PHILLIPSBURG
Municipal Airport

Chapter 3
Facility Requirements

Proper airport planning requires the translation of forecasted aviation demand into the specific types and quantities of facilities that can adequately serve the identified demand. This chapter will analyze the existing capacities of Phillipsburg Municipal Airport (PHG) facilities. The existing capacities will then be compared to the forecasted activity levels prepared in Chapter Two to determine the adequacy of existing facilities and identify whether deficiencies currently exist or may be expected to materialize in the future. This chapter will present the following elements:

- Planning Horizon Activity Levels
- Airport Physical Planning Criteria
- Airside and Landside Facility Requirements

This exercise is intended to identify the adequacy of existing airport facilities, outline what new facilities may be needed, and determine when they may be needed to accommodate forecasted demands. Once the facility needs have been identified, various alternatives for providing these facilities will be detailed for both the airside and the landside. Each alternative will be evaluated to determine the most feasible, cost-effective, and efficient means for implementation.

The facility requirements for Phillipsburg Municipal Airport were evaluated using guidance contained in several Federal Aviation Administration (FAA) publications, including the following:

- Advisory Circular (AC) 150/5300-13B, *Airport Design*, Change 1
- AC 150/5325-4B, *Runway Length Requirements for Airport Design*
- Federal Aviation Regulation (FAR) Part 77, *Objects Affecting Navigable Airspace*
- FAA Order 5090.5, *Formulation of the National Plan of Integrated Airport Systems (NPIAS) and the Airports Capital Improvement Plan (ACIP)*

DEMAND-BASED PLANNING HORIZONS

An updated set of aviation demand forecasts for Phillipsburg Municipal Airport has been established and was detailed in Chapter Two. These activity forecasts include annual aircraft operations, based aircraft, aircraft fleet mix, and peaking characteristics. With this information, specific components of the airfield and landside system can be evaluated to determine their capacity to accommodate future demand.

Cost-effective, efficient, and orderly development of an airport should be based more on actual demand at an airport than on a time-based forecast figure. In order to develop a master plan that is demand-based, rather than time-based, a series of planning horizon milestones has been established that takes into consideration the reasonable range of aviation demand projections. The planning horizons are the short term (years 1-5), the intermediate term (years 6-10), and the long term (years 11-20).

It is important to consider that the actual activity at the airport may be higher or lower than what the annualized forecast portrays. By planning according to activity milestones, the resultant plan can accommodate unexpected shifts or changes in the area's aviation demand by allowing airport management the flexibility to make decisions and develop facilities based on need generated by actual demand levels, rather than dates in time. The demand-based schedule provides flexibility in development, as development schedules can be slowed or expedited according to demand at any given time over the planning period. The resultant plan provides airport officials with a financially responsible and needs-based program. **Table 3A** presents the short-, intermediate-, and long-term planning horizon milestones for each aircraft activity level forecasted in Chapter Two.

TABLE 3A | Aviation Demand Planning Horizons

	Base Year (2024)	Short Term (1-5 Years)	Intermediate Term (6-10 Years)	Long Term (11-20 Years)
BASED AIRCRAFT				
Single-Engine	9	10	10	13
Multi-Engine	1	1	1	0
Turboprop	0	0	1	1
Jet	0	0	0	0
Helicopter	0	0	0	1
Other	0	0	0	0
TOTAL BASED AIRCRAFT:	**10**	**11**	**12**	**15**
ANNUAL OPERATIONS				
Itinerant				
Air Carrier	0	0	0	0
Air Taxi	12	20	20	20
General Aviation	1,678	1,880	2,020	2,320
Military	0	0	0	0
Total Itinerant Operations:	**1,690**	**1,900**	**2,040**	**2,340**
Local				
General Aviation	2,637	2,950	3,190	3,690
Military	0	0	0	0
Total Local Operations:	**2,637**	**2,950**	**3,190**	**3,690**
TOTAL OPERATIONS:*	**4,327**	**4,850**	**5,230**	**6,030**

*Total operations have been rounded.

Source: Coffman Associates analysis

AIRSIDE FACILITY REQUIREMENTS

Airside facilities include those facilities related to the arrival, departure, and ground movement of aircraft. Airside facility requirements are based primarily on the runway design code (RDC) for each runway. Analysis in Chapter Two identified the existing RDC for Runway 13-31 as B-I-5000 and the ultimate RDC as B-II-5000. For Turf Runway 3-21, the existing/ultimate RDC is planned as A-I(Small)-VIS.

RUNWAYS

Runway conditions, such as orientation, length, width, and pavement strength, were analyzed at Phillipsburg Municipal Airport. From this information, requirements for runway improvements were determined for the airport.

Runway Orientation

Key considerations in the runway configuration of an airport involve the orientation for wind coverage and the operational capacity of the runway system. FAA AC 150/5300-13B, *Airport Design*, Change 1, recommends that a crosswind runway be made available when the primary runway orientation provides less than 95 percent crosswind component coverage for an aircraft design group (ADG). **Table 3B** details the allowable crosswind component for each RDC.

TABLE 3B | Allowable Crosswind Component by RDC

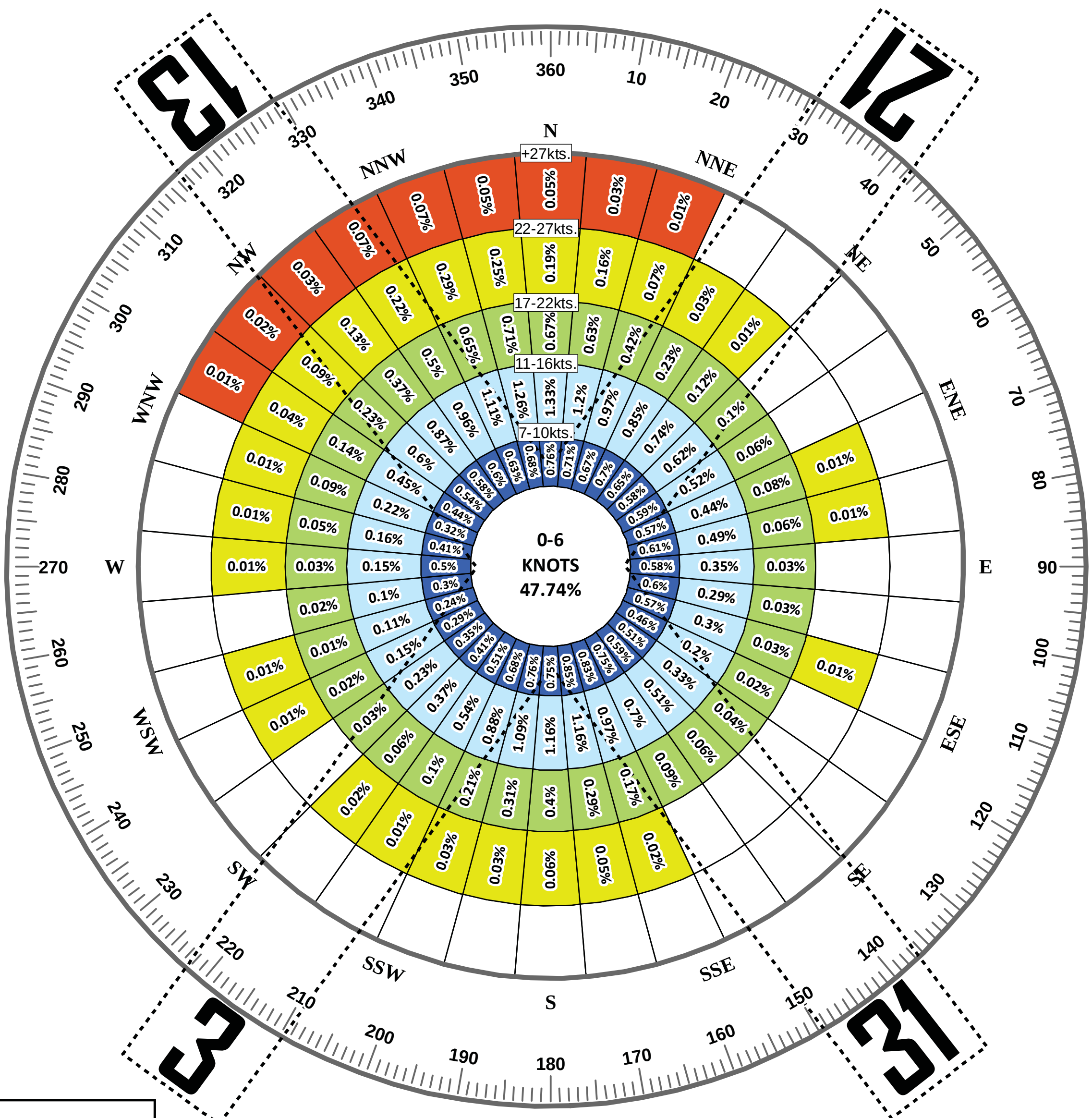
RDC	Allowable Crosswind Component
A-I and B-I (includes small aircraft)	10.5 knots
A-II and B-II	13 knots
A-III and B-III	16 knots
C-I through D-III	
A-IV and B-IV	20 knots
C-IV through C-VI	
D-IV through D-VI	
E-I through E-VI	

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

Exhibit 3A presents the generalized, FAA-accepted all-weather and instrument flight rules (IFR) wind roses for the airport. The previous 10 years of wind data were obtained from an automated weather observation station (AWOS) at Hill City Municipal Airport[1] and have been analyzed to identify wind coverage provided by the existing runway orientations. At PHG, the orientation of Runway 13-31 provides 87.83 percent coverage for the 10.5-knot component, 93.55 percent coverage for the 13-knot component, and greater than 98 percent coverage in 16-knot and higher components in all weather conditions. Runway 3-21 provides 85.64 percent coverage in 10.5-knot conditions. Combined, the runways provide 97.62 percent coverage in all-weather conditions. In IFR conditions, primary Runway 13-31 provides 82.43 percent coverage in 10.5-knot components, 89.89 percent in 13-knot conditions, and greater than 96 percent in 16-knot and higher conditions. When combined with Runway 3-21, coverage is 95.89 percent in the 10.5-knot component during IFR conditions.

[1] Data were taken from the AWOS at Hill City Municipal Airport because 10 years' worth of data were not available from PHG's on-airport AWOS during the time of this study.

