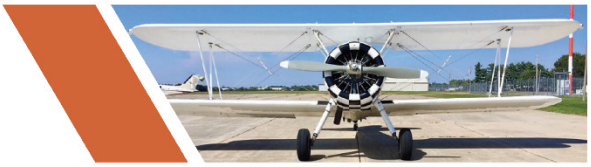
LEBANON AVIATION SERVICES

AIRPORT MASTER PLAN



CHAPTER 1

INVENTORY

The inventory of existing conditions is the initial step in the preparation of the Floyd W. Jones Lebanon Airport (LBO) Master Plan. The inventory will serve as an overview of the airport's physical and operational features, including facilities, users, and activity levels, as well as specific information related to the airspace, air traffic activity, and role of the airport. Additionally, a summary of socioeconomic characteristics and review of existing environmental conditions on and adjacent to the airport are detailed, which will provide further input into the study process.

Information provided in this chapter serves as a baseline for the remainder of the master plan, which is compiled using a wide variety of resources, including: applicable planning documents; on-site visits; interviews with airport staff, tenants, and users; aerial and ground photography; federal, state, and local publications; and project record drawings.

AIRPORT SETTING

The City of Lebanon is the county seat of Laclede County, located in south central Missouri, approximately 47 miles northeast of Springfield, Missouri. The U.S. Army installation Fort Leonard Wood is located approximately 30 miles to the east of the city, and Lake of the Ozarks lies 38 miles to the north. The U.S. Census Bureau indicates the population of the city was 14,474 in 2010, with a 2020 estimate of 15,013; population in the county was 35,571 in 2010, with a 2020 estimate of 36,039.

LBO, which encompasses nearly 200 acres, is situated at an elevation of 1,321 feet mean sea level (MSL), three miles south of the city's central business district. Access to the airport is provided by Missouri State Route 5/S Jefferson Avenue with an interchange at Interstate 44 just north of the airport. **Exhibit 1A** shows the regional setting for LBO.

AIRPORT ADMINISTRATION

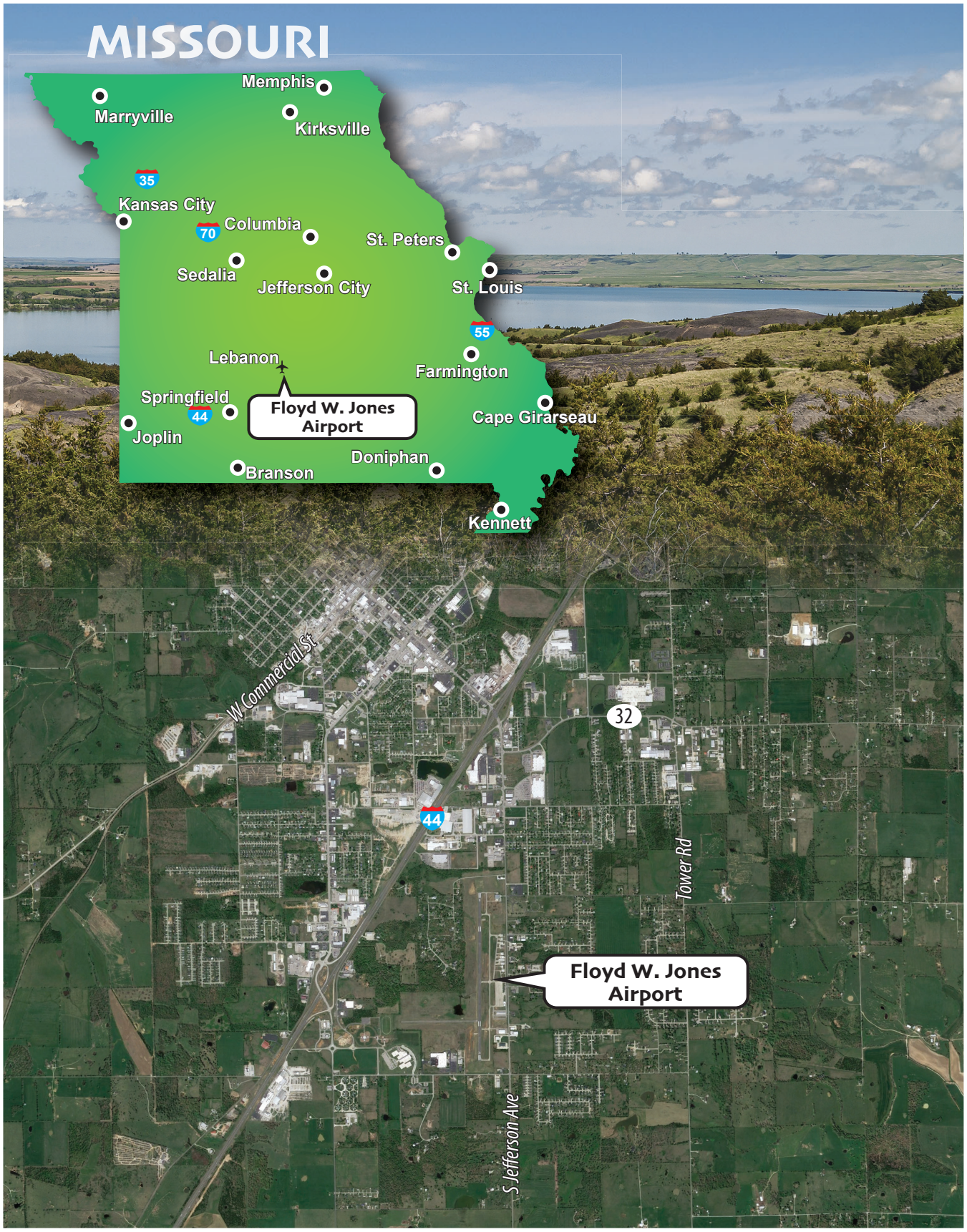
The airport is managed by the City of Lebanon and has an airport manager/superintendent, who is also the city's Information Technology (IT) Director, and an airport supervisor, both of which are full-time positions. The airport employs maintenance and operations staff, one full-time and one part-time role each.

Figure 1A: Airport Organization Structure

An advisory board deals with matters that arise at the airport and acts as a liaison to the city. It is comprised of seven members: two council members and five at-large members. Each member serves a three-year term, which are staggered, and the members are appointed by the mayor through nominations by other individuals. Members of the advisory board must either reside within the city limits, own an aviation business, or have an access lease to airport property.

CLIMATE

Weather conditions are important to the planning and development of an airport. Temperature is an essential factor in determining runway length requirements, while wind direction and speed are used to determine optimum runway orientation. The need for navigational aids and lighting is determined by the percentage of time that visibility is impaired due to cloud coverage or other conditions.


MISSOURI
Memphis
Marryville
Kirksville
35
Kansas City
70
Columbia
St. Peters
Sedalia
Jefferson City
St. Louis
55
Lebanon
Farmington
Springfield
44
Floyd W. Jones Airport
Cape Girarseau
Joplin
Doniphan
Branson
Kennett
W Commercial St
32
44
Tower Rd
Floyd W. Jones Airport
S Jefferson Ave

Lebanon has hot, humid summers with an average high temperature in August of 88.4 degrees Fahrenheit (F). Winters are generally cold with January being the coldest month with an average low temperature of 21.2°F. According to the Köppen climate classification system, Lebanon has a Humid-Subtropical climate. Due to its location in central Missouri, Lebanon is susceptible to supercell thunderstorms, which can produce large hail and tornadoes. The area receives a total of 45.3 inches of precipitation during an average year, with May being the rainiest month. **Exhibit 1B** summarizes weather and wind patterns at the airport.

ECONOMIC IMPACT

In 2012, Missouri Department of Transportation (MoDOT) conducted a study of the impact and relationship of airports in Missouri to the economic health of the state. The *Missouri Statewide Airports Economic Impact Study* examined economic benefits provided by 108 of the state's airports: nine commercial service airports and 99 general aviation airports. Impact types include direct impacts, which account for the sales, employment, and wages generated by on-airport business activity; indirect impacts, which account for visitor spending at locations such as hotels, restaurants, and entertainment venues; induced/multiplier impacts, which result from the recirculation of direct and indirect spending; and total economic impact, which is the sum of direct, indirect, and induced impacts. **Table 1A** and **Figure 1B** summarize the economic impact of LBO.

TABLE 1A | Aviation Economic Impact

	LBO	Statewide Benefits from Aviation
Total Economic Activity	$2.26 million	$11.1 billion
Total Payroll	$676,000	$3.1 billion
Total Employment	27	100,621

Source: Missouri Statewide Airports Economic Impact Study (2012)

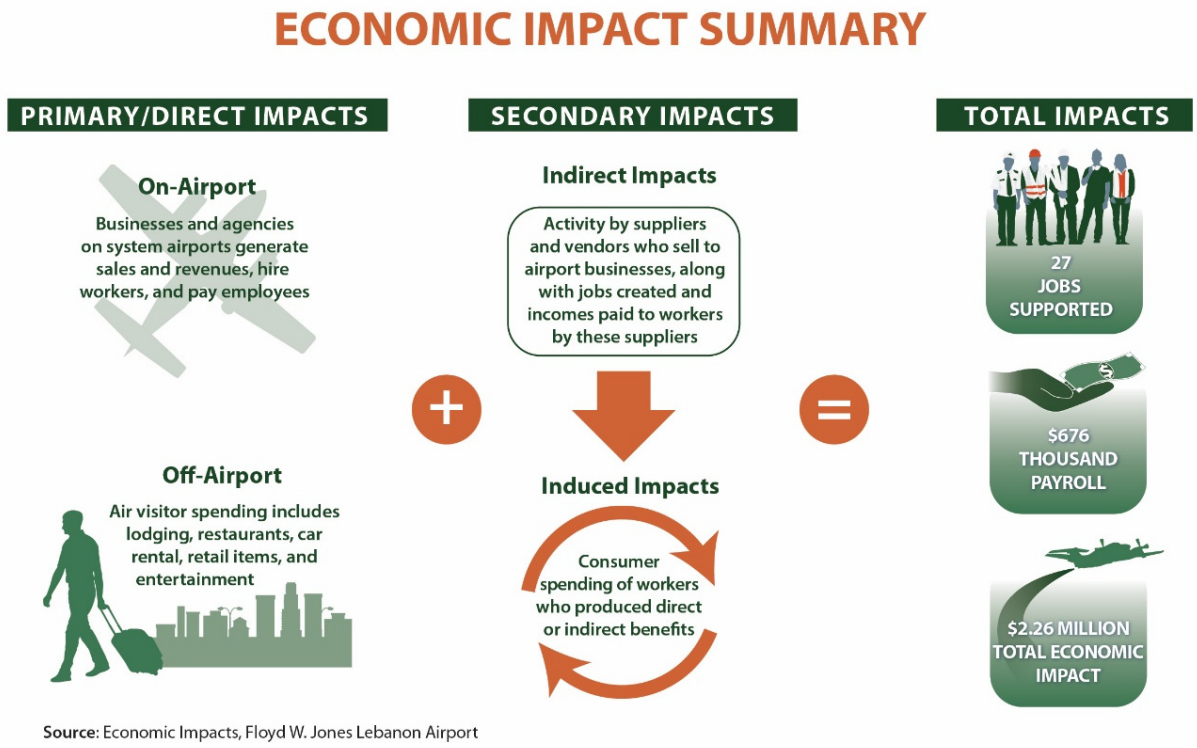
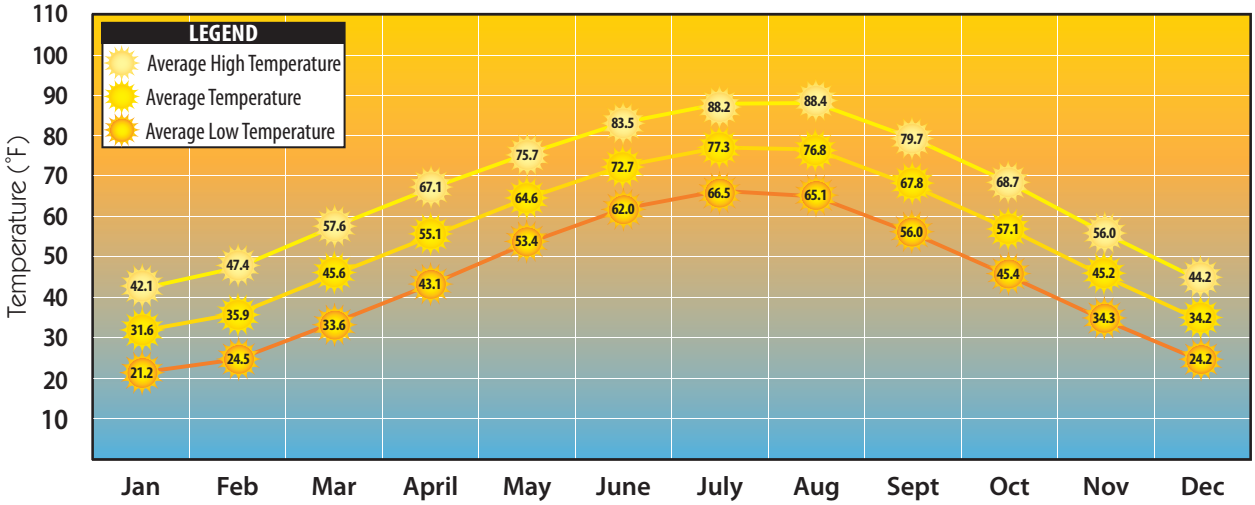
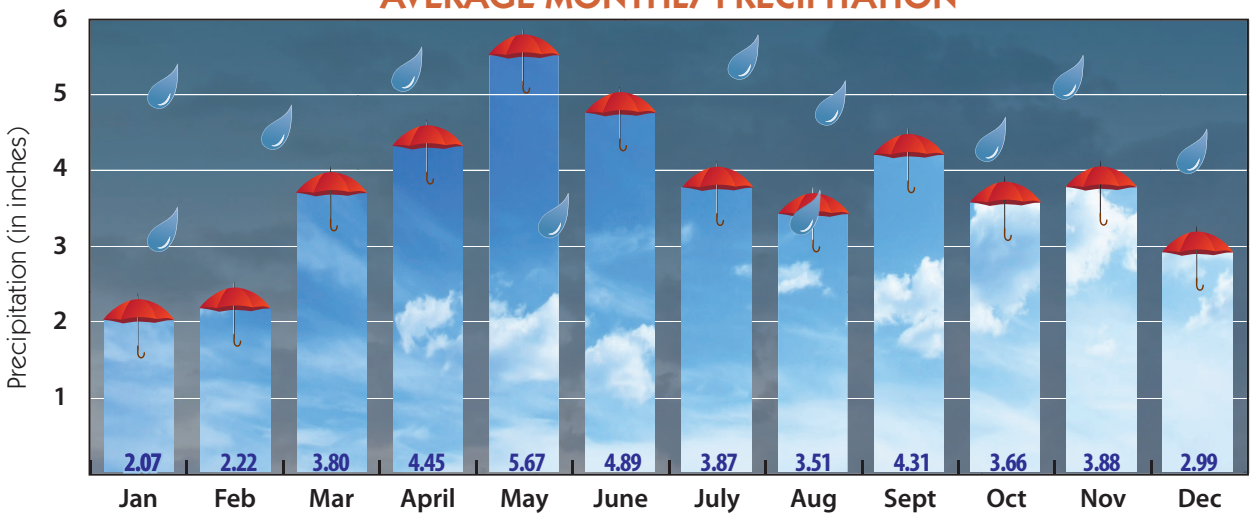


