Akron

COLORADO PLAINS REGIONAL AIRPORT
MASTER PLAN

TECHNICAL REPORT
2017

JVIATION®

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1. STUDY INTRODUCTION AND GOALS

This airport master plan (AMP) defines a development concept for the Colorado Plains Regional Airport (AKO or the Airport) over the course of a 20-year planning period. This plan will provide the Town of Akron (the Airport Sponsor or Sponsor) with a long-range vision for airport development that is designed to result in a safe, efficient, economical, and environmentally-acceptable air transportation facility that meets both existing and projected aviation demand levels.

The study was funded by the Federal Aviation Administration (FAA) and the Town of Akron. Technical work was conducted by a study team that was led by Jviation, Inc. and supported by GDA Engineers. The FAA requires airport sponsors to maintain current Airport Layout Plans (ALP), Exhibit A property maps, and Capital Improvement Plans (CIP), and also recommends that airport master plans be updated on a regular basis. The FAA recommends that airport master plans address the "unique issues at each airport."

The primary objective: to produce a comprehensive planning guide for AKO that continues development of a safe, efficient, and environmentally-compatible aviation facility.

The goal of the AMP is to provide a carefully considered, systematic approach to the Airport's overall maintenance, development, and operation over a 20-year period. This planning document is intended to identify and then plan for future facility needs well in advance of the actual demand for those future facilities.

The AMP is also designed to review and assess the Airport's current conformance with federal and state airport design and operational standards to help ensure that the Airport continues to operate in as safe a manner as possible. This is being undertaken to ensure that AKO can appropriately coordinate project approvals, design, financing, and construction, while avoiding the detrimental effects that could be realized due to inadequate or noncompliant airport facilities.

1.1 Master Plan Purpose and Objectives

The primary purpose of this AMP is to produce a comprehensive planning guide for the continued development of a safe, efficient, and environmentally-compatible aviation facility that meets the goals of the Town of Akron, Airport users and tenants, and the surrounding Airport service area.

The plan must also satisfy FAA and Colorado Department of Transportation (CDOT) guidelines for the development of airport master plans and facilities, while incorporating characteristics that are unique to the service area. The study focuses on aeronautical forecasts, need and justification for development, and a staged plan for recommended development.

In addition, the plan considers input from Airport users and tenants as well as community leaders to position the Airport to take advantage of future opportunities. Proposed airport development must adhere to standards that provide for safe aviation facilities while accommodating future demand.

The staged plan typically looks at planning horizons of 0–5 years, 6–10 years, and 11–20 years. The first phase generally addresses existing facility deficiencies or non-compliance to airport design standards. The subsequent phases typically address the facilities and resources needed to accommodate predicted growth based on reasonable assumptions.

In addition to addressing these objectives, the AMP must also fulfill broad master planning objectives established in FAA Advisory Circular (AC) 150/5070-6B, *Airport Master Plans*. These objectives include:

- Document the relevant issues that are considered during the preparation of the plan.
- Justify proposed development through the technical, economic, and environmental investigation of concepts and alternatives.
- Prepare a graphic presentation of development and anticipated land uses in the vicinity of the Airport.
- Develop a realistic implementation schedule, particularly the short-term capital improvement program (CIP).
- Propose an achievable financial plan to support the implementation schedule.
- Provide sufficient project definition and detail for subsequent environmental evaluations that may be required.
- Present a plan that adequately addresses the issues and satisfies local, state, and federal regulations.
- Document policies and future aeronautical demand to support municipal or local deliberations on spending, debt, land use controls, and other policies necessary to preserve the integrity of the Airport and its surroundings.
- Establish the framework for a continuing planning process.

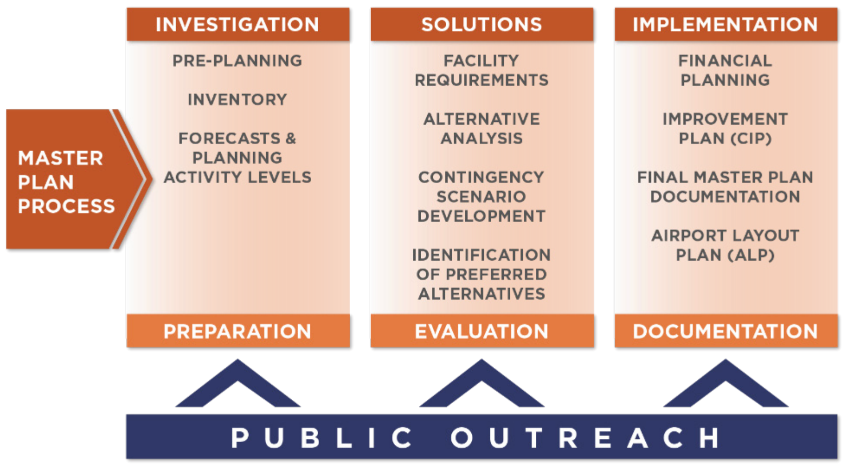
1.2 Master Plan Study Elements

Report chapters are designed to identify future facility requirements and provide the supporting rationale for their implementation.

The AKO master plan has been prepared to be consistent with the guidance provided in FAA AC 150/5070-6B, *Airport Master Plans*, and other industry-accepted principles and practices. Specifically, this AMP has seven chapters that are designed to identify future facility requirements and provide the supporting rationale for their implementation. As required by FAA, the master plan looks 20 years into the future. The planning periods are divided into three phases: short-term, 0-5 years; intermediate period, 6-10 years; and long-range planning, 11-20 years. FAA acknowledges that forecast accuracy decreases the farther it extends into the future, and therefore recommends that the forecasts should be monitored and compared against actual activity levels, and updated on a regular basis.

Figure 1-1 displays the master planning process. The process is broken down into three district phases, into which the chapters fall. Chapters One, Two, and Three are in the Investigation-Preparation phase. Chapters Four and Five are completed during the Solutions-Evaluations phase, and the remaining chapters are written during the final phase, Implementation-Documentation.

FIGURE 1-1: MASTER PLAN PROCESS



Source: Jviation

Chapter One, Study Introduction and Goals provides an overview of the AMP, including its purpose, objectives, work products, and overall structure of the project.

Chapter Two, Inventory of Existing Conditions establishes a sound basis for plan and program development through the assimilation and documentation of relevant data. The inventory is designed to assemble essential data regarding the physical, operational, and functional characteristics of AKO, its sub-components, and its environs. For example, the Airport's facilities are analyzed in relation to current FAA airport design standards, and any non-conforming conditions are identified and subsequently analyzed in this master plan. This data collection process also includes the gathering of environmental data so that it can be considered throughout the master planning process and potential follow-on environmental efforts.

Chapter Three, Aviation Activity Forecast essentially serves as the hub of the AMP by utilizing local socioeconomic information as well as regional and national air transportation trends to project the levels of aviation activity that can reasonably be expected to occur over the upcoming 20-year planning period. Assessing these future activity trends is especially important and the facility improvement recommendations within the plan are principally based on meeting aviation activity demand forecasts. Therefore, it is very important that the forecasts be both reasonable and defensible. FAA requires that the forecasts developed for the master plan be compared to the FAA's Terminal Area Forecast (TAF): if they differ by more than 10 percent, an explanation must be provided explaining the difference.

Chapter Four, Airfield Capacity and Facility Requirements utilizes the results of the Forecast to assess the ability of existing airside and landside facilities to meet the projected level of demand for the short-, mid-, and long-term planning horizons. This analysis results in the determination of those facilities that will meet the forecast of demand over the course of the 20-year planning period. Beyond this, airport facilities are examined with respect to improvements needed to safely serve the type of aircraft expected to operate at the Airport in the future, including compliance with FAA design standards, and NAVAID to increase the safety and efficiency of operations.

Chapter Five, Development Alternatives and Recommended Plan considers a variety of solutions to accommodate the anticipated facility needs identified within the Facility Requirements analysis. Through this process, various facility and site plan alternatives are proposed and evaluated with respect to their ability to meet the projected facility needs. This analysis ultimately results in the Preferred Alternative that is deemed to best meet the facility requirements in the most efficient and appropriate manner available to achieve the Airport's long-term goals. As a tool for the alternatives review and evaluation, matrices are employed to help identify the strengths and weaknesses of each proposed development alternative, with the intention of determining a single direction for development. This evaluation method focuses on several key criteria including: cost, efficiency, feasibility, operational effectiveness, impacts, and other measures. An environmental screening of the preferred development plan is also included in this chapter.

Chapter Six, Airport Layout Plan (ALP) provides a graphic description of the recommended plan for the use, development, and operation of the Airport. The ALP is a set of drawings intended to illustrate the existing and future facilities at the Airport as well as other key features such as airport geometrics, airspace, property lines and interests, and other facets.

Chapter Seven, Program Implementation Plan focuses on the capital improvement program, which defines the schedules, costs, and funding sources for the recommended development plan. It is important that the development program be practical, reasonable, and capable of enhancing the economic viability for the Airport.

1.3 Overview of AKO's Issues and Concerns

AKO's previous AMP was completed in 2005; since then, some of the Airport issues and focal points identified in that master plan have been addressed through the completion of specific projects or by updating Airport documents. Some issues have not been addressed due to changing industry standards or master plan assumptions and have yet to be resolved.

Every master plan needs to identify and focus on the unique issues at each airport. The following issues and concerns have been identified and will be addressed in the 2016 AKO master plan.

- **Existing Facilities and Environmental Resources:** Assess environmental impacts of proposed projects and the need for additional environmental documentation.
- **Aviation Trends and Forecasts:** Prepare general aviation activity forecasts considering declining traffic levels and revenues. These two elements will depend on an understanding of aviation industry trends while considering the unique vision for AKO.
- **Development Needs Assessments:** Prepare assessments of facilities needed to meet demand forecasts and analyze alternatives for major development areas. A detailed analysis on all precision and non-precision approaches for future aviation demand will also be completed when determining forecasted needs.

- **Capital Improvements:** Identify future capital improvements based on the analysis of existing and future demand as well as a financial evaluation and implementation plan. These will identify how improvements may be funded.
- **Aerial/Property Survey and Photogrammetry:** To be consistent with FAA master plan requirements, this master plan will obtain FAA AGIS-compliant base mapping and provide a detailed analysis of all approaches. Additionally, this project includes a property boundary survey consistent with updated FAA guidelines.

1.4 Master Plan Communication and Coordination

Public involvement is a part of many airport planning studies since it encourages information sharing and collaboration among the community and airport stakeholders with a collective interest in the Airport. Stakeholders typically include airport management, the airport sponsor, tenants, users, local businesses and residents, federal and state agencies, elected and appointed public officials, and the general public. With a diverse stakeholder group, a variety of forums are often employed to enhance the effectiveness of project coordination.

- The Planning Advisory Committee (PAC) served as a resource to ensure the study addressed the issues facing the Airport and its surrounding community today and into the future. Key tenants and Town representatives were included in this effort to ensure their interests were considered. The members of this group were charged with reviewing and commenting on draft study products, and to provide linkages to constituencies. The group met three times during the project.
- An online survey of key airport stakeholders (including users, tenants, based aircraft owners/pilots, transient pilots, and Airport users) was conducted to get feedback on a variety of topics, including their existing and projected activities. The survey results were utilized to help guide planning actions during the subsequent Airfield Capacity and Facility Requirements tasks.
- Various public outreach materials were created to generate public awareness of the AMP. The materials and outreach program served as important sources of information for interested parties to keep them informed of the planning process, to solicit input and to facilitate decision making during the process. The outreach materials include a project website, press releases for local media, and meeting advertisements.

Other forms of public involvement included regular public briefings to the Town of Akron Council, as well as a public information meeting/workshop. The public workshop provided an opportunity to engage the public in meaningful conversation about the Airport and the AMP.

1.5 Colorado Plains Regional Airport Vision Statement

As part of the master plan process, a visioning meeting was held with members of the PAC. The meeting included a 10-year visioning exercise whereby members of the PAC considered the opportunities that lay ahead for the Airport and how they may influence how AKO is developed and operating in the future.

A Vision Statement was created from the visioning meeting to reflect the values of the community, Airport stakeholders, and Airport users. The Vision Statement is as follows:

> “Colorado Plains Regional Airport’s reputation is built upon Safety, Reliability, and Outstanding Customer Service. Our efforts are focused to support the community’s deeply rooted base in agriculture and to serve as an incubator for businesses in our region. Maximizing the development potential of our airport facilities allows AKO to provide business and employment opportunities that benefit both AKO and the community.
>
> Supporting general aviation throughout our region is critical to our mission. We offer capable, convenient, and affordable services and amenities for locally-based aircraft owners and transient pilots. Our openness to innovative partnerships brings us state-of-the-art aviation services that attract world-wide customers.
>
> We pride ourselves on exceeding the expectations of our customers and the general public. Our employees demonstrate a passion for aviation and are knowledgeable and professional. This, along with our can-do attitude and willingness to go the extra mile, make AKO a unique and valued asset in our community and the region.”

The AMP recommendations and outcomes will be fully consistent with the Vision Statement adopted by the Airport users and community.

2. INVENTORY

The first step in the airport master planning process, as outlined in Federal Aviation Administration (FAA) Advisory Circular (AC) 150/5070-6B, *Airport Master Plans*, involves gathering information about the airport and its environs. An inventory of current conditions is essential to the success of a master plan since the information also provides a foundation, or starting point, for subsequent evaluations.

The inventory serves as a foundation or starting point for the master plan.

2.1 Airport Overview

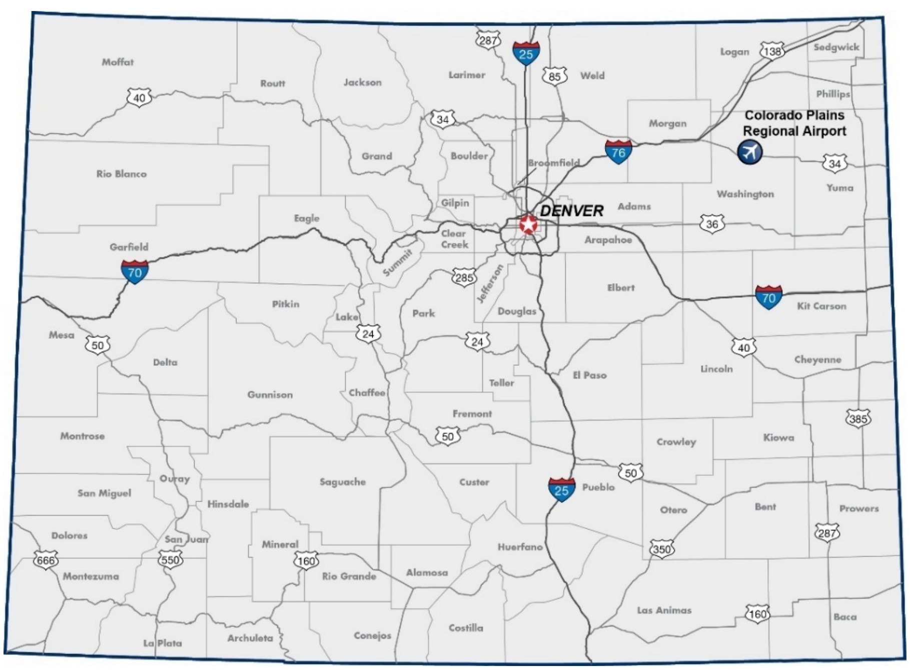
Akron is the county seat in Washington County, in the northeast corner of Colorado. It is home to approximately 1,700 people, making it the largest municipality in the County. The Town sits at the intersection of Colorado Highway 63 and US Highway 34. Interstate 76, located 30 miles west of Akron, enables travel across the country.

Akron, Colorado

Colorado Plains Regional Airport (AKO or the Airport) is 4,715 feet above sea level. Located less than a mile from the center of town, the Airport is easily accessed on Cedar Avenue (Colorado Highway 63), a main street that runs through town.

AKO is a general aviation airport owned and operated by the Town of Akron. A general aviation airport is defined as a public-use airport that does not have scheduled airline service or has less than 2,500 annual passenger boardings[1]. As the owner and Airport sponsor, the Town is responsible for operating and maintaining AKO in a safe condition and leasing properties within the Airport boundary.

FIGURE 2-1: AIRPORT LOCATION MAP



Source: Jviation

1 www.faa.gov

2.1.1 Airport History

AKO's facilities were originally established southeast of town in the early 1930s as part of the "Green Six" airway and a very early low frequency range location, making it one of Colorado's first six instrument approaches. When the very high frequency omni-directional range (VOR) system was implemented by the FAA, AKO was selected as an early site, and maintained its instrument weather capability. The Airport has had continuous on-site weather observations since the early 1930s. AKO was home to the Civil Aeronautics Authority (CAA) and FAA Flight Service Stations until 1988 when they were consolidated into another location. The Airport has always been a regional facility, serving the needs of aviation beyond the boundaries of Akron.

AKO was relocated to its current location in 1958. The Airport's main structures were constructed in 1989, including the terminal building (pre-existing), hangars, and the runway. Two airport master plan (AMP) updates were completed in 1995 and 2005. An Airport Layout Plan (ALP) update was completed in 1998; this planning tool depicts an airport's existing facilities and planned development.

Additional information related to the development of AKO over the past 10 years can be seen by examining the history of FAA Airport Improvement Program (AIP) grants issued to the Town, as shown in **Table 2-1**.

TABLE 2-1: AKO AIP GRANT HISTORY

Year	Purpose	Amount
2005	Construct Taxiway	$800,000
2008	Rehabilitate RWY 11/29	$38,760
2008	Rehabilitate RWY 11/29	$111,240
2009	Install Perimeter Fencing	$48,693
2009	Install Perimeter Fencing	$101,307
2013	Install Perimeter Fencing	$230,000
2015	Rehabilitate Apron, Rehabilitate Taxiway	$374,321
2016	Repair Precision Approach Path Indicator (PAPI) System for Runway 11/29	$120,000

Source: FAA Grant Histories

2.1.2 Financial Structure

Regarding the financial condition at airports, the FAA sponsor grant assurances state: "It (i.e. the airport sponsor) will maintain a fee and rental structure for the facilities and services at the airport which will make the airport as self-sustaining as possible under the circumstances existing at the particular airport, considering such factors as the volume of traffic and economy of collection."

Because AKO is owned and operated by the Town of Akron, the fiscal responsibility of the Airport resides with the Town and Airport Management. Airport finances are managed through an Airport General Fund. Airport revenue is generated from aviation fuel fees as well as rentals and leases of property.

The Town collects fees each month from various sources, listed in **Table 2-2**. The Airport is not fully self-sufficient and receives subsidies through the Town of Akron.

The majority of facilities on the Airport, including all of the hangar structures, are privately owned. Owners of the facilities lease property from the Town of Akron and pay a lease rate for the property. The facility owners are also taxed at the prevailing property tax rate, and these property taxes generate additional revenue. The combined Mill levy for this area is 128.662 mills for the 2016 tax year or the decimal equivalent rate of .128662. This is applied to the "Assessed Value" to calculate the tax amount. The assessed value is 29 percent of the appraised value.

Table 2-3 details AKO's annual expenditures. Refer to **Chapter Seven, Program Implementation Plan** for additional information on the Airport's financial structure.

TABLE 2-2: AKO RATES AND FEES

Source/Service	Fee
Land Lease	$.02/sq ft/yr
Fuel Flowage fee	$.05/gallon
Transient Overnight Tie Down Fees	No Charge
Landing Fees	No Charge

Source: Town of Akron 2016 Budget, 2014, Airport Administration

TABLE 2-3: AKO ANNUAL OPERATING AND MAINTENANCE EXPENDITURES

Source/Service	Annual Cost
Operating Supplies and Expenses	$29,385
Utilities and Lighting	$2,409
Insurance and Bonds	$7,719
Capital Outlay	$13,098

Source: Town of Akron 2016 Budget, 2014 Actual Expenditures

2.1.3 Airport Economic Impact

The Colorado Department of Transportation, Division of Aeronautics (CDOT) conducted an Economic Impact Study for Colorado airports in 2013. The economic contributions of AKO stem from on-airport activities and off-airport spending by visitors who arrive in Colorado via the Airport. The economic contributions of these activities are measured through jobs, associated payroll, and economic output.[1] Capital improvement projects at AKO also support jobs and payroll over the duration of the project. On-airport activities include tenants and AKO activity such as administration, operations, and maintenance.

According to CDOT, approximately 5,000 visitors arrive in Colorado via AKO. The spending analysis of the visitors on food, lodging, transportation, entertainment, and retail purchases results in support of local jobs and payroll. The capital improvement, Airport, tenant, and visitor impacts, in conjunction with multiplier effects, represent

[1] 2013 Economic Impact Study for Colorado Airports

total economic contribution at AKO of $4 million, including 40 jobs with an annual payroll of $1 million.

Airport management noted that aviation businesses situated on AKO are not replicated at most Colorado airports and not anywhere in eastern Colorado, and therefore represent a significant element to Akron's and Washington County's economic development.

2.1.4 Airport Role

Airports play a variety of functional roles and contribute at varying levels in meeting the transportation and economic needs on national, regional, state, and local levels. Identifying and understanding the various roles that an airport plays is essential for that airport to be developed with facilities and services appropriate to fulfilling its respective roles. FAA and CDOT classify AKO as a general aviation (GA) airport.

Every two years, the FAA classifies airports in the National Plan of Integrated Airport Systems (NPIAS) in a report to Congress. The NPIAS includes approximately 3,400 airports that FAA considers vital to the nation's aviation transportation system, and are eligible for federal grants. Classifying the airports enables funding to be distributed according to formulas set by Congress and distributed through FAA's Airport Improvement Program (AIP). FAA lists AKO as a "Basic" GA airport in the most recent NPIAS report. FAA's 2012 report, *General Aviation Airports: A National Asset*, provides "Local" and "Basic" classifications for GA airports, and lists AKO as a "Local" airport. These roles are defined as:

- **Local Airports:** located near larger population centers but not necessarily in metropolitan areas.
- **Basic Airports:** fulfill the principal role of a community airport providing a means for private general aviation flying, linking the community with the national airport system, and making other unique contributions.

Individual states also define the roles of airports within their borders through statewide aviation system plans. Colorado's 2011 Aviation System Plan update labels AKO as an "Intermediate" airport. AKO was previously listed as a "Major" airport in terms of operational demand/capacity, however, the recommendation to downgrade the category was based on an annual decline of 1.9 percent.

Table 2-4 provides a summary of the primary data elements for AKO.

TABLE 2-4: PRIMARY AIRPORT DATA

Data Element	Colorado Plains Regional Airport
FAA Designation	AKO
Airport Sponsor	Town of Akron
Associated Town	Akron, CO
Date Established	1930s
Airport Management	Agreement with FBO Manager
Airport Roles	FAA NPIAS: Local/Basic CDOT: Intermediate

Data Element	Colorado Plains Regional Airport
Universal Communication (Unicom)	122.8
Airspace Classification	Class G (surface-699 AGL), Class E (700-17,999AGL)
Automated Surface Observation System Frequency/Phone Number	135.475 / 970.345.2320
Airport Reference Point	N 40° 10' 32.3000" W 103° 13' 19.3000"
Elevation	4,715.8 MSL
Acreage	631
Sectional Chart	Cheyenne
Area Mean Maximum Temperature	88°F

Source: AKO Form 5010, AirNav.com, Cheyenne Sectional, AKO Chart Supplement
Note: AGL = Above Ground Level, MSL = Mean Sea Level

2.2 Airside Facilities

Airside facilities are the portions of the airport that accommodate the movement of aircraft and encompass runways, taxiways, airfield lighting, and other facilities necessary to support flight activity.

2.2.1 Runways

AKO Location and Runway Hold

AKO currently has one runway (11/29). **Table 2-5** provides detail about Runway 11/29. Runway orientation is discussed in **Chapter Four**.

Although they do not meet critical aircraft threshold criteria, military aircraft train at the Airport, including National Guard and Reserve C-130s as well as contract training and flight testing by Sierra Nevada Corp in support of Middle East operations involving C-146s, among others. AKO is the only airport in eastern Colorado beyond the Front Range capable of safely handling larger corporate aircraft.

TABLE 2-5: AKO RUNWAY 11/29 DATA

Item	Detail
Dimensions	7,001 ft x 100 ft
Runway Markings	Non-Precision Instrument
Runway Surface Type	Asphalt
Runway Strength	– Single Wheel: 65,000 lbs – Double Wheel: 85,000 lbs – Double Tandem: 125,000 lbs
Runway End Elevations	4,715.8/4,670.6 MSL
Visual Approach Slope Indicator	Precision Approach Path Indicator (PAPI)
Effective Gradient	-0.6%/0.6%
Runway Design Code (RDC)	B-II
Critical Aircraft	Citation Excel. Airport management notes that AKO also accommodates Guard aircraft such as C-130s

Source: AKO Form 5010, AKO FAA Survey

2.2.2 Taxiways

AKO Taxiway

Taxiways are paved areas over which airplanes move from one part of the airfield to another. One of their more important uses is to provide access between the terminal/hangar facilities and the runways. There are three types of taxiways: parallel, entrance/exit, and access. Taxiways that are parallel to runways generally provide a route for aircraft to reach the runway end. Entrance/exit taxiways, which usually connect runways to parallel taxiways, provide paths for aircraft to enter the runway for departure or leave the runway after landing. Access taxiways provide a means for aircraft to move among the various airside components of an airport including aircraft hangar and storage areas, fueling area, and aircraft parking and aprons.

AKO has one partial-length parallel taxiway, A, serving Runway 11/29. The distance between the Taxiway A and Runway centerlines is 400 feet. Access to the Runway is provided by entrance/exit Taxiways A1 and A2 located at the Runway 29 threshold (A1) and approximately 2,200 feet from the Runway 29 threshold (A2). There are turnaround taxiways, A3 and A4, that aircraft utilize to taxi and turn around for departure on Runway 11. **Table 2-6** details information about each taxiway.

TABLE 2-6: TAXIWAY DETAILS

Taxiway	Type	Width	Condition
A	Partial Parallel	35 ft	Fair
A1	Access	35 ft	Good
A2	Access	40 ft	Good
A3	Turnaround	35 ft	Fair
A4	Turnaround	35 ft	Fair

Source: Jviation

2.2.3 Aprons

An aircraft apron is used for aircraft movement and positioning, vehicle movement and parking, and aircraft tiedowns. AKO has one aircraft apron located adjacent to the fixed-base operator (FBO) and approach end of Runway 29. The 88,000-square-foot concrete apron can accommodate approximately 17 aircraft of varying sizes.

Airport management noted that aircraft parking on the apron is often challenging. With only a few aircraft on the ramp, helicopter fueling, which are often serviced "hot" (i.e. refueled with the engine running but the rotor stopped), impacts the space available to park aircraft. In addition, helicopters frequently generate rotor wash turbulence when they hover taxi, and takeoff and land, and the rotor wash impacts fixed-wing aircraft. Larger aircraft are often pinched on the east end of the apron due to the close proximity of the based aircraft tiedowns.

In general, transient aircraft prefer power-in, power-out parking versus nested tiedowns that require towing an aircraft into and out of each parking position. However, power-in, power-out parking requires more space than nested tiedowns. AKO's apron is designed to accommodate both types of parking (**Figure 2-2**).

FIGURE 2-2: AIRCRAFT APRON

Source: Google Earth

2.2.4 Pavement Condition and Strength

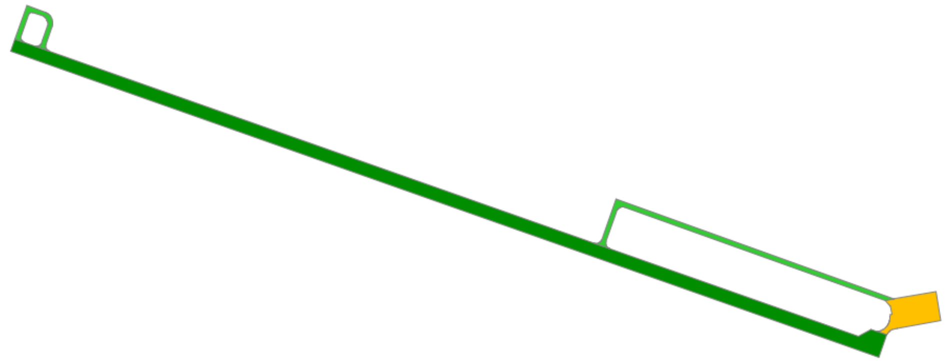
FAA AC 150/5380-6B, *Guidelines and Procedures for Maintenance of Airport Pavements* recommends conducting a detailed pavement inspection that follows the American Society for Testing and Materials (ASTM) D5340, Standard Test Method for Airport Pavement Condition Index Surveys.

A detailed pavement inspection is conducted for airport pavements to employ a visual rating system for pavement distress. This condition and strength value is the Pavement Condition Index (PCI). The PCI scale ranges from a value of zero (representing a pavement in a failed condition) to a value of 100 (representing a pavement in excellent condition).

CDOT Aeronautics completed a PCI study for AKO in 2016. Overall, the surfaces at AKO range from a PCI of 41-55 (orange) to 86-100 (green) as shown in **Figure 2-3**. AKO's airfield pavement is predominately considered to be in "good" condition. AKO's lowest PCI values, indicating pavement in "fair" condition, are limited to the aircraft apron.

The weight-bearing capacity of Runway 11/29 is listed in FAA's Airport Facility Directory (chart supplement) as: S-65 (single-wheel 65,000 pounds), D-85 (dual-wheel 85,000 pounds), 2D-125 (two dual wheels in tandem type landing gear 125,000 pounds).

FIGURE 2-3: AKO PAVEMENT CONDITION INDEX



Source: CDOT 2016 System Update, Pavement Evaluations & Management

2.2.5 Airfield Lighting

Identification Lighting

A rotating beacon identifies the Airport's location at night and during periods of poor visibility. This beacon projects alternating green and white beams from dusk to dawn. When activated during daylight hours, the beacon signals Instrument Flight Rule (IFR) conditions. AKO's beacon is located north of the aircraft parking apron.

Runway Lighting

Lighting aids are necessary to provide pilots with critical takeoff and landing information concerning runway alignment, lateral displacement, rollout operations, and distance remaining. AKO's runway lighting is detailed in **Table 2-7**.

A Precision Approach Path Indicator (PAPI) is a series of lights that provides visual guidance during a runway approach. Runway 11/29 has a two-light PAPI system.

AKO's runway edge lighting is classified as Medium Intensity Runway Light (MIRL) and consists of a single row of white lights bordering each side of the Runway. The runway lights are activated remotely by pilots over the Unicom (CTAF) frequency of 122.8. Once activated, the lights remain on for 15 minutes and then automatically shut down.

Runway End Identifier Lights (REIL) are high intensity white strobe lights located on each end of Runway 11/29 to enable rapid identification of the runway threshold, particularly at night and during periods of poor visibility.

TABLE 2-7: AKO RUNWAY LIGHTING

Lighting	Runway 11	Runway 29
Approach Lighting	PAPI	PAPI
Runway Edge Lighting	MIRL	MIRL
Centerline Lighting	None	None
Runway End Identifier Lights	Yes	Yes

Source: Jviation

Taxiway Lighting

Taxiway edge lights provide visual guidance in low visibility or night conditions to pilots and ground service/maintenance vehicles accessing the taxiway. AKO does not have a taxiway lighting system, though blue reflectors mounted on short poles along the edge of the Taxiway guide aircraft from the Runway to the apron area.

Visual Aids

Additional visual aids and instrumentation at the Airport assist pilots in arriving or departing. The Airport's segmented circle and integrated lit wind cone provide pilots with traffic pattern and wind direction/velocity information. The segmented circle is located south of the Runway.

Segmented Circle

Additionally, the Airport has an Automated Surface Observation System (ASOS) that automatically records and broadcasts important weather information such as barometric pressure, wind speed and direction, temperature, visibility, sky condition, cloud ceiling height, and precipitation.

Airfield signage gives pilots visual guidance information for all phases of movement on the airfield. AKO is equipped with lighted signs to indicate connector taxiways and runway ends; the signage is standard and in good condition.

2.3 Landside Facilities

AKO's landside development includes a terminal building, FBO facilities, maintenance hangar facilities, fuel storage, and access roadways.

2.3.1 General Aviation Areas

Hayes Aviation is the Airport's FBO, located on Cedar Avenue (Highway 63), north of the approach end of Runway 29.

Hayes Aviation, FBO/Terminal Building

Hayes Aviation offers multiple services including aircraft fueling, catering, maintenance, and aircraft painting. The company also offers a courtesy car for pilots and passengers. The aircraft power plant, airframe, and propeller maintenance are among the major services offered to aircraft operators.

The FBO occupies the single-story terminal building, and houses a pilot briefing room, lounge area, restrooms, and 24-hour vending. The FBO has approximately 15 auto parking spaces for Airport visitors.

Per Airport management, the terminal building was originally constructed in 1946, but was transformed into a space for airport public-use space and the FBO in 1989. The building elevation was not sufficiently factored in during the development of the airside pavement, and the terminal regularly floods during heavy rains. The terminal also needs to be refurbished for energy efficiency and to meet the Americans with Disabilities Act requirements.

2.3.2 Hangars

AKO Hangars

Hangars are buildings used to store and maintain aircraft at airports. Hangars come in many shapes and sizes, but the two most common are T-hangars and conventional (or box) hangars. T-hangars are shaped like a "T" and typically accommodate piston-engine aircraft. They are one of the most common hangars at GA airports, and are usually the least expensive to construct. AKO currently has eight T-hangars, with an average size of 1,000 square feet.

Box hangars can be built to any size and are primarily used for aircraft storage and maintenance. There are currently eight box hangars at AKO, some of which are used for aircraft maintenance. The hangars vary in age and range in size from 1,200 to 6,000 square feet; most do not have paved taxilanes to the Runway or Taxiway.

As discussed previously, all the hangars are privately owned, but lease their land from the Town of Akron. Hangar owners pay both land lease and commercial property tax to the Town. **Figure 2-4** illustrates the locations of the hangars at AKO, and **Table 2-8** details hangar size.

FIGURE 2-4: HANGAR LOCATIONS

Source: Google Earth, Jviation

TABLE 2-8: HANGAR SIZE AND CONDITION

Hangar	Type	Square Footage
1	T-Hangar: 5 Units	5,000
2	T-Hangar: 3 Units	3,000
3	Box Hangar	6,000
4	Box Hangar	2,500
5	Box Hangar	2,000

Hangar	Type	Square Footage
6	Box Hangar	2,000
7	Box Hangar	1,200
8	Box Hangar	6,000
9	Box Hangar	6,800

Source: Jviation

2.4 Airport Support Facilities

2.4.1 Fuel Storage

Hayes Aviation provides fuel service to all transient and based aircraft at AKO and is responsible for ensuring the availability and quality of aviation fuel sold at the Airport. The Airport owns two 10,000-gallon above-ground fuel storage tanks, one for JetA and the other for 100LL. AKO also owns a 600-gallon 100LL fuel truck, and a 3,000-gallon JetA fuel truck. Aircraft operators in need of 100LL fuel may also use the self-serve fuel station 24 hours a day. The FBO services aircraft 24 hours a day.

Self-Serve Fuel Station

2.4.2 Snow Removal Equipment and Airport Grounds Maintenance

Used primarily during the winter months, snow removal equipment (SRE) is designed to keep the Airport safe during snow events. Grounds maintenance equipment is used to mow grass areas and fields adjacent to aircraft movement and public access areas. Because the Town of Akron owns AKO, the Town's Public Works Department performs snow removal and grounds maintenance. This group focuses on clearing snow from the Runway, Taxiway, and aircraft parking ramp as well as cutting the grass near aircraft movement and public access areas. The SRE and maintenance equipment is stored off-airport.

2.4.3 Airport Access Roadways and Auto Parking

The Airport is accessible from the north/south via Cedar Avenue (Highway 63), which leads north from Akron. There is a gravel/dirt parking lot for Airport users, tenants, and Airport administration vehicles. Highway 63 connects with I-76 to the north, and via Highway 36 to I-70 to the south.

2.4.4 Fencing

Airport fencing is intended to prevent animals and unauthorized people from intruding on Airport property. Normally installed along the perimeter of Airport property, fencing provides increased safety and security for the Airport. AKO's property boundary is surrounded by four-strand barbed wire. The terminal area is enclosed by an eight-foot chain-link fence topped with barbed wire to enhance security near the hangars and aircraft. The aircraft apron is accessible to pilots and tenants through a controlled access system of a gate located next to the parking lot.

2.4.5 Airport Utilities

Electrical power in Akron is provided by Y-W Electric Association, Inc. Gas services are provided by Kinder Morgan Energy Gas Company, and telephone/internet service is provided by CenturyLink Telecommunication Company. The Airport currently has access to three-phase electricity, natural gas, sewer lines, water, and telephone services. It is important to note that utility poles are located on the west side of Cedar Avenue, running north and south adjacent to the Airport.

AKO management has noted a need to improve to their internet access as this may be an added value to Airport tenants and is a desirable amenity for Airport users. Other service capacities for electric, gas, and telephone exceed the current requirements, accommodating expansion of the Airport.

2.5 Airspace System/Navigation and Communication Aids

AKO operates within the larger National Aviation System (NAS), which comprises a wide array of services, systems, and requirements for the airports and pilots that function within it. The following sections provide an overview of some of AKO's key considerations with respect to navigating and operating within the NAS.