ALL-WEATHER WIND COVERAGE				
Runways	10.5 Knots	13 Knots	16 Knots	20 Knots
Runway 13-31	87.83%	93.55%	98.05%	99.59%
Runway 3-21	85.64%	91.53%	96.36%	98.72%
All Runways	97.62%	99.41%	99.88%	99.98%



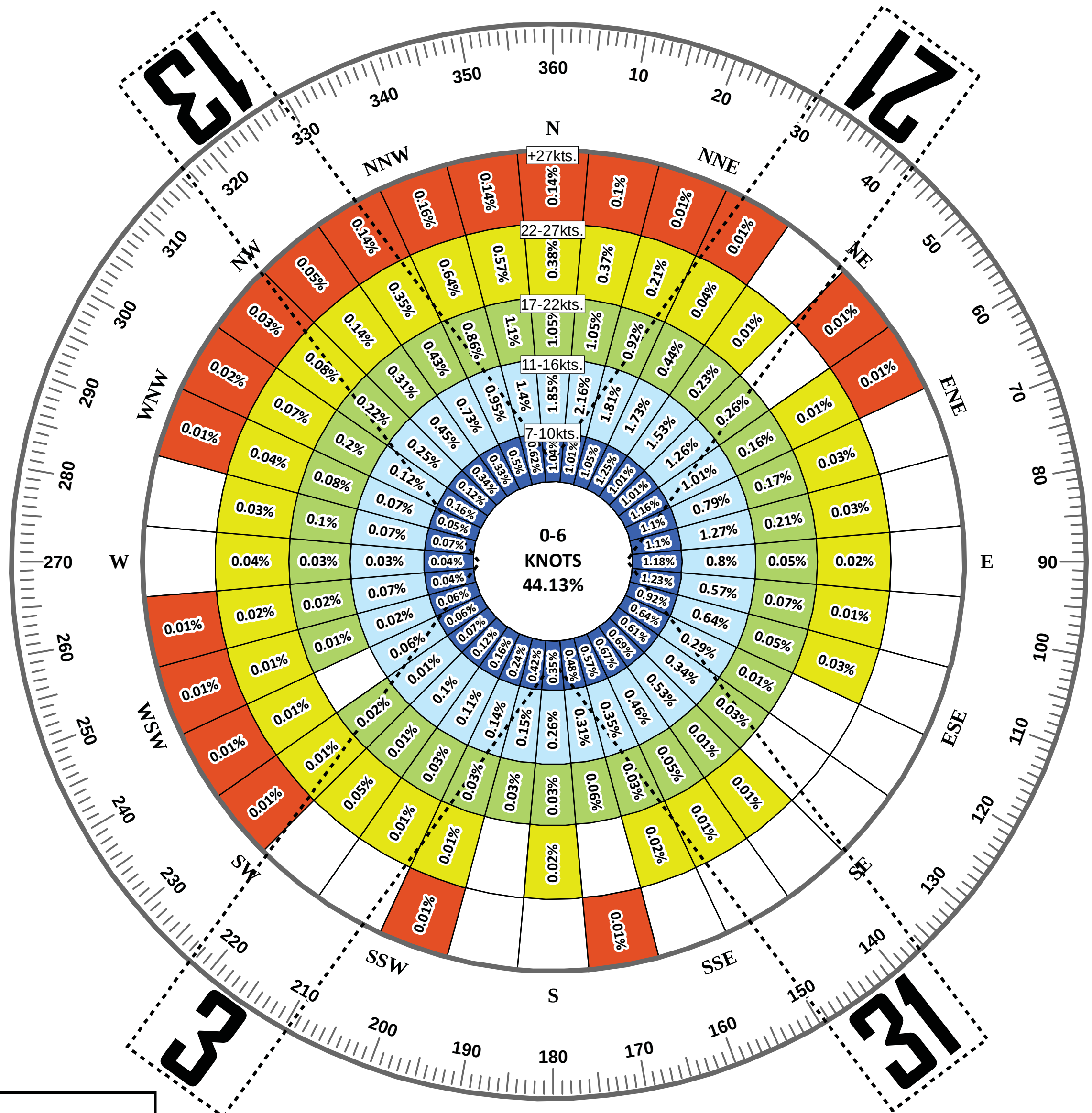
Wind Speed Percentages

- 7 - 10 kts.
- 11 - 16 kts.
- 17 - 22 kts.
- 22 - 27 kts.
- + 27 kts.

SOURCE:
NOAA National Climatic Center
Asheville, North Carolina
Hill City Municipal Airport
Hill City, Kansas

OBSERVATIONS:
103,661 All Weather Observations
Jan. 1, 2014 - Dec, 31 2023

IFR WIND COVERAGE				
Runways	10.5 Knots	13 Knots	16 Knots	20 Knots
Runway 13-31	82.43%	89.89%	96.40%	99.08%
Runway 3-21	84.85%	90.37%	95.02%	97.82%
All Runways	95.89%	98.68%	99.62%	99.93%



Wind Speed Percentages

- 7 - 10 kts.
- 11 - 16 kts.
- 17 - 22 kts.
- 22 - 27 kts.
- + 27 kts.

SOURCE:
NOAA National Climatic Center
Asheville, North Carolina
Hill City Municipal Airport
Hill City, Kansas

OBSERVATIONS:
14,620 IFR Observations
Jan. 1, 2014 - Dec, 31 2023

Based on this information, a crosswind runway at PHG is eligible for grant consideration, with specific FAA justification analysis needed for federal funding assistance. Turf Runway 3-21 currently serves as the crosswind runway, but its unpaved surface and length (1,755 feet) limits utility of this runway to exclusively small aircraft. Additionally, its orientation limits potential landside development east of the terminal area. For these reasons, the alternatives in the next chapter will consider several modification options for the turf runway, including the potential to decommission or realign the crosswind runway.

Runway Designations

A runway's designation is based on its magnetic headings, which are determined by the magnetic declination for the area. The magnetic declination near Phillipsburg Municipal Airport is 4° 21' E ± 0° 4' W per year. Runway 13-31 has a true heading of 143°/323°. Adjusting for the magnetic declination, the current magnetic heading of Runway 13-31 is 139°/319° and the magnetic heading of Runway 3-21 is 32°/212°. Given the changes in magnetic declination, consideration should be given to redesignating Runway 13-31 as Runway 14-32; Runway 3-21 should remain as-is. Any redesignation of Runway 13-31 should be coordinated with the FAA to ensure its necessity and that all appropriate publications are updated. If it is confirmed that the runway should be redesignated, new runway end designation markings can be incorporated concurrently with a future pavement rehabilitation project.

Runway Length

AC 150/5325-4B, *Runway Length Requirements for Airport Design*, provides guidance for determining runway length needs. The determination of runway length requirements for the airport is based on five primary factors:

- Mean maximum temperature of the hottest month
- Airport elevation
- Runway gradient
- Critical aircraft type expected to use the runway
- Stage length of the longest nonstop destination (specific to larger aircraft)

The mean maximum daily temperature of the hottest month for Phillipsburg Municipal Airport is 92.5 degrees Fahrenheit (°F), which occurs in July. The airport elevation is 1,910.1 feet mean sea level (MSL). Both runways have a longitudinal gradient of 0.48 percent.

Airplanes operate on a wide variety of available runway lengths. Many factors govern the sustainability of runway lengths for aircraft, such as elevation, temperature, wind, aircraft weight, wing flap settings, runway condition (wet or dry), runway gradient, vicinity airspace obstructions, and any special operating procedures. Airport operators can pursue policies that maximize the sustainability of the runway length. Policies such as area zoning and height and hazard restricting can protect an airport's runway length. Airport ownership (fee simple easement) of land leading to the runway ends reduces the possibility of natural growth or human-made obstructions. Planning for runways should include an evaluation of aircraft types expected to use the airport now and in the future. Future planning should be realistic, supported by the FAA-approved forecasts, and based on the critical aircraft (or family of aircraft).

General Aviation Aircraft

Most operations occurring at Phillipsburg Municipal Airport are conducted using smaller general aviation (GA) aircraft that weigh less than 12,500 pounds. Following guidance from AC 150/ 5325-4B, to accommodate 95 percent of these small aircraft with fewer than 10 passenger seats, a runway length of 3,900 feet is recommended. For 100 percent of these small aircraft, a runway length of 4,500 feet is recommended. For small aircraft with 10 or more passenger seats, 4,600 feet of runway length is recommended.

The airport is also utilized by aircraft that weigh more than 12,500 pounds, including small- to medium-sized business jet aircraft. Runway length requirements for business jets that weigh less than 60,000 pounds have also been calculated. These calculations take into consideration the runway gradient and landing length requirements for contaminated (wet) runways. Business jets tend to need greater runway length when landing on wet surfaces because of their increased approach speeds. AC 150/5325-4B stipulates that runway length determination for business jets should consider a grouping of airplanes with similar operating characteristics. The AC provides two separate family groupings of airplanes, each of which is based on its representative percentage of aircraft in the national fleet. The first grouping is those business jets that comprise 75 percent of the national fleet, and the second grouping is those that comprise 100 percent of the national fleet. **Table 3C** presents a partial list of common aircraft in each aircraft grouping. A third grouping considers business jets that weigh more than 60,000 pounds. Runway length determination for these aircraft must be based on the performance characteristics of the individual aircraft.

TABLE 3C | Business Jet Categories for Runway Length Determination

Aircraft	MTOW (lbs.)
75 Percent of the National Fleet	
Lear 35	20,350
Lear 45	20,500
Cessna 550	14,100
Cessna 560XL	20,000
Cessna 650 (VII)	22,000
IAI Westwind	23,500
Beechjet 400	15,800
Falcon 50	18,500
75-100 Percent of the National Fleet	
Lear 55	21,500
Lear 60	23,500
Hawker 800XP	28,000
Hawker 1000	31,000
Cessna 650 (III/IV)	22,000
Cessna 750 (X)	36,100
Challenger 604	47,600
IAI Astra	23,500
Greater than 60,000 Pounds	
Gulfstream II	65,500
Gulfstream IV	73,200
Gulfstream V	90,500
Global Express	98,000
Gulfstream 650	99,600
MTOW = maximum takeoff weight	

Source: FAA AC 150/5325-4B, Runway Length Requirements for Airport Design

Table 3D presents the results of the runway length analysis for business jets that was developed following the guidance provided in AC 150/5325-4B. To accommodate 75 percent of the business jet fleet at 60 percent useful load, a runway length of 5,500 feet is recommended. This length is derived from a raw length of 5,040 feet, which is adjusted (as recommended) for runway gradient and consideration of landing length needs on a contaminated (wet and slippery) runway. To accommodate 100 percent of the business jet fleet at 60 percent useful load, 6,200 feet is the recommended runway length.

Utilization of the 90 percent category for runway length determination is generally not considered by the FAA unless there is a demonstrated need at an airport, such as documented activity by a business jet operator that flies out frequently with heavy loads. To accommodate 75 percent of the business jet fleet at 90 percent useful load, a runway length of 7,000 feet is recommended. To accommodate 100 percent of business jets at 90 percent useful load, a runway length of 9,200 feet is recommended.

TABLE 3D | Runway Length Requirements

Fleet Mix Category	TAKEOFF LENGTHS		LANDING LENGTHS	Final Runway Length
	Raw Runway Length from FAA AC	Runway Length with Gradient Adjustment (+360')	Wet Surface Landing Length for Jets (+15%)*	
75% of Fleet at 60% Useful Load	5,040'	5,045'	5,500'	5,500'
100% of Fleet at 60% Useful Load	6,188'	6,193'	5,500'	6,200'
75% of Fleet at 90% Useful Load	6,920'	6,925'	7,000'	7,000'
100% of Fleet at 90% Useful Load	9,224'	9,229'	7,000'	9,200'

*Max. 5,500' for 60% useful load and max. 7,000' for 90% useful load in wet condition

Source: FAA AC 150/5325-4B, Runway Length Requirements for Airport Design

Another method to determine runway length requirements for aircraft at Phillipsburg Municipal Airport is to examine aircraft flight planning manuals under conditions specific to the airport. Several aircraft were analyzed for takeoff length requirements at a design temperature of 92.5°F and a field elevation of 1,910.1 feet MSL with a 0.48 percent runway grade. **Table 3E** provides a detailed runway length analysis for some of the most common turbine aircraft in the national fleet. This data was obtained from Ultranav software, which computes operational parameters for specific aircraft based on flight manual data. The analysis includes the maximum takeoff weight (MTOW) allowable and the percent useful load from 60 percent to 100 percent.