Figure 1B: Airport Economic Impact

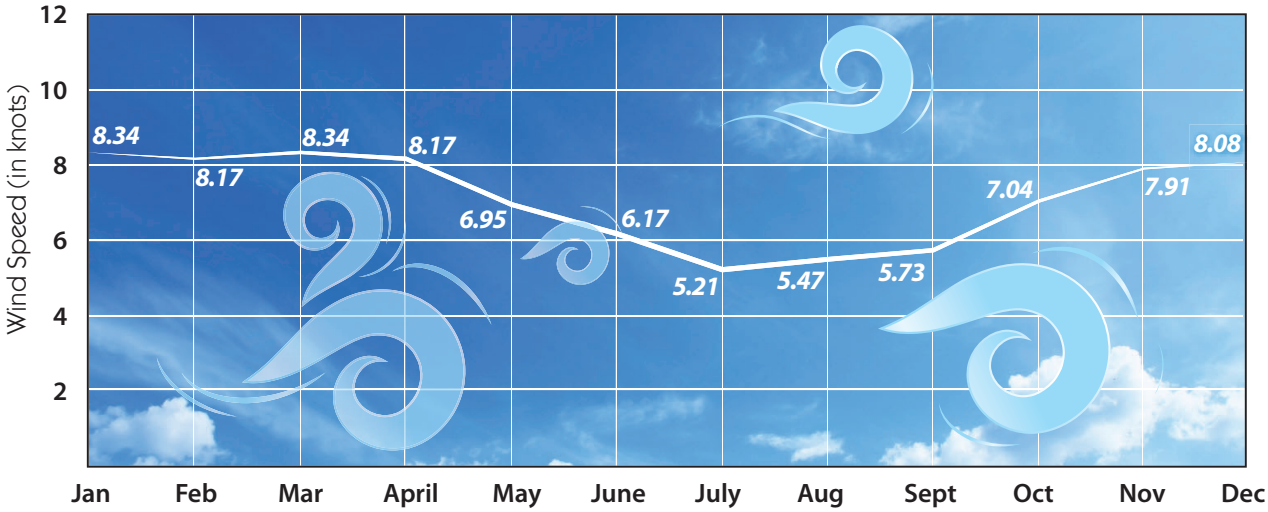
AVERAGE MONTHLY TEMPERATURES



AVERAGE MONTHLY PRECIPITATION



AVERAGE MONTHLY WIND DATA



Source: NOAA National Centers for Environmental Information Climate Normals, 1981-2010 -- Station: Lebanon 2 W

THE AIRPORT'S SYSTEM ROLE

Airport planning takes place at the local, state, and national levels, and each has a different emphasis and purpose.

- **Local:** At the local level, LBO has an airport master plan, which was last prepared in 2003. The airport last updated their Airport Layout Plan (ALP) in 2002. Other City-drafted documents also factor into airport planning on a local level.

- **State:** In 2019, the MoDOT Aviation Section, in partnership with the Federal Aviation Administration (FAA) and Missouri airports, completed the *Missouri State Airport System Plan*. Previously done in 2002, the 20-year plan projects demand and expected capital improvement projects at the state's 107 public-use airports.

- **National:** The airport is included in the *National Plan of Integrated Airport Systems* (NPIAS), which categorizes overall airport roles and responsibilities based on input from local and state planning efforts (e.g., master plans and state airport system plans).

LOCAL AIRPORT PLANNING

The airport master plan is the primary local planning document that provides a 20-year airport development vision based on aviation demand forecasts. The 2003 *Airport Master Plan* used 2001 data for its aviation forecast baseline. Given the inevitable uncertainties as the master plan ages, the FAA recommends airports update their master plans every five to ten years, or as necessary to address any significant changes. Primary recommendations from the master plan included extending Runway 18-36 to 6,500 feet and widening the surface to 100 feet, installing a runway approach lighting system, increasing the size of the terminal building to 4,300 square feet, and installing a weather reporting station.

STATE AIRPORT PLANNING

LBO is included in the 2019 *Missouri State Airport System Plan Update*. The plan is an evaluation of Missouri's aviation system and serves as a guide for future development. Airports are evaluated against a classification system and defined as one of five separate roles: Commercial, National Business, Regional Business, Business Community, or Community Local. LBO is identified as one of 25 Regional Business airports in the state. These airports focus on serving business activity, including small jet and multi-engine general aviation aircraft. The applicable design and performance objectives for Regional Business airports are listed in **Table 1B**.

TABLE 1B | Missouri Regional Business Airport Objectives			
	Minimum Objective	Conditions at LBO	Meets State Objectives
Airside Facilities			
Airport Reference Code[1]	B-II	B-II	Yes
Runway Length (ft.)	5,000	5,000	Yes
Runway Width (ft.)	75	75	Yes
Runway Lighting	Medium-Intensity	Medium-Intensity	Yes
Taxiway System	Full Parallel	Full Parallel	Yes
Taxiway Lighting	Medium-Intensity	Reflectors	No
Navigational/Visual Aids	- Rotating Beacon - Lighted Wind Cone - Segmented Circle - REILs - PAPI or VASI	- Rotating Beacon - Lighted Wind Cone - Segmented Circle - REILs (18/36) - PAPI-4s (18/36)	Yes
Approach	Precision-Like (ILS or LPV)	Non-Precision	No
Weather Reporting	AWOS or ASOS	AWOS	Yes
General Aviation Facilities			
Hangar Storage	70% of based aircraft	14	No
Tie Downs	30% of based & 75% of daily transient	33	Yes
Terminal/GA Building	- 2,500 square feet - Public Restroom - Conference Room - Pilot Lounge	- 1,260 square feet - Public Restroom - Pilot Lounge	No
Auto Parking	1 space/based aircraft & 50% for visitors/employees	16	No
Services	- AvGas/Jet Fuel - FBO Facility - On-Site Maintenance - Rental Car Access - Courtesy Car/Shuttle	- AvGas/Jet Fuel - FBO Facility - On-Site Maintenance - Rental Car Access - Courtesy Car/Shuttle	Yes

[1]The FAA's Airport Reference Code is described in detail in Chapter Two.

Source: Missouri State Airport System Plan Update (2019)

LBO does not meet all the minimum state objectives for its airport classification. Additions to both airside and landside facilities, including runway length, airfield lighting, aircraft parking and storage, and terminal facilities will be evaluated and presented in this master plan.

FEDERAL AIRPORT PLANNING

Many of the nation's existing airports were either initially constructed by the federal government, or their development and maintenance was partially funded through various federal grant-in-aid programs to local communities. The system of airports existing today is therefore due, in large part, to federal policy that promotes the development of civil aviation. As part of a continuing effort to develop a national airport system, the U.S. Congress has maintained a national plan for the development and maintenance of airports.

The FAA maintains a database of public-use airports eligible for Airport Improvement Program (AIP) funding called the *National Plan of Integrated Airport Systems* (NPIAS). The NPIAS is published and used by the FAA in administering the AIP, which is the source of federal funds for airport improvement projects across the country. The AIP is funded exclusively by user fees and user taxes, such as those imposed on fuel and airline ticket sales. An airport must be included in the NPIAS to be eligible for federal funding assistance through the AIP.

The most current plan is the 2021-2025 NPIAS, which identifies 3,310 public-use airports (3,304 existing and six proposed) that are important to the national air transportation system. The plan estimates approximately $43.6 billion in AIP-eligible and justified airport development projects will occur between 2021 and 2025. **Table 1C** identifies the types of airports included in the NPIAS.

TABLE 1C | Activity and Development at NPIAS Airports

Number of Airports	Airport Category	Percentage of Airports	Percentage of Runways	Percentage of 2018 Total Enplanements	Percentage of All Based Aircraft[1]	Percentage of Total Operations	Percentage of NPIAS Cost[2]
30	Large Hub	1	3	71.39	0.7	13.3	29.4
31	Medium Hub	1	2	16.65	1.7	5.1	10.7
69	Small Hub	2	3	8.46	4.4	6.8	11.7
266	Non-Hub	8	10	3.43	11.0	12.0	14.2
396	**Primary Subtotal**	**12**	**18**	**99.93**	**17.8**	**37.1**	**66.0**
92	National	3	4		9.7	8.9	4.6
482	Regional	14	16		20.4	23.3	9.6
1,213	Local	37	34		18.7	22.2	12.7
893	Basic	27	22		3.6	6.4	6.6
228	Unclassified	7	6		1.0	2.1	0.0
2,908	**Nonprimary Subtotal**	**88**	**82**	**0.07**	**53.4**	**62.9**	**33.5**
3,304	**Total NPIAS Airports**	**100**	**100**	**100**	**71.2**	**100**	**99.4**

[1] Based on active general aviation fleet of 211,749 aircraft in 2018. The remaining aircraft are based at other, non-NPIAS airports.
[2] These costs are rounded and do not include the cost for new airports (0.6 percent)

Source: National Plan of Integrated Airport Systems, 2021-2025

LBO is currently classified as a general aviation (GA) airport in the NPIAS. GA airports are public airports that do not have scheduled commercial air service or have air service with less than 2,500 passenger boardings (enplanements) each year. The NPIAS further categorizes GA airports into four subcategories: National, Regional, Local, and Basic, which are defined in **Table 1D**. LBO is categorized as a Local GA airport. As a Local GA airport, LBO provides its local community access to the state or immediate region. Most of the flying at local airports is by piston-powered aircraft in support of business and personal needs. These airports typically accommodate flight training, emergency services, and charter passenger service.

TABLE 1D | General Aviation Airport Categories	
ROLE	**DESCRIPTION**
National	Located in metropolitan areas near major business centers and support flying throughout the U.S. and the world. These airports provide alternatives to the busy primary airports. National airports have very high levels of activity with many jets and multiengine propeller aircraft. National airports average 203 total based aircraft, including 39 jets.
Regional	Regional airports are also in metropolitan areas and support regional economies with interstate and some long-distance flying. These airports have some jet and multiengine propeller activity. Regional airports average 86 total based aircraft, including three jets.
Local	A critical component of the general aviation system, local airports provide communities with access to local and regional markets. While still located near larger population centers, these airports are not always in metropolitan areas. Flight training and emergency services are a common activity. Local airports average 32 based aircraft with no jets.
Basic	Links the community with the national airport system and supports general aviation activity (e.g., emergency response, air ambulance, flight training, personal flying). These airports have moderate levels of activity with an average of nine based aircraft and no jets.

Source: National Plan of Integrated Airport Systems, 2021-2025

AIRSIDE FACILITIES

Airside facilities are those which facilitate aircraft movement between the air and ground. Generally, these facilities include runways, taxiways/taxilanes, terminal ramp aprons, airport lighting and markings, and weather and communication aids. **Exhibit 1C** depicts and summarizes airfield facility information at LBO.

RUNWAYS

LBO is served by a single runway, designated Runway 18-36, which has a north/south orientation. It is 5,000 feet long and 75 feet wide, is paved with asphalt, and is in excellent condition. The runway has non-precision markings, consisting of a centerline, runway designator, threshold markings, and aiming point markings. The surface has a strength rating of 33,000 pounds for single wheel landing gear configurations and 54,000 pounds for double gear configurations. The gradient of the runway is 0.23 percent, with the Runway 36 end elevation at 1,319.2 feet mean sea level (MSL), and the elevation of the Runway 18 end at 1,305.8 feet MSL. Runway 18-36 is equipped with medium-intensity edge lighting (white) to illuminate the runway edges at night and/or poor meteorological conditions. Standard left-hand traffic patterns are used for each runway end.

Runway 36 with parallel taxiway (right)

TAXIWAYS/TAXILANES

Taxiways are generally aircraft movement surfaces that provide direct access to runways. This includes parallel taxiways and connecting taxiways. Taxilanes are surfaces that provide access to hangar or aircraft tie-down areas.

