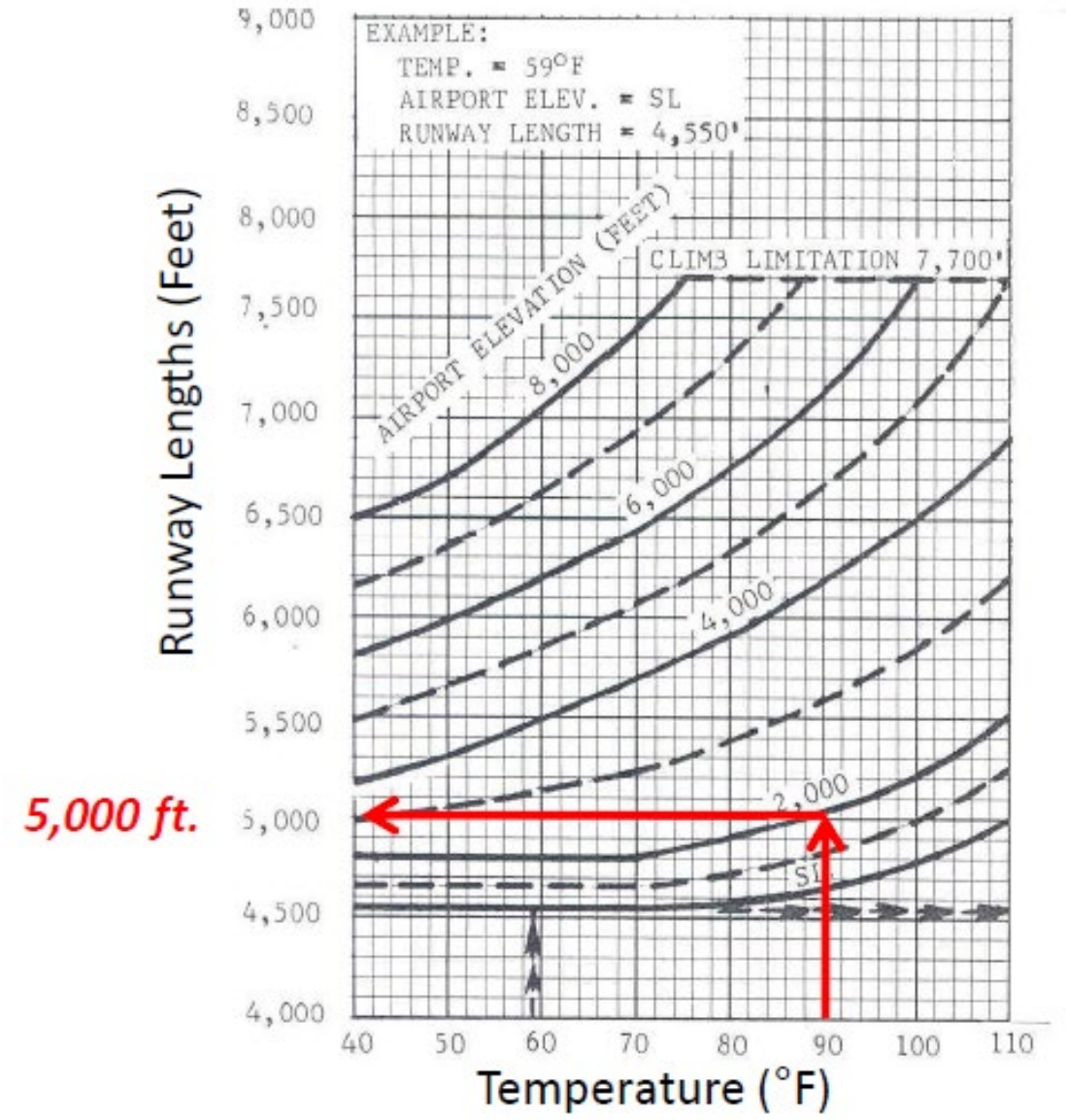


Figure 3-4. Aircraft Making Up 75 Percent of the Fleet at 90 Percent Useful Load