TABLE 3E | Business Aircraft Takeoff Length Requirements

		TAKEOFF LENGTH REQUIREMENTS (feet)				
		Useful Load				
Aircraft Name	MTOW	60%	70%	80%	90%	100%
Pilatus PC-12	9,921	2,792	2,957	3,126	2,904	3,128
King Air C90GTi	10,100	2,808	3,012	3,236	3,460	3,684
King Air C90B	10,100	2,995	3,217	3,445	3,691	3,956
Citation CJ3	13,870	3,139	3,378	3,630	3,902	4,228
King Air 200 GT	12,500	3,708	3,854	4,003	4,135	4,252
Citation Sovereign	30,300	3,413	3,594	3,837	4,289	4,395
Citation (525A) CJ2	12,375	3,446	3,714	3,995	4,287	4,616
King Air 350	15,000	3,852	4,012	4,170	4,461	4,801
Citation Mustang	8,645	3,177	3,533	3,918	4,412	4,904
Citation 560 XLS	20,200	3,765	4,076	4,391	4,730	5,091
Citation II (550)	13,300	3,436	3,812	4,219	4,656	5,125
Citation (525) CJ1	10,600	3,745	4,176	4,614	5,051	5,489
Beechjet 400A	16,300	4,392	4,728	5,087	5,483	5,878
Hawker 800/850 XP	28,000	4,806	5,286	5,813	5,888	5,888
Citation III	21,500	4,892	5,406	5,968	6,081	6,081
Hawker 4000	39,500	4,626	5,026	5,456	5,996	6,611
Falcon 50 EX	41,000	4,855	5,377	5,926	6,504	6,667
Westwind II	23,500	5,655	6,291	6,883	6,883	6,883
Lear 40	21,000	4,563	5,010	5,598	6,256	6,928
Challenger 300	38,850	4,917	5,384	5,875	6,389	6,935
Global 5000	92,500	4,757	5,291	5,852	6,441	7,054
Citation X	35,700	5,086	5,559	6,105	6,748	7,062

(Continues)

TABLE 3E | Business Aircraft Takeoff Length Requirements (continued)

		TAKEOFF LENGTH REQUIREMENTS (feet)				
		Useful Load				
Aircraft Name	MTOW	60%	70%	80%	90%	100%
Gulfstream 450	74,600	4,933	5,446	5,991	6,594	7,231
Falcon 900EX	49,200	4,760	5,370	6,060	6,750	7,360
Falcon 2000	35,800	5,346	5,807	6,281	6,791	7,377
Falcon 7X	70,000	4,865	5,420	5,986	6,667	7,408
Global Express	98,000	5,197	5,824	6,485	7,179	7,594
Challenger 604/605	48,200	5,507	6,078	6,729	7,422	8,123
Lear 60	23,500	5,713	6,303	6,852	7,552	8,459
Gulfstream 280	39,600	5,770	7,280	8,092	8,477	8,786

Note: Green cell values are less than or equal to the length of the primary runway at PHG; orange cell values are greater than the length of the primary runway at PHG.
MTOW = maximum takeoff weight

Source: Ultranav software

The majority of the aircraft analyzed are capable of departing at MTOW on the existing runway length of 5,101 feet during hot weather with useful loads up to 60 percent. Roughly half can take off with useful loads up to 70 percent, beyond which the aircraft analyzed become more weight-restricted.

Table 3F presents the runway length required for landing under three operational categories: Title 14 Code of Federal Regulations (CFR) Part 91, Part 135, and Part 91k. Part 91 operations are those conducted by private individuals or companies that own their aircraft. Part 135 applies to all for-hire charter operations, including most fractional ownership operations, while Part 91k includes operations in fractional ownership that utilize their own aircraft under direction of pilots specifically assigned to said aircraft. Part 91k and Part 135 have rules regarding landing operations that require an operator to land at the destination airport within 60 percent of the effective runway length. An additional rule allows for an operator to land within 80 percent of the effective runway length if the operator has an approved destination airport analysis in the airport's program operating manual. The landing length analysis accounts for both scenarios, as shown in the table.

TABLE 3F | Business Aircraft Landing Length Requirements

		LANDING LENGTH REQUIREMENTS (feet)					
		Dry Runway Condition			Wet Runway Condition		
Aircraft Name	MLW	Part 91	80% Rule	60% Rule	Part 91	80% Rule	60% Rule
Westwind II	19,000	2,500	3,125	4,167	2,870	3,588	4,783
Global 5000	78,600	2,761	3,451	4,602	3,175	3,969	5,292
Global Express	78,600	2,761	3,451	4,602	3,175	3,969	5,292
King Air 350	15,000	2,903	3,629	4,838	3,338	4,173	5,563
Falcon 7X	62,400	3,043	3,804	5,072	3,499	4,374	5,832
Falcon 50 EX	35,715	3,044	3,805	5,073	3,501	4,376	5,835
Citation III	19,000	2,356	2,945	3,927	3,680	4,600	6,133
Citation Sovereign	27,100	2,906	3,633	4,843	3,698	4,623	6,163
Citation Mustang	8,000	2,646	3,308	4,410	3,720	4,650	6,200
Hawker 4000	33,500	3,302	4,128	5,503	3,797	4,746	6,328
Lear 40	19,200	2,973	3,716	4,955	3,801	4,751	6,335
Citation (525) CJ1	9,800	3,024	3,780	5,040	4,086	5,108	6,810
Citation CJ3	12,750	3,083	3,854	5,138	4,198	5,248	6,997
Hawker 800/850 XP	23,350	2,767	3,459	4,612	4,209	5,261	7,015

(Continues)

TABLE 3F | Business Aircraft Landing Length Requirements (continued)

		LANDING LENGTH REQUIREMENTS (feet)					
		Dry Runway Condition			Wet Runway Condition		
Aircraft Name	MLW	Part 91	80% Rule	60% Rule	Part 91	80% Rule	60% Rule
Gulfstream 280	32,700	3,867	4,834	6,445	4,448	5,560	7,413
Challenger 604/605	38,000	2,994	3,743	4,990	4,582	5,728	7,637
Citation (525A) CJ2	11,500	3,268	4,085	5,447	4,736	5,920	7,893
Lear 60	19,500	3,776	4,720	6,293	5,063	6,329	8,438
Challenger 300	33,750	2,710	3,388	4,517	5,194	6,493	8,657
Beechjet 400A	15,700	3,860	4,825	6,433	5,666	7,083	9,443
Gulfstream 450	66,000	3,390	4,238	5,650	5,728	7,160	9,547
Citation II (550)	12,700	3,670	4,588	6,117	5,820	7,275	9,700
Citation X	31,800	3,703	4,629	6,172	5,902	7,378	9,837
Citation 560 XLS	18,700	2,614	3,268	4,357	6,317	7,896	10,528
Falcon 900EX	44,500	3,817	4,771	6,362	6,362	7,953	10,603
Falcon 2000	33,000	6,209	7,761	10,348	6,433	8,041	10,722
King Air C90GTi	9,600	2,740	3,425	4,567	N/A	N/A	N/A
King Air 200 GT	12,500	1,276	1,595	2,127	N/A	N/A	N/A
King Air C90B	9,600	1,313	1,641	2,188	N/A	N/A	N/A
Pilatus PC-12	9,921	2,404	3,005	4,007	N/A	N/A	N/A

Note: Green cell values are less than or equal to the length of the primary runway at PHG; orange cell values are greater than the length of the primary runway at PHG.
MLW = maximum landing weight
N/A = not applicable; some turboprop aircraft landing lengths are not adjusted for wet runway conditions

Source: Ultranav software

The analysis shows that nearly all of the aircraft analyzed can land on the runway length currently available at PHG during dry runway conditions when operating under Part 91 or using the 80 percent rule. During wet (or contaminated) runway conditions, about half of the aircraft analyzed can land when operating under Part 91, fewer are able to land under the 80 percent rule, and only one (the Westwind II) is able to land under the 60 percent rule.

Runway Length Summary

Many factors are considered when determining an appropriate runway length for safe and efficient operations of aircraft at Phillipsburg Municipal Airport. The airport should strive to accommodate smaller jets and turboprop aircraft to the greatest extent possible, as demand dictates. According to the FAA calculations detailed in **Table 3D**, a length of 5,500 feet is recommended to accommodate 75 percent of the business jet fleet (aircraft that weigh between 12,500 and 60,000 pounds) at 60 percent of their useful load; however, these aircraft operate less frequently at the airport and the current length of Runway 13-31 is capable of accommodating many of these users under moderate loading conditions. As such, the 5,101 feet of length available on the primary runway is considered sufficient for the aircraft that currently operate and are anticipated to operate at PHG in the future.

The airport's crosswind runway, turf Runway 3-21, is currently 1,755 feet long, which falls short of the FAA-recommended length of 3,900 feet to accommodate 95 percent of small aircraft with fewer than 10 passenger seats. It should be noted that this runway was shortened in 2024 and the Runway 21 threshold was relocated approximately 1,000 feet to the southwest. This was done to shift the runway visibility zone (described later in the *Line of Sight* section) off the aircraft parking apron. The alternatives in the next chapter will explore options to provide a longer crosswind runway at PHG.

Runway Width

Runway width design standards are primarily based on the critical aircraft but can also be influenced by the visibility minimums of published instrument approach procedures. For primary Runway 13-31, existing RDC B-I-5000 design criteria stipulate a runway width of 60 feet, while ultimate RDC B-II-5000 standards call for a width of 75 feet. Runway 13-31 is currently 60 feet wide and meets the existing design standards, but future planning should consider a width increase to 75 feet to meet the ultimate design standard.

For crosswind Runway 3-21, the RDC is A-I(Small)-VIS in the existing and ultimate conditions, which has a runway width standard of 60 feet. Crosswind Runway 3-21 is currently 140 wide, which should be maintained if this runway remains in its current disposition.

Pavement Strength

An important feature of airfield pavement is its ability to withstand repeated use by aircraft of varying weights. The FAA reports the pavement strength for primary Runway 13-31 as 12,500 pounds for single wheel aircraft (S). No data is reported for the dual wheel aircraft (D) and dual tandem wheel aircraft (2D) pavement strength for Runway 13-31. Pavement strength is not applicable to crosswind Runway 3-21, as it is a turf runway.

The strength rating of a runway does not preclude aircraft that weigh more than the published strength rating from using the runway. All federally obligated airports must remain open to the public, and it is typically up to the pilot of an aircraft to determine if a runway can safely support their aircraft. An airport sponsor cannot restrict an aircraft from using the runway simply because its weight exceeds the published strength rating. On the other hand, the airport sponsor has an obligation to properly maintain and protect the useful life of the runway, typically for 20 years.

