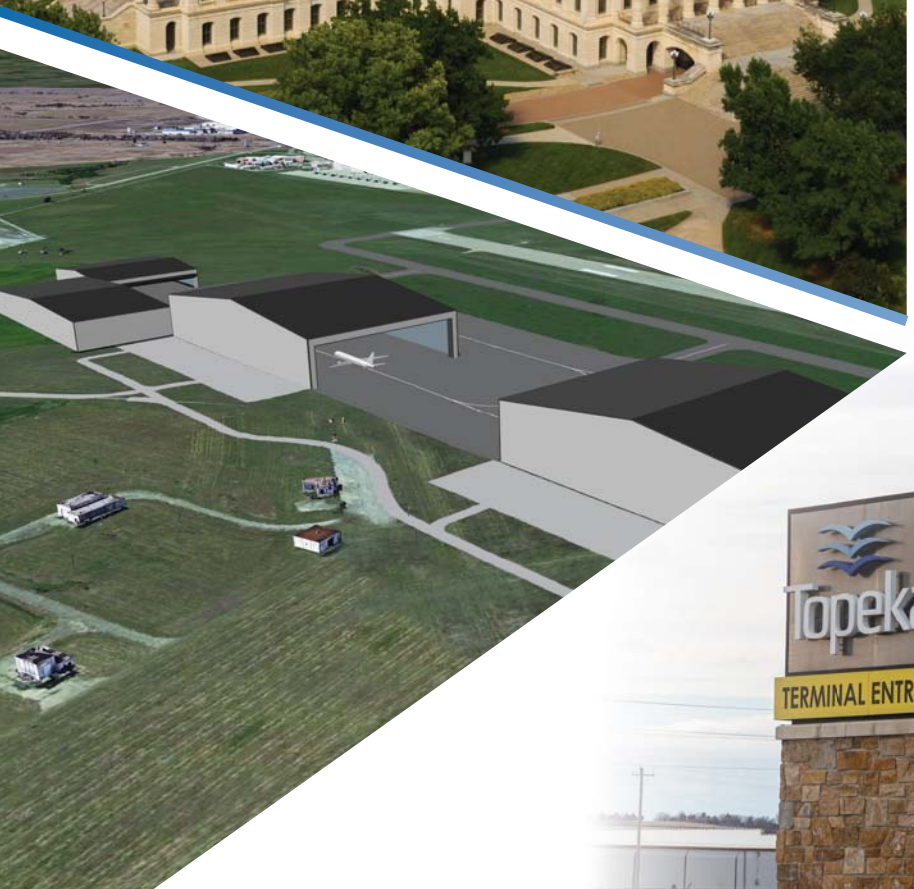
Topeka Regional

Focused Planning Study to Assess Maintenance, Repair, and Overhaul (MRO) Hangar Development Alternatives



FOCUSED PLANNING STUDY TO ASSESS MAINTENANCE, REPAIR, and OVERHAUL (MRO) HANGAR DEVELOPMENT ALTERNATIVES

Prepared for

TOPEKA REGIONAL AIRPORT (FOE)
Topeka, Kansas

Prepared by

DRAFT FINAL
December 2022

Topeka Regional

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MRO STUDY

INTRODUCTION

Topeka Regional Airport (FOE) is a vibrant aviation facility that serves a variety of aviation industry sectors for the state capital region. There is a significant general aviation presence with the airport home to approximately 18 based aircraft and a Million Air fixed-based-operator facility. The airport is home to two military units. At the north end of the airfield is the Kansas Air National Guard that actively operates KC-135 aircraft. At the south end of the airfield is the Kansas Army National Guard which operates the UH-60M Blackhawk helicopters. The airport is a primary location from which Fort Riley deploys troops around the world and brings them home. The troop movements are conducted using large transport aircraft including the Boeing 747, 757, 767, and 777.

The airport facilities include a 12,803-foot primary runway, one of the longest in the US, as well as crosswind Runway 3-21 which is 7,001 feet long. Taxiways support the runway surfaces and provide access to the landside components of the airport that are located on the west side of the property. The airport has more than two million square feet of apron space available for transient military, general aviation, and commercial/air taxi aircraft.

FOE is an important airport both regionally and nationally. It is classified as a regional general aviation airport in the Federal Aviation Administration's (FAA) *National Plan of Integrated Airports System* (NPIAS). The airport has had commercial passenger service in the recent past; however, it does not currently have commercial service. The airport experiences approximately 22,000 annual operations of which approximately 15,000 are military operations. The airport encompasses approximately 2,659 acres. The west side of the airport is fully developed, while the east and south sides are undeveloped. The north side is not available for development.

The Metropolitan Topeka Airport Authority (MTAA) seeks to analyze the feasibility of accommodating a future maintenance, repair, and overhaul (MRO) facility. This facility is intended for the conversion of large commercial aircraft to cargo aircraft. At a minimum the facility must be capable of accommodating two Boeing 777 aircraft. The goal of this study is to examine the feasibility for locating these new hangar and apron facilities at the south end of the airport. The south end of the airfield encompasses approximately 575 acres of land. A small portion of the land are used for firefighting training and there are several "bunkers" and other unmaintained structures that were constructed during 1950's.

PROJECT DEFINITION

The impetus of this study was the goal to capture projected growth of the MRO aviation market. This goal is one part of an overall plan to enhance the position of the State of Kansas as a leader in the aerospace industry. The *Kansas Framework for Growth*, published in February of 2021, lists several targeted sectors primed to drive economic growth within the state (see **Appendix A**). The five targeted sectors are:

- Advanced Manufacturing
- Aerospace
- Distribution, Transportation & E-Commerce
- Food & Agriculture
- Professional & Technical Services

The installation of new MRO hangars and ramp facilities at the south end of FOE would align with the aerospace sector of the strategic plan. **Exhibit A** illustrates the south airport area that is the subject of this study. The goal of the MTAA is to see this area developed into an area of vibrant aircraft MRO facilities.

This scope of this study was coordinated with FAA and MTAA. The following elements are included in the scope:

FORECAST

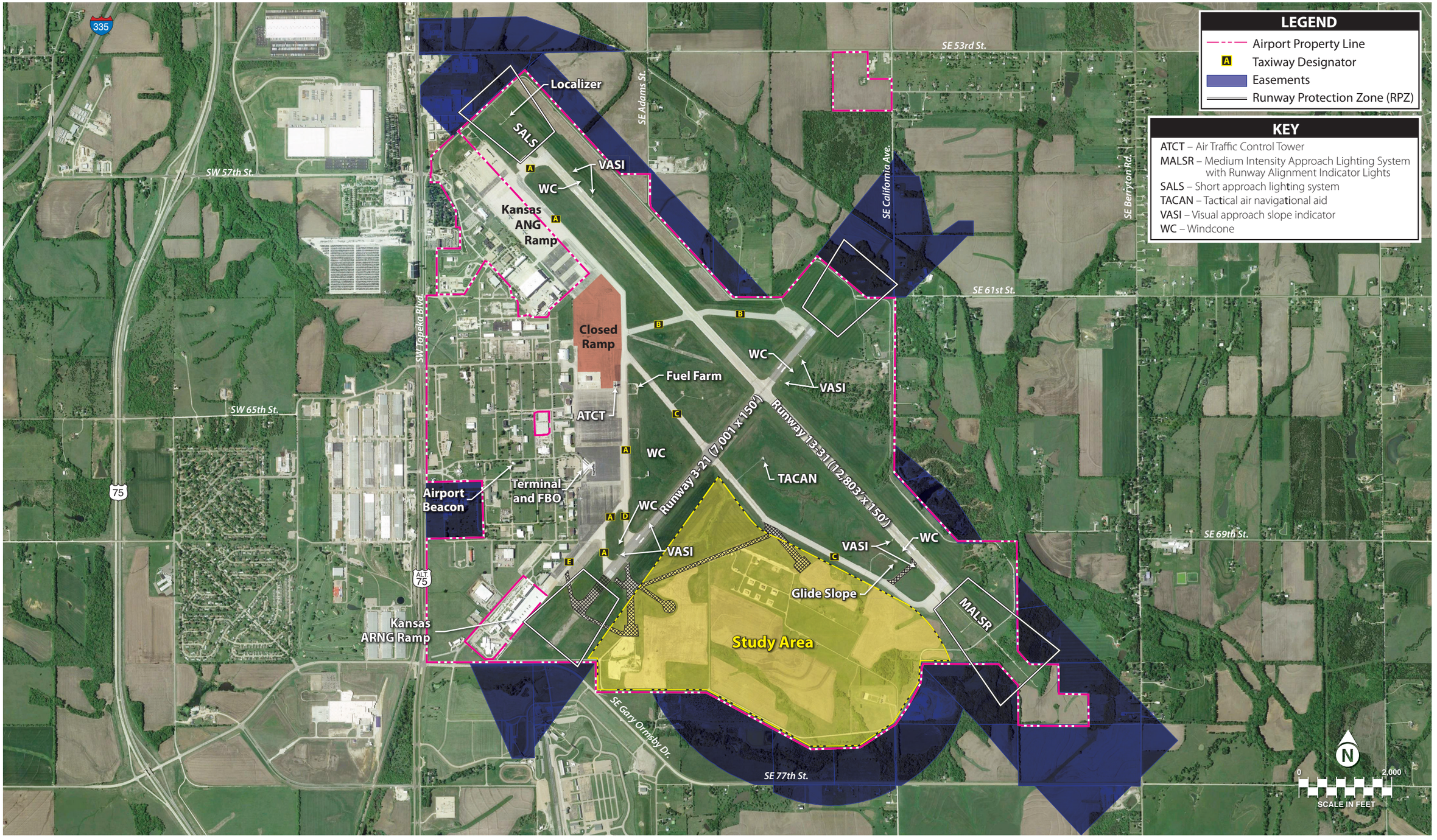
An operations forecast will be developed that includes activity levels that could be generated by a large MRO facility. The operations forecast will include general aviation, air taxi, and military activity, and it is meant to inform the development of noise contours. An operational fleet mix classified by aircraft type will be developed. Neither based aircraft nor potential scheduled commercial operations will be part of the forecast.

ALTERNATIVES DEVELOPMENT

Consultant will develop up to three MRO development alternatives on the selected site at the south end of the airport. This task will evaluate the alternatives in the context of meeting the MRO needs, separation and safety standards, and airspace clearances. FAA design standards as outlined in FAA AC 150/5300-13B will be used. The alternatives will be presented to the Sponsor, and a preferred alternative will be identified for further environmental analysis. The alternatives analysis will prioritize avoiding any existing structures (i.e., bunkers, buildings).

ENVIRONMENTAL ANALYSIS/NOISE CONTOURS

Utilizing the FAA Order 1050.1F environmental resource categories as the framework, the consultant will develop the preliminary environmental analysis scope with this effort. Utilize online environmental databases to inventory what might be affected and to help narrow down the scope of what might need to be coordinated with various resource agencies. This effort will cover the NEPA categories and will "flag" any of those categories that may be impacted by the preferred alternative. The alternatives developed in Task 2 will be coordinated with the SHPO by the Consultant. If SHPO determines that a cultural/architectural survey is needed, that will occur under a separate contract. Cultural/architectural and biological surveys are not included in this contract. The FAA has indicated that they will coordinate any necessary tribal consultation. Noise analysis will be conducted utilizing FAA's Area Equivalent Method.


LEGEND
Airport Property Line
A Taxiway Designator
Easements
Runway Protection Zone (RPZ)
KEY
ATCT – Air Traffic Control Tower
MALSR – Medium Intensity Approach Lighting System with Runway Alignment Indicator Lights
SALS – Short approach lighting system
TACAN – Tactical air navigational aid
VASI – Visual approach slope indicator
WC – Windcone
335
SW 57th St.
SW Topeka Blvd
SE Adams St.
SE 53rd St.
SE California Ave.
SE Berryton Rd.
SE 61st St.
SE 69th St.
SW 65th St.
75
ALT 75
SE Gary Ormsby Dr.
SE 77th St.
Localizer
SALS
VASI
WC
Kansas ANG Ramp
Closed Ramp
Fuel Farm
ATCT
WC
VASI
Runway 13-31 (12,803' x 150')
Runway 3-21 (7,001 x 150')
TACAN
Airport Beacon
Terminal and FBO
WC
VASI
VASI
WC
Glide Slope
MALSR
Kansas ARNG Ramp
Study Area
N
0
2,000
SCALE IN FEET

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UPDATE AIRPORT LAYOUT PLAN

Based upon guidance from the Sponsor, the ALP drawings will be updated to reflect the preferred alternative.

DELIVERABLES

A final narrative report with various exhibits will be drafted. The report will document the process, alternatives considered, the preferred alternative, and the environmental analysis. The report will support the updates to the ALP.

FORECAST BACKGROUND

The introduction of a large MRO facility may have an impact on overall activity at the airport. This element presents a 20-Year operational forecast for the airport. The operational forecast is then used to undertake an environmental analysis which includes new noise contours. The Federal Aviation Administration (FAA) has oversight responsibility to review and approve aviation forecasts developed in conjunction with airport planning studies. The FAA will review these forecasts and compare them to its *Terminal Area Forecasts* (TAF) and the *National Plan of Integrated Airport Systems* (NPIAS).

Aviation activity can be affected by many influences on the local, regional, and national levels, making it virtually impossible to predict year-to-year fluctuations of activity over 20 years with any certainty. Therefore, it is important to remember that forecasts are to serve only as guidelines, and planning must remain flexible enough to respond to a range of unforeseen developments.

The forecast analysis for Topeka Regional Airport was produced following FAA guidelines. Existing forecasts are examined and compared against current and historic activity. The historical aviation activity is then examined, along with other factors and trends that can affect demand. The intent is to provide an updated set of aviation demand projections for the airport that will permit airport management to make planning adjustments as necessary to maintain a viable, efficient, and cost-effective facility.

The forecast base year is 2022. The long-range forecast year is 2042.

The forecast for this study will utilize a base year of 2022 with a long-range forecast of 2042. These forecasts were developed in October of 2022, therefore a complete calendar year of operations for 2022 was not available. Therefore, the base year operations numbers are actual tower counts through August which is then supplemented with the actual counts from September-December 2021. The base year operations estimate is used for the following reasons:

- An effort to use the most recent data.
- Most airports have been experiencing a return to normal operational counts by late 2021 following the COVID-19 pandemic impacts from 2020 and early 2021.

PREVIOUS FORECASTS

It is proper to review forecasts previously developed for the airport. Two such forecasts are considered: the Terminal Area Forecast and the 2016 Airport Master Plan forecasts.

2022 Terminal Area Forecast (TAF)

On an annual basis, the FAA publishes the TAF for each airport included in the NPIAS. The TAF is a generalized forecast of airport activity used by the FAA for internal planning purposes. It is available to airports and consultants to use as a baseline projection and point of comparison while developing local forecasts. The TAF is typically published early in the year and is based on the federal fiscal year (October-September). **Table 1** shows the 2022 TAF for Topeka Regional Airport.

TABLE 1 | 2022 Terminal Area Forecast - Operations

Operation Type	2022	FORECAST		
		2027	2032	2042
ITINERANT OPERATIONS				
Air Carrier	126	213	213	213
Air Taxi	309	340	340	340
GA	6,218	6,218	6,218	6,218
Military	4,581	4,581	4,581	4,581
Subtotal	***11,234***	***11,352***	***11,352***	***11,352***
LOCAL OPERATIONS				
GA	2,653	2,693	2,693	2,693
Military	11,404	11,404	11,404	11,404
Subtotal	***14,057***	***14,097***	***14,097***	***14,097***
Total	**25,291**	**25,449**	**25,449**	**25,449**

As can be seen in the table, the TAF for FOE shows a flatline projection for operations for every year through 2042.

2016 Master Plan Forecasts

The airport completed a master plan in 2016. The base year of the forecast element in the master plan was 2015. Those forecasts were approved by the FAA on March 9, 2016. **Table 2** presents the operations forecast from the 2016 master plan.

TABLE 2 | 2016 Master Plan Operations Forecast

	Base Year	FORECAST		
	2015	2020	2025	2035
ANNUAL OPERATIONS				
Commercial Operations (Itinerant)				
Air Carrier (Charter with >59 seats)	200	200	210	230
Air Taxi/Commuter (Charter <60 seats)	64	70	90	120
Total Commercial Operations	*264*	*270*	*300*	*350*
Other Air Taxi	*398*	*430*	*510*	*680*
General Aviation Operations				
Itinerant	5,749	5,900	6,100	6,900
Local	971	1,000	1,050	1,200
Total General Aviation Operations	*6,720*	*6,900*	*7,150*	*8,100*
Military Operations				
Military Itinerant	8,186	11,200	11,200	11,200
Military Local	10,421	8,200	8,200	8,200
Total Military Operations	*18,607*	*19,400*	*19,400*	*19,400*
Total Operations				
Total Local Operations	*11,392*	*9,200*	*9,250*	*9,400*
Total Itinerant Operations	*14,597*	*17,800*	*18,110*	*19,130*
Total Annual Operations	**25,989**	**27,000**	**27,360**	**28,530**
PEAKING CHARACTERISTICS				
Peak Month	2,842	2,906	2,945	3,071
Busy Day	191	196	198	207
Design Day	93	95	96	100
Design Hour	18	18	18	19
ANNUAL INSTRUMENT APPROACHES	**292**	**356**	**362**	**383**

Source: 2016 FOE Master Plan - Coffman Associates

SOCIOECONOMIC TRENDS

The socioeconomic conditions provide an important baseline for preparing aviation demand forecasts. Local socioeconomic variables, such as population, employment, and income, are indicators for understanding the dynamics of the community and can relate to local trends in aviation activity. Analysis of the demographics of the airport service area (generally Shawnee County) will give a more comprehensive understanding of the socio-economic situations affecting the region which supports the airport.

Table 3 summarizes historical and forecast estimates for population, employment, and income for Shawnee County. Over the next 20 years, the population is projected to add approximately 7,000 people. This equates to an average annual growth rate of 0.18 percent. Employment is projected to grow at 0.36 percent annually, and income is projected to grow at 1.35 percent annually.

Table 3 | Socioeconomic History and Forecasts

	HISTORY				FORECAST			
	2010	2020	2022*	CAGR 2010-2022	2027	2032	2042	CAGR 2022-2042
SHAWNEE COUNTY								
Population	178,365	178,608	178,838	0.02%	181,333	183,275	185,281	0.18%
Employment	118,391	116,622	121,576	0.22%	125,629	127,943	130,677	0.36%
Income (PCPI)	$39,284	$45,374	$45,660	1.26%	$49,077	$52,552	$59,659	1.35%

CAGR: Compound average annual growth rate
PCPI: Per capita personal income ($2009)
*2022 is an estimate.

Sources: U.S. Census Bureau; Woods & Poole Economics - 2022.

NATIONAL TRENDS

Each year, the FAA updates and publishes a national aviation forecast. Included in this publication are forecasts for the large air carriers, regional/commuter air carriers, general aviation, and FAA workload measures. The forecasts are prepared to meet the budget and planning needs of the FAA and to provide information that can be used by state and local authorities, the aviation industry, and the public. The current edition upon preparation of this master plan was *FAA Aerospace Forecast – Fiscal Years 2021-2041*, published in early 2021. The FAA primarily uses the economic performance of the United States as an indicator of future aviation industry growth. Similar economic analyses are applied to the outlook for aviation growth in international markets. The following discussion is summarized from the *FAA Aerospace Forecast*.

Since its deregulation in 1978, the U.S. commercial air carrier industry has been characterized by boom-to-bust cycles. The volatility that was associated with these cycles was thought by many to be a structural feature of an industry that was capital intensive but cash poor. However, the great recession of 2007-09 marked a fundamental change in the operations and finances of U.S. airlines. Since the end of the recession in 2009, U.S. airlines have revamped their business models to minimize losses by lowering operating costs, eliminating unprofitable routes, and grounding older, less fuel-efficient aircraft. To increase operating revenues, carriers initiated new services that customers were willing to purchase and started charging separately for services that were historically bundled in the price of a ticket. The industry experienced an unprecedented period of consolidation with three major mergers in five years. The results of these efforts have been impressive: 2019 marked the eleventh consecutive year of profitability for the U.S. airline industry. Prior to the COVID-19 pandemic, there was confidence that U.S. airlines had finally transformed from a capital intensive, highly cyclical industry to an industry that generates solid returns on capital and sustained profits.

The biggest factor affecting aviation trends recently was the COVID-19 pandemic. The effect of the pandemic on the aviation industry has been most devastating to the commercial airline operators with segments of the general aviation industry, such as charters, air taxi, and fractional operators, appearing to maintain pre-pandemic levels and, in many cases, showing increases as people sought alternatives to flying commercially. At this point, uncertainty persists on what the long-term impacts of the pandemic will be on the aviation industry.

Economic Environment

Fundamentally, aviation demand is driven by economic activity. According to the FAA forecast, the COVID-19 pandemic caused a 3.5 percent decline in U.S. gross domestic product (GDP). This was accompanied by a 44.2 percent decrease in passenger enplanements, resulting in a combined operating loss of $32.1 billion dollars for all passenger carriers. General aviation aircraft deliveries fell by 12.4 percent in 2020, general aviation activity fell by 8.9 percent, and the total number of operations at airports with control towers decreased by 16.7 percent compared to 2019. Oil prices are forecasted to rise gradually after 2021, reaching $94 per barrel by 2041, while domestic GDP is projected to grow 2.4 percent annually through the 20-year planning period.

Despite the largest decline in aviation activity since the jet era began in the late 1950s, the aviation industry has already shown signs of recovery from the COVID-19 pandemic. As of this writing (October 2022), daily airline passenger enplanements (as measured by TSA screening counts) consistently measure more than double the amount from same-day 2020 numbers, and passenger counts are close to surpassing 2019 levels. General aviation activity appears to have recovered and is exceeding 2019 levels currently.

Table 4 summarizes the national FAA operations forecasts by operational category. Air carrier operations (seating capacity greater than 60) are expected to increase by 3.79 percent over the next 20-years. Air taxi operations (commuter aircraft with less than 60 seats, cargo, air ambulance, fractionals, and any other for-hire operations) are projected to increase 1.19 percent annually. General aviation is projected to increase 0.56 percent annually. In the FAA forecast, military operations are flatlined because the mission of the military can change quickly. Therefore, the military operations are a general estimate and a place holder for actual operations.

TABLE 4 | FAA National Operations Forecasts (in thousands)

Fiscal Year	Air Carrier	Air Taxi	GA Itinerant	GA Local	Military Itinerant	Military Local	Total
2015	13,755	7,895	13,887	11,691	1,292	1,203	49,724
2016	14,417	7,580	13,905	11,633	1,317	1,145	49,997
2017	15,047	7,180	13,839	11,732	1,326	1,200	50,325
2018	15,686	7,126	14,130	12,354	1,319	1,155	51,770
2019	16,192	7,234	14,245	13,109	1,349	1,134	53,264
2020	11,737	5,472	12,608	12,333	1,192	1,020	44,362
2021	11,219	5,013	13,199	12,744	1,192	1,020	44,388
2022*	12,674	5,015	14,061	13,111	1,192	1,020	47,073
FORECAST							
2027	19,626	5,401	15,177	13,680	1,192	1,020	56,097
2032	21,780	5,708	15,373	13,927	1,192	1,020	59,000
2042	26,646	6,359	15,877	14,481	1,192	1,020	65,574
CAGR 2022-2042	**3.79%**	**1.19%**	**0.61%**	**0.50%**	**0.00%**	**0.00%**	**1.67%**

Source: FAA Aerospace Forecasts 2021-2041

FORECASTING APPROACH

The development of aviation forecasts proceeds through both analytical and judgmental processes. A series of mathematical relationships is tested to establish statistical logic and rationale for projected growth. However, the judgment of the forecast analyst, based upon professional experience, knowledge of the aviation industry, and assessment of the local situation, is important in the final determination of the preferred forecast. The most reliable approach to estimating aviation demand is through the utilization of more than one analytical technique. Methodologies frequently considered include trend line/time-series projections, correlation/regression analysis, and market share analysis. Those methodologies that are employed in developing forecasts are each described below.

A wide range of factors is known to influence the aviation industry and can have significant impacts on the extent and nature of aviation activity in both the local and national markets. Historically, the nature and trend of the national economy has had a direct impact on the level of aviation activity. Recessionary periods have been closely followed by declines in aviation activity. Nonetheless, over time, trends emerge and provide the basis for airport planning.

This study requires the following forecast elements:

- Total Operations
- Operations by category (air carrier, air taxi, general aviation, military)
- Peak operations characteristics
- Operations fleet mix (by category)

OPERATIONS FORECASTS

Table 5 shows the historical operations at FOE. These operational counts were sourced from the control tower and downloaded from the FAA's Operational Network (OPSNET). As noted, the 2022 operations are from September 2021 through August 2022, thus representing the most recent 12 months of operational data.

General aviation operations include a wide range of activity from recreational use to business and corporate uses. Military operations include those operations conducted by various branches of the U.S. military. Air taxi operations are those conducted by aircraft operating under FAR Part 135, otherwise known as "for-hire" or "on-demand" activity. Air taxi operations typically include commuter, air cargo, air ambulance, and many fractional ownership operations.

Aircraft operations are further classified as local and itinerant. A local operation is a takeoff or landing performed by an aircraft that operates within sight of an airport, or which executes simulated approaches or touch-and-go operations at an airport. Generally, local operations are characterized by training activity. Itinerant operations are those performed by aircraft with a specific origin or destination away from an airport. Typically, itinerant operations increase with business and commercial use since business aircraft are used primarily to transport passengers from one location to another.

TABLE 5 | Historical Operations

	GENERAL AVIATION			Air Carrier	Air Taxi	MILITARY			Grand Total
	Itinerant	Local	Total			Itinerant	Local	Total	
2012	4,648	690	5,338	191	415	9,751	7,709	17,460	23,404
2013	4,668	1,052	5,720	253	326	9,468	7,812	17,280	23,579
2014	4,555	1,042	5,597	212	1,104	8,509	7,751	16,260	23,173
2015	5,749	971	6,720	200	462	8,186	10,421	18,607	25,989
2016	4,944	899	5,843	222	553	7,104	7,874	14,978	21,596
2017	4,367	667	5,034	173	308	3,892	2,790	6,682	12,197
2018	3,732	422	4,154	130	417	2,609	2,192	4,801	9,502
2019	4,209	692	4,901	252	330	5,296	6,098	11,394	16,877
2020	4,753	1,489	6,242	86	271	5,086	8,144	13,230	19,829
2021	5,994	2,621	8,615	111	349	4,477	11,427	15,904	24,979
2022*	5,257	1,669	6,926	250	483	5,064	8,657	13,721	21,380

*Sept. 2021 thru Aug. 2022

Source: FAA OPSNET database of control tower operations counts.