2.5.1 Air Traffic and Aviation Communications

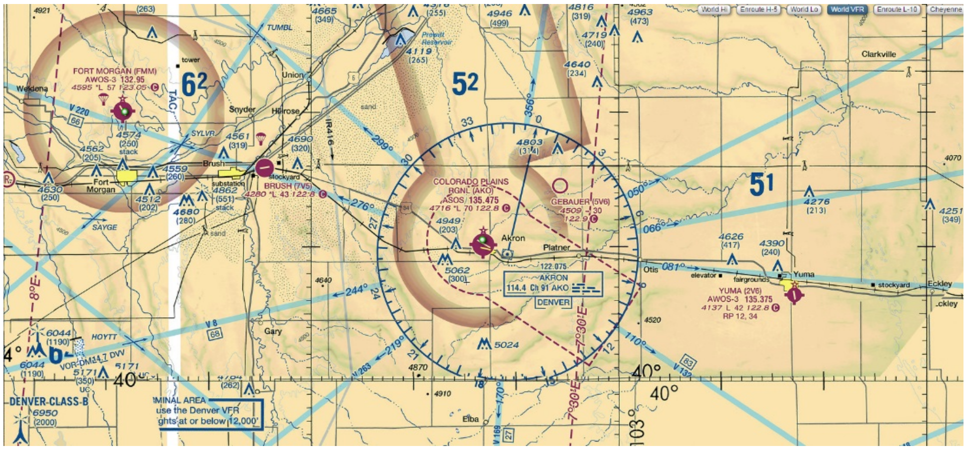
There is no air traffic control (ATC) tower at AKO. Aviation communication facilities associated with AKO include the Universal Communication (Unicom) station on frequency 122.8 MHz. As mentioned earlier, ASOS weather data for AKO is available via radio frequency 135.475 MHz, as well as by telephone at 970.345.2320. There is a remote communication outlet (RCO) to Denver Flight Service Station via 122.075. This allows pilots to file flight plans, obtain weather information away from AKO, and receive air traffic control clearances.

2.5.2 Airspace

To ensure a safe and efficient airspace environment for all aspects of aviation, the FAA has established an airspace structure through the Federal Aviation Regulations (FAR) that regulates and establishes procedures for aircraft that use the NAS. This airspace structure provides for two basic categories of airspace: controlled (classified as Class A, B, C, D, and E) and uncontrolled (classified as Class G).

AKO lies in Class E airspace, which extends up to 18,000 feet (Class A airspace). **Figure 2-5** shows a portion of the sectional aeronautical chart published by the FAA's National Aeronautical Charting Office for the airspace around AKO. Pilots are not required to obtain air traffic clearances to fly to, from, or near AKO during good weather (visual meteorological conditions – VMC). However, when the ASOS reports cloud ceilings of less than 1,000 feet and/or visibility less than three miles, pilots are required to obtain an ATC clearance to fly through the Class E airspace. The Class E airspace is shaped to protect aircraft flying the RNAV GPS Runway 11 approach.

FIGURE 2-5: AKO AIRSPACE



Source: www.vfrmap.com

2.5.3 Navigational Aids (NAVAIDS)

In addition to GPS, ground-based NAVAIDs are also available to pilots around AKO, located near the field and at other locations within the region. Many of these NAVAIDs are available for en route air traffic. They are used by pilots flying in the vicinity of AKO (**Table 2-9**).

A VOR/DME is a very high frequency omnidirectional range (VOR) station with distance measuring equipment (DME) transmitting very high frequency (VHF) signals, 360 degrees in azimuth oriented from magnetic north. The reception of a VOR is restricted because it does not follow the curvature of the earth. Because of this, the farther an aircraft is from the station, the higher their altitude must be to receive the signal. This DME is used to measure, in nautical miles (nm), the slant range distance of an aircraft from the NAVAID. AKO's VOR/DME is 1.7 nautical miles from the Airport.

TABLE 2-9: NAVAIDS AROUND AKO

Type	FAA ID	Name	Frequency	Radial	Range
VOR/DME	AKO	Akron	114.4	289°	2.3 nm

Source: AirNav, AKO Approach Charts

There are three published instrument approaches at AKO: one for Runway 11 and two for Runway 29. All the instrument approaches are non-precision procedures, i.e. they do not provide vertical guidance.

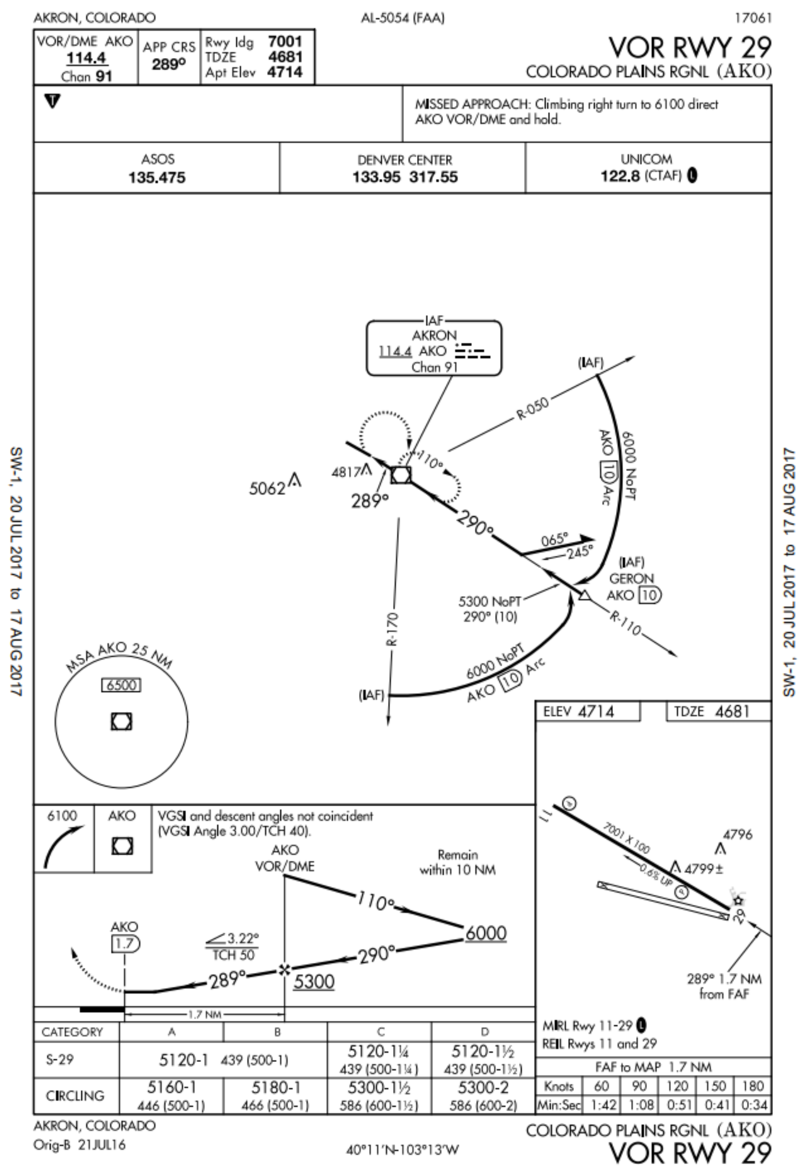
Table 2-10 summarizes the approach and visibility minima of these approaches. Two of the approaches are for straight-in area navigation (RNAV) using GPS. **Figure 2-6**, **Figure 2-7**, and **Figure 2-8** are the current approach charts for these published instrument procedures.

TABLE 2-10: LOWEST INSTRUMENT APPROACH MINIMUMS

Instrument Approach	Lowest Straight-in Approach		Lowest Circling Approach	
	Ceiling	Visibility	Ceiling	Visibility
VOR Rwy 29	439 AGL	1 nm	446 AGL	1 nm
RNAV GPS RWY 11	250 AGL	1 nm	404 AGL	1 nm
RNAV GPS RWY 29	250 AGL	1 nm	404 AGL	1 nm

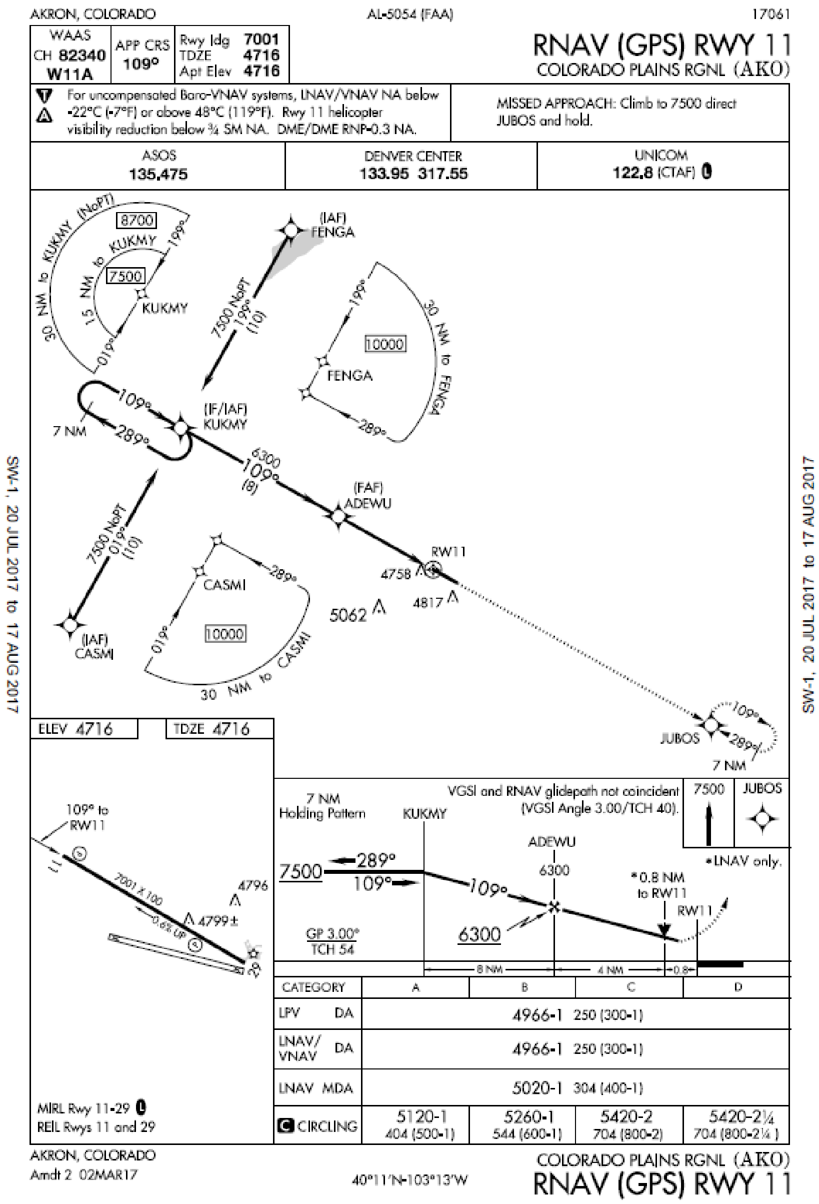
Source: http://www.airnav.com/airport/KAKO

FIGURE 2-6: VOR RUNWAY 29



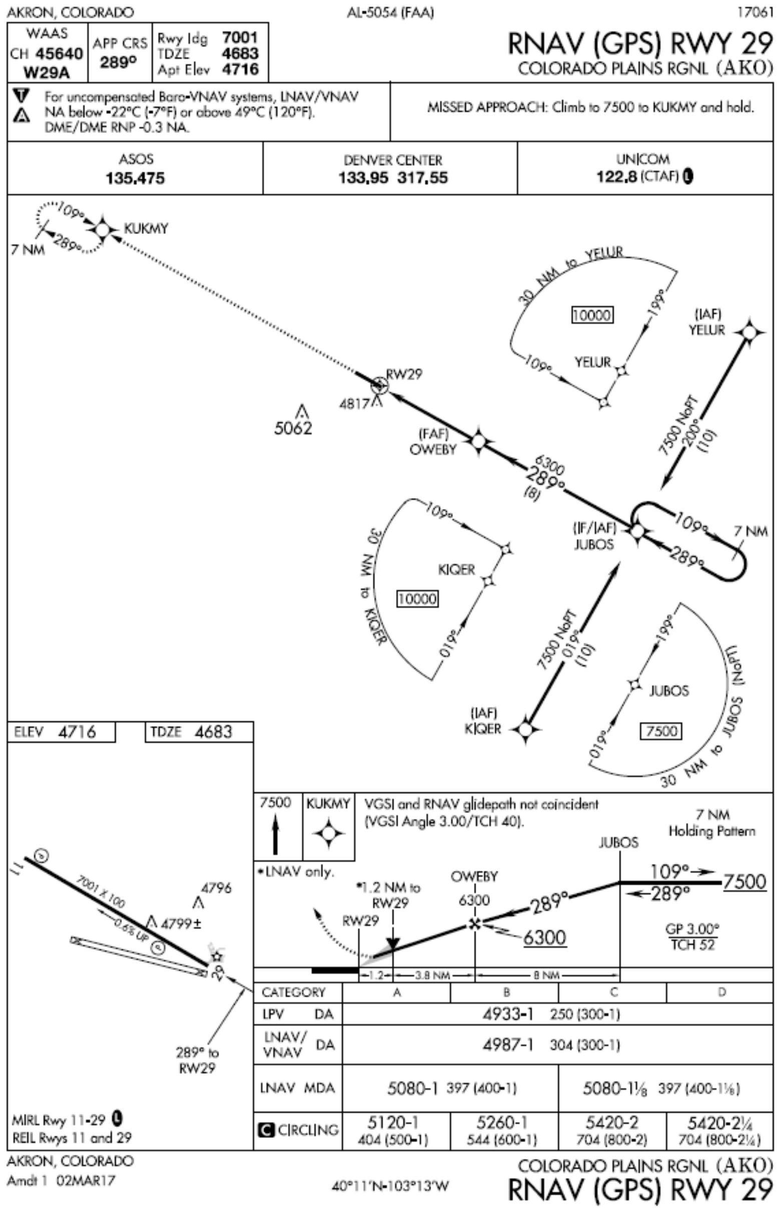
Source: http://www.airnav.com/airport/KAKO

FIGURE 2-7: RNAV (GPS) APPROACH RUNWAY 11



Source: http://www.airnav.com/airport/KAKO

FIGURE 2-8: RNAV (GPS) APPROACH RUNWAY 29



CATEGORY	A	B	C	D
LPV DA	4933-1 250 (300-1)			
LNAV/VNAV DA	4987-1 304 (300-1)			
LNAV MDA	5080-1 397 (400-1)		5080-1⅛ 397 (400-1⅛)	
CIRCLING	5120-1 404 (500-1)	5260-1 544 (600-1)	5420-2 704 (800-2)	5420-2¼ 704 (800-2¼)

Source: http://www.airnav.com/airport/KAKO

2.5.4 14 CFR Part 77 Airspace Surfaces

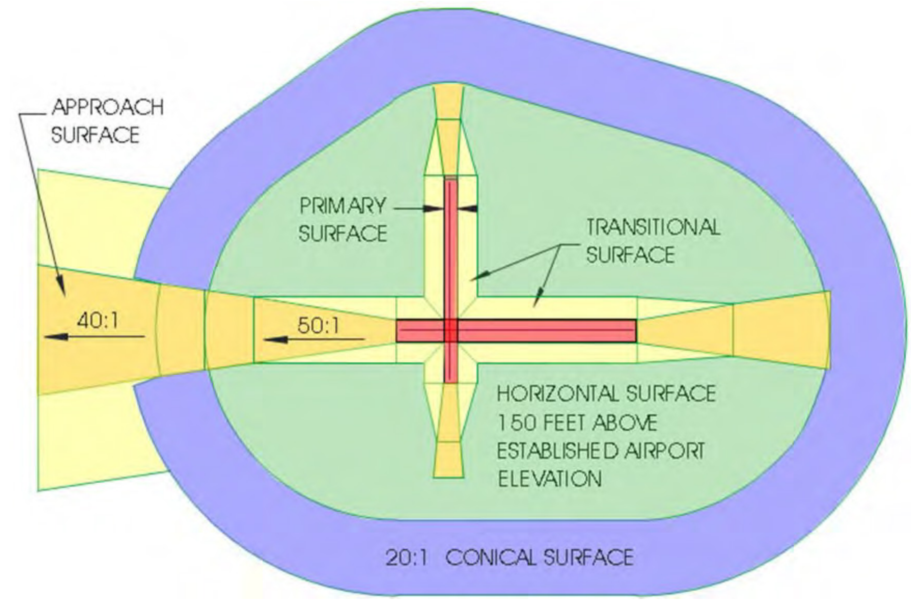
The FAA sponsor grant assurances require airport sponsors to protect the airspace over and in the vicinity of an airport. That airspace is described in 14 Code of Federal Regulations (CFR) Part 77, *Safe, Efficient Use, and Preservation of the Navigable Airspace*. Part 77 is one tool used to protect the airspace over and around a given airport and each of its runway approaches from potential obstructions to air navigation. The Town of Akron and Washington County have zoning ordinances in place[1] to protect the Part 77 airspace, as well as the approach surfaces to Runway 11/29. The ordinance protects the airspace extending from the thresholds of the respective ends.

To determine whether an object is an obstruction to air navigation, Part 77 describes five imaginary airspace surfaces in relation to an airport and to each runway end. The dimensions and slopes of these surfaces depend on the classification of each runway (utility or other-than-utility), and the instrument approach categories of the airport's runway system. The size of the imaginary surfaces depends largely upon the type of approach to the runway in question. Any penetration to an imaginary surface is defined by FAA as an obstruction. FAA requires airport sponsors to either lower, remove, or light the obstruction. FAA AC 70/7460-1L, *Obstruction Marking and Lighting*, provides guidance to airport sponsors. The five imaginary surfaces are described below and illustrated in **Figure 2-9**.

- Primary Surface: Longitudinally centered on the runway at the same elevation as the nearest point on the runway centerline.
- Horizontal Surface: Located 150 feet above the established airport elevation, the perimeter of which is established by swinging arcs of specified radii from the center of each the primary surface end, connected via tangent lines.
- Conical Surface: Extends outward and upward from the periphery of the horizontal surface at a slope of 20:1 for a horizontal distance of 4,000 feet.
- Approach Surface: Longitudinally centered on the extended centerline, and extending outward and upward from each runway end at a designated slope (e.g. 20:1, 34:1, 40:1, and 50:1) based on the runway approach.
- Transitional Surface: Extends outward and upward at a right angle to the runway centerline at a slope of 7:1 up to the horizontal surface.

[1] Source: Akron Town Code, Zoning Regulations, Title 11, Zoning Regulations, Chapter 4 General Design and Use Requirements, 11-4-3, Akron-Washington County Airport Clear Zone.

FIGURE 2-9: PART 77 PLAN VIEW



Source: FAA

A full representation and analysis of all current and future Part 77 surfaces as they relate to AKO are depicted on the ALP drawing set in **Chapter 6**. FAA requires that digital mapping be acquired to FAA Airports Geographic Information System (AGIS) standards; this AGIS mapping serves as the base mapping for the ALP drawings. The AGIS mapping identifies objects and their elevation on and in the vicinity of AKO and serves as the basis for determining the penetrations to the imaginary surfaces. The AGIS mapping is also used by FAA Flight Procedures to examine the instrument approach procedures to AKO and determine if the approach minimums should be adjusted, and if the runway qualifies for different types of GPS approaches, such as an LPV approach with vertical guidance.

2.6 Airport Environs

The purpose of the following sections is to establish the broader context for AKO within its community and regional setting. Airports are multi-modal transportation facilities designed to provide access to communities, and therefore must efficiently serve the needs of the community as well as be a good neighbor. This section includes demographic and economic considerations in Akron and a brief discussion of other factors such as land use and environmental considerations.

2.6.1 Community Overview

Akron and Washington County have a rich history of farming. As noted on the Town's history web page[1], Akron was a "frontier town on the prairie" and is currently one of the largest agricultural producing areas in Colorado. This area is known for its

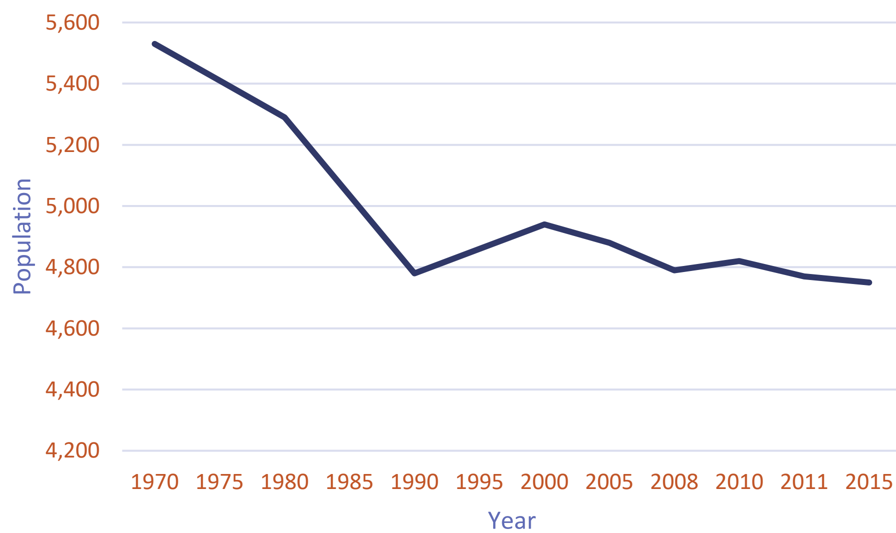
[1] http://www.townofakron.com/history.htm

production of dairy, beef, wheat, millet, milo, corn, and sunflowers. Oil and gas exploration and extraction are also major components of the County's economy.

2.6.2 Area Demographics

Between 1970 and 2015, the population of Washington County decreased an average of .34 percent each year (**Figure 2-10**). In 2015, the population was approximated at 4,750.

FIGURE 2-10: POPULATION OF WASHINGTON COUNTY 1970-2015



Source: Woods and Poole 2014 Complete Economic and Demographic Data Source

2.6.3 Area Economy

Washington County's unemployment rate was approximately 2.5 percent in 2015. For the same year, the national unemployment rate averaged between 5 and 5.7 percent. The top industries/employment centers in the region surrounding Akron are shown in **Table 2-11.**

TABLE 2-11: TOP INDUSTRIES IN WASHINGTON COUNTY

Industry	Employment
Farming	1,060
State and Local Government	470
Retail Trade	220
Forestry, Fishing and Other	180
Wholesale Trade	130
Finance and Insurance	130

Source: Woods and Poole 2014 Complete Economic and Demographic Data Source

The 2015 per capita personal income for the Washington County was estimated to be $46,997, just above the national average of $46,411.

2.6.4 Existing Land Use and Zoning in the Airport Environs

The FAA recommends that airport sponsors protect the areas surrounding an airport from incompatible development, which includes land uses that would be sensitive to aircraft noise or overflight, such as residences, schools, churches, hospitals, as well as uses that could attract wildlife and cause a hazard to aircraft operations such as landfills, ponds, and wastewater treatment facilities.

As noted previously, the Town of Akron and Washington County have zoning ordinances in place to protect the Part 77 airspace surfaces, as well as the approach surfaces to Runway 11/29.

AKO is surrounded on three sides by open space, primarily agricultural land uses (**Figure 2-11**), which are considered to be compatible with airport and aircraft operations. Akron is located less than a mile south of the Airport, and the nearest residence is approximately 600 feet from the Runway 29 threshold.

FIGURE 2-11: RESIDENTIAL LAND USE PROXIMITY

Source: Google Earth, 2016

There is unincorporated property located within Washington County. The remainder of the property adjacent to the Airport and the Airport property is incorporated in the Town of Akron.

The Town of Akron established Title 17, Zoning, as part of the Town General Plan. These regulations were enacted to promote health, safety, morals, convenience, order, prosperity, and welfare for the present and future inhabitants of Akron.

As part of this ordinance, Chapter 17.40.030, specifically refers to the airport clear zone. This clear zone was established to prevent the development of any structure around the Airport that would represent an incompatible land use according to FAA rules and regulations. This section also prohibits the establishment of new landfills or treatment plants within 10,000 feet of any runway at AKO. However, the regulation does not specifically identify the dimensional criteria associated with the clear zone.

2.6.5 Local Comprehensive Planning

A local comprehensive plan is a strategic long-range document that addresses land use and zoning as it relates to growth and development of a municipality. With respect to an airport that lies within a community, it is critical that local comprehensive planning efforts acknowledge and address the issue of land use compatibility near an airport.

A Master Plan for Washington County was written in 2002. The Washington County Plan does not specifically address land uses around AKO, rather, the Plan proposes various land uses to encourage their development goals of "community identity, growth and development, viability, amenity, adaptability, and diversity."

2.6.6 Environmental Setting and Considerations

Current information from federal, state, and local agencies concerning environmental conditions on and near AKO were reviewed as part of this AMP update. FAA Order 1050.1F, *Environmental Impacts: Policies and Procedures*, and Order 5050.4B, *National Environmental Policy Act: Implementation Instruction for Airport Actions* address specific environmental categories that are evaluated in environmental documents in accordance with the National Environmental Policy Act (NEPA). The following section inventories the applicable environmental categories.

The following environmental categories are not discussed as they are not relevant to AKO: Coastal Resources; Climate; and Socioeconomic, Environmental Justice, and Children's Environmental Health and Safety Risks.

Air Quality

Air quality analysis for federally funded projects must be prepared in accordance with applicable air quality statutes and regulations that include the Clean Air Act (CAA) of 1970[1], 1977 Clean Air Act Amendments[2], 1990 Clean Air Act Amendments[3], and National Ambient Air Quality Standards[4] (NAAQS). Specifically, the air pollutants of concern in the assessment of impacts from airport-related sources include six "criteria pollutants:" carbon monoxide (CO), lead (Pb), nitrogen dioxide (NO_2), ozone (O_3), particulate matter (PM-10 and PM-2.5), and sulfur dioxide (SO_2).

AKO Aircraft Parking Ramp

Areas within Colorado are designated with respect to the NAAQS as being in attainment, nonattainment, maintenance, or unclassifiable. An area with air quality better than the NAAQS is designated in attainment, while an area with air quality worse than the NAAQS is designated nonattainment. An area may also be designated unclassifiable when there is a lack of data to form a basis of attainment status. Washington County is designated as being in attainment for all criteria pollutants[5].

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[1] U.S. Code. The Clean Air Act of 1970. U.S. Congress, Public Law 91-604, 42 U.S.C. §7401
[2] U.S. Code. The 1977 Clean Air Act Amendments, U.S. Congress, Public Law 95-95, 42 U.S.C. §7401
[3] U.S. Code. The 1990 Clean Air Act Amendments, U.S. Congress, Public Law 101-549, 42 U.S.C. §7401
[4] 40 CFR Part 50, Section 121, National Ambient Air Quality Standard
[5] Environmental Protection Agency, Green Book National Area and County- Level Multi-Pollutant Information https://www3.epa.gov/airquality/greenbook/anayo_co.html

Biological Resources

Requirements are set forth by the Endangered Species Act[1], Sikes Act[2], Fish and Wildlife Coordination Act[3], Fish and Wildlife Conservation Act[4], and Migratory Bird Treaty Act[5], for the protection of fish, wildlife, and plants of local and national significance. The U.S. Fish and Wildlife Service's (USFWS) Information, Planning, and Conservation (IPaC) System is used to identify species of concern. It is found that five species listed by the USFWS as being threatened, endangered, or candidates may be found near Akron. Identified species are depicted in **Table 2-12**.

TABLE 2-12: THREATENED AND ENDANGERED SPECIES

Species	Scientific Name	Status
Bird: Least Tern	*Sterna antillarum*	Endangered
Bird: Piping Plover	*Charadrius melodus*	Threatened
Bird: Whooping Crane	*Grus americana*	Endangered
Fish: Pallid Sturgeon	*Scaphirhynchus albus*	Endangered
Flowering Plant: Western Prairie Fringed Orchid	*Plantanthera praeclara*	Threatened

Source: Department of the Interior, U.S. Fish and Wildlife Service. IPAC System – Natural Resources of Concern, Accessed 2016

Section 4(f) Resources

The Department of Transportation (DOT) Act, Section 4(f) provides that the:

> Secretary of Transportation will not approve any program or project that requires the use of any publicly owned land from a public park, recreation area, or wildlife and waterfowl refuge of national, state, or local significance or land from an historic site of national, state, or local significance unless there is no feasible or prudent alternative and the use of such land includes all possible planning to minimize harm resulting from the use[6].

The FAA has adopted the regulations from the Federal Highway Administration (FHWA) and the Federal Transit Administration (FTA) issued in March 2008 (23 CFR Part 774)[7] to address project-related effects on Section 4(f) resources. For Section 4(f) purposes, a proposed action would eliminate a resource's use in one of two ways, physical use or constructive use.

> **Physical Use**: Action physically occupies and directly uses the Section 4(f) resource. An action's occupancy or direct control (via purchase) causes a change in the use of the Section 4(f) resources. For example, building a

[1] Endangered Species Act of 1973, U.S. Congress, Public Law 93-205, 16 U.S.C §1531-1544
[2] Sikes Act, Amendments of 1974, U.S. Congress, Public Law 93-452
[3] Fish and Wildlife Coordination Act of 1958, U.S. Congress, Public Law 85-624, 16 U.S.C §661-666c
[4] Fish and Wildlife Conservation Act of 1980, U.S. Congress, Public Law 96-366, 16 U.S.C §2901-2912
[5] Migratory Bird Treaty Act of 1981, 16 U.S.C §703-712
[6] U.S. Department of Transportation Act, section 4(f), recodified and renumbered as § 303(c) of 49 U.S.C.
[7] Vol. 73 Federal Register, page 13395, Mar. 2008.

runway safety area across a fairway of a publicly-owned golf course is a physical taking because the transportation facility physically used the course by eliminating the fairway.

Constructive Use: Action indirectly uses a Section 4(f) resource by substantially impairing the resource's intended use, features, or attributes. For example, a constructive use of an overnight camping area would occur when project-related aircraft noise eliminates the camping area's solitude. Although not physically occupying the area, the project indirectly uses the area by substantially impairing the features and attributes (i.e., solitude) that are necessary for the area to be used as an overnight camping area.[1]

The Town of Akron has multiple land uses considered to be section 4(f) properties. **Table 2-13** lists parks and other 4(f) properties within the vicinity of AKO. The closest 4(f) property is Akron High School, approximately one mile southeast of the Airport.

TABLE 2-13: SECTION 4(F) PROPERTIES NEAR AKO

Site	Type	Distance to AKO
Akron Gymnasium	Historic Property	1 mile
Akron High School	School	1 mile
Akron Cemetery	Cemetery	2 miles
Washington County Event Center	Recreation Area	2.4 miles
St. Joseph Catholic Church	Church	2.1 miles
Peace Evangelical Lutheran Church	Church	2.1 miles
First Baptist Church	Church	2.2 miles
Akron United Methodist Church	Church	2 miles
First Presbyterian Church- Akron	Church	1.9 miles
Akron Foursquare Church	Church	2.3 miles

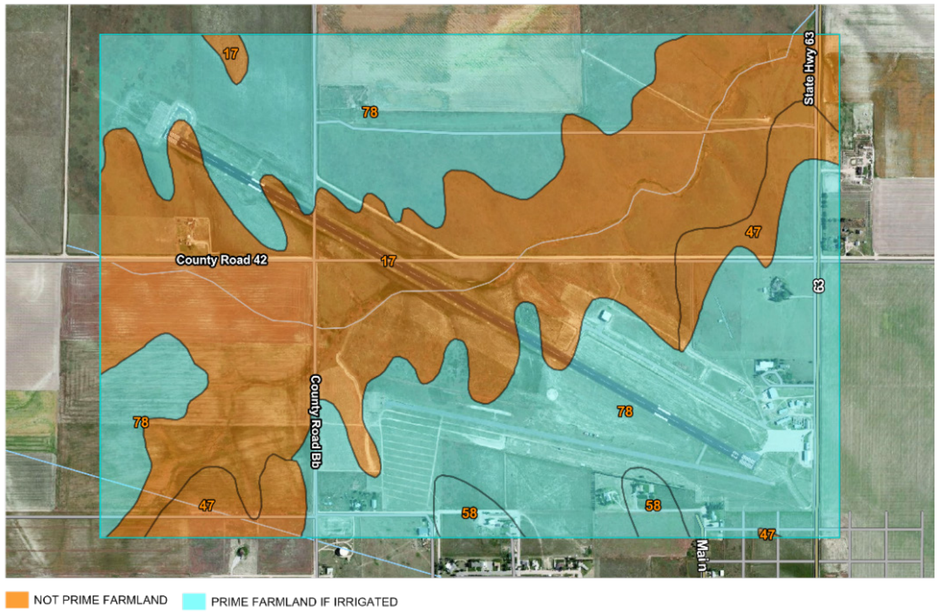
Source: National Register of Historic Places
http://www.nationalregisterofhistoricplaces.com/co/washington/state.html, Google Maps

Farmlands

The Farmland Protection Policy Act (FPPA) regulates federal actions that may impact or convert farmland to a non-agricultural use. FPPA defines farmland as "prime or unique land as determined by the participating state or unit of local government and considered to be of statewide or local importance." **Figure 2-12** details land classified as prime farmland if irrigated and non-prime farmland at AKO.

[1] A de minimis use cannot occur if a project constructively uses a Section 4(f) property. This is because the substantial impairment associated with a constructive use is more severe than the minor effects to which de minimis provisions apply.

FIGURE 2-12: FARMLAND DESIGNATION AT AKO



Source: Jviation, http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx

Hazardous Materials, Solid Waste, and Pollution Prevention

Hazardous Materials, Pollution Prevention, and Solid Waste at the Airport are regulated under the following Federal and State statute and regulations:

- Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) (amended by Superfund Amendments and Reauthorization Act of 1986 and Community Environmental Response Facilitation Act of 1992) [42 U.S.C. 9601-9675]; 40 CFR parts 300, 311, 355, and 370.
- Pollution Prevention Act of 1990; CEQ Memorandum on Pollution Prevention and the National Environmental Policy Act, January 1993.
- Toxic Substances Control Act of 1976, as amended (TSCA) [15 U.S.C. 2601-2692] [PL 94-469]; 40 CFR parts 761 and 763.
- Resource Conservation and Recovery Act of 1976 (RCRA) [amended by the Solid Waste Disposal Act of 1980 (SWDA), PL 96-482, the Hazardous and Solid Waste Amendments of 1984, PL 98-616, and the Federal Facility Compliance Act of 1992, (FFCA) PL 103-386]; 40 CFR parts 240-280.
- Executive Order 12088, Federal Compliance with Pollution Control Standards, October 13, 1978 (43 FR 47707), amended by Executive Order 12580, January 23, 1987 (52 FR 2923) January 29, 1987.
- Executive Order 12856, Federal Compliance with Right-to-Know Laws and Pollution Prevention Requirements (58 FR 41981, August 3, 1993).
- Executive Order 12580, Superfund Implementation, amended by Executive Order 13016 and 12777.

To determine the potential for encountering soils contaminated from historical releases or former land development practices, the U.S. Environmental Protection

Agency (EPA) Envirofacts database was searched. The system reported no potential for encountering soil contamination near the Airport.

The National Priorities List (NPL) is the list of national priorities among the known releases or threatened releases of hazardous substances, pollutants, or contaminants throughout the United States and its territories. The NPL is intended primarily to guide the EPA in determining which sites warrant further investigation. According to the NPL, no sites are located on or near AKO[1].

Historical, Architectural, Archeological and Cultural Resources

The National Historic Preservation Act[2] and the Archaeological and Historical Preservation Act[3] regulate the preservation of historical, architectural, archaeological, and cultural resources. Federal actions and undertakings are required to evaluate the impact on these resources.

For the purposes of this AMP, historic, archaeological, and cultural resources are districts, sites, buildings, structures, objects, landscapes, and Native American Traditional Cultural Properties (TCPs) that are on or eligible for listing on the National Register of Historic Places (NRHP) are shown in **Table 2-14.**

TABLE 2-14: HISTORIC RESOURCES IN AKRON

Site	Type	Distance to AKO
Akron Gymnasium	Historic Property	1 mile

Source: National Register of Historic Places
http://www.nationalregisterofhistoricplaces.com/co/washington/state.html

Aircraft Noise and Compatible Land Use

A number of federal agencies including FAA, Housing & Urban Development (HUD), and EPA, among others, have adopted guidelines for noise exposure and compatible land uses. The noise metric commonly used is the Day-Night Noise Exposure Level (DNL). The FAA developed a computer model to develop DNL noise contours based on aviation activity, the Aviation Environmental Design Tool (AEDT). The FAA and HUD have stated that certain types of land uses located within 65 DNL or higher noise contours are not considered to be compatible. Noise-sensitive land uses include residential, institutional (schools, hospitals, etc.), outdoor recreational, etc.

An analysis of the noise contours on and around AKO was completed in the previous AMP. The analysis reported that the 65 day-night average DNL contours were entirely on Airport property and would continue this pattern for the 20-year forecasted period. Since that time, aircraft activity has decreased, indicating the noise levels have remained the same or decreased.

[1] https://www.epa.gov/superfund/search-superfund-sites-where-you-live#basic
[2] U.S. Code, 1966, National Historic Preservation Act of 1966, Public Law 89-665
[3] U.S. Code, 1974, Archaeological and Historical Preservation Act of 1974, 16 USC 469

Visual Effects Including Light Emissions

Federal regulations do not specifically regulate airport light emissions; however, the FAA does consider airport light emissions on communities and properties near the Airport. A significant portion of light emissions at airports are a result of facilities as well as safety and security equipment.

The existing lighting at AKO includes runway lighting (medium intensity on Runway 11/29) and lighting used for navigation/visual aid. The approach lighting system includes two-light PAPIs and REILs on each end of Runway 11/29. There is terminal, parking lot, apron, and hangar lighting.

All sources of light aid in the safety of operations at AKO and produce an insignificant amount of light beyond the Airport boundary.