The strength rating of a runway can change over time. Regular usage by heavier aircraft can decrease the strength rating, while periodic runway resurfacing can increase the strength rating. The current strength rating on primary Runway 13-31 is adequate to accommodate the aircraft that currently operate at the airport; however, consideration should be given to evaluating the pavement strength to ensure the most frequently operating heavy aircraft are adequately supported. At a minimum, airfield pavement should be planned to support aircraft within the ultimate design group (B-II), such as the King Air 350, which has an MTOW of 15,000 pounds on dual wheel main landing gear (D).

Gradient

The surface gradient of a runway affects aircraft performance and pilot perception. The surface gradient is the maximum allowable slope for a runway. For runways designated for approach categories A and B, the maximum longitudinal grade is 2.0 percent. Both runways have a longitudinal grade of 0.48 percent, meeting the gradient standard.

Line of Sight

Runway line of sight (LOS) standards reduce conflicts among aircraft and between aircraft and vehicles operating on active runways. For intersecting runways, the runway visibility zone (RVZ) is an area formed by imaginary lines connecting the intersecting runways' LOS points. The purpose of the RVZ is to facilitate coordination among aircraft and between aircraft and vehicles operating on active runways. Having a clear LOS allows departing aircraft and arriving aircraft to verify the locations and actions of other aircraft and vehicles on the ground that could create a conflict. Within the RVZ, any point five feet above the runway centerline must be mutually visible with any other point five feet above the centerline of the crossing runway. These standards apply to airports without airport traffic control towers (ATCTs) or with part-time ATCT operations. The RVZ at PHG is depicted on **Exhibit 3B**. The RVZ is unobstructed, except for the wind cone, which is co-located with the segmented circle. Consideration should be given to relocating this equipment outside the RVZ.

SAFETY AREA DESIGN STANDARDS

The FAA has established several imaginary surfaces to protect aircraft operational areas and keep them free from obstructions. These include the runway safety area (RSA), runway object free area (ROFA), runway obstacle free zone (ROFZ), and runway protection zone (RPZ).

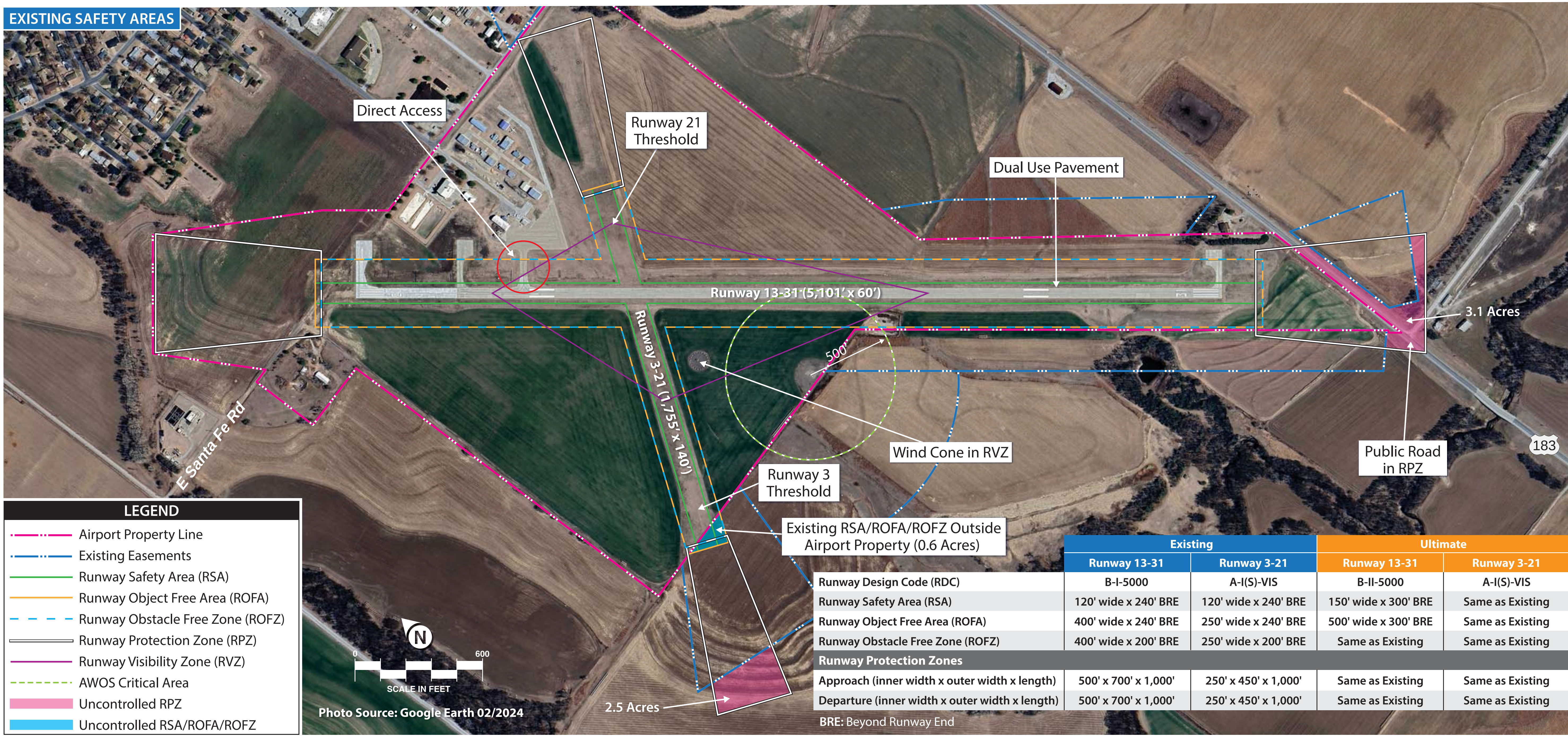
The entire RSA, ROFA, and ROFZ must be under the direct ownership of the airport sponsor to ensure these areas remain free of obstacles and can be readily accessed by maintenance and emergency personnel. RPZs should also be under airport ownership, where feasible. An alternative to outright ownership of the RPZ is the purchase of avigation easements (acquiring control of designated airspace within the RPZ) or having sufficient land use control measures in place that ensure the RPZ remains free of incompatible development. The various airport safety areas and their dimensions, as sourced from FAA AC 150/5300-13B, *Airport Design*, Change 1 are presented graphically on **Exhibit 3B**.

Runway Safety Area

The RSA is defined in FAA AC 150/5300-13B, *Airport Design*, Change 1 as a "defined area surrounding the runway consisting of a prepared surface suitable for reducing the risk of damage to aircraft in the event of undershoot, overshoot, or excursion from the runway." The RSA is centered on the runway and dimensioned in accordance with the approach speed of the critical aircraft using the runway. The FAA requires the RSA to be cleared and graded, drained by grading or storm sewers, capable of accommodating the critical aircraft and fire and rescue vehicles, and free of obstacles not fixed by navigational purpose, such as runway edge lights or approach lights.

The FAA places high significance on maintaining adequate RSA at all airports. The FAA established the Runway Safety Area Program under Order 5200.8 (effective October 1, 1999). The Order states: "The objective of the Runway Safety Area Program is that all RSAs at federally obligated airports…shall conform to the standards contained in AC 150/5300-13B, *Airport Design*, Change 1 to the extent practicable." Each Regional Airports Division of the FAA is obligated to collect and maintain data on the RSAs for all runways and perform airport inspections.

EXISTING SAFETY AREAS



	Existing		Ultimate	
	Runway 13-31	Runway 3-21	Runway 13-31	Runway 3-21
Runway Design Code (RDC)	B-I-5000	A-I(S)-VIS	B-II-5000	A-I(S)-VIS
Runway Safety Area (RSA)	120' wide x 240' BRE	120' wide x 240' BRE	150' wide x 300' BRE	Same as Existing
Runway Object Free Area (ROFA)	400' wide x 240' BRE	250' wide x 240' BRE	500' wide x 300' BRE	Same as Existing
Runway Obstacle Free Zone (ROFZ)	400' wide x 200' BRE	250' wide x 200' BRE	Same as Existing	Same as Existing
Runway Protection Zones				
Approach (inner width x outer width x length)	500' x 700' x 1,000'	250' x 450' x 1,000'	Same as Existing	Same as Existing
Departure (inner width x outer width x length)	500' x 700' x 1,000'	250' x 450' x 1,000'	Same as Existing	Same as Existing

BRE: Beyond Runway End

ULTIMATE SAFETY AREAS (Runway 13-31)

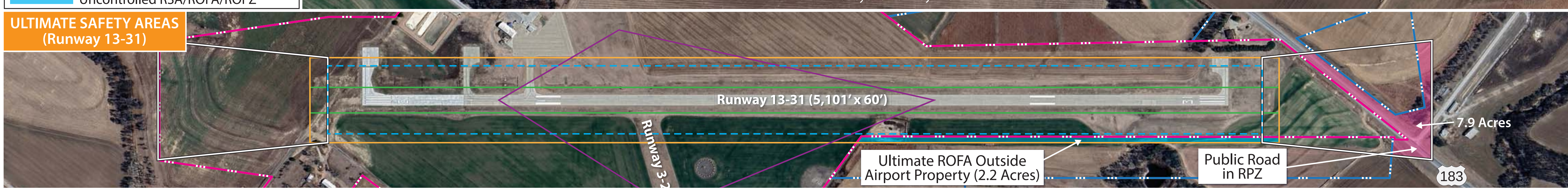


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Table 3G summarizes the standard RSA dimensions in the existing and ultimate conditions and whether these standards are met in each scenario. **Exhibit 3B** graphically depicts this safety area.

TABLE 3G | RSA Standards

	Runway 13-31		Runway 3-21
	Existing RDC B-I-5000	**Ultimate RDC B-II-5000**	**Existing/Ultimate RDC A-I(Small)-VIS**
RSA Dimensions	240' beyond runway x 120' wide	300' beyond runway x 150' wide	240' beyond runway x 120' wide
Meets Standard?	Yes	Yes	No; a portion of the RSA extends beyond airport property

Sources: FAA AC 150/5300-13B, Airport Design; Coffman Associates analysis

As shown in the table and on the exhibit, the existing and ultimate RSA for primary Runway 13-31 are both controlled by the airport and free of obstructions; however, a portion of the RSA associated with Runway 3-21 extends beyond the current airport property line near the Runway 3 threshold. The airport sponsor should consider acquisition of this property to maintain positive control over this safety area.

Runway Object Free Area

The ROFA is "a clear area limited to equipment necessary for air and ground navigation and provides wingtip protection in the event of an aircraft excursion from the runway." The ROFA is a two-dimensional ground area surrounding runways, taxiways, and taxilanes that is clear of objects, except for objects with locations fixed by function (i.e., airfield lighting). The ROFA does not have to be graded and level like the RSA; instead, the primary requirement for the ROFA is that no object in the ROFA penetrates the lateral elevation of the RSA. The ROFA is centered on the runway, extending out in accordance with the critical aircraft utilizing the runway.

Table 3H summarizes the standard ROFA dimensions in the existing and ultimate conditions and whether these standards are met in each scenario. **Exhibit 3B** graphically depicts this safety area.