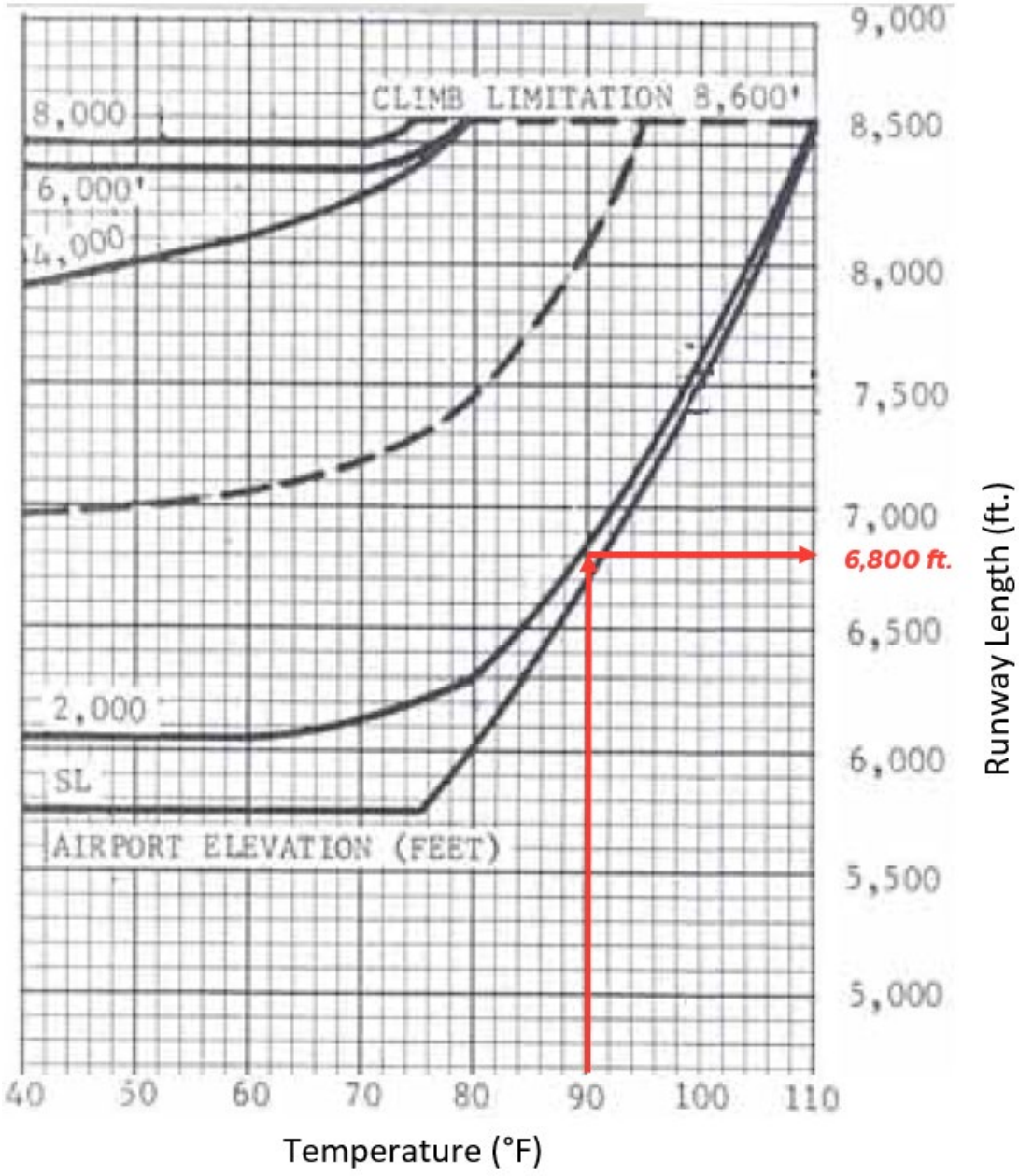


Figure 3-5. Aircraft Making Up 100 Percent of the Fleet at 60 Percent Useful Load