Water Resources (Wetlands, Floodplains, Surface/Ground Waters)

Water resources are vital to society and include wetlands, floodplains, surface waters, ground waters, and Wild and Scenic Rivers. They provide drinking water and support recreation, transportation and commerce, industry, agriculture, and aquatic ecosystems. These resources act together as one integrated natural system. Impacts to one resource can disrupt the entire system. Water resources near AKO are summarized in the following sections.

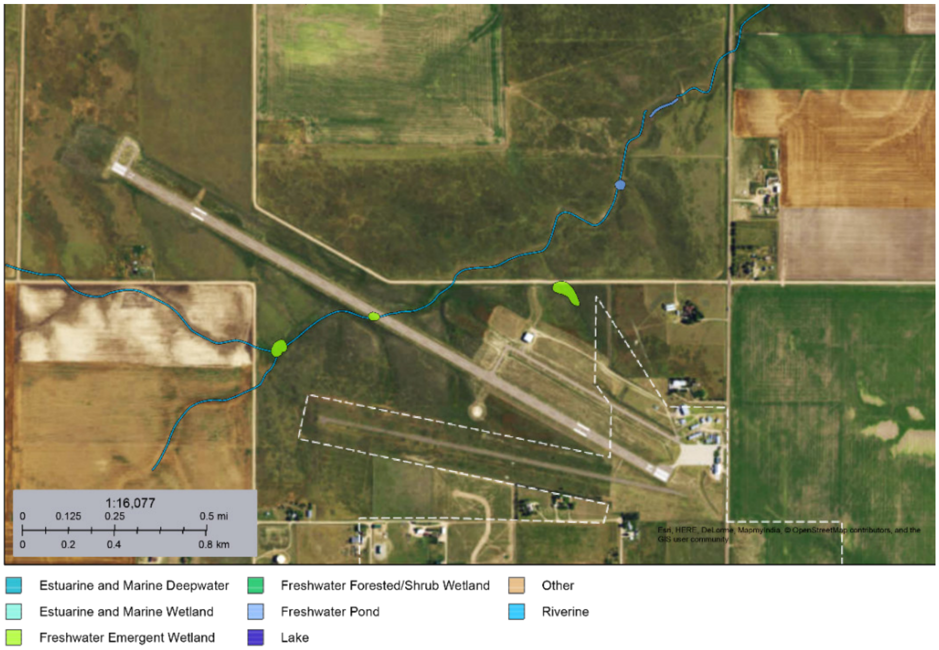
Wetlands

Executive Order 11990, Protection of Wetlands, defines 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."[1] Federal agencies are required to minimize the destruction, loss, or degradation of wetlands.

According to the National Wetlands Inventory (NWI), one Freshwater Emergent Wetland and one Riverine have been identified or delineated on AKO property. In addition, two wetlands are located near the Airport. One is located north of the Airport and the other is south. **Figure 2-13** shows the location of the three freshwater emergent wetlands and riverine. If future airport development were to extend in these directions, a survey would need to be completed prior to development to determine if any new wetlands may be impacted.

[1] Executive Order 11990, Protection of Wetlands, 1977 – Section 7, Paragraph C

FIGURE 2-13: WETLAND AREAS AROUND AKO



Source: National Wetlands Inventory Mapper, Jviation

Floodplains

Executive Order 11988, Floodplain Management, directs federal agencies to "avoid to the extent possible the long- and short-term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct and indirect support of floodplain development wherever there is a practicable alternative."[1]

The FEMA Flood Map indicates that this area is not printed and that AKO is not in a Special Flood Hazard Area.

Surface and Ground Waters

The Federal Water Pollution Control Act, as amended by the Clean Water Act[2] and the Safe Drinking Water Act, as amended, protect and regulate Federal actions that have the potential to impact surface and ground waters[3].

According to the EPA, Akron is located within the North Fork Republican watershed[4]. This watershed is located throughout northeastern Colorado, and parts of Nebraska and Kansas.

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[1] Executive Order 11988, Floodplain Management, 1977 – Introduction
[2] 33 U.S.C. Chapter 26.
[3] 42 U.S.C. 300.f.
[4] https://cfpub.epa.gov/surf/huc.cfm?huc_code=10250002

Wild and Scenic Rivers

The Wild and Scenic Rivers Act, as amended, designates rivers and those eligible to be designated in the Wild and Scenic Rivers System. Wild and scenic rivers are designated as "rivers having remarkable scenic, recreational, geological, fish, wildlife, historic, or cultural values."[1] The Department of the Interior (National Park Service, U.S. Fish and Wildlife Service, and Bureau of Land Management) and the Department of Agriculture (U.S. Forest Service) are the oversight agencies for the Wild and Scenic Rivers System. Federal agencies with jurisdiction over lands that border upon, or are adjacent to any designated rivers, are required to take the necessary actions to protect the rivers, as stated in Section 12 of the Wild and Scenic Rivers Act.

Colorado has approximately 107,403 miles of river, but less than 1 percent are designated Wild and Scenic Rivers. Parts of the Cache la Poudre River are considered Wild and Scenic, but do not pass through AKO.

Aviation Fuel Farm & Containment Area

Spill Prevention, Control, and Countermeasure Plan

All facilities that store or have the potential to store more than 1,320 gallons of oil are required, per 40 CFR 112, to have a Spill Prevention, Control, and Countermeasure Plan (SPCC) in place[2]. The SPCC is designed to provide preventative measures to ensure that any oil spills are contained and avoid oil spills reaching navigable waters. AKO has developed and implemented an SPCC, as the aboveground storage capacity meets the minimum requirements of 1,320 gallons of oil.

Storm Water Management Plan

Under the EPA, National Pollutant Discharge Elimination System (NPDES) permits are required for any discharge of storm water from municipalities and industrial sites. The Airport is required to obtain an Industrial Stormwater Permit. The Airport has a Storm Water Management Plan (SWMP) which addresses potential pollutant sources at the facility/site, and Best Management Practices to reduce or eliminate the risk of pollution from those sources.[3]

[1] National Wild and Scenic Rivers System; https://www.rivers.gov/wsr-act.php
[2] https://www3.epa.gov/region10/pdf/npdes/stormwater/msgp_faq_aug2015.pdf
[3] https://www.codot.gov/business/designsupport/design-docs/stormwater-management-plan-swmp

3. FORECASTS OF AVIATION ACTIVITY

Projecting future aviation demand is a critical element in the master planning process since many proposals and recommendations within the master plan are based upon aviation activity demand forecasts. As noted in Federal Aviation Administration (FAA) Advisory Circular (AC) 150/5070-6B, *Airport Master Plans*, "Forecasts of future levels of aviation activity are the basis for effective decisions in airport planning. These projections are used to determine the need for new or expanded facilities. In general, forecasts should be realistic, based upon the latest available data, be supported by information in the study, and provide an adequate justification for airport planning and development."

Forecasts must be reasonable and defensible. They serve as the basis of future facility requirements.

The forecasts developed in this chapter will be used to project Colorado Plains Regional Airport's (AKO or the Airport) future activity necessary to determine the type, size, and timing of future development. Because the decision to identify and execute projects is largely based on the anticipated levels of demand, forecasting acts as the hub of a master planning process. Future aviation activity also determines the role of the Airport as well as the appropriate airport design standards, which are discussed below.

This chapter discusses projected aviation demand at AKO over the next 20 years, from 2016 to 2036. While forecasting considers the most accurate information available at the time the projections are completed, it is not an exact science. It must be recognized that there are likely to be some divergences of an airport's activity from a prepared forecast due to many factors that simply cannot be anticipated such as changes in aviation fuel prices, new regulations, and trends in the economy. However, when soundly established, the forecasts developed in a master plan will provide a sound, defensible, and defined rationale to guide the analysis of future airport development needs and alternatives.

This forecast presents the projected demand at AKO over the next 20 years.

The amount and type of aviation activity occurring at an airport are dependent upon many factors. These include but are not limited to the services available to aircraft operators, the businesses located on the airport or within the host community, and the economic conditions within the surrounding area. The AKO forecast analysis considers historical aviation trends at the Airport, the surrounding region, and throughout the nation.

Projections of aviation activity for AKO were prepared for the near-term (2021), intermediate-term (2026), and long-term (2036) time frames. The twenty-year planning period is FAA's recommended outlook period for airport master plans. Other forecasts discussed below cover different planning periods, such as FAA's Terminal Area Forecast (TAF), which extends to 2040.

The following resources were used to estimate activity and generate forecasts for AKO:

- 2005 AKO Airport Master Plan
- FAA Airport Master Record Form 5010
- 2015 FAA Terminal Area Forecast, issued January 2016

- Discussions with Airport Management
- Colorado 2011 Statewide Aviation System Plan
- 2016 FAA Aerospace Forecast
- Airport Market Area Demographic and Socioeconomic Projections

3.1 Aviation Activity Forecast Context

Activity at airports is influenced by national, state, and regional trends as well as various factors within the Airport's individual market area. Because of this, it is important that each of these are carefully analyzed to understand how the Airport reacts to influences.

3.1.1 National Aviation Trends

National trends within aviation are often reflected in airports and the local communities they serve, and should be considered in the development of activity projections. For AKO, various sources were used to examine current and anticipated trends influencing the general aviation industry:

- Federal Aviation Administration: FAA Aerospace Forecasts, 2016-2036
- General Aviation Manufacturers Association (GAMA): General Aviation Statistical Databook, 2015
- National Business Aircraft Association (NBAA): NBAA Business Aviation Fact Book, 2016 and earlier

General Aviation Industry

General Aviation includes all individual unscheduled aviation activities that enrich, enhance, preserve, and protect the lives of citizens.

General aviation (GA) aircraft are classified as all aircraft not flown by commercial airlines or the military. This includes an incredibly diverse array of flying that ranges from a personal vacation in a small single-engine plane, to an overnight package delivery, to an emergency medical evacuation, to a morning sightseeing flight, to flight instruction training new pilots, to helicopter traffic reports that keep drivers informed of rush-hour delays. Simply stated, general aviation encapsulates all individual unscheduled aviation activities that enrich, enhance, preserve, and protect the lives of citizens.

The FAA divides general aviation activities into six broad categories:

- Personal: About one-third of private flying in the United States is for personal reasons, which may include practicing flight skills, personal or family travel, personal enjoyment, or personal business.
- Instructional: All private flight instruction for purposes ranging from private pilot to airline pilot is conducted through general aviation.
- Corporate: About 12 percent of the total private flying in the United States is done in aircraft owned by a business and piloted by a professional. Most of these flights are in jets and cover long distances, with some flying to international destinations. Businesses elect to fly these trips to save time and expand their geographic and operational networks.

- Business: About 11 percent of private flying in the United States is done by business people flying to meetings or other events, primarily in piston or turboprop aircraft. Many pilots flying for business own or work for relatively small businesses and use the aircraft to accomplish missions that would otherwise take more time or would be infeasible.
- Air Taxi: When scheduled air service is either not available or inconvenient, businesses and individuals use charter aircraft from air taxis service providers. These flights save time and make it possible to fly directly to places that cannot be reached by scheduled service.
- Other: Given the diverse nature of general aviation, this category includes disaster relief, search and rescue, police operations, news reporting, border patrol, forest firefighting, aerial photography and surveying, crop dusting, and tourism activities, among many others.

General Aviation Trends

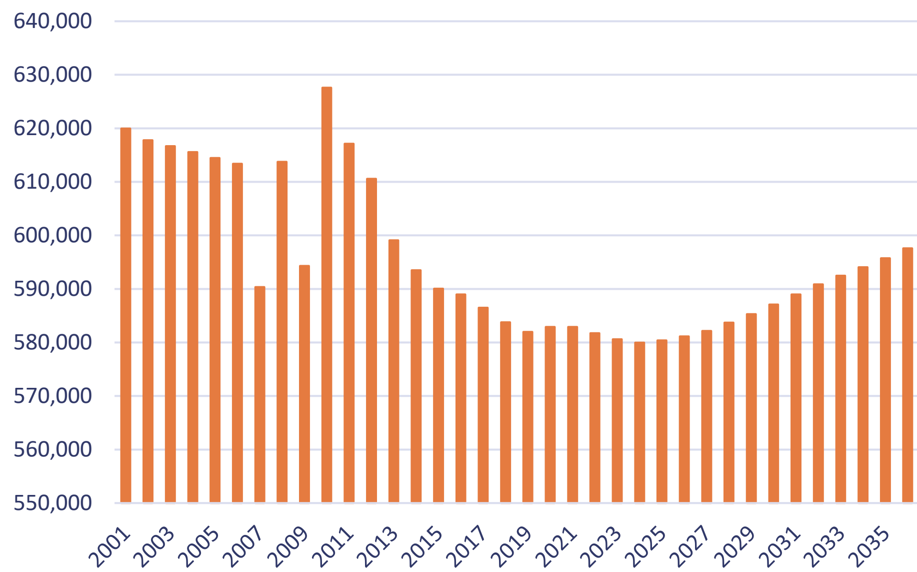
At the national level, business cycles and the price of aircraft ownership have impacts on general aviation demand levels. This section provides an overview of the most profound general aviation trends, as well as some of the various factors that have influenced those trends in the United States. These are important considerations in the development of projections of general aviation demand for AKO. According to the FAA, between 2001 and 2015 the total number of pilots decreased by 0.35 percent[1] annually. This decline impacts demand for aircraft activity throughout the country: the fewer pilots there are, the less flying will be done, resulting in fewer operations at airports.

The FAA develops forecasts of future levels of aviation activity from past trends and economic drivers. The most recent forecast available, in *FAA Aerospace Forecasts, Fiscal Years 2016-2036*, presents near-term and long-term forecasts, depicted in **Figure 3-1**. The FAA has forecasted the number of licensed pilots to increase 0.07 percent[1] each year for the next 20 years. Although this will not bring the total number of pilots back to its 2010 peak of 627,000, it may help increase the overall level of aviation activity and the number of operations at airports across the country.

The decline in the total number of pilots in the last 15 years impacts demand for aircraft activity throughout the country.

[1] https://www.faa.gov/data_research/aviation/aerospace_forecasts/

FIGURE 3-1: HISTORICAL AND FORECASTED NUMBER OF TOTAL PILOTS

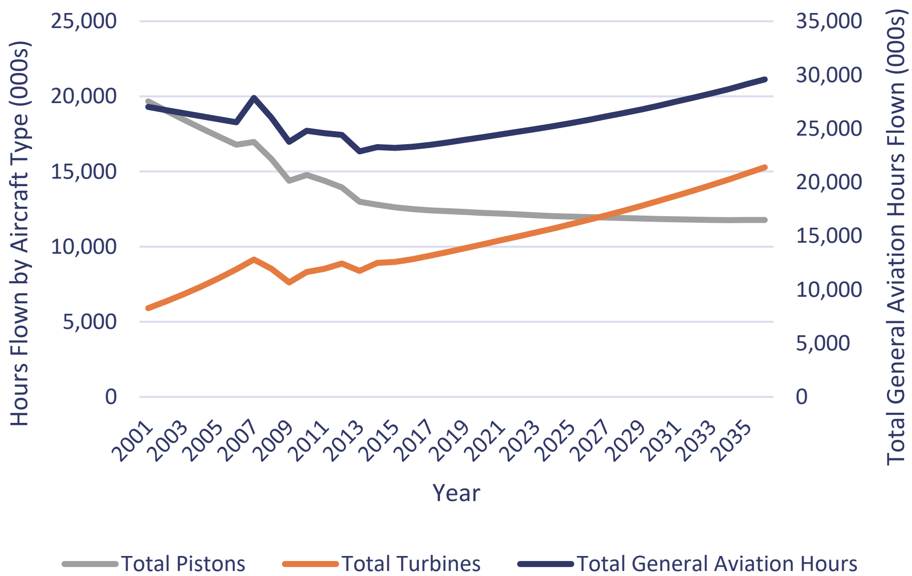


Source: FAA Aerospace Forecast, 2016-2036, Active Pilots by Type of Certificate
Note: Years 2002-2006 were interpolated based on FAA's AAGR

The FAA also tracks and projects a valuable metric known as active general aviation and air taxi hours flown. This is done through a nationwide survey conducted every two years. This metric captures several activity-related data including aircraft utilization, frequency of use, and duration of use.

As shown in **Figure 3-2**, hours flown in general aviation piston aircraft experienced a significant decrease of 3.4 percent annually from 2000 to 2014. However, this trend is expected to lessen over the 20-year planning period with an annual decrease rate of 0.5 percent. For turboprop and jet aircraft, hours flown are expected to continue to grow at a relatively high rate of 2.7 percent per year through 2036, primarily due to the high utilization of business aviation aircraft.

FIGURE 3-2: HISTORICAL AND FORECASTED GA AIRCRAFT HOURS



Source: FAA Aerospace Forecast 2016-2036, Active General Aviation and Air Taxi Hours Flown

Other trends that have and will affect general aviation activity include:

- The availability and cost of 100LL avgas. Avgas is the only leaded fuel allowed in the United States, and the FAA has been working with companies to develop an unleaded replacement. The majority of piston-engine aircraft use 100LL avgas. Some smaller displacement engines can use unleaded auto fuel (mogas) without ethanol, but auto fuel without ethanol is relatively scarce. Larger piston engines cannot use mogas, and they use the largest volume of 100LL. The three primary goals for the replacement of 100LL are to certify an unleaded fuel that can be used in all piston-engine airplanes, that can be used by the existing fuel storage and transportation system, and will cost approximately the same as the retail price of existing 100LL.
- User fees. Congress has considered a number of proposals to impose additional fees for the use of the National Airspace System and the services provided by FAA. There have also been discussions about privatizing the air traffic control system, similar to Canada, Australia, and other countries. Each of the aviation trade associations have noted that imposition of user fees would directly impact GA activity.
- New airport and airspace security regulations. After Congress created the Department of Homeland Security in 2002 and the Transportation Security Administration (TSA) in 2001, those agencies imposed new security regulations for commercial service airports. GA airports were not covered by those regulations, but if they were to be subject to similar security requirements in the future it would adversely impact GA activity. FAA has also imposed numerous temporary flight restrictions (TFR), many in response to security issues, some of which have adversely affected activity and businesses at GA airports. Any increase in the number and/or size of TFRs would further adversely impact GA activity.

Business Use of Aviation

AKO accommodates a wide range of corporate aircraft, which fly into the Airport for business travelers visiting the area. Companies and individuals use general aviation aircraft as a tool to improve efficiency and productivity of their business and personnel. Use of aircraft gives businesses control over their travel itineraries and destinations, and can greatly reduce travel time associated with scheduled airline service. FAA has noted that business aviation has been one of the fastest growing segments of GA activity over the last 15 years. However, even business aviation activity declined in 2009-2010 during the national recession, and although it has rebounded since then, it has not returned to the activity levels seen in 2007[2]. FAA noted in their Aerospace Forecast FY 2016-2036, "…the long-term outlook for general aviation, driven by turbine aircraft activity, remains favorable. The more expensive and sophisticated turbine-powered fleet (including rotorcraft) is projected to grow by 15,600 aircraft -- at an average rate of 2.1 percent a year over the forecast period, with the turbine jet portion increasing at 2.5 percent a year."

General Aviation can improve efficiency and productivity of businesses and personnel.

One trend to note is the popularity of fractional ownership, which began in the 1980s. These programs offer aircraft owners flexibility in their ownership and operation of their aircraft. The program uses current aircraft acquisition concepts, including shared or joint aircraft ownership, and provides for the management of the aircraft by an aircraft management company. Aircraft owners participating in the program agree to share ownership interest in an aircraft, and most also lease their aircraft to others in the program. The aircraft owners use a common management company to provide aviation management services including maintenance of the aircraft, pilot training and assignment, and leasing management of the aircraft.

Fractional ownership has continued to improve, even in an unsteady economy.

Even in an unsteady economy, fractional operators continue to see growth as previous customers re-enter the market or existing customers increase their fractional aircraft usage. In addition, fractional owners witness an increasing number of new prospects making the move to fractional ownership as an alternative to flying commercially or owning a business jet outright. In the United States, fractional ownership makes up 15 percent of business aviation flights.

Fractional ownership makes up 15 percent of business aviation flights in the United States.

Other users of GA aircraft—including crop spraying, flight training, medical transports, aerial surveying and photography, equipment sales and support, aircraft servicing and maintenance companies, heating/air conditioning companies, and medical service firms—are using jet/turbine aircraft to fly to AKO.

3.1.2 State/Regional Trends

National trends offer a broad summary of what has occurred across the country, but may be different than what has occurred locally. For this reason, it is important to consider state and regional trends that may influence AKO. The following information focuses on the region's economy and regional airport operations.

The large majority of GA airports in the United States do not have a control tower, including AKO. As a result, there is often no one counting GA takeoffs and landings, and aviation activity is estimated by a number of sources including the FAA, airport

[2] Source: FAA Business Jet Report, February 2017 Issue

managers, fixed-base operators (FBOs), and other airport users. It is not uncommon for those entities to estimate different levels of activity at a given non-towered airport. Some state agencies and airports use acoustical counters and video cameras to count takeoffs and landings at non-towered airports, but due to their cost and labor requirements they are not commonly used.

State/Regional General Aviation Airport Trends

The FAA issues a Terminal Area Forecast for each airport included in its National Plan of Integrated Airport Systems (NPIAS). The TAF provides historical activity data as well as forecasts through the year 2040. As noted above, the activity levels at non-towered airports are estimated based on input from other planning studies, airport managers, etc. Observing other GA airports near AKO provides an understanding of how the Airport's current and forecasted activity compares to other airports and identifies possible linkages for future opportunities. The FAA predicts most general aviation airports within 50 miles of AKO will not experience significant growth, if any, over the next 20 years (**Table 3-1**).

TABLE 3-1: REGIONAL GENERAL AVIATION TRENDS

Airport	FAA ID	Current Operations	Forecasted Operations (2036)	Based Aircraft	Forecasted Based Aircraft
Colorado Plains Regional	AKO	17,080	17,080	13	13
Kit Carson County	ITR	8,000	8,000	18	18
Yuma Municipal	2V6	4,264	4,300	17	17
Sterling Municipal	STK	2,165	2,165	34	44
Fort Morgan Municipal	FMM	9,543	10,000	23	23
Holyoke	HEQ	7,300	7,300	11	11
Wray Municipal	2V5	14,600	14,600	20	36

Source: 2015 FAA TAF, issued January 2016

Colorado Statewide Aviation System Plan

The Colorado Department of Transportation (CDOT), Aeronautics Division last updated the Colorado State Aviation System Plan (SASP) in 2011. "The plan helps to identify a system of airports and projects that meets the State's air transportation needs and supports its economic goals. The state aviation system plan also provides the Division of Aeronautics with an important planning tool to monitor how investment elevates overall system performance."[3] The plan measures and forecasts activity to determine if the system has sufficient capacity to meet future needs.

A state aviation system plan provides an important planning tool to monitor investments and the benefits to the whole state.

The SASP forecasted the growth rate of aircraft operations at general aviation airports throughout Colorado to be 0.7 percent per year through 2030. That relatively flat growth rate is consistent with FAA's TAF. The SASP also analyzed based aircraft and forecasted an average annual growth rate of 0.5 percent.

[3] 2011 Colorado Aviation System Plan - Technical Report

Colorado Business Incentives

Many states offer financial and other incentives for companies to relocate to their state. This can often help the area's economy grow and become more sustainable. The Colorado Office of Economic Development and International Trade offers a variety of incentives for companies to locate in the state. Akron is located within the Northeast Administrative Zone for Enterprise Tax Zone Credits, which provides state income tax credits that encourage businesses to locate and develop there. The Colorado Enterprise Zone Program is designed to promote a business-friendly environment in economically distressed areas[4].

Table 3-2 highlights other incentive programs Colorado offers to businesses relocating or starting within its borders.

TABLE 3-2: COLORADO BUSINESS INCENTIVES

Incentive Program Title	Description
Aviation Development Zone Tax Credit*	A program providing a state income tax credit of $1,200 per new full-time employee for businesses involved in the maintenance and repair, completion, or modification of aircraft located within approved Aviation Development Zone airports.
Colorado FIRST	A customized job training program that focuses on companies relocating to or expanding in Colorado and provides funds only to net new hires.
Enterprise Zone Tax Credit	These tax incentives encourage businesses to locate and expand in designated economically distressed areas of the state.
Job Growth Incentive Tax Credit	A performance-based program for businesses pursuing job creation projects that would not occur in Colorado without this support.
Job Growth Incentive Tax Credit-Higher Education Partnership	A program for businesses partnering with State Higher Institutions (HEI) to support job growth, academic development and economic expansion.
Strategic Fund Incentive	A performance-based program designed to encourage recruitment, retention and economic growth through Colorado by supporting Colorado Economic Development Commission (EDC) approved businesses that have created and maintained permanent net new jobs for one year.

Source: Colorado Office of Economic Development and International Trade http://choosecolorado.com/doing-business/incentives-financing/businesses-considering-colorado-site-selectors/
* AKO is not an eligible airport for the Aviation Development Zone Tax Credit

3.1.3 Airport Market Area

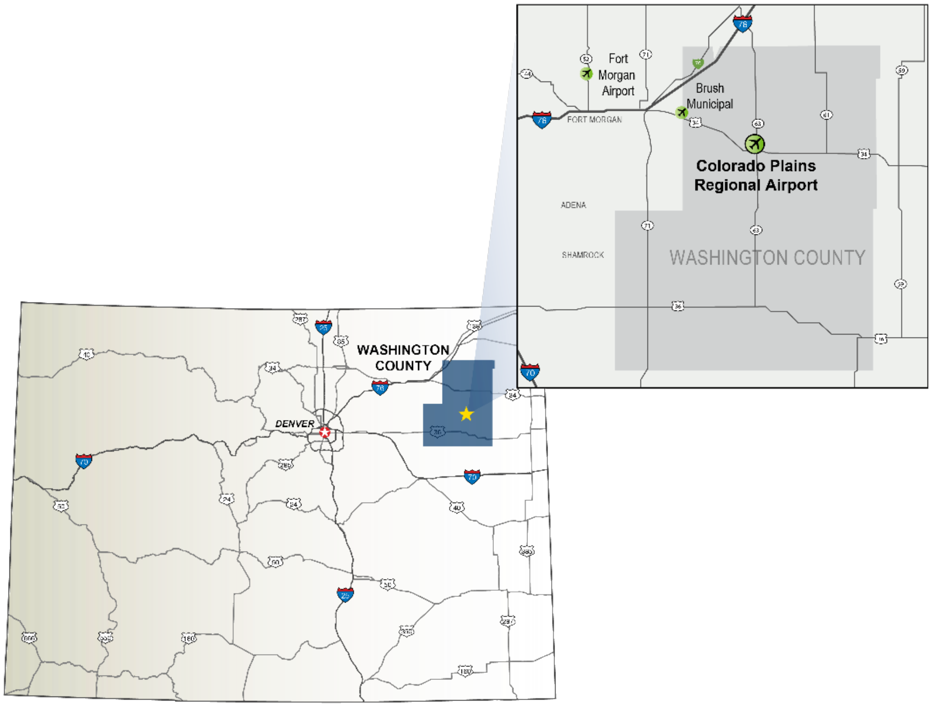
An airport's market area is defined as the geographic region served by a particular airport.

An airport's market area is defined as the geographic region served by a particular airport. The location and geographic attributes surrounding an airport can influence the type and levels of activity it experiences. For example, airports located near or in resort areas typically may receive many tourist travelers owning or using private aircraft. Located in a large agricultural county, Akron is considered a rural area.

The market area for AKO is Washington County (**Figure 3-3**). No other publicly owned airports are located within the county, making it probable that a resident of the county would utilize AKO, if needed.

[4] www.choosecolorado.com

FIGURE 3-3: AKO MARKET AREA



Source: Jviation

Demographics

Aviation demand is strongly tied to the number of people within an airport's market area, as well as their financial ability and desire to travel by air. Indicators such as trends in overall population, per capita and disposable personal income, and unemployment rates all have a bearing on aviation activity at a given airport.

The Colorado Department of Local Affairs notes: "Colorado's population is forecast to increase from 5,029,196 in 2010 to 6 million in 2020 and 7.01 million by 2030. This is an average annual growth rate of 1.7 percent followed by 1.5 percent. The forecasted growth rates are slightly slower than the previous decade yet faster than the US rate of 0.9 percent. The largest share of the population (82.4 percent) will continue to be along the Front Range with a growing share in the Western Slope, growing from 11 to 12 percent between 2010 and 2020."[5]

Washington County's population in 2015 was estimated to be 4,750[6]. The county's population has decreased 0.3 percent from 1970 to 2015. If this trend were to continue, the population of Washington County by the end of the planning period (2036) would be 4,340. Population forecasts prepared by the Colorado Department of Local Affairs shows relatively little growth in the county's population through 2050.

[5] https://demography.dola.colorado.gov/

[6] Woods and Poole Data, 2011

According to the Colorado Department of Local Affairs, in 2009 the per capita personal income in Washington County was less than the state and national average, which is consistent with other rural areas in the state (**Table 3-3**).

TABLE 3-3: PER CAPITA PERSONAL INCOME IN 2009

Area	Income
Washington County	$36,461
State of Colorado	$41,895
U.S. Average	$39,635

Source: Colorado Department of Local Affairs[5]

The combination of the relatively low growth in overall population in the county along with the county's per capita personal income indicates that the demand for aviation services will not likely experience strong growth unless there were significant new aviation services offered at AKO.

3.2 Historical and Existing Aviation Activity

Records of historical and existing based aircraft and operations are the starting point for future projections. AKO accommodates a wide variety of aviation activity, ranging from occasional air taxi operators to recreational, corporate activity, and public service operations. Since AKO does not have an air traffic control tower, operational levels must be estimated (as opposed to counted).

3.2.1 Based Aircraft

Per FAA, a based aircraft is operational and air worthy, and is typically stored at the facility for most of a year.

Per the FAA, a based aircraft is operational and airworthy, and is typically stored at the facility for most of a year[7]. It is not uncommon for primary sources of historical based aircraft data, such as the FAA TAF and airport records (Airport Master Record 5010), to vary from one another. FAA Form 5010, updated annually by airports, reports runway and taxiway information as well as based aircraft and aircraft operations totals. According to the FAA TAF, (dated 2015), AKO has 13 based aircraft. Airport management reported 13 single-engine, one multi-engine, and one helicopter for a total of 15 based aircraft. **Table 3-4** shows the counts of each based aircraft by type reported by FAA and the Airport Manager.

TABLE 3-4: BASED AIRCRAFT COUNT BY TYPE

Aircraft Type	FAA TAF	Airport Manager
Single Engine	12	13
Multi Engine	0	1
Jet	0	0
Helicopter	1	1
Total	**13**	**15**

Source: FAA TAF, Airport Management

[7] FAA National Based Aircraft Inventory Program

Many factors influence airport operations and based aircraft, such as the price of tiedowns and hangars, the availability of fuel and support services such as maintenance, etc. **Figure 3-4** displays the number of based aircraft at AKO since 2000. The number of aircraft has fluctuated throughout the years, but has grown at an overall average annual growth rate of 0.54 percent.

FIGURE 3-4: HISTORICAL NUMBER OF BASED AIRCRAFT

Source: 2015 FAA TAF, issued January 2016

3.2.2 Aircraft Operations

An aircraft operation is defined as a takeoff or landing of any aircraft on an airport. The historical operations data includes activity conducted by based aircraft as well as operations conducted by itinerant[8] aircraft. Information related to aircraft operations is important in understanding the demand on the Airport and helps to serve as a basis for determining where improvements are needed.

An aircraft operation is defined as a takeoff or landing of any aircraft on an airport.

Since there is not an active air traffic control tower located at AKO, estimates of operations are based upon information from the FAA, CDOT, Airport Management records, and Airport tenants and users.

Per FAA Order 5090.3C, Paragraph 3-2(c), aviation forecasts at uncontrolled GA airports should use the following operations per based aircraft (OPBA) numbers when estimating activity:

a. 250 operations per based aircraft for rural general aviation airports with little itinerant traffic,
b. 350 operations per based aircraft for busier general aviation airports with more itinerant traffic, and
c. 450 operations per based aircraft for busy reliever airports.

Assuming AKO is a busier GA airport with 350 operations per based aircraft, annual operations would be estimated at 4,550 (350 operations x 13 based aircraft). Because

[8] Itinerant aircraft are aircraft based at other airports

the TAF and reported levels of activity from the Airport Manager are much higher than the OPBA model (**Figure 3-5**), this method is not an accurate measure of forecasting. This is primarily based on two factors: very high seasonal agricultural operations and the high level of itinerant operations (more than 75 percent).

Since 2000, aircraft operations at AKO have fluctuated from a low of 12,316 in 2000 to a high in 2006 of 24,280 (**Figure 3-5**). Looking at historical trends, growth between 2000 and 2006 could be contributed to the increase in Airport business and an increase in the utilization of the based aircraft.

From 2008 to 2010, many industries were severely impacted by the economic downturn throughout the country, and the aviation industry was no exception. Fewer aircraft were purchased and the high operational costs of business aircraft caused aviation activity throughout the country to decline. Even with this national downturn trend, between 2000 and 2015 the average growth rate of aircraft operations at AKO has been 2.2 percent each year.

Airport Management reported an upward trend in agricultural (Ag) aircraft operations and noted that on certain days Ag aircraft exceed 200 operations per day in the early summer/spring. It is unknown if this trend will continue, or if the circumstances of the last few years will subside, reducing Ag aircraft operations.

FIGURE 3-5: HISTORICAL NUMBER OF AIRCRAFT OPERATIONS

Source: 2015 FAA TAF, issued January 2016

AKO'S operations data includes local activity conducted by based aircraft as well as those conducted by itinerant aircraft stored at other airports arriving at AKO for a variety of reasons including maintenance, business, recreation, or flight training. **Table 3-5** lists operations conducted by based aircraft versus itinerant aircraft.

TABLE 3-5: ITINERANT VERSUS LOCAL AIRCRAFT OPERATIONS

Year	Itinerant Operations	Local Operations	Total Operations	Itinerant Percentage of Total
2005	16,280	8,000	24,280	67%
2010	13,250	7,000	20,250	65%
2015	13,080	4,000	17,080	77%

Source: 2015 FAA TAF, issued January 2016

3.3 Projections of Aviation Activity

Projections of aviation activity are generated by using historical data and incorporating assumptions, conditions, and trends. Forecasting of any type is as much an art as it is a science, and no matter how sophisticated, it represents an educated guess at a point in time. Therefore, forecasts must be updated and revised as necessary to reflect changing conditions and developments.

As noted previously, it is difficult to accurately forecast events that could impact aviation activity at AKO such as rising fuel prices, new user fees, or changes in airport or airspace security regulations. Airport Management has noted that the FBO is seeking to add flight training, which could increase the number of based aircraft and operations by as much as 10 percent over current levels. Other events that could increase traffic at AKO include the basing of a corporate flight department at the Airport. In addition to the Airport's facilities, several factors affect the decision to open a flight school or base a flight department at AKO, including market conditions, the cost of doing business at AKO compared to other area airports, and required capital investment costs, among others.

During a master plan, aviation activity forecasts are typically developed using a wide variety of assumptions that can result in a wide range of outcomes. This is done intentionally to provide a broad view of future airport utilization based on a range of possible events that could affect activity. Once that broad view has been established, a careful examination of those assumptions is undertaken to determine which could be reasonably applied given that airport's current situation and opportunities.

3.3.1 AKO Based Aircraft Forecast

Estimating the number and types of aircraft expected to be based at AKO throughout the forecasting period will impact the need for future facilities and infrastructure requirements. In one perspective related to airport growth, as the number of aircraft based at an airport increases, so does the demand for aircraft storage and other facilities required at the Airport, particularly for tiedowns and hangars, as well as for fuel and other FBO services. **Table 3-6** and **Figure 3-6** show the results of four (no growth, low, medium, and high) based aircraft projections as well as their average annual growth rate (AAGR).

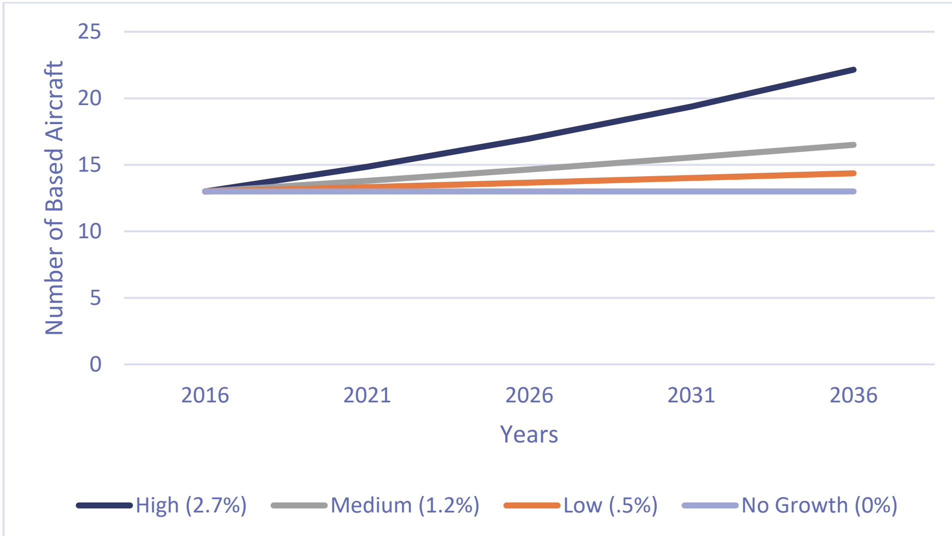
Possible forecasts of based aircraft range from an average growth rate of 0 percent to 2.7 percent.