TABLE 3H | ROFA Standards

	Runway 13-31		Runway 3-21
	Existing RDC B-I-5000	**Ultimate RDC B-II-5000**	**Existing/Ultimate RDC A-I(Small)-VIS**
ROFA Dimensions	240' beyond runway x 400' wide	300' beyond runway x 500' wide	240' beyond runway x 250' wide
Meets Standard?	Yes	No; a portion of the ultimate ROFA extends beyond airport property	No; A portion of the ROFA extends beyond airport property

Sources: FAA AC 150/5300-13B, Airport Design; Coffman Associates analysis

As shown in the table and on the exhibit, the existing ROFA associated with Runway 13-31 is controlled by the airport and free from obstructions; however, in the ultimate condition, the ROFA dimensions increase, resulting in a portion of the ROFA (approximately 2.2 acres) extending beyond the property line along the southwest side of Runway 13-31. For Runway 3-21, a portion of the ROFA extends beyond the current airport property line near the Runway 3 threshold. The airport sponsor should consider acquisition of unowned ROFA property to maintain positive control over this safety area.

Runway Obstacle Free Zone

The ROFZ is an imaginary surface that precludes object penetrations, including taxiing and parked aircraft. The only allowance for ROFZ obstructions is navigational aids mounted on frangible bases that are fixed in their locations by function, such as airfield signs. The ROFZ is established to ensure the safety of aircraft operations. If the ROFZ is obstructed, the airport's approaches could be removed or approach minimums could be increased.

For all runways serving aircraft over 12,500 pounds, the ROFZ is 400 feet wide, centered on the runway, and extends 200 feet beyond the runway ends. This standard applies to primary Runway 13-31 at Phillipsburg Municipal Airport. For runways serving small aircraft under 12,500 pounds but with approach speeds greater than or equal to 50 knots, the ROFZ is 250 feet wide, centered on the runway, and extends 200 feet beyond the runway ends. This standard applies to crosswind Runway 3-21. **Table 3J** summarizes the ROFZ dimensions and whether these standards are met in each scenario. **Exhibit 3B** graphically depicts this safety area.

TABLE 3J | ROFZ Standards

	Runway 13-31	Runway 3-21
ROFZ Dimensions	200' beyond runway x 400' wide	200' beyond runway x 250' wide
Meets Standard?	Yes	No; a portion of the ROFZ extends beyond airport property

Sources: FAA AC 150/5300-13B, Airport Design; Coffman Associates analysis

As shown in the table and on the exhibit, the ROFZ for primary Runway 13-31 is controlled by the airport and free of obstructions. A portion of the ROFZ associated with Runway 3-21 extends beyond the current airport property line near the Runway 3 threshold. The airport sponsor should consider acquisition of this property to maintain positive control over this safety area.

Runway Protection Zone

An RPZ is a trapezoidal area centered on the extended runway centerline beginning 200 feet from the end of the runway. This safety area has been established to protect the end of the runway from airspace penetrations and incompatible land uses. The RPZ dimensions are based on the established RDC and the approach visibility minimums serving the runway. While the RPZ is intended to be clear of incompatible objects or land uses, some uses are permitted with conditions and other land uses are prohibited. According to AC 150/5300-13B, the following land uses are permissible within the RPZ:

- Farming that meets the minimum buffer requirements
- Irrigation channels, as long as they do not attract birds
- Airport service roads, as long as they are not public roads and are directly controlled by the airport operator
- Underground facilities, as long as they meet other design criteria, such as RSA requirements, as applicable

- Unstaffed navigational aids (NAVAIDs) and facilities required for airport equipment that are fixed by function in regard to the RPZ
- Aboveground fuel tanks associated with backup generators for unstaffed NAVAIDS

In September 2022, the FAA published AC 150/5190-4B, *Airport Land Use Compatibility Planning*, which states that airport owner control over RPZs is preferred. Airport owner control over RPZs may be achieved through one of the following methods:

- Ownership of the RPZ property in fee simple
- Possessing sufficient interest in the RPZ property through easements, deed restrictions, etc.
- Possessing sufficient land use control authority to regulate land use in the jurisdiction that contains the RPZ
- Possessing and exercising the power of eminent domain over the property
- Possessing and exercising permitting authority over proponents of development within the RPZ (e.g., where the sponsor is a state)

AC 150/5190-4B further states that "control is preferably exercised through acquisition of sufficient property interest and includes clearing RPZ areas (and keeping them clear) of objects and activities that would impact the safety of people and property on the ground." The FAA recognizes that land ownership, environmental, geographical, and other considerations can complicate land use compatibility within RPZs. Regardless, airport sponsors must comply with FAA grant assurances, including (but not limited to) Grant Assurance 21, *Compatible Land Use*.

Sponsors are expected to take appropriate measures to "protect against, remove, or mitigate land uses that introduce incompatible development within RPZs." For a proposed project that would shift an RPZ into an area with existing incompatible land uses, such as a runway extension or the construction of a new runway, the sponsor is expected to have or secure sufficient control of the RPZ, ideally through fee simple ownership. Where existing incompatible land uses are present, the FAA expects sponsors to "seek all possible opportunities to eliminate, reduce, or mitigate existing incompatible land uses" through acquisition, land exchanges, right-of-first refusal to purchase, agreements with property owners regarding land uses, easements, or other such measures. These efforts should be revisited during master plan or airport layout plan (ALP) updates, and periodically thereafter, and documented to demonstrate compliance with FAA grant assurances. If new or proposed incompatible land uses impact an RPZ, the FAA expects the airport to take the above actions to control the property within the RPZ and adopt a strong public stance opposing the incompatible land uses.

For new incompatible land uses that result from a sponsor-proposed action (e.g., an airfield project such as a runway extension, a change in the critical aircraft that increases the RPZ dimension, or lower minimums that increase the RPZ dimension), the airport sponsor is expected to conduct an alternatives evaluation. The intent of the alternatives evaluation is to "proactively identify a full range of alternatives and prepare a sufficient evaluation to be able to draw a conclusion about what is 'appropriate and reasonable.'" For incompatible development off-airport, the sponsor should coordinate with the FAA Airports District Office (ADO) as soon as the sponsor learns of the development and the alternatives evaluation should be conducted within 30 days of the sponsor becoming aware of the development within the RPZ. The following items are typically necessary in an alternatives evaluation:

- Sponsor's statement of the purpose and need of the proposed action (airport project, land use change, or development)
- Identification of any other interested parties and proponents
- Identification of any federal, state, and/or local transportation agencies involved
- Analysis of sponsor control of the land within the RPZ
- Summary of all alternatives considered, including:
    - Alternatives that preclude introducing the incompatible land use within the RPZ (e.g., zoning action, purchase, and design alternatives, such as implementation of declared distances, displaced thresholds, runway shift or shortening, raising minimums, etc.)
    - Alternatives that minimize the impact of the land use in the RPZ (e.g., rerouting a new roadway through less of the RPZ, etc.)
    - Alternatives that mitigate risk to people and property on the ground (e.g., tunnelling, depressing, and/or protecting a roadway through the RPZ, implementing operational measures to mitigate any risks, etc.)
- Narrative discussion and exhibits or figures depicting the alternative
- Rough order of magnitude cost estimates associated with each alternative, regardless of potential funding sources
- Practicability assessment based on the feasibility of the alternative in terms of constructability, cost, operational impacts, and other factors

Once the alternatives evaluation has been submitted to the ADO, the FAA will determine whether the sponsor has made an adequate effort to pursue and fully consider appropriate and reasonable alternatives. **The FAA will not approve or disapprove the airport sponsor's preferred alternative. The FAA will only evaluate whether an acceptable level of alternatives analysis has been completed before the sponsor makes the decision to allow or disallow the proposed land use within the RPZ.**

In summary, the RPZ guidance published in September 2022 shifts the responsibility of protecting the RPZ to the airport sponsor. The airport sponsor is expected to take action to control the RPZ or demonstrate that appropriate actions have been taken. It is ultimately up to the airport sponsor to permit or disallow existing or new incompatible land uses within an RPZ, with the understanding that the sponsor still has grant assurance obligations, and the FAA retains the authority to review and approve or disapprove portions of the ALP that would adversely impact the safety of people and property within the RPZ.

RPZs include approach and departure RPZs. The approach RPZ is a function of the aircraft approach category (AAC) and approach visibility minimums associated with the approach runway end. The departure RPZ is a function of the AAC and departure procedures associated with the runway. For a particular runway end, the more stringent RPZ requirements (usually associated with the approach RPZ) will govern the property interests and clearing requirements the airport sponsor should pursue. None of the runways at PHG have displaced thresholds, so the approach and departure RPZs on each runway occur in the same location 200 feet from the end of each runway. For planning purposes, the approach RPZ was used to create the most restrictive condition. The existing RPZs at PHG are presented on **Exhibit 3B** and detailed further in **Table 3K**.

TABLE 3K | Runway Protection Zones (RPZs) Summary

Runway	Visibility Minimums	RPZ Dimensions	Uncontrolled RPZ	Notes/Potential Incompatibilities
RUNWAY 13-31 EXISTING/ULTIMATE CONDITION				
Runway 13	1-mile	1,000' length 500' inner width 700' outer width	N/A	The existing/ultimate Runway 13 RPZ is located on airport property and does not contain incompatible land uses.
Runway 31	1-mile	1,000' length 500' inner width 700' outer width	3.1 acres	The majority of the existing/ultimate Runway 31 RPZ is located on airport property or protected through an avigation easement. Approximately 3.1 acres within the existing/ultimate Runway 31 RPZ are not controlled by the airport. U.S. Route 183 traverses the RPZ.
RUNWAY 3-21 EXISTING/ULTIMATE CONDITION				
Runway 3	Visual	1,000' length 250' inner width 450' outer width	2.5 acres	The majority of the existing/ultimate Runway 3 RPZ is protected by an avigation easement. Approximately 2.5 acres within the existing/ultimate Runway 3 RPZ are not controlled by the airport.
Runway 21	Visual	1,000' length 250' inner width 450' outer width	N/A	Existing/ultimate Runway 21 RPZ is located on airport property and does not contain incompatible land uses.
Note: Acreages are approximate.				

Source: Coffman Associates analysis

SEPARATION STANDARDS

There are several other standards related to separation distances from runways and taxiways. Each is designed to enhance the safety of the airfield.

Runway/Taxiway Separation

Neither runway at PHG is served by a parallel taxiway. Future planning should consider construction of a parallel taxiway to serve primary Runway 13-31, at a minimum. Ultimate B-II-5000 design standards dictate a separation distance of 240 feet between the runway and taxiway centerlines. The alternatives in the next chapter will evaluate options for the inclusion of a parallel taxiway.

Holding Position Separation

Holding position markings are placed on taxiways leading to runways. When approaching the runway, pilots should stop short of the holding position marking line. FAA design standards call for hold lines to be 200 feet from the runway centerline for B-I and B-II runways with approach minimums no lower than ¾-mile. These standards apply to Runway 13-31 in the existing and ultimate conditions. The FAA also recommends that hold lines be parallel with the runway so a pilot is fully perpendicular to the runway with a clear, unobstructed view of the entire runway length. If a 90-degree angle intersection with the runway is not practicable, a +/- 15-degree margin is allowable.