Primary taxiway at LBO

The taxiway system at LBO includes a full-length parallel taxiway serving Runway 18-36. Entrance taxiways are located at both runway ends, and three additional exit taxiways are located along the runway. Most of the parallel taxiway is 35 feet wide and is located 300 from the runway, centerline-to-centerline. The remaining section of the parallel taxiway north of the Runway 36 PAPI is only 200 feet to the runway centerline and is only 29 feet wide. A network of taxilanes, ranging in width from 28 to 35 feet, provide access to the terminal building and aircraft hangars.

Aircraft holding position markings are on four of the five taxiways leading to the runway; the entry taxiway for Runway 18 does not have any hold markings. The hold short markings are located 250 feet from the runway centerline.

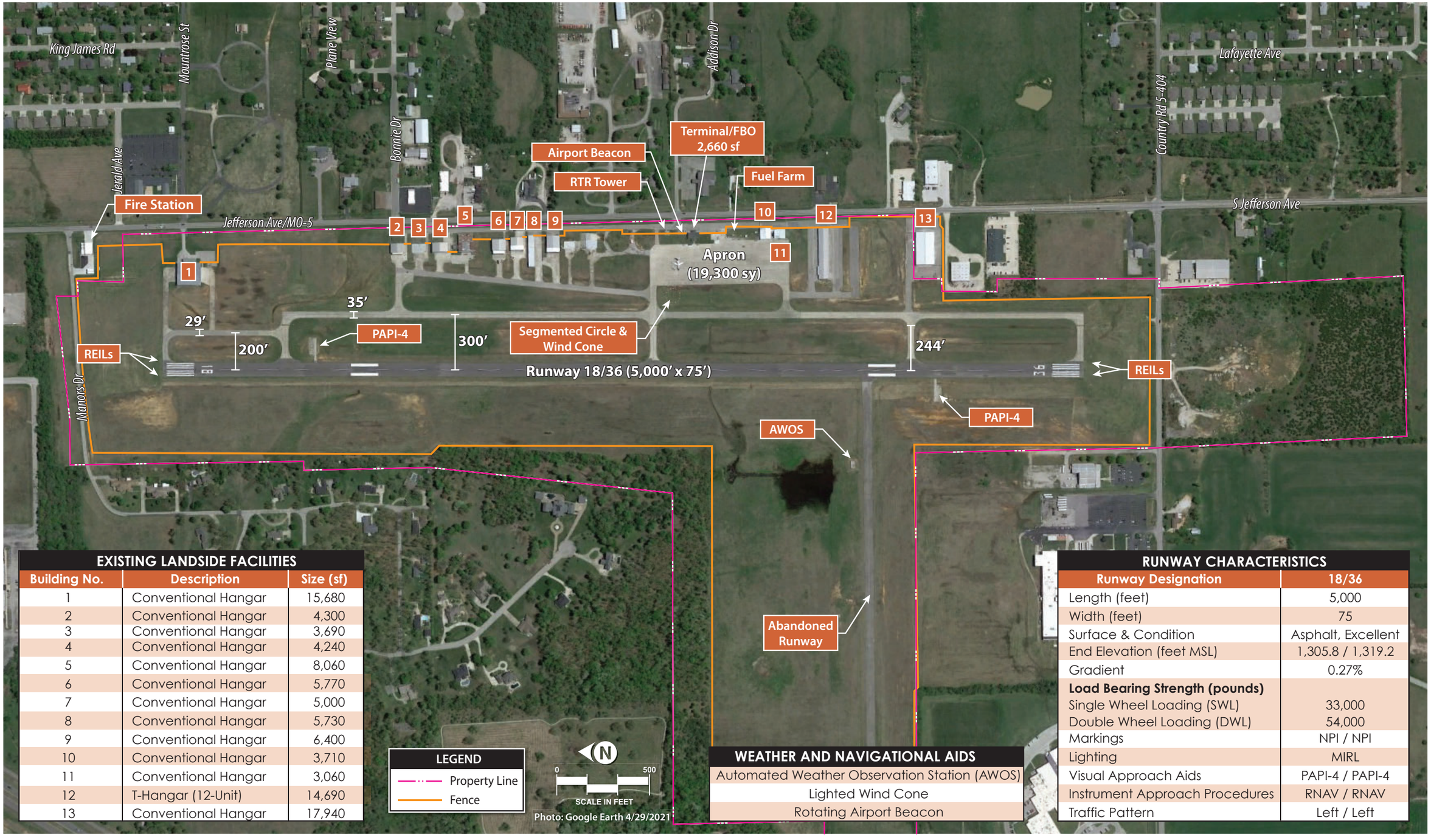
TERMINAL APRON

The primary terminal apron at LBO is located midfield, east of the runway. The apron is approximately 19,400 square yards (sy) and has 34 aircraft tiedown spots. The ramp provides access to the general aviation terminal building, as well as to two box hangars on the south end of the pavement. There is a single vehicle access gate from S. Jefferson Avenue at the north end of the apron.

Primary apron with wind cone and terminal building

AIRFIELD LIGHTING

Airfield lighting systems extend an airport's usefulness into periods of darkness and/or poor visibility. A variety of lighting systems are installed at the airport for this purpose. These lighting systems, categorized by function, are summarized as follows.



EXISTING LANDSIDE FACILITIES

Building No.	Description	Size (sf)
1	Conventional Hangar	15,680
2	Conventional Hangar	4,300
3	Conventional Hangar	3,690
4	Conventional Hangar	4,240
5	Conventional Hangar	8,060
6	Conventional Hangar	5,770
7	Conventional Hangar	5,000
8	Conventional Hangar	5,730
9	Conventional Hangar	6,400
10	Conventional Hangar	3,710
11	Conventional Hangar	3,060
12	T-Hangar (12-Unit)	14,690
13	Conventional Hangar	17,940

WEATHER AND NAVIGATIONAL AIDS

Automated Weather Observation Station (AWOS)
Lighted Wind Cone
Rotating Airport Beacon

RUNWAY CHARACTERISTICS

Runway Designation	18/36
Length (feet)	5,000
Width (feet)	75
Surface & Condition	Asphalt, Excellent
End Elevation (feet MSL)	1,305.8 / 1,319.2
Gradient	0.27%
Load Bearing Strength (pounds)	
Single Wheel Loading (SWL)	33,000
Double Wheel Loading (DWL)	54,000
Markings	NPI / NPI
Lighting	MIRL
Visual Approach Aids	PAPI-4 / PAPI-4
Instrument Approach Procedures	RNAV / RNAV
Traffic Pattern	Left / Left

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Identification Lighting

The location of the airport at night is universally identified by a rotating beacon. The beacon projects two beams of light, one white and one green, 180 degrees apart. The beacon, which operates sunset to sunrise or during periods of instrument meteorological conditions (IMC), is located immediately north of the terminal building.

Remote transmitter/receiver tower (left) and airport beacon (right)

Pavement Edge Lighting/Signage

Runway edge lighting utilizes light fixtures placed near the edge of the pavement to define the lateral limits of the pavement. This lighting is essential for safe operations during night and/or times of low visibility to maintain safe and efficient movement of aircraft.

Runway 18-36 is equipped with medium-intensity runway lighting (MIRL). The taxiways have blue colored reflectors.

The presence of runway/taxiway signage is an essential component of a surface movement guidance control system necessary for the safe and efficient operation of the airport. Currently installed at LBO are runway holding position signs at the four marked holding locations previously discussed. LBO is not currently equipped with location or directional signage or distance remaining signage.

Taxiway edge reflectors

Runway hold position marking and sign

Visual Glide Slope Approach Aids

Both Runway 18 and Runway 36 are equipped with a four-box precision approach path indicator (PAPI-4L) system. A PAPI consists of light boxes that shine either a red or white light that the pilot of a landing aircraft interprets to determine if they are on the correct glide path to the runway. The PAPI serving Runway 18 is located on the left side of the runway, 810 feet from the runway threshold. The Runway 36 PAPI is located 785 feet from the runway threshold, also on the left side of the pavement. Both PAPIs are set to a standard glide path of 3.00 degrees.

Precision Approach Path Indicator (PAPI)

Runway End Identifier Lights (REIL)

Both ends of Runway 18-36 are equipped with REILs, which are located adjacent to each side of the runway threshold. REILs consist of two synchronized, directional flashing lights that face the approach area of the runway and provide rapid identification of the runway threshold for up to 20 miles.

Runway End Identifier Light (REIL)

Pilot-Controlled Lighting (PCL)

During times of low light and/or poor visibility, the runway lights and REILs can be activated by pilots by using the pilot-controlled lighting (PCL) system. The airfield lights are activated via a series of clicks with the pilot's microphone transponder on the common traffic advisory frequency (CTAF) of 122.8 MHz.

WEATHER AND COMMUNICATION AIDS

Weather and communication devices provide pilots with information about the existing conditions at the airport. At airports with no air traffic control tower (ATCT), it is essential that pilots can still communicate with each other and receive current weather reports. These devices are described below.

Wind Indicator

LBO is equipped with a single lighted windsock, located midfield adjacent to the terminal ramp. The windsock provides information to pilots regarding wind direction and approximate intensity.

Wind cone and segmented circle

Automated Weather Observing System (AWOS)

LBO is served by an AWOS-3PT, which measures and reports wind direction and speed; visibility; temperature and dew point; altimeter setting (barometric pressure) and density altitude; cloud height; precipitation type, intensity, and amount; as well as thunderstorm and lightning information. The AWOS-3PT updates observations every minute, 24 hours a day, and transmits the information to pilots at and near the airport by a very high frequency (VHF) ground-to-air radio transmitter via frequency 118.975 MHz. Pilots can all receive the weather report by calling a local telephone number (417-533-3419).

Automated Weather Observing System (AWOS)

Common Traffic Advisory Frequency (CTAF)

The CTAF radio frequency at LBO is 122.8 MHz. CTAF is used by pilots at and near the airport to communicate with each other about approaches to or departures from the airport, as well as for control of the airport's PCL system, as described above.

LANDISDE FACILITIES

Landside facilities support the aircraft and pilot/passenger transition between air and ground. Typical landside facilities include the terminal/FBO, on-airport businesses, aircraft hangars, and vehicle parking. An overview of the landside facilities and a building inventory at LBO are depicted on **Exhibit 1C**.

TERMINAL/FBO COMPLEX

A fixed-base operator (FBO) is an airport service center responsible for a variety of aviation services, such as passenger handling, aircraft fueling, parking, maintenance, aircraft towing and storage, and other related services. The City of Lebanon manages the only FBO at the airport. The FBO is in the terminal building at the northeast corner of the primary ramp.

Airport terminal/FBO building

AIRPORT BUSINESSES

There are three specialty aviation service operators (SASOs) located on the airport. These are companies that offer one or more specialized aviation services, such as flight instruction or aircraft maintenance and repair. The airport businesses operating at the airport at the time of this writing (January 2022) include:

- Fostair – fixed-wing aircraft maintenance, repair, and inspection
- Heartland Helicopter – Part 61/141 helicopter flight instruction, fixed- and rotary-wing maintenance, repair, and inspection, helicopter tours
- M&S Aviation – Part 61 fixed-wing flight instruction, aircraft rental

AIRCRAFT HANGARS

It is important to identify those hangars that may be used for aircraft storage. By having a reasonable estimate of the baseline hangar capacity, a determination of future hangar needs can be made based upon forecast hangar demand. Existing hangar facilities at LBO consist of large, conventional-style hangars used to store multiple aircraft, mid-sized box hangars, and T-hangars that are designed to accommodate smaller aircraft. The box hangars range in size from 1,000 to 3,500 square feet (sf), while the conventional hangars used for storage and/or aircraft maintenance are greater than 3,500 sf, with the largest exceeding 10,000 sf. Hangars at LBO are identified on **Exhibit 1C** with their approximate size.

Conventional and T-hangars at LBO

SUPPORT FACILITIES

The previous sections addressed airside and landside facilities, those critical to the movement of aircraft and people on the airport. This section discusses other airport facilities that support airport operations, including ARFF, airport maintenance, fuel storage, and perimeter fencing. These facilities are identified on **Exhibit 1C**.

AIRPORT RESCUE AND FIRE FIGHTING (ARFF)

Airports that have regularly scheduled commercial air service using aircraft with ten or more seats are required to have available ARFF services. These airports must follow regulations outlined in 14 CFR Part 139, which includes the ability of ARFF responders to reach the center of the runway within three minutes.

Since LBO is not a Part 139 airport and does not have commercial air service, the airport is not required to have on-airport ARFF facilities. Emergency services are provided by the City of Lebanon, with the closest fire station located ½-mile north on Highway 5.

AIRPORT MAINTENANCE AND SNOW REMOVAL

Airport operations personnel handle most airport maintenance, while snow removal operations are conducted by Lebanon Public Works staff, when needed. An assortment of vehicles and maintenance equipment assigned to the airport is detailed in **Table 1E**. Some of the equipment is stored in the southernmost hangar on the parking ramp, while larger equipment and select vehicles are stored at the city public works complex across town.

TABLE 1E | Airport Equipment and Vehicles

Equipment Description	Condition
1992 GMC Refueling Truck (Jet A)	Poor
1993 GMC Refueling Truck (AvGas)	Poor
2002 Ford Ranger	Poor
2004 Ford Explorer	Poor
John Deere 970 4WD Tractor	Poor
John Deere 970 2WD Tractor	Poor
John Deere "Gator"	Poor
2020 Frontier 7-ft Finish Mower	Good
2022 Grasshopper 480D 6-ft Zero-Turn Mower	New
John Deere Z960M 5-ft Zero-Turn Mower	Good
John Deere Loader	Fair
Assorted Aircraft Tow Bars	Good

Source: Airport records

FUEL STORAGE

Fuel storage for both AvGas and Jet A is located in underground storage tanks just south of the terminal building. Both AvGas and Jet A are stored in 12,000-gallon fiberglass tanks which were installed new in 1990. The airport provides both self-service and full-service fueling for pilots. Full-service fueling is provided by the fuel trucks mentioned above. The AvGas truck has a 1,200-gallon tank, while the Jet A truck has a 2,200-gallon tank. Fire extinguishers are installed on both trucks. **Table 1F** presents the fuel sales since 2018; reliable data is unavailable for fuel sales prior to 2018.