TABLE 3-6: BASED AIRCRAFT PROJECTIONS

Year	High Growth	Medium Growth	Low Growth	No Growth
2015	13	13	13	13
Projections				
2021	15	14	13	13
2026	17	15	14	13
2031	19	16	14	13
2036	22	17	14	13
AAGR	**2.7%**	**1.2%**	**.5%**	**0%**

Sources: High: FAA Aerospace Forecast - Jet Aircraft; Medium: FAA Aerospace Forecast - GA Hours Flown; Low: 2011 Colorado SASP; No Growth: 2015 FAA TAF, issued January 2016

FIGURE 3-6: BASED AIRCRAFT FORECASTS 2016-2036



Sources: High: FAA Aerospace Forecast - Jet Aircraft; Medium: FAA Aerospace Forecast - GA Hours Flown; Low: 2011 Colorado SASP; No Growth: 2015 FAA TAF, issued January 2016

The number of business jets operating throughout the United States has been increasing for the past seven years. The FAA expects this trend will continue at an average annual growth rate of 2.7 percent per year. While AKO serves jet aircraft, there are no jet aircraft based at AKO; the decision to base jet aircraft at AKO is based on a number of factors, including the needs of the business and the cost of constructing hangars and related facilities (apron, access road, utility hookups). The fact that FAA projects that the number of corporate aircraft in the United States will increase throughout the forecast period increases the possibility that corporate aircraft will be based at AKO in the future.

Preferred Based Aircraft Forecast

The preferred based aircraft forecast shows a 1.2 percent increase per year.

The preferred based aircraft forecast is the medium-growth projection of 1.2 percent per year. It represents a reasonable and conservative growth projection for AKO while considering FAA outlooks and demographic characteristics unique to Washington County. This projection shows that the number of based aircraft at AKO will increase from 13 to 17 based aircraft within the 20-year planning period.

3.3.2 AKO Aircraft Operations Forecast

Annual operations represent the number of aircraft takeoffs and landings at an airport in one calendar year. Many different factors can influence the number of aircraft operations at an airport, including, but not limited to, total based aircraft, area demographics, activity and policies at neighboring airports, and national, state, and local aviation trends. These factors were used to develop projections of future aircraft operations at AKO, shown in **Table 3-7** and **Figure 3-7**.

TABLE 3-7: AIRCRAFT OPERATIONS FORECAST

Year	High Growth	Medium Growth	Low Growth	No Growth
2015	17,080	17,080	17,080	17,080
Projections				
2021	19,043	18,130	17,686	17,080
2026	21,232	19,244	18,314	17,080
2031	23,673	20,427	18,964	17,080
2036	26,394	21,682	19,637	17,080
AAGR	**2.2%**	**1.2%**	**.7%**	**0%**

Sources: High: FAA TAF - Historical Aircraft Operations; Medium: Operations Per Based Aircraft Ratio and FAA Aerospace Forecast (GA Hours Flown); Low: 2011 Colorado SASP; No Growth: 2015 FAA TAF, issued January 2016 - Forecasted Aircraft Operations

FIGURE 3-7: AIRCRAFT OPERATIONS FORECAST (2016-2036)

Sources: High: FAA TAF - Historical Aircraft Operations; Medium: Operations Per Based Aircraft Ratio and FAA Aerospace Forecast (GA Hours Flown); Low: 2011 Colorado SASP; No Growth: 2015 FAA TAF, issued January 2016 - Forecasted Aircraft Operations

AKO's 20-year operations forecasts range from 17,080 to 26,394 aircraft operations by the end of the planning period. Growth rates represented by these forecasts ranged from an AAGR of 0 percent to 2.2 percent. This range represents the most realistic growth considering the Airport's history and predicted regional, state, and national growth estimates.

AKO's 20-year operations forecasts ranging from 17,080 to 26,394 aircraft operations by the end of the planning period.

The high-range forecast represents the historical number of operations at AKO. The FAA predicts that general aviation activity will not increase throughout the planning period. Nationwide historical trends and forecasts demonstrate that the high forecasted growth rate is not a dependable planning tool.

Preferred Aircraft Operations Forecast

A 1.2 percent increase in aircraft operations projection is reasonable and considers the OPBA and FAA Aerospace Forecasts.

The preferred operations forecast is 1.2 percent, the medium-range projection. While the forecast is lower than historical operations growth projections, it is reasonable and considers the forecast from FAA Aerospace Forecast of general aviation hours flown. **Table 3-8** presents the preferred based aircraft and operations forecast with a breakdown of expected itinerant and local activity founded on the current split of operations (77 percent itinerant and 23 percent local).

TABLE 3-8: PREFERRED FORECASTS

	Current	2021	2026	2031	2036	AAGR
Based Aircraft	13	14	15	16	17	**1.2%**
Total Operations	17,080	18,130	19,244	20,427	21,682	**1.2%**
– Itinerant	13,080	13,960	14,818	15,729	16,695	
– Local	4,000	4,170	4,426	4,698	4,987	

Source: Jviation

3.4 Comparison with FAA TAF

To secure FAA approval for the master plan activity projections, FAA requires a comparison of the master plan forecasts to the annually produced TAF, preferring that airport planning forecasts not vary significantly from the TAF.

FAA looks for the two forecasts to be within 10 percent of their five-year forecasts and within 15 percent of their ten-year forecasts. If they are not within these tolerances, an explanation must be provided. A comparison between the forecasts shows that the preferred projections are within FAA tolerances (**Table 3-9**).

TABLE 3-9: FORECASTED OPERATIONS COMPARISON WITH FAA TAF

	Current	2021	2026	2031	2036	AAGR
Based Aircraft						
– Preferred Forecast	13	14	15	16	17	**1.2%**
– TAF	13	13	13	13	13	**0.0%**
Variance	*0%*	*6%*	*11%*	*20%*	*27%*	
Operations						
– Preferred Forecast	17,080	18,130	19,244	20,427	21,682	**1.2%**
– TAF	17,080	17,080	17,080	17,080	17,080	**0.0%**
Variance	*0%*	*6%*	*13%*	*20%*	*27%*	

Source: Jviation

3.5 Critical Aircraft Design

The development of an airport is influenced by the demand for various facilities, typically represented by total based aircraft and operations at an airport, and the type of aircraft that will use those facilities. In general, airport infrastructure components are designed to accommodate the most demanding aircraft, referred to as the critical design aircraft, which will utilize the infrastructure on a regular basis.

The factors used to determine an airport's critical design aircraft are the approach speed and wing span/tail height of the most demanding class of aircraft that is anticipated to perform at least 500 annual itinerant operations at the airport during the planning period. That means that the critical design aircraft must perform at least one takeoff and landing every weekday throughout the course of a year.

Many airports, including large commercial service airports and GA airports, accommodate occasional operations by aircraft larger than the critical design aircraft. However, if larger airplanes do not generate sufficient activity throughout the year to meet FAA's definition of substantial use, those aircraft cannot typically be used to determine airport or airspace design standards.

After identifying an airport's critical design aircraft, it is then possible to determine the facility's Airport Reference Code (ARC). The ARC is a coding system defined by the FAA that relates airport design criteria to the operational and physical characteristics of the critical design aircraft. An airport's ARC is a composite designation based on the Approach Category and Airplane Design Group (wingspan and tail height) of that airport's critical aircraft.

Data from the FAA's Traffic Flow Management System Counts (TFMSC) database was used to evaluate historical corporate jet operations and help identify the appropriate critical design aircraft. The FAA's TFMSC data is based on flight plans and aircraft contacts with FAA approach control facilities, and identifies aircraft by type. However, FAA's TFMSC data does not include aircraft that did not file flight plans or contact approach control, so it does not capture 100 percent of activity. Corporate aircraft typically file plans because they normally operate under instrument flight rules (IFR) and also contact approach control, and therefore are well-represented in TFMSC data. Smaller piston-engine airplanes are less likely to file IFR flight plans or contact approach control and are not represented as well in the data.

Almost all the piston and turboprop aircraft at AKO fall within the A-1 to B-II ARC designations. Although a single aircraft within the B-II ARC does not operate more than 500 times per year at AKO, the collective group of aircraft that represent B-II operate well above the 500 operation thresholds. Therefore, based on the FAA guidelines, it is reasonable to assign the B-II ARC designation to AKO with a critical design aircraft as Citation Excel for both existing and future conditions.

AKO'S critical aircraft is a Citation Excel; thus, the ARC is B-II for existing and future needs.

From 2012 to 2016, 151 types of aircraft have reported arriving or departing at AKO; the total number of business jet operations was over 290 and included operations from Gulfstream V, Boeing 737, DC-8, and Embraer 190. These aircraft fall under the C-III ARC. If operations of aircraft of this size continue to increase, it is vital that the region has an airport of AKO's current size and capacity.

AKO routinely hosts aircraft able or willing to use surrounding area airports situated in Logan, Morgan, Sedgewick, Phillips, Yuma counties, and beyond. This is often due to the fact that AKO has services not offered at other airports. Additionally, many aircraft in the B-II ARC or larger require longer runways under certain conditions, especially during hot or snow/ice conditions. Because of these points, and AKO's agenda to grow and attract businesses that increase airport activity, it is viewed as a resource throughout the northeastern Colorado region.

Competition for based aircraft, tenants, and transient aircraft depends largely on the facilities and services offered at airports within a region, as well as the prices charged. AKO can be compared to other general aviation airports in the area. **Table 3-10** lists some of the general aviation airports near AKO and their comparable data. Per Airport Management, AKO is home to one of the few full-service FBOs and full-service aircraft maintenance facilities in the region. Airports that have full maintenance capabilities and runway facilities similar to AKO are more than 100 miles away.

TABLE 3-10: COMPARISON OF AIRPORTS NEAR AKO

Airport (FAA ID)	Distance from AKO	Runway(s) & Dimensions (feet)	Annual Operations	Based Aircraft	Services Offered
Colorado Regional (AKO)	n/a	11/29: 7,001 x 100	17,080	13	100LL, Jet A, hangars, tiedowns, maintenance
Brush Municipal (7V5)	17.1 nm	7/25: 4,300 x 60	1,456	8	Tiedowns
Yuma Municipal (2V6)	23.7 nm	16/34: 4,200 x 75 12/30: 2,740 x 60	4,264	17	100LL, Jet A, hangars, tiedowns, maintenance
Sterling Municipal (STK)	26.4 nm	15/33: 5,201 x 75 4/22: 2,809 x 150	2,132	33	100LL, Jet A, hangars, tiedowns
Fort Morgan Municipal (FMM)	28.4 nm	14/32: 5,731 x 75 17/35: 5,216 x 80 8/26: 2,468 x 100	9,855	22	100LL, Jet A, hangars, tiedowns
Haxtun Municipal (17V)	38.9 nm	17/35: 1,650 x 30 8/26: 3,860 x 40	264	1	Tiedowns
Wray Municipal (2V5)	45.4 nm	17/35: 5,399 x 75	14,600	18	100LL, tiedowns

Source: AirNav, SkyVector

Corporate aircraft that operate at AKO include: Phenom 100 and 300, Falcon 900 and 2000, Citation CJ1-3, Cirrus SR 22, Piper Seminole, Piper Malibu, Pilatus PC-12, and Beech King Air 90, Bombardier Challenger 300 and 604, Bombardier Learjet 31-60, Citation Sovereign, Citation Excel, Cessna XLS, and Hawker 800. Runway 11/29 was designed and built to accommodate C-III aircraft, beyond the needs of B-II. As a valuable resource to the community and region, it is recommended that the Airport maintain airfield capabilities to accommodate C-III aircraft as an Ultimate objective. As such, the Airport Layout Plan (ALP) prepared for this study shows an Ultimate ARC of C-III in order to preserve critical airfield infrastructure (runway, associated safety and object free areas, taxiways, aprons, and others).

To preserve critical airfield infrastructure, an Ultimate ARC of C-III is recommended.

Further discussion for maintaining standards at AKO to C-III is discussed in **Chapter 4, Facility Requirements**, including the cost/benefit to maintaining C-III standards versus changes necessary to meet a lower ARC, the additional wind coverage the wider runway adds, and the benefits this size runway brings to the region.

4. FACILITY REQUIREMENTS

A key step in the Airport Master Plan (AMP) process is determining future requirements for airport facilities that allow for airside and landside development over a 20-year planning period. By comparing the existing conditions of an airport to its predicted growth, an AMP can define requirements for runways, taxiways, aprons, hangars, terminals, and other related airport facilities to accommodate growth over the short-, intermediate-, and long-term planning periods.

An essential step in the process of estimating future airport needs is the determination of an airport's current capability to accommodate anticipated demand. Demand capacity and other analyses aid in the identification of airport deficiencies, surpluses, and opportunities for future development. Ultimately, they yield information that is used to design the Airport Layout Plan (ALP) and set the stage for future facility development.

This chapter identifies facility requirements for Colorado Plains Regional Airport (AKO or the Airport) over the next 20 years. Existing and future facility requirements and development standards are identified based on the Town of Akron's current strategic development initiatives, and by comparing the Airport's existing facilities to future facility needs rooted in the forecasts of aviation demand presented in **Chapter 3, Forecasts of Aviation Activity**. The results of Chapter 4 serve as input for the next chapter, **Chapter 5, Alternatives**, which presents an examination of development alternatives to meet any current and projected deficiencies for the Airport. That analysis will result in identifying the best strategy to meet the needs of AKO, its users, and the community.

The Federal Aviation Administration (FAA) provides guidance for planning and design of airport facilities through Advisory Circulars (AC) that promote airport safety, economy, efficiency, and sustainability. Many of the facility requirements identified at AKO incorporate FAA planning and design standards presented in FAA AC 150/5300-13A, *Airport Design*, and AC 150/5060-5, *Airport Capacity and Delay.* Other FAA ACs used to develop this chapter are cited throughout the document.

4.1 Airfield Demand Capacity

Airfield Demand Capacity refers to the number of aircraft operations that a given facility can accommodate on an hourly or annual basis. The capacity of an airfield is primarily a function of the major aircraft operating on infrastructure elements that comprise an airfield (i.e., runways and taxiways), as well as the alignment and configuration of those elements. The capacity is also related to and considered in concurrence with wind coverage, airspace utilization, and the availability and type of navigational aids (NAVAIDs). Each of these components has been examined as part of the airfield demand capacity analysis.

Key terms relative to the discussion of capacity are:

- Demand: the magnitude of aircraft operations to be accommodated in a specified period of time, provided by the forecasts.

- Capacity: a measure of the maximum number of aircraft operations that can be accommodated on an airport.
- Annual Service Volume (ASV): a reasonable estimate of an airport's annual capacity (i.e., level of annual aircraft operations that will result in an average annual aircraft delay of approximately one to four minutes).
- Delay: the difference between the actual time it takes an aircraft to operate on the airfield and the time it would take the aircraft if it were operating without interference from other aircraft or other influences, usually expressed in minutes.

4.1.1 Airfield Capacity Assumptions

Several factors are known to influence airport capacity. Visual and Instrument Flight Rule (VFR and IFR) hourly capacities for AKO are based on the following assumptions:

- Runway-use Configuration: Runway Configuration Number 1, page 8 from Advisory Circular 150/5060-5.
- Arrivals and Departures are equal.
- Percentage of Touch and Go Operations: Touch and Go operations are generally attributed to flight education. AKO currently receives occasional flight training traffic.
- Taxiways: Types of taxiways affect the capacity at an airport. Taxiways parallel to and the same length as an associated runway provide the most efficient capacity levels. AKO currently has a partial parallel taxiway.
- Airspace Limitations: Because there are no air carrier or highly active general aviation (GA) airports in its proximity, AKO has few airspace limitations.
- Runway Instrumentation: AKO has three published non-precision approach procedures that allow access during inclement weather conditions.
- Mix Index: A mathematical expression used to represent the percentage of operations conducted by larger classes of aircraft (based on weight) using the Airport. Although AKO may accommodate some larger aircraft, (exceeding 12,500 pounds), the majority of aircraft using the airport (more than 80 percent) are less than 12,500 pounds. Therefore, the Mix Index is estimated to fall between zero percent and 20 percent based on existing fleet usage and will continue to be in this range in the future. This index range is used as a reference for determining the ASV.

4.1.2 Capacity and Delay - Annual Service Volume

Under optimal conditions, AKO would have an ASV of 230,000 operations. Per the FAA, the following guidelines should be used to determine when airport capacity improvements or demand management strategies should be enacted as demand reaches designated airfield capacity levels.

- 60 percent of ASV: Threshold at which planning for capacity improvements should begin.
- 80 percent of ASV: Threshold at which planning for improvements should be complete and construction should begin.

- 100 percent of ASV: The airport has reached the total number of annual operations (demand) that it can accommodate, and capacity-enhancing improvements should be made to avoid extensive delays.

Table 4-1 reflects the percentage of total airport capacity currently being used. According to FAA's standards, AKO should start planning for capacity improvements when airport operational levels reach 138,000 operations (60 percent of ASV), and should initiate construction of those improvements at 184,000 operations (80 percent of ASV). Based on the forecast of aviation demand for AKO, capacity enhancements are not required within the planning period. As shown in **Table 4-1**, AKO is not predicted to reach beyond 9.4 percent of the ASV.

TABLE 4-1: AIRFIELD CAPACITY AND DEMAND

	2016	2021	2026	2036
ASV	230,000	230,000	230,000	230,000
Demand - Aircraft Operations	17,080	18,130	19,244	21,682
Percent of Capacity	7.4%	7.9%	8.3%	9.4%

Source: FAA AC 150/5060-5, *Airport Capacity and Delay*; AKO AMP Chapter 3, Forecasts of Aviation Activity

4.2 Airfield Requirements

Airfield facilities generally include those that support the transition of aircraft from flight to the ground or the movement of aircraft from parking or storage areas to departure and flight. This section describes the airside requirements needed to accommodate current and projected activity at AKO throughout the planning period.

4.2.1 Airport Design Standards

The FAA defines a wide variety of airport dimensional design requirements in order to promote safety, efficiency, and consistency at airports across the country. These standards can change due to updates to the regulatory documents, changes to local airport operational patterns, or because of some other priority, so it is important that a master plan review all the critical design criteria to ensure compliance and identify areas of improvement. This section reviews the FAA design criteria for AKO based on its current and projected operational patterns throughout the planning period.

The improvements recommended in this section to maintain safety clearances on the airfield are shown in **Chapter 6** on the ALP prepared for this master plan.

Design Aircraft

The basis for the FAA airport design standards is the "design aircraft" or "critical design aircraft," defined as the largest aircraft or family of aircraft anticipated to utilize a given airport on a regular basis. The FAA defines "regular basis" as conducting at least 500 annual itinerant operations (takeoff or landing).

As discussed in **Chapter 3, Forecasts of Aviation Activity**, the critical design aircraft is the Citation Excel.

Based on the design aircraft, an appropriate Airport Reference Code (ARC) can be identified. The ARC is a coding system used to relate airport design criteria to the operational and physical characteristics of the types of aircraft intended to operate at that airport. Specifically, the ARC is an airport designation that signifies the airport's highest Runway Design Code (RDC), which itself consists of the following components:

- Aircraft Approach Category (AAC) depicted by a letter and based on aircraft approach speed (**Table 4-2**).
- Airplane Design Group (ADG) depicted by a Roman numeral and based on aircraft wing span and tail height (**Table 4-3**).
- Runway Visual Range (RVR) based on runway visibility minimums (**Table 4-4**).

Figure 4-1 displays examples of aircraft in each of the RDC categories.

TABLE 4-2: AIRCRAFT APPROACH CATEGORY

Approach Category	Approach Speed
A	< 91 knots
B	91 knots - < 121 knots
C	121 knots - < 141 knots
D	141 knots - < 166 knots
E	166 knots or more

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

TABLE 4-3: AIRPLANE DESIGN GROUP

Design Group	Wingspan	Tail Height
I	< 49 feet	< 20 feet
II	49 feet - < 79 feet	20 feet - < 30 feet
III	79 feet - < 118 feet	30 feet - < 45 feet
IV	118 feet - < 171 feet	45 feet - < 60 feet
V	171 feet - < 214 feet	60 feet - < 66 feet
VI	214 feet - < 262 feet	66 feet - < 80 feet

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

TABLE 4-4: RUNWAY VISUAL RANGE

RVR (feet)	Instrument Flight Visibility Category (statute mile)
5,000	**Not lower than 1 mile (AKO)**
4,000	Lower than 1 mile but not lower than ¾ mile
2,400	Lower than ¾ mile but not lower than ½ mile
1,600	Lower than ½ mile but not lower than ¼ mile
1,200	Lower than ¼ mile

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

FIGURE 4-1: RUNWAY DESIGN CODE (RDC)

Source: Jviation, FAA Aircraft Characteristics Database, 2018

Based on the above criteria, the ARC for AKO is B-II-5,000. Runway 11/29 was designed and built to accommodate C-III aircraft, beyond the needs of B-II. Additional discussion related to this is included in the following sections.

4.2.2 Runway Orientation

Runway orientation is the physical layout of the airfield system, including the number of runways, their orientation, and their locations relative to each other as well as to the landside facilities. Each runway configuration has a different capacity due to operational limitations and restrictions. For example, runways that converge or intersect have lower capacities than parallel runways because an aircraft on a converging runway must wait to land or take off until the aircraft on the second runway has cleared the path for aircraft arriving or departing from the other runway.

Climatological conditions specific to the location of an airport not only influence the layout of the airfield, but also affect the use of the runway system. Surface wind conditions have a direct impact on airport operations—runways not oriented to take the maximum advantage of prevailing winds will restrict the capacity of an airport to varying degrees. When landing and taking off, aircraft are able to operate properly on a runway as long as the wind component perpendicular to the direction of travel (defined as a crosswind) is not excessive (generally, this is specific to the operational requirements and capabilities of individual aircraft).

Surface wind conditions (i.e., direction and speed) generally determine the desired alignment and configuration of the runway system. Wind conditions affect all airplanes in varying degrees; however, the ability to land and take off in crosswind conditions varies according to pilot proficiency and aircraft type. It can be generally stated that the smaller the aircraft, the more susceptible it is to the effects of crosswinds. To determine wind coverage at AKO, wind data from observations taken at the Airport from 2005 to 2015 obtained from the National Climatic Data Center was utilized to construct VFR, IFR, and all-weather wind roses. The optimum runway orientation is one that will provide AKO at least 95 percent level of wind coverage at any given crosswind component.

TABLE 4-5: WIND COVERAGE ANALYSIS FOR RUNWAY 11/29

	10.5 knots	13 knots	16 knots	20 knots
All Weather	76.83%	86.05%	94.23%	98.3%
IFR	73.48%	81.88%	90.52%	96.87%
VFR	79.41%	88.23%	95.71%	98.83%

Source: FAA AGIS Wind File Generator, National Climatic Data Center, and Wind Analysis
Notes: 10.5 knots: ARC A-I and B-I aircraft; 13 knots: ARC A-II and B-II aircraft; 16 knots: ARC A-III through D-III aircraft; 20 knots: ARC A-IV through E-VI.

As shown in **Table 4-5**, AKO's wind coverage does not meet the FAA's recommendation of 95 percent for the aircraft categories of 10.5, 13, and 16 knots. Since the Airport ARC (B-II) falls outside aircraft designated for the 16-knot category, coverage for that category is not recommended. However, 95 percent coverage for 10.5- and 13-knot category aircraft is recommended. In addition, the Airport Manager noted that wind conditions do limit aircraft operations. Often times, the wind speed and crosswind component are too great for aircraft to land. Because of this, additional analysis has been completed to observe if the wind coverage would be adequate with the addition of a second runway.

Table 4-6 displays wind coverage percentages if an additional runway with an orientation of 01/19 was constructed. This orientation was introduced in AKO's 2005 master plan as an Ultimate recommendation. Analysis shows that, in almost all crosswind situations, two runways (11/29 and 01/19) combined provide adequate wind coverage.

TABLE 4-6: WIND COVERAGE ANALYSIS (ULTIMATE RUNWAY LAYOUT)

	10.5 knots	13 knots	16 knots	20 knots
All Weather	95.12%	98.49%	99.53%	99.9%
IFR	94.31%	97.73%	99.16%	99.79%
VFR	95.66%	98.81%	99.67%	99.93%

Source: FAA AGIS Wind File Generator, National Climatic Data Center, and Wind Analysis

The current width of the runway is an important consideration in wind coverage analysis. At 100 feet wide, Runway 11/29 exceeds the minimum width requirements for most small aircraft operating at AKO. This supplementary width may be viewed as an allowance for additional wind coverage because it affords smaller aircraft excess pavement to account for greater crosswinds.

4.2.3 Runway Length

The purpose of this section is to determine if the lengths of the existing runways are adequate to accommodate the aircraft fleet currently operating and projected to operate at AKO. Because this length is dependent on multiple factors (such as those listed in **Table 4-7**), specific runway length requirements are individually generated for each flight originating at AKO. This runway length analysis was conducted in accordance with FAA AC 150/5325-4B, *Runway Length Requirements for Airport Design,* to normalize those factors and ensure that the existing and future runway lengths are suitable for the forecasted critical design aircraft. FAA's methodology establishes minimum runway length requirements based primarily upon several factors, including airport elevation, average temperature, and type aircraft expected to use the runway on a regular basis.

TABLE 4-7: FACTORS AFFECTING RUNWAY LENGTH

Environmental	Airfield	Aircraft
Temperature	Runway Gradient	Length of Flight
Terrain	Airfield Elevation	Aircraft Design
Surrounding Obstructions	Runway Surface (wet/dry)	Performance Characteristics
Noise Abatement Procedures		Engine Type

Source: Jviation

TABLE 4-8: RECOMMENDED RUNWAY LENGTH

Category	Runway Data
Airport Elevation	4,715 feet
Mean Daily Maximum Temperature of the Hottest Month	88°F
Small Airplanes with Approach Speeds <30 Knots	142 feet
Small Airplanes with Approach Speeds >30 knots, <50 Knots	377 feet
Small Airplanes with <10 Passenger Seats	
– 95% of these Small Airplanes	6,000 feet
– 100% of these Small Airplanes	6,100 feet
Large airplanes weighing less than or equal to 60,000 pounds	
— 75% of these Large Airplanes at 60% Useful Load	6,300 feet
— 75% of these Large Airplanes at 90% Useful Load	8,600 feet
— 100% of these Large Airplanes at 60% Useful Load	9,000 feet
— 100% of these Large Airplanes at 90% Useful Load	>10,200 feet
Airplanes of more than 60,000 pounds	See Manufacturer Data

Source: FAA AC 150/5325- 4B, *Runway Length Requirements for Airports*

At 7,001 feet, Runway 11/29 can accommodate most users without aircraft weight limitations. However, based on the data in **Table 4-8**, a longer runway would allow larger aircraft weighing less than 60,000 pounds to take off with greater payloads. Given the current and anticipated level of activity of larger aircraft at AKO, and the Runway's ability to accommodate them, it is recommended that Runway 11/29 be maintained at 7,001 feet. Based on the need to meet wind coverage and the runway length analysis, a crosswind runway should be at least 6,000 feet in length to accommodate the majority of general aviation aircraft that are most susceptible to crosswinds.

4.2.4 Runway Width

The required width of a runway is a function of the runway design code (RDC) and the instrument approaches available for that runway. AKO exceeds the 75-foot minimum width requirement for a B-II runway.

As mentioned earlier in this and the previous chapter, it is recommended that the Ultimate ARC for AKO be designated as C-III to preserve and maintain Runway 11/29 at its current width of 100 feet. Additional discussion is in **Section 4.2.6**.

4.2.5 Pavement Strength

Airfields are constructed to provide adequate pavement strength for aircraft loads, as well as resisting the abrasive action of traffic and deterioration from adverse weather conditions and other influences. They are designed not only to withstand the loads of the heaviest aircraft expected to use the airport, but they must also be able to withstand the repetitive loadings of the entire range of aircraft expected to use the pavement over many years. Proper pavement strength design represents the most economical solution for long-term aviation needs.

There are several factors that must be considered when determining appropriate pavement strength for airfield structures. These factors include, but are not limited to, aircraft loads, frequency and concentration of operations, and the condition of subgrade soils. Runway pavement strength is typically expressed by common aircraft landing gear configurations. The aircraft gear type and configuration dictate how aircraft weight is distributed to the pavement and determines pavement response to loading. Example aircraft for each type of gear configuration are as follows:

- Single-wheel: Each landing gear unit has a single tire; for example, light aircraft and some business jet aircraft.
- Dual-wheel: Each landing gear unit has two tires; for example, the Boeing 737, Boeing 727, MD-80, CRJ-200, and the Dash 8.
- Two single wheels: Two single wheels in tandem; for example, the C130.
- Dual-tandem: Main landing gear unit has four tires arranged in the shape of a square; for example, the Boeing 757 and KC135.

While aircraft operating on a runway generally can exceed the defined pavement strength, such operations will ultimately degrade the pavement prematurely and create wear issues that require more aggressive pavement maintenance. The published pavement strength of Runway 11/29 is 65,000 pounds for single-wheel, 85,000 pounds for dual-wheel, and 125,000 for dual-tandem. AKO's runway pavement strengths are adequate to accommodate existing and forecasted activity.

Ongoing pavement maintenance is crucial for continued pavement strength; recommended pavement maintenance projects are specified in the capital projects list located in **Chapter 7, Financial Implementation Plan**.

4.2.6 ARC and Runway Width Considerations and Recommendations

Runway 11/29 has unique characteristics that set it apart from runways at other airports. Its current width is 100 feet, which exceeds its 75-foot width requirement. As discussed previously, Runway 11/29 has been identified as having an ARC of B-II with an approach category of at least one mile of visibility. Additional factors justifying a width of 100 feet must be considered.

1. There remains a common perception in the aviation industry that jet aircraft require runways at least 100 feet wide. While this perception is not as prevalent as the 5,000-foot-runway-length "standard," it is still factored by the aircraft insurance industry when underwriting policies. Essentially, a jet aircraft that operates regularly on a runway less than 100 feet wide is likely to be subject to a higher level of scrutiny that could result in higher insurance rates.
2. AKO has the only 100-foot-wide runway that exceeds 5,000 feet in length in the region. The closest airports having similar capabilities are much larger airports located near the Denver metroplex serving commercial airlines and corporate operators. These airports are approximately a two-hour drive from Akron and do not provide reasonable access. Growth opportunities within the region may be reliant on the close proximity of an airport capable of handling larger aircraft. Additionally, AKO's runway dimensions and location outside the Denver metroplex provide pilots with alternate facilities when a diversion is necessary.
3. During flight operations, runway width is an important consideration in inclement and/or windy conditions. Specifically, during takeoff and landing operations when an aircraft is most vulnerable, strong and variable winds (including quartering headwinds, variable crosswinds and gusts, etc.) can easily blow a pilot off runway centerline. A wider runway provides a pilot with enhanced flexibility to safely and appropriately respond to that common circumstance. This is most critical at a single-runway airport like AKO, where pilots have limited runway options. As stated earlier, a crosswind runway at AKO would provide additional wind coverage necessary to meet FAA recommendations. Until the crosswind runway is constructed, however, the wider runway width helps compensate for the lack of wind coverage. FAA AC 150/5300-13A allows consideration of increasing operational tolerance to crosswinds by upgrading the airport layout to the next higher RDC.
4. To meet B-II design standards, the runway width would have to be narrowed from 100 feet to 75 feet. The steps to achieve that width and maintain design standards would require the demolition and removal of runway pavement, removal and relocation of runway lights, proper grading and shoulder strengthening, and other projects. It is viewed that narrowing the Runway to 75 feet may likely be more expensive than maintaining the

current width. When further considering the benefits the wider runway provides, narrowing the Runway to achieve a lower standard is counterproductive.

When reviewing these individual factors in total, it is reasonable to conclude that maintaining the Runway at its current width of 100 feet provides added accessibility and safety to AKO users while representing responsible use of an asset. Therefore, it is recommended that the ultimate ARC for AKO be designated as C-III to preserve Runway 11/29 at its current width and length, and to make AKO eligible for C-III federal funding. If the Runway is not maintained (i.e. fog seal, crack seal, and rehabilitated when necessary) as a C-III runway, when considering pavement maintenance as a federally eligible project, the Town of Akron may not be capable of funding maintenance beyond the B-II level. In that event, pavement the FAA would not be willing to assist in maintaining may potentially deteriorate at a much faster pace.

4.2.7 Taxiways

Like runway design, taxiway design standards are based on a combination of the ADG and the Taxiway Design Group (TDG) criteria defined in FAA AC 150/5300-13A. The TDG is centered on the ratio of the overall Main Gear Width (MGW) and the Cockpit to Main Gear (CMG) distance of the critical design aircraft. As mentioned previously, the current and forecasted design aircraft for AKO is the Citation Excel; therefore, TDG 2 is designated for AKO.

A taxiway system should be designed to facilitate safe and efficient aircraft movement to and from the runways and aprons that serve terminal buildings, hangars, and general aviation facilities. It is generally recommended that an airport's primary runway be served by a full-length parallel taxiway to allow aircraft to enter or exit the runway environment as expeditiously as possible.

FAA's taxiway design requirements are intended to enhance the overall safety of taxiway operations and minimize opportunities for runway incursions. Many of these requirements are relatively new (circa 2012) and were not in effect during the previous master planning efforts. The design principles for taxiway system layouts are listed in **Table 4-9.**

TABLE 4-9: TAXIWAY DESIGN PRINCIPLES

Design Principle	Summarized Definition
Steering Angle	Design taxiways such that the nose gear steering angles is < 50 degrees
Fillet Design	– Traditional fillet design standards have been replaced – New fillet design more effectively reflects aircraft wheel tracks
Standardize Intersection Angles	– 90-degree turns – 30-, 45-, 60-, 90-, 120-, 135-, and 150-degree preferred intersection standard angles
Safety and Object Free Areas	Areas along the edges of taxiways to protect aircraft and property
Concepts to Minimize Runway Incursions	
Increase Pilot Situational Awareness	– Utilize the "three-node concept" – Pilot should have three or fewer choices at an intersection (left, right, straight ahead)

Design Principle	Summarized Definition
Avoid Wide Expanses of Pavement	Wide pavement requires placing signs far from a pilot's eye
Limit Runway Crossings	Reduces the opportunity for human error
Avoid "High Energy" Intersections	– Located in the middle third of the runways – Limit the runway crossings to the outer thirds of the runway
Increase Visibility	– Provide right angle intersections for best pilot visibility – Acute angle runway exits should not be used as runway entrance or runway crossing
Avoid "Dual Purpose" Pavements	Runways used as taxiways and taxiways used as runways can lead to confusion
Indirect Access	Eliminate taxiways leading directly from an apron to a runway
Hot Spots	Limit the number of taxiways intersecting in one spot

Source: FAA

AKO has one 35-foot-wide partial parallel taxiway and two connector taxiways. Based on taxiway design standards, the following recommendations are proposed:

- Lengthen the partial parallel taxiway to 7,001 feet and 35-feet-wide.
- Replace taxiway reflectors with taxiway lighting.
- Realign the taxiway leading directly from the runway to the apron or place markings on apron pavement to effectively require a pilot to make a turn before accessing the runway.
- Any additional paved runways should have a full-length, lighted taxiway.

4.2.8 Navigational Aids

Navigational aids (NAVAIDs) consist of equipment to aid pilots in locating an airport (particularly airports without air traffic control assistance), to provide horizontal guidance information for a non-precision approach, and to provide horizontal and vertical guidance information for a precision instrument approach. Approach minimums for such procedures are based on several factors, including aircraft characteristics, obstacles, navigation equipment, approach lighting, and weather reporting equipment. The condition of AKO's NAVAIDs and visual aids is shown in **Table 4-10**.

TABLE 4-10: AKO'S NAVAIDS AND VISUAL AIDS

NAVAIDs and Visual Aids	Condition	Comments
Rotating Beacon	Good	
ASOS	Good	Would have to be relocated to allow for development in the terminal area.
VOR/DME	Good	
PAPI	Good	Runway 11 PAPI was replaced in 2017. Replacement of Runway 29 PAPI is pending (as of 2018).

Source: www.airnav.com/airport/KAKO, Jviation
Notes: PAPI = Precision Approach Path Indicator; ASOS = Automated Surface Observing System; VOR/DME = Very High Frequency Omnidirectional Range/Distance Measuring Equipment

AKO has three published instrument approach procedures designed to provide pilots with varying degrees of navigational guidance to the Airport during inclement weather. All of the procedures are defined as non-precision; that is, none of them provide vertical guidance that is accepted and defined by the FAA as precise. The existing instrument procedures and their respective minimums (descent altitude/visibility) are shown in **Table 4-11**. Based on feedback and input from airport management and users, it is recommended that AKO establish, at a minimum, approach procedures with ¾-mile visibility to increase the utility of the Airport during meteorological conditions. To achieve lower approach visibility minima, it is recommended that the runway ends served by these approaches have simplified approach lighting systems.

TABLE 4-11: INSTRUMENT PROCEDURES

Instrument Approach	Lowest Minimums
RNAV (GPS) Runway 11	– 250 feet AGL – 1 mile visibility
RNAV (GPS) Runway 29	– 250 feet AGL – 1 mile visibility
VOR Runway 29	– 439 feet AGL – 1 mile visibility

Source: www.airnav.com/airport/KAKO
Notes: RNAV = Area Navigation; AGL = above ground level

4.2.9 Dimensional Standards

Safe and efficient operations at an airport require that certain areas on or near the airport be clear of objects or restricted from a certain function, composition, and/or height. The key standards shown in **Table 4-12** provide guidance for existing and future development at AKO for a safe operating environment for aircraft. The dimensions of these areas are based on the ARC B-II-5,000 (current) and C-III-4,000 (ultimate) at given approach visibility minimums.