At Phillipsburg Municipal Airport, each taxiway turnaround and the taxiway leading from the apron to primary Runway 13-31 is marked with holding positions that are separated by 200 feet from the runway centerline, as shown on **Exhibit 3C**. This meets the design standard in the existing and ultimate condition and should be maintained.

Exhibit 3C – Holding Position Separation

Aircraft Parking Area Separation

According to FAA AC 150/5300-13B, Change 1, aircraft parking positions should be located to ensure aircraft components (wings, tail, and fuselage) do not:

1. Conflict with the object free area for adjacent runway or taxiways:
    a. Runway object free area (ROFA)
    b. Taxiway object free area (TOFA)
    c. Taxilane object free area (TLOFA)
2. Violate any of the following aeronautical surfaces and areas:
    a. Runway approach or departure surface
    b. Runway visibility zone (RVZ)
    c. Runway obstacle free zone (ROFZ)
    d. Navigational aid equipment critical areas

Existing aircraft parking positions at Phillipsburg Municipal Airport are located on the terminal apron. In their existing locations, each marked aircraft parking position at PHG is clear of the safety areas and aeronautical surfaces described above.

TAXIWAYS

The design standards associated with taxiways are determined by the taxiway design group (TDG) or the ADG of the critical aircraft. As previously determined, the applicable ADG for both runways in the existing condition is ADG I, with primary Runway 13-31 identified as ADG II in the ultimate condition. **Table 3G** presents the various taxiway design standards related to both ADG I and II. The table also shows the taxiway design standards related to TDG. The TDG standards are based on the main gear width (MGW) and cockpit to main gear (CMG) distance of the critical aircraft expected to use those taxiways. Different taxiway and taxilane pavements can (and should) be planned to the most appropriate TDG design standards based on usage.

TABLE 3G | Taxiway Dimensions and Standards

STANDARDS BASED ON WINGSPAN	ADG I	ADG II
Taxiway and Taxilane Protection		
Taxiway Safety Area Width (TSA)	49'	79'
Taxiway Object Free Area Width (TOFA)	89'	124'
Taxilane Object Free Area Width (TLOFA)	79'	110'
Taxiway and Taxilane Separation		
Taxiway Centerline to Parallel Taxiway Centerline	70'	101.5'
Taxiway Centerline to Fixed or Moveable Object	44.5'	62'
Taxilane Centerline to Parallel Taxilane Centerline	64'	94.5'
Taxilane Centerline to Fixed or Moveable Object	39.5'	55'
Wingtip Clearance		
Taxiway Wingtip Clearance (feet)	20'	22.5'
Taxilane Wingtip Clearance (feet)	15'	15.5'
STANDARDS BASED ON TDG	**TDG 1A/B**	**TDG 2A/B**
Taxiway Width Standard	25'	35'
Taxiway Edge Safety Margin	5'	7.5'
Taxiway Shoulder Width	10'	15'

ADG = airplane design group
TDG = taxiway design group
Note: All dimensions are in feet.

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

The current design for taxiways serving Runway 13-31 is TDG 1A, transitioning to TDG 2A at some point in the future. Taxiways at PHG are at least 35 feet wide, which conforms to ultimate TDG 2A standards. Certain portions of the landside area that are utilized exclusively by small aircraft, such as the T-hangar areas, should adhere to TDG 1A/1B standards. All taxiway widths on the airfield should be maintained, and any new taxiways should be planned to conform to ADG II and TDG 2A standards.

The taxiway object free area (TOFA) for taxiways serving Runway 13-31 is currently 89 feet wide, increasing to 124 feet wide in the ultimate condition. The taxilane object free area (TLOFA) varies depending on the type(s) of aircraft using the taxilane. Both the TOFA and TLOFA should be cleared of objects except those needed for air navigation or aircraft ground maneuvering purposes. The TOFAs associated with the connector taxiways are clear of obstructions, as are the TLOFAs associated with the taxilanes that provide access to hangars.

Taxiway and Taxilane Design Considerations

FAA AC 150/5300-13B, *Airport Design*, Change 1 provides guidance on recommended taxiway and taxilane layouts to enhance safety by avoiding runway incursions. A runway incursion is defined as “any occurrence at an airport involving the incorrect presence of an aircraft, vehicle, or person on the protected area of a surface designated for the landing and takeoff of aircraft.” The following is a list of the taxiway design guidelines and the basic rationale behind each recommendation included in the current AC, as well as previous FAA safety and design recommendations.

1. *Taxiing Method*: Taxiways are designed for cockpit-over-centerline taxiing with pavement that is wide enough to allow a certain amount of wander. On turns, sufficient pavement should be provided to maintain the edge safety margin from the landing gear. When constructing new

taxiways, existing intersections should be upgraded to eliminate judgmental oversteering, which is when a pilot must intentionally steer the cockpit outside the marked centerline to ensure the aircraft remains on the taxiway pavement.

2. *Curve Design*: Taxiways should be designed so the nose gear steering angle is no more than 50 degrees, which is the generally accepted value to prevent excessive tire scrubbing.
3. *Three-Path Concept*: To maintain pilot situational awareness, taxiway intersections should provide a pilot with a maximum of three choices of travel. Ideally, these are right, left, and a continuation straight ahead.
4. *Channelized Taxiing*: To support visibility of airfield signage, taxiway intersections should be designed to meet standard taxiway width and fillet geometry.
5. *Designated Hot Spots and Runway Incursion Mitigation (RIM) Locations*: A hot spot is a location on the airfield with elevated risk of a collision or runway incursion. Mitigation measures should be prioritized for areas the FAA designates as hot spots or RIM locations.
6. *Intersection Angles*: Turns should be designed to be 90 degrees wherever possible. For acute-angle intersections, standard angles of 30, 45, 60, 120, 135, and 150 degrees are preferred.
7. *Runway Incursions*: Taxiways should be designed to reduce the probability of runway incursions.
   - *Increase Pilot Situational Awareness*: A pilot who knows where he/she is on the airport is less likely to enter a runway improperly. Complexity leads to confusion. Taxiway systems should be kept simple by using the three-path concept.
   - *Avoid Wide Expanses of Pavement*: Wide pavements require placement of signs far from a pilot's eye. This is especially critical at runway entrance points. Where a wide expanse of pavement is necessary, direct access to a runway should be avoided.
   - *Limit Runway Crossings*: The taxiway layout can reduce the opportunity for human error. The benefits are twofold: through a simple reduction in the number of occurrences and a reduction in air traffic controller workload.
   - *Avoid High-Energy Intersections*: These are intersections in the middle thirds of runways. By limiting runway crossings to the first and last thirds of the runway, the portion of the runway where a pilot can least maneuver to avoid a collision is kept clear.
   - *Increase Visibility*: Right-angle intersections between taxiways and runways provide the best visibility. Acute-angle runway exits provide greater efficiency in runway usage but should not be used as runway entrance or crossing points. A right-angle turn at the end of a parallel taxiway is a clear indication of approaching a runway.
   - *Avoid Dual-Purpose Pavements*: Runways used as taxiways and taxiways used as runways can lead to confusion. A runway should always be clearly identified as a runway, and only a runway.

- *Direct Access*: Taxiways should not be designed to lead directly from an apron to a runway. Such configurations can lead to confusion when a pilot typically expects to encounter a parallel taxiway.

- *Hot Spots*: Confusing intersections near runways are more likely to contribute to runway incursions. These intersections must be redesigned when the associated runway is subject to reconstruction or rehabilitation. Other hot spots should be corrected as soon as practicable.

8. *Runway/Taxiway Intersections*:

    - *Right Angle*: Right-angle intersections are the standard for all runway/taxiway intersections, except where there is a need for an acute-angled exit. Right-angle taxiways provide the best visual perspective to a pilot approaching an intersection with the runway to observe aircraft in both the left and right directions. Right angles also provide optimal orientation of the runway holding position signs so they are visible to pilots.

    - *Acute Angle*: Acute angles should not be larger than 45 degrees from the runway centerline. A 30-degree taxiway layout should be reserved for high-speed exits. The use of multiple intersecting taxiways with acute angles creates pilot confusion and improper positioning of taxiway signage. The construction of high-speed exits is typically only justified for runways that experience regular use by jet aircraft in approach categories C and above.

    - *Large Expanses of Pavement*: Taxiways must never coincide with the intersection of two runways. Taxiway configurations with multiple taxiway and runway intersections in a single area create large expanses of pavement and make it difficult to provide proper signage, marking, and lighting.

9. *Taxiway/Runway/Apron Incursion Prevention*: Apron locations that allow direct access onto a runway should be avoided. Pilot situational awareness can be increased by designing taxiways in a manner that forces pilots to consciously make turns. Taxiways originating from aprons and forming straight lines across runways at mid-span should be avoided.

    - *Wide Throat Taxiways*: Wide throat taxiway entrances should be avoided. Such large expanses of pavement may cause pilot confusion and make lighting and marking more difficult.

    - *Direct Access from Apron to Runway*: Taxiway connectors that cross over a parallel taxiway and directly onto a runway should be avoided. A staggered taxiway layout or a no-taxi island that forces pilots to make a conscious decision to turn should be considered.

    - *Apron to Parallel Taxiway End*: Direct connection from an apron to a parallel taxiway at the end of a runway should be avoided.

The taxiway system at Phillipsburg Municipal Airport is limited to a connector taxiway between the apron and primary Runway 13-31 and three holding bays that serve as taxiway turnarounds, as there is no parallel taxiway. Due to the lack of a parallel taxiway, pilots are required to back-taxi prior to departure, which creates a dual-purpose pavement condition. Additionally, the connector taxiway between the apron and Runway 13-31 serves as a direct access point, as shown on **Exhibit 3B**. Analysis in the next chapter will consider improvements that could be implemented on the airfield to minimize runway incursion potential, improve efficiency, and conform to FAA standards for taxiway design.

Taxilanes are distinguished from taxiways in that they do not provide access directly to or from the runway system. Taxilanes typically provide access to hangar areas and can be planned to varying design standards, depending on the type(s) of aircraft that utilize the taxilane.

NAVIGATIONAL AND APPROACH AIDS

Navigational aids are devices that provide pilots with guidance and position information when utilizing the runway system. Providing electronic and visual guidance to arriving aircraft enhances the safety and capacity of the airfield. Such facilities are vital to the success of an airport and provide additional safety to pilots and passengers using the air transportation system. While instrument approach aids are especially helpful during poor weather, they are often used by pilots conducting flight training and operating larger aircraft when visibility is good.

Instrument Approach Aids

Phillipsburg Municipal Airport has two published instrument approaches. A localizer performance with vertical guidance (LPV) via an area navigation (RNAV) global positioning system (GPS) instrument approach is available to each end of Runway 13-31. This approach has visibility minimums of not lower than one-mile for Categories A, B, and C aircraft, but is not available to Category D aircraft. These approaches are considered adequate for primary Runway 13-31 in both the existing and ultimate conditions. Crosswind turf Runway 3-21 is a visual runway and is planned to remain as such.