TABLE 1F | Fuel Sales at LBO

Fiscal Year	AvGas (gal.)	Jet A (gal.)
2018	18,733	41,900
2019	20,799	33,935
2020	24,986	35,341
2021	27,590	63,976
CAGR	**13.78%**	**15.15%**

Source: Airport records

Fuel cabinet with in-ground tanks (left)

Fuel trucks parked under weather covers

Perimeter Fencing

The entirety of the airfield is enclosed with security fencing, which is regularly inspected. The fence is approximately eight feet tall with 3-strand barbed wire tops. The fencing serves as a barrier to trespassers and wildlife. Vehicle access on and off the airport is provided through a gate, located adjacent to the terminal building.

Perimeter fence

AREA AIRSPACE AND AIR TRAFFIC CONTROL

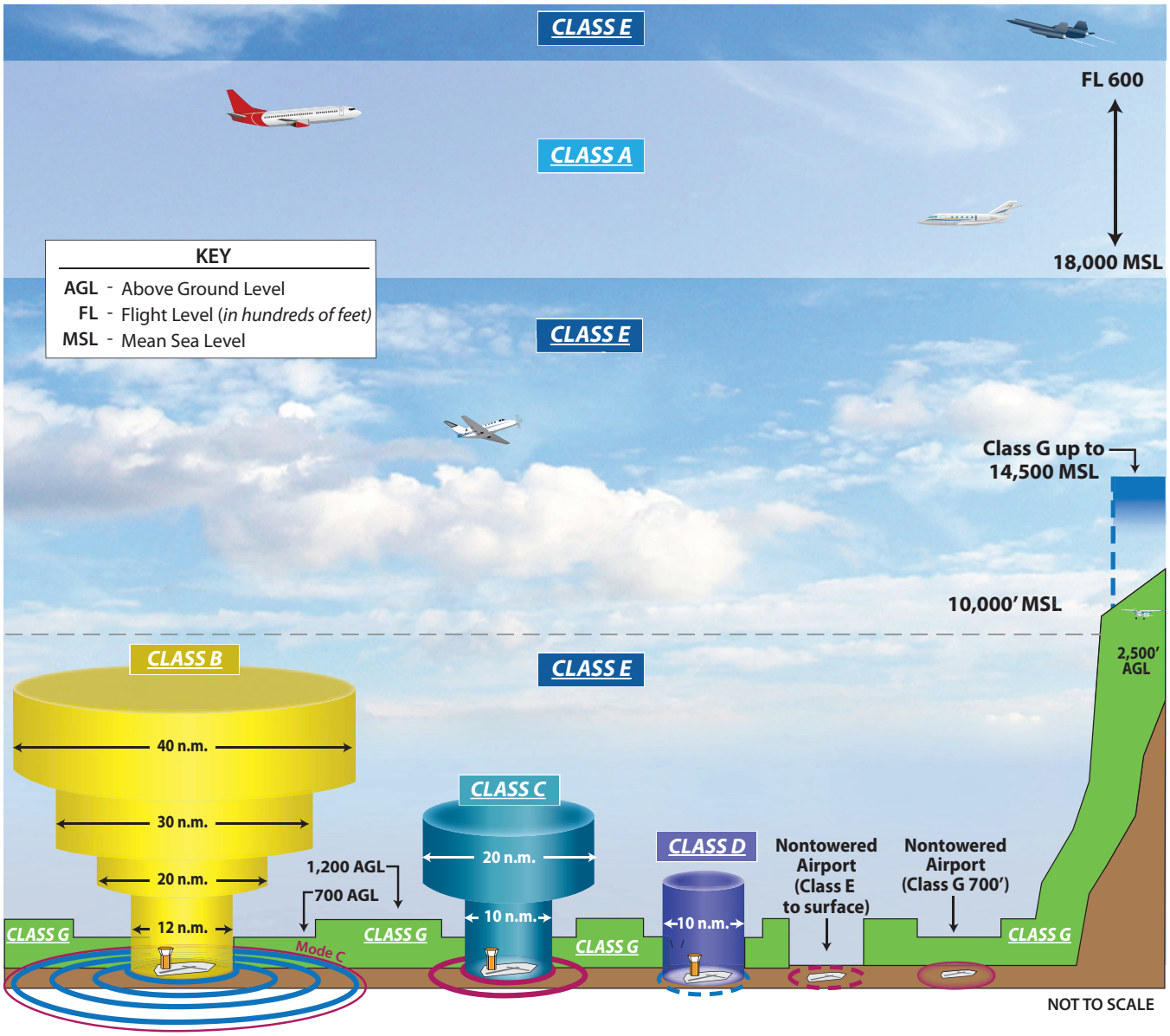
The *FAA Act of 1958* established the FAA as the responsible agency for the control and use of navigable airspace within the U.S. The FAA has established the National Airspace System (NAS) to protect people and property on the ground, in addition to establishing a safe and efficient airspace environment for civil, commercial, and military aviation. The NAS covers the common network of U.S. airspace, including air navigation facilities; airports and landing areas; aeronautical charts; associated rules, regulations, and procedures; technical information; and personnel and material. The system also includes components shared jointly with the military.

AIRSPACE STRUCTURE

Airspace within the U.S. is broadly classified as either "controlled" or "uncontrolled." The difference between controlled and uncontrolled airspace relates primarily to requirements for pilot qualifications, air-to-ground communications, navigation and air traffic services, and weather conditions. Six classes of airspace have been designated in the U.S., as shown on **Exhibit 1D**. Airspace designated as Class A, B, C, D, or E is considered controlled airspace. Aircraft operating within controlled airspace are subject to varying requirements for positive air traffic control. Airspace near LBO is depicted on **Exhibit 1E**.

Class A Airspace: Class A airspace includes all airspace from 18,000 feet MSL to flight level (FL) 600 (approximately 60,000 feet MSL) over the contiguous 48 states and Alaska. This airspace is designated in Federal Aviation Regulation (FAR) Part 71.33 for positive control of aircraft. All aircraft must be on an IFR clearance to operate within Class A airspace.

Class B Airspace: Class B airspace has been designated around some of the country's major airports, such as Chicago O'Hare International Airport, to separate all aircraft within a specified radius of the primary airport. Each Class B airspace is specifically tailored for its primary airport. All aircraft operating within the Class B airspace must have air traffic control (ATC) clearance. Certain minimum aircraft equipment and pilot certification requirements must also be met. This airspace is the most restrictive controlled airspace routinely encountered by pilots operating under VFR in an uncontrolled environment. The nearest Class B airspace surrounds St. Louis Lambert International Airport (STL), approximately 126 nautical miles to the northeast of LBO.



DEFINITION OF AIRSPACE CLASSIFICATIONS

CLASS A Think A - Altitude. Airspace above 18,000 feet MSL up to and including FL 600. Instrument Flight Rule (IFR) flights only, ADS-B 1090 ES transponder required, ATC clearance required.

CLASS B Think B - Busy. Multi-layered airspace from the surface up to 10,000 feet MSL surrounding the nation's busiest airports. ADS-B 1090 ES transponder required, ATC clearance required.

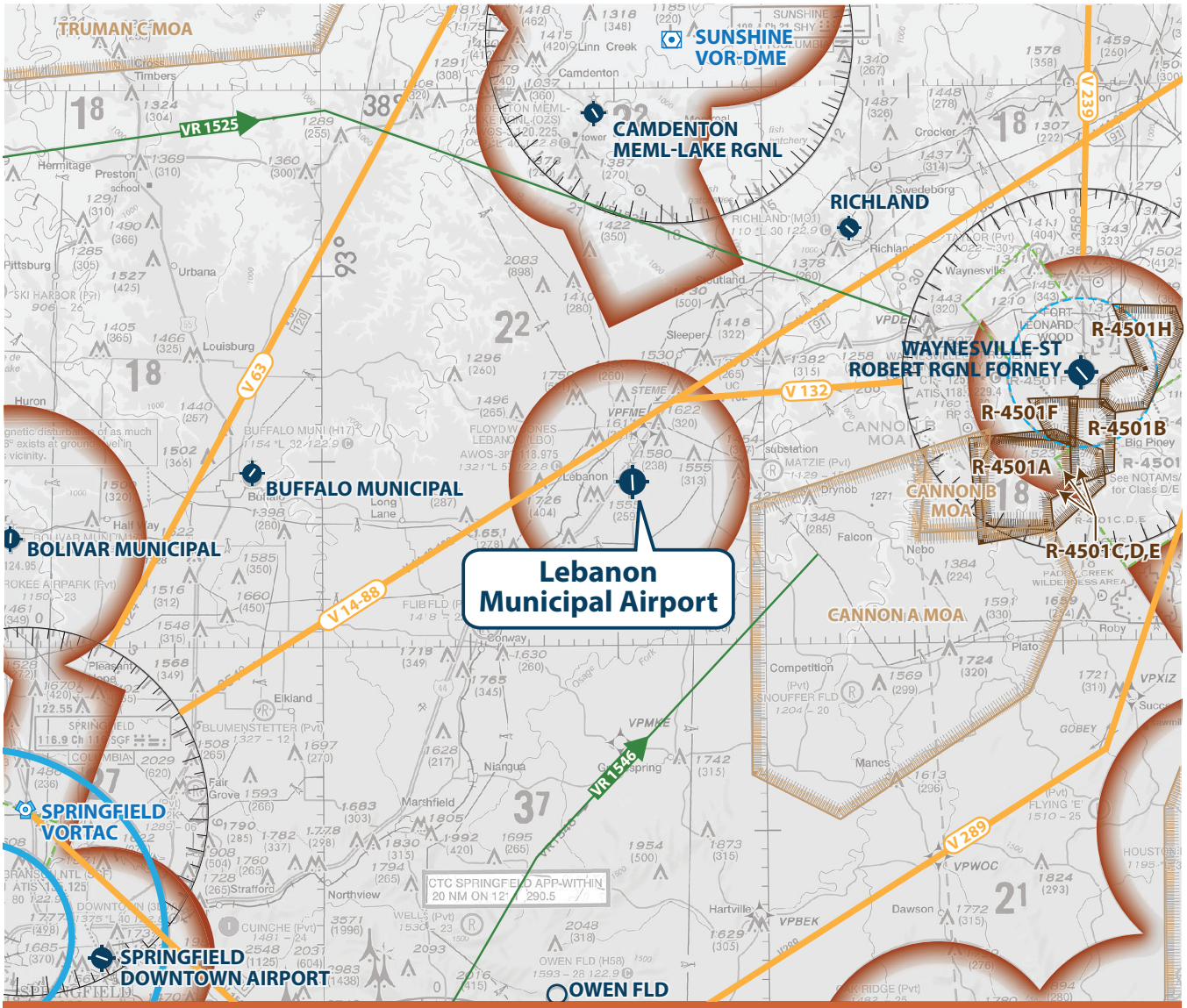
CLASS C Think C - Mode C. Mode C transponder required. ATC communication required. Generally airspace from the surface to 4,000 feet AGL surrounding towered airports with service by radar approach control.

CLASS D Think D - Dialogue. Pilot must establish dialogue with tower. Generally airspace from the surface to minimum 2,500 feet AGL surrounding towered airports.

CLASS E Think E - Everywhere. Controlled airspace that is not designated as any other Class of airspace.

CLASS G Think G - Ground. Uncontrolled airspace. From surface to a 1,200 AGL (in mountainous areas 2,500 AGL) Exceptions: near airports it lowers to 700' AGL; some airports have Class E to the surface. Visual Flight Rules (VFR) minimums apply.

Source: www.faa.gov/regulations_policies/handbooks_manuals/aviation/phak/media/15_phak_ch15.pdf



LEGEND

- Airport with other than hard-surfaced runway
- Airport with hard-surfaced runways 1,500' to 8,069' in length
- VORTAC
- VOR-DME
- Compass Rose
- Victor Airways
- Class C Airspace
- Class D Airspace
- Class E Airspace
- Class E (sfc) Airspace with floor 700 ft. above surface that laterally abuts 1200 ft. or higher Class E airspace
- Military Training Route
- Alert Area and MOA
- Prohibited, Restricted, and Warning Areas

N

NOT TO SCALE

Source: Kansas City Sectional Chart, US Department of Commerce, National Oceanic and Atmospheric Administration. December 02, 2021

Class C Airspace: The FAA has established Class C airspace at approximately 120 airports around the country that have significant levels of IFR traffic. Class C airspace is designed to regulate the flow of uncontrolled traffic above, around, and below the arrival and departure airspace required for high-performance, passenger-carrying aircraft at major airports. To fly inside Class C airspace, an aircraft must have a two-way radio, an encoding transponder, and have established communication with ATC. Aircraft may fly below the floor or above the ceiling of the Class C airspace without contacting ATC. The nearest Class C airport to LBO is Springfield-Branson National Airport (SGF), approximately 43 nautical miles to the southwest.

Class D Airspace: Class D airspace is controlled airspace surrounding airports with an air traffic control tower (ATCT). The Class D airspace typically constitutes a cylinder with a horizontal radius of four or five nautical miles from the airport, extending from the surface up to a designated vertical limit, typically set approximately 2,500 feet above the airport elevation. Pilots planning to operate within Class D airspace are required to contact the ATCT prior to entering the airspace and must remain in contact while within the airspace. Forney Army Airfield (TBN) at Fort Leonard Wood, approximately 25 miles to the east, is the closest Class D airport to LBO.