TABLE 4-12: RUNWAY/TAXIWAY PROTECTION AREA STANDARDS

B-II 5,000 Standards	C-III 4,000 Standards
Runway Centerline to Taxiway Centerline Separation	
240 ft.	400 ft.
Runway Safety Area	
Length beyond departure end: 300 ft. Length prior to threshold: 300 ft. Width: 150 ft.	Length beyond departure end: 1,000 ft. Length prior to threshold: 600 ft. Width: 500 ft.
Taxiway Safety Area (Width)	
79 ft.	118 ft.
Runway Object Free Area	
Length beyond runway end: 300 ft. Length prior to threshold: 300 ft. Width: 500 ft.	Length beyond runway end: 1,000 ft. Length prior to threshold: 600 ft. Width: 800 ft.
Object Free Zone (Width)	
250 ft.	400 ft.

B-II 5,000 Standards	C-III 4,000 Standards
Approach Runway Protection Zone	
Length: 1,000 ft. Inner Width: 500 ft. Outer Width: 700 ft. Acres: 13.77	Length: 1,700 ft. Inner Width: 1,000 ft. Outer Width: 1,510 ft. Acres: 48.98
Departure Runway Protection Zone	
Length: 1,000 ft. Inner Width: 500 ft. Outer Width: 700 ft. Acres: 13.77	Length: 1,700 ft. Inner Width: 500 ft. Outer Width: 1,010 ft. Acres: 29.47

Source: FAA AC 150/5300-13A, *Airport Design,* Tables 4-1, A7-4, and A7-9

Runway Safety Area

The Runway Safety Area (RSA) enhances the safety of aircraft by providing an area around the runway that is prepared or suitable for reducing the risk of damage to an aircraft that undershoots, overruns, or veers off the runway. The RSA also provides greater accessibility for firefighting and rescue equipment during such incidents. The RSA should generally be free of objects, except for objects that need to be located in the RSA because of their function. Objects higher than three inches above grade should be constructed of low-impact resistant supports (frangible mounted structures) of the lowest practical height with the frangible point no higher than three inches above grade.

The RSA should be cleared and graded and have no potential hazardous ruts, humps, depressions, or other surface variations. It should also be drained by grading or storm sewers to prevent water accumulation. The RSA should also be capable, under dry conditions, of supporting an aircraft that veers off the runway, snow removal equipment and aircraft rescue and firefighting equipment. The area is located symmetrically about the runway; extending outward from the runway centerline (equal distance) and a specific distance beyond the runway ends that depends on the approach speed and wingspan of the critical aircraft family as well as the approach visibility minimums established or planned for the runway.

The last ALP shows the runway threshold relocated to limit noise impacts on the town of Akron. It is recommended the relocation of the runway threshold still be shown as an ultimate objective to meet RSA dimensions associated with a C-III designation and continue to address local community noise concerns.

Taxiway Safety Area

The Taxiway Safety Area (TSA) is centered on the taxiway centerline and similar to the RSA, is the surface alongside the taxiway prepared or suitable for reducing the risk of damage to an aircraft that has deviated from the taxiway. It is recommended that as taxiways are extended at AKO, they meet the TSA dimensional standards set forth in FAA AC 150/5300-13A.

Object Free Area

The Object Free Area (OFA) is a two-dimensional area centered on the runway, taxiway, and taxilane centerlines. The OFA is an area clear of objects that could disrupt the flow of aircraft, except for frangible visual NAVAIDs that need to be in the OFZ because of their function. Except where precluded by other clearing standards, it is acceptable to place objects that need to be in the OFA for air navigation or aircraft ground maneuvering purposes and to taxi and hold aircraft in the OFA. Objects that are non-essential for air navigation or aircraft ground maneuvering purposes are not to be placed in the OFA (this includes parked airplanes and agricultural operations). Dimensional standards for the Runway OFA are shown in **Table 4-12**.

Obstacle Free Zone

The Obstacle Free Zone (OFZ) is a three-dimensional volume of airspace that supports the transition of ground-to-airborne operations or vice versa. The OFZ clearing standards preclude taxiing and parked airplanes and object penetrations, except frangible visual NAVAIDs that need to be in the OFZ because of their function.

Because AKO does not have an approach lighting system, the only applicable area for the OFZ is around the runway centerline. FAA AC 150/5300-13A states, "The OFZ is the airspace below 150 feet above the established airport elevation and along the runway and extended runway centerline that is required to be clear of all objects, except for frangible visual NAVAIDs that need to be in the OFZ because of their function, in order to provide clearance protection for aircraft landing or taking off from the runway, and for missed approaches." In addition, the OFZ extends 200 feet beyond each end of the runway and is 250 feet wide for operations on runways by small aircraft with approach speeds of 50 knots or more. The width of the OFZ widens to 400 feet when large aircraft begin operating at the Airport. Additional OFZ standards apply when approach lighting systems are installed.

Runway Protection Zones

The Runway Protection Zone (RPZ) is designed to provide additional protection for people and property on the ground. This protection is provided through airport owner control of RPZs, preferably through the acquisition of sufficient property interest in the RPZ, and includes clearing RPZ areas of incompatible objects and activities. The RPZ represents the approach surface from the ground, is trapezoidal in shape, and is centered on the extended runway centerline. Its size depends on the approach speed and wingspan of the critical aircraft family as well as the approach visibility minimums established or planned for the runway. The RPZ consists of two components: the central portion and the controlled activity area. The central portion of the RPZ extends from the beginning to the end of the RPZ and is centered on the runway centerline; its width is equal to the runway OFA. The controlled activity area of the RPZ is the remaining area on either side of the central portion of the RPZ.

Runway 29's approach RPZ is currently over Highway 63. FAA AC 5300-13A states, "It is desirable to clear the entire RPZ of all above-ground objects. Where this is impractical, airport owners, as a minimum, should maintain the RPZ clear of all facilities supporting incompatible activities." Per FAA Memorandum, *Interim*

Guidance on Land Uses within the RPZ (dated 9/27/2012), public roads and highways are "incompatible" and must be addressed when runway enhancements effect a change in the approach minimums and/or RPZ. Therefore, if/when the C-III designation and reduced approach visibility minimums changes occur, it is recommended that AKO relocate the runway threshold to comply with RPZ standards. This recommendation is illustrated on the ALP as an ultimate objective.

4.2.10 Airspace Requirements

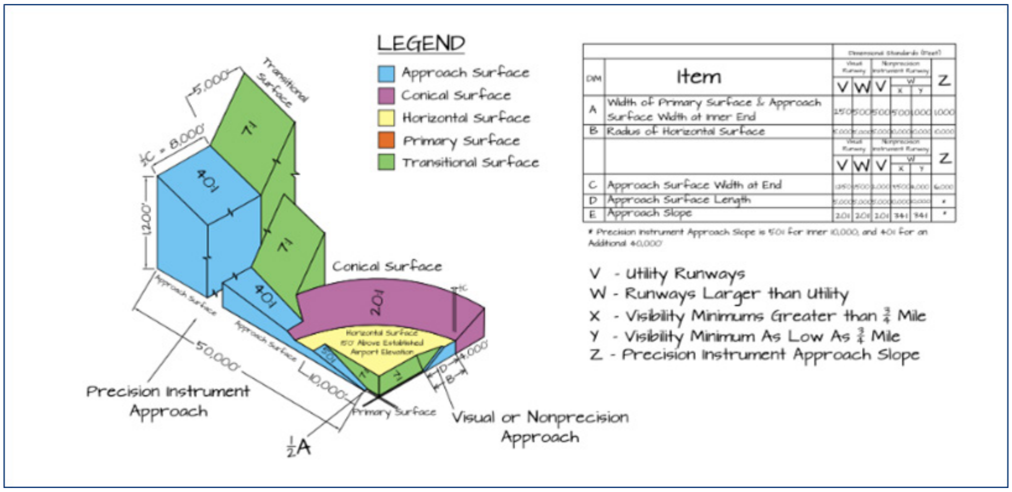
In addition to the primary airport infrastructure on the ground, FAA also requires airports to consider the surrounding airspace infrastructure. FAA standards apply to the use of navigable airspace through the definition of imaginary airspace surfaces, which are geometric shapes with size and dimensions based on the category of each runway for existing and planned airport operations, the types of instrument approaches, and their enabling regulatory document. The FAA grant assurances signed by AKO require that the imaginary surfaces be cleared of all obstructions, to the extent feasible.

Any changes to the airfield must be reviewed by the FAA to ensure there is appropriate obstacle clearance to maintain safe airport operations. Prior to any airport development, AKO or the Town must request that the FAA conduct an airspace evaluation to determine the potential impact a project may have on airport safety, regardless of scale; the airspace evaluation includes determining the impact on an airport's imaginary airspace surfaces. For the purposes of the AMP, three primary regulatory documents (and their associated airspace surfaces) were considered:

1. Title 14, Code of Federal Regulations (CFR) Part 77, *Safe, Efficient Use, and Preservation of the Navigable Airspace*, defines five imaginary surfaces, shown in **Title 14,** Code of Federal Regulations, including the Primary, Approach, Horizontal, Conical, and Transitional surfaces. Any object that penetrates these surfaces is considered to be an obstruction and may affect navigable airspace. Unless these obstructions undergo additional aeronautical study to conclude they are not a hazard, obstructions are presumed to be a hazard to air navigation.[1] Hazards to air navigation may include terrain, trees, permanent or temporary construction equipment, or permanent or temporary manufactured structures (such as power lines) penetrating one of the Part 77 surfaces.

[1] Title 14, Code of Federal Regulations Part 77, *Safe, Efficient Use, and Preservation of the Navigable Airspace*

FIGURE 4-2: TITLE 14 CFR PART 77 SURFACES



Source: FAA

2. FAA AC 150/5300-13A, *Airport Design*, defines approach airspace surfaces that are separate from 14 CFR Part 77, and are designed to protect the use of the runway in both visual and instrument meteorological conditions near the airport. These approach surfaces are defined by each runway's current approach type (i.e., visual, non-precision instrument, etc.), and typically are trapezoidal in shape, extending away from the runway along the centerline and at a specific slope. To establish the location of a runway threshold, the associated approach surface must be clear of all obstructions. If it is not clear, either the obstructions must be removed, or the runway threshold must be relocated until its associated approach surface is clear.
3. FAA Order 8260.3B, *U.S. Standard for Terminal Instrument Procedures (TERPS)* generally defines a wide variety of airspace surfaces that are designed to establish and maintain safe operational conditions around an airport for aircraft using instrument approaches. Obstructions to a TERPS surface can result in impacts to the instrument approach that could include a raising of minimums, making the approach unavailable in certain conditions, or decommissioning the instrument approach altogether

An aeronautical survey and obstruction analysis was performed on these surfaces at AKO. The ALP includes airspace and inner approach drawings that document the location and height of possible obstructions and their disposition. Further, data collected from the aeronautical survey will be uploaded to the FAA's Airport GIS system.

4.3 Landside Requirements

This section describes the landside requirements needed to accommodate AKO's general aviation and commercial activity throughout the planning period. Areas of focus include the terminal building, hangars, aprons and tie-down areas, automobile parking, as well as the various associated support facilities.

4.3.1 Airport Access

AKO is located along Highway 63, one mile north of the intersection of Highway 63 and Highway 34, providing convenient access for anyone driving to AKO. There are no recommendations to change the airport access as it accommodates all current and projected needs. Access to newly developed areas is shown on the ALP.

4.3.2 Terminal/Administration Building

Conveniently located along Highway 63, AKO's terminal is currently occupied by the fixed-base operator (FBO), Hayes Aviation. The terminal building includes offices, a pilot's lounge/planning area, waiting area, restrooms, vending machines with an eating area, and access to the Internet and weather services.

The terminal building was originally constructed in 1946 as two T-hangars. In 1951, this structure was renovated to be a gas station and repair shop. The building was last remodeled to serve as the terminal/administration building. The building is beyond its useful life and requires frequent, ongoing maintenance. Additionally, there appears to be movement and slippage where the building and the adjacent aircraft apron pavement meet, bringing into question their integrity and safety. It is recommended that AKO construct a new terminal within the next five to ten years.

Most terminal buildings at airports like AKO are between 1,500 and 2,500 square feet and include space for passenger waiting, flight planning, restrooms, concessions, small office, and a sales counter area. The new terminal should include space for these and any other AKO- or FBO-specific requirements. Some terminal buildings include space for a restaurant with a view to the airfield, or limited restaurant choices. Upon design of a new terminal building, the Town of Akron should consider if this would be an attractant and a potential revenue-enhancing opportunity.

4.3.3 Hangars

Hangars are used to store aircraft, provide protection from adverse weather conditions, and supply additional security. Hangars are also used for temporary storage while an aircraft is undergoing maintenance and/or repairs. The demand for hangar storage is generally a function of the number and type of based aircraft. All the hangars at AKO are utilized for private aircraft storage and maintenance.

The forecast for AKO shows growth from 13 to 17 based aircraft over the planning period. The results from the hangar storage analysis are shown in **Table 4-13.**

TABLE 4-13: HANGAR STORAGE REQUIREMENTS

	Current	2021	2026	2036
Required Hangar Spaces [1]	13	14	15	17
Total Square Feet of Hangar Space [2]	32,500	35,000	37,500	42,500
Existing Hangar Square Footage Available	34,500	34,500	34,500	34,500
Hangar Space Requirement Surplus or (Deficit)	2,000	(500)	(3,000)	(8,000)

Notes: [1] Assumed 100% of based aircraft would be stored in hangars.
[2] Assumed an average of 2,5000 square feet to accommodate most general aviation aircraft and other maintenance-related functions.

AKO Terminal Area

As evidenced in aerial photos of the Airport, the hangars were not built in an organized layout. Further, many of the hangars have uses besides aircraft storage, such as aircraft maintenance, equipment, and repair facilities. Generally, a larger amount of space is needed to accommodate these types of uses and was accounted for in the analysis. As demand warrants, future hangar construction will be carried out to best accommodate airport growth. Part of the goal of the master plan is to lay out the ideal position and access for hangar facilities to make the best use of available land while meeting the needs of AKO users. Alternative options and a recommended layout to meet requirements shown above are provided in the next chapter.

4.3.4 Apron and Tiedown Areas

AKO's 80,000-square-foot concrete apron has 17 "T" parking spots painted to accommodate multiple power-in, power-out parking areas. This ramp was constructed in 1993 and is in poor condition in several areas. As pavement deteriorates, pieces come apart and create hazards for vehicles and aircraft. CDOT Aeronautics uses a pavement condition index (PCI) of 1 to 100 to determine when pavement should be updated, with 100 being excellent condition. CDOT recommends pavement be replaced when it is 54 or below. AKO'S apron currently has a PCI of 43; it is recommended the apron be replaced within the next five to ten years.

Based on planning criteria and interviews with airport management, the current size of the apron space (80,000 square feet) is adequate to accommodate existing and future demand. A key component in the determination of the overall amount of apron space is a function of the location of facilities and proximity to the runway/taxiway system. An apron area that best suits the future location of the terminal building, provides ample tiedown/parking space, and accesses existing and future hangars is presented in **Chapter 5, Alternatives**.

4.3.5 Automobile Parking

Parking for airport visitors is on the east side of the terminal building and west of Highway 63. The parking lot accommodates approximately 13 cars.

Automobile parking is typically provided for based aircraft owners, Airport employees, and visitors. Utilizing typical planning rules of thumb for airports like AKO, an analysis was completed to determine the required number of auto parking spaces and square yardage (see **Table 4-14**). This analysis does not include space for the movement of vehicles within the parking area. It is recommended that parking for automobiles be increased when a new terminal building is constructed.

TABLE 4-14: AUTO PARKING REQUIREMENTS

	Current	2021	2026	2036
Required Parking Spaces [1]	20	21	23	26
Total Square Yards of Parking Space	560 sy	588 sy	644 sy	728 sy
Existing Parking Square Yardage Available	560 sy	560 sy	560 sy	560 sy
Parking Space Requirement Surplus or (Deficit)	- sy	(28) sy	(84) sy	(168) sy

Notes: [1] Assumes one auto parking space per based aircraft plus 50% for visitors/employees.

4.3.6 Utilities

Electrical power for AKO is provided by Y-W Electric Association, Inc. Gas services are provided by Kinder Morgan Energy Gas Company and telephone services are provided by CenturyLink Telecommunications Company. If development occurs along the north side of the airfield, additional capacity for each utility may be added from existing services. Any additional facilities added to the west or south sides of the airfield would likely require extensive infrastructure improvements.

4.4 Airport Support Facilities

Current conditions at the Airport and potential future developments may impact aviation-support facilities. Potential requirements necessary to meet deficiencies or address future needs for facilities that support the Airport's infrastructure and basic services are detailed below.

4.4.1 Fuel Storage Facilities

As a major revenue source for the Airport, aviation fuel sales have significant financial impact for AKO in addition to benefiting its users. Fuel storage requirements are typically based on maintaining a two- or three-week supply of fuel during an average month. The availability for more frequent deliveries can reduce the fuel storage capacity requirement, however deliveries add to the cost of fuel. Storage beyond a four-week period is not recommended as the quality of the fuel could degrade.

The main fuel storage area is parallel to the taxiway and northwest of the apron area. The Airport has a 100-LL self-serve fuel pump and two fuel trucks (100LL and Jet A) supplied by two 10,000-gallon tanks. In total, AKO has a capacity of 11,600 gallons of 100LL and 13,000 gallons of Jet A, enough storage for current and projected activity.

4.4.2 Airport Security

Airport security is essential to the safe operation of any airport. Because AKO is not a commercial service airport, there are no mandated security regulations. The Transportation Security Administration (TSA) and Aircraft Operator's and Pilot's Association (AOPA) have published guidelines for general aviation airports. TSA's document "Security Guidelines for General Aviation Airports" states:

> "The purpose of the Security Guidelines for General Aviation Airports Information Publication (IP) is to provide owners, operators, sponsors, and other entities charged with oversight of GA airports a set of federally endorsed security enhancements and a method for determining when and where these enhancements may be appropriate. The document does not contain regulatory language nor is it intended to suggest that any recommendations or guidelines should be considered a mandatory requirement."

AOPA's Airport Watch and General Aviation Hotline are two other programs that are highly utilized throughout the industry. The consensus throughout the general aviation airport community is that general aviation airports should have perimeter fencing for security and to reduce wildlife occurrences on the airfield, and that controlled-access gates be installed at key access points and monitored by Airport/security staff. AKO currently has controlled-access gates, but limited fencing. It is recommended that AKO construct a security/wildlife fence surrounding the entire airport property, and continue to monitor airport access through existing and future controlled-access gates.

4.4.3 Airfield Maintenance Facilities

The two largest categories of airfield maintenance are generally snow removal and mowing. At AKO, these tasks are performed by the Town of Akron. Subsequently, there are no on-airfield storage buildings for plows or mowers. If the Airport purchases maintenance equipment, storage facilities would need to be built to ensure its safety and longevity. Based on the Airport's acreage (approximately 640 acres) it is recommended that a maintenance equipment storage building from 3,000 to 4,000 square feet be added to the ALP, if/when the facility is deemed necessary.

4.4.4 Aircraft Rescue and Firefighting

AKO does not currently accommodate air carrier aircraft, nor does it hold a Part 139 certificate; subsequently, it is not required to have Aircraft Rescue and Firefighting (ARFF) available. However, emergency response services are provided from the Town of Akron Fire Department, located one mile from AKO. This emergency response service is adequate for the 20-year planning range.

4.5 Facility Requirements Summary

Various improvements at AKO will be needed over the 20-year planning period. **Table 4-15** summarizes the airside, landside, and support facility development needs identified in this chapter, along with a brief justification for each improvement. The facilities listed in the table will undergo further review and evaluation in later chapters to determine the feasibility of the requirements. Development alternatives are reviewed and a recommended concept is presented in **Chapter 5, Alternatives**, and illustrated on the ALP in **Chapter 6**.

TABLE 4-15: FACILITY RECOMMENDATIONS

Facility	Future Requirement	Justification
Terminal Construction	Construct a new terminal building and associate access and parking.	Create a safer, more updated space for the public.
Apron Reconstruction	Pave a new apron to accommodate existing and future aircraft.	Increase safety and reduce foreign object debris (FOD).
Hangar Development	T-hangar and box hangar development.	As demand warrants.
Runway Development	Relocate Runway 11/29 threshold while maintaining width. Consider constructing crosswind runway to meet FAA wind coverage recommendations if land and funding available.	Maintain width and ARC C-III as a regional resource and benefit to airport users. Crosswind runway to meet wind coverage if possible beyond long-term planning range.
Approach Capabilities	Lower instrument approach visibility minimums to ¾-mile.	Address needs of existing users and attract others during adverse weather conditions.

Facility	Future Requirement	Justification
Taxiway Improvements	Extend taxiway the full length of the runway and other enhancements.	Increase safety and airfield efficiency. Meet design standards.
Maintenance Equipment Storage	Storage building for airfield maintenance equipment.	Needed if airfield maintenance responsibilities were to shift to AKO.
Airfield Perimeter Fencing	Supplement existing fencing near terminal building to encompass entire airport property.	Security and wildlife management.
In-fill Development	Hangar and non-aeronautical development within vacant spaces.	Development where practical.

Source: Jviation

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5. ALTERNATIVES

This chapter present various options and provide recommendations for future development at the Colorado Plains Regional Airport (AKO or the Airport) over the next 20 years. It examines multiple development concepts and employs evaluation criteria to select a preferred development scenario to meet the identified facility requirements. The overall objective of this analysis is to identify a set of feasible development options that enables the Airport to meet projected levels of aviation demand. Each alternative is evaluated to provide recommended improvements that meet demand and provide for future flexibility. Additionally, this chapter describes various factors and influences that form the basis for the Airport's long-term development program.

5.1 Facility Requirements Summary

The Forecast and Facility Requirements chapters determined that AKO's airfield operational capacity is sufficient to meet expected demand throughout the planning period. However, several enhancements are recommended to meet FAA design standards and improve aircraft safety and movement.

Airport improvements also address the demands for additional aircraft storage and identify the size, placement, and use of additional facilities that could bring businesses and increased employment to the region. **Table 5-1** is the summary of key facility recommendations identified in **Chapter 4**.

TABLE 5-1: FACILITY RECOMMENDATIONS

Facility	Future Requirement	Justification
Terminal Construction	Construct a new terminal building and associate access and parking.	Create a safer, more updated space for the public.
Apron Reconstruction	Pave a new apron to accommodate existing and future aircraft.	Increase safety and reduce foreign object debris (FOD).
Hangar Development	T-hangar and box hangar development.	As demand warrants.
Runway Development	Relocate Runway 11/29 threshold while maintaining width. Consider constructing crosswind runway to meet FAA wind coverage recommendations if land and funding available.	Maintain width and ARC C-III as a regional resource and benefit to airport users. Crosswind runway to meet wind coverage if possible beyond long-term planning range.
Approach Capabilities	Lower instrument approach visibility minimums to ¾-mile.	Address needs of existing users and attract others during adverse weather conditions.
Taxiway Improvements	Extend taxiway the full length of the runway and other enhancements.	Increase safety and airfield efficiency - Meet design standards.
Maintenance Equipment Storage	Storage building for airfield maintenance equipment.	Needed if airfield maintenance responsibilities were to shift to AKO.
Airfield Perimeter Fencing	Supplement existing fencing near terminal building to encompass entire airport property.	Security and wildlife management.
In-fill Development	Hangar and non-aeronautical development within vacant spaces.	Development where practical.

Source: Jviation

5.2 Evaluation Criteria

To facilitate the selection of a preferred airfield development scenario, the following evaluation criteria were utilized to determine the potential benefits and impacts of the various alternative development scenarios:

- **Safety/Operational Factors:** Each alternative is evaluated to determine its ability to safely accommodate future demand for aircraft, vehicles, and other relevant factors based on the specific facility being evaluated. This criterion evaluates alternative development concepts based on anticipated improvements to operational safety, capacity, and delay, as well as tenant convenience and other relevant planning considerations.
- **Economic Factors**: Historic infrastructure investment, the remaining useful life of existing airport facilities, anticipated alternative project cost differentials, and property acquisition requirements are economic factors considered in this metric. These factors provide a basis for comparing the cost-effectiveness and economic ramifications of development scenarios.
- **Environmental Factors:** A broad evaluation of relevant environmental factors associated with development, including, but not limited to, noise, wetland, and contamination impacts, are evaluated in greater detail for the preferred alternative. Considerations also include potential physical impacts to the surrounding community.
- **Implementation Feasibility:** There are often tangible and intangible factors that can impact an airport's ability to implement certain development scenarios. Community and political acceptance are examples of implementation feasibility factors taken into consideration in this analysis. Alternative facility development concepts identified for AKO are evaluated relative to each other based on the anticipated feasibility of their implementation.

Where appropriate, alternative development scenarios are quantitatively and qualitatively evaluated based on these factors. In addition to the evaluation criteria used above, select improvements were presented to the Airport to receive feedback and input on the demand for and preferred location of each facility.

5.3 Development Concepts & Alternatives

Because all other airport functions relate to and revolve around the basic runway/taxiway layout, airside development alternatives must be carefully examined and evaluated. While it is essential that the initial development recommendations for the Airport be commensurate with the near-term needs and requirements of the Airport users, the long-term improvement of the facility must also be considered and planned for to ensure the Airport's capability to accommodate future activity levels. Consequently, the main objective of the planning recommendations presented in this section is to identify future development that will result in a runway/taxiway system capable of accommodating the forecasted aviation activity levels.

The following sections provide overviews of the alternative analyses for several of the key airfield infrastructure elements. Although these individual analyses are presented separately, it must be understood that they can and do impact each other.

5.3.1 Terminal Area

Terminal Alternative 1: Renovate or Reconstruct the Terminal Building in its Current Location

The terminal building is located along Highway 63, providing convenient access to the Airport. The capacity of the terminal is sufficient for current demand, however, maintenance repairs have become a problem, requiring continuous up-keep. Renovating or reconstructing the terminal would allow these issues to be addressed, maintain the building through the planning period, and continue convenient access from the highway and runway. This alternative does not consider any growth opportunity.

If the Airport maintains its B-II ARC and does not lower minimums on Runway 29, the current terminal building and attached hangar will remain outside of the Runway 29 runway protection zone (RPZ). If the Airport lowers minimums on Runway 29, the RPZ dimensions increase significantly, resulting in the terminal, attached hangar, and part of the parking apron being within the RPZ.

In the ultimate forecast, the Airport will upgrade to a C-III ARC. This will require all safety areas to increase, and the terminal building, nearby hangar, and much of the current apron area will be within the new safety areas. Because of the ultimate C-III designation, Terminal Alternative 1 is not recommended.

Terminal Alternative 2: New Terminal Area: North Side, Central Airfield

Terminal Alternative 2 proposes the new terminal location on the north side of the property, shown in **Figure 5-1**. The relocation would be much closer to Hayes Aviation maintenance hangars and would provide more space for automobile parking. Terminal Alternative 2 centralizes the terminal area on Airport property.

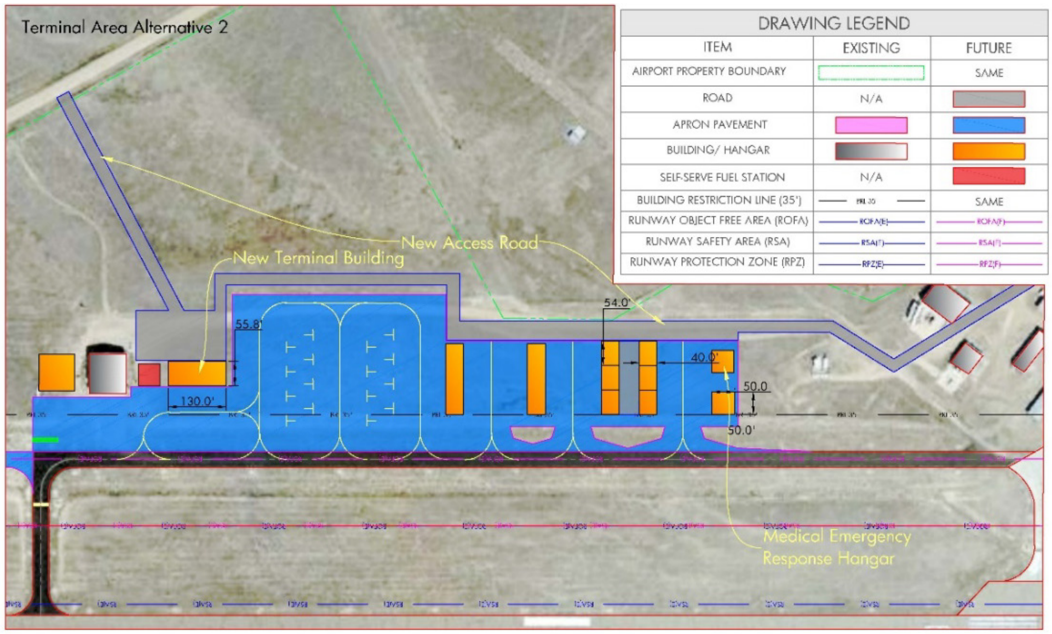
With the terminal area in a new location, a new apron would need to be constructed for aircraft parking. An area for hangar development is shown on the east side of the new apron. Additional hangars would allow for transient or based aircraft parking.

The buildings in **Figure 5-1** are not currently in any safety areas, and remain outside the ARC C-III safety areas. Terminal Alternative 2 allows for lower approach minimums and an increased ARC, and works well for the current Runway layout.

Although this Alternative considers future development changes, there are some concerns. For example, Terminal Alternative 2 proposes a large amount of new pavement for parking and taxiing. It was noted that the proposed areas may be more pavement and storage space than future demands warrant. Another concern is relocating the terminal building. Currently, the terminal building and Airport entrance are located on Highway 63 (Cedar Avenue), one of the main roads through Akron.

Moving the terminal building off a main roadway could result fewer visitors and more confusion as to the location of the Airport entrance. Subsequently, Terminal Alternative 2 is not recommended.

FIGURE 5-1: TERMINAL ALTERNATIVE 2: NORTH SIDE, CENTRAL AIRFIELD



Source: Jviation

Terminal Alternative 3: New Terminal Area: South Side, Central Airfield

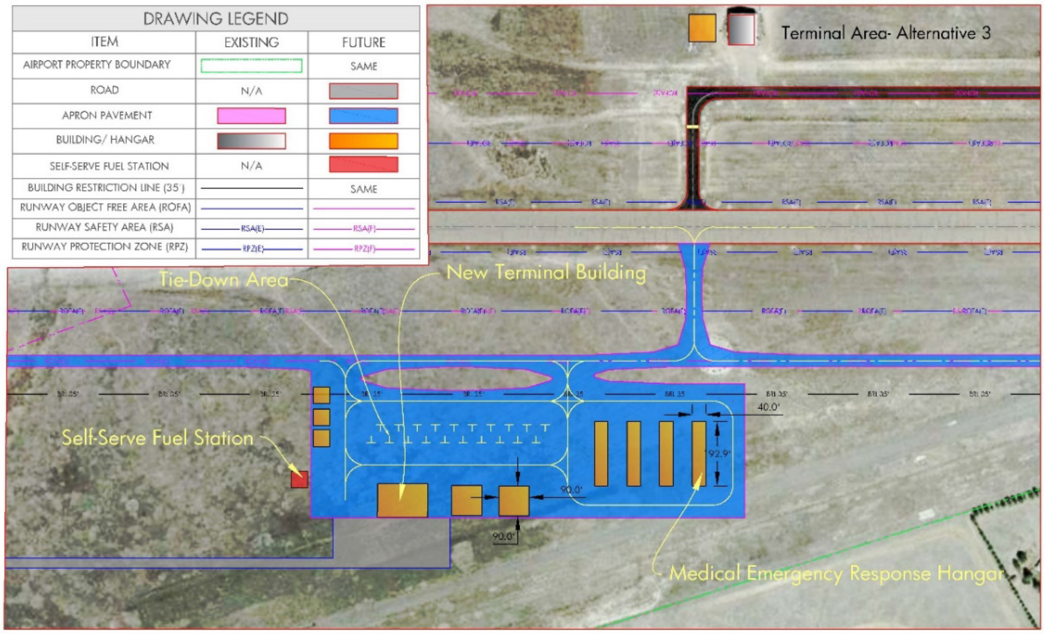
The north side of the Airport could be considered constrained because of the adjacent property line. There is a considerable amount of space that could be used for development south of the Runway. Terminal Alternative 3 proposes development along the south side of Airport property, shown in **Figure 5-2**.

Terminal Alternative 3 proposes a new terminal building, self-serve fuel, and hangars of varying sizes. It also allows for ample aircraft tie-down spaces, and includes a full-length parallel taxiway on the south side of Runway 11/29. Access to this new terminal area would be on County Road B.

For ultimate development, a crosswind runway, an increase in ARC, and lower minima were considered, and it was determined that development in this area would not interfere with any safety areas.

There are challenges with development on the south side. Utilities currently only exist on the north side of the Runway, and are often expensive and difficult to move. Land south of the Airport property boundary is currently being developed for single-family homes, and it is highly likely that additional aircraft traffic further south on Airport property would not be well received by community members. Subsequently, Terminal Alternative 3 is not recommended.

FIGURE 5-2: TERMINAL ALTERNATIVE 3: SOUTH SIDE, CENTRAL AIRFIELD



Source: Jviation

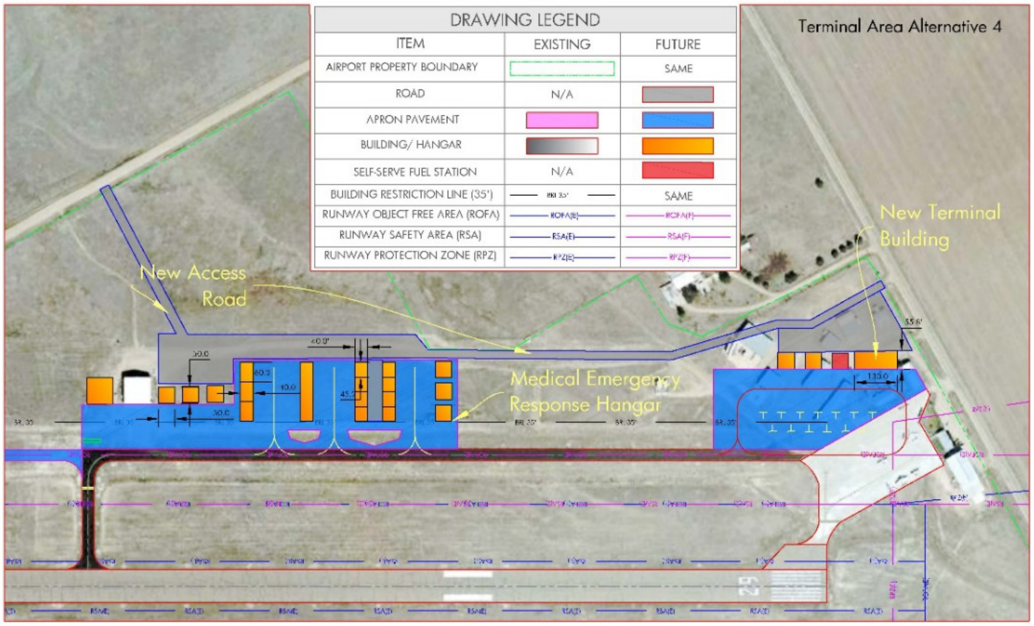
Terminal Alternative 4: New Terminal Area: North Side, East Airfield

Terminal Alternative 4 proposes two development areas, shown in **Figure 5-3**. A new terminal building, self-serve fuel station, and two hangars would be built north of the existing apron. This area also has a large space for tiedown parking. Development in this location would require relocation of the existing hangars. The second area, mainly for commercial and private hangar development, is located west of the proposed terminal area and north of the Runway, near the existing Hayes Aviation maintenance hangars.

Terminal Alternative 4 includes a new access road to private businesses and hangars that would cut down on traffic around the terminal building, and allow for additional auto parking.

Terminal Alternative 4 prepares the airfield and terminal area for any future airspace or ARC changes. The proposed buildings will be outside of any current through ultimate development. Subsequently, Terminal Alternative 4 is recommended for the future of Colorado Plains Regional Airport.

FIGURE 5-3: TERMINAL ALTERNATIVE 4: NORTH SIDE, EAST AIRFIELD



Source: Jviation

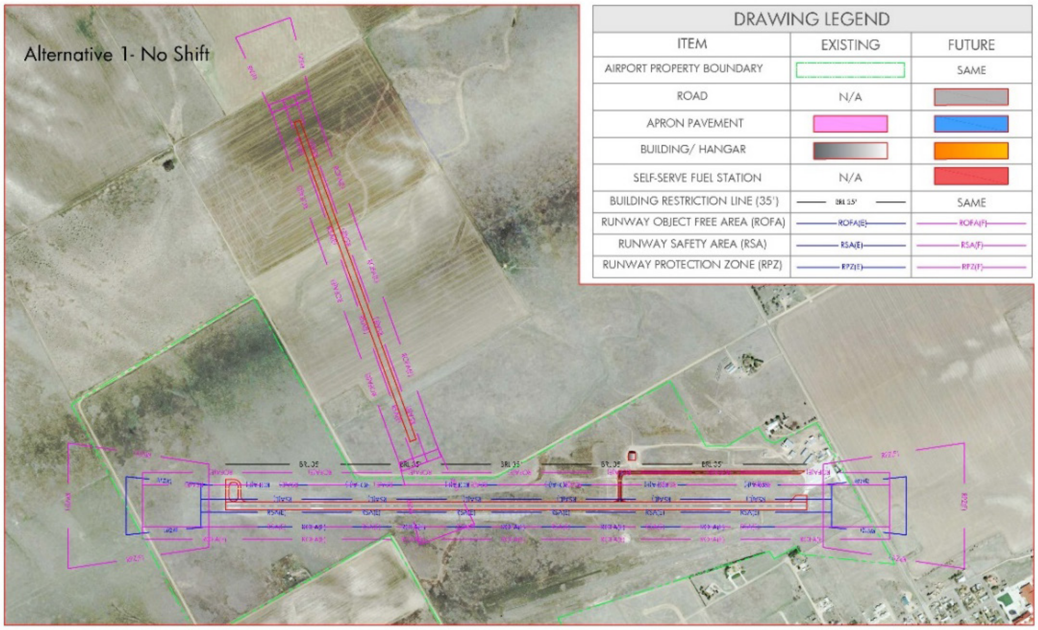
5.3.2 Airfield Alternatives

Airfield Alternative 1: No Change

Airfield Alternative 1 proposes no change to the current layout of Runway 11/29, including the current safety areas based on B-II standards (**Figure 5-4**). The approach RPZ for Runway 29 currently encompasses part of Highway 63, an incompatible land use that needs to be addressed if there is a change in approach minima and/or RPZ, per FAA Memorandum *Interim Guidance on Land Uses Within a Runway Protection Zone*. Since Airfield Alternative 1 proposes “No Change,” the Airport and Town would not have to address the issue.