The following sections present the operations forecasts by type. Once a forecast of general aviation operations has been selected, they will be combined with air taxi and military operations to provide a total operations forecast for use in determining facility requirements for the airport. Several methods for determining general aviation operations have been employed to develop a reasonable planning envelope.

General Aviation Operations Forecast

A common method of forecasting is to compare known historical data to the FAA national forecasts. **Table 6** presents two market share forecasts of national general aviation operations. As can be seen in the table, in 2022, general aviation operations at the airport represented 0.0255 percent of national general aviation operations. By maintaining this ratio as a constant and extending it to the future years of this study, a forecast emerges. By the long-term planning year of 2040, this forecast results in 7,680 general aviation operations.

A second market share forecast is also presented; however, this one considers the airport capturing an increasing market share of national general aviation operations. In this scenario, the long-term general aviation forecast results in 10,847 operations.

TABLE 6 | General Aviation Operations - Market Share Forecasts

Year	FOE GA Operations	U.S. GA Operations	FOE Market Share
2012	5,338	26,129,962	0.0204%
2013	5,720	25,805,725	0.0222%
2014	5,597	25,654,033	0.0218%
2015	6,720	25,578,541	0.0263%
2016	5,843	25,537,816	0.0229%
2017	5,034	25,571,475	0.0197%
2018	4,154	26,484,509	0.0157%
2019	4,901	27,354,002	0.0179%
2020	6,242	24,940,880	0.0250%
2021	8,615	25,942,797	0.0332%
2022*	6,926	27,172,041	0.0255%
Constant Market Share of National GA Operations (CAGR = 0.52%)			
2027	7,356	28,857,124	0.0255%
2032	7,468	29,299,755	0.0255%
2042	7,680	30,130,687	0.0255%
Increasing Market Share of National GA Operations (CAGR = 2.55%)			
2027	8,657	28,857,124	0.0300%
2032	9,669	29,299,755	0.0330%
2042	10,847	30,130,687	0.0360%
*Sept 2021-Aug 2022			

A third general aviation operations forecast is also presented in **Table 7**. This forecast applies the growth rate (0.08%) of the statewide TAF to the 2022 general aviation operations for the airport and projects that into the plan years. This results in modest growth for the airport.

TABLE 7 | General Aviation Operations Statewide TAF Growth Rate Forecast

Year	FOE GA Operations
2022*	6,926
Statewide TAF Growth Rate (CAGR = 0.08%)	
2027	6,954
2032	6,982
2042	7,043
*Sept 2021-Aug 2022	

General aviation operations have remained fairly consistent for more than a decade, though there have been fluctuations from year to year. The increasing market share of national operations is considered to be a high range forecast. In fact, FOE has not seen this level in the last 10 years or more. Applying the statewide TAF growth rate to FOE results in modest growth and is a reasonable forecast to be considered. The constant market share of national general aviation operations forecast is also reasonable and is reflective of the operations level over the last 10 years. In any individual year, general aviation operations may exceed this forecast. For this planning study this is the preferred forecast and will be carried forward to support further analysis.

Over the last 10 years, itinerant general aviation operations have represented approximately 80 percent of general aviation operations while local general aviation has been approximately 20 percent. **Exhibit B** graphically shows the general aviation operations forecast.

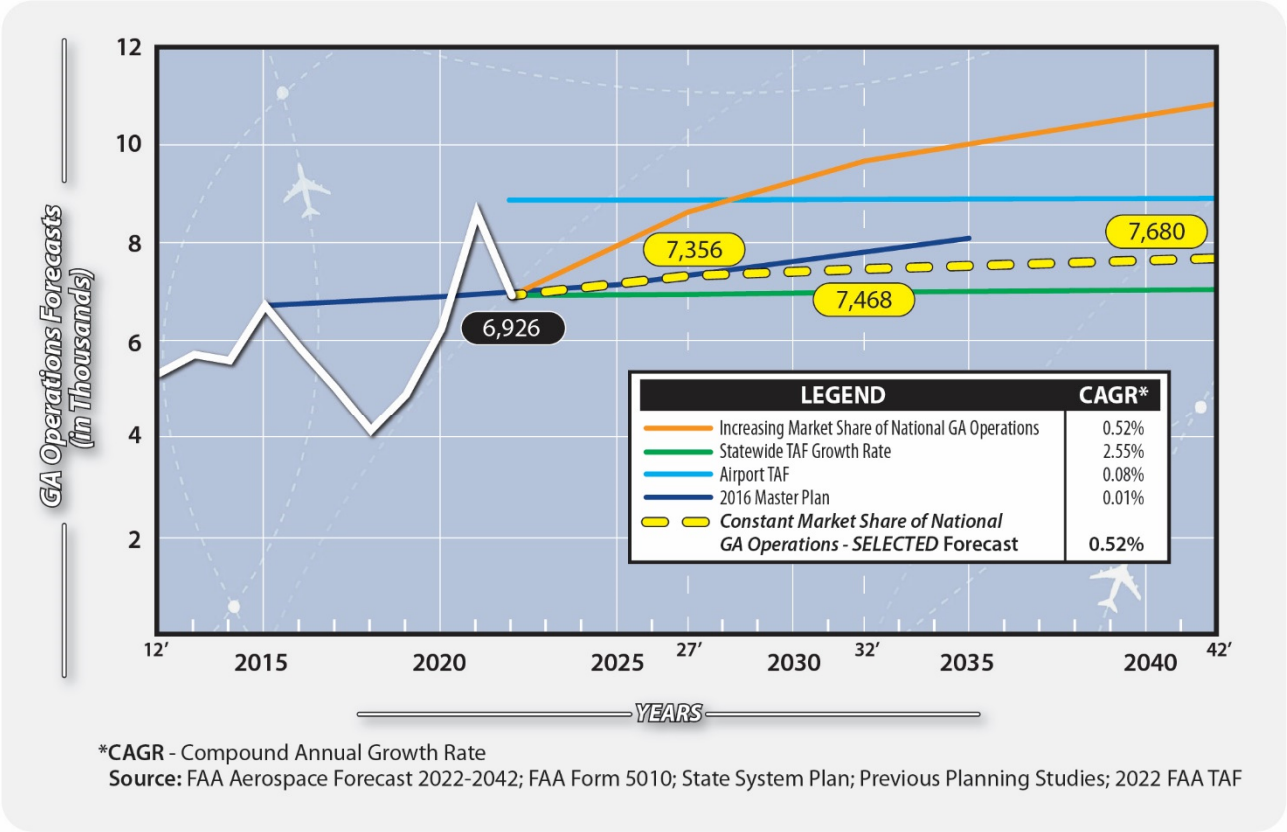

Exhibit B: General aviation operations forecast

Air Carrier Operations Forecasts.

Air carrier operations have been very consistent over the years. The air carrier operations are primarily conducted by the troop transport aircraft. **Table 8** shows a forecast that is based on the historical growth rate since 2016. All air carrier operations are considered itinerant in nature.

Exhibit C graphically presents the air carrier operations forecast.

TABLE 8 | Air Carrier Operations Forecast

Year	FOE Air Taxi Operations
2016	222
2017	173
2018	130
2019	252
2020	86
2021	111
2022*	250
CAGR	1.71%
Historical Growth Rate (CAGR = 1.71%)	
2027	272
2032	296
2042	351

CAGR: Compound average annual growth rate
*Sept 2021-Aug 2022

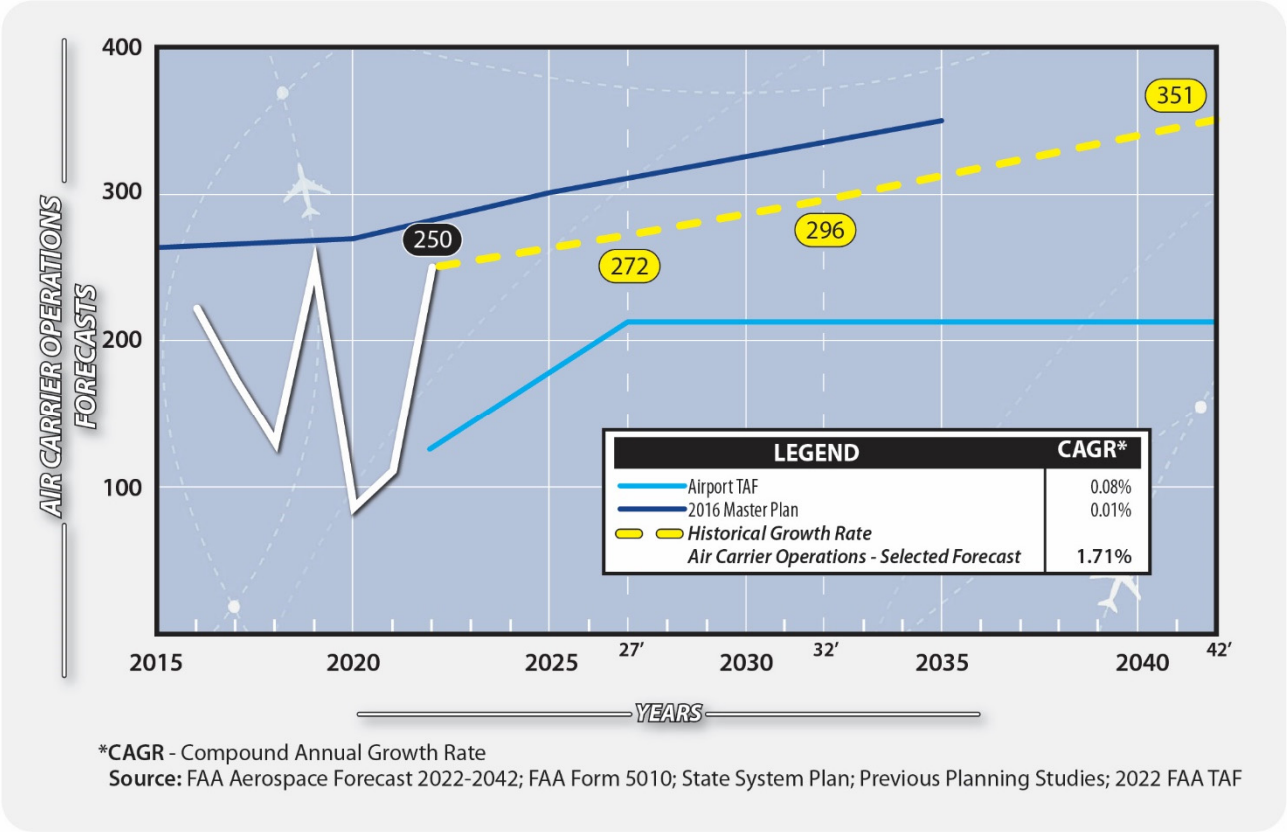

Exhibit C: Air carrier operations forecast

Air Taxi Operations Forecast

Air taxi operations are those operating under Part 135 in a commercial (for-hire) capacity. This may include commuter operations with less than 60 seats, air cargo, air ambulance, and certain fractional ownership operations. The FAA also provides a forecast for air taxi operations nationally. **Table 9** presents two forecasts related to the national air taxi forecast. The first considers the airport maintaining a constant share of national air taxi operations. This results 612 air taxi operations by 2042 and an annual growth rate of 1.19 percent. The second air taxi market share forecast considers an increasing share of national air taxi operations, which is reflective of the trend over the last three years. This results in 827 air taxi operations by 2042 and an annual growth rate of 2.27 percent.

TABLE 9 | Air Taxi Operations Forecast

Year	FOE Air Taxi Operations	U.S. Air Taxi Operations	FOE Market Share
2016	553	7,580,119	0.0073%
2017	308	7,179,651	0.0043%
2018	417	7,125,556	0.0059%
2019	330	7,234,239	0.0046%
2020	271	5,471,641	0.0050%
2021	349	5,013,415	0.0070%
2022*	483	5,014,824	0.0096%
Constant Market Share of National Air Taxi Operations (CAGR = 1.19%)			
2027	520	5,401,488	0.0096%
2032	550	5,707,729	0.0096%
2042	612	6,359,000	0.0096%
Increasing Market Share of National Air Taxi Operations (CAGR = 2.27%) – Selected Forecast			
2027	540	5,401,488	0.0100%
2032	628	5,707,729	0.0110%
2042	827	6,359,000	0.0130%
Statewide TAF Air Taxi Growth Rate (CAGR = 0.50%)			
2027	495	5,401,488	0.0092%
2032	508	5,707,729	0.0089%
2042	534	6,359,000	0.0084%

CAGR: Compound average annual growth rate
*Sept 2021-Aug 2022

The table also includes a forecast in which the projected growth rate of the statewide TAF (0.5 percent) is applied to the air taxi operations base year of 2022. By then projecting into future plan years, an air taxi forecast emerges in which there are projected to be 534 operations by 2042.

The preferred forecast for air taxi operations is the increasing market share of national operations. This forecast is selected because it is anticipated that the MRO business will impact for-hire operations at the airport. While the projected growth in air taxi operations is modest, it does capture the potential increase. **Exhibit D** graphically presents the air taxi operations forecast.

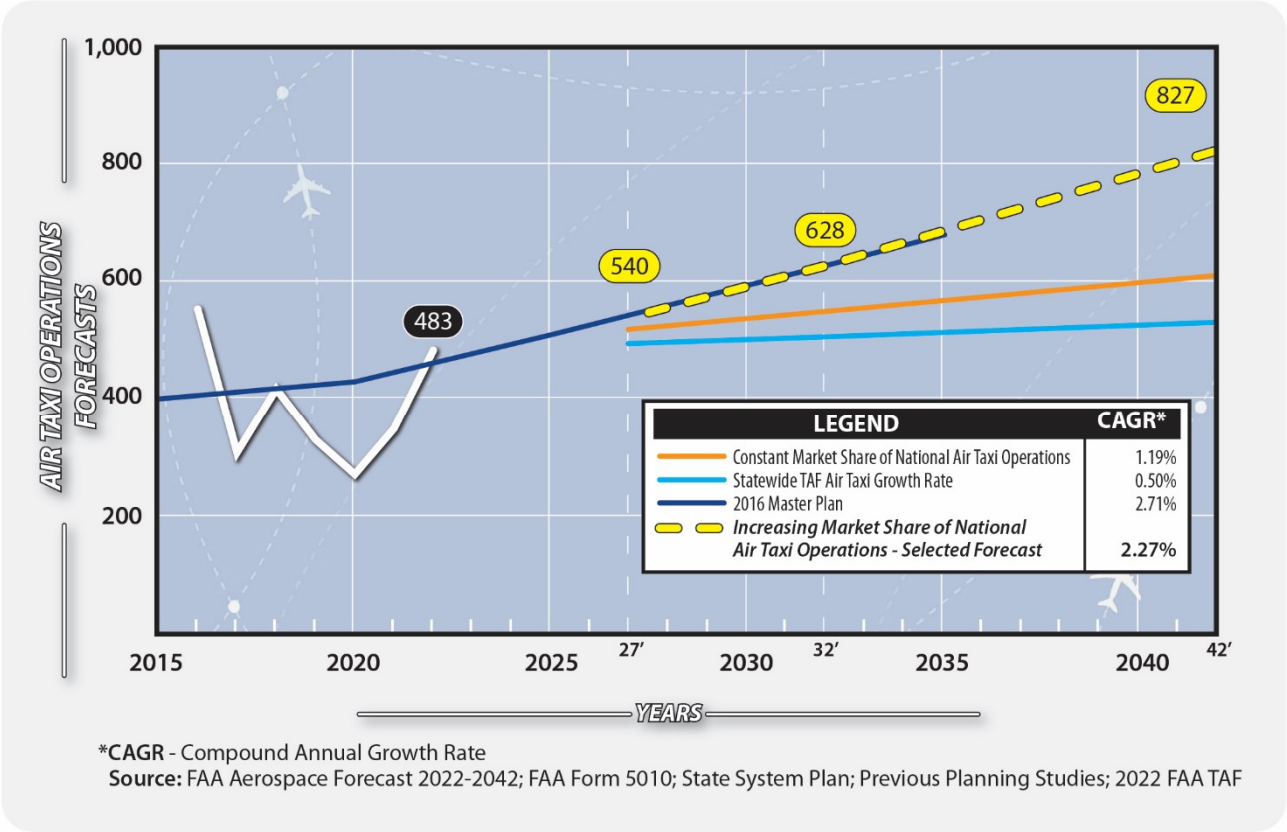

Exhibit D: Air taxi operations forecast

Military Operations Forecast

Military operations are a significant portion of activity at the airport because of the presence of both the Kansas Air National Guard (KC-135 aircraft) and the Kansas Army National Guard (Blackhawk Helicopters) on the airfield. Military operations represented 64 percent of total operations in 2022. Forecasting military operations is inherently challenging because the nature of the military mission can change on short notice. As a result, the FAA does not project military operations in the TAF or in the national forecasts. Instead, a flatline projection is considered to account for the military operations. At FOE, every year over the 20-year planning period is projected at 11,404 local military operations and 4,581 itinerant military operations.

OPERATIONS FORECAST SUMMARY

Table 10 presents a summary of the operations forecast for FOE for the plan years of 2027, 2032, and 2042. Total operations are projected to increase over time with an average annual growth rate of 1.36 percent. The base year for operations is the most recent 12 months that includes September 2021 through August 2022 and is 21,380. By 2042, operations are projected to increase to 28,010.

TABLE 10 | Total Operations Forecast Summary

Year	GENERAL AVIATION			Commercial	Air Taxi	MILITARY			Grand Total
	Itinerant	Local	Total			Itinerant	Local	Total	
2016	4,944	899	5,843	222	553	7,104	7,874	14,978	21,596
2017	4,367	667	5,034	173	308	3,892	2,790	6,682	12,197
2018	3,732	422	4,154	130	417	2,609	2,192	4,801	9,502
2019	4,209	692	4,901	252	330	5,296	6,098	11,394	16,877
2020	4,753	1,489	6,242	86	271	5,086	8,144	13,230	19,829
2021	5,994	2,621	8,615	111	349	4,477	11,427	15,904	24,979
2022	5,257	1,669	6,926	250	483	5,064	8,657	13,721	21,380
OPERATIONS FORECAST									
2027	6,926	1,731	8,657	272	540	4,581	11,404	15,985	25,454
2032	7,735	1,934	9,669	296	628	4,581	11,404	15,985	26,578
2042	8,678	2,169	10,847	351	827	4,581	11,404	15,985	28,010

Exhibit E graphically presents the combined total operations forecast.

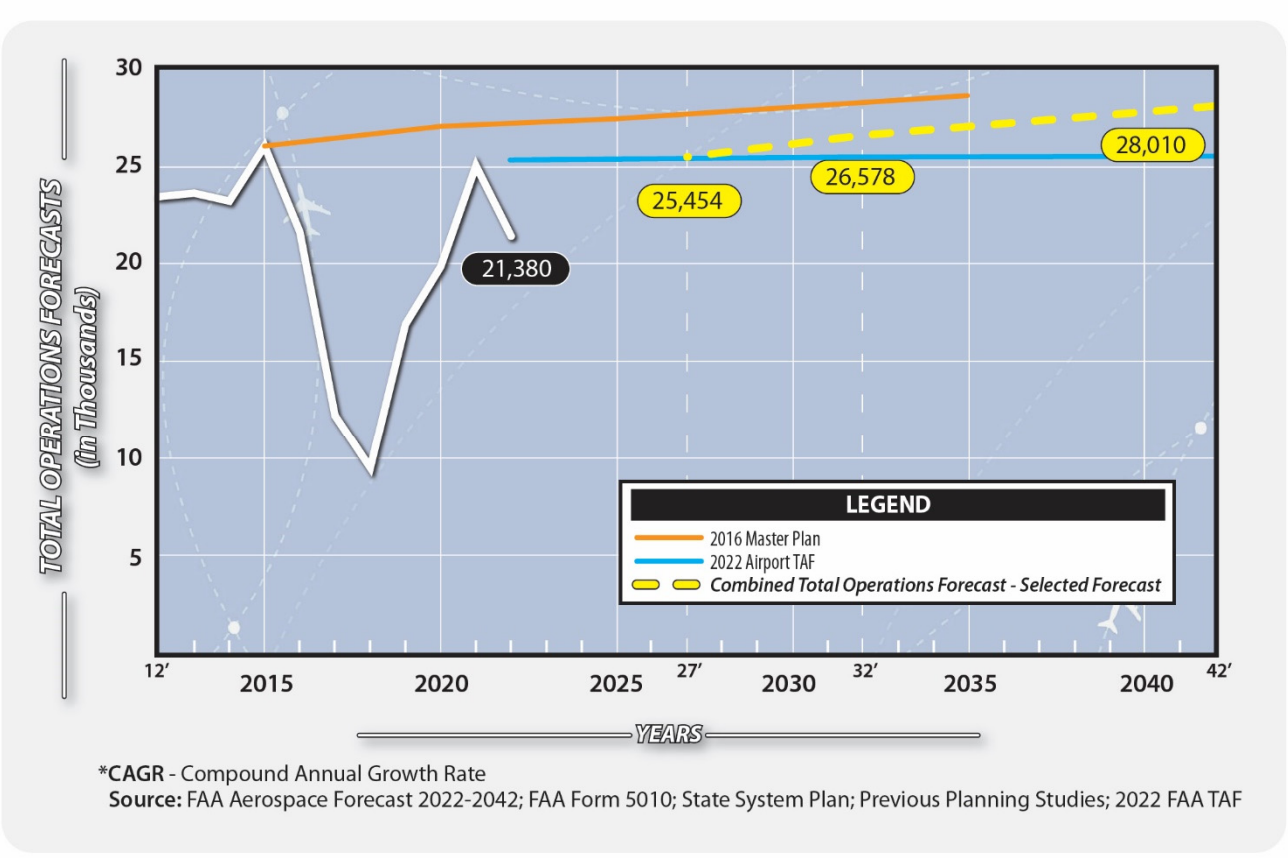

Exhibit E: Combined total operations forecast

COMPARISON TO THE TAF

When reviewing airport forecasts, FAA typically compares them to the TAF for consistency. To be consistent with the TAF, the forecasts should differ by 10 percent or less in the first five years and 15 percent or less in the 10-year timeframe. In addition, the forecasts should not affect the timing of a project or the role of the airport. Where these criteria are not met, additional review with the local FAA office or FAA headquarters may be necessary.

Table 11 presents a comparison of the forecasts for this study with the FAA TAF for total operations. The percent difference is the absolute value of the difference between the two numbers divided by the average of the two numbers. For operations, the forecast is consistent the TAF.

TABLE 11 | Forecast Comparison to the Terminal Area Forecast (TAF)

	BASE YEAR	FORECAST			CAGR
	2022	2027	2032	2042	2022-2042
Total Operations					
Study Forecast	21,380	25,454	26,578	28,010	1.36%
2022 FAA TAF[1]	25,291	25,449	25,449	25,449	0.03%
% Difference	16.8%	0.0%	4.3%	9.6%	
CAGR: Average annual growth rate					

[1]*Source: Terminal Area Forecast (published March 2022)*

PEAKING CHARACTERISTICS

Many airport facility needs are related to the level of activity during peak periods for both operations. The peak periods utilized in airport planning are as follows:

- **Peak Month –** The calendar month when peak activity occurs.
- **Design Day –** The average day in the peak month.
- **Design Hour –** The peak hour within the design day.

The peak month is an absolute peak within the year, which in this case is July 2022 when there were 2,311 operations. Each of the other periods will be exceeded at various times during the year. However, each provides reasonable planning standards that can be applied without overbuilding or being too restrictive.

A review of tower records shows that the peak month for operations has averaged 10.08 percent of total annual operations. This factor is carried to the plan years. The design day is simply the peak month divided by the number of days in that month. Most often, the peak month is a month with 31 days, therefore dividing the peak month by 31 results in the design day operational level. The design hour is an average of the peak hour of the peak day of each week in the peak month which is 19.05 percent of design day operations. **Table 12** presents the peaking characteristics for FOE.

TABLE 12 | Peaking Characteristics

	2022	2027	2032	2042
Annual Operations	**21,380**	**25,454**	**26,578**	**28,010**
Peak Month	2,311	2,749	2,870	3,025
Design Day	75	89	93	98
Design Hour	14	17	18	19

Source: Coffman Associates analysis of ATCT data.

OPERATIONAL FLEET MIX

The operational fleet mix provides a general understanding of the type of aircraft operating at the airport. The airport traffic control tower (ATCT) counts individual operations by type (air carrier, air taxi, general aviation and military) and by nature (local or itinerant). The ATCT does not classify operations by engine type or distinguish between fixed wing and helicopter. However, certain environmental analyses, such as noise contours) require this information.

As a result, other sources of information are analyzed to arrive at an understanding of the of a reasonable estimate of the operations fleet mix. The primary sources of operational data used are:

OPSNET: FAA database of operations at the airport as counted by ATCT (reference Table 5). This data is classified by either local or itinerant and further by air carrier, air taxi, general aviation, and military. This data provides certain parameters for estimating the operational fleet mix. For example, the OPSNET data shows the split between local and itinerant operations, and it gives us an understanding of how many air carrier, air taxi, general aviation, and military operations there were.

TFMSC: The FAA also maintains the Traffic Flow Management System Count database. This database captures flight plans to and from the airport. Since most operators of jets and turboprops routinely file flight plans, the FAA indicates that the operations accuracy is 95 percent or more for total operations by these aircraft types. The TFMSC also provides total operations by aircraft make and model. Therefore, the operational counts for turboprops and jets are thought to be very accurate from this database. However, FOE presents a challenge because many military aircraft (e.g., KC-135) perform training operations and don't routinely file flight plans for touch-and-go operations. **Exhibit F** shows the TFMSC database for jets and turboprops for the 2022 base year.

The combination of these two operations data sources allows the forecast analyst to estimate other categories such as piston and helicopter operations. **Table 13** presents the fleet mix operations estimate for FOE for the 2022 base year and for the plan years in the future.

Typically, local operations will be conducted by operators of smaller piston aircraft. It is unusual for turboprop and jet operators to regularly perform local operations because of the higher cost of operating for these types of aircraft. However, at FOE, there is a large military presence which accounts for more than half of total operations. Many of the military operations are training exercises which are thus classified as local in nature (and are not captured in the TFMSC database). It is very common to see KC-135 aircraft in the traffic pattern performing touch-and-go operations, for example. In addition, there are numerous based Blackhawk helicopters at the airport which will routinely perform training exercises; however, these are not captured by the TFMSC database.

TABLE 13 | Fleet Mix Operations Forecast

	2022	2027	2032	2042
LOCAL OPERATIONS				
Piston	1,569	1,631	1,834	2,069
Turboprop	100	100	100	100
Jets	5,157	6,804	6,804	6,900
Helicopter	3,500	4,600	4,600	4,504
Total Local	*10,326*	*13,135*	*13,338*	*13,573*
ITINERANT OPERATIONS				
Single Piston	3,254	3,300	3,400	3,800
Multi-Piston	200	250	300	400
Turboprop	2,244	2,300	2,400	2,700
Jet	3,856	4,469	4,700	4,937
Helicopters	1,500	2,000	2,440	2,600
Total Itinerant	*11,054*	*12,319*	*13,240*	*14,437*
Total Operations	**21,380**	**25,454**	**26,578**	**28,010**

Source: Coffman Associates analysis

The TFMSC database shows 2,244 turboprop operations and 3,856 jet operations. Because these are flight plans, it is reasonable to identify these as itinerant in nature. Assumptions about helicopter, piston, and multi-engine piston operations must then be made with the understanding that the ATCT counts are the maximum total operations.