Class E Airspace: Class E airspace consists of controlled airspace designed to contain IFR operations near an airport and while aircraft are transitioning between the airport and enroute environments. Unless otherwise specified, Class E airspace terminates at the base of any overlying airspace. Only aircraft operating under IFR are required to be in contact with ATC when operating in Class E airspace. While aircraft conducting visual flights in Class E airspace are not required to be in radio contact with ATC facilities, visual flight can only be conducted if minimum visibility and could ceilings exist.

Class E airspace sits above LBO at 700 feet above ground level (AGL) and extends up to but not including 18,000 feet MSL where Class A airspace begins. From the surface up to but not including 700 feet AGL at the airport is Class G airspace.

Class G Airspace: Airspace not designated as Class A, B, C, D, or E is considered uncontrolled, or Class G, airspace. ATC does not have the authority or responsibility to exercise control over air traffic within this airspace. Class G airspace lies between the surface and the overlying Class E airspace (700 to 1,200 feet AGL).

While aircraft may technically operate within this Class G airspace without any contact with ATC, it is unlikely that many aircraft would operate this low to the ground. Furthermore, federal regulations specify minimum altitudes for flight. FAR Part 91.119, *Minimum Safe Altitudes*, generally states that, except when necessary for takeoff or landing, pilots may not operate an aircraft over any congested area of a city, town, or settlement, or over any open-air assembly of people, at an altitude of 1,000 feet above the highest obstacle within a horizontal radius of 2,000 feet to the aircraft.

Over less congested areas, pilots must maintain an altitude of 500 feet AGL, except over open water or sparsely populated areas. In those cases, the aircraft may not be operated closer than 500 feet to any person, vehicle, or structure. Helicopters may be operated at less than the minimums prescribed above if the operation is conducted without hazard to people or property on the surface. In addition, each person operating a helicopter shall comply with any routes or altitudes specifically prescribed for helicopters by the FAA.

SPECIAL USE AIRSPACE

Special use airspace is defined as airspace where activities must be confined because of their nature of where limitations are imposed on aircraft not taking part in those activities. The designation of special use airspace identifies for other users the areas where military activity may occur, provides segregation between enroute/landing aircraft, and allows charting to keep airspace users informed.

Victor Airways: For aircraft arriving or departing the regional area using very high frequency omni-directional range (VOR) facilities, a system of Federal Airways, referred to as Victor Airways, has been established. Victor Airways are corridors of airspace eight miles wide, extending upward from 1,200 feet AGL to 18,000 feet MSL, that extend between VOR navigational facilities. Victor Airways near LBO are identified on **Exhibit 1E**. For aircraft enroute or departing LBO, there are several Victor Airways available converging on the Springfield VORTAC, approximately 37 nautical miles to the southwest of the airport. While the Forney VOR is 12 miles closer to the airport, navigation to the facility, which is located at Fort Leonard Wood, would require potentially crossing Restricted and/or MOA airspaces.

Military Training Routes: Military Training Routes (MTRs) are designated airspace that has been generally established for use by high-performance military aircraft to train below 10,000 feet AGL and at speeds of more than 250 knots. There are VR (visual) and IR (instrument) designated MTRs. MTRs with no segment above 1,500 feet AGL are designated with the VR or IR, followed by a four-digit number. MTRs with one of more segments above 1,500 feet AGL are identified by the route type (VR/IR), followed by a three-digit number. The arrows on the route show direction of travel. The closest MTR is VR1546, which passes approximately 10 miles southwest of LBO.

Military Operations Areas: Military Operations Areas (MOAs) are areas of airspace where military activities are conducted. The nearest MOA to LBO is Cannon A, located six nautical miles to the east, just outside LBO airspace. The Cannon A MOA is controlled by the Kansas City Air Route Traffic Control Center (ARTCC) with active military operating in the MOA from 300 feet AGL up to but not including 18,000 feet MSL. The MOA is operated from Tuesday through Saturday, from 9:00 a.m. to 4:00 p.m., and other times as issued by notices to airmen (NOTAM).

Restricted Areas: Restricted areas contain airspace where operation of aircraft is subject to restrictions. Often the existence of unusual, often invisible hazards discourages unauthorized flight in these areas. The nearest restricted area to LBO is R-4501A, located 18 nautical miles to the east. The area is active from the surface up to but not including 2,200 feet MSL, 6:30 a.m. to 9:00 p.m., Monday through Saturday, and other times as issues by NOTAMs. The Kansas City ARTCC is the controlling agency for R-4501A.

Terminal Radar Service Area: A TRSA is defined as non-regulated airspace that surrounds busy Class D airports where ATC provides traffic separation with the use of a radar. The purpose of a TRSA is to provide VFR aircraft with additional, yet voluntary, benefits such as vectoring, sequencing, and separation. Though typically busier than other Class D airports, these airports are not busy enough to be classified as Class B or Class C airports. The closest TRSA to LBO is the Fort Smith TRSA, which surrounds Fort Smith Regional Airport (FSM) in Arkansas, approximately 162 nautical miles to the southwest.

AIRSPACE CONTROL

The FAA has established 22 Air Route Traffic Control Centers (ARTCCs) throughout the continental U.S., Alaska, and Hawaii to control aircraft operating under IFR within controlled airspace and while enroute. An ARTCC assigns specific routes and altitudes along Federal Airways to maintain separation and orderly traffic flow. The Kansas City ARTCC controls IFR airspace enroute to and from LBO. There is no airport traffic control tower (ATCT) at LBO. Aircraft operating near and at the airport communicate with other aircraft by using the airport CTAF/Unicom frequency of 122.8 MHz. Local air traffic clearances can be provided by Springfield Approach, while enroute air traffic control services are provided by the Kansas City ARTCC.

Flight Service Station (FSS)

A Flight Service Station (FSS) is an air traffic facility which provides pilot briefings, flight plan processing, inflight radio communications, search and rescue (SAR) services, and assistance to lost aircraft or aircraft in emergency situations. FSSs also relay air traffic control clearances, process NOTAMs, broadcast aviation meteorological and aeronautical information, and notify Customs and Border Protection of transborder flights. The Columbia FSS provides these services to LBO.

NAVIGATIONAL AIDS

Navigational aids are electronic devices that transmit radio frequencies that pilots of properly equipped aircraft can translate into point-to-point guidance and position information. The types of electronic navigational aids available for aircraft flying to or from the airport include very high frequency omni-directional range beacons (VOR) and area navigation (RNAV) using global positioning system (GPS).

The VOR provides azimuth readings to pilots of properly equipped aircraft by transmitting radio signals at every degree to provide 360 individual navigation courses. Frequently, distance measuring equipment (DME) is combined with a VOR facility (VOR-DME) to provide distance, as well as directional information. Military tactical air navigation aids (TACANs) and civil VORs are commonly combined to form a VORTAC. The VORTAC provides distance and direction information to both civil and military pilots. The Sunshine VOR-DME is the closest navigational aid to LBO, located approximately 23.7 nautical miles north of the airport.

GPS was initially developed by the United States Department of Defense for military navigation around the world. However, GPS is now used extensively for a wide variety of civilian uses, including civil air navigation. GPS uses satellites placed in orbit to transmit electronic signals, which pilots of properly equipped aircraft use to determine altitude, speed, and navigational information. With GPS, pilots can directly navigate to any airport in the country and are not required to navigate to a specific ground-based facility.

INSTRUMENT APPROACH PROCEDURES

Instrument approach procedures assist pilots in locating and landing at an airport during low visibility and cloud ceiling conditions. They are categorized as either precision, approach with vertical guidance (APV), or non-precision. Precision instrument approach aids provide an exact course alignment and vertical descent path for an aircraft on final approach to a runway with a height above threshold (HATh) lower than 250 feet and visibility lower than ¾ mile. APVs also provide course alignment and vertical guidance but have HAThs of 250 feet or more and visibility minimums of ¾ mile or greater. Non-precision instrument approaches provide only course alignment information with no vertical guidance.

Approach minimums are published for different aircraft categories (aircraft categories are described in greater detail in Chapter 2) and consist of a minimum "decision" altitude and required visibility. According to FAR 91.175, a pilot must be able to make a safe landing, have the runway in sight, and the visibility requirement is met. There are no cloud ceiling requirements; the decision altitude is the point at which the pilot must meet all three criteria for landing, otherwise they cannot land using the published instrument approach.

The only instrument procedures available at LBO are RNAV (GPS) for each runway end. **Table 1G** presents the current, published instrument approach procedures at the airport.

TABLE 1G | Instrument Approach Procedures

Category	A	B	C	D
RNAV (GPS) Runway 18				
LNAV/VNAV DA	1,937'/2 ¼-mile			
LNAV MDA	1,760'/1-mile		1,760'/1 ¼-mile	
Circling	1,820'/1-mile		1,820'/1 ½-mile	
RNAV (GPS) Runway 36				
LNAV/VNAV DA	1,680'/1 ¼-mile			
LNAV MDA	1,700'/1-mile			1,700'/1 ¼-mile
Circling	1,820'/1-mile		1,820'/1 ½-mile	1,980'/2-mile

LNAV/VNAV: Lateral Navigation/Vertical Navigation
DA: Decision Altitude
MDA: Minimum Descent Altitude
(xxx'/ x-mile): Decision height/Visibility requirement

Source: U.S. Terminal Procedures, Floyd W. Jones Lebanon (LBO)

RUNWAY USE AND TRAFFIC PATTERNS

The traffic pattern at the airport is maintained to provide the safest and most efficient use of the airspace. At LBO, both runways have standard left-hand traffic patterns, which means aircraft make left turns when in the pattern for landing.

LBO has established a specific pattern altitude for aircraft of select sizes. Light aircraft are expected to fly a traffic pattern of 2,100 feet MSL while heavier aircraft (jets and larger turboprops) fly a 2,310-foot traffic pattern.

LBO does not have aircraft restrictions, curfews, or a mandatory noise abatement program, as these programs would violate the Federal *Airport Noise and Capacity Act* (ANCA) *of 1990*. Federal law requires the airport to remain open 24 hours a day, 7 days a week, and to accept all civilian and military aircraft that can be safely accommodated.

REGIONAL AVIATION FACILITIES

A review of other public-use airports with at least one paved runway within a 30-nautical mile radius of LBO was conducted to identify and distinguish the types of air service provided in the region. It is important to consider the capabilities and limitations of these airports when planning for future changes or improvements to LBO. **Table 1H** provides basic information about these airports, while **Figure 1C** identifies the location of each airport in relation to LBO. It should be noted that only public-use airports have been included in the comparison.

TABLE 1H | Local Airports

Airport	Distance/Direction from LBO[1]	NPIAS Service Level[2]	State Service Level[3]	Based Aircraft[4]	Annual Operations[4]	Longest Runway (ft.)[1]	Lowest Visibility Minimum[1]
Floyd W. Jones Lebanon (LBO)	**---**	**Local GA**	**Regional Business**	**26**	**18,125**	**5,000**	**1-mile**
Richland Municipal (MO1)	17.9 nm NE	NA	Community Local	0	360	3,000	NA
Camdenton Memorial - Lake Regional (OZS)	19.6 nm N	Local GA	Regional Business	25	10,020	4,000	7/8-mile
Buffalo Municipal (H17)	20.6 nm W	NA	Community Local	11	4,040	3,220	NA
Waynesville-St. Robert Regional - Forney Field (TBN)	24.9 nm E	Regional Commercial Service	Commercial	9	25,807	6,037	1-mile
Lee C Fine Memorial (AIZ)	27.3 nm N	Basic GA	Regional Business	6	4,704	6,497	1-mile
Grand Glaize - Osage Beach (K15)	27.8 nm N	Local GA	Business Community	11	2,794	3,205	1-mile

GA: General Aviation
NA: Not Applicable

Sources: [1]airnav.com, [2]FAA NPIAS, [3]Missouri State Airport System Plan Update (2019), [4]FAA ADIP (as of November 2021)