Airfield Alternative 1 is not recommended because it does not help AKO improve in the future.

FIGURE 5-4: AIRFIELD ALTERNATIVE 1: NO CHANGE

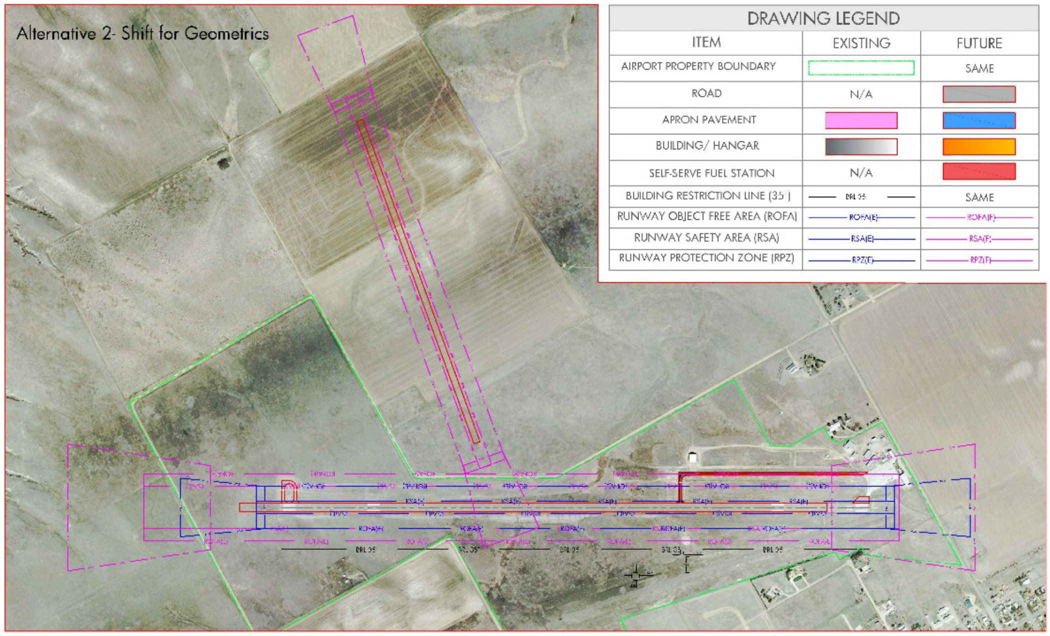


Source: Jviation

Airfield Alternative 2: Shift Runway for Geometrics

Airfield Alternative 2 proposes increasing the ARC to C-III. The new designation would change the dimensions of the safety areas surrounding the Runway, effectively putting Highway 63 within the runway safety area (RSA) and the runway object-free area (ROFA), as well as the RPZ, as shown in **Figure 5-5**. To address the requirements of the *Interim Guidance on Land Uses Within a Runway Protection Zone*, Airfield Alternative 2 proposes realigning the Runway so existing buildings and Highway 63 are not within the new RSA and ROFA. Moving the Runway to accommodate the new RPZ dimensions would be an expensive adjustment, so a phased approach may be warranted. Additional coordination with the FAA would need to be conducted to receive their approval on shifting the RSA and ROFA, but not the RPZ. Airfield Alternative 2 helps AKO reach its ultimate goals, and therefore is recommended as an Ultimate condition.

FIGURE 5-5: AIRFIELD ALTERNATIVE 2: SHIFT RUNWAY FOR GEOMETRICS



Source: Jviation

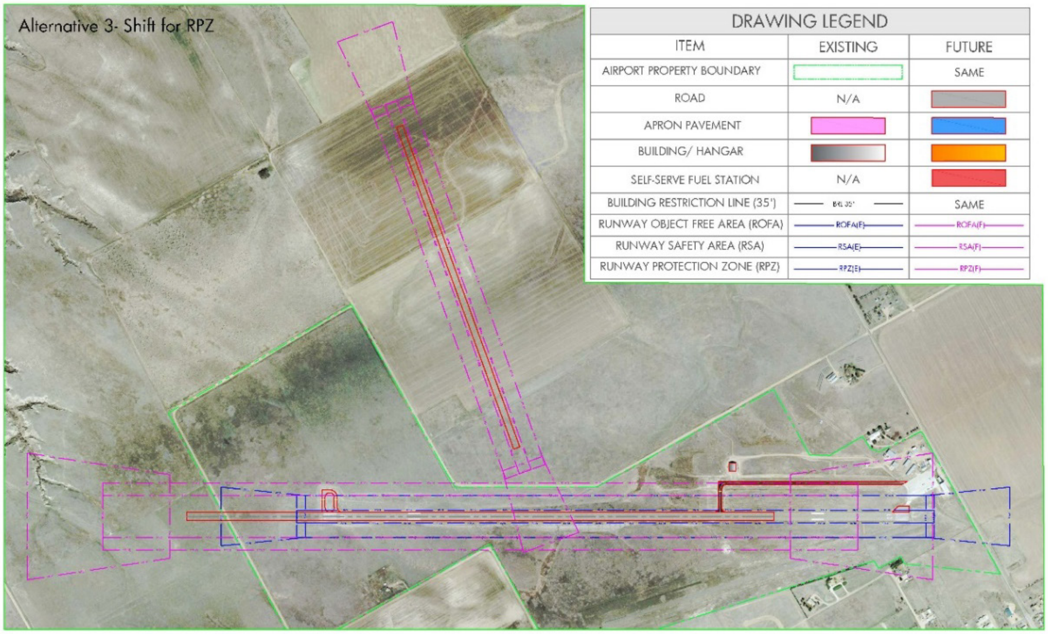
Airfield Alternative 3: Shift for RPZ

Airfield Alternative 3 proposes increasing the Airport ARC to C-III and shifting the Runway west about 1,500 feet so all buildings and roads are outside safety areas and runway protection zones (**Figure 5-6**). As stated previously, a change in the ARC would fall under the FAA's interim guidance to adjust land uses within the RPZ. Alternative 3 shifts the Runway and safety areas to comply with the FAA's guidance.

This adjustment would affect buildings and parking areas that are currently occupied. In coordination with the Preferred Terminal Alternative, this Alternative could be accommodated with the removal of the occupied buildings.

The cost of Airfield Alternative 3 greatly outweighs the benefits to AKO and therefore, is not recommended.

FIGURE 5-6: AIRFIELD ALTERNATIVE 3: SHIFT FOR RPZ



Source: Jviation

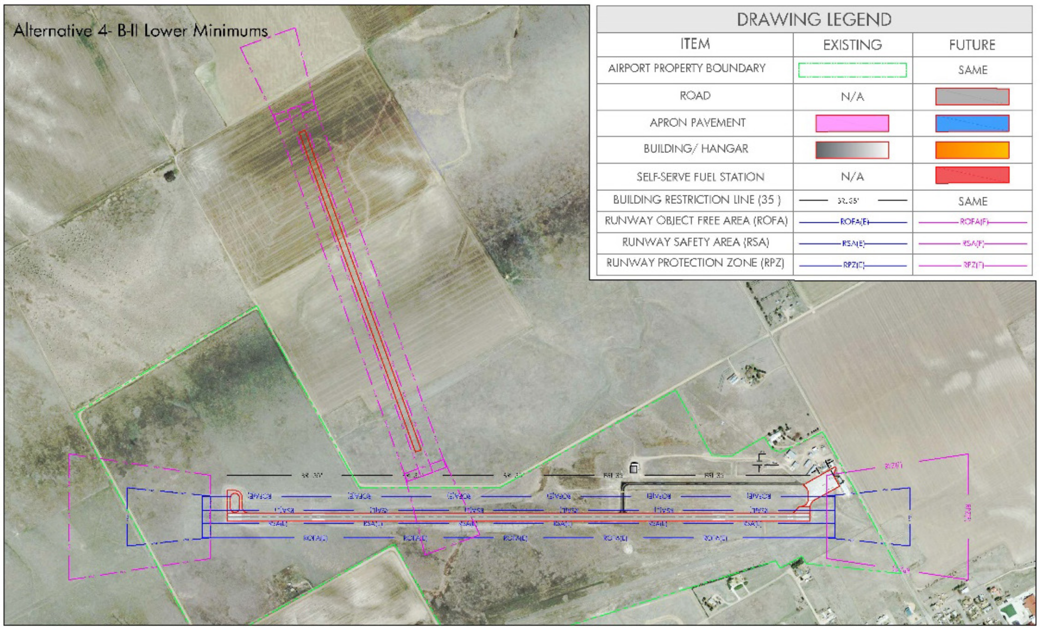
Airfield Alternative 4: B-II, Lower Minimums

Figure 5-7 displays Airfield Alternative 4. In this proposed development, the Runway would maintain a B-II ARC, but approach visibility minimums would lower to ¾ statute mile. This change causes the RPZ dimensions to increase, but the RSA and ROFA dimensions remain the same.

Most aircraft land on Runway 11, which opens the possibility of lowering the minimums for only that runway. With this option, the RPZ would only change for Runway 11. The current RPZ for Runway 29 would not be changed, and therefore would not need adjustments to comply with FAA's *Interim Guidance on Land Uses Within a Runway Protection Zone*.

Airfield Alternative 4 does not require the Airport to move the Runway and allows approach minimums to be lower, but does not consider the Airport's desire to ultimately have a C-III ARC designation. Therefore, it is not recommended.

FIGURE 5-7: AIRFIELD ALTERNATIVE 4: B-II, LOWER MINIMUMS



Source: Jviation

Airfield Alternative 5: Build a Paved Crosswind Runway

Ultimately, if the Airport wants to increase crosswind coverage for all aircraft, a crosswind runway should be constructed. A paved crosswind runway is a large investment, both initially and in ongoing maintenance, for the FAA, the State, and the Town of Akron, and should be considered carefully. Although costly, the Airport would be able to accommodate additional aircraft, potentially increasing revenue overall. A CATEX and additional environmental processes would need to be addressed before any work could begin on the construction of this runway.

Airfield Alternative 5b: Build a Turf Crosswind Runway

Airfield Alternative 5b proposes that a turf runway be installed rather than a paved crosswind runway. This would increase crosswind coverage while encouraging flight training on turf runways at AKO. Currently, there are very few public-use airports in Colorado with turf runways, making this alternative appealing. Maintenance would still need to be performed on this runway, but a turf crosswind runway serving the needs of small aircraft is more cost effective than a paved runway.

Figure 5-78 shows the ultimate airfield layout of AKO. Airfield Alternative 5b is recommended for beyond the 20-year planning period.

5.3.3 Miscellaneous

Fencing

Because AKO is currently not fully fenced around its property boundaries, people and animals can access airport property at any time. To increase safety and prevent trespassing, it is recommended that the fencing be extended around the entire airport property.

Taxiway

The most efficient way to increase capacity at an airport is to have a taxiway the same length and parallel to the airport's runways. AKO's taxiway is approximately half the length of Runway 11/29. It is suggested that the taxiway be extended to be the same length as the Runway.

It is important to note the economic and environmental concerns with lengthening the taxiway. The land for this taxiway is hilly, and dirt would need to be moved to accommodate the additional length. Moving land is costly and could disrupt various habitats. A CATEX will need to be completed to determine if additional levels of environmental impact would be affected.

5.4 Recommended Plan

Recommended alternatives are aligned with forecasted operations and based aircraft and allow the Airport space to accommodate additional hangars, aprons, and other landside development. Utilizing the evaluation of the alternatives, feedback from airport staff, and the project advisory committee (made up of key tenants and stakeholders), future improvements can be determined.

TABLE 5-2: RECOMMENDED PLAN

Development Area	Preferred Alternative
Terminal Area	Terminal Alternative 4: Construct New Terminal with additional hangar development throughout the north side of the Airport.
Airfield Alternatives	– Within the 20-year planning period: Airfield Alternative 2, Runway Shift for Geometrics. – Beyond the 20-year planning period: Airfield Alternative 5a, Build Turf Crosswind Runway with the possibility of paving it when demand warrants and funding becomes available.
Miscellaneous	Finish fencing and extend taxiway.

Source: Jviation

Recommended improvements throughout the Airport are displayed in **Figure 5-8**. These projects will be carried through the rest of the master plan study for further evaluation and depiction on the Airport Layout Plan. **Chapter 7, Implementation Plan**, estimates costs and financial resources available to fund recommended projects.

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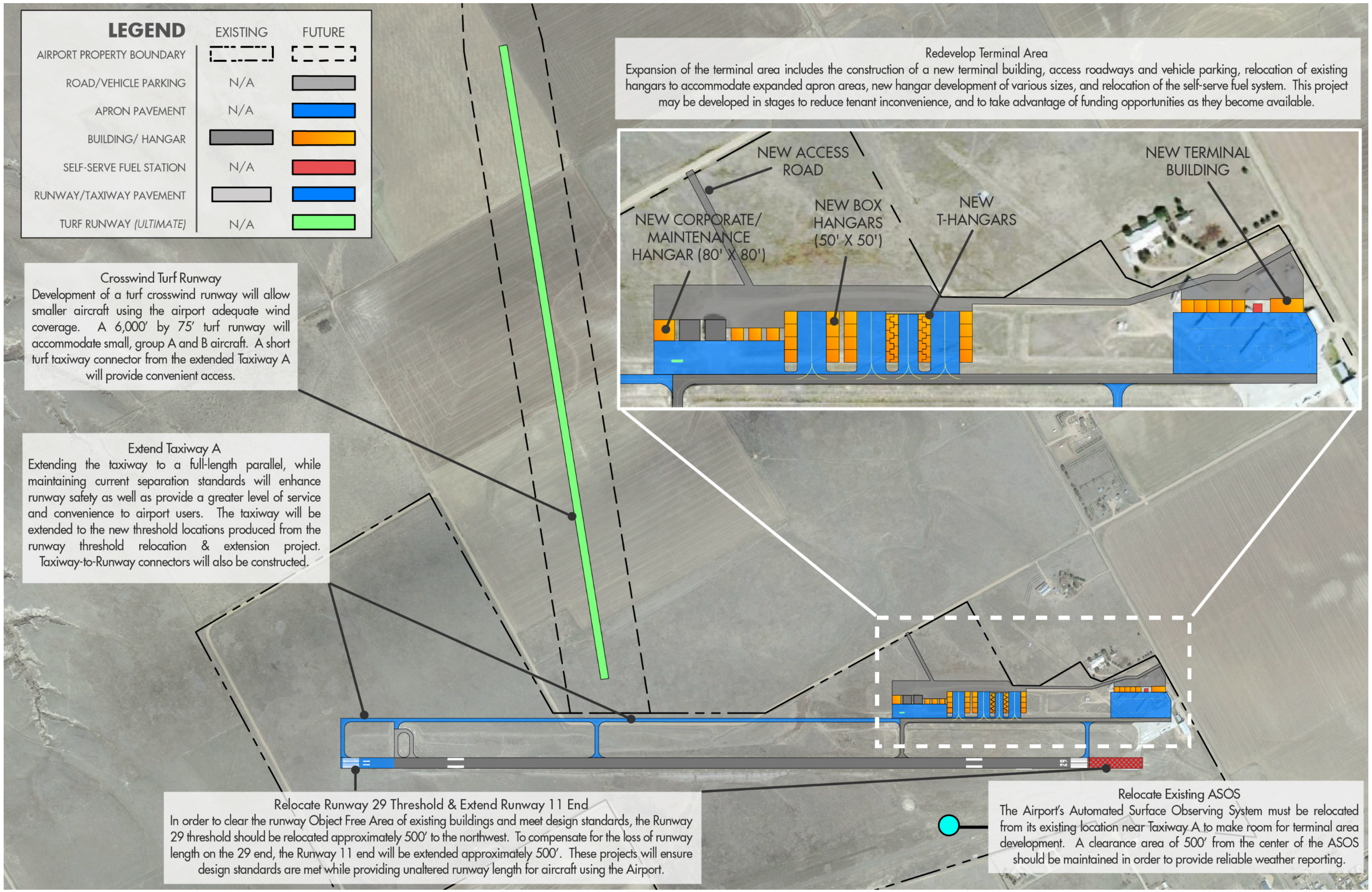
FIGURE 5-8: RECOMMENDED AIRPORT IMPROVEMENTS



Source: Jviation

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6. AIRPORT LAYOUT PLAN SET

The Federal Aviation Administration (FAA) requires, in part, a current Airport Layout Plan (ALP) that has been approved by both the airport sponsor (Town of Akron) and the FAA prior to the approval of an airport development project. The FAA further requires that the airport sponsor maintain an ALP that ensures the safety, utility and efficiency of the airport. FAA sponsor grant assurance number 29 also requires that the Akron keep the ALP up to date at all times. As stated in FAA Order 5100.38, Airport Improvement Program Handbook, an ALP remains current for at least a five-year period unless major changes at the airport are made or planned.

As noted in FAA Advisory Circular (AC) 150/5070-6B, *Airport Master Plans*, the five primary functions of the ALP are:

- Create a blueprint for airport development by depicting proposed facility improvements. The ALP provides a guideline by which the airport sponsor can ensure that development maintains airport design standards and safety requirements, and is consistent with airport and community land use plans.
- A public document that serves as a record of aeronautical requirements, both present and future, and as a reference for community deliberations on land use proposals and budget resource planning.
- To enable the airport sponsor and the FAA to plan for facility improvements at the airport. It also allows the FAA to anticipate budgetary and procedural needs. The approved ALP also allows the FAA to protect the airspace required for facility or approach procedure improvements.
- To serve as a working tool for the airport sponsor, particularly its development and maintenance staff.
- Requirement for the airport sponsor to receive FAA financial assistance.

The Colorado Plains Regional Airport (AKO or the Airport) ALP drawing set was developed in conformance with FAA SOP 2.00, ALP Review Checklist, dated October 1, 2013. The specific drawings included in the ALP set are determined by a number of factors, including the number of runways at the airport, and the type of instrument approaches.

6.1 Airport Layout Plan Drawing Set Elements

The following is a brief description of the ALP drawing sheets. FAA SOP 2.00 provides a detailed checklist of items required to be included in each drawing.

Cover Sheet: includes approval signature blocks, airport location maps, and other pertinent information as required by the local FAA Airports office.

Airport Layout Plan: illustrates the existing and future airport facilities. The drawing should include the depiction of all applicable design standards contained in the latest version of AC 150/5300-13, including but not limited to, landing areas, movement areas and aircraft parking areas (e.g., runways, taxiways, helipads, aprons, etc.), required facility identifications, description labels, imaginary surfaces, Runway Protection Zones, Runway and Taxiway Safety Areas, Runway and Taxiway Object

Free Areas, Runway Obstacle Free Zones and basic airport and runway data tables. The various data tables are on a separate sheet.

Terminal Area Plan(s): presents a large-scale depiction of areas with significant terminal facility development. The Terminal Area drawing is an enlargement of a portion of the ALP.

Airport Airspace Drawing: 14 CFR Part 77, Safe, Efficient Use, and Preservation of the Navigable Airspace, defines the five imaginary surfaces that are depicted for each runway and the airport as a whole. This drawing depicts the obstacle identification surfaces for the full extent of all airport development. It also depicts airspace obstructions for the portions of the surfaces excluded from the Inner Portion of the Approach Surface Drawing.

Inner Portion of the Approach Surface Drawing: is the plan and profile view of the inner portion of the approach surface to the runway end, as well as a tabular listing of all of the imaginary surface penetrations. The drawing depicts the obstacle identification approach surfaces contained in 14 CFR Part 77, Safe, Efficient Use, and Preservation of the Navigable Airspace. The drawing also depicts other approach surfaces including the threshold-siting surface and those surfaces associated with United States Standards for Instrument Procedures (TERPS).

Runway Departure Surface Drawing: depicts the applicable departure surfaces as defined in FAA AC 150/5300-13A, *Airport Design*. The departure surfaces are shown for runway end(s) designated primarily for instrument departures.

Land Use Drawing: shows the land uses within the airport property boundary. It also depicts land uses and zoning districts in the area around the airport, outside of the airport property boundary.

Airport Property Map (Exhibit A): depicts the airport property boundary, the various tracts of land that were acquired to develop the airport, and the methods of acquisition (where appropriate). The drawing also depicts easements beyond the airport boundary. It is important to note that an Exhibit A was prepared as part of this master plan and is included in this ALP set.

7. IMPLEMENTATION PLAN

This chapter of the airport master plan (AMP) presents the implementation analysis for Colorado Plans Regional Airport (AKO or the Airport), and examines various facets of the financial operating condition of the Airport. In addition, this chapter reviews the Airport's historic operating revenues and expenses, and provides estimates for future financial results. The goal of this chapter is to help the Airport meet the requirements of Federal Aviation Administration (FAA) sponsor assurance number 24, Fee and Rental Structure, which states: "It (i.e. the airport sponsor) will maintain a fee and rental structure for the facilities and services at the airport which will make the airport as self-sustaining as possible under the circumstances existing at the particular airport, taking into account such factors as the volume of traffic and economy of collection."

The projections of airport revenues and expenses focus on the three planning periods of this AMP's Capital Improvement Program (CIP): Phase I (Short-term, 2018-2022), Phase II (Intermediate-term, 2023-2027), and Phase III (Long-term, 2028-2037). These planning periods are utilized to assist the Airport in financially supporting future capital projects either by contributing the local share of costs in coordination with FAA and CDOT grants, or by wholly funding them. The CIP and associated financial plan included in this chapter should be viewed as a guideline that is based on the circumstances and conditions that were current at the time of the completion of this master plan. Ultimately, capital projects should be undertaken when demand warrants and appropriate funding becomes available.

The overall approach for the development of the implementation analysis included the following elements:

- Gathered and reviewed key Airport documents related to historical financial results, capital improvement plans, operating budgets, regulatory requirements, and Airport policies.
- Interviewed key Airport management personnel to gain an understanding of the existing operating and financial environment, as well as the overall financial management philosophy.
- Reviewed the AMP CIP, project cost estimates, and development schedule anticipated for the three planning periods, to project the overall financial requirements to implement the CIP.
- Identified and analyzed the sources and timing of capital funding available to meet the financial requirements for funding the CIP.
- Analyzed historical and budgeted operating expenses, developed operations and maintenance expense assumptions, and projected future operating costs for the planning periods.
- Analyzed historical and budgeted operating revenues, developed operating revenue assumptions, and projected future operating revenues for the planning periods.
- Completed results of the analysis and evaluation in a Financial Plan Summary that provides conclusions regarding the financial feasibility of the CIP.

Airport budgets can be broadly categorized as capital improvements and operating and maintenance (O&M). Grants issued by the FAA and CDOT are generally restricted to capital improvement projects, and with few exceptions cannot be used for airport operating and maintenance expenses. Operating revenues generated by aircraft landing and parking fees, fuel flowage fees, land and building leases, etc., can be applied to both capital improvements as well as O&M expenses.

7.1 Capital Funding Sources

The implementation of AKO's Master Plan CIP is anticipated to be funded primarily through the following sources:

- FAA grants from its Airport Improvement Program (AIP)
- State of Colorado funding sources
- Local funding sources
- Other capital project funding sources, such as private parties

Each of these funding sources is described in the following sections.

7.1.1 Federal Aviation Administration Grants

Airports included in FAA's National Plan of Integrated Airport Systems (NPIAS) are eligible to receive FAA grants. For general aviation airports, the FAA provides the most significant percentage of the funding required for the construction of eligible capital projects. Following World War II, the federal government recognized the need to develop airports to meet the nation's long-term aviation needs, and thereafter initiated a Grants-In-Aid Program. Congress established the AIP on behalf of the FAA through the Airport and Airway Improvement Act of 1982.

AIP grants are generally available for planning, development, or noise compatibility projects at public-use airports included in the NPIAS. Eligible projects include improvements related to enhancing airport safety, capacity, security, and environmental concerns. Funds obligated for the AIP are drawn from the Airport and Airway Trust Fund, which is designed to support the improvement of the country's air transportation system by funding airport improvements, airport repair projects, and modernizing the Air Traffic Control system. The Trust Fund receives revenue through taxes on aviation fuels, airline ticket sales, and air freight shipments.

The initial AIP legislation provided funding through FY 1992; since then, the AIP has been reauthorized and amended multiple times. In order for FAA to continue issuing grants, Congress will ultimately need to authorize a new AIP program or else pass continuing resolutions as it has frequently done in the past. (Each time Congress reauthorizes the AIP, it typically changes parts of the program including funding disbursements, project eligibility requirements, appropriation levels, etc. These changes and the debate they can generate often delay the AIP reauthorization, and also make it difficult for airports to know how much FAA funding will be available in the future, and what requirements may be in place to secure that funding.)

Under current legislation, the AIP will typically provide 90 percent of the total cost of an FAA-eligible capital project (with the balance often being covered through a combination of state and local funding), although this percentage can be reduced based on the size, complexity, and requirements of a specific project. FAA Order 5100.38D, *Airport Improvement Handbook* specifies the eligibility requirements for capital projects to receive FAA grants. In general, sponsors can apply AIP funds to most airfield capital improvements and preservation efforts, and in limited situations, for terminals, hangars, aprons, and other non-aviation development. Professional services that are necessary for eligible projects, such as planning, surveying, and engineering design, may also be eligible. In most cases, an airport's demand for capital improvements must be appropriately quantified and documented (such as through an airport master plan process), and each project must be shown on an approved Airport Layout Plan (ALP). Additionally, all proposed capital improvements must meet appropriate Federal environmental and procurement requirements. Projects related to revenue-generating improvements (such as privately owned or leased hangars and aprons, or those portions of a terminal building leased by airlines or concessions, etc.) are typically not eligible for AIP funding, nor are standard airport operations and maintenance costs (e.g., salaries, equipment, supplies, etc.).

AIP grants are generally divided into two categories: entitlements and discretionary. Entitlement Grants are allocated among NPIAS airports through a formula largely driven by passenger enplanements, landed cargo weights, and types of operations. Currently, "primary" airports, defined in the NPIAS as having a particular level of commercial air service (i.e. enplane more than 10,000 passengers annually), receive $1 million annually in entitlement funding. "Non-primary" airports, which include small commercial service airports and general aviation airports like AKO, are currently eligible for $150,000 of annual FAA entitlement funding. AIP grants must be expended within four years of being issued or be returned to the FAA. This means airports can accrue a maximum of three years' worth of annual entitlements to be applied towards eligible projects in the fourth year. There are also options potentially available to airports whereby they may "borrow" entitlements from future years to apply to a project in the near-term.

Similar to entitlements to individual airports, each state receives an annual apportionment from the FAA based on an area-population formula. These federal funds are utilized at the discretion of the individual states.

In addition to entitlement grants, the AIP also distributes discretionary grants, since the capital requirements of airports often will exceed the limits of their annual entitlement funding. National discretionary funding levels are established annually by the FAA, and result from federal funds that remain available after the distribution of entitlements. Congress sets the requirements for how discretionary funds are allocated by the FAA, with certain amounts set-asides for projects of special interest (e.g., airport safety, noise mitigation, the military airport program, etc.).

Each NPIAS airport development project is subject to eligibility and justification requirements as part of the normal AIP funding process. Generally, airports within similar categories (general aviation, reliever, primary, etc.) compete for these discretionary grants, which are typically awarded based on priority ratings given by the FAA to each potential project. Given the lack of adequate discretionary funding available, this prioritization process tries to ensure that the most important and beneficial projects (as viewed by the FAA) are given priority.

In early 2018, the President signed legislation that provided the AIP an additional $1 billion in discretionary grants. The Act gives priority consideration to projects at non-primary airports that are classified as regional, local or basic rural airports, like AKO. Eligibility requirements may present an opportunity for AKO develop projects with 100 percent funding that would otherwise be unattainable. AKO should work closely with its consultant and the local FAA Airports District Office to take advantage of this AIP supplement.

7.1.2 State of Colorado Funding Sources

Colorado Aviation Grant Program

In support of the Colorado Department of Transportation's (CDOT) stated goal to develop a forward-looking multi-modal transportation system for the 21st century, CDOT Division of Aeronautics is charged with promoting partnerships with its public and private constituents to enhance aviation safety, aviation education, and the development of an effective air transportation system through the efficient administration of the Colorado Aviation Fund. Specifically, through the Colorado Aviation Grant program and at the discretion of the Colorado Aeronautical Board (CAB), the Division annually awards discretionary aviation grants to the state's public-use, publicly-owned airports from the Aviation Fund.

The chief priority for distributing these state grants is to leverage Federal AIP grants by providing a five percent match to state airports. The State awards half of the local match requirement up to a limit, recommended annually by the Division and approved by the CAB. Currently the grant cap is $150,000 through the year 2020, after which that cap may be raised to $250,000. Although the State is currently limiting grants to matches on AIP projects, it does have the statutory authority to give grants for overmatch on an AIP project that may be short of funds, as well as to award grants for State and Local projects without federal participation. In general, State funding is focused on non-revenue generating projects that are prioritized from the "runway out," meaning that preference is given to projects related to runways, then taxiways, and then others.

The Colorado Aviation Fund is directly supported by revenues generated through a state sales tax on aviation fuel. This tax is indexed to a percentage of the cost of a gallon of commercial jet fuel. Therefore, as the cost of jet fuel increases, the size of the Colorado Aviation Fund increases, allowing for more state grant availability. Conversely, when fuel prices decline, the fund will decrease in size, reducing state grant availability.

At the time of this document, the Colorado Aviation Fund was in process of recovering from a significant deficit that was precluding the State from actively funding programs other than matching funds for individual AIP projects. This recovery is anticipated to be complete in FY 2018 at which time the State will be able to progressively start to reinstitute some of its former funding programs.

State Infrastructure Bank

The State Infrastructure Bank (SIB) Loan Program was enacted by the Colorado Legislature in 1998 and adopted by CDOT in 1999. This unique funding source is administered by the Colorado Transportation Commission and helps provide funding for all types of transportation facilities (including aviation) through a low-interest revolving loan program. For aviation needs, a separate fund has been established within the SIB so that airports only compete with other airports for funding.

Loans awarded to Colorado public-use airports from the SIB have been used to support funding for projects such as capital airport improvements, air traffic control towers, snow removal equipment, and airport pavement reconstruction. Additionally, these low-interest loans have been utilized for land acquisitions that have protected Colorado airports from incompatible land-use surrounding airports. These loans are awarded for a maximum of 10 years with an interest rate that is set every six months by the Transportation Commission. In November 2016, the interest rate was set at 2¼ percent and the aviation fund had an available balance of approximately $11 million.

State Aviation Fuel Tax Disbursements

Pursuant to Colorado statutes, the State currently collects multiple sales taxes on aviation fuels at publicly owned, public-use airports at the following rates:

- Commercial jet fuel = 2.9 percent of the cost of a gallon
- Non-commercial jet fuel = $0.04 per gallon
- Aviation gasoline = $0.06 per gallon

Of the commercial jet fuel sales taxes collected annually, 65 percent are distributed back to the airport where the fuel was sold, with the remaining 35 percent being used to fund the Colorado Division of Aeronautics Program. Of the non-commercial jet fuel taxes collected, 100 percent is provided to the airport of origin. With respect to aviation gasoline tax revenues, 66 percent is sent to the airport, and the remaining 33 percent is applied to the State Aviation Program. **Table 7-1** shows the amount CDOT passed through to AKO from the aviation fuel taxes that were collected:

TABLE 7-1: CDOT AVIATION FUEL TAX DISTRIBUTION TO AKO

Fiscal Year	Amount
2016	$ 4,926.16
2015	$ 5,071.15
2014	$ 3,339.62
2013	$ 3,007.07
2012	$ 5,597.93
2011	$ 3,425.39
2010	$ 1,336.89
2009	$ 2,506.71

Source: CDOT Division of Aeronautics https://www.codot.gov/programs/aeronautics/FuelTax

7.1.3 Local Funding Sources

Local funding is typically generated from operating revenues accrued on a given airport and generally consist of user fees associated with leases, fuel sales, services, etc. The user fees are typically established by the airport based on market conditions in the area and vary from airport to airport.

The majority of facilities on the airport, including all of the hangar structures, are privately owned. Owners of the facilities lease property from the Town of Akron and pay a lease rate for the property. The facility owners are also taxed at the prevailing property tax rate, and as result the property taxes generate revenue in addition to fees generated by the leases. The land lease rate is currently $0.02 per square foot per year and generates less than $1,000 per year in revenue. The Town of Akron collects a fuel flowage fee of $0.05 for every gallon of aviation fuel sold at the Airport. Revenue generated from this fee varies with the amount of fuel sold, but generally falls between $2,000 and $3,000 per year.

Landside facility development and levels of aviation activity are the primary factors affecting airport operating revenues. These revenues will normally increase as a function of usual inflationary growth as well as average annual increases associated with existing leases. Additionally, as additional airport development occurs, growth in the numbers of based aircraft and itinerant aircraft operational levels will often be realized. In general, land and building leases provide the most stable long-term sources of revenue at an airport. Fuel sales, tie-downs and other operational fees will fluctuate with traffic levels. Unlike commercial service airports, GA airports typically generate little to no revenue from auto parking, concessions (e.g. restaurants and shops), and terminal building tenants (airlines, rental car agencies).

7.1.4 Other Capital Project Funding Sources

The traditional funding sources described in previous sections (FAA and CDOT grants and airport revenue) are often insufficient to finance the full range of capital projects programmed for development during a CIP. In addition, some projects are not eligible for FAA or state grants. When the availability of traditional funding is lacking, other non-traditional sources need to be investigated and possibly utilized for the ultimate implementation of projects. (In this chapter, these sources have collectively been referenced as "Other Funding Sources.") If funding sources cannot be ultimately identified and obtained in the time frames planned, the associated projects should be delayed until appropriate funding can be identified and secured.

Non-traditional funding sources for an airport typically include general fund revenues, bond issues, and private funding. Of these, general fund revenues and general obligation bonds are the most common funding sources. The ability of municipalities and counties to issue general obligation bonds for airport capital projects is directly affected by their debt level and ability to finance their existing and future debt load. As the debt burden increases, rating agencies often lower their credit ratings, which increases their interest payments. Revenue bonds supported by airport-generated revenues are seldom used by general aviation airports because most such airports do not generate enough income to pay operating expenses and the debt service of capital funding requirements.

Private funding sources such as FBOs, aircraft owners, investors, etc., often assume the responsibility of paying for hangars, fuel storage tanks, and sometimes for parking aprons, taxiways, and utility hookups. However, when private parties make capital investments in airports, they often try to negotiate reduced land and/or building lease rates to balance their capital investment. Additionally, they can seek to avoid property reversion clauses whereby ownership facilities constructed on an airport ultimately revert to the airport after a set period (often a minimum of 20 years).

General Fund Revenues

General fund revenues are those provided by the airport sponsor (county, municipality, or state) from their general tax revenues. Airport capital development expenditures from general fund sources have been somewhat difficult to obtain in recent years. One reason for this difficulty is the seemingly universal shortfall in local general fund revenues. Budgetary problems have created an environment where local funding is uncertain. The amount of general fund support for airport improvement projects varies by airport and is generally based upon the local tax base, the credit rating of the county, municipality, and state, priority of the development project, historical funding trends, and, of course, local attitudes concerning the importance of aviation.

Bond Funds

The period since the mid-1990s has seen the unprecedented development of various types of municipal bonds and securities used for airport projects. Municipal and County securities (bonds) refer generically to interest-bearing obligations issued by state and local governmental entities to finance capital costs. These funding instruments are generally broken down into the following categories: (1) general obligation bonds, (2) revenue and special facility bonds, (3) hybrid source bonds, and (4) industrial development and exempt facility bonds.

For an airport owned by a town, like AKO, bond issues funding the local share of airport development projects will often compete for the same attention and leadership consideration as other departments or divisions within the town government (i.e., roads, sewer, parks, etc.). As with the general fund apportionment, bond issues supporting airport development depend greatly on the priority assigned to such projects by the local community.

Private Funds

Items such as hangars, fuel systems, and other revenue producers are not typically eligible for federal or state grant funding at public airports because they generate income for the airport. Communities sometimes work with FBOs or other local businesses to fund these types of improvements. Each of these options would need to be weighed independently to determine the appropriateness of their potential application for eligible projects.

7.2 Financial Analysis and Implementation Plan

This section, along with the tables presented at the end of the section, provide the analysis and results of evaluating the financial reasonableness of implementing the master plan CIP during the planning period (2018 through 2037).