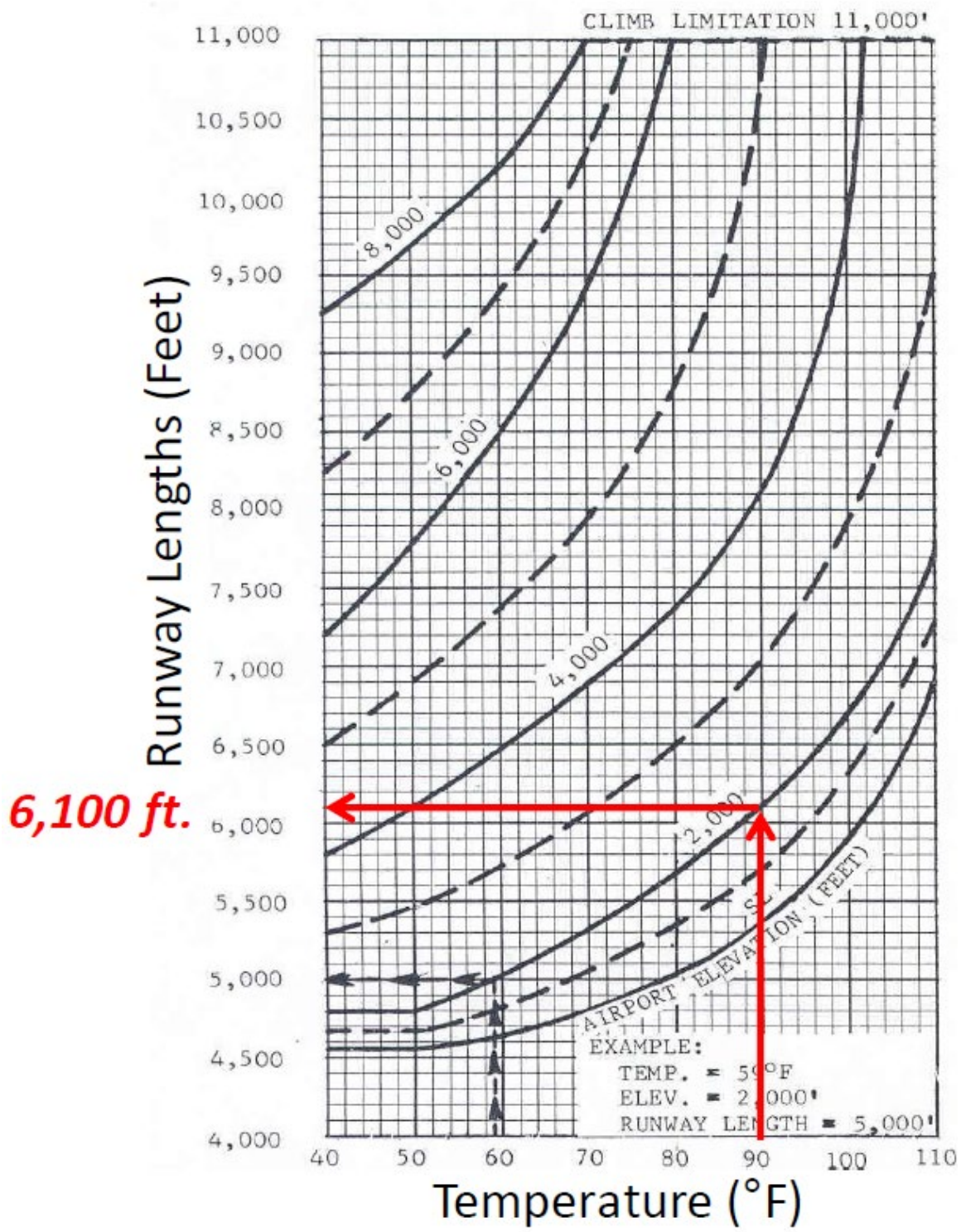
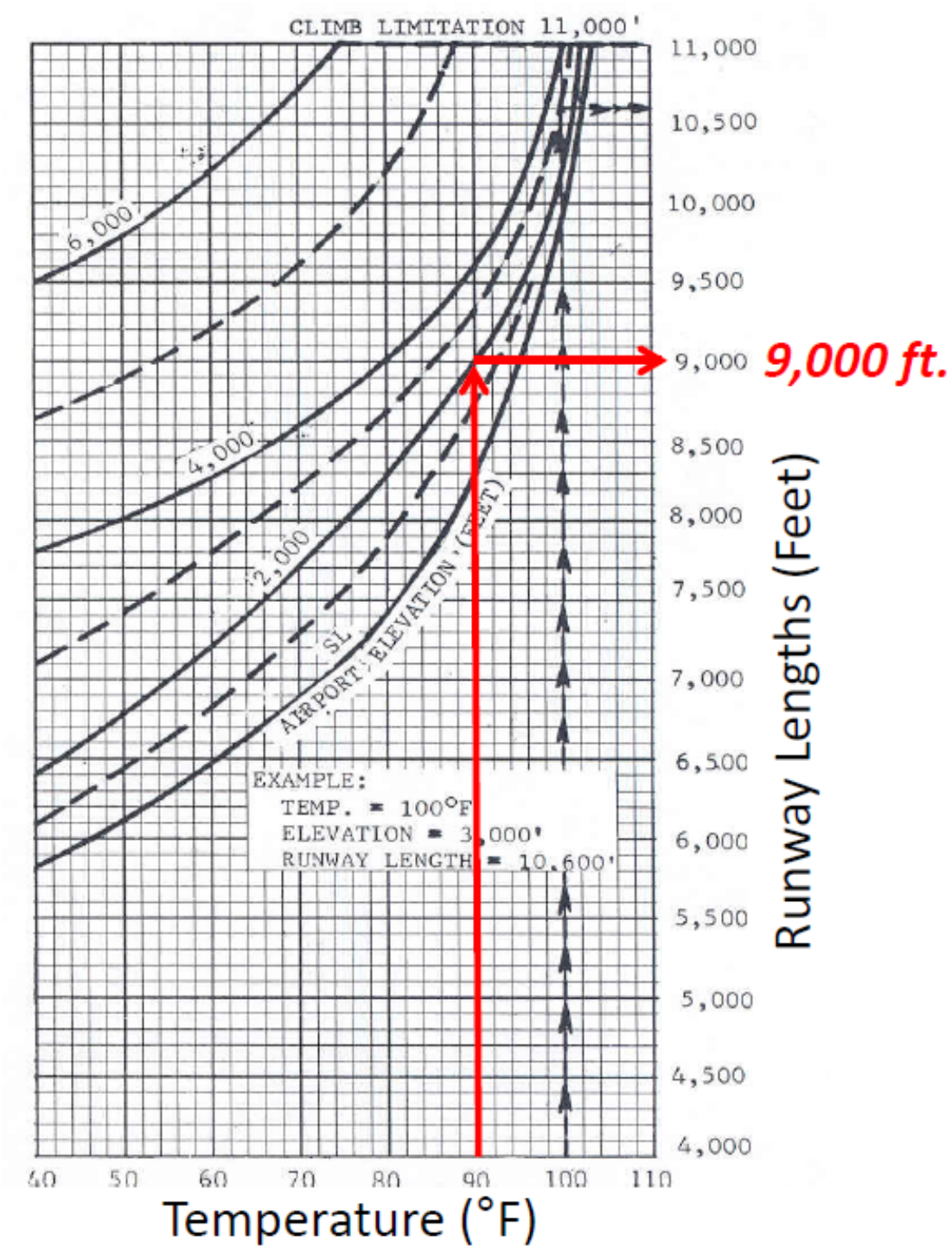