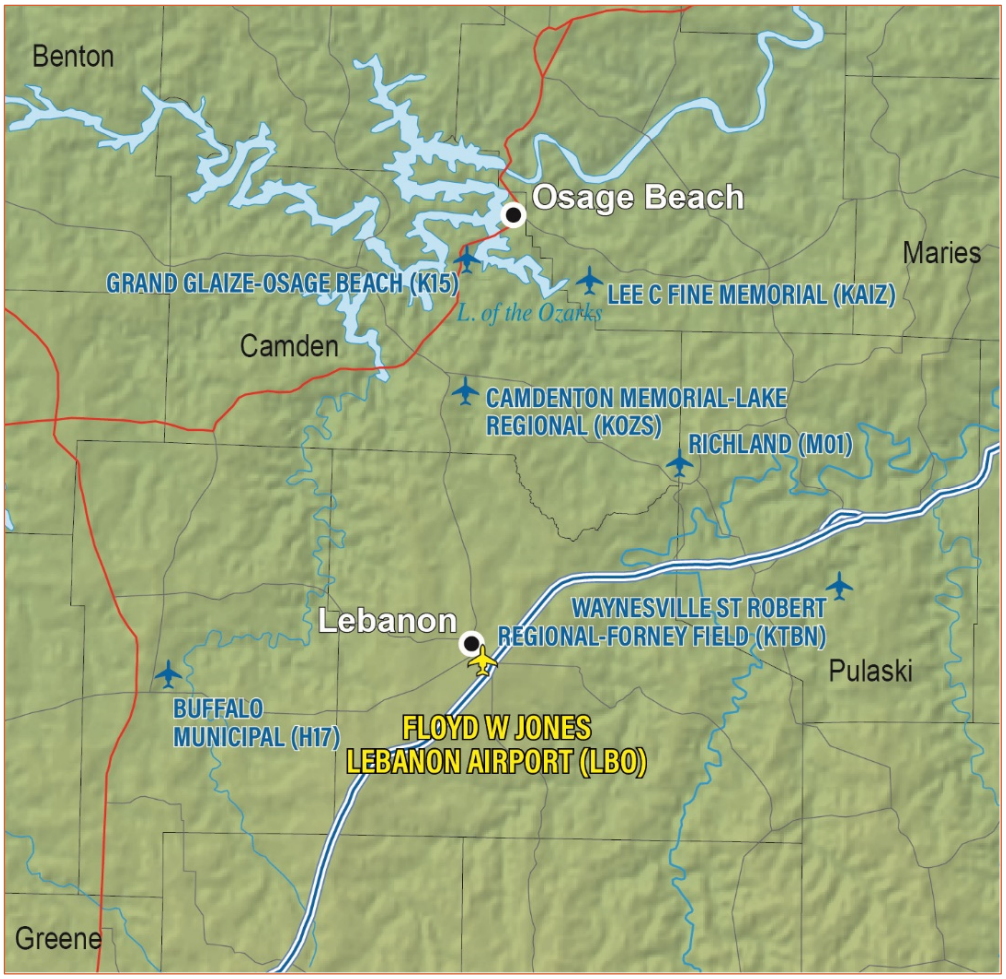


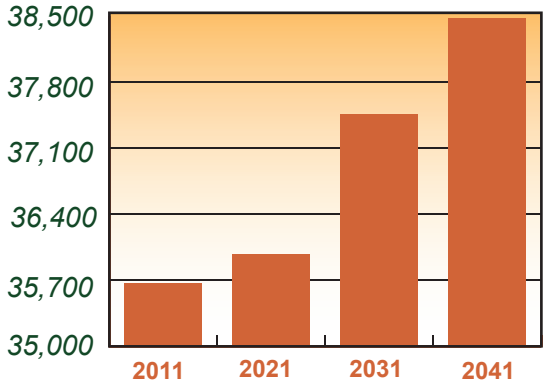
Figure 1C: Location of Local Airports

SOCIOECONOMIC CHARACTERISTICS

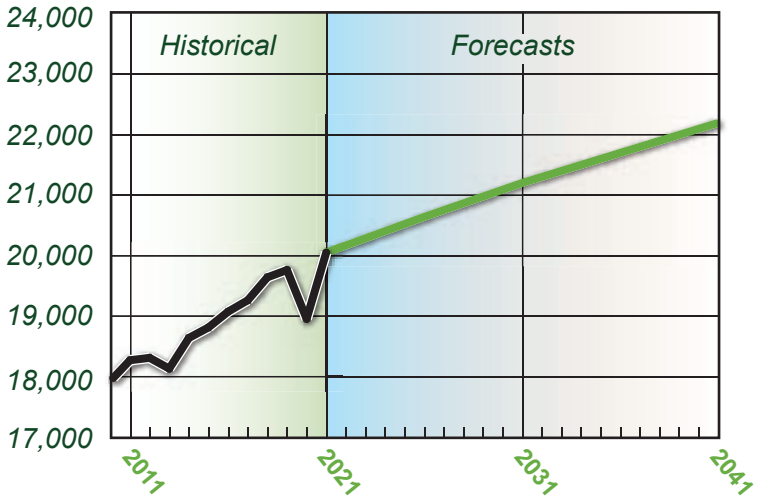
Socioeconomic characteristics are collected and examined to derive an understanding of the dynamics of growth near the airport. This information is essential in determining aviation demand level requirements, as most general aviation demand is directly related to the socioeconomic condition of the surrounding region. Statistical analysis of population, employment, income, and gross regional product (GRP) trends provide a picture of the economic strength of the region, as well as the ability of the area to sustain a strong economic base into the future. Additional socioeconomic data will be used in the forecast chapter; however, the information provided in this chapter will introduce socioeconomic trends in the study area.

Exhibit 1F details the socioeconomic profile of Laclede County, including future projections. The data shows that county population has grown slightly over the past 10 years at a CAGR of 0.03 percent with a total population of 35,812 as of 2020. Projections indicate population growth will be at a slightly faster pace of 0.34 percent CAGR over the next 20 years, reaching a total of 38,480 by 2041. Employment has grown faster than population over the same period, with a 10-year CAGR of 0.56 percent and is forecast to grow at a faster pace of 0.76 percent through 2041. The largest industries in Laclede County are

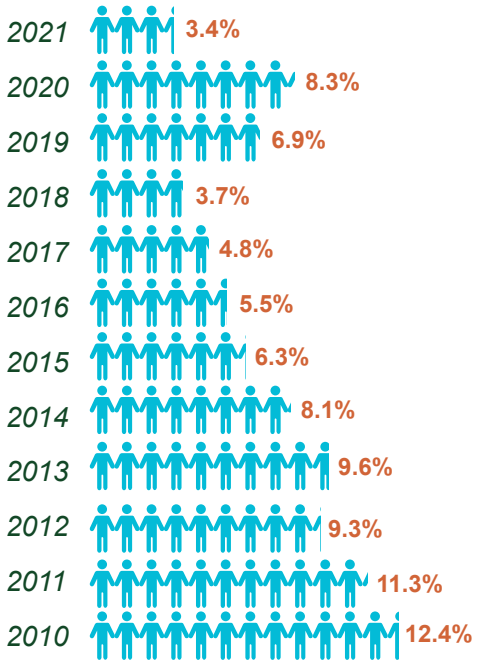
POPULATION



EMPLOYMENT



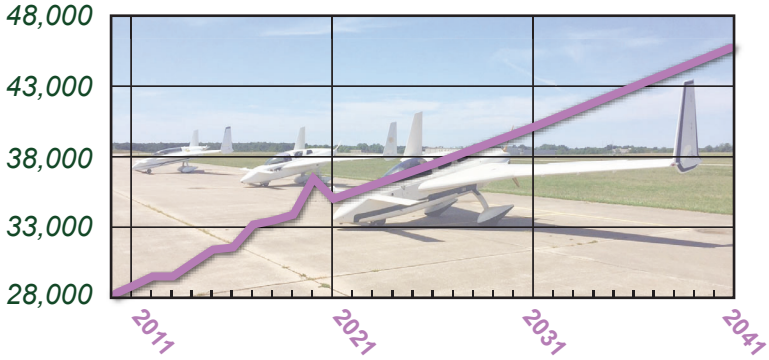
UNEMPLOYMENT



LARGEST INDUSTRIES

- Manufacturing
- Retail Trade
- Health Care/ Social Assistance
- Government
- Accomodation/ Food Service

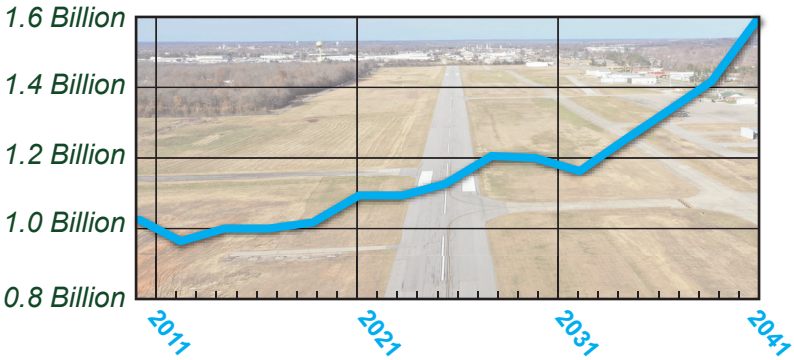
PERSONAL INCOME PER CAPITA (2012 DOLLARS)



MAJOR EMPLOYERS

- White River Marine Group (Tracker Boats)
- Emerson Climate Technologies
- Missouri Cooperage
- The Durham Company
- G3 Boats
- Lowe Boats
- Marine Electical Products
- Detroit Tool Metal Products
- Regal Beloit
- DT Engineering

GROSS REGIONAL PRODUCT (2012 DOLLARS)



manufacturing and retail trade, with Lebanon holding the title of "Aluminum Fishing Boat Capitol of the World," while health care, government, and food service round out the top five industries. **Exhibit 1F** shows the top employers in the area. Projections for the future of employment in the county maintains the MANUFACTURING sector as the largest.

Per capita personal income (PCPI) levels in the county were at $36,458 in 2020, which represents a growth of 2.6 percent annually over the past decade. PCPI levels are projected to continue to rise, though not as fast, to $45,857 (1.1% CAGR) by 2041.

ENVIRONMENTAL INVENTORY

The following section examines existing environmental conditions at LBO and the environs to help identify environmental concerns that should be considered during the preparation of the Airport Master Plan. The inventory is organized using the resource categories contained in FAA Order 1050.1F, *Environmental Impacts: Policies and Procedures* (2015). Available information regarding the environmental conditions at the airport and within the surrounding area has been derived from internet resources, agency maps, and existing literature. A comprehensive list of the resources that are included in this section is below.

- Air Quality
- Biological Resources
- Climate
- Coastal Resources
- *Department of Transportation Act*, Section 4(f)
- Farmlands
- Hazard Materials, Solid Waste, and Pollution Prevention
- Historical, Architectural, Archaeological, and Cultural Resources
- Land Use
- Natural Resources and Energy Supply
- Noise and Noise-Compatible Land Use
- Socioeconomics, Environmental Justice, and Children's Environmental Health and Safety Risks
- Visual Effects
- Water Resources

AIR QUALITY

The concentration of various pollutants in the atmosphere describes the local air quality. The significance of a pollutant's concentration is determined by comparing it to the state and federal air quality standards. In 1971, the U.S. Environmental Protection Agency (EPA) established standards that specify the maximum permissible short- and long-term concentrations of various air contaminants. The National Ambient Air Quality Standards (NAAQS) consist of primary and secondary standards for criteria pollutants: ozone (O_3), carbon monoxide (CO), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), coarse particulate matter (PM_{10}), fine particulate matter (PM2.5), and lead (Pb).

Based on federal air quality standards, a specific geographic area can be classified as either an "attainment," "maintenance," or "nonattainment" area for each pollutant. The threshold for nonattainment designation varies by pollutant.

The airport is in Laclede County. Laclede County is in attainment for all criteria pollutants.

BIOLOGICAL RESOURCES

Biotic resources include the various types of plants and animals that are present in an area. The term also applies to rivers, lakes, wetlands, forests, and other habitat types that support plants and animals.

The U.S. Fish and Wildlife Service (USFWS) is charged with overseeing the requirements contained within Section 7 of the *Endangered Species Act* (ESA). The ESA provides a framework to conserve and protect animal or plant species whose populations are threatened by human activities. The FAA and USFWS review projects to determine if a significant impact to protected species will result in the implementation of a proposed project. Significant impacts occur when a proposed action could jeopardize the continued existence of a protected species or would result in the destruction or adverse modification of federally designated critical habitat in the area.

The Migratory Bird Treaty Act prohibits the take (including killing, capturing, selling, trading, and transport) of protected migratory bird species without prior authorization by the Department of Interior U.S. Fish and Wildlife Service.[1]

Table 1J shows federally listed species potentially occurring near LBO. All species included below have no critical habitat on airport grounds.

TABLE 1J | Federally Listed Species Potentially Occurring Near LBO

Species Name	Scientific Name	Federal Status	Range/Habitat
Eastern Hellbender Missouri	*Crytobranchus alleganiensis*	Endangered	There is no critical habitat at the airport.
Gray Bat	*Myotis grisescens*	Endangered	There is no critical habitat at the airport.
Indiana Bat	*Myotis sodalist*	Endangered	There is no critical habitat at the airport.
Monarch Butterfly	*Danaus plexippus*	Candidate	There is no critical habitat at the airport.
Northern Long-Eared Bat	*Myotis septentrionalis*	Threatened	There is no critical habitat at the airport.

Source: USFW IPaC

[1] U.S. Fish & Wildlife Service - Migratory Bird Program | Conserving America's Birds - https://fws.gov/birds/policies-and-regulations/laws-legislations/migratory-bird-treaty-act.php

CLIMATE

The EPA's *Inventory of U.S. Greenhouse Gas Emissions and Sinks 1990-2017* found that the transportation sector, which includes aviation, accounted for approximately 29 percent of U.S. greenhouse gas (GHG) emissions in 2019. Of this, the aviation sector contributed approximately 175.0 million metric tons (MMT) of carbon dioxide equivalent (CO_2), or nearly 9.4 percent of all transportation emissions. Transportation emission sources include cars, trucks, ships, trains, and aircraft. Most GHG emissions from transportation systems are CO_2 emissions resulting from the combustion of petroleum-based products in internal combustion engines. Relatively insignificant amounts of methane (CH_4), hydrofluorocarbon (HFC), and nitrous oxide (N_2O) are emitted during fuel combustion. From 1990 to 2017, total transportation emissions increased. The upward trend is largely due to increased demand for travel; however, much of this travel was done in passenger cars and light-duty trucks. In addition to transportation-related emissions, **Figure 1D** shows GHG emissions sources in the U.S. in 2019.