Capital Improvement Program (CIP)

The following is a listing and brief description of the projects identified within this AMP for inclusion in AKO's on-going CIP. The individual projects are listed in order of their CIP identifying letter and all projects are assumed to require some level of federal, state, and/or local funding, unless otherwise indicated. (Each project's associated "CIP ID" is not an indication of prioritization, importance, or funding participation, but simply a mechanism for tracking the individual projects.) Note that this listing is the best estimate of anticipated projects at the time of this AMP; however, it should be understood that many of these projects may change in scope or in timing based on future requirements. Therefore, the CIP must be reviewed, assessed and updated on a regular basis (typically annually).

A. **Relocate Existing Automated Surface Observing System (ASOS)**: The Airport's ASOS must be relocated from its existing location near Taxiway A to make room for terminal area development. A clearance area of 500 feet from the center of the ASOS should be maintained in order to provide reliable weather reporting.

B. **Maintain Runway 11/29 and Taxiway A Pavement:** As part of the Airport's on-going pavement maintenance initiative, this project includes inspection and repair of any cracks or other defects to the runway and taxiway pavement.

C. **Redevelop Terminal Area:** Expansion of the terminal area includes the construction of a new terminal building, access roadways and vehicle parking, relocation of existing hangars to accommodate expanded apron areas, new hangar development of various sizes, and relocation of the self-serve fuel system. This project may be developed in stages to reduce tenant inconvenience and take advantage of the funding opportunities when they become available.

D. **Repair Concrete Ramp Pavement**: The concrete ramp at AKO serves as the primary movement, fueling, staging and tiedown area for based and transient aircraft. Regular inspection and repair to cracks and defects in the concrete allow for on-gong utilization of this important asset.

E. **Extend Taxiway A to Full Length:** The runway is currently served by a partial-length parallel taxiway. Extending the taxiway to a full-length parallel, while maintaining current separation standards will enhance runway safety as well as provide a greater level of service and convenience to airport users. This includes necessary land acquisition.

F. **Maintain Runway 11/29 and Taxiway A Pavement:** As part of the Airport's on-going pavement maintenance initiative, this project includes inspection and repair of any cracks or other defects to the runway and taxiway pavement.

G. Relocate Runway 29 Threshold and Extend Runway 11 End: In order to clear the runway Object Free Area (OFA) of existing buildings and meet design standards, the Runway 29 threshold should be relocated northwest approximately 500 feet. To compensate for the loss of runway length on the 29 end, the Runway 11 end will be extended approximately 500 feet. These projects will ensure design standards are met while providing unaltered runway length for aircraft using the Airport. In association with this project, it is recommended that the Airport seek to lower non-precision approach minimums to Runway 11 to ¾-mile.

H. Extend Taxiway A: The full-length taxiway will be extended to the new threshold locations produced from the extension project noted above. Taxiway connectors will also be constructed.

I. Construct Crosswind Turf Runway: Development of a turf crosswind runway will allow smaller aircraft using the airport adequate wind coverage. A 6,000-foot by 75-foot turf runway will accommodate small, group A and B aircraft. A short turf taxiway connector from the extended Taxiway A will provide convenient access. This project also includes the property acquisition needed to develop the runway.

7.2.2 Estimated Project Costs and Development Schedule

A list of capital improvement projects has been assembled based on the recommended development alternatives for the Airport established in **Chapter Five**. This project list has been coordinated with the ALP drawing set and the Airport's current CIP, both of which should be maintained and updated by Airport management, as required. Generally, the CIP has three primary purposes:

1. Identify projects that will be required over a specific period of time.
2. Estimate the order of implementation of the projects included in the plan.
3. Estimate the total costs and funding sources for each of the projects.

As the CIP progresses from project planning in the current year to projects planned in future years, the plan becomes less detailed and more flexible. Additionally, the CIP is typically modified on an annual basis as new projects are identified, priorities change, funding sources evolve, and financial environments evolve.

Each proposed capital improvement project has been assigned to one of four planning periods, as depicted in **Table 7-2**, along with all proposed and current CIP projects (including AIP-funded, State-funded, Airport-funded, and privately funded) and their estimated costs for each phase within the planning horizon. (As mentioned previously, reauthorization of the FAA AIP by Congress may change the funding formulas used in these tables.) The project cost estimates are based on 2018 dollars.

TABLE 7-2: AKO CAPITAL IMPROVEMENT PROGRAM

CIP ID	Project	Primary Funding Source	Estimated Capital Cost	Funding Sources			
				Federal	State	Local	Other/ Private
Phase I (2018-2022)							
A	Relocate Existing ASOS	Federal	$106,000	$95,400	$5,300	$5,300	
B	Maintain Runway 11/29 and Taxiway A Pavement	Federal	$394,000	$354,600	$19,700	$19,700	
C	Redevelop Terminal Area						
	- Mobilization/Demolition	Federal	$1,678,000	$1,510,200	$83,900	$83,900	
	- Aprons/Taxilanes	Federal	$6,265,000	$5,638,500	$313,250	$313,250	
	- New Terminal	Federal	$1,230,000	$1,107,000	$61,500	$61,500	
	- New Hangars	Private	$3,313,000				$3,313,000
	Phase I Total		**$12,986,000**	**$8,705,700**	**$483,650**	**$483,650**	**$3,313,000**
Phase II (2023 – 2027)							
D	Repair Concrete Apron Pavement	Federal	$500,000	$450,000	$25,000	$25,000	
E	Extend Taxiway A to Full Length	Federal	$5,720,000	$5,148,000	$286,000	$286,000	
F	Maintain Runway 11/29 and Taxiway A Pavement	Federal	$330,000	$297,000	$16,500	$16,500	
	Phase II Total		**$6,550,000**	**$5,895,000**	**$327,500**	**$327,500**	
Phase III (2028 – 2037)							
G	Relocate Runway 29 Threshold and Extend Runway 11 End	Federal	$1,252,000	$1,126,800	$62,600	$62,000	
H	Extend Taxiway A to New Thresholds	Federal	$1,140,000	$1,026,000	$57,000	$57,000	
	Phase III Total		**$2,392,000**	**$2,152,800**	**$119,600**	**$119,600**	
Ultimate (Beyond 20-Year Period)							
I	Construct Crosswind Turf Runway	Federal	$2,300,000	$2,070,000	$115,000	$115,000	
	Ultimate Total		**$2,300,000**	**$2,070,000**	**$115,000**	**$115,000**	
	Program Total		**$24,228,000**	**$18,826,500**	**$1,045,750**	**$1,045,750**	**$3,313,000**

Source: Jviation

7.2.3 Airport Operating Revenue and Expenses

Airport revenues are typically generated through user fees charged by a given airport for the facilities and services that it provides. These user fees are normally established by that airport based on the market conditions within its service area and can vary dramatically from airport-to-airport. At AKO, operating revenues are realized through ground leases and aircraft fuel sales.

The amount of land leased, the lease rates charged, and levels of aviation activity that generate fuel sales are the primary factors affecting operating revenues at the Airport. At AKO, Hayes Aviation serves as the fixed-base operator (FBO). As a result, the Town receives a portion of the money collected on fuel sales called fuel flowage. Some Towns, Cities, and Counties act as the FBO and realize a greater share of the profit on fuel sales, but these are typically at larger, more active airports. The higher revenues generated by the Town acting as the FBO, however, is somewhat offset by higher costs associated with staffing, wholesale fuel purchasing, maintaining fuel tanks and mobile fuelers, and associated insurance.

One industry trend of note affecting airports and FBOs in general is the ability of corporate aircraft to "tanker" fuel due to their increasingly fuel-efficient engines. Because turbine powered aircraft can buy between 500 to 2,000 gallons of fuel at one time, corporate operators often negotiate the retail price per gallon before buying fuel at a given airport. If they do not reach agreement with the FBO on the discount they will not buy fuel, relying on their fuel reserves to fly to another airport that offers lower fuel prices. As a result, a given FBO is competing not just with adjacent airports for fuel sales, but also against airports located hundreds of miles away that may offer lower fuel prices. Some FBOs have noted that although overall corporate aircraft activity has risen, their fuel sales have not increased as quickly due to their inability to compete other FBOs on price.

As additional airport development occurs, the number of based aircraft and itinerant aircraft operations should reasonably be expected to increase, resulting in a commensurate increase in airport operating revenues. (Note that revenues associated with fuel sales, aircraft tiedowns and transient hangar rentals are directly influenced by traffic levels). Additionally, as new leases are enacted and existing leases are updated to reflect prevailing rates and terms, the Airport's most stable source of revenue will continue to increase over the long term.

In that the Airport accepts AIP grants with the stipulation that it abide by FAA grant assurances, it is important that the Airport continue to consider the following with respect to the future establishment of lease rates and other income generating fees:

- FAA Grant Assurance 22, *Economic Nondiscrimination*, states, "It [the airport sponsor] will make the airport available as an airport for public use on reasonable terms and without unjust discrimination to all types, kinds and classes of aeronautical activities, including commercial aeronautical activities offering services to the public at the airport."
- FAA Grant Assurance 22 also states that the sponsor, as well as airport tenants who enter into an agreement with the sponsor, will "furnish said services on a reasonable, and not unjustly discriminatory, basis to all users" and "charge reasonable, and not unjustly discriminatory prices."
- FAA Grant Assurance 22 also states that "each fixed-based operator at the airport shall be subject to the same rates, fees, rentals, and other charges as are uniformly applicable to all other fixed-based operators making the same or similar uses of such airport and utilizing the same or similar facilities."
- The FAA considers any lease with a term of greater than 20 years to be "long-term," and a lease with a term of 50 years or greater to be in violation of FAA policy (per FAA Order 5160.9B, *Airport Compliance Manual*). The FAA considers 50-year lease terms as equivalent to the sale of airport property, which FAA allows only under very specific circumstances. FAA recommends that lease terms extend no longer than the end of the amortization period and/or useful life of the facility.

Ideally, airport operating revenues will at least offset the airport's operating expenses, typically referred to as O&M costs. Airport operating expenses are the day-to-day costs incurred by operating the airport. They do not include non-cash and capital costs associated with depreciation and infrastructure development. Capital outlay shown below can vary significantly from year to year and are typically related to on-going maintenance expenses that are large supported by State and/or Federal grants. Primary components of O&M costs at AKO include, but are not limited to, the following:

- Operating Supplies and Expenses
- Utilities and Lighting
- Insurance and Bonds
- Capital Outlay

The historical expenses for AKO between 2012 and 2016 are presented in **Table 7-3**.

TABLE 7-3: AKO ANNUAL OPERATING AND MAINTENANCE EXPENDITURES

Source/Service	2012	2013	2014	2015	2016 Estimated
Operating Supplies/Expenses	$29,089	$28,567	$29,385	$28,611	$27,073
Utilities and Lighting	$2,202	$2,172	$2,409	$2,484	$2,477
Insurance and Bonds	$9,530	$8,406	$7,719	$8,981	$7,717
Capital Outlay*	$894,649	$263,823	$13,098	$383,696	$32,775
Total	**$935,470**	**$302,968**	**$52,611**	**$423,772**	**$70,042**

Source: Town of Akron
*Often offset, in part, by State and/or Federal grants

7.2.4 Projected Operating Revenues and Expenses

The continued growth of AKO in terms of activity, tenants, new leases and facility development will impact the Airport's operating revenues and expenses over the 20-year planning period. Projections developed in this evaluation depict future airport operating revenues and expenses based on recent financial results, budgeted revenues and expenses, forecasted increases in airport based and itinerant aircraft activities, as well as airport tenant population trends identified in previous chapters of this Master Plan. Projections of future airport operating revenues and expenses at AKO for the periods 2017 through 2036 are presented in **Table 7-4.**

Specifically, the estimates for future operating revenues were established through close consideration of historical trends, as well as proposed airport development initiatives and how they might impact those future revenues. In most instances, revenue projections resulted from normal, conservative growth factors refined to more closely reflect the circumstances of the Airport. Annual revenues were projected to increase 30 percent over the 20-year planning period. The exception to these rates may be miscellaneous revenues that could be realized through the one-time sales of airport assets, such as easement rights or other assets. Additionally, since the Airport is projected to continue to hangar construction throughout the planning period, increased revenue growth associated with hangar and land leases was identified in selected years.

On the operating expenses side, increases in operating supplies and expenses, as well as overall operational activities are based on accepted inflationary growth rates and reasonable growth in costs related to increases in activity. Due to unique aspects of capital outlays to support on-going maintenance, this category is excluded from projections.

TABLE 7-4: AIRPORT OPERATING REVENUES AND EXPENSES

	2017 Budget	2021	2026	2036
Revenues				
– Rent	$770	$1,600	$1,200	$1,500
– Fuel Flowage	$2,000	$2,700	$3,300	$4,500
– State Aviation Tax Refund	$4,500	$4,750	$5,000	$6,000
Expenses				
– Operating Supplies/Expenses	$27,500	$29,000	$31,000	$35,000
– Utilities and Lighting	$2,720	$2,900	$3,100	$3,500
– Insurance and Bonds	$7,800	$8,350	$8,900	$10,000
Net Operating Income	**($30,750)**	**($31,200)**	**($33,500)**	**($36,500)**

Source: Town of Akron (2017 budget), Jviation (projections)

The projections of revenues and expense shown above depict a continued negative operating income for the Airport. It may be reasonable to assume, however, additional revenue growth beyond what is shown with the development of new facilities and the attraction of additional businesses and tenants. Nevertheless, additional businesses and tenants as a result of future development is speculation and development intended for specific uses should only be carried out with certainty and commitment.

7.3 A Path Toward Growth

Future development of AKO should consider the value the Airport represents to various stakeholders. The residents of Akron and the surrounding region, local businesses, Airport tenants and transient users all have different perspectives from which to view AKO. Below are examples what the Airport may mean to various stakeholders.

Residents of Akron and the Surrounding Region:

- Flight training
- Jobs in aviation/technology
- Access to medical evacuation services
- Connection to energy and agricultural businesses
- Reach beyond the Town of Akron

Businesses:

- Pro-business attitude to attract entrepreneurs
- Agricultural support facilities – quarantine for Ag freight
- Unmanned Aerial Vehicle opportunities

Based Aircraft Owners and Tenants:

- Pilot facilities and services, at a competitive price
- Specialized aircraft maintenance, fostering other aspects of aircraft maintenance
- Excellent airfield capabilities, serving a large region

Transient Aircraft:

- Pilot facilities and services, at a competitive price
- Full range of aircraft fuel, maintenance and storage
- Excellent airfield capabilities, serving a large region
- Pilot proficiency, training

A town has many financial obligations, many of which are basic services, but few of which represent an investment in the town's future equal to improvements of an airport. As the Airport and Town considers future development opportunities, decision makers should be reminded of the value airport facilities represent to all stakeholder groups.

7.4 Financial Plan Summary

The primary goal is for AKO to evolve into a facility that will best serve the air transportation needs of Akron and the surrounding region, while simultaneously striving to become a self-sustaining economic generator. This Airport Master Plan can best be described as the road map to helping the Airport and the Town achieve these goals. In order to realize those goals through the successful implementation of airport development projects, the Airport must make sound and measured decisions. Two of the most important factors influencing the decision to move forward with a specific improvement are airport activity levels (i.e., demand) and funding availability. Both factors must be considered in the implementation of the CIP, because while airport activity levels provide the "what" and the "why" in implementing future airport improvements, the timing of funding provides the "how." The "what" and the "why" have been discussed in detail in previous chapters.

This chapter has addressed the "how" by providing an overview of the practical financial realities required to implement this overall airport development program. While every effort has been made in this chapter to conservatively estimate when facility development may be required, aviation demand and the availability of financial resources for capital projects will ultimately dictate when facility improvements need to be implemented, accelerated or delayed.

The financial plan presented in this chapter includes projection totals for operating revenues, operating expenses, capital expenditures, and capital funding presented above. Based on the assumptions identified within the previous sections, and subject to the availability of FAA and CDOT funding (identification of a potential funding source does not guarantee its availability), and the identification of other financial resources described in the analysis, implementation of AKO's master plan CIP is financially feasible.

Key assumptions supporting the financial plan relate to the availability and timeliness of the funding sources. Continuation of the AIP entitlement program at authorized funding levels is essential. Additionally, securing federal funding of approximately $8,705,700 during Phase I, $5,895,000 during Phase II and $2,152,800 during Phase III is critical to the financial feasibility of implementing these projects. Without these levels of funding, these projects are not feasible and would need to be delayed or cancelled unless another source of funds could be acquired. As mentioned earlier, the Airport's ability to take advantage of recent supplementary AIP funding may be key in the development of Phase I projects.

As noted previously, when Congress reauthorizes the FAA's AIP, the funding formulas shown in the AKO CIP may change. If that happens, the CIP should be adjusted accordingly and the feasibility of implementing the projects in the time frame shown should be reconfirmed. After a new AIP program has been authorized, discussions will need to be held between AKO and the Denver Airports District Office (ADO) to determine the ADO's funding availability based on the new formulas and stipulations set by Congress. Similarly, CDOT funding levels and formulas change over time and need to be monitored, and close coordination with CDOT be maintained to ensure that state funding will be available when anticipated.

However, it should be recognized that planning is a continuous process that does not end with the completion of the Master Plan—the fundamental issues that have driven this planning effort will remain valid for many years. Therefore, the ability to continuously monitor actual revenues and expenses, as well as aviation activity levels, will be key to maintaining a sound financial position. Actual future financial outcomes will be determined by a variety of factors, many of which are difficult to identify at this time, such as future FAA and CDOT funding formulas, and potential revenues associated with future development as well as businesses and tenants seeking to locate to AKO.

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Appendix A

Aviation Glossary of Terms

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A. APPENDIX A, AVIATION GLOSSARY OF TERMS

ABOVE GROUND LEVEL (AGL). An altitude that is measured with respect to the underlying ground.

ACCELERATED-STOP DISTANCE AVAILABLE (ASDA). See *Declared Distances.*

ADMINISTRATOR. Federal Aviation Administrator or any person to whom he has delegated his authority in the matter concerned.

ADVISORY CIRCULAR (AC). External communications or publications issued by the FAA to provide non-regulatory guidelines for the recommendations relative to a policy, and guidance and information relative to a specific aviation subject matter. An example of this is AC 150/1300-13A, *Airport Design*, which is frequently referenced throughout a typical master plan.

AIR CARRIER. A person or company who undertakes directly by lease, or other arrangement, to engage in air transportation.

AIR ROUTE TRAFFIC CONTROL CENTERS (ARTCC). A facility responsible for en route control of aircraft operating under IFR in a particular volume of airspace (within its area of jurisdiction) at high altitudes between airport approaches and departures. Approximately 26 such centers cover the United States.

AIR TAXI. An aircraft operating under an air taxi operating certificate for the purpose of carrying passengers, mail, cargo for revenue in accordance with FAR 121 or FAR Part 135.

AIR TRAFFIC. Any aircraft operating in the air or on an airport surface, exclusive of loading ramps and parking areas.

AIR TRAFFIC CONTROL (ATC). A service provided by ground-based controllers who direct aircraft on the ground and in the air. The primary purpose of ATC systems is to separate aircraft to prevent collisions, to organize and expedite the flow of traffic, and to provide information and other support for pilots when able.

AIR TRAFFIC CONTROL TOWER (ATCT). A facility in the terminal air traffic control system located at an airport which consists of a tower cab structure and an associated instrument flight rules rooms, if radar equipped, that uses ground-to-air and air-to-ground communications and radar, visual, signaling, and other devices to provide for the safe and expeditious movement of terminal area air traffic in the airspace and airports within its jurisdiction.

AIR TRAFFIC CONTROL (ATC) SERVICE. A service provided for the purpose of promoting the safe, orderly, and expeditious flow of air traffic, including airport, approach, and enroute air traffic control services. ATC is provided by the Federal Aviation Administration, a branch of the federal government under the Department of Transportation or, at Airport Traffic Control Tower (ATCT), through an independent service provider contracted with the Federal Aviation Administration.

AIRCRAFT. A device that is used or intended to be used for flight in the air.

- **Airplane.** An engine-driven fixed-wing aircraft heavier than air that is supported in flight by the dynamic reaction of the air against its wings.
    - **Large Airplane.** An airplane of more than 12,500 pounds maximum certified takeoff weight.
    - **Small Airplane.** An airplane of 12,500 pounds or less maximum certified takeoff weight.
- **Balloon.** A lighter-than-air aircraft that is not engine-driven, and that sustains flight through the use of either gas buoyancy or an airborne heater.

- **Glider.** A heavier-than-air aircraft that is supported in flight by the dynamic reaction of the air against its lifting surfaces and whose free flight does not depend principally on an engine.
- **Heavy Aircraft.** Aircraft capable of takeoff weight of more than 255,000 pounds whether or not they are operating at this weight during a particular phase of flight.
- **Helicopter.** A rotorcraft that, for horizontal motion, depends principally on its engine-driven rotors.
- **Large Aircraft.** Aircraft of more than 41,000 pounds maximum certified takeoff weight, up to 255,000 pounds.
- **Regional Jet (RJ).** There is no regulatory definition for an RJ; however, for FAA use, an RJ is a commercial jet airplane that carries fewer than 100 passengers.
- **Rocket**. An aircraft propelled by ejected expanding gases generate in engine from self-contained propellants and not dependent on the intake of outside substances.
- **Rotorcraft.** A heavier-than-air aircraft that depends principally for it support in flight on the lift generated by one or more rotors.
- **Small Aircraft.** Aircraft of 41,000 pounds or less maximum certified takeoff weight.

AIRCRAFT APPROACH CATEGORY (AAC). A grouping of aircraft based on approach speed, defined as 1.3 times the aircraft stall speed at maximum certificated takeoff weight. The categories are as follows:

- **Category A**: Speed less than 91 knots.
- **Category B**: Speed 91 knots or more but less than 121 knots.
- **Category C**: Speed 121 knots or more but less than 141 knots.
- **Category D**: Speed 141 knots or more but less than 166 knots.
- **Category E**: Speed 166 knots or more.

AIRCRAFT DEICING PAD. See *Deicing Pad*.

AIRCRAFT ENGINE. The component of the propulsion system for an aircraft that generates mechanical power. They are almost always either lightweight piston engines or gas turbines, although electric engines are currently in development.

- **Piston Engine.** A heat engine that uses one or more reciprocating pistons to convert pressure generated from aviation gasoline into a rotating motion.
- **Turbine Engine.** A mechanical device or engine that spins in reaction to fluid flow through or over it. This device is used in turbofan, turbojet, and turboprop-powered aircraft and utilizes jet fuel.
    - **Turbofan.** A turbojet engine whose thrust has been increased by the addition of a low-pressure compressor fan.
    - **Turbojet.** An engine that derives power from a fanned wheel spinning in reaction to burning gases escaping from a combustion chamber. The turbine in turn drives a compressor and other accessories.
    - **Turboprop.** A turbine engine in which the rotating turbine turns a propeller.

AIRCRAFT OPERATION. See *Operation*.

AIRCRAFT RESCUE AND FIRE FIGHTING (ARFF). A special category of fire fighting that involves the response, hazard mitigation, evacuation and possible rescue of passengers and crew of an aircraft involved in (typically) an airport ground emergency.

AIRPLANE. See *Aircraft.*

AIRPLANE DESIGN GROUP (ADG). A numerical classification aircraft based on wingspan or tail height. Where an airplane is in two categories, the most demanding category should be used. The groups are as follows:

- **Group I**: Up to but not including 49 feet wingspan or tail height up to but not including 20 feet (e.g. Cessna 172).
- **Group II**: 49 feet up to but not including 79 feet wingspan or tail height from 20 up to not including 30 feet (e.g. Cessna Citation Business jet).
- **Group III**: 79 feet up to but not including 118 feet wingspan or tail height from 30 up to but not including 45 feet (e.g. Boeing 737).
- **Group IV**: 118 feet up to but not including 171 feet wingspan or tail height from 60 up to but not including 66 feet (e.g. Boeing 767).
- **Group V**: 171 feet up to but not including 214 feet wingspan or tail height from 60 up to but not including 66 feet (e.g. Boeing 747).
- **Group VI**: 214 feet up to but not including 262 feet wingspan or tail height from 66 up to but not including 80 feet (e.g. Airbus A380).

AIRPORT. An area of land or water that is used or intended to be used for the landing and takeoff of aircraft, and includes its buildings and facilities, if any. Different types of airports include the following:

- **Cargo Service Airport.** An airport served by aircraft providing air transportation of property only, including mail, with an annual aggregate landed weight of at least 100 million pounds.
- **Certificated Airport.** An airport that has been issued an Airport Operating Certificate by the FAA under the authority of FAR Part 139, Certification and Operation.
- **Commercial Service Airport.** A public airport providing scheduled passenger service that enplanes at least 2,500 annual passengers.
- **General Aviation Airport.** An airport that provides air service to only general aviation.
- **Hub Airport.** An airport that an airline uses as a transfer point to get passengers to their intended destination. It is part of a hub and spoke model, where travelers moving between airports not served by direct flights change planes en route to their destinations.
  - **Large Hub Airport.** An airport that handles over 1% of the country's annual enplanements.
  - **Medium Hub Airport.** An airport that handles 0.25% ≥ 1% of the country's annual enplanements.
  - **Small Hub Airport.** An airport that handles 0.05% ≥ 0.25% of the country's annual enplanements.
  - **Non-Hub Airport.** An airport that handles over 10,000 enplanements, but less than 0.05% of the country's annual enplanements.
- **International Airport.** Relating to international flight, it means:
  - An airport of entry which has been designated by the Secretary of Treasury or Commissioner of Customs as an international airport for customs service.
  - A landing rights airport at which specific permission to land must be obtained from customs authorities in advance of contemplated use.
  - Airports designated under the Convention on ICAO as an airport for use by international commercial air transport and/or international general aviation.
- **Primary Airport.** A commercial service airport that enplanes at least 10,000 annual passengers.
- **Reliever Airport.** General aviation airports in a major metropolitan area that provides pilots with attractive alternatives to using congested hub airports.
- **Uncontrolled Airport.** An airport without an air traffic control tower at which the control of VFR traffic is not exercised. Pilots "see and avoid" other traffic without the aid of air traffic control.

AIRPORT AUTHORITY. A quasi-government public organization responsible for setting the policies governing the management and operation of an airport or system of airports under its jurisdiction.

AIRPORT CAPITAL IMPROVEMENT PLAN (CIP). The planning program used by the FAA to identify, prioritize, and distribute funds for airport development and the needs of National Airspace System (NAS) to meet specified national goals and objectives.

AIRPORT ELEVATION. The highest point of an airport's usable runway(s) expressed in feet above mean sea level (MSL).

AIRPORT FACILITY DIRECTORY (AFD). Now known as a Chart Supplement, a publication with information on all airports, seaplane bases, and heliports open to the public. This publication is issued in seven volumes according to geographical area, and includes communications data, navigational facilities, and certain special notices and procedures.

AIRPORT HAZARD. Any structure or natural object located on or in the vicinity of a public airport, or any use of land near such airport, that obstructs the airspace required for the flight of aircraft in landing or taking off at the airport or is otherwise hazardous to aircraft landing, taking of, or taxiing at the airport.

AIRPORT IMPROVEMENT PROGRAM (AIP). An FAA program authorized by the Airport and Airway Improvement Act of 1982 that serves as the primary source of funding airport planning and development. This funding is provided at specific levels, with the funding priority based on the airport's Capital Improvement Program (CIP) and available funds.

AIRPORT INFLUENCE AREA. The area defined by overlaying the FAR Part 77 Imaginary Surfaces, Aircraft Accident Safety Zone data, and Noise Contour data over the top of an existing land use map, critical areas map or other base map.

AIRPORT LAYOUT PLAN (ALP). A scaled drawing (or set of drawings), in either traditional or electronic form, of current and future airport facilities that provides a graphic representation of the existing and long-term development plan for the airport and demonstrates the preservation and continuity of safety, utility, and efficiency of the airport to the satisfaction of the FAA.

AIRPORT LIGHTING. Various lighting aids that may be installed on an airport. Types of airport lighting include:

- **ALS.** See *Approach Light System.*
- **Boundary Lights.** Lights defining the perimeter of an airport or landing area.
- **Runway Centerline Lighting.** Flush centerline lights spaced at 50-foot intervals beginning 75 feet from the landing threshold and extending to within 75 feet of the opposite end of the runway. Only used on Category II/III ILS Runways.
- **Runway Edge Lights.** Lights used to outline the edges of the runways during periods of darkness or restricted visibility conditions. They are usually uniformly spaced at intervals of approximately 200 feet, and intensity may be controlled or preset. These light systems are classified according to the intensity they are capable of producing:
  - High Intensity Runway Lights (HIRLs)
  - Medium Intensity Runway Lights (MIRLs)
  - Low Intensity Runway Lights (LIRLs)
- **Runway End Identifier Lights (REIL).** Provides rapid and positive identification of the approach end of particular runway. The system consists of a pair of synchronized flashing lights, one on each side of the runway threshold.

- **Threshold Lights.** Fixed lights arranged symmetrically left and right of the runway centerline, identifying the runway threshold. Lights are green for arriving aircraft and red for departing aircraft.
- **Touchdown Zone Lighting.** Two rows of transverse light bars located symmetrically about the runway centerline normally at 100 foot intervals. Only used on Category II/III ILS Runways.

AIRPORT MARKINGS. Markings used on runway and taxiway surfaces to identify a specific runway, a runway threshold, a centerline, a hold line, etc. A runway should be marked in accordance with its present usage such as: 1) Visual, 2) Non-precision instrument, 3) Precision Instrument.

AIRPORT MASTER PLAN. A comprehensive study of an airport that focuses on the short-, medium-, and long-term development plan to meet future aviation demand of the airport.

AIRPORT OBSTRUCTION CHART (OC). A scaled drawing depicting the FAR Part 77 imaginary airspace surfaces, a representation of objects that penetrate these surfaces, runway, taxiway, and ramp areas, navigational aids, buildings, roads, and other detail in the vicinity of the airport.

AIRPORT OPERATIONS AREA (AOA). An area of an airport used or intended to be used for landing, takeoff, or surface maneuvering of aircraft. An AOA includes such paved areas or unpaved areas that are used or intended to be used for the unobstructed movement of aircraft in addition to its associated runway, taxiways, or apron.

AIRPORT OPERATOR. The operator (private or public) or sponsor of a public-use airport.

AIRPORT REFERENCE CODE (ARC). A coding system used to relate the airport design criteria to the operational and physical characteristics of the airplanes intended to use the airport or the critical aircraft. It is a two-character code consisting of the Aircraft Approach Category and the Airplane Design Group.

AIRPORT REFERENCE POINT (ARP). The latitude and longitude of the approximate center of the runway(s) at an airport.

AIRPORT SIGNS. Signs used to identify items and locations on the airport. Following are the most common sign types:

- **Boundary Sign.** These signs are used to identify the location of the boundary of the RSA/ROFZ or ILS critical areas for a pilot, or an existing the runway. These signs have a black inscription on a yellow background.
- **Destination Sign.** These signs indicate the general direction to a remote location. They have black inscriptions on a yellow background and ALWAYS contain an arrow.
- **Direction Sign.** These signs indicate directions of taxiways leading out of an intersection. They may also be used to indicate a taxiway exit from a runway. These signs have black inscriptions on a yellow background and ALWAYS contain arrows.
- **Information Sign.** These signs are installed on the airside of an airport and are considered to be signs other than mandatory signs. They have black inscriptions on a yellow background.
- **Location Sign.** These signs identify the taxiway or runway upon which the aircraft is located. The sign has yellow inscriptions on a black background with a yellow border and does NOT use arrows.
- **Mandatory Instruction Sign.** They denote taxiway/runway intersections, runway/runway intersections, ILS critical areas, OFZ boundaries, runway approach areas, CAT II/II operations areas, military landing zones, and no entry areas. These signs have white inscriptions with a black outline on a red background.

- **Roadway Sign.** These signs are located on the airfield and are solely intended for vehicle operators. They should conform to the categorical color codes established by the Manual on Uniform Traffic Control Devices (MUTCD).
- **Runway Distance Remaining Signs.** These signs are used to provide distance remaining information to pilots during takeoff and landing operations. These signs have a white numeral inscription on a black background.

AIRPORT SPONSOR. The entity that is legally responsible for the management and operation of an airport including the fulfillment of the requirements of laws and regulations related thereto.

AIRPORT SURVEILLANCE RADAR (ASR). A radar system used at airports to detect and display the position of aircraft in the terminal area.

AIRSIDE. The portion of an airport that contains the facilities necessary for the operations of aircraft.

ANNUAL SERVICE VOLUME (ASV). The number of annual operations that can reasonably be expected to occur at the airport based on a given level of delay.

APPROACH END OF RUNWAY. The approach end of runway is the near end of the runway as viewed from the cockpit of a landing airplane.

APPROACH LIGHT SYSTEM (ALS). An airport lighting facility aids in runway identification during the transition from instrument flight to visual flight for landing. Typical approach lighting systems used at airports include:

- **Approach Light System with Sequenced Flashing (ALSF)**.
- **Lead-in-light System (LDIN).** Consists of one or more series of flashing lights installed at or near ground level that provides positive visual guidance along an approach path, either curving or straight, where special problems exist with hazardous terrain, obstructions, or noise abatement procedures.
- **Medium-Intensity Approach Light System with Runway Alignment Indicator (MALSR).** A lighting system installed on the approach end of a runway and consists of a series of lightbars, strobe lights, or a combination that extends outward from the runway end. It usually serves a runway that has an instrument approach procedure associated with it and allows the pilot to visually identify and align self with the runway environment once the pilot has arrived at a prescribed point on the approach.
- **Omnidirectional Approach Lighting System (ODALS).** Consist of seven omnidirectional flashing lights located in the approach area of a non-precision runway. Five lights are located on the runway centerline extended with the first light located 300 feet from the threshold and extending at equal intervals up to 1,500 feet from the threshold. The other two lights are located on each side of the runway, with a lateral distance of 40 feet from the runway edge, or 75v feet from the runway edge when installed on a runway equipped with VASI.
- **Runway Alignment Indicator Lights (RAILS).** Sequenced Flashing Lights which are installed only in combination with other lighting systems.

APPROACH PROCEDURES WITH VERTICAL GUIDANCE (APV). Instrument approach procedures conducted under IFR that provide both lateral and vertical guidance, but that do not meet all the accuracy requirements and navigation specifications to be classified as precision approach. Examples of APV approaches include Area Navigation (RNAV) (lateral approach procedures with vertical guidance (LPV) or lateral navigation (LNAV)/vertical navigation (VNAV) minimums) and localizer-type directional aid (LDA) with glideslope (GS).

APPROACH SURFACE. See *Imaginary Surfaces*.

APRON. A specific portion of the airfield used for passenger, cargo or freight loading and unloading, aircraft parking, and the refueling, maintenance and servicing of aircraft. Also referred to as ramp or tarmac.

ARFF BUILDING. A facility located at an airport that provides emergency vehicles, extinguishing agents, and personnel responsible for minimizing the impacts of an aircraft accident or incident.

ARRIVAL TIME. The time an aircraft touches down on arrival.

AUTOMATED FLIGHT SERVICE STATION (AFSS). An automated air traffic facility that provides information and services to aircraft pilots before, during, and after flights, but it is not responsible for giving instructions or clearances or providing separation.

AUTOMATED SURFACE OBSERVATION SYSTEM (ASOS). Similar data reporting as an AWOS, but usually owned and maintained by the National Weather Service.

AUTOMATED WEATHER OBSERVATION SYSTEM (AWOS). An automated sensor suite which is voice synthesized to provide a weather report that can be transmitted via VHF radio, NDB, or VOR ensuring that pilots on approach have up-to-date airport weather for safe and efficient aviation operations. Most AWOS observe and record temperature and dew point in degrees Celsius, wind speed and direction in knots, visibility, cloud coverage and ceiling up to 12,000 feet, freezing rain, thunderstorm (lightning), and altimeter setting.

AVGAS. Aviation fuel (gasoline) used for aircraft with internal-combustion engines. The most common Avgas is currently 100LL (Low Lead).

AVIGATION EASEMENT. A contractual right or a property interest in land over which a right of unobstructed flight in the airspace can occur.

BALLOON. See *Aircraft*.

BAGGAGE CLAIM. An area where passengers obtain luggage that was previously checked at an airline ticket counter at the departing airport.

BASED AIRCRAFT. An aircraft permanently stationed at an airport by agreement between the airport owner (management or FBO) and the aircraft owner.

BASE LEG. See *Traffic Pattern*.

BENEFIT-COST ANALYSIS (BCA). An analysis of the cost, benefit, and the uncertainty associated with a project or action. A formal BCA is required for capacity projects of $5 million or more AIP discretionary funds.

BIRDS BALLS. High-density plastic floating balls that can be used to cover ponds and prevent birds from using the sites.

BLAST FENCE. A barrier used to divert or dissipate jet blast or propeller wash.

BOUNDARY LIGHTS. See *Airport Lighting.*

BOUNDARY SIGN. See *Airport Signs.*

BUILDING RESTRICTION LINE (BRL). A line that identifies suitable building area locations on airports to limit building proximity to aircraft movement areas. Typically based on the FAR Part 77 Airport Imaginary Surfaces.

CAPACITY (THROUGHPUT CAPACITY). A measure of the maximum number of aircraft operations or their airport components which can be accommodated on the airport.

CAPITAL IMPROVEMENT PROGRAM (CIP). Provides a schedule of development for the proposed projects identified by an airport or through the development of an Airport Master Plan.

CARGO SERVICE AIRPORT. See *Airport.*

CEILING. The height above the earth's surface of the lowest layer of clouds or obscuring phenomena that is reported as broken, overcast or obscured.

CERTIFICATED AIRPORT. See *Airport.*

CIRCLING APPROACH. A maneuver initiated by the pilot to align the aircraft with a runway for landing when a straight-in landing from an instrument approach is not possible or is not desirable.