CRITICAL AIRCRAFT

Prior to developing alternatives for the MRO facility, it is important to understand the FAA design standards relative to any future development. The FAA has established multiple aircraft classification systems that group aircraft based upon operational (approach speed in landing configuration) and design characteristics (wingspan and landing gear configuration). These classification systems are used to design certain airport elements, such as runways, taxiways, aprons, safety areas, and separation standards, based upon the aircraft expected to use the facilities most frequently.

The use of appropriate FAA design standards is generally based upon the characteristics of aircraft commonly using, or expected to use, the airport facilities. The aircraft used to design these facilities is designated as the "critical aircraft." An airport's critical aircraft can be a single aircraft or a grouping of similar aircraft commonly using the airport. The design aircraft or collection of aircraft is defined by three different categories: Aircraft Approach Category (AAC), Airplane Design Group (ADG), and Taxiway Design Group (TDG). FAA Advisory Circular (AC) 150/5300-13B, *Airport Design*, describes the classification systems and their parameters.

Aircraft Approach Category (AAC): A grouping of aircraft based on a reference landing speed (V_{REF}), if specified. If V_{REF} is not specified, 1.3 times the stall speed (V_{SO}) at the maximum certificated landing weight is used. These numbers are those values as established for an aircraft by the certification authority of the country of registry. The higher the approach speed, the more restrictive the design standards. The AAC is depicted by letters A through E and applies to runway and runway-related facilities, such as runway width, runway safety area (RSA), runway object free area (ROFA), runway protection zone (RPZ), and separation standards.

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ARC	Aircraft	FAA TDG	2016	2017	2018	2019	2020	2021	2022*
A-I	B60T - Beechcraft 60 Royal Turbine Duke	TBD	0	0	0	12	0	0	0
	C10T - Cessna P210 (Turbo)	1A	2	2	2	0	2	0	0
	DA20 - Diamond DA 20	1A	2	0	0	0	0	0	0
	EA50 - Eclipse 500	1A	10	8	12	14	6	10	10
	EPIC - Dynasty	TBD	0	0	0	0	0	0	2
	EVOT - Lancair Evolution Turbine	TBD	0	0	2	0	0	0	0
	KODI - Quest Kodiak	1A	2	2	0	2	0	0	0
	P46T - Piper Malibu Meridian	1A	20	18	30	18	16	90	64
	SF50 - Cirrus Vision SF50	1A	0	4	6	12	12	10	14
	TBM7 - Socata TBM-7	TBD	6	2	4	2	0	4	4
	TBM8 - Socata TBM-850	TBD	16	2	8	4	8	8	8
	TBM9 - Socata TBM	TBD	0	2	4	2	8	2	8
	Total		**58**	**40**	**68**	**66**	**52**	**124**	**110**
A-II	C208 - Cessna 208 Caravan	1A	2	4	6	0	2	0	8
	DHC6 - DeHavilland Twin Otter	1A	8	0	4	4	0	4	2
	PC12 - Pilatus PC-12	1A	498	458	452	460	308	458	522
	Total		**508**	**462**	**462**	**464**	**310**	**462**	**532**
A-III	DHC7 - De Havilland DHC-7	3	0	0	0	2	0	0	0
	Total		**0**	**0**	**0**	**2**	**0**	**0**	**0**
B-I	BE10 - Beech King Air 100 A/B	TBD	0	0	0	0	0	2	0
	BE40 - Raytheon/Beech Beechjet 400/T-1	1A	568	298	108	610	490	490	510
	BE9L - Beech King Air 90	1A	76	48	76	62	130	138	136
	C25M - Cessna Citation M2	1A	0	2	6	6	2	12	14
	C425 - Cessna 425 Corsair	1A	10	28	12	4	4	4	14
	C500 - Cessna 500/Citation I	2	0	0	0	0	0	2	0
	C501 - Cessna I/SP	2	6	0	4	6	4	4	4
	C510 - Cessna Citation Mustang	1A	4	6	4	0	18	10	14
	C525 - Cessna CitationJet/CJ1	1A	34	10	16	52	20	24	20
	CL41 - Canadair CL-41 Tutor	TBD	0	0	2	0	0	0	0
	E50P - Embraer Phenom 100	1B	12	10	4	2	18	228	248
	FA10 - Dassault Falcon/Mystère 10	1B	0	2	2	0	0	0	0
	H25C - BAe/Raytheon HS 125-1000/Hawker 1000	1B	2	0	2	0	0	0	0
	HDJT - HONDA HA-420 HondaJet	TBD	6	72	82	78	36	38	40
	L39 - Aero L-139 Albatross	1B	2	0	0	0	2	0	0
	MG17 - Mikoyan MIG-17	TBD	0	0	0	0	0	2	0
	MU2 - Mitsubishi Marquise/Solitaire	1A	0	4	0	0	6	2	0
	MU20 - Marquise/Solitaire	1A	0	0	2	0	0	0	0
	MU30 - Mitsubishi MU300/ Diamond I	1A	0	6	0	0	0	0	0
	P180 - Piaggio P-180 Avanti	2	2	0	0	0	0	6	10
	PAY1 - Piper Cheyenne 1	2	10	2	4	0	2	4	2
	PAY2 - Piper Cheyenne 2	2	12	4	2	0	2	0	4
	PAY3 - Piper PA-42-720 Cheyenne 3	2	0	2	0	2	0	2	2
	PAY4 - Piper Cheyenne 400	2	0	2	2	0	0	0	0
	PRM1 - Raytheon Premier 1/390 Premier 1	1A	48	40	36	42	18	22	20
	SBR1 - North American Rockwell Sabre 40/60	TBD	4	0	0	0	0	0	0
	TEX2 - Raytheon Texan 2	1A	114	88	74	72	26	212	134
	Total		**910**	**624**	**438**	**936**	**778**	**1,202**	**1,172**

ARC	Aircraft	FAA TDG	2016	2017	2018	2019	2020	2021	2022*
B-II	AC90 - Gulfstream Commander	2	14	10	12	8	14	20	16
	B190 - Beech 1900/C-12J	2	16	12	8	6	6	16	10
	B350 - Beech Super King Air 350	2	28	34	44	24	72	70	98
	BE20 - Beech 200 Super King	2	276	364	344	346	294	388	244
	BE30 - Raytheon 300 Super King Air	2	32	12	28	14	28	26	42
	BE9T - Beech F90 King Air	1A	20	0	0	0	0	0	0
	C25A - Cessna Citation CJ2	2	26	12	16	16	8	8	10
	C25B - Cessna Citation CJ3	2	12	14	12	12	46	50	58
	C25C - Cessna Citation CJ4	1B	8	10	14	12	6	20	16
	C441 - Cessna Conquest	1A	8	2	6	6	4	14	10
	C550 - Cessna Citation II/Bravo	2	58	58	22	10	34	14	18
	C55B - Cessna Citation Bravo	2	0	0	0	0	2	4	6
	C560 - Cessna Citation V/Ultra/Encore	2	282	248	124	144	148	122	120
	C56X - Cessna Excel/XLS	1B	374	374	432	440	348	400	472
	C680 - Cessna Citation Sovereign	1B	84	68	66	40	8	16	22
	C68A - Cessna Citation Latitude	1B	4	20	14	16	18	26	48
	C700 - Cessna Citation Longitude	TBD	0	0	4	2	18	38	30
	C750 - Cessna Citation X	1B	114	62	58	54	22	8	14
	CL30 - Bombardier (Canadair) Challenger 300	1B	20	30	36	78	74	96	104
	CL35 - Bombardier Challenger 300	1B	0	2	4	10	6	20	10
	D328 - Dornier 328 Series	TBD	2	2	0	4	4	0	2
	E120 - Embraer Brasilia EMB 120	3	4	0	2	2	0	0	0
	E55P - Embraer Phenom 300	1B	20	10	14	16	22	34	46
	F2TH - Dassault Falcon 2000	2	16	20	16	40	26	34	32
	F900 - Dassault Falcon 900	2	10	8	18	2	8	12	16
	FA20 - Dassault Falcon/Mystère 20	1B	8	8	14	18	6	0	0
	FA50 - Dassault Falcon/Mystère 50	1B	10	6	4	0	0	4	10
	HA4T - Hawker 4000	1B	0	0	2	2	2	2	2
	JS31 - BAe-3100 Jetstream	TBD	2	0	0	0	0	0	0
	PC24 - Pilatus PC-24	TBD	0	0	2	4	2	2	4
	SH33 - Shorts 330	TBD	2	0	0	0	0	0	0
	SH36 - Shorts 360	TBD	0	2	0	0	4	2	2
	SW4 - Swearingen Merlin 4/4A Metro2	TBD	28	16	16	16	8	16	22
	Total		**1,478**	**1,404**	**1,332**	**1,342**	**1,238**	**1,462**	**1,484**
B-III	C2 - Grumman C-2 Greyhound	TBD	0	2	0	0	0	0	0
	CN35 - CASA CN-235	1A	2	2	0	0	0	0	2
	DH8B - Bombardier DHC8-200	3	0	0	0	0	2	6	8
	DH8C - Dash 8/DHC8-300	3	0	0	0	0	2	8	8
	E2 - Grumman TE-2 Hawkeye	TBD	28	14	2	44	12	2	2
	F27 - Fokker Friendship F27	3	6	2	0	0	0	0	0
	FA8X - Dassault Falcon 8X	TBD	0	0	0	2	0	0	0
	GL5T - Bombardier BD-700 Global 5000	2	0	0	2	0	0	0	4
	GL7T - Bombardier Global 7500	TBD	0	0	0	0	0	2	0
	GLEX - Bombardier BD-700 Global Express	2	2	2	4	0	2	8	8
	SB20 - Saab 2000	TBD	4	0	0	0	2	2	2
	Total		**42**	**22**	**8**	**46**	**20**	**28**	**34**

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ARC	Aircraft	FAA TDG	2016	2017	2018	2019	2020	2021	2022*
C-I	H25A - BAe HS 125-1/2/3/400/600	TBD	0	2	6	0	0	2	0
	HAR - Boeing AV-8 Harrier	TBD	0	0	6	0	0	0	0
	HAWK - BAe Systems Hawk	TBD	8	0	6	2	0	4	4
	LJ25 - Bombardier Learjet 25	1B	2	0	0	0	0	0	0
	LJ31 - Bombardier Learjet 31/A/B	1B	8	6	2	2	0	4	4
	LJ40 - Learjet 40; Gates Learjet	1B	0	2	4	2	2	2	4
	LJ45 - Bombardier Learjet 45	1B	28	16	8	12	28	16	14
	LJ55 - Bombardier Learjet 55	1B	12	0	2	0	2	2	0
	LJ60 - Bombardier Learjet 60	1B	10	18	10	8	20	20	16
	LR60 - Bombardier Learjet 60	1B	0	0	2	0	0	0	0
	T1 - Fuji T1	TBD	2	2	0	0	0	2	2
	WW24 - IAI 1124 Westwind	1B	2	0	4	0	0	0	0
	Total		**72**	**46**	**50**	**26**	**52**	**52**	**44**
C-II	A10 - Fairchild A10	TBD	2	0	0	4	8	4	4
	ASTR - IAI Astra 1125	1B	2	2	0	4	10	0	0
	C650 - Cessna III/VI/VII	1B	4	4	2	4	0	6	2
	CL60 - Bombardier Challenger 600/601/604	1B	8	26	14	14	8	24	26
	CRJ1 - Bombardier CRJ-100	1B	0	2	4	0	0	0	0
	CRJ2 - Bombardier CRJ-200	1B	28	28	16	8	2	4	6
	CRJ7 - Bombardier CRJ-700	2	6	6	12	42	24	10	10
	E135 - Embraer ERJ 135/140/Legacy	2	78	88	24	60	34	12	12
	E145 - Embraer ERJ-145	2	8	8	12	12	20	4	34
	E35L - Embraer 135 LR	2	2	0	4	2	4	2	4
	E45X - Embraer ERJ 145 EX	2	20	14	18	14	8	6	0
	E545 - Embraer EMB-545 Legacy 450	1B	0	0	0	2	0	4	10
	E550 - Embraer Legacy 500	1B	2	2	2	4	0	0	2
	G150 - Gulfstream G150	1B	6	6	4	8	4	4	54
	G280 - Gulfstream G280	1B	10	8	6	16	4	18	18
	GLF3 - Gulfstream III/G300	2	2	4	0	0	0	0	0
	H25B - BAe HS 125/700-800/Hawker 800	1B	74	60	40	14	20	12	14
	LJ75 - Learjet 75	1B	6	14	8	8	10	8	8
	Total		**258**	**272**	**166**	**216**	**156**	**118**	**204**
C-III	A319 - Airbus A319	3	0	2	4	8	0	0	2
	A320 - Airbus A320 All Series	3	0	0	0	2	6	0	6
	A321 - Airbus A321 All Series	3	2	0	2	8	4	0	0
	B462 - BAe 146 -200	2	0	4	0	0	2	0	0
	B732 - Boeing 737-200/VC96	3	0	2	4	2	4	0	2
	B733 - Boeing 737-300	3	10	6	4	2	14	0	16
	B734 - Boeing 737-400	3	38	56	48	54	24	44	46
	B735 - Boeing 737-500	3	0	2	6	14	0	0	0
	B737 - Boeing 737-700	3	16	16	16	2	6	12	24
	B773 - Boeing 777-300	6	0	0	0	0	0	0	2
	BA11 - BAC 111 One-Eleven	3	2	0	0	0	0	0	0
	BCS1 - Bombardier CS100	3	10	0	0	0	0	2	2
	BCS3 - Bombardier BD-500 CSeries CS300	3	2	0	0	0	0	12	12
	C27J - Alenia C-27J Spartan	TBD	0	0	0	0	0	0	2
	CRJ9 - Bombardier CRJ-900	2	0	0	0	0	0	2	2
	DC9 - Douglas DC 9-10/30/50	TBD	2	0	0	0	0	0	0

ARC	Aircraft	FAA TDG	2016	2017	2018	2019	2020	2021	2022*
C-III	DC93 - Boeing (Douglas) DC 9-30	TBD	52	0	0	0	0	0	0
	DH8D - Bombardier Q-400	5	30	6	0	0	0	0	10
	E170 - Embraer 170	3	4	0	0	0	0	0	0
	E190 - Embraer 190	3	0	0	0	0	0	2	2
	E75L - Embraer 175	3	0	10	8	6	4	0	0
	MD82 - Boeing (Douglas) MD 82	4	8	0	0	0	0	0	0
	MD87 - Boeing (Douglas) MD 87	4	6	0	0	0	0	0	0
	P3 - Lockheed P-3C Orion	TBD	0	0	0	0	0	0	36
	Total		**182**	**104**	**92**	**98**	**64**	**74**	**164**
C-IV	B752 - Boeing 757-200	4	0	8	6	22	6	28	34
	B762 - Boeing 767-200	5	0	0	0	10	4	22	14
	B763 - Boeing 767-300	5	12	0	0	64	6	44	66
	B767 - Boeing 767	5	0	0	0	0	0	0	2
	C130 - Lockheed 130 Hercules	TBD	38	12	2	54	8	24	14
	C135 - Boeing C-135	TBD	12	0	4	0	0	0	0
	C17 - Boeing Globemaster 3	TBD	14	4	12	2	4	14	24
	C30J - C-130J Hercules ; Lockheed	2	12	10	10	40	40	98	40
	E3 - Boeing E-3F Sentry	TBD	0	0	0	2	0	0	0
	E3TF - Boeing Sentry TF33/E3C	TBD	4	0	0	0	0	6	6
	E6 - Boeing E-6 Mercury	TBD	8	2	2	12	2	0	0
	K135 - KC-135 Strattotanker	TBD	2	0	0	0	4	4	0
	K35 - Boeing KC-135 Stratotanker	TBD	4	0	0	6	2	4	2
	K35E - Boeing KC-135E Stratotanker	TBD	0	0	0	0	0	0	4
	K35R - Boeing KC-135 Stratotanker	4	920	616	516	784	934	914	936
	KC35 - Boeing C-135	TBD	4	2	4	4	2	6	2
	KR35 - Boeing KR 35 Stratotanker	TBD	20	8	0	2	0	0	0
	R135 - Boeing RC-135	4	0	2	0	2	2	4	6
	Total		**1,050**	**664**	**556**	**1,004**	**1,014**	**1,168**	**1,150**
C-V	A332 - Airbus A330-200	5	0	0	0	0	0	2	8
	A333 - Airbus A330-300	5	0	0	0	12	0	0	0
	B2 - Northrop B-2 Spirit	TBD	0	0	2	0	0	4	0
	B772 - Boeing 777-200	5	12	0	0	46	0	20	26
	P8 - Boeing P-8 Poseidon	3	0	4	2	0	0	2	4
	P8 - Boeing P-8 Poseidon	TBD	8	0	0	0	0	0	0
	Total		**20**	**4**	**4**	**58**	**0**	**28**	**38**
C-VI	C5 - Lockheed C-5	TBD	2	0	0	0	0	0	0
	Total		**2**	**0**	**0**	**0**	**0**	**0**	**0**
D-I	C21 - Learjet 35; Gates Learjet	1B	0	0	0	0	0	2	2
	F15 - Boeing F-15 Eagle	TBD	4	0	0	0	0	4	0
	F18 - Boeing FA-18 Hornet	TBD	44	8	4	6	2	6	0
	F18H - F/A 18 Hornet	TBD	14	2	6	18	10	28	16
	F18S - F18 Hornet	TBD	28	38	34	80	22	100	70
	F22 - Boeing Raptor F22	TBD	6	0	0	0	0	4	0
	F5 - Northrop F-5 Freedom Fighter	TBD	0	0	0	10	2	4	2
	FA18 - F18 Hornet	TBD	2	2	0	2	0	0	0
	LJ35 - Bombardier Learjet 35/36	1B	202	152	30	42	52	60	82
	LR35 - Learjet 35	1B	4	0	0	0	0	0	0

ARC	Aircraft	FAA TDG	2016	2017	2018	2019	2020	2021	2022*
D-I	T38 - Northrop T-38 Talon	TBD	886	146	132	536	704	716	704
	Total		**1,190**	**348**	**206**	**694**	**792**	**924**	**876**
D-II	GALX - IAI 1126 Galaxy/Gulfstream G200	1B	2	8	2	8	4	2	14
	GLF2 - Gulfstream II/G200	1B	0	0	0	0	0	2	2
	GLF4 - Gulfstream IV/G400	2	6	2	10	6	0	12	14
	Total		**8**	**10**	**12**	**14**	**4**	**16**	**30**
D-III	B738 - Boeing 737-800	3	50	64	38	50	26	2	14
	B739 - Boeing 737-900	3	8	12	4	12	10	14	16
	GA5C - G-7 Gulfstream G500	2	0	0	2	32	32	2	0
	GLF5 - Gulfstream V/G500	2	20	24	8	16	6	12	16
	GLF6 - Gulfstream	2	4	2	2	8	2	10	6
	MD83 - Boeing (Douglas) MD 83	4	4	8	0	0	0	0	0
	MD88 - Boeing (Douglas) MD 88	4	0	0	0	0	2	0	0
	Total		**86**	**110**	**54**	**118**	**78**	**40**	**52**
D-IV	B764 - Boeing 767-400	5	0	0	0	10	0	0	0
	DC10 - Boeing (Douglas) DC 10-10/30/40	TBD	6	0	0	0	6	2	0
	Total		**6**	**0**	**0**	**10**	**6**	**2**	**0**
D-V	B52 - Boeing B-52 Stratofortress	TBD	0	0	0	0	0	2	0
	B742 - Boeing 747-200	5	2	0	0	0	0	0	0
	B744 - Boeing 747-400	5	42	0	0	12	0	18	0
	B77W - Boeing 777-300ER	6	0	0	0	0	0	6	6
	Total		**44**	**0**	**0**	**12**	**0**	**26**	**6**
E-I	F16 - Lockheed F-16 Fighting Falcon	TBD	2	2	0	18	0	36	18
	Total		**2**	**2**	**0**	**18**	**0**	**36**	**18**

ARC CODE SUMMARY

ARC CODE	2016	2017	2018	2019	2020	2021	2022*
A-I	58	40	68	66	52	124	110
A-II	508	462	462	464	310	462	532
A-III	0	0	0	2	0	0	0
B-I	910	624	438	936	778	1,202	1,172
B-II	1,478	1,404	1,332	1,342	1,238	1,462	1,484
B-III	42	22	8	46	20	28	34
C-I	72	46	50	26	52	52	44
C-II	258	272	166	216	156	118	204
C-III	182	104	92	98	64	74	164
C-IV	1,050	664	556	1,004	1,014	1,168	1,150
C-V	20	4	4	58	0	28	38
C-VI	2	0	0	0	0	0	0
D-I	1,190	348	206	694	792	924	876
D-II	8	10	12	14	4	16	30
D-III	86	110	54	118	78	40	52
D-IV	6	0	0	10	6	2	0
D-V	44	0	0	12	0	26	6
E-I	2	2	0	18	0	36	18
Total	5,916	4,112	3,448	5,124	4,564	5,762	5,914

APPROACH CATEGORY

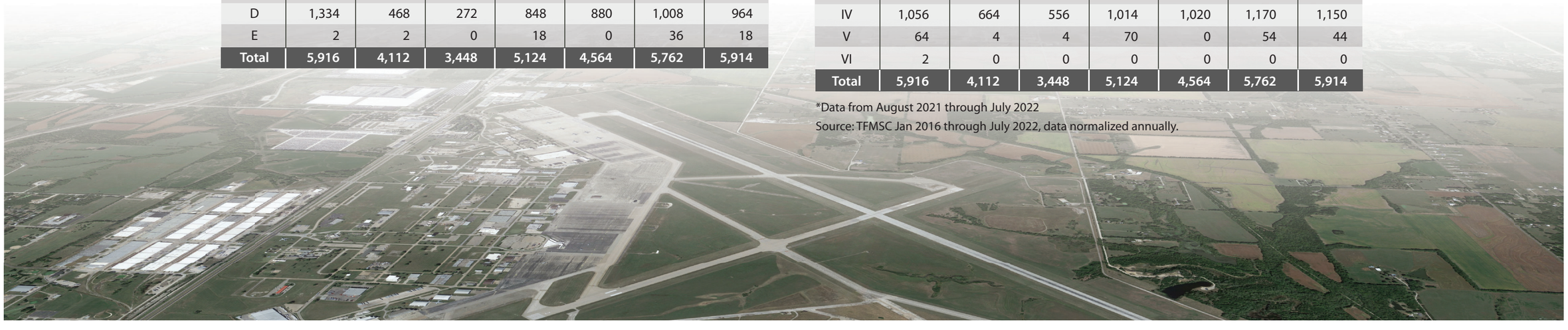
AC	2016	2017	2018	2019	2020	2021	2022*
A	566	502	530	532	362	586	642
B	2,430	2,050	1,778	2,324	2,036	2,692	2,690
C	1,584	1,090	868	1,402	1,286	1,440	1,600
D	1,334	468	272	848	880	1,008	964
E	2	2	0	18	0	36	18
Total	5,916	4,112	3,448	5,124	4,564	5,762	5,914

DESIGN GROUP

DG	2016	2017	2018	2019	2020	2021	2022*
I	2,232	1,060	762	1,740	1,674	2,338	2,220
II	2,252	2,148	1,972	2,036	1,708	2,058	2,250
III	310	236	154	264	162	142	250
IV	1,056	664	556	1,014	1,020	1,170	1,150
V	64	4	4	70	0	54	44
VI	2	0	0	0	0	0	0
Total	5,916	4,112	3,448	5,124	4,564	5,762	5,914

*Data from August 2021 through July 2022

Source: TFMSC Jan 2016 through July 2022, data normalized annually.



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Airplane Design Group (ADG): The ADG, depicted by a Roman numeral I through VI, is a classification of aircraft relating to the aircraft wingspan or tail height. If the wingspan and tail height fall under different classifications, the higher (more restrictive) category is used. The ADG is used to establish design standards for taxiway safety area (TSA), taxiway/taxilane object free area (OFA), apron wingtip clearance, and other separation standards.

Taxiway Design Group (TDG): A classification of aircraft based on the dimensions of the airplane under-carriage: the outer-to-outer main gear width (MGW) and cockpit-to-main gear (CMG) distance. Several taxiway design elements are determined by the TDG, including taxiway width, taxiway edge safety margin, taxiway shoulder width, taxiway fillet design and dimension, and separation standards. It is appropriate for taxiways to be planned and built to different taxiway design standards based on expected use.

Exhibit G presents the aircraft classification of common aircraft in operation today.

The critical aircraft is "the most demanding aircraft type or grouping of aircraft with similar physical and operational characteristics, that make regular use of the airport. Regular use is 500 annual operations, excluding touch-and-go operations. The critical aircraft determines the applicable design standards for facilities on the airport including individual runways, taxiways, etc."

The airport layout plan (ALP) is a technical document that each federally obligated airport must have on file with the FAA to be eligible for federal grant funding. The ALP for FOE was approved on March 9, 2016. The ALP identifies the current civilian critical aircraft as those in C-III (e.g., B-737/CRJ-900). Projects that adhere to C-III standards are eligible for FAA capital improvement funding through the Airport Improvement Program (AIP). The ALP also identifies a military critical aircraft as C-IV (i.e., the KC-135). While the airport should protect to the C-IV standards to the greatest degree possible, projects specifically needed to meet C-IV standards may require the financial participation of the military.

For the purposes of this study, it was important to determine the specific aircraft or type of aircraft that will use the future MRO facilities and the taxiways to access those facilities. The MRO hangars are to be used to convert large transport class aircraft to cargo uses. The largest aircraft anticipated is the **Boeing 777-300ER**. Other smaller transport aircraft such as the Boeing 767-200 and Airbus A321-200 may also be converted to cargo uses; however, it is the more restrictive attributes of the Boeing 777-300ER that are critical in applying FAA design standards for these analyses. **Table 14** lists design characteristics that are associated the Boeing 777-300ER as well as the current ALP approved civilian and military critical aircraft.