Visual Approach Aids

In most instances, the landing phase of any flight must be conducted in visual conditions. To provide pilots with visual guidance information during landings to the runway, electronic visual approach aids are commonly provided at airports. Both ends of primary Runway 13-31 are currently equipped with a two-box precision approach path indicator (PAPI-2) system. As more turbine aircraft begin to operate at the airport, consideration should be given to upgrading the PAPI-2 to a PAPI-4 (four-box system) on each runway end.

Runway end identification lights (REILs) are flashing lights located at the runway threshold end that facilitate rapid identification of the runway end at night and during poor visibility conditions. REILs provide pilots with the ability to identify the runway thresholds and distinguish the runway end lighting from the other lighting on the airport and in the approach areas. The FAA indicates that REILs should be considered for all lighted runway ends not planned for more sophisticated approach lighting systems. Both ends of primary Runway 13-31 are equipped with REILs, which should be maintained.

Crosswind turf Runway 3-21 is not equipped with any visual approach aids, which is considered sufficient for a turf runway.

Weather Reporting Aids

Phillipsburg Municipal Airport has a lighted wind cone and segmented circle, which are located near the intersection of Runway 13-31 and Runway 3-21. Wind cones provide information to pilots regarding wind speed and direction, while the segmented circle consists of a system of visual indicators designed to provide traffic pattern information to pilots. This equipment should be maintained but should be relocated outside the RVZ.

The airport is also equipped with an automated weather observation station (AWOS-3), which provides weather observations 24 hours per day. The system updates weather observations every minute, continuously reporting significant weather changes as they occur in real time. This information is transmitted via a designated radio frequency at regular intervals. FAA siting criteria indicate that the AWOS should be located between 1,000 and 3,000 feet from the runway threshold and between 500 to 1,000 feet perpendicular to the runway centerline. The AWOS at PHG generally meets these siting criteria and should be maintained in its existing location. The AWOS also has a 500-foot radius critical area, shown on **Exhibit 3B**, which must be kept free of obstructions that could interfere with its sensors.

AIRFIELD LIGHTING, MARKING, AND SIGNAGE

Several lighting and pavement marking aids serve pilots using the airport. These aids assist pilots in locating the airport and runway at night or in poor visibility conditions. They also serve aircraft navigating the airport environment on the ground when transitioning to/from aircraft parking areas to the runway.

Airport Identification Lighting

Phillipsburg Municipal Airport ’s rotating beacon is located on the north side of the airport property along the access road leading to the airport terminal building. The beacon should be maintained in its current location and upgraded with light-emitting diode (LED) lighting, as necessary.

Runway and Taxiway Lighting

Runway 13-31 is equipped with a medium intensity runway lighting (MIRL) system. This system is adequate and should be maintained. Turf Runway 3-21 is not equipped with any edge lighting; consideration should be given to the installation of reflectors or low intensity runway lighting (LIRL) to enhance visibility and safety.

The edges of taxiway and taxilane pavement are delineated by taxiway edge reflectors; medium intensity taxiway lighting (MITL) is available at runway-taxiway intersections. Planning should consider expansion of the MITL system if/when new taxiway pavement is constructed.

Airfield Signs

Airfield identification signs assist pilots in identifying their locations on the airfield and directing them to their desired locations. PHG is not equipped with airfield signage. Consideration should be given to adding lighted runway/taxiway designation and directional signage.

Pavement Markings

Runway markings are typically designed to the type of instrument approach available on the runway. FAA AC 150/5340-1K, *Standards for Airport Markings*, provides guidance necessary to design airport markings. Runway 13-31 is equipped with non-precision markings, which are sufficient through the planning period. Turf Runway 3-21 is identified by turf runway markers, which should be maintained if this runway remains in its current disposition.

A summary of the airside facility requirements at Phillipsburg Municipal Airport is presented on **Exhibit 3D**.

LANDSIDE FACILITY REQUIREMENTS

Landside facilities are those necessary for the handling of aircraft and passengers while on the ground. These facilities provide the essential interface between the air and ground transportation modes. The capacity of the various components of each element was examined in relation to projected demand to identify future landside facility needs. At Phillipsburg Municipal Airport, these include components for general aviation needs, such as the following:

- General aviation terminal facilities and auto parking
- Aircraft storage hangars
- Aircraft parking aprons
- Airport support facilities

Projections made for aircraft storage hangars, aircraft parking aprons, and marked parking positions are based on the number of aircraft currently based and forecasted to base on the airport property over the 20-year planning horizon. Terminal facilities, auto parking, and other airport support facilities are based on the annual number of operations projected to occur over the planning period.

In addition to landside facility requirements, potential non-aeronautical land uses will be evaluated in subsequent chapters. These are portions of airport property that are suitable for non-aviation purposes and can generate revenue for the airport, such as agriculture or industrial uses. While airport property is generally subject to Airport Improvement Program (AIP) grant assurances, an airport can request a release from aeronautical federal obligations for certain areas of property that are not necessary for aviation uses. These requests are facilitated under the *FAA Reauthorization Act of 2024*, Section 743, which governs the FAA's authority over non-aeronautical development.

TERMINAL BUILDING AND VEHICLE PARKING REQUIREMENTS

The terminal facilities provide space for a variety of activities and pilot services. Existing GA terminal services at PHG are provided from the 700-square-foot (sf) terminal building, which includes a pilots' lounge and restroom. The number of itinerant passengers expected to use terminal services during the design hour are taken into consideration to estimate terminal facility needs. These requirements are based on a range of designated square feet per design hour passenger (typically between 90 and 125 sf). For this study, a planning standard of 125 sf was used to estimate the space required. To determine the

	EXISTING Runway 13-31	ULTIMATE Runway 14-32	EXISTING Runway 3-21	ULTIMATE Runway 3-21
Runways				
Runway Design Code (RDC)	B-I-5000	B-II-5000	A-I(Small)-VIS	A-I(Small)-VIS
Dimensions	5,101' x 60'	5,101' x 75'	1,755' x 140'	Consider changes to ultimate disposition (surface type, dimensions, orientation)
Pavement Strength	12,500 lbs S	15,000 lbs D	N/A	N/A
Safety Areas				
Runway Safety Area (RSA)	Standard RSA	Maintain	RSA extends beyond airport property and should be acquired	Maintain standard RSA
Runway Object Free Area (ROFA)	Standard ROFA	Ultimate ROFA extends beyond airport property and should be acquired.	ROFA extends beyond airport property and should be acquired	Maintain standard ROFA
Runway Obstacle Free Zone (ROFZ)	Standard ROFZ	Maintain	ROFZ extends beyond airport property and should be acquired	Maintain standard ROFZ
Runway Protection Zone (RPZ)	3.1 acres uncontrolled (Runway 31); public road traverses RPZ	Consider mitigative actions	2.5 acres uncontrolled (Runway 3)	Consider mitigative actions
Taxiways				
Design Group	1A	2A	N/A	N/A
Taxiway	Connector taxiway and taxiway turnarounds	Consider a full-length parallel taxiway	N/A	N/A
Parallel Taxiway Separation from Runway	N/A	240' separation	N/A	N/A
Widths	35'-50'	Maintain	N/A	N/A
Holding Position Separation	200'	Maintain	N/A	N/A
Notable Conditions	Dual-use pavement; direct access	Consider mitigative actions	None	N/A
Navigational and Weather Aids				
Instrument Approaches	LPV GPS (13, 31)	Maintain	Visual only	Maintain
Navigation/Weather-Reporting Equipment	AWOS, wind cone, rotating beacon, and segmented circle	Maintain equipment; upgrade to LED as necessary		
Approach Aids	PAPI-2 & REILS on both runway ends	Consider upgrade to PAPI-4; maintain REILs	None	None
Lighting and Marking				
Runway Lighting	MIRL	Maintain	None	Install reflectors or LIRL
Runway Marking	Non-precision	Maintain	Turf markers	Maintain
Taxiway Lighting	Edge reflectors; MITL at intersections	MITL on new taxiways	N/A	N/A
Runway/Taxiway Signage	None	Install lighted signage	None	Maintain

KEY

AWOS - Automated Weather Observation Station
D - Dual Wheel Loading
GPS - Global Positioning System
LIRL - Low Intensity Runway Lighting
LPV - Localizer Performance with Vertical Guidance
MIRL - Medium Intensity Runway Lighting
MITL - Medium Intensity Taxiway Lighting
N/A - Not Applicable
PAPI - Precision Approach Path Indicator
RDC - Runway Design Code
REIL - Runway End Identification Lights
S - Single Wheel Loading

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number of design hour passengers, the number of itinerant design hour operations is multiplied by the number of passengers expected on the aircraft. Design hour itinerant operations have been estimated at 20 percent of the design day itinerant operations occurring at the airport. Because most of the aircraft operating at PHG allow for multiple passengers, a multiplier of 3.0 was established for the short term, growing to 4.0 by the long term. This is a reasonable multiplier, as the airport regularly accommodates itinerant operations by aircraft with seating capacities of four to 10 passengers – a trend that is expected to continue through the planning period.

Table 3H details current and projected terminal building requirements over the planning period. In terms of size, the existing terminal building is likely adequate to accommodate airport users through the long term, although it could become slightly constrained near the end of the planning period.

Vehicle parking spaces for airport users have also been evaluated. There are 10 marked parking spaces at the terminal building, including one accessible parking space. Parking space requirements were based on estimated existing and future itinerant traffic, as well as based aircraft at the airport. Although some based aircraft owners prefer to park their vehicles in their hangars, safety can be compromised when automobile and aircraft movements are intermixed. This master plan assumes 50 percent of based aircraft will require vehicle parking spaces. **Table 3H** details vehicle parking requirements for the airport. By the long term, 21 marked vehicle parking spaces are estimated to be needed to accommodate local and transient airport users.

TABLE 3H | General Aviation Terminal Area Facilities

	Currently Available	Short-Term Need	Intermediate-Term Need	Long-Term Need
Terminal Building (sf)	700	500	600	800
General Aviation Design Hour Passengers	–	4	5	6
Passenger Multiplier	–	3.0	3.5	4.0
Visitor/Tenant Vehicle Parking	10	15	16	21

Source: Coffman Associates analysis

AIRCRAFT HANGARS

Utilization of hangar space varies as a function of local climate, security, and owner preference. The trend in general aviation aircraft is toward more sophisticated (and consequently, more expensive) aircraft; therefore, many aircraft owners prefer enclosed hangar space, as opposed to outside tiedowns.

The demand for aircraft storage hangars is dependent on the number and type(s) of aircraft expected to be based at the airport in the future. For planning purposes, it is necessary to estimate hangar requirements based on forecasted operational activity; however, hangar development should be based on actual demand trends and financial investment conditions. While most aircraft owners prefer enclosed aircraft storage, some will still use outdoor tiedown spaces, usually due to lack of available hangar space, high hangar rental rates, or operational needs; therefore, enclosed hangar facilities do not necessarily need to be planned for each based aircraft.

Hangar types vary greatly in size and function. T-hangars, box hangars, and shade hangars are popular with aircraft owners who need to store individual private aircraft. These hangars often provide individual spaces within a larger structure or in standalone portable buildings. There is approximately 5,800 sf of

T-hangar storage space at the airport. PHG also has a two-unit linear box hangar, which encompasses an estimated 3,000 sf. For determining future aircraft storage needs, a planning standard of 1,200 sf per aircraft is utilized for these types of hangar.