Figure 3-6. Aircraft Making Up 100 Percent of the Fleet at 90 Percent of Useful Load



Source: FAA AC 150/5325-4B

RUNWAY LENGTH REQUIREMENT

The aircraft using Felts Field today are load-limited and as the airport grows and is projected to see an increase in jet operations with higher design codes, the need for additional runway length will increase. Based on the curves from FAA AC 150/5325-4B, the runway length requirements for aircraft similar to the existing critical aircraft (Citation II) and the future critical aircraft (Learjet 25/36 and the Hawker 800) are depicted in Table 3-8.

Table 3-8. Runway Length Requirements

CONDITION	PROPOSED RUNWAY REQUIREMENTS (FEET)
Existing Runway 4L-22R	4,499
60% useful payload (Cessna Citation, Learjet 25/36)	5,000
90% useful payload (Cessna Citation, Learjet 25/36)	6,800
75% payload (Learjet 25/36) and 60% useful payload (Hawker 800)	6,100
90% useful payload (Hawker 800)	9,000

The runway length would need to increase to at least 5,000 feet to accommodate the fleet mix of jets at 60% useful load. To accommodate the 100% fleet mix at a 90% useful load, the runway length would need to be 9,000 feet, which is unrealistic for Felts Field due to space constraints, as the airport is bordered by a river to the north and west, railroad tracks to the southeast, and neighborhoods to the east and west. Another challenge is the high terrain to the northeast of Runway 4L-22R, which affects the approach and departure procedures, and thus can limit runway extensions to the northeast.