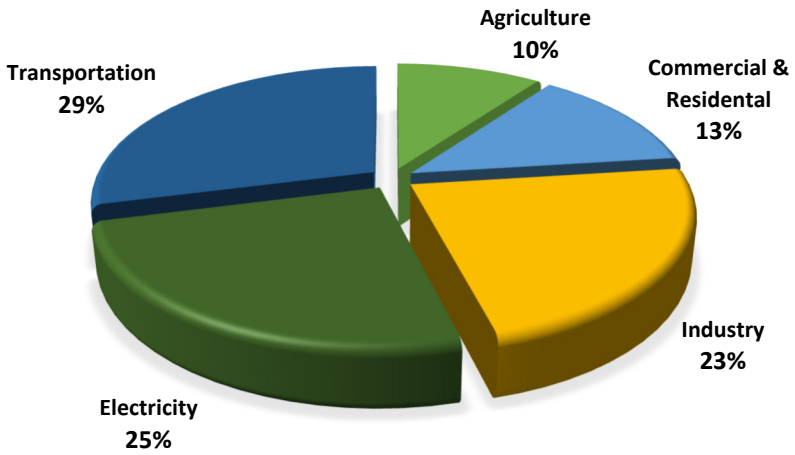


Figure 1D: 2019 Sources of Greenhouse Gas Emissions in the U.S. (EPA, 2021)

Several factors influence the quantities of greenhouse gas emissions released into the atmosphere including Agriculture, Commercial & Residential, Industry, Electricity, and Transportation. Increasing concentration of GHGs can affect global climate by trapping heat in Earth's atmosphere. Scientific measurements have shown that Earth's climate is warming with concurrent impacts, including warmer air temperatures, rising sea levels, increased storm activity, and greater intensity in precipitation events. Climate change is a global phenomenon that can also have local impacts (Intergovernmental Panel on Climate Change, 2014). GHGs, such as water vapor (H_2O), CO_2, CH_4, N_2O, and O_3, are both naturally occurring and anthropogenic (man-made). The research has established a direct correlation between fuel combustion and GHG emissions. GHGs from anthropogenic sources include CO_2, CH_4, N_2O, HFCs, perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6). CO_2 is the most important anthropogenic GHG because it is a long-lived gas that remains in the atmosphere for up to 100 years.[2]

Information regarding the climate for the City of Lebanon and surrounding environments, including wind, temperature, and precipitation, are found earlier in this chapter.

COASTAL RESOURCES

Federal activities involving or affecting coastal resources are governed by the *Coastal Barriers Resource Act*, the *Coastal Zone Management Act*, and Executive Order (E.O.) 13089, *Coral Reef Protection*.

[2] Intergovernmental Panel on Climate Change AR5 Synthesis Report: Climate Change 2014 (http://www.ipcc.ch/)

The Airport is located approximately 540 miles from the Gulf of Mexico and 960 Miles from the Atlantic Ocean, the nearest U.S. coastal areas. Therefore, the airport is not located within a coastal zone. The closest National Marine Sanctuary is the Flower Garden Bank NMS, located 660 miles from the airport.[3]

DEPARTMENT OF TRANSPORTATION ACT, SECTION 4(f)

Section 4(f) of the *Department of Transportation Act,* which was recodified and renumbered as Section 303(c) of 49 United States Code, provides that the Secretary of Transportation will not approve any program or project that requires the use of any publicly or privately owned historic sites, public parks, recreation areas, or waterfowl and wildlife refuges of national, state, regional, or local importance unless there is no feasible and prudent alternative to the use of such land, and the project includes all possible planning to minimize harm resulting from the use.[4]

The closest resource properties to LBO that may be protected under Section 4(f) of the DOT Act are summarized in **Table 1K** and are depicted on **Exhibit 1G.**

TABLE 1K | *Department of Transportation Act*, Section 4(f) Resources

Facility	Distance from LBO (mi.)	Direction from LBO
National Register of Historic Places		
Ralph E. Burley House	2.0	Northeast
Wallace House	2.0	Northeast
Polger Money Maker Place	2.0	Southeast
Joe Knight Building	2.0	South
Parks		
Nelson Park	0.6	Southwest
Harke Park	0.35	Southwest
Maplecrest Park	0.65	Northwest
Boswell Park	1.1	Northwest

Source: Google Earth Aerial Imagery, Coffman Associates analysis

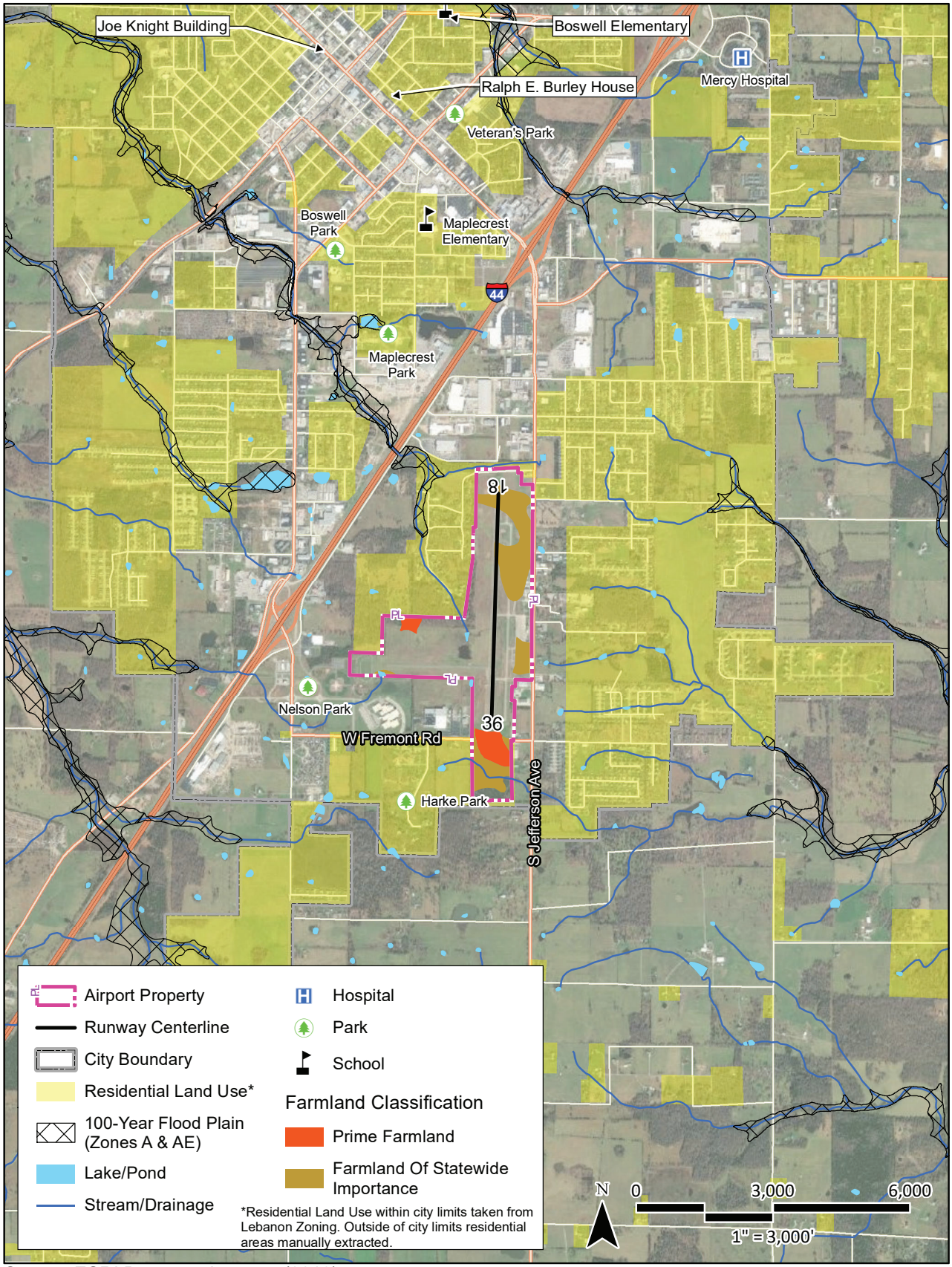
There are no other Section 4(f) Resources within the vicinity of the airport (i.e., wilderness and recreation areas, wildlife refuges or waterfowl habitats). Nearest wilderness, recreation, and critical habitat points are listed below:

- Nearest Wilderness Area: Paddy Creek Wilderness (30 miles southeast from the airport)
- Nearest Recreation Area: Onyx Cave Conservation Area (38 miles northeast from airport)
- Nearest Critical Habitat Line: Neosho Mucket (79 miles south from airport).

FARMLANDS

Under the *Farmland Protection Policy Act* (FPPA), federal agencies are directed to identify and consider the adverse effects of federal programs on the preservation of farmland, to consider appropriate

[3] Google Earth Aerial Imagery (2021)
[4] 49 U.S. Code § 303 - Policy on lands, wildlife and waterfowl refuges, and historic sites



Source: ESRI Basemap Imagery (2018), FEMA, USDA, City of Lebanon.

alternative actions which could lessen adverse effects, and to assure that such federal programs are, to the extent practicable, compatible with state or local government programs and policies to protect farmland. The FPPA guidelines, developed by the U.S. Department of Agriculture (USDA), apply to farmland classified as prime or unique, or of state or local importance as determined by the appropriate government agency, with concurrence by the Secretary of Agriculture.

Information obtained from the Natural Resource Conservation Service's (NRCS) Web Soil Survey (WSS) indicates that soils indicative of important farmlands are present throughout the airport property. The airport has soils that are either classified as "farmland of statewide importance," "all areas are prime farmland" or "not prime farmland." Areas of farmland classifications at LBO are depicted on **Exhibit 1G**.

HAZARDOUS MATERIALS, SOLID WASTE, AND POLLUTION PREVENTION

Federal, state, and local laws regulate hazardous materials use, storage, transport, and disposal. These laws may extend to past and future landowners of properties containing these materials. In addition, disrupting sites containing hazardous materials or contaminants may cause significant impacts to soil, surface water, groundwater, air quality, and the organisms using these resources. According to the EPA's Environmental Justice Screen and Mapping Tool (*EJSCREEN*), there are no Superfund or brownfields sites within three miles of the airport.

The airport currently operates a stormwater management pollution prevention plan (SWMP) through the MS4 General permit (2017-2021) which is issued and regulated by the Missouri Department of Transportation. The SWMP summarizes MoDOT's intentions to reduce the categories of concern listed in the MS4 General permit. These categories are as follows: Public Education and Outreach, Public Involvement and Participation, Illicit Discharge Detection and Elimination, Construction Site Runoff Control, Post-Construction Site Runoff Control, and Pollution Prevention/Good House Keeping.[5]

HISTORICAL, ARCHITECTURAL, ARCHAEOLOGICAL, AND CULTURAL RESOURCES

Determination of a project's environmental impact to historic and cultural resources is made under guidance in the *National Historic Preservation Act* (NHPA) *of 1966*, as amended, the *Archaeological and Historic Preservation Act* (AHPA) *of 1974*, the *Archaeological Resources Protection Act* (ARPA), and the *Native American Graves Protection and Repatriation Act* (NAGPRA) *of 1990*. In addition, the *Antiquities Act of 1906*, the *Historic Sites Act of 1935*, and the *American Indian Religious Freedom Act of 1978* also protect historical, architectural, archaeological, and cultural resources. Impacts may occur when a proposed project causes an adverse effect on a resource which has been identified (or is unearthed during construction) as having historical, architectural, archaeological, or cultural significance.

The Department of Transportation Section has identified several 4(f) Resources within the vicinity of the airport as was discussed previously

[5] MoDOT's Stormwater Management Plan (SWMP) Stormwater Management Plan (modot.org)

LAND USE

Land use regulations near airports are achieved through local government codes, city policies, and plans that include airport districts and planning areas. Regulations are used to avoid land use compatibility conflict around airports.

Revised Statute 89.010 of Missouri (2017) prescribes Transect-based zoning. Transect-based or smart growth zoning provisions adopted by a city govern street configuration requirements, including number and locations of parking spaces, street, drive lane, and cul-de-sac lengths and widths, turning radii, and improvements within the right of-way, prevail over zoning provisions adopted by another political subdivision with jurisdiction in the city. This principle was developed to guide creation of sustainable communities in permitting high density and mixed-use development in urban areas.

The Zoning Districts Map shows the airport is located within an RS-1 Residential District. Surrounding parcels have several zone classifications including General C-1/Limited C-L Commercial or Light Industrial M-1 Rural RU-2 Districts.[6]

NATURAL RESOURCES AND ENERGY SUPPLY

E.O. 13423, *Strengthening Federal Environmental, Energy, and Transportation Management* instructs federal agencies to advance the nation's energy security and environmental performance by achieving specified goals. Natural resources and energy supply provide an evaluation of a project's consumption of natural resources. It is the policy of FAA Order 1053.1, *Energy and Water Management Program for FAA Buildings and Facilities*, to encourage the development of facilities that exemplify the highest standards of design, including principles of sustainability.

Natural resources and energy supply are discussed earlier in this chapter under "Fuel Storage."

NOISE AND NOISE-COMPATIBLE LAND USE

Federal land use compatibility guidelines are established under 14 Code of Federal Regulations (CFR) Part 150, *Airport Noise Compatibility Planning*. According to 14 CFR Part 150, residential land uses and schools are noise-sensitive land uses that are not considered compatible with a 65 decibel (dB) Day-Night Average Sound Level (DNL). Other noise-sensitive land uses (such as religious facilities, hospitals, or nursing homes), if located within a 65 dB DNL contour, are generally compatible when an interior noise level reduction of 25 dB is incorporated into the design and construction of the structure. Special consideration should also be given to noise-sensitive areas within Section 4(f) properties where the land use compatibility guidelines in 14 CFR Part 150 do not account for the value, significance, and enjoyment of the area in question.[7]

[6] Lebanon, MO Zoning Districts Map 2019 Zoning-Map (lebanonmissouri.org)
[7] 49 U.S. Code § 47141 – Compatible land use planning and projects by State and Local Governments

Noise-sensitive land uses near the airport consist of schools, places of worship, and a senior center. **Table 1M** shows noise-sensitive land uses within 3 miles of the airport.