TABLE 14 – Critical Aircraft for MRO Development

Aircraft	V_{REF}	AAC	Wingspan	Tail Height	ADG	MGW	CMG	TDG
777-300ER[1]	**149 knots**	**D**	**212.58 ft**	**61.83 ft**	**V**	**42.33 ft**	**114.36 ft**	**6**
Boeing 737[2]	130 knots	C	112.58 ft	41.58 ft	III	41.33 ft	46.58 ft	3
KC-135[3]	128 knots	C	145.75 ft	42.08	IV	24.98 ft	68.42 ft	4

MRO: Maintenance, Repair, & Overhaul
V_{REF}: 1.3 Times the Stall Speed in Landing Configuration
AAC: Aircraft Approach Category
ADG: Airplane Design Group
MGW: Main Gear Width
CMG: Cockpit to Main Gear Distance
TDG: Taxiway Design Group

[1]Critical aircraft for this MRO Study
[2]Current civilian critical aircraft
[3]Current military critical aircraft

Source: Aircraft planning manuals and FAA aircraft characteristics database

Topeka Regional

A-I

Aircraft	TDG
• Beech Baron 55	1A
• **Beech Bonanza**	**1A**
• Cessna 150, 172	1A
• Eclipse 500	1A
• Piper Archer, Seneca	1A

B-I

Aircraft	TDG
• **Beech Baron 58**	**1A**
• Beech King Air 90	1A
• Cessna 421	1A
• Cessna Citation CJ1 (525)	1A
• Cessna Citation 1(500)	2A
• Embraer Phenom 100	1B

A/B-II *12,500 lbs. or less*

Aircraft	TDG
• **Beech Super King Air 200**	**2A**
• Cessna 441 Conquest	1A
• Cessna Citation CJ2 (525A)	2A
• Pilatus PC-12	1A

B-II *over 12,500 lbs.*

Aircraft	TDG
• Beech Super King Air 350	2A
• Cessna Citation CJ3(525B), V (560)	2A
• Cessna Citation Bravo (550)	1A
• **Cessna Citation CJ4 (525C)**	**1B**
• Cessna Citation Latitude/Longitude	1B
• Embraer Phenom 300	1B
• Falcon 10, 20, 50	1B
• Falcon 900, 2000	2A
• Hawker 800, 800XP, 850XP, 4000	1B
• Pilatus PC-24	1B

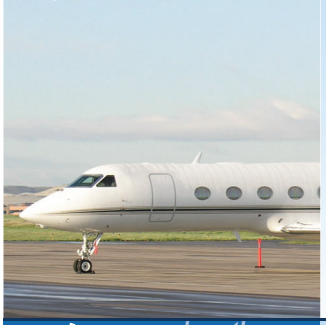
A/B-III

Aircraft	TDG
• Bombardier Dash 8	3
• **Bombardier Global 5000,** 6000, 7000, 8000	**2B**
• Falcon 6X, 7X, 8X	2B

C/D-I

Aircraft	TDG
• **Lear** 25, 31, 45, 55, **60**	**1B**
• Learjet 35, 36 (D-I)	1B

C/D-II



Aircraft	TDG
• Challenger 600/604/ 800/850	1B
• Cessna Citation VII, X+	1B
• Embraer Legacy 450/500	1B
• **Gulfstream IV,** 350, 450 (D-II)	2A
• Gulfstream G200/G280	1B
• Lear 70, 75	1B

C/D-III *less than 150,000 lbs.*

Aircraft	TDG
• Gulfstream V	2A
• **Gulfstream** G500, 550, 600, **650 (D-III)**	**2B**

C/D-III *over 150,000 lbs.*

Aircraft	TDG
• Airbus A319-100, 200	3
• **Boeing 737 -800,** 900, BBJ2 (D-III)	**3**
• MD-83, 88 (D-III)	4

C/D-IV

Aircraft	TDG
• Airbus A300-100, 200, 600	5
• Boeing 757-200	4
• **Boeing 767**-300, **400**	**5**
• MD-11	6

D-V

Aircraft	TDG
• Airbus A330-200, 300	5
• Airbus A340-500, 600	6
• Boeing 747-100 - 400	5
• Boeing 777-300	6
• **Boeing 787-8,** 9	**5**

Note: Aircraft pictured is identified in bold type.

As can be seen, the Boeing 777-300ER is classified as D-V-6 which will have more restrictive design standards than either the current civilian critical aircraft (C-III) or the military critical aircraft (C-IV).

CRITICAL AIRCRAFT SUMMARY

Because FOE is a joint use facility with a significant military component, it is necessary to distinguish between the civilian and military critical aircraft. The civilian critical aircraft would include any additional operations anticipated by the MRO facility. This distinction is necessary because FAA can legally only provide infrastructure funding for justified civilian facilities.

Table 15 is an estimate of total operations as classified by the airport reference code (i.e., the critical aircraft parameters). Helicopters are not classified by airport reference code, so they are added to the fixed wing operations at the end. In this analysis, total operations, total military operations, and total civilian operations are known from the ATCT counts available through OPSNET. The TFMSC data provides some insight to the ARC of the operations, but it is not complete because no visual flights are captured. Therefore, the forecast analyst must make reasonable assumptions.

TABLE 15 | Operations Fleet Mix by Airport Reference Code (Military/Civilian)

ARC	TOTAL OPERATIONS		TOTAL NON-MILITARY OPERATIONS	
	2022	2042	2022	2042
A-I	4,805	5,809	4,099	5,359
A-II	686	1,000	686	1,000
B-I	2,490	2,600	1,612	1,683
B-II	666	1,194	432	774
B-III	42	100	36	86
C-I	44	100	34	80
C-II	572	1,120	8	16
C-III	154	230	110	164
C-IV	6,551	8,533	0	0
C-V	22	40	14	25
D-I	238	320	42	56
D-II	30	50	24	40
D-III	38	200	38	200
D-IV	0	10	0	0
D-V	34	200	24	141
Total Fixed Wing	16,372	21,506	7,159	9,625
Helicopter	5,008	6,504	500	2,400
Total Operations	21,380	28,010	7,659	12,025
Military Ops	13,721	15,985	13,721	15,985
Civilian	7,659	12,025	7,659	12,025

Source: Coffman Associates analysis of TFMSC data.

The challenge to distinguishing between military and civilian aircraft is that certain aircraft have both a military use and civilian use. The TFMSC data does indicate what aircraft are military. For example, of the 530 Beechjet 400 (B-I) operations documented for 2022, 424 of them were military operations captured in TFMSC. For King Air models, in 2022 there were 454 operations and 226 of them were military. Certain aircraft only have a military version such as all fighter jets and the KC-135.

Table 16 further classifies military and civilian operations by approach category and design group. From this table we can see that the 2024 civilian critical aircraft (>500 annual operations) will be C-III. This is the result of adding 285 (AAC C) and 438 (AAC D) which exceeds 500 operations. The design group is 450 (ADG III) and 167 (ADG V/VI) for a total of 617 operations. Since there are only 167 operations by aircraft with an ADG greater than III, it does not qualify for the overall civilian ADG. Therefore, the civilian critical aircraft is C-III. This is what is reflected on the current ALP for the airport.

TABLE 16 | Fixed Wing Operations Fleet Mix by Airport Reference Code

	TOTAL OPERATIONS		TOTAL NON-MILITARY OPERATIONS	
Approach Category	**2022**	**2042**	**2022**	**2042**
A	5,491	6,809	4,785	6,359
B	3,198	3,894	2,080	2,543
C	7,343	10,023	166	285
D/E	340	780	128	438
Total	16,372	21,506	7,159	9,625
Design Group				
I	7,577	8,829	5,787	7,179
II	1,954	3,364	1,150	1,830
III	234	530	184	450
IV	6,551	8,543	0	0
V/VI	56	240	38	167
Total	**16,372**	**21,506**	**7,159**	**9,625**

Source: Coffman Associates analysis of TFMSC data.

It should be noted that the 167 operations by aircraft above design group III includes the operations anticipated by the MRO facility. The MRO facility is not anticipated to generate more than 500 B-777 operations, thus a change in the current civilian critical aircraft is not anticipated by the activity of the MRO facility.

TAXIWAY/TAXILANE DESIGN STANDARDS

The design standards associated with taxiways and taxilanes are determined by the ADG or the TDG of the critical aircraft. ADG V and TDG 6 are the applicable classifications for this MRO Study based on the characteristics of the Boeing 777-300ER. **Table 17** presents the taxiway and taxilane design standards for ADG III, IV, and V and for TDG 3, 4, and 6. Different taxiway and taxilane pavements can and should be planned to the most appropriate ADG/TDG design standards based on usage. Therefore, any taxiways/taxilanes that will support the Boeing 777-300ER should be protected based on the standards outlined in the table. The protective surfaces for other taxiways/taxilanes that will not support the Boeing 777-300ER should maintained based on the approved civilian critical aircraft.

TABLE 17 – Taxiway/Taxilane Dimensions and Standards

STANDARDS BASED ON WINGSPAN	*ADG III*[1]	*ADG IV*[2]	*ADG V*[3]
Taxiway Protection			
Taxiway Safety Area width (feet)	118	171	214
Taxiway Object Free Area width (feet)	171	243	285
Taxilane Object Free Area width (feet)	158	224	270
Taxiway Separation			
Taxiway Centerline to:			
Fixed or Movable Object (feet)	85.5	121.5	142.5
Parallel Taxiway/Taxilane Centerline (feet)	144	207	249
Taxilane Centerline to:			
Fixed or Movable Object (feet)	79	112	135
Parallel Taxilane (feet)	138	198	242
Wingtip Clearance:			
Taxiway Wingtip Clearance (feet)	27	36	36
Taxilane Wingtip Clearance (feet)	20	27	28
STANDARDS BASED ON UNDERCARRIAGE	***TDG 3***	***TDG 4***	***TDG 6***
Taxiway/Taxilane Width Standard (feet)	50	50	75
Taxiway/Taxilane Edge Safety Margin (feet)	10	10	14
Taxiway/Taxilane Shoulder Width (feet)	20	20	30

ADG: Airplane Design Group;
TDG: Taxiway Design Group
[1]Current civilian ADG
[2]Current military ADG
[3]Boeing 777-300ER ADG (MRO critical aircraft)

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

DEVELOPMENT ALTERNATIVES

The next step in the MRO facility planning process is to explore potential development alternatives. The following are the minimum criteria considered when planning these facilities:

- The MRO hangar will have pull-through capability (doors on both ends).
- The MRO hangar will be large enough to accommodate two Boeing 777-300ER aircraft at the same time (647’ x 408’ x 70’).
- The MRO hangar will be set back far enough from the runway to clear the FAR Part 77 surfaces, specifically the transitional surface which encompasses the airspace in the study area.
- Vehicle road access will be provided along with vehicle parking.
- Space will be made available for support buildings such as a paint/machine shop and a warehouse facility.
- Expansion capability for a second MRO hangar will be provided.
- An aircraft apron and taxilanes that lead to the hangar doors.
- A clear taxiway OFA that is 285 feet wide (ADG V standard).
- A clear taxilane OFA that is 270 feet wide (ADG V standard).
- Avoid the existing structures including the “bunkers” as much as possible.

ALTERNATIVE 1

Exhibit H presents the first MRO hangar layout alternative. The MRO hangars are positioned facing north toward Runway 3. The hangar edge closest to the runway is 990 feet from the runway centerline. At this distance, the FAR Part 77 transitional surface has a clearance of 70 feet which is the planned height of the MRO hangar. If the hangar were to be taller, then it should be set back further from the runway. The MRO hangar is 647 feet wide (side facing the runway) and 408 feet long (hangar door sides). A duplicate second hangar is shown to demonstrate expansion capability.

A partial parallel taxiway (Taxiway F) is planned that extends from the Runway 3 threshold to an intersection with Taxiway C. A crossing taxiway is also planned that will align with Taxiway D. Both of these taxiways are planned to be 75 feet wide to meet the width standard associated with the Boeing 777-300ER (TDG 6). Future partial parallel Taxiway F is planned at 400 feet of separation distance from Runway 3-21 which meets the runway to taxiway separation standard.

Two access taxilanes are planned to extend to an apron area to provide access to the MRO hangars. Taxilane separation standards are applied in this area which is a TLOFA of 270 feet. Apron space is made available in front of the hangars (northside facing the runway) to allow for aircraft to move from one hangar to another without using planned Taxiway F. These areas can also be used for temporary aircraft parking.

Two additional structures that might be considered as part of a large MRO complex are shown. The first is a 300’ x 300’ hangar that is considered for a paint shop or a machine shop. The second structure is a warehouse facility that measures 540’ x 250’.

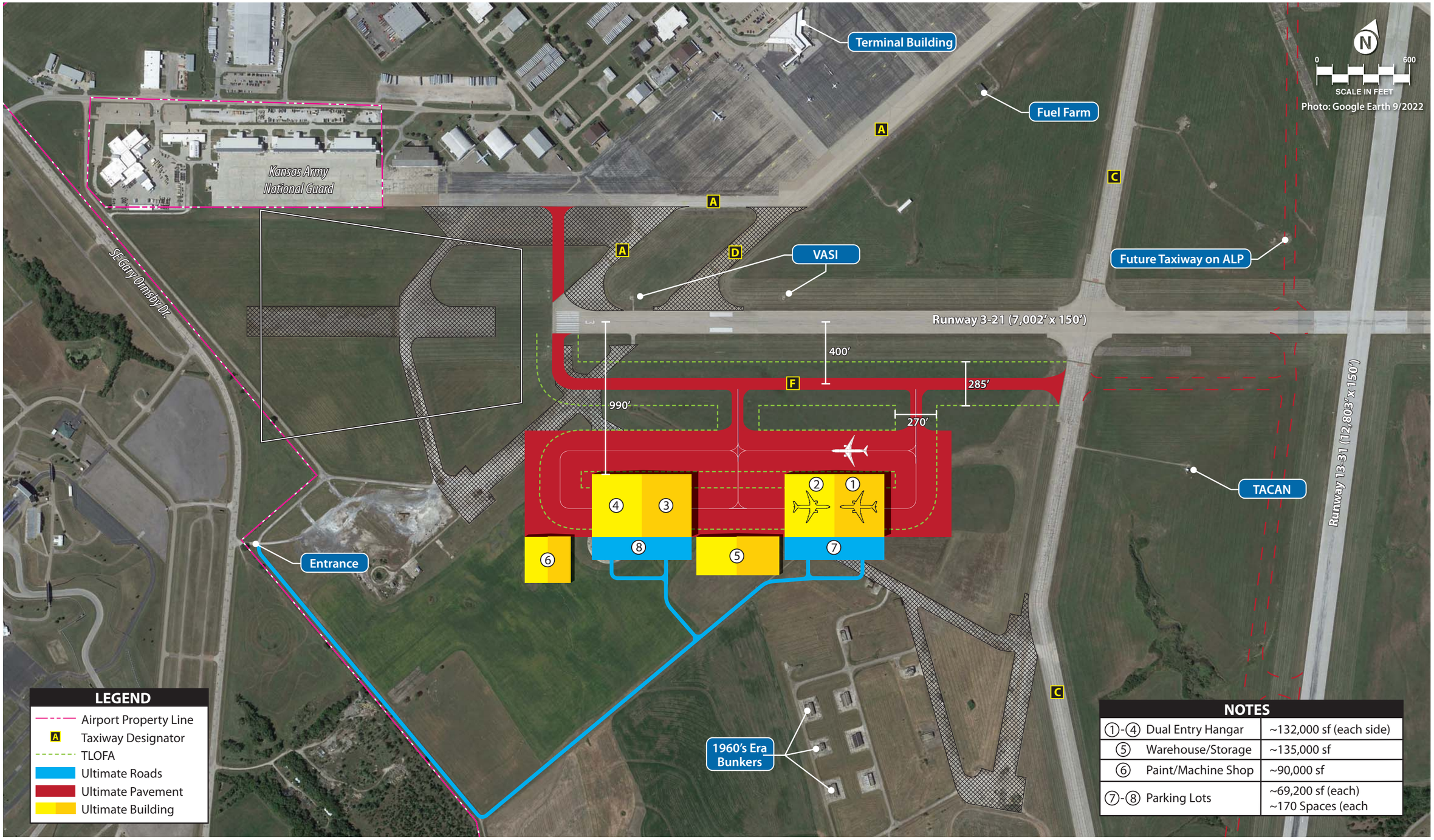
Access to the MRO hangars is planned by utilizing the existing perimeter road and access road. The entrance to the perimeter road would be from an existing gated entrance that is at the intersection with SE Gary Ormsby Dr. It is likely that both of these roads would need to be improved to support the activity at the MRO facility. If the MRO facility needed to be accessed by the general public, then dedicated security fencing may be required. The access roads lead to two vehicle parking lots, each of which are sized for 176 parking spaces.

The currently approved ALP for the airport considers replacing Taxiway C with a taxiway parallel to Runway 13-31. This potential parallel taxiway is depicted on the exhibit and future Taxiway F may need to be extended to the new parallel taxiway to Runway 13-31 (assuming existing Taxiway C were removed from service once replaced).

This alternative does not impact any of the 1960’s era bunkers or other structure in the area. Portions of long abandoned pavement would be impacted.

ALTERNATIVE 2

Exhibit J presents the second MRO facility layout. This layout primarily differs from the first in that the two hangars are shifted to the east in order to take advantage of existing Taxiway C, which would allow at least one hanger end to be accessed from Taxiway C. This could shorten taxi times. Similar to



LEGEND

- Airport Property Line
- A Taxiway Designator
- TLOFA
- Ultimate Roads
- Ultimate Pavement
- Ultimate Building

NOTES

①-④ Dual Entry Hangar	~132,000 sf (each side)
⑤ Warehouse/Storage	~135,000 sf
⑥ Paint/Machine Shop	~90,000 sf
⑦-⑧ Parking Lots	~69,200 sf (each) ~170 Spaces (each

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Terminal Building
Fuel Farm
A
C
A
A
D
VASI
Future Taxiway on ALP
Runway 3-21 (7,002' x 150')
400'
285'
F
990'
270'
Runway 13-31 (12,803' x 150')
TACAN
6
4
3
2
1
5
8
7
Entrance
1960's Era Bunkers
C
N
0
600
SCALE IN FEET
Photo: Google Earth 9/2022

LEGEND

- Airport Property Line
- A Taxiway Designator
- TLOFA
- Ultimate Roads
- Ultimate Pavement
- Ultimate Building

NOTES

①-④ Dual Entry Hangar	~132,000 sf (each side)
⑤ Warehouse/Storage	~135,000 sf
⑥ Paint/Machine Shop	~90,000 sf
⑦-⑧ Parking Lots	~69,200 sf (each) ~170 Spaces (each

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Alternative 1, a partial parallel taxiway is planned 400 feet from Runway 3. The MRO hangars and the supplemental buildings are the same size as those in Alternative 1. Access is also from the same location, at the existing gate at SE Gary Ormsby Dr.

This alternative also depicts the planned future parallel taxiway to Runway 13-31 and shows how that may impact the facility layout. Currently, this alternative shows a hangar entrance extending from Taxiway C. To maintain this accessibility, a portion of Taxiway C would need to be maintained or a new taxilane extending from the future Taxiway F, would need to be constructed.

This alternative does not impact any of the 1960's era bunkers or other structure in the area. Portions of long abandoned pavement would be impacted.

ALTERNATIVE 3

Exhibit K presents the third MRO facility layout. This alternative presents a concept where the MRO hangars are positioned close to Taxiway C, which would allow for ready access to the primary runway. Two 300' x 300' support buildings are shown on the layout.

The currently approved ALP for the airport considers replacing Taxiway C with a taxiway parallel to Runway 13-31. If this project were to advance, then this specific facility layout would not be feasible as shown as the ATCT line-of-sight to the replacement taxiway would be impeded and the replacement taxiway itself would encroach on the hangars. Therefore, it is important to understand that this facility concept is only feasible if the possible future parallel taxiway were to be removed from consideration on the ALP.

This alternative considers a different access road layout. The entrance would be from an intersection with SE 77th Stret and SE California Ave. The road would pass by the police practice range. This layout could also be accessed from the same location as indicated on the first two alternatives

This alternative does not impact any of the 1960's era bunkers or other structure in the area. Portions of long abandoned pavement would be impacted.

ALTERNATIVE 4

As noted in the description of Alternative 3, a taxiway parallel to Runway 13-31, is depicted on the currently approved ALP. **Exhibit L**, depicting Alternative 4, is a variation of Alternative 3, which assumes the planned future parallel taxiway will remain on the ALP. The hangar complex is reoriented to be parallel to Runway 13-31 and it is set back to the point where the ATCT line-of-sight would not be impeded.

This alternative does not directly impact any of the 1960's era bunkers or other structure in the area, however it does come within just a few feet of one of the abandon structures. Portions of long abandoned pavement would be impacted.

RECOMMENDED CONCEPT

The four MRO facility layout alternatives were presented in draft form to the FAA and airport management for review and consultation. Alternative 2 is the preferred alternative to be advanced to the final environmental analyses. Alternative 2 is the preferred alternative for the following primary reasons:

- Allows for potential facility, apron, and taxilane expansion to the south.
- Facility layout is accessible to future taxiway geometry shown on current ALP.
- Close proximity to runway system.
- Close proximity to main terminal area.
- Does not encroach on the "bunkers".
- Most efficient use of new pavement.

Exhibit M presents the preferred alternative in context on the ALP for the airport.

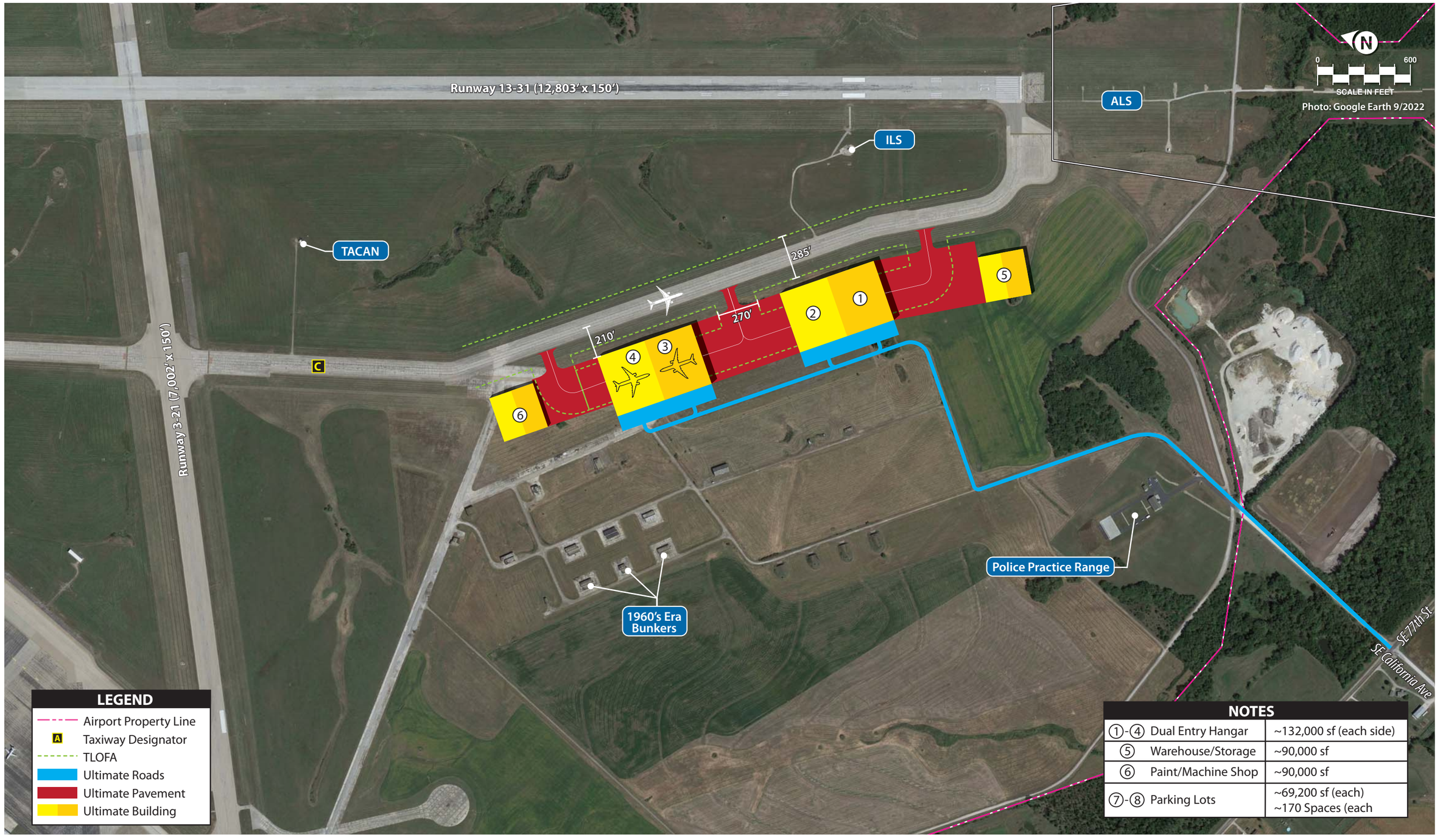
ENVIRONMENTAL OVERVIEW

The primary purpose of this environmental overview is to identify significance thresholds for the various resource categories contained in FAA Order 1050.1F, *Environmental Impacts: Policies and Procedures*, Exhibit 4-1 and FAA Order 5050.4B, *National Environmental Policy Act* (NEPA) *Implementation Instructions for Airport Actions*, Table 7.1. The environmental overview then evaluates the conceptual site plan to determine whether the proposed project might significantly affect the quality of the environment. This analysis does not replace future detailed environmental review of the project under the *National Environmental Policy Act*, if required.

Under FAA's NEPA compliance orders, for projects not "categorically excluded" under FAA Order 1050.1F, compliance with NEPA is generally satisfied through the preparation of an Environmental Assessment (EA). An EA is prepared when the initial review of the proposed action indicates that it is not categorically excluded, involves at least one extraordinary circumstance, or the action is not one known normally to require an Environmental Impact Statement (EIS). If none of the potential impacts are likely to be significant, then the responsible FAA official prepares a Finding of No Significant Impact (FONSI), which briefly presents, in writing, the reasons why an action, not otherwise categorically excluded, would not have a significant impact on the human environment and the approving official may approve it. Issuance of a FONSI signifies that FAA would not prepare an EIS and has completed the NEPA process for the proposed action.

In instances where significant environmental impacts are expected, an EIS may be required. An EIS is a clear, concise, and appropriately detailed document that provides agency decision-makers and the public with a full and fair discussion of significant environmental impacts of the proposed action and reasonable alternatives and implements the requirement in NEPA §102(2)(C) for a detailed written statement.