Therefore, it is recommended that for the medium-term (2027), future runway length should accommodate 5,000 feet for the Cessna Citation at 60% useful payload, and that for the long-term (2037), a runway length of 6,100 feet would accommodate the Learjet 25/36 at approximately 75% payload and the Hawker 800 at 60% useful payload, assuming an unconstrained airport.

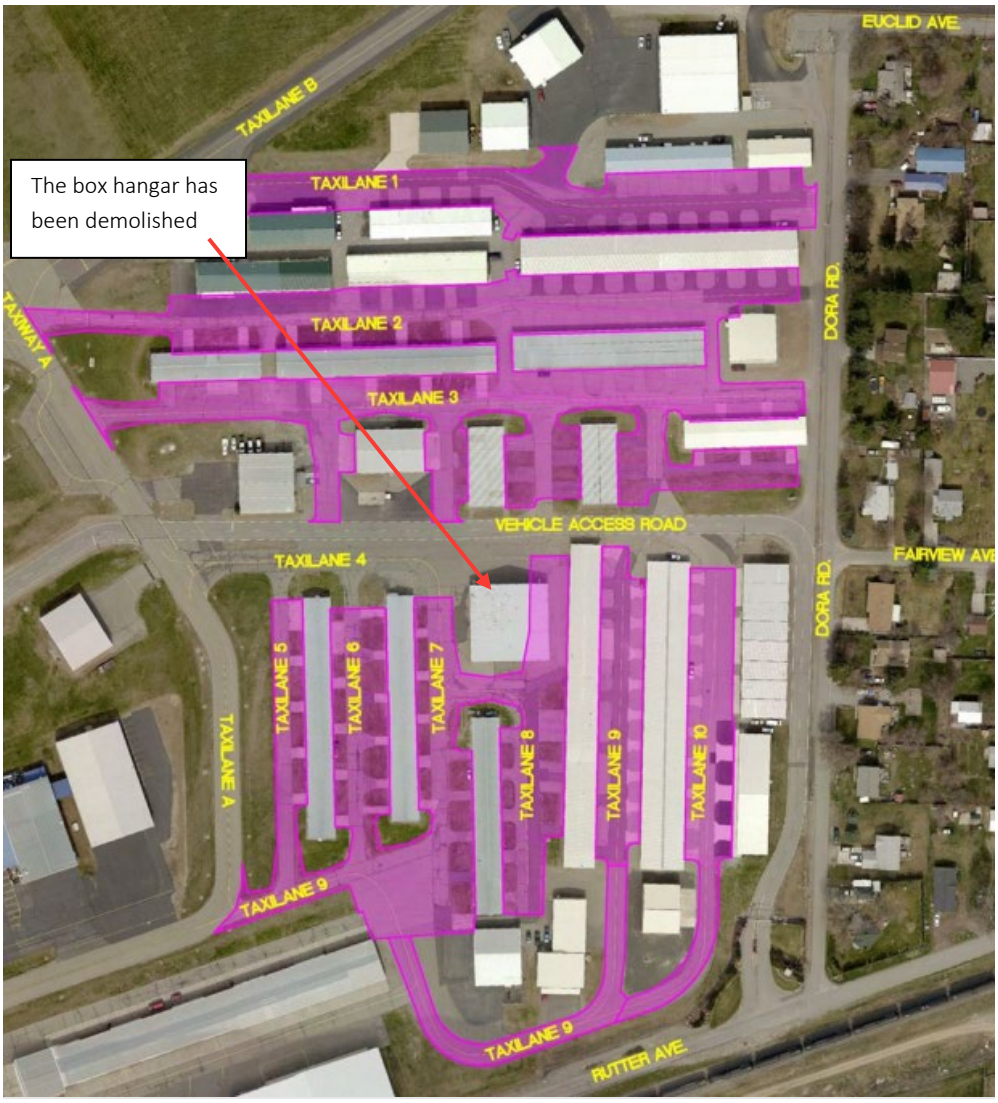
3.2.4 Taxiway Requirements

TAXIWAY

Felts Field taxiway system comprises five taxiways (Taxiways A, B, C, D, and E) and one taxilane (Taxilane A). Based on the previous Felts Field Airport Layout Plan, the highest Taxiway Design Group (TDG) of the current taxiway system is TDG 3, for Taxiways C and D, which are exit taxiways for Runway 4L-22R. The other taxiways and taxilanes are designed for TDG 1A/B and 2. Per the FAA-approved forecasts, the most demanding aircraft through the next twenty years will require TDG 2 standards. Felts Field has one parallel taxiway, Taxiway B, for Runway 4R-22L. Taxiway A provides access to both ends of Runway 4L-22R. As Runway 4L-22R does not have a parallel taxiway, but there are hold pads off Taxiway A to allow of aircraft to maneuver around each other when necessary. The taxiway system is sufficient for the current operations at Felts Field but as jet operations increase, the potential need for a high-speed exit taxiway on Runway 4L-22R increases.

However, in Chapter 4, "Alternatives Analysis," the redevelopment of T-Hangars will explore potential fixes to the taxilane separations that are not to standard, as shown in **Figure 3-7**. In addition, existing Taxilane MOS are in force at the south-east hangar complex to reduce the Taxilane Object Free Area and limit the maximum allowable aircraft wingspan.

Figure 3-7. Taxilanes with Modification of Standards



Source: T-O Engineers, Inc.

HANGAR ACCESS

Taxiway A and Taxiway B provide access to the east hangar area. The design standards for these TDGs are 1A/B. The system is sufficient for current operations and aircraft types.

3.2.5 Air Traffic Control Tower

Felts Field has a 65-foot tall (AGL) ATCT located next to the terminal building. It was built in 1968 and has an eye height of 54 feet AGL. The contract tower is adequate to meet the current and future operational demand and is necessary for the safe operation of the wide variety of airport user groups. However, the ATCT height and location limits the ability to fully develop Felts Field for aeronautical development. Tower relocation options (see Appendix D, "ATCT Siting Study") are used in Chapter 4, "Alternatives Analysis" to evaluate how a new location could provide additional development space on the airport.