TABLE 1M | Noise-Sensitive Land Uses within Three Miles of LBO

Facility	Distance from LBO (mi.)	Direction from LBO
Schools/Child Care Centers		
Joe D. Ether Elementary School	2.6	Northwest
Lebanon High School	2.7	Northwest
Places of Worship		
Calvary Baptist Church	0.02	West
Unity Freewill Baptist Church	0.02	West
Highland Park Church of God	0.35	Northeast
Bethel Missionary Baptist Church	2.7	South
Senior Centers		
Lebanon South Nursing & Rehab	0.3	Southwest

Source: Google Earth Aerial Imagery, Coffman Associates analysis

SOCIOECONOMICS, ENVIRONMENTAL JUSTICE, AND CHILDREN'S ENVIRONMENTAL HEALTH AND SAFETY RISKS

Socioeconomics

Socioeconomics is an umbrella term used to describe aspects of a project that are either social or economic in nature. A socioeconomic analysis evaluates how elements of the human environment such as population, employment, housing, and public services might be affected by the proposed action and alternative(s).

FAA Order 1050.1F, *Environmental Impacts: Policies and Procedures* specifically requires that a federal action causing disproportionate impacts to an environmental justice population (i.e., a low-income or minority population) be considered, as well as an evaluation of environmental health and safety risks to children. The FAA has identified factors to consider when evaluating the context and intensity of potential environmental impacts. Impacts to consider include (but are not limited to):

- Induce substantial economic growth in an area, either directly or indirectly;
- Disrupt or divide the physical arrangement of an established community;
- Cause extensive relocation when sufficient replacement housing is unavailable;
- Cause extensive relocation of community business what would cause severe economic hardship for affected communities;
- Disrupt local traffic patterns and substantially reduce the levels of service of roads serving an airport and its surrounding communities; or
- Produce a substantial change in the community tax base?

The EPA's *EJSCREEN* online tool identifies the presence of environmental justice areas within the vicinity of the airport. According to 2018 American Community survey estimates, the population within three miles of the airport is 704 persons, of which 46 percent of the population is considered low-income and four percent is considered a minority population.

Environmental Justice

Environmental justice is the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Fair treatment means that no group of people should bear a disproportionate share of the negative environmental consequences resulting from industrial, governmental, and commercial operations or policies.

Meaningful Involvement ensures that:

- people have an opportunity to participate in decisions about activities that may affect their environment and/or health;
- the public's contribution can influence the regulatory agency's decision;
- their concerns will be considered in the decision-making process; and
- the decision-makers seek out and facilitate the involvement of those potentially affected.[8]

The EPA's *EJSCREEN* was consulted and identified the presence of minority populations within three miles of the airport. There are 23 persons identified as minority. Indicated in **Table 1N**, approximately two percent of the population has identified as Hispanic or Latino. The closest residential area is .15 miles east of the airport property line across State Route 5.

TABLE 1N | Population Characteristics within Three Miles of LBO

Characteristic	Three-Mile Buffer of LBO
Total Population	**704**
Race (alone or in combination with two or more races)	
White	97%
Black or African American	0%
American Indian	0%
Asian	1%
Native Hawaiian/Pacific Islander	0%
Some other race	1%
Reporting two or more races	1%
Total	**100%**
Percentage Hispanic and Latino population	
Total Hispanic or Latino (of any race)	**2%**

Source: U.S. EPA EJSCREEN (2021)

Children's Environmental Health and Safety

Federal agencies are directed, per E.O. 13045, Protection of Children from Environmental Health Risks and Safety Risks, to make it a high priority to identify and assess the environmental health and safety risks that may disproportionately impact children. Such risks include those that are attributable to products or substances that a child is likely to encounter or ingest (air, water, food, or drinking water) or to which they may be exposed.

[8] Environmental Justice EPA https://www.epa.gov/environmentaljustice

According to the U.S. EPA *EJSCREEN* report, approximately 23 percent of the population within the three-mile study area previously identified is under the age of 17.

VISUAL EFFECTS

Visual effects deal broadly with the extent to which a proposed action or alternative(s) would either: 1.) produce light emissions that create an annoyance or interfere with activities; or 2.) contrast with, or detract from, the visual resources and/or the visual character of the existing environment. Each jurisdiction will typically address outdoor lighting, scenic vistas, and scenic corridors in zoning ordinances and their general plan.

Light Emissions

Light emissions include any light that originates from a light source into the surrounding environment, such as airfield and apron floodlighting, navigational aids, parking lot illumination, and roadway lighting. Glare is a type of emission that occurs when light is reflected off a surface, including solar panels or window glass.

Light emission impacts typically relate to the extent to which any light or glare results from a source that could create an annoyance for people or would interfere with normal activities. Generally, local jurisdictions will include ordinances in the local code addressing outdoor illumination to reduce the impact of light on surrounding properties.

Visual Resources and Visual Character

Visual character refers to the overall visual makeup of the existing environment where a proposed action or its alternative(s) would be located. For example, areas near densely populated areas generally have a visual character that could be defined as urban, whereas less developed areas could have a visual character defined by the surrounding landscape features, such as open grass fields, forests, mountains, or deserts, etc.

Visual resources include buildings, sites, traditional cultural properties, and other natural or manmade landscape features that are visually important or have unique characteristics. Visual resources may include structures or objects that obscure or block other landscape features. In addition, visual resources can include the cohesive collection of various individual visual resources that can be viewed at once or in concert from the area surrounding the site of the proposed action or alternative(s).

The 2005 Comprehensive Plan prescribed a balance of different residential zones. The Planning and Zoning Commission outlined ways to provide appropriate buffers to residential areas with limited commercial zoning - aiming to protect the sanctuary of the homes in residential areas. Additionally, the plan discussed the need to implement more neighborhood design standards such as minimum green space requirement, recreational space, aesthetics borders or buffers, etc.

The Green Infrastructure Implementation Methods cited by Missouri Department of Natural Resources includes information and case studies to model the pathway to Missouri's Rural Smart Growth. The methods include suggestions to minimize disturbance of native soils, vegetation, and natural resources and integrate natural systems into neighborhood design.[9]

The airport lies on the outskirts of the urban area and is visible from State Route 5. This highway is not a designated scenic highway within the state or the county.

WATER RESOURCES

Wetlands

The U.S. Army Corps of Engineers regulates the discharge of dredged and/or fill material into waters of the United States, including adjacent wetlands, under Section 404 of the *Clean Water Act* (CWA). Wetlands are defined in E.O. 11990, *Protection of Wetlands*, as "those areas that are inundated by surface or groundwater with a frequency sufficient to support and under normal circumstances does or would support a prevalence of vegetative or aquatic life that requires saturated or seasonally saturated soil conditions for growth and reproduction." Wetlands can include swamps, marshes, bogs, sloughs, potholes, wet meadows, river overflows, mudflats, natural ponds, estuarine areas, tidal overflows, and shallow lakes and ponds with emergent vegetation. Wetlands exhibit three characteristics: the soil is inundated or saturated to the surface at some time during the growing season (hydrology), has a population of plants able to tolerate various degrees of flooding or frequent saturation (hydrophytes), and soils that are saturated enough to develop anaerobic (absent of air or oxygen) conditions during the growing season (hydric).

USFWS manages the National Wetlands Inventory on behalf of all federal agencies. The National Wetlands Inventory identifies surface waters and wetlands in the nation. There are two freshwater retention ponds present on the Northeast and Southwest boundaries of the airport. Drainage from the airport is channelized running south to north from retention ponds off the airport runway. The National Wetlands Inventory maps the inland surface waterways as Riverine. However, based on aerial and ground photography of the airport, including Google Earth mapping, the on-airport drainages do not appear to convey waters to waters of the U.S. (i.e., traditional navigable waters). The NRCS Web Soil Survey indicated hydric soils present within the airport boundaries due to conditional flooding in the area.[10]

Floodplains

E.O. 11988, *Floodplain Management*, directs federal agencies to take action to reduce the risk of flood loss, minimize the impact of floods on human safety, health, and welfare, and restore and preserve the natural and beneficial values served by the floodplains. A review of the Federal Emergency Management Agency

[9] Green Infrastructure Implementation Methods | Missouri Department of Natural Resources (mo.gov) https://dnr.mo.gov/document-search/green-infrastructure-implementation-methods
[10] National Wetlands Inventory – Wetlands Mapper https://www.fws.gov/wetlands/Data/Mapper.html

(FEMA) Flood Insurance Rate Map (FIRM) panel number 29105C0219C, effective September 2010, indicates that there are no Special Flood Hazard Areas such as a 100-year floodplain on the airport.[11]

Surface Waters

The *Clean Water Act* establishes water quality standards, controls discharges, develops waste treatment management plans and practices, prevents or minimizes the loss of wetlands, and regulates other issues concerning water quality. Water quality concerns related to airport development most often relate to the potential for surface runoff and soil erosion, as well as the storage and handling of fuel, petroleum products, solvents, etc. Additionally, Congress has mandated (under the CWA) the National Pollutant Discharge Elimination System (NPDES). The Missouri Department of Natural Resources has the authority to administer the NPDES program in the state, tribal lands excluded. The State of Missouri and City of Lebanon mandate certain procedures required to prevent contamination of water bodies from stormwater runoff.

The City of Lebanon, Missouri has been designated by the EPA/MDNR as a small MS4 community and must meet and comply with Phase II Storm Water Final Rule. The Phase II Final Rule requires the City of Lebanon, as a MS4 operator, to develop, implement, and enforce a program to reduce pollutants in storm water runoff to their MS4 from construction activities that result in a land disturbance of greater than or equal to one acre. The drainage basins and watersheds in Lebanon generally drain from a Southeast direction to a Northwest direction. The highest point within the corporate limits of the City of Lebanon is on or near the hospital area (1350). The lowest point is Goodwin Hollow Lift Station Area (1150). Approximately 200 feet of relief occurs from the high point to the low point. The watersheds which make up Lebanon's drainage maps are Goodwin Hollow (northwest of Lebanon), Dry Auglaize (north of Lebanon), and Cobbs Creek (southeast of Lebanon).[12]

The city stormwater drainage system includes a combination of storm sewer pipe, open ditches, culverts, and detention areas directly related to roadways and conveyance areas.

The Missouri Water Quality 305(b) Report prescribed by the Clean Water Act, requires the state to report the status of their state waters to EPA on April 1 every even-numbered year. The integrated report provides an overview of the status of Missouri's water. The report summarizes water quality issues and assesses the degree of progress Missouri has made toward meeting federal Clean Water Act goals. The report also includes the list of impaired waters and what pollution sources are affecting them.

The airport shares a boundary with two watersheds: North Cobb Creek and Headwater Goodwins Hallow Creek.[13] The nearest Total Maximum Daily Load TDML Stream is the Dry Auglaize Creek 20 miles from then airport.[14]

[11] Federal Emergency Management Agency *Flood Map Service Center* https://msc.fema.gov/portal/home
[12] City of Lebanon Stormwater Management Plan (2007) SWMP (lebanonmissouri.org)
[13] EPA *EJSCREEN* Report: Watersheds EJSCREEN (epa.gov)
[14] Impaired Waters and Total Maximum Daily Loads (TMDL) Viewer (arcgis.com)

Groundwater

Groundwater is subsurface water that occupies the space between sand, clay, and rock formations. The term aquifer is used to describe the geologic layers that store or transmit groundwater, such as wells, springs, and other water sources. Examples of direct impacts to groundwater could include withdrawal of groundwater for operational purposes or reduction of infiltration or recharge area due to new impervious surfaces.[15]

The EPA's Sole Source Aquifer (SSA) Program was established under Section 1424(e) of the Safe Drinking Water Act (SDWA.) Since 1977, it has been used by communities to help prevent contamination of groundwater from federally funded projects. It has increased public awareness of the vulnerability of groundwater resources.

The SSA program is authorized by Section 1424(e) of the *Safe Drinking Water Act of 1974* (Public Law 93-523, 42 U.S.C. 300 et. seq), which states:

> "If the Administrator determines, on his own initiative or upon petition, that an area has an aquifer which is the sole or principal drinking water source for the area and which, if contaminated, would create a significant hazard to public health, he shall publish notice of that determination in the Federal Register."[16]

According to the EPA Sole Source Aquifer for Drinking Water, there are no sole source aquifers located within airport boundaries.[17] The nearest sole source aquifer is in south-central Oklahoma, 305 miles southwest from the airport, named Arbuckle-Simpson Aquifer.

Wild and Scenic Rivers

The *National Wild and Scenic Rivers Act* was established to preserve certain rivers with outstanding natural, cultural, and recreational values in a free-flowing condition for the enjoyment of present and future generations.

The Nationwide River Inventory (NRI) is a list of over 3,400 rivers or river segments that appear to meet the minimum *Wild and Scenic Rivers Act* eligibility requirements based on their free-flowing status and resource values. The development of the NRI resulted from Section 5(d)(1) in the *Wild and Scenic Rivers Act*, directing Federal agencies to consider potential wild and scenic rivers in the comprehensive planning process.

The closest designated wild and scenic river identified by the NRI is the Eleven Point River located 85 miles east of the airport.[18]

[15] United States Geological Survey - What is Groundwater? https://www.usgs.gov/faqs/what-groundwater
[16] Overview of the Drinking Water Sole Source Aquifer Program | US EPA https://www.epa.gov/dwssa/overview-drinking-water-sole-source-aquifer-program#Authority
[17] Interactive Map for Sole Source Aquifers Sole Source Aquifers (arcgis.com)
[18] Nationwide Rivers Inventory – Rivers https://www.nps.gov/subjects/rivers/nationwide-rivers-inventory.htm