Table 18 summarizes potential environmental concerns associated with implementation of the proposed development concept. Analysis under NEPA includes direct, indirect, and cumulative impacts. Direct impacts are those caused by the action and occur at the same time and place. Examples of direct impacts include:



LEGEND

- Airport Property Line
- A Taxiway Designator
- TLOFA
- Ultimate Roads
- Ultimate Pavement
- Ultimate Building

NOTES

①-④ Dual Entry Hangar	~132,000 sf (each side)
⑤ Warehouse/Storage	~90,000 sf
⑥ Paint/Machine Shop	~90,000 sf
⑦-⑧ Parking Lots	~69,200 sf (each) ~170 Spaces (each

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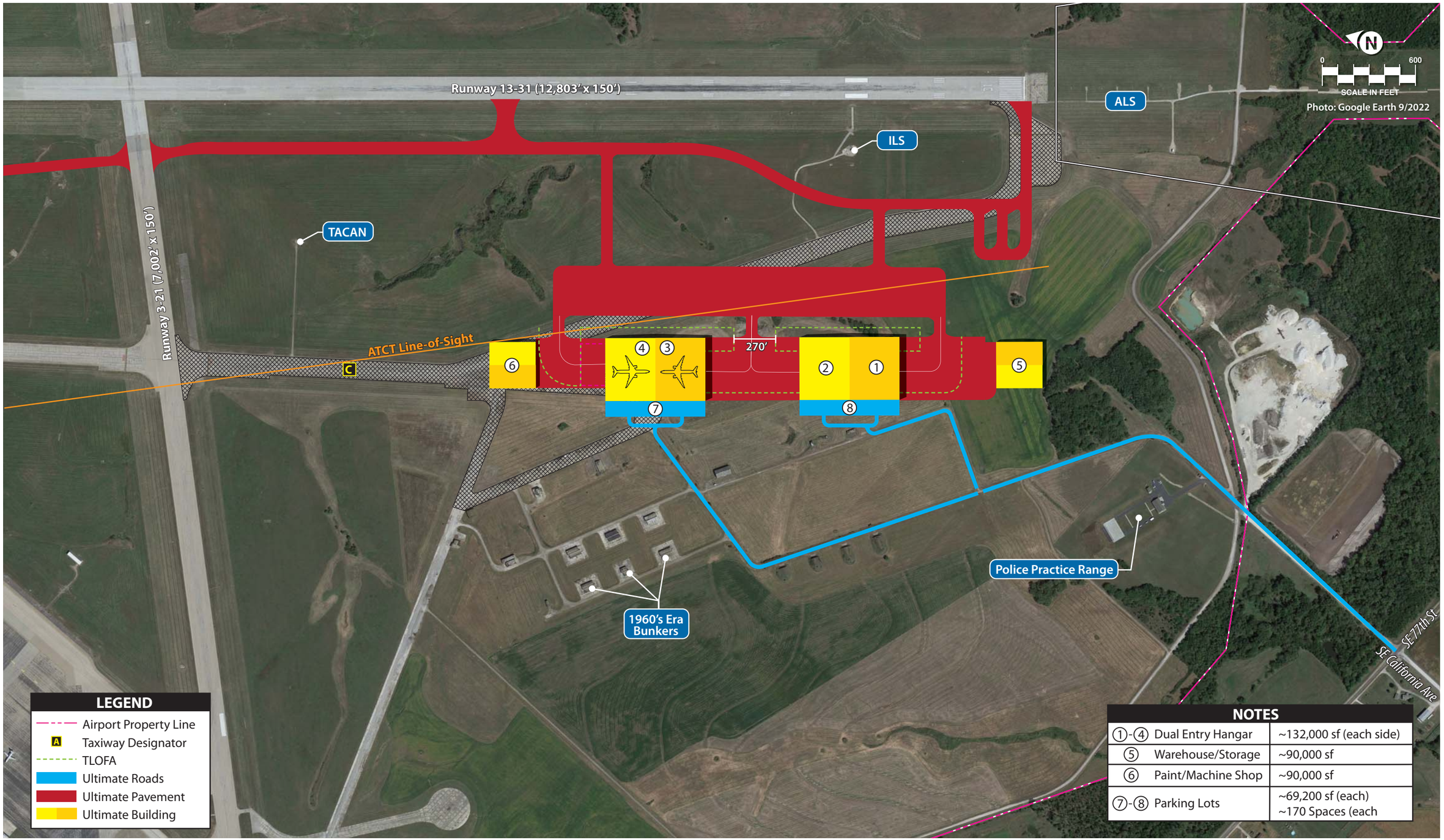

NOTES	
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⑦-⑧ Parking Lots	~69,200 sf (each) ~170 Spaces (each

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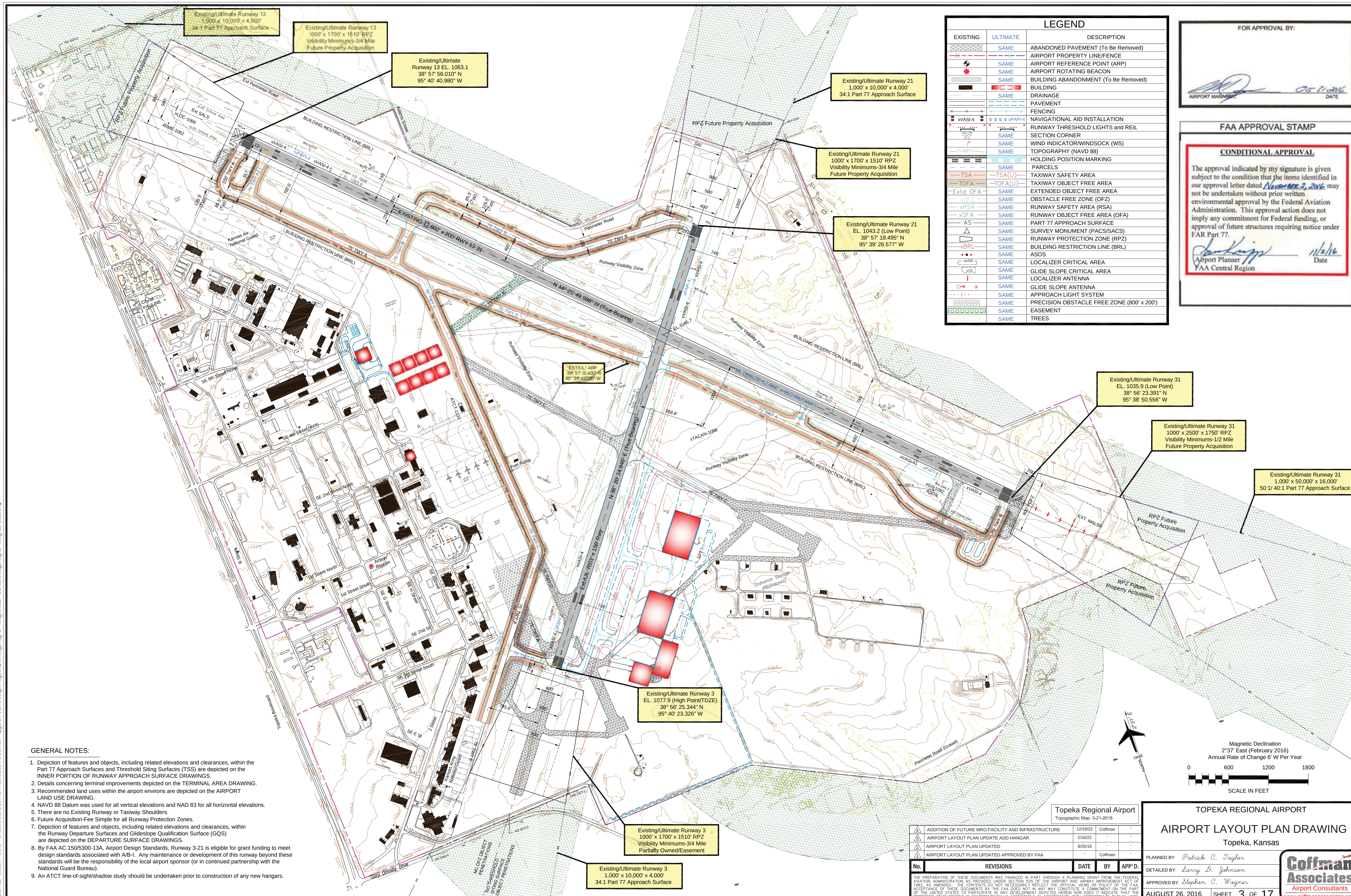
Existing/Ultimate Runway 13
1,000' x 10,000' x 4,000'
34:1 Part 77 Approach Surface
Existing/Ultimate Runway 13
1000' x 1700' x 1510' RPZ
Visibility Minimums-3/4 Mile
Future Property Acquisition
Existing/Ultimate
Runway 13 EL. 1063.1
38° 57' 56.010" N
95° 40' 40.980" W
Existing/Ultimate Runway 21
1,000' x 10,000' x 4,000'
34:1 Part 77 Approach Surface
Existing/Ultimate Runway 21
1000' x 1700' x 1510' RPZ
Visibility Minimums-3/4 Mile
Future Property Acquisition
Existing/Ultimate Runway 21
EL. 1043.2 (Low Point)
38° 57' 18.495" N
95° 39' 26.577" W
Existing/Ultimate Runway 31
EL. 1035.9 (Low Point)
38° 56' 23.391" N
95° 38' 50.556" W
Existing/Ultimate Runway 31
1000' x 2500' x 1750' RPZ
Visibility Minimums-1/2 Mile
Future Property Acquisition
Existing/Ultimate Runway 31
1,000' x 50,000' x 16,000'
50:1/ 40:1 Part 77 Approach Surface
Existing/Ultimate Runway 3
EL. 1077.9 (High Point/TDZE)
38° 56' 25.344" N
95° 40' 23.326" W
Existing/Ultimate Runway 3
1000' x 1700' x 1510' RPZ
Visibility Minimums-3/4 Mile
Partially Owned/Easement
Existing/Ultimate Runway 3
1,000' x 10,000' x 4,000'
34:1 Part 77 Approach Surface
RPZ Future Property Acquisition
Runway Visibility Zone
BUILDING RESTRICTION LINE (BRL)
Perimeter Road
Perimeter Road (Gravel)
Topeka Boulevard
LEGEND
EXISTING
ULTIMATE
DESCRIPTION
ABANDONED PAVEMENT (To Be Removed)
AIRPORT PROPERTY LINE/FENCE
AIRPORT REFERENCE POINT (ARP)
AIRPORT ROTATING BEACON
BUILDING ABANDONMENT (To Be Removed)
BUILDING
DRAINAGE
PAVEMENT
FENCING
NAVIGATIONAL AID INSTALLATION
RUNWAY THRESHOLD LIGHTS and REIL
SECTION CORNER
WIND INDICATOR/WINDSOCK (WS)
TOPOGRAPHY (NAVD 88)
HOLDING POSITION MARKING
PARCELS
TAXIWAY SAFETY AREA
TAXIWAY OBJECT FREE AREA
EXTENDED OBJECT FREE AREA
OBSTACLE FREE ZONE (OFZ)
RUNWAY SAFETY AREA (RSA)
RUNWAY OBJECT FREE AREA (OFA)
PART 77 APPROACH SURFACE
SURVEY MONUMENT (PACS/SACS)
RUNWAY PROTECTION ZONE (RPZ)
BUILDING RESTRICTION LINE (BRL)
ASOS
LOCALIZER CRITICAL AREA
GLIDE SLOPE CRITICAL AREA
LOCALIZER ANTENNA
GLIDE SLOPE ANTENNA
APPROACH LIGHT SYSTEM
PRECISION OBSTACLE FREE ZONE (800' x 200')
EASEMENT
TREES
FOR APPROVAL BY:
AIRPORT MANAGER
DATE
FAA APPROVAL STAMP
CONDITIONAL APPROVAL
The approval indicated by my signature is given subject to the condition that the items identified in our approval letter dated November 2, 2016 may not be undertaken without prior written environmental approval by the Federal Aviation Administration. This approval action does not imply any commitment for Federal funding, or approval of future structures requiring notice under FAR Part 77.
Airport Planner
FAA Central Region
Date
11/2/16
GENERAL NOTES:
1. Depiction of features and objects, including related elevations and clearances, within the Part 77 Approach Surfaces and Threshold Siting Surfaces (TSS) are depicted on the INNER PORTION OF RUNWAY APPROACH SURFACE DRAWINGS.
2. Details concerning terminal improvements depicted on the TERMINAL AREA DRAWING.
3. Recommended land uses within the airport environs are depicted on the AIRPORT LAND USE DRAWING.
4. NAVD 88 Datum was used for all vertical elevations and NAD 83 for all horizontal elevations.
5. There are no Existing Runway or Taxiway Shoulders.
6. Future Acquisition-Fee Simple for all Runway Protection Zones.
7. Depiction of features and objects, including related elevations and clearances, within the Runway Departure Surfaces and Glideslope Qualification Surface (GQS) are depicted on the DEPARTURE SURFACE DRAWINGS.
8. By FAA AC 150/5300-13A, Airport Design Standards, Runway 3-21 is eligible for grant funding to meet design standards associated with A/B-I. Any maintenance or development of this runway beyond these standards will be the responsibility of the local airport sponsor (or in continued partnership with the National Guard Bureau).
9. An ATCT line-of-sight/shadow study should be undertaken prior to construction of any new hangars.
Magnetic Declination
2°37' East (February 2016)
Annual Rate of Change 6' W Per Year
0
600
1200
1800
SCALE IN FEET
TRUE NORTH
Topeka Regional Airport
Topographic Map: 3-21-2016
4 ADDITION OF FUTURE MRO FACILITY AND INFRASTRUCTURE 12/19/22 Coffman -
3 AIRPORT LAYOUT PLAN UPDATE ADD HANGAR 2/16/22 - -
2 AIRPORT LAYOUT PLAN UPDATED 8/26/16 - -
1 AIRPORT LAYOUT PLAN UPDATED APPROVED BY FAA - Coffman -
No. REVISIONS DATE BY APP'D.
THE PREPARATION OF THESE DOCUMENTS WAS FINANCED IN PART THROUGH A PLANNING GRANT FROM THE FEDERAL AVIATION ADMINISTRATION AS PROVIDED UNDER SECTION 505 OF THE AIRPORT AND AIRWAY IMPROVEMENT ACT OF 1982, AS AMENDED. THE CONTENTS DO NOT NECESSARILY REFLECT THE OFFICIAL VIEWS OR POLICY OF THE FAA. ACCEPTANCE OF THESE DOCUMENTS BY THE FAA DOES NOT IN ANY WAY CONSTITUTE A COMMITMENT ON THE PART OF THE UNITED STATES TO PARTICIPATE IN ANY DEVELOPMENT DEPICTED HEREIN NOR DOES IT INDICATE THAT THE PROPOSED DEVELOPMENT IS ENVIRONMENTALLY ACCEPTABLE IN ACCORDANCE WITH APPROPRIATE PUBLIC LAWS.
TOPEKA REGIONAL AIRPORT
AIRPORT LAYOUT PLAN DRAWING
Topeka, Kansas
PLANNED BY: Patrick C. Taylor
DETAILED BY: Larry D. Johnson
APPROVED BY: Stephen C. Wagner
AUGUST 26, 2016
SHEET 3 OF 17
Coffman Associates
Airport Consultants
www.coffmanassociates.com

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- Construction of a facility or runway in a wetland which results in the loss of a portion of the wetland; or
- Noise generated by the proposed action or alternative(s) which adversely affects noise sensitive land uses.

Indirect impacts are those impacts caused by the action but are later in time or farther removed in distance but are still reasonably foreseeable. Indirect impacts may include growth inducing impacts and other effects related to induced changes in the pattern of land use, population density or growth rate, and related impacts on air and water and other natural systems, including ecosystems. Cumulative impacts are those that take into consideration the environmental impact of past, present, and future actions. Cumulative impacts would vary based on the project type, geographic location, potential to impact resources, and other factors, such as the current condition of potentially affected impact categories.

TABLE 18| Summary of Potential Environmental Concerns

AIR QUALITY	
FAA Order 1050.1F, *Significance Threshold/Factors to Consider*	***The action would cause pollutant concentrations to exceed one or more of the National Ambient Air Quality Standards (NAAQS), as established by the United States (U.S.) Environmental Protection Agency (EPA) under the Clean Air Act, for any of the time periods analyzed, or to increase the frequency or severity of any such existing violations.***
Potential Environmental Concerns	The airport is in Shawnee County, which is an attainment area for all federal pollutants. Therefore, a general conformity review per the *Clean Air Act* will not be required. However, the proposed MRO facility could result in temporary impacts to air quality. Exhaust emissions from the operation of construction vehicles are common air pollutants during construction. For construction emissions, a quantitative emissions inventory under NEPA may be required.
BIOLOGICAL RESOURCES (including fish, wildlife, and plants)	
FAA Order 1050.1F, *Significance Threshold/Factors to Consider*	***The U.S. Fish and Wildlife Service (FWS) or the National Marine Fisheries Service (NMFS) determines that the action would be likely to jeopardize the continued existence of a federally listed threatened or endangered species or would result in the destruction or adverse modification of federally designated critical habitat.*** ***FAA has not established a significance threshold for non-listed species. However, factors to consider are if an action would have the potential for:*** • ***Long-term or permanent loss of unlisted plant or wildlife species;*** • ***Adverse impacts to special status species or their habitats;*** • ***Substantial loss, reduction, degradation, disturbance, or fragmentation of native species' habitats or their populations; or*** • ***Adverse impacts on a species' reproductive rates, non-natural mortality, or ability to sustain the minimum population levels required for population maintenance.***
Potential Environmental Concerns	The USFWS indicates that two listed endangered species and one candidate species have the potential to be in the general area of the airport. The two endangered species fall under the mammal and fish categories. The northern long-eared bat (*Mytois grisescens*) roosts in caves and crevices of live and dead trees. No critical habitat has been designated for this species. The second endangered species, Topeka shiner (*Notropis topeka (=tristis*)) inhabits small, low-order prairie streams. There is final critical habitat for this species, but this habitat type is not present within airport property boundaries. Monarch butterflies (*Danaus plexippus*) are a candidate species under the *Endangered Species Act*. Monarch butterflies migrate and have a variety of habitats. However, they only breed on milkweed (*Asclepias sp.*). If milkweed is present on the proposed project site, habitat surveys may be necessary prior to project development. In addition, migratory birds protected by the *Migratory Bird Treaty Act* (MBTA) could be adversely affected if construction occurs during the nesting and breeding seasons (typically May through September). There are several bird species protected under the MBTA that could occur within airport boundaries. Under the requirements of the MBTA, all project components are responsible for complying with appropriate regulations protecting migratory birds when planning and developing a project.

CLIMATE	
FAA Order 1050.1F, *Significance Threshold/Factors to Consider*	***FAA has not established a significance threshold for Climate.*** *Refer to FAA Order 1050.1F Desk Reference and/or the most recent FAA Aviation Emissions and Air Quality Handbook for the most up-to-date methodology for examining impacts associated with climate change.*
Potential Environmental Concerns	An increase in greenhouse gases (GHGs) could occur because of the temporary construction activities that would result in increased equipment emissions. GHGs would also occur due to the additional Boeing 777 operations. According to a projected forecast it is assumed that in the base year there will be an additional 34 operations by Boeing 777 and 200 Boeing 777 would occur in the 20-year forecast. Thus, there would be an additional 166 Boeing 777 operations within a 20-year period.
COASTAL RESOURCES	
FAA Order 1050.1F, *Significance Threshold/Factors to Consider*	***FAA has not established a significance threshold for Coastal Resources. Factors to consider are if an action would have the potential to:*** • ***Be inconsistent with the relevant state coastal zone management plan(s);*** • ***Impact a coastal barrier resources system unit;*** • ***Pose an impact on coral reef ecosystems;*** • ***Cause an unacceptable risk to human safety or property; or*** • ***Cause adverse impacts on the coastal environment that cannot be satisfactorily mitigated.***
Potential Environmental Concerns	None. The airport is not located within a designated coastal zone.
***DEPARTMENT OF TRANSPORTATION ACT*, SECTION 4(f)** (NOW CODIFIED IN 49 UNITED STATES CODE [U.S.C.] § 303)	
FAA Order 1050.1F, *Significance Threshold/Factors to Consider*	***The action involves more than a minimal physical use of a Section 4(f) resource or constitutes a "constructive use" based on an FAA determination that the aviation project would substantially impair the Section 4(f) resource. Resources that are protected by Section 4(f) are publicly owned land from a public park, recreation area, or wildlife and waterfowl refuge of national, state, or local significance; and publicly or privately owned land from an historic site of national, state, or local significance. Substantial impairment occurs when the activities, features, or attributes of the resource that contribute to its significance or enjoyment are substantially diminished.***
Potential Environmental Concerns	None. The closest potential Section 4(f) resource near the proposed project area is Building 679, which is located west of the runway complex, and is a historic structure eligible for listing on the National Register of Historic Places (NRHP). In addition to this, Landon Nature Trail, part of the Kanza Rail-Trails Conservancy, is located ½ mile east of the Runway 21 threshold. The proposed project will not result in physical or constructive use of these properties.
FARMLANDS	

FAA Order 1050.1F, *Significance Threshold/Factors to Consider*	***The total combined score on Form AD-1006, Farmland Conversion Impact Rating, ranges between 200 and 260. (Form AD-1006 is used by the U.S. Department of Agriculture, Natural Resources Conservation Service [NRCS] to assess impacts under the Farmland Protection Policy Act [FPPA].)***
	
	FPPA applies when airport activities meet the following conditions:
	• *Federal funds are involved;*
	• *The action involves the potential for the irreversible conversion of important farmlands to non-agricultural uses. Important farmlands include pastureland, cropland, and forest considered to be prime, unique, or statewide or locally important land; or*
	• *None of the exemptions to FPPA apply. These exemptions include:*
	  ○ *When land is not considered "farmland" under FPPA, such as land already developed or already irreversibly converted. These instances include when land is designated as an urban area by the U.S. Census Bureau or the existing footprint includes rights-of-way.*
	  ○ *When land is already committed to urban development.*
	  ○ *When land is committed to water storage.*
	  ○ *The construction of non-farm structures necessary to support farming operations.*
	  ○ *The construction/land development for national defense purposes.*

Potential Environmental Concerns	None. Information obtained from the Natural Resource Conservation Service's (NRCS) Web Soil Survey indicates the majority of airport property, and property adjacent to the airport, is classified as "all areas are prime farmland." Additionally, a small portion of the soils located to the east of the airport runways are classified as "farmland of statewide importance" and "prime farmland if irrigated and drained." Development of the proposed MRO facility will likely be exempt from the requirements of the *Farmland Protection Policy Act* (FPPA) as the airport is a designated urban area.

HAZARDOUS MATERIALS, SOLID WASTE, AND POLLUTION PREVENTION	
FAA Order 1050.1F, *Significance Threshold/Factors to Consider*	***FAA has not established a significance threshold for Hazardous Materials, Solid Waste, and Pollution Prevention. However, factors to consider are if an action would have the potential to:*** • ***Violate applicable federal, state, tribal, or local laws or regulations regarding hazardous materials and/or solid waste management;*** • ***Involve a contaminated site;*** • ***Produce an appreciably different quantity or type of hazardous waste;*** • ***Generate an appreciably different quantity or type of solid waste or use a different method of collection or disposal and/or would exceed local capacity; or*** • ***Adversely affect human health and the environment.***
Potential Environmental Concerns	None. There are no identified brownfields or Superfund sites located within a one-mile buffer of the airport. There are two former landfill sites – north landfill and south landfill – on the eastern side of the airport property. These were discovered by the U.S. Army Corps of Engineers (USACE) in 1995 and were determined to pose a contamination risk to both groundwater and soils. Remediation of both landfills began in 2016. The proposed project will not occur on the landfill site as the landfill is more than ½ mile away from the proposed MRO facility. A solid waste landfill cover was installed in the north landfill after it underwent remediation. Solid waste from construction of the MRO facility will be taken to the nearest active landfill or recycling/transfer facility and will need to comply with any disposal conditions. The proposed MRO project will need a construction stormwater pollution prevention plan (SWPPP) due to the amount of ground disturbance (i.e., over one acre).
HISTORICAL, ARCHITECTURAL, ARCHAEOLOGICAL, AND CULTURAL RESOURCES	
FAA Order 1050.1F, *Significance Threshold/Factors to Consider*	***FAA has not established a significance threshold for Historical, Architectural, Archaeological, and Cultural Resources. Factors to consider are if an action would result in a finding of "adverse effect" through the Section 106 process. However, an adverse effect finding does not automatically trigger the preparation of an EIS (i.e., a significant impact).***
Potential Environmental Concerns	A survey was conducted at the airport, but it did not cover the proposed project area. On-ground cultural resources surveys may be needed in any area where ground disturbance has not occurred but is proposed (i.e., the project's area of potential effect [APE]). The project information has been submitted to the Kansas State Historic Preservation Office (SHPO) to aid in this determination. The Kansas SHPO may also require an impact analysis of a visual APE. However, the only known historic structure at the airport (Building 679) is almost two miles northwest from the project site.
LAND USE	
FAA Order 1050.1F, *Significance Threshold/Factors to Consider*	***FAA has not established a significance threshold for Land Use. There are also no specific independent factors to consider. The determination that significant impacts exist is normally dependent on the significance of other impacts.***
Potential Environmental Concerns	None. On the western boundary of the airport lies a single-family residential community less than two miles away from the airport, as well as one school (Pauline Central Primary School) and several parks. Near the eastern boundary of the airport lay scattered single-family homes and two schools (Berryton Elementary School and Shawnee Heights Unified School). Proposed MRO development will occur within the existing airport boundaries on the south end of the airport and would not directly affect existing off-airport land uses.
NATURAL RESOURCES AND ENERGY SUPPLY	
FAA Order 1050.1F, *Significance Threshold/Factors to Consider*	***FAA has not established a significance threshold for Natural Resources and Energy Supply. However, factors to consider are if the action would have the potential to cause demand to exceed available or future supplies of these resources.***
Potential Environmental Concerns	Demand for fossil fuels, building materials (for hangars and aprons), and water for dust suppression will occur during the construction of the MRO facility. No unusual demand is anticipated that would exceed available or future supplies. Coordination with service providers will be necessary.
NOISE AND NOISE-COMPATIBLE LAND USE	
FAA Order 1050.1F, *Significance Threshold/Factors to Consider*	***The action would increase noise by Day-Night Average Sound Level (DNL) 1.5 decibel (dB) or more for a noise-sensitive area that is exposed to noise at or above the DNL 65 dB noise exposure level, or that will be exposed at or above the DNL 65 dB level due to a DNL 1.5 dB or greater increase, when compared to the no action alternative for the same timeframe.*** ***Another factor to consider is that special consideration should be given to the evaluation of the significance of noise impacts on noise-sensitive areas within Section 4(f) properties where the land use compatibility guidelines in Title 14 Code of Federal Regulations (CFR) Part 150 are not relevant to the value, significance, and enjoyment of the area in question.***

Potential Environmental Concerns

Noise exposure contours were prepared as part of the 2016 Master Plan for Topeka Regional Airport. The long-range noise exposure contours are depicted on **Exhibit N**. As shown on the exhibit, the 70 and 75 DNL noise exposure contours remain entirely on airport property. The 65 DNL noise exposure contour extends off airport property to the east and northeast. Much of the non-airport area encompassed by the 65 DNL noise exposure contours is undeveloped land that is used for agriculture. Based on a review of aerial photography, there are barns and agricultural equipment storage areas within the 65 DNL noise exposure contours. These land uses are considered compatible from an aviation noise perspective.