Through the FAA's Contract Tower Program, the agency contracts air traffic control (ATC) services to private-sector airports. Since its inception in 1982, the program has received positive endorsements from all parties involved, including the FAA, the National Transportation Safety Board, the U.S. DOT Inspector General, airport management, Congress and, most importantly, the users of the aviation system. The primary advantages of this program are enhanced safety, improved ATC services and significant ATC cost savings to FAA. A DOT Inspector General audit of the FAA Contract Tower Program, released November 5, 2012, concluded that FAA contract towers continue to provide cost-effective and safe ATC services and operate at a lower cost than similar FAA-operated towers.

3.2.6 Helicopter Takeoff and Landing Requirements

Felts Field accommodates locally based and transient helicopters. The FAA standards for helicopter facilities are described in FAA AC 150/5390-2C, "Heliport Design." Among the helicopters serving Felts Field, the AgustaWestland AW109E and the Airbus Helicopters H135 operated by Life Flight and an air medical transport service are the most demanding regarding the required takeoff and landing distances operated in performance class 1. Additional helicopter users of the airport include Spokane County Sheriff, White Rabbit (aerial tours), Customs and Border Patrol, and Inland Helicopters (training).

The required Final Approach and Takeoff (FATO) area for these two helicopters at the maximum takeoff weight is approximately 1,015 feet at sea level. The two paved runways greatly exceed this requirement and provide an adequate surface for helicopter takeoff and landing operations.

As the number of based and transient helicopters operations grow at Felts Field, and are predicted to nearly double by 2037, a FATO area or "helicopter landing area" will be considered in the alternative development chapter.

3.2.7 Instrumentation and Lighting

INSTRUMENT APPROACH PROCEDURES

Felts Field has four IAPs available for Runway 4L-22R and discussed in Section 1.2, "Existing Airport Conditions." Runway 22R offers the lowest approach minima, with ceiling and visibility minimums of 300 feet and ¾ statute miles (ILS) even though Runway 22R has a MALSR approach lighting system (ALS). An ALS typically lowers minima by ¼ mile. Therefore, as part of the alternatives analysis, the controlling obstacle(s) will be evaluated to potentially reduce the minimums to 200 feet and ½ mile.