Executive box hangars are open-space facilities with no interior supporting structure. These hangars can vary in size from 1,500 and 2,500 sf to nearly 10,000 sf. They are typically able to house single-engine, multi-engine, turboprop, and jet aircraft, as well as helicopters. Executive box hangar space at the airport is estimated at 19,200 sf. For future planning, standards of 3,000 sf per turboprop, 5,000 sf per jet, and 1,500 sf per helicopter are utilized for executive box hangars.

Conventional hangars are large open-space facilities with no supporting interior structure. These hangars provide for bulk aircraft storage and are often utilized by airport businesses, such as fixed base operators (FBOs) or aircraft maintenance operators. Conventional hangars are generally larger than executive box hangars and can range in size from 10,000 sf to more than 20,000 sf. Often, a portion of a conventional hangar is utilized for non-aircraft storage needs, such as maintenance or office space. There are no conventional hangars at PHG. For planning purposes, the aircraft sizing standards utilized for executive hangars are also utilized for conventional hangars.

Requirements for maintenance/service hangar area have also been calculated. There are currently no maintenance/service hangars at PHG. To determine ultimate service hangar needs, a planning standard of 250 sf per based aircraft has been calculated.

Ultimate hangar requirements for the airport are summarized in **Table 3J**. While most based aircraft owners prefer enclosed hangar space, it is assumed that some will use tiedowns on the apron. The analysis shows that future hangar requirements indicate a potential need for 18,300 sf of new hangar storage capacity through the long-term planning period, including a mixture of hangar types and space intended for aircraft maintenance. Due to the projected increase in based aircraft and annual general aviation operations, facility planning will consider additional hangars at the airport. It is expected that the aircraft storage hangar requirements will continue to be met through a combination of hangar types.

TABLE 3J | Aircraft Hangar Requirements

	Currently Available	Short-Term Need	Intermediate-Term Need	Long-Term Need	Difference
Total Based Aircraft	10	11	12	15	+5
T-Hangar/Linear Box Hangar Area (sf)	8,800	13,600	13,600	17,300	+8,500
Executive Box/Conventional Hangar Area (sf)	19,200	19,200	23,700	25,200	+6,000
Service Hangar Area (sf)	–	2,800	3,000	3,800	+3,800
Total Hangar Area (sf):	**28,000**	**35,600**	**40,300**	**46,300**	**+18,300**

Source: Coffman Associates analysis

It should be noted that hangar requirements are general in nature and are based on the aviation demand forecasts. The actual need for hangar space will further depend on the usage within the hangars. For example, some hangars may be utilized entirely for non-aircraft storage purposes, such as maintenance, but they have an aircraft storage capacity from a planning standpoint; therefore, the needs of an individual user may differ from the calculated space necessary.

AIRCRAFT PARKING APRONS

The aircraft parking apron is an expanse of paved area intended for aircraft parking and circulation. Typically, a main apron is centrally located near an airside entry point, such as the terminal building or FBO facility. Ideally, the main apron is large enough to accommodate transient airport users, as well as a portion of locally based aircraft. The apron layout at Phillipsburg Municipal Airport follows this typical pattern.

To determine future apron needs, the FAA-recommended planning criterion of 805 square yards (sy) was used for single- and multi-engine itinerant aircraft, while a planning criterion of 1,360 sy was used to determine the area for transient turboprop and jet aircraft. A parking apron should also provide space for locally based aircraft that require temporary tiedown storage. Locally based tiedowns will typically be utilized by smaller single-engine aircraft; thus, a planning standard of 230 sy per position was utilized.

The total apron parking requirements are presented in **Table 3K**. The existing apron pavement area at Phillipsburg Municipal Airport currently encompasses approximately 6,800 sy. Using the planning standards described above and factoring in assumptions regarding operational and based aircraft growth, there may be a need for additional apron space in the future, with approximately 7,300 sy anticipated to be needed by the long term.

TABLE 3K | Aircraft Parking Apron Requirements

	Available	Short Term	Intermediate Term	Long Term
Aircraft Parking Positions				
Based/Local GA Aircraft	–	1	1	1
Transient GA Aircraft	–	4	4	5
Jet Aircraft	–	1	1	2
Helicopter	–	1	1	2
Total Parking Positions:	**9**	**7**	**7**	**10**
Total Apron Area (sy):	**6,800**	**5,000**	**5,000**	**7,300**

Source: Coffman Associates analysis

Nine marked parking positions are currently available for fixed-wing aircraft. There is no helicopter parking. As shown in the table, this is adequate through the intermediate period; however, consideration should be given to the addition of jet and helicopter parking, as these aircraft are expected to operate at PHG more frequently in the future.

It should be noted that the configuration of the existing aircraft tiedowns in relation to the taxilane leading to the hangar area and the location of the self-serve fuel pumps can lead to congestion on the apron. **Exhibit 3E** depicts an example of this situation. The alternatives in the next chapter will consider modifications to improve circulation on the apron and ensure adequate wingtip clearance between parked and taxiing aircraft.

Exhibit 3E – Apron Circulation

SUPPORT FACILITIES

Aviation Fuel Storage

The airport's fuel storage tanks are located on the terminal apron. There is one aboveground 4,000-gallon tank for 100LL fuel and one 4,000-gallon tank for Jet A fuel. Based on historical fuel flowage records from the last four years, the airport pumped an average of 3,126 gallons of 100LL fuel and 2,122 gallons of Jet A fuel per year. Dividing the total fuel flowage by the total number of operations provides a ratio of fuel flowage per operation. Between 2020 and 2024, the airport pumped approximately 0.72 gallons of 100LL fuel per operation and 0.49 gallons of Jet A fuel per operation.

Maintaining a 14-day supply would allow the airport to limit the impact of a disruption of fuel delivery. Currently, the airport has enough fuel storage to meet the 14-day supply criteria for both 100LL fuel and Jet A fuel. Based on these usage assumptions and projected design day operations, no additional storage for either 100LL fuel or Jet A fuel is projected to be needed. **Table 3L** summarizes the forecasted fuel storage requirements through the planning period.

TABLE 3L | Fuel Storage Requirements

			PLANNING HORIZON		
	Capacity	Current Need	Short-Term	Intermediate-Term	Long-Term
100LL					
14-Day Supply (gal.)	4,000	142	162	172	192
Annual Usage (gal.)		3,700	4,200	4,500	5,000
Jet A					
14-Day Supply (gal.)	4,000	96	110	117	130
Annual Usage (gal.)		2,500	2,900	3,000	3,400

Sources: Historical fuel flowage data provided by airport staff; fuel supply projections prepared by Coffman Associates

Fuel storage requirements are typically based on keeping a two-week supply of fuel during an average month; however, more frequent deliveries can reduce the fuel storage capacity requirements. Generally, fuel tanks should be of adequate capacity to accept a full refueling tanker, which is approximately 8,000 gallons, while maintaining a reasonable level of fuel in the storage tank. Future aircraft demand experienced at the airport will determine the need for additional fuel storage capacity. It is important that airport personnel work with the city to plan for adequate levels of fuel storage capacity through the long-term planning period of this study. Planning should also consider an additional tank to store unleaded aviation fuel (100UL). The FAA has recently approved the use of 100UL fuel in piston-powered aircraft, although unknowns regarding infrastructure and distribution remain; nevertheless, the alternatives will include placeholders for these facilities.

Perimeter Fencing and Gates

Perimeter fencing is used at airports primarily to secure the aircraft operational area. The physical barrier of perimeter fencing provides the following functions:

- Gives notice of legal boundary of the outermost limits of the facility or security-sensitive areas
- Assists in controlling and screening authorized entries into a secured area by deterring entry elsewhere along the boundary

- Supports surveillance, detection, assessment, and other security functions by providing a zone for installing intrusion detection equipment and closed-circuit television (CCTV)
- Deters casual intruders from penetrating the aircraft operations areas on the airport
- Creates a psychological deterrent
- Demonstrates a corporate concern for facilities
- Limits inadvertent access to the aircraft operations area by wildlife

PHG is not enclosed by perimeter fencing. Consideration should be given to the installation of perimeter fencing to secure the airport from unauthorized/inadvertent entry.

A summary of the overall general aviation landside facilities is presented on **Exhibit 3F**.

SUMMARY

This chapter outlines the safety design standards and facilities required to meet potential aviation demand projected at Phillipsburg Municipal Airport for the next 20 years. In an effort to provide a more flexible master plan, the yearly forecasts from Chapter Two have been converted to planning horizon levels. The short term roughly corresponds to a five-year timeframe, the intermediate term is approximately 10 years, and the long term is 20 years. By utilizing planning horizons, airport management can focus on demand indicators for initiating projects and grant requests, rather than on specific dates in the future.

In Chapter Four, potential improvements to the airside and landside systems will be examined through a series of airport development alternatives. Most of the alternatives discussion will focus on the capital improvements that would be eligible for federal and state grant funds. Other projects of local concern will also be presented. Ultimately, an overall airport development plan that presents a vision beyond the 20-year scope of this master plan will be developed for Phillipsburg Municipal Airport.

	Available	Short Term	Intermediate Term	Long Term
Aircraft Storage Hangar Requirements				
T-hangar/Linear Box Hangar Area (sf)	8,800	13,600	13,600	17,300
Executive/Conventional Hangar Area (sf)	19,200	19,200	23,700	25,200
Service/Maintenance Area (sf)	-	2,800	3,000	3,800
Total Hangar Storage Area (sf)	28,000	35,600	40,300	46,300
Aircraft Parking Apron				
Aircraft Parking Positions	9	7	7	10
Total Public Apron Area (sy)	6,800	5,000	5,000	7,300
General Aviation Terminal Facilities and Parking				
Building Space (sf)	700	500	600	800
Terminal and Tenant Vehicle Parking	10	15	16	21
Fuel Storage				
100LL 14-Day Supply (gal)	4,000	162	172	192
Jet A 14-Day Supply (gal)	4,000	110	117	130

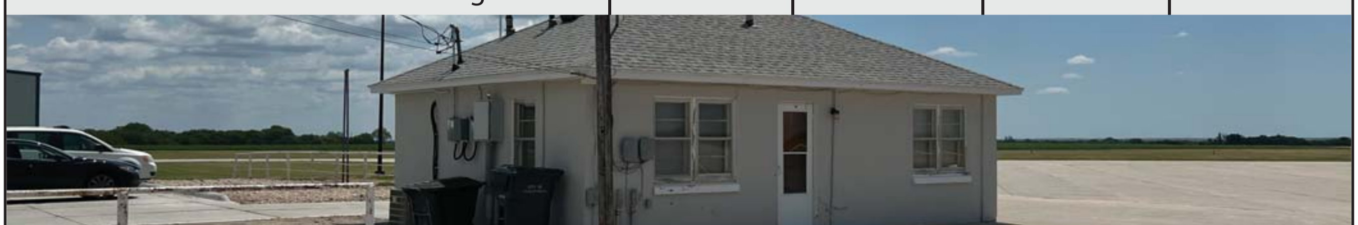

Exhibit 3F
LANDSIDE FACILITY REQUIREMENTS