The noise exposure contours prepared for the master plan did not include Boeing 777 aircraft; therefore, the FAA's Area Equivalent Model (AEM) was used to evaluate the potential increase in noise associated with the MRO facility. According to the FAA's Office of Environment and Energy, "AEM is a screening procedure used to simplify the assessment step in determining the need for further analysis with the Aviation Environmental Design Tool (AEDT). AEM is a mathematical procedure that provides an estimated noise contour area of a specific airport given the types of aircraft and the number of operations for each aircraft." For this analysis, AEM Version 2c SP2 was used.

As outlined in Section 11.1.3 of FAA's 1050.1F, *Desk Reference*, the AEM is used for, "evaluating proposed actions and alternative(s) at an airport which result in a general overall increase in daily aircraft operations or the use of larger/noisier aircraft, as long as there are no changes in ground tracks or flight profiles. If the AEM calculations indicate that the action would result in less than a 17 percent (approximately a Day-Night Level [DNL] 1 dB) increase in the DNL 65 dB contour area, there would be no significant impact over noise-sensitive areas and no further noise analysis would be required. If the AEM calculations indicate an increase of 17 percent or more, or if the action is such that use of the AEM is not appropriate, then the noise analysis must be performed using the Aviation Environmental Design Tool (AEDT) to determine if significant noise impacts would result."

The analysis requires comparing the baseline operational condition for the airport to proposed scenarios with the addition of cargo aircraft. For the baseline condition, an operational fleet mix was prepared for calendar year 2022. A forecast condition fleet mix was also prepared.

To determine the type of aircraft operating at the airport, information from FAA's Traffic Flow Management System Counts (TFMSC) for a 12-month period. The TFMSC includes all operations for which an Instrument Flight Rule (IFR) flight plan was filed and completed. This does not include flights for which an IFR flight plan was filed but cancelled en route. AEM includes 247 different aircraft models for which noise information is available. Based on the information collected, operations were assigned to the corresponding noise designator in the AEM. It is important to note that the AEM does not include an option to model helicopter noise.

As the analysis is based on the DNL cumulative noise metric, the AEM requires input for daytime (0700-2200) and nighttime (2200-0700) operations. For the purposes of this analysis, it is assumed that 97 percent of the operations at the airport occur during the daytime and 3 percent occur during the nighttime.

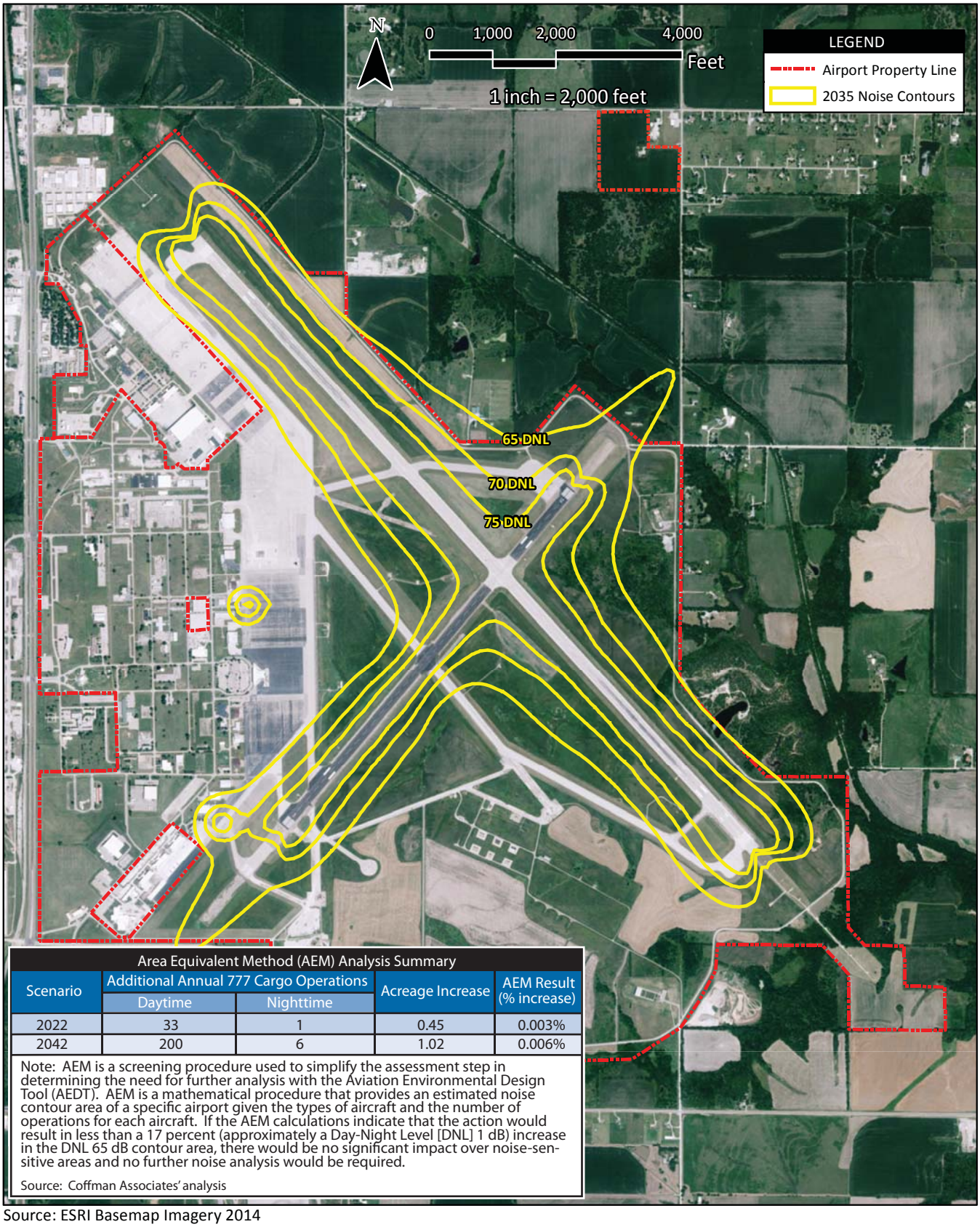
Appendix B includes a table which summarizes the baseline condition and forecast fleet mix for the noise analysis. The table includes the total annual operations by aircraft noise designator. The table also includes daily daytime and nighttime operations based on the annual operations.

Two scenarios were prepared to evaluate the potential changes in aircraft noise related to the proposed cargo operations at the airport. **Table 19** summarizes the additional daily operations which would be conducted with Boeing 777 aircraft. The table also presents the projected increase in noise contour area associated with each of these scenarios. As noted in the table, the projected increases are less than 17%. Therefore, per FAA's 1050.1F Desk Reference, no additional analysis is needed.

TABLE 19 | Area Equivalent Method Analysis - Topeka Regional Airport

Scenario	Additional Annual 777 Cargo Operations		Acreage Increase	AEM Result (% increase)
	DAYTIME	NIGHTTIME		
2022	33	1	0.45	0.003%
2042	200	6	1.02	0.006%

Source: Coffman Associates' analysis



Area Equivalent Method (AEM) Analysis Summary

Scenario	Additional Annual 777 Cargo Operations		Acreage Increase	AEM Result (% increase)
	Daytime	Nighttime		
2022	33	1	0.45	0.003%
2042	200	6	1.02	0.006%

Note: AEM is a screening procedure used to simplify the assessment step in determining the need for further analysis with the Aviation Environmental Design Tool (AEDT). AEM is a mathematical procedure that provides an estimated noise contour area of a specific airport given the types of aircraft and the number of operations for each aircraft. If the AEM calculations indicate that the action would result in less than a 17 percent (approximately a Day-Night Level [DNL] 1 dB) increase in the DNL 65 dB contour area, there would be no significant impact over noise-sensitive areas and no further noise analysis would be required.

Source: Coffman Associates' analysis

Source: ESRI Basemap Imagery 2014

SOCIOECONOMICS, ENVIRONMENTAL JUSTICE, AND CHILDREN'S ENVIRONMENTAL HEALTH AND SAFETY RISKS	
Socioeconomics	
FAA Order 1050.1F, *Significance Threshold/Factors to Consider*	***FAA has not established a significance threshold for Socioeconomics. However, factors to consider are if an action would have the potential to:*** • ***Induce substantial economic growth in an area, either directly or indirectly (e.g., through establishing projects in an undeveloped area);*** • ***Disrupt or divide the physical arrangement of an established community;*** • ***Cause extensive relocation when sufficient replacement housing is unavailable;*** • ***Cause extensive relocation of community businesses that would cause severe economic hardship for affected communities;*** • ***Disrupt local traffic patterns and substantially reduce the levels of service of roads serving the airport and its surrounding communities; or*** • ***Produce a substantial change in the community tax base.***
Potential Environmental Concerns	None. Socioeconomic impacts from the proposed project are expected to be a positive economic outcome to the airport and region. No business or housing relocations will be necessary as the proposed project site is within airport boundaries and will be located on the south side of the airport, which is currently underdeveloped.
Environmental Justice	
FAA Order 1050.1F, *Significance Threshold/Factors to Consider*	***FAA has not established a significance threshold for Environmental Justice. However, factors to consider are if an action would have the potential to lead to a disproportionately high and adverse impact to an environmental justice population (i.e., a low-income or minority population), due to:*** • ***Significant impacts in other environmental impact categories; or*** • ***Impacts on the physical or natural environment that affect an environmental justice population in a way that FAA determines is unique to the environmental justice population and significant to that population.***
Potential Environmental Concerns	None. No disproportionately high or adverse impacts are anticipated to occur to people of color or low-income populations near the airport as a result of the proposed MRO facility. According to the 5-year American Community Survey (2016-2020), 25 percent of persons living within a one-mile buffer of the airport are people of color and 35 percent are low income. However, as mentioned earlier in the Land Use discussion, the proposed project site will remain within airport boundaries and will not adversely impact existing residents near the airport.
Children's Health and Safety Risks	
FAA Order 1050.1F, *Significance Threshold/Factors to Consider*	***FAA has not established a significance threshold for Children's Environmental Health and Safety Risks. However, factors to consider are if an action would have the potential to lead to a disproportionate health or safety risk to children.***
Potential Environmental Concerns	None. No disproportionately high or adverse impacts are anticipated to affect children living, playing, or attending school near the airport as a result of the proposed MRO facility. The airport is an access-controlled facility, and children will not be allowed within the fenced portions of the airport without adult supervision. All construction areas should be controlled to prevent unauthorized access.
VISUAL EFFECTS (INCLUDING LIGHT EMISSIONS AND VISUAL RESOURCES/VISUAL CHARACTER)	
Light Emissions	
FAA Order 1050.1F, *Significance Threshold/Factors to Consider*	***FAA has not established a significance threshold for Light Emissions. However, a factor to consider is the degree to which an action would have on the potential to:*** • ***Create annoyance or interfere with normal activities from light emissions;*** • ***Affect the nature of the visual character of the area due to light emissions, including the importance, uniqueness, and aesthetic value of the affected visual resources;***
Potential Environmental Concerns	None. Currently, there is no lighting at the proposed MRO facility project site. However, once constructed there will be building security lighting and lighting for the newly constructed parking lots. All new airport lighting will be part of the overall airport environment and is not expected to cause significant lighting issues to areas outside of airport property.

Visual Resources/Visual Character	
FAA Order 1050.1F, *Significance Threshold/Factors to Consider*	***FAA has not established a significance threshold for Visual Resources/Visual Character. However, a factor to consider is the extent an action would have on the potential to:*** • ***Affect the nature of the visual character of the area, including the importance, uniqueness, and aesthetic value of the affected visual resources;*** • ***Contrast with the visual resources and/or visual character in the study area; and*** • ***Block or obstruct the views of the visual resources, including whether these resources would still be viewable from other locations.***
Potential Environmental Concerns	None. No impacts to visual resources/visual character are anticipated from the proposed MRO facility, as the project site will be located within airport boundaries. Additionally, the proposed project will be located on the eastern boundary of Runway 3-21 where little to no development has occurred at present. There is minimal development near the project site with a small portion of single-family residential and scattered commercial and recreational areas over one mile from the project site. Furthermore, the appearance of the MRO facility will be similar to what currently exists at the airport and will not alter the visual character of the airport. No protected scenic byways are near the airport.
WATER RESOURCES (INCLUDING WETLANDS, FLOODPLAINS, SURFACE WATERS, GROUNDWATER, AND WILD AND SCENIC RIVERS)	
Wetlands	
FAA Order 1050.1F, *Significance Threshold/Factors to Consider*	***The action would:*** 1. ***Adversely affect a wetland's function to protect the quality or quantity of municipal water supplies, including surface waters and sole source and other aquifers;*** 2. ***Substantially alter the hydrology needed to sustain the affected wetland system's values and functions or those of a wetland to which it is connected;*** 3. ***Substantially reduce the affected wetland's ability to retain floodwaters or storm runoff, thereby threatening public health, safety or welfare (the term welfare includes cultural, recreational, and scientific resources or property important to the public);*** 4. ***Adversely affect the maintenance of natural systems supporting wildlife and fish habitat or economically important timber, food, or fiber resources of the affected or surrounding wetlands.*** 5. ***Promote the development of secondary activities or services that would cause the circumstances listed above to occur; or,*** 6. ***Be inconsistent with applicable state wetland strategies.***
Potential Environmental Concerns	None. According to the National Wetlands Inventory, there are no wetlands present on existing airport property.
Floodplains	
FAA Order 1050.1F, *Significance Threshold/Factors to Consider*	***The action would cause notable adverse impacts on natural and beneficial floodplain values. Natural and beneficial floodplain values are defined in Paragraph 4.k of DOT Order 5650.2, Floodplain Management and Protection.***
Potential Environmental Concerns	None. According to the Federal Emergency Management Agency (FEMA), the proposed MRO facility lies with an area of minimal flood hazard. Thus, the proposed project would not cause notable adverse impacts on natural and beneficial floodplain values.
Surface Waters	
FAA Order 1050.1F, *Significance Threshold/Factors to Consider*	***The action would:*** 1. ***Exceed water quality standards established by federal, state, local, and tribal regulatory agencies; or*** 2. ***Contaminate public drinking water supply such that public health may be adversely affected.***
Potential Environmental Concerns	The airport boundaries are in two watersheds: Burys Creek-Wakarusa River and Sherwood Lake-Shunganunga Creek Watersheds. The airport is primarily in the Burys Creek-Warkarusa River Watershed. East of the runway intersection the airport is in the Sherwood Lake-Shunganunga Creek Watershed, which has impaired waters to the southeastern portion of the runway. West of the runway intersection the airport is in the Burys Creek-Wakarusa River Watershed. There are four waterbodies within this watershed. The waterbody closest to the airport is Lynn Creek. According to the U.S. Environmental Protection Agency (EPA), this waterbody is classified as "good" and does not have impaired waters. Long-term impacts to water quality from the proposed MRO project may need to be assessed, depending on how or if stormwater runoff is conveyed to airport stormwater infrastructure, as there appears to be a drainage within the project area (based on aerial mapping). Construction water quality management plans and other best management practices in keeping with FAA Advisory Circular 150/5370-10H, *Standards for Specifying Construction of Airports*, Item C-102, Temporary Air and Water Pollution, Soil Erosion and Siltation Control should be followed.

Groundwater	
FAA Order 1050.1F, *Significance Threshold/Factors to Consider*	***The action would:*** ***1. Exceed groundwater quality standards established by federal, state, local, and tribal regulatory agencies: or*** ***2. Contaminate an aquifer used for public water supply such that public health may be adversely affected.*** ***Factors to consider are when a project would have the potential to:*** • ***Adversely affect natural and beneficial groundwater values to a degree that substantially diminishes or destroys such values;*** • ***Adversely affect groundwater quantities such that the beneficial uses and values of such groundwater are appreciably diminished or can no longer be maintained, and such impairment cannot be avoided or satisfactorily mitigated; or*** • ***Present difficulties based on water quality impacts when obtaining a permit or authorization.***
Potential Environmental Concerns	None. The majority of eastern Kansas, including Shawnee County, is underlain by the Western Interior Plains Aquifer system, which is classified as a minor aquifer. Due to this classification, the change in the impervious surface due to the proposed MRO facility will not adversely affect groundwater quantities, such that the values of the respective groundwater would be appreciably diminished. The airport property is not located near a sole source aquifer. Mahomet Aquifer is the nearest sole aquifer and is over 280 miles away.
Wild and Scenic Rivers	
FAA Order 1050.1F, *Significance Threshold/Factors to Consider*	***FAA has not established a significance threshold for Wild and Scenic Rivers. Factors to consider are when an action would have an adverse impact on the values for which a river was designated (or considered for designation) through:*** • ***Destroying or altering a river's free-flowing nature;*** • ***A direct and adverse effect on the values for which a river was designated (or under study for designation);*** • ***Introducing a visual, audible, or another type of intrusion that is out of character with the river or would alter outstanding features of the river's setting;*** • ***Causing the river's water quality to deteriorate;*** • ***Allowing the transfer or sale of property interests without restrictions needed to protect the river or the river corridor; or*** • ***Any of the above impacts preventing a river on the Nationwide Rivers Inventory (NRI) or a Section 5(d) river that is not included in the NRI from being included in the Wild and Scenic River System or causing a downgrade in its classification (e.g., from wild to recreational).***
Potential Environmental Concerns	None. There are no protected rivers near the proposed project site. The nearest river to the airport is Kansas River over 15 miles away.

Sources:

Air Quality: U.S. EPA |Green Book | Kansas Nonattainment/Maintenance Status for Each County by Year for All Criteria Pollutants (as of November 30th, 2022) (https://www3.epa.gov/airquality/greenbook/anayo_ks.html)
***Department of Transportation Act*, Section 4(f):** Topeka Regional Airport | Airport Master Plan pg. 47 (2016)
Farmlands: United States Department of Agriculture | Natural Resources Conservation Service | (https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx)
Historical, Architectural, Archaeological, and Cultural Resources: Cultural Resources Survey and Evaluation Report for Kansas Air National Guard Properties at Forbes Field, Topeka, Kansas (as of April 2008) | (https://www.kshs.org/resource/survey/forbesfieldreport042808.pdf); Topeka Regional Airport | Airport Master Plan (p.73 and Exhibit 1U);
Kansas Adjutant General's Department (April 2012) (https://www.kansastag.gov/press_release_detail.asp?PRid=977)
Environmental Justice: U.S. EPA | EJSCREEN ACS 2016-2020 Summary Report | (https://ejscreen.epa.gov/mapper/demogreportpdf.aspx?report=acs2020)
Wetlands: National Wetlands Inventory **|** National Flood Hazard Layer | (https://fwsprimary.wim.usgs.gov/wetlands/apps/wetlands-mapper/)
Floodplains: FEMA Flood Map Service Center | (https://msc.fema.gov/portal/search?AddressQuery=Topeka%20Regional%20Airport#searchresultsanchor) (December 2022)
Surface Waters: U.S. EPA **|** How's My Waterway **|** (https://mywaterway.epa.gov/community/topeka%20regional%20airport/overview) | (December 2022)
Groundwater: Sole Source Aquifer | (https://epa.maps.arcgis.com/apps/webappviewer/index.html?id=9ebb047ba3ec41ada1877155fe31356b) | (December 2022)
Wild and Scenic Rivers: National Park Service U.S. Department of the Interior | (https://www.nps.gov/maps/full.html?mapId=8adbe798-0d7e-40fb-bd48-225513d64977) | (December 2022)

Topeka Regional

APPENDIX A
KANSAS FRAMEWORK FOR GROWTH

KANSAS FRAMEWORK FOR GROWTH

FEBRUARY 2021

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LETTER FROM THE GOVERNOR

As our children and grandchildren, along with our friends and other family members, leave Kansas to enjoy greater pay and career opportunities, we face a struggling economy, threatening our collective quality of life for generations to come. This is not acceptable. The world is changing and accelerating every day, and therefore with urgency, we too must change. It is time for Kansas to once again "punch above our weight class."

Recognizing the decline in our state, our local economic development professionals asked for a new economic development strategy to build upon the legacy of the Redwood-Krider report, our last comprehensive economic development strategy, published in 1986. My administration, through the leadership at the Kansas Department of Commerce, made developing a Framework for Growth, a top priority. We also wanted to make sure this is a Kansas strategy and we were successful by using a public process where over 2,000 Kansans were engaged to help guide the direction of the Framework for Growth.

The world is changing and accelerating every day, and therefore with urgency, we too must change.

Our great people, communities, educational system and unique assets give Kansas a solid foundation for growth. While our sector mix is not aligned for future growth and resilience, with intentional action and investment, we can leverage our sectors into new opportunities through the development of modern skills and innovation. The Framework for Growth is grounded in four pillars:

TALENT | INNOVATION | COMMUNITY ASSETS | POLICY

The Framework for Growth is a guide for our actions today and into the future. To help set the Framework into action, two exciting initiatives will be developed by the Department of Commerce. Kansas Competitiveness Project, a cross-cutting competency development effort built on advanced skills, knowledge, and innovation, will position Kansas as a leader and future-proof our economy. The Regional Excellence Initiative will help communities work together to leverage their collective assets and creativity to further develop their region for global economic competition. These initiatives combined with other actions will position our economy for success.

Join me as we stabilize and strengthen our economy and "punch above our weight class" in a robust Kansas economy built on advanced skills, innovation, and outstanding community assets. Through bold action we will win the talent war and enjoy a prosperous future together. It is with this vision and collective effort we can welcome new friends, reunite with old friends, and enjoy time with our families, children, and grandchildren, in Kansas.

Sincerely,

Governor
Laura Kelly

OUR COMPETITIVE POSITION

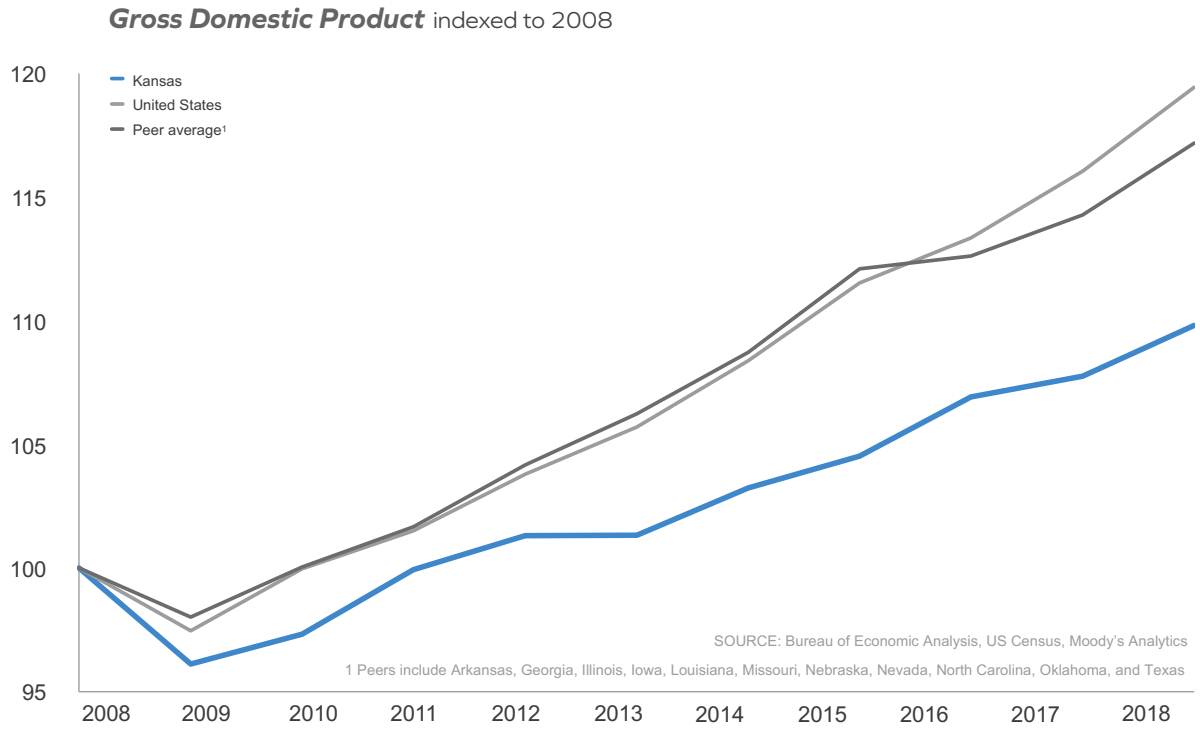
In an increasingly competitive and rapidly changing environment for economic development, Kansas has fallen behind. The future of our state and the prosperity of our residents are at stake.

Disruptive forces are changing the competitive landscape for our state's economy and its businesses, and a variety of trends are rapidly accelerating and changing the economic geography of various sectors of economic activity. Automation is fundamentally reshaping manufacturing processes, warehouse operations, and other activities. New technologies are emerging and rendering once competitive products obsolete. Consumer preferences are ever-changing and creating new markets every day. Global wealth is expanding, opening up new trade and export opportunities. Global pandemics and other emerging threats challenge the resiliency of our economies, and our preparation for the future.

ECONOMIC OVERVIEW

In Kansas we take pride in our great people and strong communities. Our state has a history of steady economic performance enabled by our unrivaled talent and strong network of businesses.

In 2008, Kansas was performing in the top half of U.S. states in terms of employment growth (24th), GDP growth (14th), and average wage growth (21st), and even had several years of sustained GDP growth that ranked in or near the top 10 in the U.S. (from 2009-2011).



In recent years, however, Kansas has slipped, our advantages have eroded and a gap is widening with our peers.

By 2018, our state had fallen from its position among the top half of states in core economic outcomes, ranking 43rd in employment growth, 35th in GDP growth, and 42nd in average wages. Compared to peer states Kansas has experienced slower growth since the recession with 0.9% GDP growth per year in Kansas since 2008 vs. 1.6% growth for peers.

ECONOMIC OVERVIEW (CONTINUED)

Fortunately, our state has core assets that we can leverage to catalyze future growth.

Kansas outperforms peers in several key areas that are critical to driving economic growth. For us to achieve our aspiration, it will be essential for Kansas to build upon its strengths, including but not limited to:

- **✓ A robust education pipeline from kindergarten to higher-ed that outperforms peers.**
- **✓ A favorable business climate and efficient incentives programs.**
- **✓ A competitive advantage in certain high growth sectors.**
- **✓ A central location and strong transportation system.**
- **✓ A high quality of life and affordable living for residents.**

U.S. LEADING STATES INDEX RANKINGS

#15 for Preschool - 12

#3 Percent of <5 year-olds enrolled in pre-K

#22 On-time graduation rates from secondary school

#36 Percent of student meeting college readiness standards

#20 NAEP Math scores

#13 for Higher Education

#22 Average student debt

#25 Average tuition

#29 Graduation rate for bachelors degree

#8 Graduation rate for 2-year post secondary institutions

#7 Unemployment rate

#13 Labor force participation

#15 Educational attainment

Despite these strengths, Kansas is facing a unique set of challenges that are hindering our state's ability to prosper and grow.