The existing offset localizer (2.98 vs. 0 degrees) and the glide slope angle of 3.7 versus 3.0 degrees are evaluated in Chapter 4, "Alternative Analysis," to determine if these ILS components can be improved.

Since IMCs occur more than 5% of the time from October to March, and since the lowest minima are exceeded for approximately 6% of the year, the existing IAPs provide adequate IFR accessibility for a general aviation airport.

VISUAL LANDING AIDS

Runway 4L-22R is equipped with MIRLs, four-box VASIs on both ends, REILs on Runway 4L and Medium Approach Light System with Runway Alignment Indicator Lights on Runway 22R. Runway 4R-22L is equipped with only a four-light PAPI on Runway 22L. These facilities are adequate for current and future airport needs; however, the VASIs will be recommended to be replaced with PAPIs.

3.3 CORPORATE AND GENERAL AVIATION

3.3.1 Aircraft Storage

Felts Field accommodates a wide variety of hangars, including commercial hangars and private hangars. Per the inventory, there are 78 aircraft hangars, eight of which are owned and operated by the airport.

As indicated in Chapter 2, "Aviation Forecast," the number of based aircraft at Felts Field is projected to increase by 35 aircraft during the next 20-year period. Currently, all hangars are utilized and based on a projected 100% hangar utilization level, additional long-term demand for new hangar space is estimated to be 35 spaces. With a planning standard of 1,500 square feet per based aircraft stored in hangars, commonly used to project aircraft space requirements, the 35 additional spaces correspond to 52,500 square feet.

According to WSDOT's 2019 *Airport Facilities and Services Report* for Felts Field, there are 50 tie-downs for based aircraft. In 2017, the tie-down utilization rate was 35%, and with the additional projected based aircraft expected to utilize hangars, the current number of tie-downs are expected to be sufficient and no additional apron is needed for aircraft storage.

3.3.2 Transient Aircraft Parking

Aircraft aprons provide parking for locally based aircraft that are not stored in hangars and for transient aircraft. At Felts Field, the transient aircraft park on aprons on both the north and south sides of Taxilane A with the based aircraft. The existing aprons has a total area of 70,200 square yards. Per the WSDOT's 2019 *Airport Facilities and Services Report* for Felts Field, there are 25 tie-downs for transient aircraft. As shown in the forecasts, the itinerant aircraft operations' share decreasing from 53.8% to 50.6% during the next 20-year period. Therefore, the existing tie-downs parking should be adequate to accommodate future transient aircraft needs.

3.3.3 Terminal

Felts Field's historic terminal building is on the south part of the airport, which is accessible through E. Rutter Avenue. The facility is approximately 4,400 square feet and provides office space and a restaurant for airport users. In addition to the historic terminal building, the airport's FBO, Western Aviation, has a new facility that offers modern pilot conveniences, serves as the functional "airport terminal" for transient pilots, and meets the FBO's existing and future needs.

3.4 SUPPORT FACILITIES

3.4.1 Airport Maintenance

Airport maintenance facilities are composed of two buildings: a snow removal equipment building and a regulator building. The regulator building is 500 square feet and is on the aircraft parking apron south of Taxiway B. The snow removal equipment building is 9,800 square feet and has an 11,000-square-foot apron. The building is also to the south of Taxiway B. The service road between the Taxiway B and Taxilane A provides vehicle access. As airfield pavement is projected to increase to meet future demand, the current maintenance facilities will also need to increase by 100% due to additional snow removal equipment and the desire to store them indoors to preserve their useful life. In addition, the location of the maintenance facility is evaluated in Chapter 4, "Alternatives Analysis," because it is located in prime airfield accessible space.

3.4.2 Aircraft Rescue and Firefighting

There is no Aircraft Rescue and Firefighting (ARFF) building at Felts Field. Since Felts Field is not a 14 CFR Part 139 certification airport, the airport does not require an ARFF facility.

3.4.3 Fuel Facilities

Felts Field relocated the fuel facilities to a new site of approximately 2,000 square yards, which opened in March 2019. The area includes above-ground fuel storage tanks, fuel truck parking, and supply vehicle containment area. There is one 15,000-gallon storage tank for Jet A fuel, one 12,000-gallon for 100LL, and a future third space for an additional tank. The containment area accommodates a fuel servicing vehicle. The current fuel storage and the apron are sufficient for future growth.