Our sector mix is not aligned for future growth and resilience. Kansas is highly specialized in industries that are experiencing stagnant growth and under indexed in high growth industries in the U.S. (i.e., tech, biosciences). Absent intervention, many of Kansas' regions will remain dependent on one to two sectors, leaving them vulnerable to a downturn or loss of a major company anchor.

Kansas has a stifled innovation ecosystem that has limited the opportunities for Kansas based start-ups. Kansas underperforms the U.S. across the innovation pipeline, falling the most behind in start-up creation and patent commercialization. We rank 38th in startup job creation and 22nd in patents granted in the country.

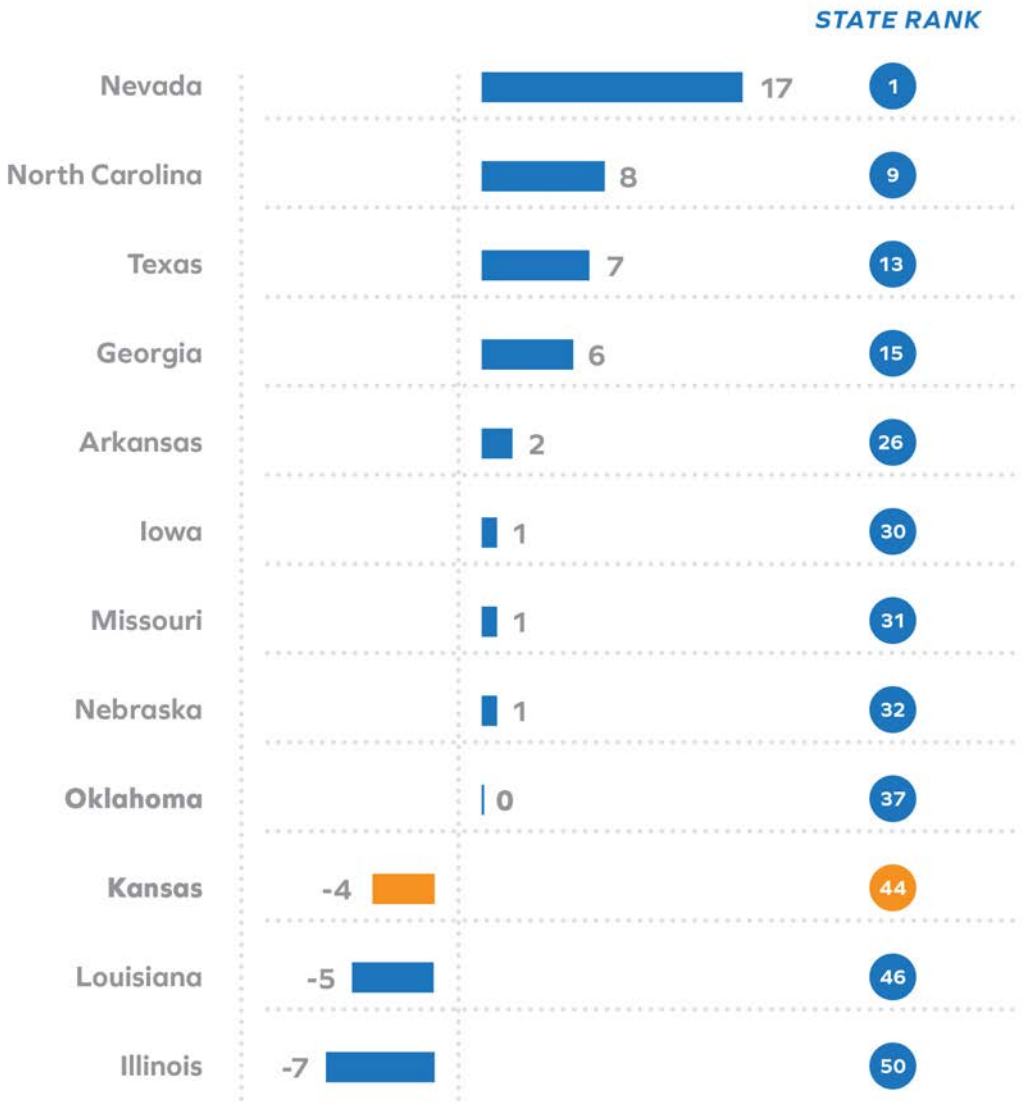
Population decline and the widening talent gap are immediate threats facing our economy. Kansas has experienced severe net outmigration in the past five years (44th in the country in net migration). The working population is projected to decline 2.3% by 2028. There is also a widening skill gap in high skilled professions. Our state has few high-skill opportunities for workers with a bachelor's degree or higher (~32% of the population has a bachelor's degree or above, and only ~24% of the current jobs require this level of skill). Absent shared commitment and collective action, these skill gaps will grow as the impacts of automation and the knowledge economy make skilled work even more valuable.

Certain regions in Kansas are experiencing greater challenges related to population loss, unemployment, and GDP growth. Some communities have faced such severe population loss that they have lost critical mass for key social services (i.e., schools, hospitals). Some are less connected to the higher growth markets and have lagging outcomes in physical and digital connectivity (i.e., broadband). Others face a disproportionate risk of job displacement from automation due to the industry mix (i.e., manufacturing, office support, food services).

ECONOMIC OVERVIEW (CONTINUED)

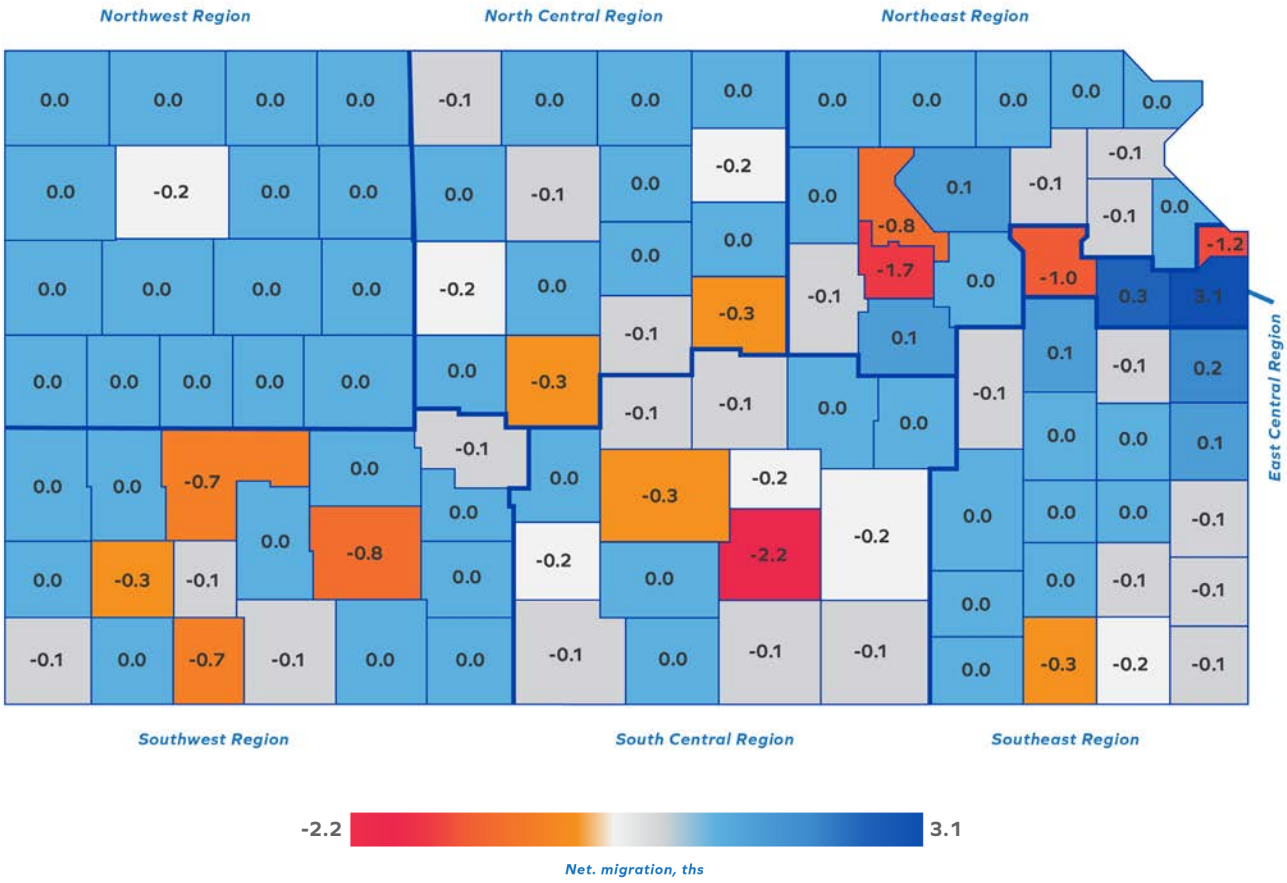
2018 Net Migration Per 1,000 People

SOURCE: US Census Bureau, Moody's Analytics



Net Migration by County in Kansas, 2018

SOURCE: US Census Bureau, Moody's Analytics



These trends and their implications for our state's future cannot be accepted. Individually and collectively, these issues cannot be confronted in isolation. We will not elevate our competitive position working in silos. Doing so will require coordinated action supporting the pillars of our state's Framework for Growth, and the unique needs of our target sectors and economic regions.

TARGET SECTORS

Kansas has a portfolio of concentrated industry sectors (clusters) that are readily identifiable and reflect the unique competitive advantages of the region. A cluster is a geographically proximate group of companies and associated institutions in a field, linked by their shared workforce, supply chain, customers or technologies. Economic clusters are an essential tool to help drive our state's regional competitiveness and economic growth by improving productivity, fostering innovation, and facilitating commercialization of new ideas.

The United States and Kansas economies can be characterized by two kinds of industries: tradable and non-tradable. Traded industries sell products or services across regions and countries. Non-tradeable industries, on the other hand, serve almost exclusively the local market and are not exposed to cross-regional competition. These tradeable sectors have a greater "multiplier effect," creating multiple jobs in the economy for every job they create through the adjacent impacts and spillovers in the economy.

Looking ahead to Kansas' future, the Framework for Growth identifies a set of tradable target sectors that will create a balanced portfolio of growth opportunities for which Kansas is effectively positioned to capture. These clusters were prioritized based on the future growth projections, level of specialization (or "comparative advantage") Kansas has in the sector, and the potential impact on the aspiration across employment growth, wage growth, and impacts on lagging regions. The target sectors identified are areas that the state can and should play a more active role in supporting and promoting through implementation of the Framework for Growth:

Advanced Manufacturing

Aerospace

Distribution, Logistics, and Transportation

Food and Agriculture

Professional and Technical Services

Advanced Manufacturing

Turn headwinds into tailwinds and become a Manufacturing 4.0 hub by embracing digital manufacturing.

Increasing global competition is creating challenges for North American manufacturers. In recent years, new players in Asia have entered the market with competitive prices and innovations, hardware is becoming commoditized as digital technologies have become capable of producing more complex products at a faster rate, and manufacturers' business models are shifting from hardware-centric to the software and services domain. The growth of digital manufacturing (i.e. the use of big data, Internet of Things (IoT) and Industrial Internet of Things (IIoT), cloud technology, advanced analytics, advanced robotics and other digital tools in traditional manufacturing processes) also has implications for labor. Manufacturing is the sector with the highest share of activities that can be automated, which has the potential to create both job displacement and higher-wage jobs.

Given these headwinds, we need to prepare our manufacturing businesses for digitalization and prepare our workers for the manufacturing jobs of tomorrow. Kansas is specialized in several major advanced manufacturing subsectors and is forecasted to have a higher five-year employment growth than both peers and the U.S. in all the major advanced manufacturing subsectors. We should leverage our existing specialization in major subsectors to help transition local manufacturers to digital manufacturing, attract high-tech players that could bring high-wage jobs and invest in local innovators who will become the next-generation digital manufacturers. Moreover, given that these subsectors are labor-intensive industries, we need to give our workers the knowledge and skills necessary for the transition into digital manufacturing.

STRATEGIC OPPORTUNITIES INCLUDE

- ✓ **Create a manufacturing 4.0 program for companies**
- ✓ **Offer new incentives to businesses to encourage digital manufacturing transformation**
- ✓ **Develop new programs to effectively train workers with Manufacturing 4.0 skills**
- ✓ **Develop and expand apprenticeship programs**
- ✓ **Help recruit tech talent to the state and its manufacturers**
- ✓ **Support the establishment of incubators that advance new technology development**
- ✓ **Improve financing and capital access to support innovative research and development activity**

TARGET SECTORS (CONTINUED)

Aerospace

Build on existing foundations to expand the value chain, drive innovation, and capture projected growth.

Kansas has a proud history as an aerospace manufacturing leader. Some of the industry's earliest pioneers, including Clyde Cessna and Walter Beech, made Kansas their home. During the 1940's, Boeing's B-29 Superfortresses rolled off Wichita's assembly lines. In 1954, Wichita began producing the iconic B-52 bombers, aircraft that are still in service today. More than 106 years since the first plane was built in Kansas, the state remains a vibrant hub for aviation manufacturing. Manufacturers in the state leverage low operating costs, a skilled workforce and world-class research institutions to build some of the most iconic planes and aerospace technologies in the world.

Looking ahead, Kansas has an opportunity to better align its world-class assets and competitive advantage in the aerospace industry with the subsectors that anticipate the most growth. Emerging technology is creating shifts in the aerospace value chain. More specifically, within aerospace manufacturing, guided missile and space vehicles (2.3% annual growth since 2013) and aircraft engine parts (1.8% annual growth) have driven the most growth the past five years. Despite this fast growth, Kansas has currently overinvested its existing workforce in sub-clusters that are in fact more at risk of slowed growth through 2023.

STRATEGIC OPPORTUNITIES INCLUDE

- ✓ **Double down on our competitive advantages to capture projected growth in MRO opportunities**
- ✓ **Scale existing aerospace assets (i.e. research centers) into new arenas of the value chain**
- ✓ **Promote cross-sectors applications such as unmanned aerial systems (UAS)**
- ✓ **Better connect aerospace anchors and OEMs to smaller manufacturers and researchers**
- ✓ **Commit Kansas to being a customer for disruptive aerospace technologies**
- ✓ **Double down on attracting new locations for OEMs and Tier 1 suppliers/vendors**
- ✓ **Expand the state's resources into aerospace industry conferences and events**
- ✓ **Increase student exposure to innovation and new technologies in aerospace**
- ✓ **Promote contracting opportunities and federal military spend in the state**

Distribution, Logistics and Transportation

Leverage location, transportation networks and investments to solidify status as a national logistics hub.

Kansas has experienced strong recent growth across distribution, logistics and transportation keeping pace with high growth sector and capturing our fair share of U.S. growth. The relative specialization, alongside our beneficial location, support the large employment share and above average growth projection. Kansas, however, needs to prepare for the global trends in evolving consumer preferences, automation and data-driven solutions that are impacting the distribution, transportation and E-Commerce market. The E-Commerce market has been growing every year since 2000 and is projected to reach $8 trillion by 2025 as E-Commerce customers want things faster and cheaper. Automation – which will impact our low- and middle-skilled workers – is also expected to play a bigger role in the competitive landscape: by 2021, there could be over $1 billion in annual warehouse automation installation investments from just the top 50 grocers globally. The increase in the use of data-driven innovations, such as analytics and Internet of Things (IoT) and Industrial Internet of Things (IIoT), will also fundamentally change every step of the logistics chain, from warehousing to last-mile delivery.

Kansas has a high level of employment and specialization in major subsectors such as trucking and warehousing, and we need to stay on the forefront of these global trends to continue capturing growth and providing jobs for our logistics workers. Kansas is projected to outperform the U.S. in employment growth for warehousing, wholesale, and ground transportation support activities – subsectors where advanced analytics and automation would increase operational efficiency and create high-wage jobs. Our central geographic location and urban cores could also help win logistics deals that could attract businesses and jobs.

STRATEGIC OPPORTUNITIES INCLUDE

- ✓ **Encourage companies and developers to prepare warehouses and spaces for automation**
- ✓ **Partner with logistics companies to host innovation competitions**
- ✓ **Incentivize logistics companies to retrain workers to manage automated solutions**
- ✓ **Provide forums to enable industry collaboration on solutions for workers at risk of automation**
- ✓ **Invest in innovative logistics solutions through a logistics center of excellence**
- ✓ **Offer grants for startups to adopt innovative third-party analytical tools**
- ✓ **Help partners establish accelerators and/or incubators supporting logistics technology startups**
- ✓ **Bolster air transportation connectivity and infrastructure to win multimodal logistics deals**
- ✓ **Incentivize prospective site development for logistics and distribution centers**

TARGET SECTORS (CONTINUED)

Food and Agriculture

Support the resilience of our agriculture sector and solidify our status as a global leader and innovator.

According to the Kansas Department of Agriculture, the sixty-six agriculture and food sectors provide nearly $68 billion in total economic contribution to Kansas. Eighty-eight percent of all Kansas land (over 46 million acres) is farmland with another 16 million acres serving as pastureland for grazing animals. Kansas is twice as specialized in Agriculture than the national average. Technology, consumer demands, alternative proteins, geopolitical changes, trade policy changes, sustainability, and many other factors pose challenges to our Agriculture industry, but they also provide an opportunity for growth.

Kansas is a globally recognized as a premier region for cattle production, but this heavy reliance on a single industry poses natural risks to our state. Consumer preferences are rapidly shifting with American consumers eating a third less beef today, eating double the amount of chicken and many are seeking alternative protein choices; these changing preferences present an opportunity for Kansas. In order to generate more security for our economy, Kansas must explore opportunities for further economic diversification while supporting the vibrancy and competitiveness of its Food and Agriculture sector.

Additionally, technology adoption continues to transform agriculture and food manufacturing at an incredibly rapid pace. New technology is increasing farm and processing productivity, generating higher crop yields and securing our livestock's health. The state must prepare and equip Kansas farmers and food manufacturing workers with new skills to succeed, including technical and analytical expertise.

Kansas – with our leading higher education institutions, extension system and research facilities – is a natural home for these developments and should align itself as a world-class home to research, development, and testing of new technologies in animal health, crop science, ag-tech and data analytics.

STRATEGIC OPPORTUNITIES INCLUDE

- ✓ **Provide technical assistance to support the growth of small businesses**
- ✓ **Ensure consistent, reliable broadband access so producers can integrate new technologies**
- ✓ **Create nontraditional lending sources to support startups and succession planning for family farms**
- ✓ **Strengthen relationships with and access to export markets for food and agricultural products**
- ✓ **Establish a center of excellence for alternative crop development and value-added opportunities**
- ✓ **Strengthen the premier animal health services corridor in the world by expanding the value chain**
- ✓ **Develop centers of excellence for ag tech innovation and applications**
- ✓ **Encourage sustainability initiatives that aid operations**

TARGET SECTORS (CONTINUED)

Professional and Technical Services

Double down on headquarters growth, strengthen regional service hubs and build centers of excellence.

While more traditionally known for industries such as agriculture and manufacturing, Kansans have developed a comparative advantage and experienced growth in the professional and technical services industries in recent decades. Of the identified target sectors, the professional and technical services sector currently comprises the largest workforce, with over 87,000 Kansans employed in 2019 (nearly 6% of Kansas' total employment). And by 2029, this figure is expected to top over 102,000 employees. In addition to nearly doubling the state's average annual wage ($83,000 compared to Kansas' average of $46,000), every job created in the professional and technical services cluster adds an additional 2.4 jobs to the local economy by increasing demand for supporting services. To maintain and accelerate our growing leadership in this high-opportunity cluster, there are three broad approaches that Kansas can pursue:

1. ***doubling-down on headquarters opportunities,***
2. ***supporting regional service hubs and centers of excellence,***
3. ***and strengthening the digital backbone and talent pipeline.***

Headquarters comprise the largest employment base (over 25,000 jobs in 2018) and created the greatest outperformance compared to the U.S. (over 8,000 jobs more than what would have been expected if Kansas had grown at the same rate as U.S. average in the sector). Kansas' competitive labor costs for headquarters ($14,000 less than peer average) also makes it an attractive destination for companies that need access to an educated workforce.

Within the business and technical services industries, company trends are increasingly moving toward more automated solutions and higher-skilled "centers of excellence" enabled by computer services. Kansas' strong talent pipeline and growing computer services industries will help support and sustain digitally-enabled business processes, automation and business tourism in the state.

STRATEGIC OPPORTUNITIES INCLUDE

- ✓ **Attract the U.S. headquarters of foreign companies through targeted international recruitment efforts**
- ✓ **Attract computer services and consulting companies through CEO networks**
- ✓ **Improve air service connectivity at Kansas' major airports**
- ✓ **Develop incentives to encourage investments in process digitalization**
- ✓ **Invest in developing vibrant business districts to attract employers and talent**
- ✓ **Attract data center investment in areas with strong broadband connectivity**
- ✓ **Strengthen relationships and partnerships between MBA and computer science programs**
- ✓ **Invest in centers of excellence to drive growth in niche technologies**

Kansas' strong talent pipeline and growing computer services industries will help support and sustain digitally-enabled business processes, automation and business tourism.

OUR VISION FOR THE FUTURE

We are at a critical juncture in our state's history. Now is the time for Kansans to come together and be bold as we contemplate our vision and strategies to enable growth and prosperity in our state. As we look to the future, it is critical for us to ensure that we continue to harness the strengths in Kansas and address our challenges head on. Accordingly, the Framework for Growth incorporates a bold vision that is defined in key increments to be achieved over time.

5 YEARS

***Stabilize and reposition* (2021 – 2025)**

Reverse negative trends and set a clear growth trajectory by building a foundation through initiation of new programs, policies, and investments.

10 YEARS

***Punch above our weight* (2026 – 2030)**

As investments begin to yield substantive gains, they drive our competitive position in key economic outcomes to the top half of all states.

15 YEARS

***Realize a "future proof" economy* (2031 – 2035)**

New approaches will have become ingrained, effects will be compounded and the return on investment will be evident as our state emerges with a reputation as a disruptor rather than the disrupted.


As we look to the future, it is critical for us to ensure that we continue to harness the strengths in Kansas and address our challenges head on.

OUR FRAMEWORK FOR GROWTH

Achieving the vision of a "future proof" Kansas economy will require aggressive yet flexible investment; the Framework for Growth will help guide this investment. Specifically, four strategic pillars provide the foundation for our state's Framework for Growth.

TALENT

INNOVATION

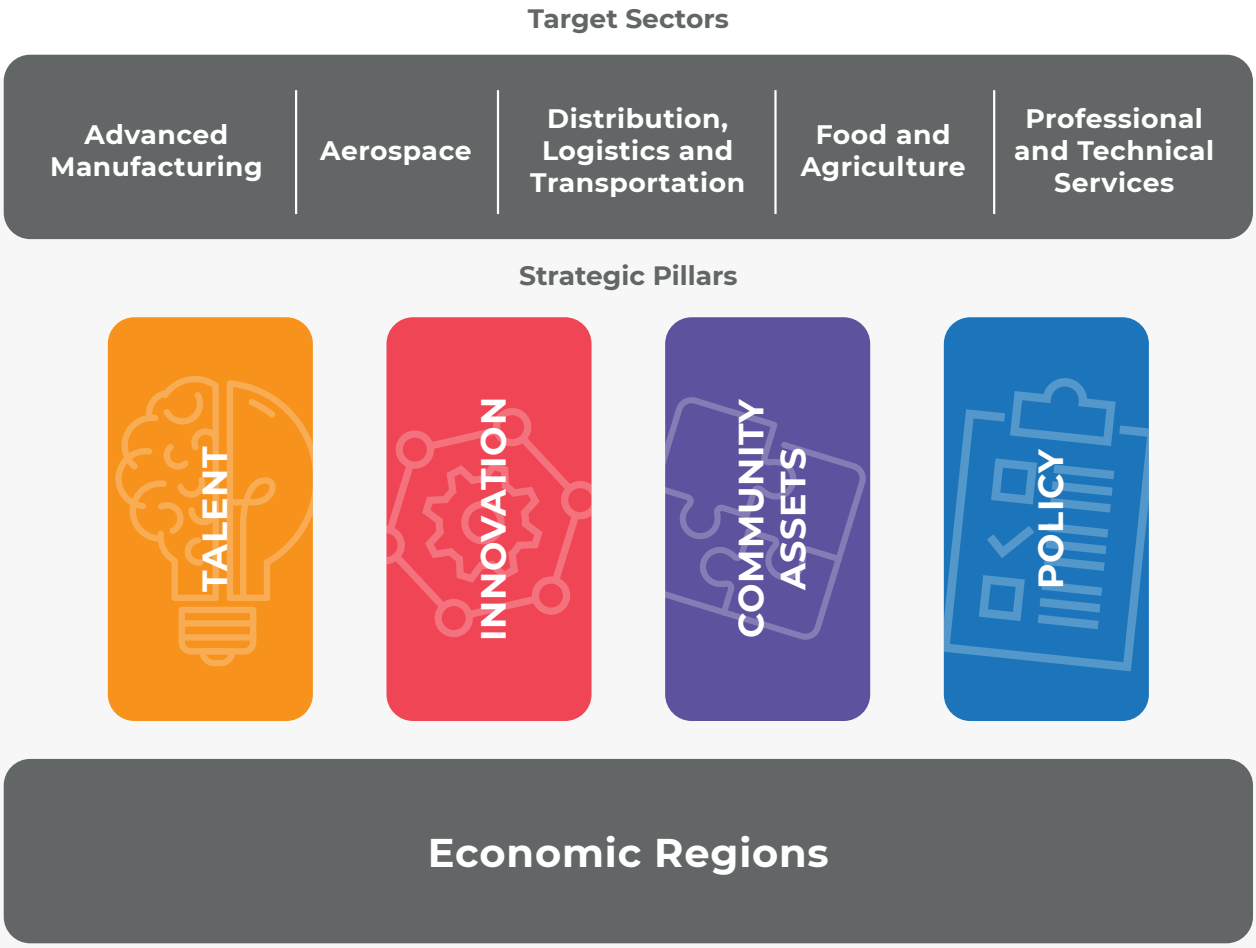
COMMUNITY ASSETS

POLICY

These four pillars support the competitiveness and resilience of our state's target sectors and economic regions. Target sectors reflect those areas of our state's economy that are most competitive, and which hold the strongest prospects for employment and income growth, and accordingly, merit focused investment to support their development. Our state's economic regions have distinct assets, opportunities and needs, and accordingly, deserve focused investment to support their prosperity. Supporting our target sectors, economic regions and the four pillars are our excellent public-school systems and higher education institutions. Specifically, our Kansas Board of Regents schools will be critical in driving job growth and capital investment in Kansas through cutting-edge research and talent development.

The Framework for Growth presents a set of objectives and outcomes and a complementary set of priority and potential initiatives and investments for each pillar and each sector. Objectives and outcomes will guide the development of new initiatives and investments by state agencies each year, initiatives and investments that are expected to align with the Framework for Growth, its strategic pillars and its target sectors. Initiatives and investments reflect new or augmented programs, policies and expenditures proposed by various state agencies as they fulfill a mandate to align budgeting and operations with the Framework for Growth. In this regard, the Framework for Growth is not a static strategy with a discrete budget; it is a framework that enables flexibility and responsiveness in our efforts to support economic growth.

Kansas Framework for Growth Model



As a result, the Framework reflects an enduring, guiding structure for our state's economic growth – one that will appropriately and proactively respond to new challenges and opportunities confronting the state, its target sectors and its economic regions. In order to address these challenges and reverse certain trends related to our state's competitive position and achieve our vision of a "future proof" economy, the Framework cannot simply exist as a set of objectives and potential initiatives. Objectives will only become outcomes and initiatives will only become investments if necessary and sufficient resources are dedicated. Accordingly, the Framework's implementation and operationalization will be supported by the establishment of two new programs: the Kansas Competitiveness Project (KCP) and the Regional Excellence Initiative (REI), supported by a new Chief Strategy Officer.

STRATEGIC PILLAR: TALENT

Objectives and Outcomes

Bridge the skills gap for in-demand and high-wage occupations in target sectors.

Attract and retain top talent across the state's economic regions.

Strengthen graduate retention from our state's institutions of higher education.

Rise to the top of Midwestern states with respect to educational and workforce outcomes.

Attract jobs in target sectors that align with the skills of our workforce.

Set annual targets for the retention of graduates in the state of Kansas.

Priority Initiatives and Investments

Kansas Talent Enterprise: Establish a new partnership to modernize state approaches to workforce development; create synergy between education and economic systems; empower business and industry to drive results; and align systems toward a shared, transformative vision.

Quick Work Kansas: Launch a comprehensive, rapid-response, workforce development program to provide new or expanding employers with a flexible, customized training solution.

"Elevate Kansas" Talent Attraction Marketing Campaign: Implement a robust and targeted talent attraction effort that effectively promotes employment opportunities in our state's economic regions and target sectors, and which welcomes former residents and alumni back to the state, through investments that promote and strengthen our image and brand identity.

Potential Future Initiatives and Investments

Employer Engagement and Work-Based Learning: Deploy Employer Engagement representatives and/or Work-Based Learning intermediaries in each of the state's economic regions to develop partnerships with industry that support applied learning and job placement.

Align "Excel in Career Technical Education Initiative" Outcomes: Establish regional advisory boards in each of the state's economic regions to align credentials with skills demanded by target sectors.

Amplify Apprenticeships: Strengthen the Registered Apprenticeship Program through a series of coordinated investments that incentivize employer engagement, nurture new partnerships, promote equity in access and accelerate the number of registered apprentices.

Kansas Completes Scholarship: Design a new scholarship program to complement existing aid and provide gap financing to help students graduate with 24-30 hours of college credit.

Welcome to Kansas: Building on the successes seen with such efforts in Dodge City and Garden City, launch a campaign to attract and support immigrant communities in Kansas through marketing, funding to resettlement agencies and services such as ESL and career placement.

Revolving Talent Fund: Work with private employers to establish a self-sustained resource for training and workforce development through interest-free loans for education and training.

STRATEGIC PILLAR: INNOVATION

Objectives and Outcomes

Foster a vibrant innovation ecosystem within and across economic regions.

Improve commercialization outcomes that drive innovation and job creation.

Support research and development of disruptive technologies that define future growth prospects.

Ensure that entrepreneurs are afforded with adequate access to capital.

Invest in the retention, expansion and attraction of innovative companies in target sectors.

Set annual targets for new business creation for each university.

Establish "front doors" at each state university to create easy access points for partnerships with the private sector to encourage new business and product development.

Priority Initiatives and Investments

Accelerating Innovation: Accelerate and focus state investment in the research, development, and commercialization of emerging and niche technologies that can "future proof" our economy by way of new programs such as the Kansas Competitiveness Project (KCP).

"Elevate Kansas" Corporate Recruitment Marketing Campaign: Implement a robust and targeted corporate recruitment effort that supports the state's vision to "stabilize and reposition" our economy, and which promotes the advantages that support our competitiveness in target sectors, through investments that promote and strengthen our image and brand identity,

Innovation Network: Create a new statewide network to provide resources for entrepreneurs, services for investors and coordinated matchmaking (i.e., mentorship, connections to investors and capital for entrepreneurs, and concierge service for investors).

Potential Future Initiatives and Investments

Corporate Accelerators and Innovation Competitions: Partner with and incentivize companies to establish accelerators and/or innovation competitions that provide industry-specific innovation ecosystems to entrepreneurs and/or incentivizes to address a specific corporate challenge.

College and University Entrepreneurship Tracks: Establish entrepreneurship-focused courses and concentrations across STEM disciplines that encourage students to combine academic and entrepreneurial interests and provide resources to support potential endeavors and enterprises.

"Invest in Kansas" Marketing Campaign: Implement a highly focused, relationship-based campaign to encourage venture capital investment in the state's target sectors.

High-Tech Research and Development Loan Program: Develop a new research and development loan program that partners with and incentivizes lenders to provide low-interest loans to small and mid-sized companies to support technology improvements.

Innovation Centers: Invest in industry-serving, university innovation centers to develop cutting-edge technology using cross-cutting advanced competencies such as AI, data analytics, robotics and automation.

STRATEGIC PILLAR: COMMUNITY ASSETS

Objectives and Outcomes

Empower our regions to develop the infrastructure that will help "future proof" their economies.

Rise to the top of Midwestern states with respect to broadband connectivity and access.

Maintain and enhance transportation networks that solidify our position as a distribution hub.

Improve multi-modal infrastructure in strategic locations throughout the state.

Promote vitality, livability and quality of place in our state's economic regions.

Priority Initiatives and Investments

Office of Broadband Development: Provide capacity and resources to support our economic regions and their collaborative yet differentiated approaches to broadband technology deployment through a coordinated Office of Broadband Development.

Sites and Buildings: Direct state resources to economic regions seeking to improve the attractiveness and preparation of sites and buildings that can support economic development by way of the Regional Excellence Initiative and other programs.

Runway to Recovery: Provide targeted support to regional partners and their airports to promote the recovery of passenger traffic and economic activities that are critical to the prosperity of our economic regions (i.e. aerospace and aerospace maintenance, overhaul and repair; transportation, logistics and distribution).

Potential Future Initiatives and Investments

Anchor Institutions and Regional Revitalization: Develop a partnership program to incentivize and encourage anchor investment strategies that spur revitalization and placemaking.

Quality of Place: Provide resources to help communities create housing solutions (i.e., co-living for young graduates), overcome connectivity issues (i.e. public transportation and walkability), and develop compelling places (i.e. Main Street revitalization).

Enabling Infrastructure: Expand state investment in infrastructure that enables competitiveness in emerging technologies and core competencies supporting target sectors (i.e. unmanned aerial systems, smart grids and technologies, driverless vehicles, etc.).

Air Service Connectivity: Work with regional and state partners to align marketing efforts and expenditures that help attract new nonstop destinations and improve passenger air connectivity.

Multi-Modal Logistics: Support the sustainability of existing logistics parks and the intentional establishment of new logistics parks by incentivizing and investing in the adoption of the latest multi-modal capabilities and technologies.

State Energy Plan: Develop a long-term, statewide energy plan to ensure the infrastructure is developed to maintain and grow our energy producing sectors including oil & gas, and renewables.

Rail Service: Help communities prepare and promote rail-served sites that leverage our network.

STRATEGIC PILLAR: POLICY

Objectives and Outcomes

Align economic development policies and incentives with target sectors.

Promote transparency through processes to evaluate the return on investments and incentives.

Provide stable and at-scale funding for economic development incentives.

Ensure that state policy supports objectives and outcomes in other strategic pillars.

Regularly evaluate state regulations policies, and incentives relative to peers and competitors.

Priority Initiatives and Investments

Modernize Incentive Programs: Adjust eligibility requirements and award amounts associated with the state's primary economic development incentive programs, Promoting Employment Across Kansas (PEAK) and the High-Performance Incentive Program (HPIP), to improve their applicability to and outcomes within economic regions and target sectors.

Funding for Incentives: Enable consistent, stable, multi-year funding streams to support the implementation of economic development programs and the provision of competitive economic development incentives (i.e. JobsOhio's monetization of state liquor licenses).

Transparency in Operations: Maintain and update the state's database to improve transparency into incentives awarded and support regular, in-depth evaluation of return on investment using economic and fiscal impact multipliers (i.e., Virginia's ROI calculator).

Potential Future Initiatives and Investments

Innovation Incentives: Support the attractiveness of our innovation ecosystem by ensuring that incentives for innovation are constantly evaluated and updated, including updates to incentives for research and development activity, angel investment and other activities.

Regulatory Alignment: Regularly convene stakeholders from target sectors and economic regions to evaluate state regulations and policies, and their impact on our economic regions and target sectors, providing necessary feedback to legislators.

Purchasing Power: Utilize state purchasing power to support the state's target sectors and economic regions abilities to be early adopters of disruptive technologies (i.e. UAS, VTOL, etc.)

Incentivizing the Supply Chain: Develop new, highly-targeted incentives that seek to incentivize the attraction of suppliers/vendors supporting existing supply- and value-chains, and/or new incentives to encourage employers to source products and services from local suppliers/vendors.

Export Promotion: Establish new policies and programs that support and promote the exportability of products manufactured in the state.

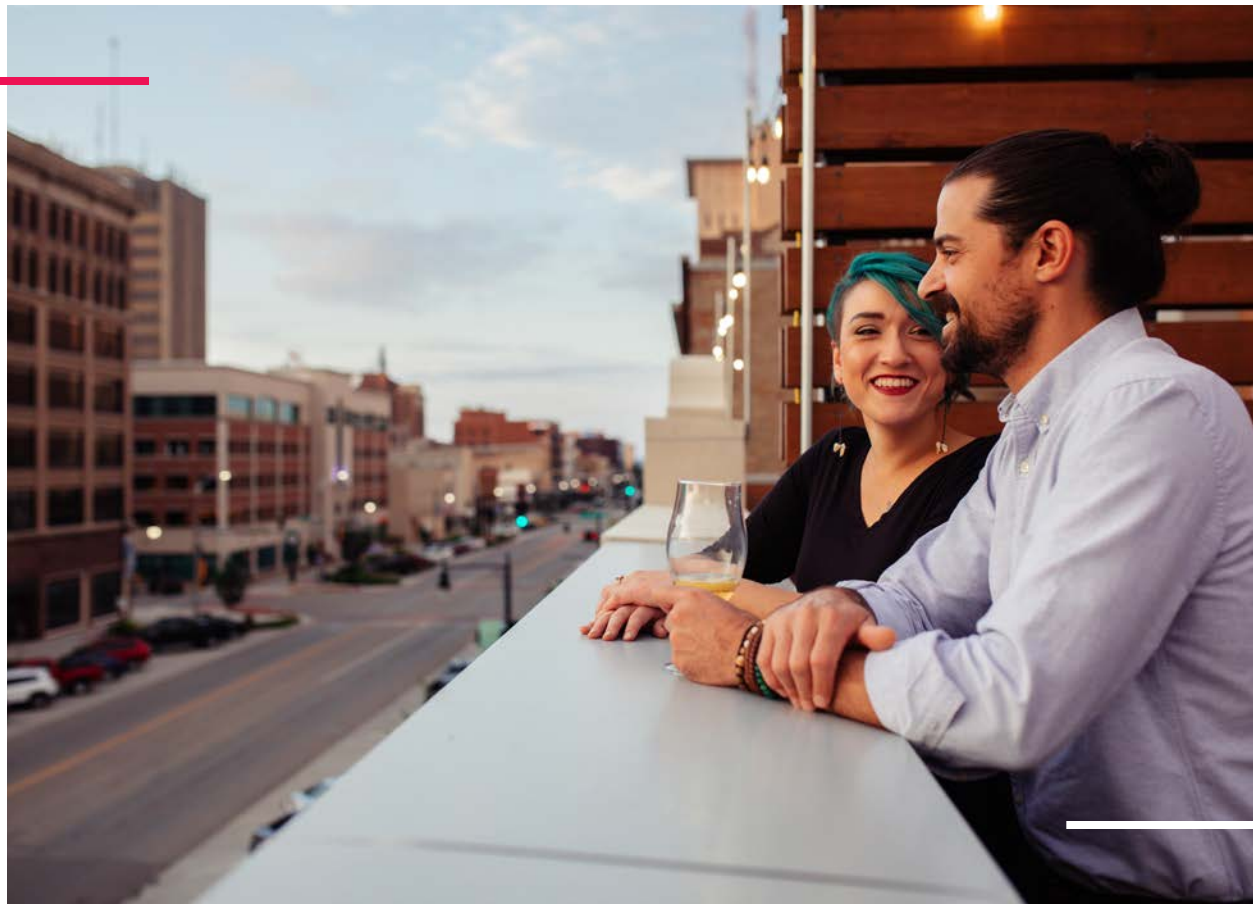
OUR COMMITMENT TO IMPLEMENTATION

OPERATIONALIZING THE FRAMEWORK

In doing so, it provides strategic guidance to the state's agencies regarding the ways in which they can and should support the state's growth objectives in their annual planning and budgeting. It guides us by way of core principles but does not prescribe our actions by way of specific tactics. Rather, it recognizes that strategic challenges and opportunities emerge every day, and that specific tactics and investments should be derived over time in alignment with guiding principles.

A new Chief Strategy Officer (see next section) will coordinate with state entities as they develop and implement programs, ensuring that the Framework for Growth is a model that permeates all state operations rather than a strategy siloed within its Department of Commerce. Proposed initiatives and investments that align with the state's Framework and its strategic pillars will be integrated into the Framework for Growth; initiatives and investments that have been appropriated or are underway will also be incorporated. In this regard, the Framework for Growth remains a dynamic document, updated annually to "tell a story" about the state and the fulfillment of its vision to "future proof" the economy.

The Kansas Framework for Growth is intended to be a flexible and responsive model to guide our state's investments in a manner that supports long-term growth and competitiveness.



CAPACITY SUPPORTING THE FRAMEWORK

Chief Strategy Officer

The Chief Strategy Officer (CSO) is a new position within the Department of Commerce which serves a critical function as the organizational backbone to the Framework for Growth, and a resource to various state agencies, regional partners and private industry to help accelerate and align the state's investments around the Framework for Growth. The CSO is responsible for oversight and administration of two new programs – the Kansas Competitiveness Project (KCP) and the Regional Excellence Initiative (REI) – to direct state investments to develop the state's target sectors and regions in a manner that aligns with the Framework's pillars and associated principles. In addition to administering these two programs, the CSO serves as an internal strategic resource within state government, tasked with supporting each agency or department's mandate to demonstrate alignment in annual budgets and operations with the pillars and principles of the Framework for Growth.

CAPACITY SUPPORTING THE FRAMEWORK
(CONTINUED)

Regional Excellence Initiative (REI)

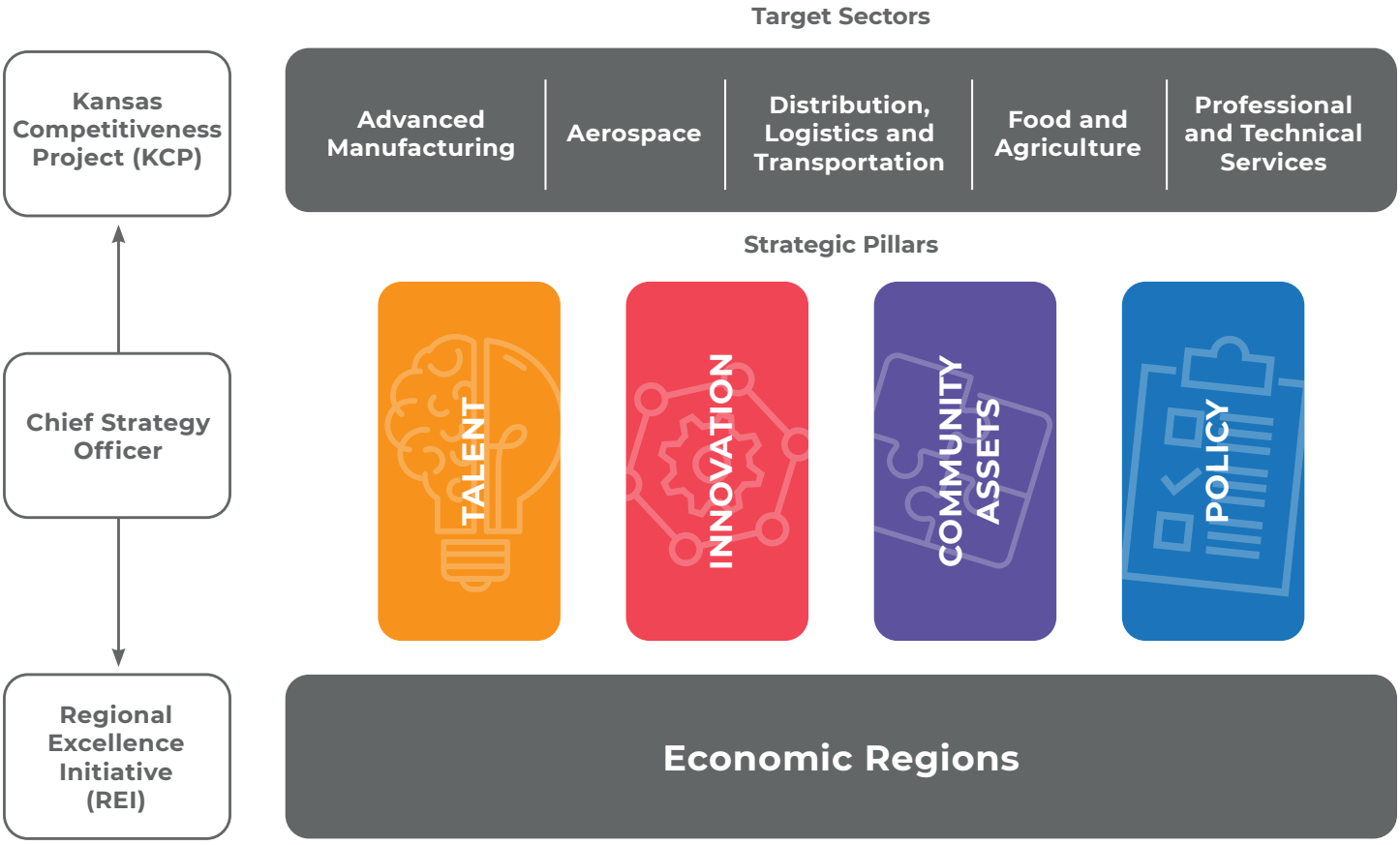
The Regional Excellence Initiative (REI) is a new effort to direct state resources and technical assistance in support of regional planning efforts that align with the Framework for Growth. The REI is intended to help regional partners assess their specific needs and opportunities, develop proactive plans to accelerate their competitiveness in alignment with the Framework for Growth and afford resources to aid their implementation. Specifically, the REI would provide regions with a set of planning and implementation grants, as well as technical assistance from the Chief Strategy Officer, to support regional strategic planning in alignment with the Framework. The Initiative should support our transition away from a fragmented system of local-level planning and rigid definitions of economic regions that often fail to reflect regional economies and clustered activities. It recognizes the reality that regional economies and clustered sectors have little regard for jurisdictional borders; accordingly, the REI will allow grant applicants to self-define their region for planning purposes.

The Initiative supports the Framework in three primary ways. First, regional planning processes serve as a regular source of strategic input that informs annual updates to the Framework for Growth. Second, regional planning processes allow regions to identify priority projects and investments that can and should be eligible for REI implementation grants, Kansas Competitive Project (KCP) grants or a variety of other state funding opportunities that can and should be aligned with the Framework for Growth. And third, regional planning processes afford an opportunity for Commerce to remain engaged with regional partners, ensuring that relationships fundamental to economic development service delivery are nurtured and respected.

Kansas Competitiveness Project (KCP)

The Kansas Competitiveness Project (KCP) is an aggressive new program to focus and direct state resources toward the development of new skills and technologies that can drive our performance in the state's target sectors. The initiative is intended to help accelerate the development of core competencies embedded in the state's workforce, institutions of higher education, research centers and elsewhere that have the potential to support a more resilient, "future-proof" economy. Specifically, KCP directs state resources by way of matching grants to institutions and organizations in the state that are working to develop new skills and technologies by way of education, research and development that align with and support the state's performance in target sectors.

Kansas Competitiveness Project & Regional Excellence Initiative Model



The model is similar to the South Carolina SmartState Centers of Excellence program in that it directs resources to support cluster-focused research and development. However, rather than investing in the establishment of a series of new "centers of excellence" at specific institutions in specific regions, the Kansas Competitiveness Project will direct resources to a variety of existing institutions that have established and continue to develop competencies in the forms of applied research, education, training and a variety of public-private partnerships. Grants could be applied to a variety of eligible uses provided matching funds from the private sector are received, from support for existing research, establishment of new research centers, endowment of researchers and scholars, establishment of new training programs and so on. The premise of KCP is to accelerate knowledge and innovation that contributes to sector performance and competitiveness.

MEASURING PERFORMANCE AND PROGRESS

A new interactive dashboard will be developed to illustrate the state's competitive position with respect to key outcomes that we wish to influence related to our strategic pillars and vision to "future proof" our economy. This dashboard will be updated annually and will benchmark the state's competitive position relative to all states and a subset of peer Midwestern states that reflect our aspiration to achieve premier status within our region. Rather than prescribing specific, measurable goals associated with various economic outcomes – measurables influenced by a variety of exogeneous factors – we intend to measure our relative competitiveness and its change over time.

Rather than prescribing specific, measurable goals associated with various economic outcomes, we intend to measure our relative competitiveness and its change over time.

The interactive dashboard will be accompanied by the aforementioned annual update to the Framework for Growth and its component initiatives and investments. In this regard, the Framework for Growth not only serves as a living strategy but also a historical record on progress. It will incorporate annual reporting on operational benchmarks related to economic development program (i.e. grant awards) and project activity (i.e. jobs, capital investment, wages, etc.).

KANSAS FRAMEWORK FOR GROWTH

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Topeka Regional

APPENDIX B
NOISE DATA

Appendix B
OPERATIONAL FLEET MIX

Table B1 on the following page lists the existing and 20-year forecast operations by aircraft type. These operations were used to conduct an Area Equivalent Method (AEM) noise analysis. An AEM analysis requires comparing the baseline operational condition for the airport to a scenario with the addition of cargo aircraft. As shown in the table, the 2022 and 2042 Action scenarios include Boeing 777 operations which are assumed to be associated with the contemplated MRO facility. FAA's AEM spreadsheet includes 247 different aircraft models for which noise information is available. Based on the operational forecasts prepared as part of this study, operations were assigned to the corresponding noise designator in the AEM. It is important to note that the AEM does not include an option to model rotorcraft noise. However, the noise energy contributions from rotorcraft will remain the same between each of the Action and No Action scenarios considered in this analysis.

Table B1 | Topeka Regional Airport Operational Fleet Mix Projection

	Noise Identifier	2022 Action	2022 No Action	2042 Action	2042 No Action
ITINERANT OPERATIONS					
FIXED WING					
Single Engine Fixed Pitch Propeller	GASEPF	1,627	1,627	1,900	1,900
Single Engine Variable Pitch Propeller	GASEPV	1,627	1,627	1,900	1,900
Multi-Engine Piston (Beech Baron 55)	BEC58P	200	200	200	200
Boeing 737 200-700	737700	88	88	40	40
Boeing 737 800-900	737800	30	30	140	140
Gulfstream Commander	GASEPV	16	16	10	10
Beech 1900	DHC6	10	10	0	0
King Air 200-350	DHC6	454	454	800	800
Boeing 777	***777ER***	***34***	***0***	***200***	***0***
Beechjet	MU3001	530	530	100	100
C130	C130	54	54	70	70
C17	C17	24	24	30	30
Boeing 757	757PW	34	34	50	50
Boeing 767	767JT9	82	82	100	100
Airbus A330-200	A320-211	18	18	40	40
Lear 35-60	LEAR35	126	126	200	200
Cessna 500+	CNA525C	812	812	1,200	1,200
Cessna X	CNA750	114	114	300	300
Challenger 300	CL600	128	128	200	200
Challenger 600	CL600	26	26	10	10
CRJ 200-900	CRJ9-ER	18	18	40	40
ERJ 135-145	EMB145	312	312	600	600
Phenom/Eclipse	ECLIPSE500	56	56	100	100
F16/F18	F16GE	112	112	120	120
Falcon 2000	CNA750	58	58	184	184
Gulfstream 150/280	IA1125	86	86	120	120
Bombardier Global	GV	12	12	50	50
Gulfstream V	GV	38	38	200	200
Hawker 800	LEAR35	16	16	50	50
KC-135	KC135	1,200	1,200	1,383	1,383
T2/T38	T-38A	838	838	1,000	1,000
Pilatus	CNA208	686	686	1,000	1,000
Piaggio	CNA441	10	10	0	0
V-22 Osprey	NA	8	8	0	0
P-3C Orion	P3A	36	36	50	50
P-8 Poseidon	737800	4	4	0	0
Q-400	DHC830	30	30	50	50
HELICOPTERS					
Helicopter (Reciprocating)	NA	100	100	800	800
Helicopter (Turbo)	NA	100	100	800	800
H60 - Sikorsky SH-60 Seahawk	NA	1,300	1,300	400	400
TOTAL ITINERANT OPERATIONS		**11,054**	**11,020**	**14,437**	**14,237**
LOCAL OPERATIONS					
Single Engine Fixed Pitch Propeller	GASEPF	785	785	1,035	1,035
Single Engine Variable Pitch Propeller	GASEPV	785	785	1,035	1,035
Pilatus PC-12 (TP)	CNA208	100	100	100	100
Helicopter (Reciprocating)	NA	150	150	400	400
Helicopter (Turbo)	NA	150	150	400	400
Helicopter (UH-60 Blackhawk)	NA	3,200	3,200	3,704	3,704
KC-135	KC135	5,157	5,157	6,900	6,900
TOTAL LOCAL OPERATIONS		**10,326**	**10,326**	**13,573**	**13,573**
TOTAL ANNUAL OPERATIONS		***21,380***	***21,346***	***28,010***	***27,810***

Note: FAA's Area Equivalent Method modeling spreadsheet does not have the capability to estimate rotorcraft noise.

Source: Coffman Associates analysis

www.coffmanassociates.com

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