3.4.4 Aircraft Maintenance

The only tenant providing aircraft maintenance is the FBO Western Aviation, which takes up approximately 35,000 square feet, and provides other services such as pilots supplies, avionics sales, fuel, aircraft tie-downs, rental cars, hangar space, and a pilot's lounge. The facilities are to the west of the terminal building and no additional maintenance space is required.

3.4.5 Perimeter Fence

The entire airport perimeter is equipped with a fence and ten controlled access gates provide adequate security for the airport facilities. The current perimeter fence is sufficient for the current layout but would need to be reassessed based on future development to ensure a full perimeter is in place.

3.4.6 Vehicle Service Road

The main vehicle service road is between Taxiway B and Taxilane A, begins on the south-east corner, on Gate 1, runs along the T-Hangars and the airport maintenance hangar, and ends on the hangars between Taxiway B and Taxilane A. Other vehicle service roads connect the southeast corner to the north part of the airport. Additional vehicle service roads would be implemented to connect the existing apron to the future hangars.

3.4.7 Parking

As indicated in Chapter 1, "Inventory," there are 565 vehicle spaces on the airport, which are not all publicly available, and the terminal building parking offers 150 spaces. Since the number of based aircraft and hangars would increase, the number of parking spaces would increase accordingly.

3.4.8 Summary of Facility Requirements

The existing Runway 4L-22R is RDC B-II and Runway 4R-22L is RDC B-I (small). The future critical aircraft is RDC C-II. Consequently, based on the forecasts, the main facility requirements are the following:

- The runway length analysis recommends the medium-term (2027) future runway length to increase to 5,000 feet to accommodate the Lear 25/36s at 60% useful payload and for the long-term (2037) runway length of 6,100 feet to accommodate the Learjet 25/36 at approximately 75% payload, assuming an unconstrained airport.
- The majority of the taxiways are designed for TDG 1A/B and TDG 2. TDG 1A/B taxilanes connect small aircraft hangars to the runways. Therefore, the current taxiway system is sufficient. Minor upgrades could be required if the small aircraft hangars are replaced by jet hangars, which is explored Chapter 4, "Alternatives Analysis."
- It is recommended to replace the VASIs on Runway 4L-22R with PAPIs.
- Per the approved forecasts, 35 additional hangar spaces would be necessary to accommodate aircraft for the long-term planning. Helicopters would represent 13 of these spaces.
- According to the based aircraft forecasts, the number of vehicle parking spaces would increase accordingly with the same rate.

Table 3-9 summarizes facility requirements for use in Chapter 4, "Alternatives Analysis."

Table 3-9. Facility Requirements Summary

	EXISTING	BASE YEAR 2017	FORECAST YEAR 2022	2027	2032	2037
AIRFIELD FACILITIES						
Runway 4L-22R ADG	B-II	B-II	SAME	SAME	SAME	C-II
Runway 4L-22R	4,499' x 140'	4,499' x 75'	SAME	5,000' x 75'	SAME	6,100' x 100'
Runway 4R-22L (B-I small)	2,647' x 75'	2,647' x 60'	SAME	SAME	SAME	SAME
Alternative Turf Strip	1,700' x 60'	1,700' x 60'	SAME	SAME	SAME	SAME
Taxiway TDG[1]	2	2	SAME	SAME	SAME	SAME
Instrument Approach	ILS	ILS	SAME	SAME	SAME	SAME
Visual Landing Aids on Runway 4L-22R	VASI	PAPI	PAPI	SAME	SAME	SAME
GENERAL AVIATION FACILITIES						
Transient Aircraft Apron (SF)	70,200	70,200	SAME	SAME	SAME	SAME
Tie-Downs (Units)	50	50	SAME	SAME	SAME	SAME
Auto Parking (Spaces)	506	510	520	530	540	550
Aircraft Storage (Units)	176	185	190	200	205	208
Helicopter Storage (SF)	57,800[2]	57,800	63,300	72,800	80,300	90,300
Aircraft Maintenance Hangar Space (SF)	35,000	35,000	SAME	SAME	SAME	SAME
Fuel Facilities (SY)	2,000	2,000	SAME	SAME	SAME	SAME

[1]Some taxiways designed for or compatible with a lower group might need to be upgraded depending on the preferred alternatives.
[2]Based on Google Earth and CAD files.