CLEARWAY (CWY). A defined rectangular area beyond the end of the runway cleared or suitable for use in lieu of runway to satisfy take off distance requirements.

COMMERCIAL SERVICE AIRPORT. See *Airport.*

COMMON TRAFFIC ADVISORY FREQUENCY (CTAF). The VHF radio frequency used for air-to-air communication at uncontrolled airports or where no control tower is currently active. Pilots use the common frequency to coordinate their arrivals and departures safely, give position reports, and acknowledge other aircraft in the airfield traffic pattern.

COMPASS ROSE. A circle, graduated in degrees, printed on some charts or marked on the ground at an airport. It is used as a reference to either true or magnetic direction. When marked on the ground it is used to calibrate an aircraft's compass.

CONICAL SURFACE. See *Imaginary Surfaces.*

CONSULTANT. A firm, individual, partnership, corporation, or joint venture that performs architectural, engineering or planning service as defined in FAA AC150/5100-14D, employed to undertake work funded under an FAA airport grant assistance program.

CONTROLLED AIRSPACE. Airspace of defined dimensions within which air traffic control service is provided to IFR flight and to VFR flights in accordance with the airspace classification. Controlled airspace is a generic term that covers Class A, Class B, Class C, Class D, and Class E Airspace.

CRITICAL (DESIGN) AIRCRAFT. The most demanding aircraft with at least 500 annual operations that operates, or is expected to operate, at the airport.

CROSSWIND. A wind that is not parallel to a runway centerline or to the intended flight path of an aircraft.

CROSSWIND COMPONENT. The component of wind that is at a right angle to the runway centerline or the intended flight path of an aircraft.

CROSSWIND LEG. See *Traffic Pattern.*

DECISION HEIGHT (DH). The lowest height or altitude in an approach descent and the point at which a missed approach shall be initiated if the required visual reference has not been established. This term is used only in procedures where an electronic glide slope provides the reference for descent, as in ILS.

DECLARED DISTANCES. The distances the airport owner declares available for an aircraft's takeoff run, takeoff distance, accelerated-stop distance, and landing distance requirements.

- **Takeoff Run Available (TORA).** The runway length declared available and suitable for the ground run of an aircraft taking off.
- **Takeoff Distance Available (TODA).** The runway length equal to the TORA plus the length of any remaining runway or clearway beyond the far end of the TORA; the full length of TODA may need to be reduced because of obstacles in the departure area.
- **Accelerated Stop Distance Available (ASDA).** The runway length equal to the runway plus stopway length declared available and suitable for the acceleration and deceleration of an aircraft aborting a takeoff.
- **Landing Distance Available (LDA).** The runway length equal to the length of runway available and suitable for the landing ground run of airplanes.

DESIGN AIRCRAFT. An aircraft whose dimensions and/or other requirements make it the most demanding aircraft for an airport's facilities (i.e. runways and taxiways). The Design Aircraft is used as the basis for airport planning and design since it is assumed that airport facilities are designed to accommodate the Design Aircraft will also be able to accommodate less demanding aircraft as well. An aircraft can be utilized as the Design Aircraft for an airport if it will (has) conduct(ed) 500 or more annual operations (250 landings) at that airport.

DECISION HEIGHT (DH). This is associated with precision approaches and the aircraft is continually descending on final approach. When the aircraft reaches the DH, the pilot must make a decision to land or execute the missed approach procedure.

DEICING. The removal, though application of a max of heated water and propylene or ethylene glycol, of frost, ice, slush, or snow from the aircraft in order to provide clean surfaces.

DEICING PAD. A facility where an aircraft received deicing or anti-icing.

DELAY. The difference between constrained and unconstrained operating time.

DEMAND. The number of aircraft operations, passengers, or other factors that are required in a specific period of time.

DEPARTMENT OF TRANSPORTATION (DOT). The United States federal department that institutes and coordinates national transportation programs; created in 1966. The FAA is an organization within the DOT.

DEPARTURE AIRSPACE. See *Approach Airspace.*

DESTINATION SIGN. See *Airport Signs.*

DETENTION PONDS. Storm water management ponds that hold storm water for short periods of time, a few hours to a few days.

DIRECTION SIGN. See *Airport Signs.*

DISCRETIONARY GRANT FUNDS. Annual Federal grant funds that may be appropriate to an airport based upon designation by the Secretary of Transportation or Congress to meet a specified national priority such as enhancing capacity, safety, and security or mitigating noise.

DISPLACED THRESHOLD. See *Threshold.*

DISTANCE MEASURING EQUIPMENT (DME). See *Navigation Aid.*

DOWNWIND LEG. See *Traffic Pattern.*

EMERGENCY LOCATOR TRANSMITTER (ELT). A radio transmitter attached to the aircraft structure that aids in locating downed aircraft by radiating an audio tone on 121.5 MHz or 243 MHz.

ENPLANEMENT. The boarding of a passenger, cargo, freight or mail on an aircraft at an airport.

END-AROUND TAXIWAY (EAT). Taxiways constructed to allow an aircraft to cross the extended centerline of the runway without specific clearance from ATC. EAT projects must be pre-approved by the FAA Office of Airport Safety and Standards, Airport Engineering Division.

ENTITLEMENT GRANT FUNDS. Annual federal funds for which all airports in the NPIAS are eligible for.

ENVIRONMENTAL ASSESSMENT (EA). An environmental analysis performed pursuant to the Nation Environmental Policy Act to determine whether an action would significantly affect the environment and thus require a more detailed environment al impact statement.

ENVIRONMENTAL IMPACT STATEMENT (EIS). A document required of federal agencies by the National Environmental Policy Act (NEPA) for major projects or legislative proposals affecting the environment. It is a tool for decision-making describing the positive. If no significant impact is found a Finding of No Significant Impact (FONSI) is issued.

FEDERAL AVIATION ADMINISTRATION (FAA). An agency of the United States Department of Transportation with authority to regulate and oversee all aspects of civil aviation in the United States.

FEDERAL AVIATION REGULATION (FAR). The general and permanent rules established by the executive departments and agencies of the Federal government for aviation which are published in the Federal Register. These are the aviation subset of the U.S. Code of Federal Regulations (CFR).

FEDERAL GRANT AGREEMENT. A Federal agreement that represents an agreement made between the FAA (on the behalf of the United States) and an airport sponsor for the grant of Federal Funding.

FEDERAL GRANT ASSURANCE. A provision within a Federal grant agreement to which the recipient of Federal airport development assistance has agreed to comply in consideration of the assistance provided.

FINAL APPROACH FIX (FAF). The fix from or over which final approach (IFR) to an airport is executed.

FINAL APPROACH. A flight path of a landing aircraft in the direction of landing along the extended runway centerline from the base leg to the runway. For instrument approaches, the final approach typically begins at the final approach fix (FAF).

FINDING OF NO SIGNIFICANT IMPACT (FONSI). A public document prepared by a Federal agency that presents the rationale why a proposed action will not have a significant effect on the environment and for which an environmental impact statement will not be prepared.

FIX. A geographical position determined by visual reference to the surface by reference to one or more radio NAVAIDs, by celestial plotting, or by another navigational device.

FIXED BASE OPERATION or FIXED BASE OPERATOR (FBO). A business enterprise located on the airport property that provides services to pilots including aircraft rental, training, fueling, maintenance, parking, and the sale of pilot supplies.

FLIGHT SERVICE STATION (FSS). An air traffic facility that provides information and services to aircraft pilots before, during, and after flights, but unlike ATC, is not responsible for giving instructions, clearances, or providing separation.

FLIGHT STANDARDS DISTRICT OFFICE (FSDO). An FAA field office serving an assigned geographical area and staffed with Flight Standard personnel who serve the aviation industry and the general public on matters relating to the certification and operation of air carrier and general aviation aircraft. Activities include general surveillance of operation safety, certification of airmen and aircraft, accident prevention, investigation, enforcement, etc.

FOREIGN OBJECT DEBRIS (FOD). Any object found on an airport that does not belong in or near airplanes, and as a result can injure personnel and damage aircraft.

FORM 7460-1, *NOTICE OF PROPOSED CONSTRUCTION OR ALTERNATION*. Federal law requires filing a Notice of Proposed Construction or Alteration (Form 7460) for all structures over 200 feet AGL or lower if closer than 20,000 feet to a public use airport with a runway over 3,200 feet in length.

FORM 7480-1, *NOTICE OF LANDING AREA PROPOSAL.* Submitted to the FAA Airport Regional Division Office or ADO as formal written notification for project involving the construction of a new airport; the construction, realigning, altering, activating, or abandoning of a runway, landing strip, or associated taxiway; or the deactivation or abandoning of an entire airport.

FUEL FLOWAGE FEE. A tax assessed on the user, which is paid at the pump. Fuel flowage fee revenues are sent to the airport governing body, usually the board or authority and are then used for airport improvements or other expenses.

GAP ANALYSIS. See *Safety Management System*.

GATE. An aircraft parking position used by a single aircraft loading or unloading passengers, mail, or cargo, etc.

GENERAL AVIATION (GA). The segment of aviation that encompasses all aspects of civil aviation except certified air carriers and other commercial operators, such as airfreight carriers.

GENERAL AVIATION AIRPORT. See *Airport.*

GEOGRAPHIC INFORMATION SYSTEM (GIS). A technology that manages, analyzes, and disseminates geographic data.

GLIDER. See *Aircraft.*

GLIDESLOPE. See *Instrument Landing System.*

GLOBAL POSITIONING SYSTEM (GPS). A satellite based navigational system that provides signals in the cockpit of aircraft defining aircraft position in terms of latitude, longitude, and altitude.

GPS RUNWAY. See *Runway.*

GRANT AGREEMENT. See *Federal Grant Agreement.*

GROUND ACCESS. The transportation system on and around the airport that provides access to and from the airport by ground transportation vehicle for passengers, employees, cargo, freight, and airport services.

HAZARD. See *Safety Management System.*

HAZARD TO AIR NAVIGATION. An existing or proposed object that the FAA, as a result of an aeronautical study, determines will have a substantial adverse effect upon the safe and efficient use of navigable airspace by aircraft, operation of air navigation facilities, or existing or potential airport capacity.

HAZARDOUS WILDLIFE. Species of wildlife (birds, mammals, reptiles) including feral animals and domesticated animals not under control, that are associated with aircraft strike problems, are capable of causing structural damage to airport facilities, or act as attractants to other wildlife that pose a strike hazard.

HEAVY AIRCRAFT. See *Aircraft.*

HEIGHT ABOVE AIRPORT (HAA). Indicates the height of the MDA above the published airport elevation. This is published in conjunction with circling minimums.

HELICOPTER. See *Aircraft.*

HELIPAD. A small, designated area, usually with prepared surface, on a heliport, airport, landing/takeoff area, apron/ramp, movement area used for takeoff, landing, or parking of helicopters.

HELIPORT. An area of land, water, or structure used or intended to be used for the landing and takeoff of helicopters.

HIGH INTENSITY RUNWAY LIGHTING (HIRL). See *Airport Lighting.*

HOLDING. A predetermined maneuver which keeps an aircraft within a specified airspace while awaiting further clearance.

HOLDING FIX. A specified geographical point or NAVAID used as a reference point in establishing and maintaining the position of an aircraft while holding.

HOLDOVER TIME. The estimated time the application of anti-icing fluid will prevent the formation of frozen contamination on the protected surfaces of an aircraft. With a one-step deicing/anti-icing operation, the holdover beings at the start of the operations; with a two-step operation, the holdover beings at the start of the final anti-icing application.

HOT SPOT. A location on an airport movement area with a history of potential risk of collision or runway incursion, and where heightened attention by pilots and drivers is necessary.

HORIZONTAL SURFACE. See *Imaginary Surfaces.*

HUB AIRPORT. See *Airport.*

IMAGINARY SURFACES. Are surfaces defined in 14 CFR Part 77, and are in relation to the airport and each runway. The size of these imaginary surfaces is based on the category of each runway for current and future airport operations. Any objects which penetrate these surfaces are considered an obstruction and affects navigable airspace.

- **Approach Surface.** An imaginary obstruction limiting surface defined in 14 CFR Part 77 which is longitudinally centered on an extended runway centerline and extends outward and upward from the primary surface at each end of a runway at a designated slope and distance upon the type of available or planned approach by aircraft to a runway.

- **Conical Surface.** An imaginary obstruction-limiting surface defined in 14 CFR Part 77 that extends from the edge of the horizontal surface outward and upward at a slope of 20 to 1 for a horizontal distance of 4,000 feet.
- **Horizontal Surface.** An imagery obstruction-limiting surface defined in 14 CFR Part 77 that is specified as a portion of a horizontal plane surrounding a runway located 150 feet above the established airport elevation. The specific horizontal dimension of this surface is a function of the types of approaches existing or planned for the runway.
- **Primary Surface.** An imaginary obstruction-limiting surface defined in 14 CFR Part 77 that is specified as a rectangular surface longitudinally centered about a runway. The specific dimensions of this surface are function of types of approaches existing or planned for the runway.
- **Transitional Surface.** An imaginary obstruction-limiting surface defined in 14 CFR Part 77 that extends outward and upward at right angles to the runway centerline and the runway centerline extended at a slope of 7 to 1 from the slides of the primary surface.

INCURSION. The unauthorized entry by an aircraft, vehicle, or obstacle into the defined protected area surrounding an active runway, taxiway, or apron.

INFORMATION SIGN. See *Airport Signs.*

INITIAL APPROACH. The segment of a standard instrument approach procedure between the initial approach fix and the intermediate fix, or the point where the aircraft is established on the intermediate segment of the final approach course.

INITIAL APPROACH ALTITUDE. The altitude prescribed for the initial approach segment of an instrument approach.

INNER MARKER (IM). See *Instrument Landing System.*

INSTRUMENT APPROACH PROCEDURE (IAP). A series of predetermined maneuvers for the orderly transfer of an aircraft under instrument flight conditions from the beginning of the initial approach to a landing or to a point from which a landing may be made visually.

INSTRUMENT FLIGHT RULES (IFR). Procedures for the conduct of flight in weather conditions below Visual Flight Rules (VFR) weather minimums. The term IFR is often also used to define weather conditions and type of flight plan under which an aircraft is operating. IFR is defined as the weather condition that occurs whenever the cloud ceiling is at least 500 feet above ground level, but less than 1,000 feet and/or visibility is at least one statue mile, but less than three statute miles.

INSTRUMENT LANDING SYSTEM (ILS). A precise ground based navigation system for aircraft that provides precision guidance to an aircraft approaching a runway. It uses a combination of radio signals and, in many cases, high-intensity lighting arrays to enable a safe landing during instrument meteorological conditions. Normally consists of the following components and visual aids:

- **Localizer.** The component of an ILS which provides horizontal guidance to the runway.
- **Glideslope.** An independent ILS subsystem that provides vertical guidance to aircraft approaching a runway. It is an antenna array that is usually located on one side of the runway touchdown zone.
- **Outer Marker (OM).** A marker beacon at or near the glideslope intercept altitude of an ILS approach and it keyed to transmit two dashes per second.
- **Middle Marker (MM).** A marker beacon that defines a point along the glideslope of an ILS normally located at or near the point of DH (CAT I). It is keyed to transmit alternate dots and dashes.

- **Inner Marker (IM).** A marker beacon used with an ILS (CAT II & CAT III) precision approach located between the middle marker and the end of the ILS runway, transmitting a radiation pattern keyed at six dots per second, and indicating that the pilot, both aurally and visually, is at the DH
- **Approach Lights.** See *Approach Lighting Systems*.

ILS CATEGORIES. The weather minimums associated with an ILS is defined by the following categories (note that to make landing under these conditions, aircraft must be equipped with special avionics, pilot must be qualified to land under specified conditions for that category, and aircraft must have proper ground equipment for conditions):

- **Category I:** 200-foot ceiling and 2,400-foot RVR;
- **Category II:** 100-foot ceiling and 1,200-foot RVR;
- **Category IIIA:** zero-foot ceiling and 700- foot RVR;
- **Category IIIB:** zero-foot ceiling and 150-foot RVR; and
- **Category IIIC:** zero-foot ceiling and zero-foot RVR.

INSTRUMENT METEOROLOGICAL CONDITIONS (IMC). Meteorological conditions expressed in terms of specific visibility and ceiling conditions that are less than the minimums specified for visual meteorological conditions. IMC are defined as period when cloud ceiling are less than 1,000 feet above ground and/or visibility less than three miles

INSTRUMENT RUNWAY. See *Runway.*

INTERNATIONAL CIVIL AVIATION ORGANIZATION (ICAO). An agency of the United Nations which codifies the principles and techniques of the international air navigation, and fosters the planning and development of international air transport to ensure safe and orderly growth. The ICAO Council adopts standards and recommended practices concerning air navigation, prevention of unlawful interference, and facilitation of border-crossing procedure for international civil aviation.

ISLAND. An unused paved or grassy area between taxiways, between runways, or between a taxiway and a runway. Paved islands are clearly marked as unusable, either by painting or the use of artificial turf.

ITINERANT OPERATIONS. See *Operation.*

JET-A. Type of aviation fuel designed for use in aircraft powered by gas-turbine engines.

KNOT. A unit of speed equal to one nautical mile per hour, or 1.15 statute mile per hour.

LAND AND HOLD SHORT OPERATIONS (LAHSO). To increase airport capacity, efficiency, and safety, LAHSO clearances usually instruct an aircraft to land, and then hold short of an intersecting runway, taxiway, or predetermined point.

LARGE HUB AIRPORT. See *Airport.*

LANDING DISTANCE AVAILABLE (LDA). See *Declared Distances.*

LANDSIDE. The portion of an airport that provides the facilities necessary for the processing of passengers, cargo, freight, and ground transportation vehicles.

LARGE AIRPLANE. See *Aircraft.*

LEAD-IN-LIGHT SYSTEM (LDIN). See *Approach Light System.*

LOCALIZER. See *Instrument Landing System.*

LOCALIZER PERFORMANCE WITH VERTICAL GUIDANCE (LPV). An instrument approach procedure that uses wide area augmentation system (WAAS) and very precise GPS capabilities to attain an airplane's position. Although it does provide vertical guidance and can provide minimums consistent with an ILS, an LPV is considered to be a non-precision approach.

LOCALIZER TYPE DIRECTIONAL AID (LDA). A facility of comparable utility and accuracy to a localizer but which is not part of a complete ILS and will not be aligned with the runway.

LOCAL OPERATIONS. See *Operation.*

LOCATION SIGN. See *Airport Signs.*

LOW INTENSITY AIRPORT LIGHTING. See *Airport Lighting.*

LOCAL OPERATION. See *Operations.*

MAGNETIC (COMPASS) HEADING. The heading relative to the magnetic poles of the Earth and indicated by a magnetic compass.

MANDATORY INSTRUCTION SIGN. See *Airport Signs.*

MAXIMUM CERTIFIED TAKEOFF WEIGHT (MTOW). The Maximum certificated weight for the airplane at takeoff, i.e. the airplane's weight at the start of the takeoff run.

MEAN SEA LEVEL (MSL). The average or mean height of the sea, with reference to a suitable reference surface.

MEDIUM HUB AIRPORT. See *Airport.*

MEDIUM INTENSITY APPROACH LIGHT SYSTEM WITH RUNWAY ALIGNMENT INDICATOR (MALSR). See *Approach Light System.*

MEDIUM INTENSITY RUNWAY LIGHTS (MIRL). See *Airport Lighting.*

MIDDLE MARKER (MM). See *Instrument Landing System.*

MILITARY OPERATIONS. See *Operation.*

MINIMUM DESCENT ALTITUDE (MDA). This is associated with non-precision approaches and is the lowest altitude an aircraft can fly until the pilot sees the airport environment. If the pilot has not found the airport environment by the Missed Approach Point (MAP) a missed approach is initiated.

MISSED APPROACH POINT (MAP). The point prescribed in an instrument approach at which a missed approach procedure shall be executed if visual reference of the runway environment is not in sight or the pilot decides it is unsafe to continue. The MAP is similar in principle to the Decision Height.

MODIFICATION TO STANDARDS (MOS). Any approved nonconformance to FAA standards, other than dimensional standards for Runway Safety Areas (RSAs), applicable to an airport design, construction, or equipment procurement project that is necessary to accommodate an unusual local condition for a specific project on a case-by-case basis while maintaining an acceptable level of safety.

MOVEMENT AREA. The runway, taxiways, and other area of an airport an airport/heliport which are utilized for taxiing, air taxiing, takeoff, and landing of aircraft, exclusive of loading ramps and parking areas. At those airports with a tower, specific approval for entry onto the movement area must be obtained from ATC.

NATIONAL AIRSPACE SYSTEM (NAS). The network of air traffic control facilities, air traffic control areas, and navigational facilities throughout the U.S.

NATIONAL ENVIRONMENTAL POLICY ACT (NEPA). Federal legislation that established environmental policy for the nation. It requires an interdisciplinary framework for federal agencies to evaluate environmental impacts and contains action-forcing procedures to ensure that federal agency decision makers take environmental factors into account.

NATIONAL PLAN OF INTEGRATED AIRPORT SYSTEMS (NPIAS). The national airport system plan developed by the Secretary of Transportation on a biannual basis for the development of public use airports to meet national air transportation needs.

NATIONAL TRANSPORTATION SAFETY BOARD (NTSB). A federal investigatory board whose mandate is to ensure safe public transportation. As part of the DOT, the NTSB investigates accidents, conducts studies, and makes recommendations to federal agencies and the transportation industry.

NAUTICAL MILE (NM). The unit measure of distance in both nautical and aeronautical context. A nautical mile equals 1.15 statute miles (6,080 feet). The measure of speed in regards to nautical miles is known as KNOTS (nautical miles per hour).

NAVIGATION AID (NAVAID). Any electronic and visual air navigation aids, lights, signs, and associated supporting equipment used or available for providing point-to-point guidance information or position data to aircraft in flight.

- **Distance Measuring Equipment (DME).** Equipment (airborne and ground) used to measure, in nautical miles, the slant range distance of an aircraft from the DME NAVAID.
- **Non-Directional Beacon (NDB).** A radio beacon transmitting non-directional signals whereby an aircraft equipped with direction finding equipment can determine headings to or from the radio beacon and “home” in on a track to or from it. The signal transmitted does not include inherent directional information.
- **Precision Approach Path Indicator (PAPI).** A path indicator that uses a single row of lights arranged to provide precision descent guidance information during approach to a runway.
- **Rotating Beacon.** A visual NAVAID used to assist pilots in finding an airport, particularly those flying in IMC or VFR at night. The beacon provides information about the type of airport through the use of a particular set of color filter:
  - Green flashed alternated with two quick white flashes: Lighted military land airport.
  - Alternating White and green flashes: Lighted civilian land airport.
  - Alternating white and yellow flashes: lighted water airport
  - Alternating yellow, green, and white: Lighted heliport.
- **Tactical Air Navigation (TACAN).** An ultra-high frequency electronic rho-theta NAVAID which provides suitably equipped aircraft a continuous indication of bearing and distance to the TACAN station.
- **Visual Approach Slope Indicator (VASI).** A system of lights arranged to provide vertical visual approach slope guidance to aircraft during approach to landing by radiating a directional pattern of high intensity red and white focused light beam.

- **VOR (Very High Frequency Omni-Directional Range).** A ground-based electronic NAVAID transmitting very high frequency navigation signals, 360-degree azimuth, oriented from magnetic north, used as a basis for navigation in NAS.
- **VORTAC (Very High Frequency Omni-Directional Range/Tactical Aircraft Control).** A NAVAID providing VOR azimuth, TACAN azimuth, and TACAN DME at one site.

NIGHT. The time between the end of evening civil twilight and the beginning of morning civil twilight, as published in the American Air Almanac, converted to local time.

NOISE ABATEMENT PROCEDURES. Procedures developed by the FAA and community to reduce the level of noise generated by aircraft departing over populated areas.

NOISE CONTOUR. A continuous line on a map of the airport vicinity connecting all points of the same noise level. These contours represent noise levels generated from aircraft operations, takeoff and landing of aircraft. They are generated based on mythology developed by the FAA and the data provides information that can be used to identify varying degrees of noise impacts on the surrounding area.

NON-DIRECTIONAL BEACON (NDB). See *Navigation Aid.*

NON-HUB AIRPORT. See *Airport.*

NON-MOVEMENT AREA. Taxilanes and apron areas not in the movement area and therefore not under the control of traffic control.

NON-PRECISION APPROACH PROCEDURE. A standard instrument approach procedure in which no electronic glideslope is provided.

NON-PRECISION RUNWAY. See *Runway.*

NOTICE TO AIRMEN (NOTAM). A notice containing information concerning the establishment, condition, or change in any component (facility, service, procedure of, or hazard in the NAS) the timely knowledge of which is essential to personnel concerned with flight operations.

OBJECT. Includes, but is not limited to above ground structures, NAVAIDs, people, equipment, vehicles, natural growth, terrain, and parked aircraft.

OBJECT FREE AREA (OFA). An area on the ground centered on a runway (ROFA), taxiway (TOFA), or taxilane centerline provided to enhance the safety of aircraft operations by having the area free of objects, except for objects that need to be located in the OFA for air navigation or aircraft ground maneuvering purposes.

OBSTACLE. An existing object at a fixed geographical location or which may be expected at a fixed location within a prescribed area with reference to which vertical clearance is or must be provided during flight operation.

OBSTACLE FREE ZONE (OFZ). The three-dimensional airspace along the runway and extended runway centerline that is required to be clear of obstacles for protection for aircraft landing or taking off from the runway and for missed approaches. It is the airspace below 150 feet above the established airport elevation and along the runway and extended runway centerline that is required to be clear of all objects, except for frangible visual NAVAIDs that need to be located in the OFZ because of their function, in order to provide clearance protection for aircraft landing or taking off from the runway, and for missed approaches.

OBSTRUCTION. An existing or future object that is of a greater height than any of the heights or surfaces defined in 14 CFR Part 77.23 and 77.25. (Note that obstructions to air navigation are presumed to be hazards to air navigation until an FAA study has determined otherwise.)

OMNIDIRECTIONAL APPROACH LIGHTING SYSTEM (ODALS). See *Approach Light System.*

OPERATION. The landing, takeoff, or touch-and-go procedure by an aircraft on a runway at an airport. Operations can be categorized into the following categories:

- **Itinerant Operations.** Operations by aircraft that leaves the local airspace.
- **Local Operations.** Aircraft operations performed by aircraft that are based at the airport and that operate in the local traffic pattern or within sight of the airport, that are known to be departing for or arriving from flights in local practice areas within a prescribed distance from the airport, or that execute simulated instrument approaches at the airport.
- **Military Operations.** Aircraft operations performed in military aircraft. May be itinerant or local operations.
- **Transient Operations.** Operations by aircraft that are not based at a specified airport.

OUTER MARKER (OM). See *Instrument Landing System.*

PARALLEL RUNWAYS. See *Runway.*

PARALLEL TAXIWAYS. See *Taxiway.*

PASSENGER FACILITY CHARGE (PFC). The collection of PFC fees for every enplaned passenger at commercial airports controlled by public agencies to be used to fund FAA-approved projects that enhance safety, security, or Capacity; reduce noise; or increase air carrier competition.

PEAK HOUR (PH). An estimate of the busiest hour in a day. This is also known as the design hour.

PERFORMANCE-BASED NAVIGATION (PBN). It specifies that aircraft RNP and RNAV systems performance requirements be defined in terms of accuracy, integrity, availability, continuity and functionality required for the proposed operations in the context of a particular airspace, when supported by the appropriate navigation infrastructure.

- **Area Navigation (RNAV).** A method of navigation that permits aircraft operations on any desired flight path.
- **Required Navigation Performance (RNP).** A type of Performance-Based Navigation (PBN) that allows an aircraft to fly a specific path between two three-dimensionally defined points in space.

PISTON ENGINE. See *Aircraft Engine.*

PLANNING ACTIVITY LEVEL (PAL). Selected activity levels that may trigger the need for additional facilities or improvements.

PRECISION APPROACH CATEGORIES I, II, III (CAT I, CAT II, CAT III). See *Instrument Landing System.*

PRECISION APPROACH PROCEDURE. A standard precision approach procedure in which an electronic glideslope is provided, such as ILS or PAR.

PRIMARY AIRPORT. See *Airport.*

PRIMARY SURFACE. See *Imaginary Surfaces.*

POOR VISIBILITY AND CEILING (PVC). Is a condition that exists whenever the cloud ceiling is less than 500 feet and/or the visibility is less than one statue mile.

PRECISION APPROACH PATH INDICATOR (PAPI). See *Navigational Aid.*

PUBLIC USE AIRPORT. An airport that is open to the general public with or without a prior request to use the airport.

RADAR (RADIO DETECTION AND RANGING). A device which, by measuring the time interval between transmission and reception of radio pulses, provides information on range, azimuth and/or elevation of objects in the path of the transmitted pulses.

RADAR SERVICE. A term which encompasses aircraft separation, navigation guidance, and/or flight track monitoring services based on the use of radar which can be provided by a controller to a pilot of a radar-identified aircraft.

RADAR SURVEILLANCE. The radar observation of a given geographic area for the purpose of performing some radar function.

RADIAL. A magnetic bearing extending from a VOR, a VORTAC, or a TACAN navigational facility.

RAMP. Synonymous with Apron. See *Apron.*

RECORD OF DECISION (ROD). A public document that reflects the FAA's final decision of an EIS, rationale behind that decision, and commitments to enforce and monitor mitigation.

REGIONAL JET. See *Aircraft.*

REGRESSION ANALYSIS. A statistical technique that seeks to identify and quantify the relationships between factors associated with a forecast.

RELIEVER AIRPORT. See *Airport.*

RETENTION PONDS. Storm water management ponds that hold water for several months.

RISK ASSESSMENT. See *Safety Management System.*

RNAV. See *Performance Based Navigation*

RNP. See *Performance Based Navigation.*

ROADWAY SIGN. See *Airport Signs.*

ROCKET. See *Aircraft.*

ROTATING BEACON. See *Navigation Aid.*

ROTORCRAFT. See *Aircraft.*

RUNWAY (RW). Defined as rectangular surface on an airport prepared or suitable for the landing and takeoff of airplanes. Runways can be classified as the following:

- **Instrument Runway.** A runway equipped with electronic and visual navigation aids for which a precision or non-precision approach procedure having straight-in landing minimums has been approved.
- **GPS Runway.** A runway having a precision or non-precision approach procedure using GPS navigational guidance with or without vertical guidance.
- **Non-precision Instrument Runway.** A runway having an existing instrument approach procedure utilizing air navigation facilities with only horizontal guidance for which a straight-in or side-step non-precision approach procedure has been approved.
- **Non-precision Runway.** A runway with only horizontal guidance available.
- **Parallel Runways.** Two or more runways at the same airport whose centerlines are parallel. In addition to runway number, parallel runways are designated as L (left) and R (right) or, if three parallel runways exist, L (left), C (center), and R (right).
- **Precision Instrument Runway.** A runway having an existing instrument approach procedure utilizing air navigation facilities with both horizontal and vertical guidance for which a precision approach procedure has been approved.
- **Utility Runway.** A runway that is constructed for and intended to be used by propeller driven aircraft of 12,500 pounds maximum gross weight and less.
- **Visual Runway.** A runway without an existing or planned straight-in instrument approach procedure and no instrument approach procedure/equipment.

RUNWAY ALIGNMENT INDICATOR LIGHTS (RAILS). See *Approach Light System.*

RUNWAY BLAST PAD. A surface adjacent to the ends of the runways provided to reduce the erosive effect of jet blast and propeller wash.

RUNWAY CENTERLINE LIGHTING. See *Airport Lighting.*

RUNWAY DESIGN CODE (RDC). A code signifying the design standards to which a runway is to be built.

RUNWAY DISTANCE REMAINING SIGN. See *Airport Signs.*

RUNWAY EDGE LIGHTS. See *Airport Lighting.*

RUNWAY END IDENTIFIER LIGHTS (REIL). See *Airport Lighting.*

RUNWAY ENVIRONMENT. The physical runway and the areas surrounding the runway out to the hold position marking.

RUNWAY GRADIENT. The ratio of the change in elevation divided by the length of the runway expressed as a percentage.

RUNWAY HEADING. The magnetic direction that corresponds with the runway centerline extended.

RUNWAY INCURSION. Any occurrence at an airport involving the incorrect presence of an aircraft, vehicle, or person on the protected area of a surface designated for the landing and takeoff of aircraft.

RUNWAY LIGHTS. See *Airport Lighting.*

RUNWAY PROTECTION ZONE (RPZ). A trapezoidal area off the runway end intended to enhance the protection of people and property on the ground.

RUNWAY SAFETY AREA (RSA). A defined surface surrounding the runway prepared or suitable for reducing the risk of damage to airplanes in the event of an undershoot, overshoot, or excursion from the runway.

RUNWAY VISUAL RANGE (RVR). The distance over which a pilot of an aircraft on the centerline of the runway can see the runway surface markings delineating the runway or identifying its centerline. RVR is normally expressed in feet.

SAFETY ASSESSMENT. See *Safety Management System.*

SAFETY ASSURANCE. See *Safety Management System.*

SAFETY MANAGEMENT SYSTEM (SMS). The formal top-down business-like approach to managing safety risk. It includes systematic procedures, practices, and policies for the management of safety (including safety risk management, safety policy, safety assurance, and safety promotion).

- **Gap Analysis*.*** Identification of existing safety components, compare to SMS program requirements. Gap analysis provides an airport operator an initial SMS development plan and Safety roadmap to compliance.
- **Hazard*.*** Any existing or potential condition that can lead to injury, illness, or death to people; damage to or loss of a system, equipment, or property, or damage to the environment. A hazard is a condition that is a prerequisite to an accident or incident.
- **Risk Assessment.** Assessment of the system or component to compare the achieved risk level with the tolerable risk level.
- **Safety Assessment.** A systematic, comprehensive evaluation of an implemented system.
- **Safety Assurance*.*** SMS process management functions that systematically provides confidence that organizational products/services meet or exceed safety requirements.
- **Safety Policy.** Defines the fundamental approach to managing safety that is to be adopted within an organization. Safety policy further defines the organization's commitment to safety and overall safety vision.
- **Safety Promotion**. A combination of safety culture, training, and data sharing activities that supports the implementation and operation of an SMS in an organization.
- **Safety Risk Control.** Anything that mitigates the safety risk of a hazard. Safety risk controls necessary to mitigate an unacceptable risk should be mandatory, measurable, and monitored for effectiveness.
- **Safety Risk Management (SRM).** A formal process within the SMS composed of describing the system, identifying the hazards, assessing the risk, analyzing the risk, and controlling the risk. The SRM process is embedded in the operation system: is not a separate/distinct process.
- **Severity**. The consequence or impact of a hazard in terms of degree of loss or harm.

SAFETY POLICY. See *Safety Management System.*

SAFETY PROMOTION. See *Safety Management System.*

SAFETY RISK. See *Safety Management System.*

SAFETY RISK CONTROL. See *Safety Management System.*

SAFETY RISK MANAGEMENT (SRM). See *Safety Management System.*

SCOPE. The document that identifies and defines the tasks emphasis, and level of effort associated with a project or study.

SELF-FUELING. The fueling of an aircraft by the owner or operator of the aircraft.

SEGMENTED CIRCLE. A circle located on an airport where wind and runway pattern information are located. It performs two functions: it aids the pilot in locating the obscure airports, and it provides a centralized location for wind and traffic pattern indicators as may be required on a particular airport.

SEPARATION. The spacing of aircraft to achieve their safe and orderly movement in flight and while landing and taking off.

SEPARATION MINIMA. The minimum longitudinal, lateral, or vertical distances by which aircraft are spaced through the application of air traffic control procedures.

SEVERITY. See *Safety Management System.*

SHOULDER. An area adjacent to the edge of paved runways, taxiways, or aprons providing a transition between the pavement and the adjacent surface; support for aircraft running off the pavement; enhanced drainage; and blast protection.

SMALL AIRPLANE. *See Aircraft.*

SMALL HUB AIRPORT. See *Airport.*

SNOW REMOVAL EQUIPMENT (SRE). Equipment, such as plow trucks and brooms, to remove snow from the paved surfaces on an airport.

SPONSOR. A public agency or private owner of a public-use airport that submits to the Secretary an application for financial assistance for the airport.

STATUTE MILE. A regular "highway" mile measuring 5,280 feet.

STOP END OF RUNWAY. The far runway end as viewed from the cockpit of a landing airplane.

STOPWAY. An area beyond the stop end of the takeoff runway which is no less wide than the runway and is centered on the extended centerline of the runway. It is able to support an airplane during an aborted takeoff without causing structural damage to the airplane, and designated by airport authorities for use in decelerating the airplane during an aborted takeoff. A blast pad is not a stopway.

SURFACE MOVEMENT GUIDANCE AND CONTROL SYSTEM (SMGCS). Systems providing routing, guidance, surveillance and control to aircraft and affected vehicles in order to maintain movement rates under all local weather condition within the Aerodrome Visibility Operational Level (AVOL) while maintaining the required level of safety.

SYSTEM OF AIRPORT REPORTING (SOAR). The FAA Office of Airport integrated database that contains airport planning, development, and financial information.

STRAIGHT-IN APPROACH. Entry into the traffic pattern by interception of the extended runway centerline (final approach) without executing any other portion of the traffic pattern.

TACTICAL AIR NAVIGATION (TACAN). See *Navigation Aid.*

TAILWIND. Any wind more than 90 degrees to the longitudinal axis of the runway.

TAKEOFF DISTANCE AVAILABLE (TODA). See *Declared Distances.*

TAKEOFF RUN AVAILABLE (TORA). See *Declared Distances.*

TAXI. The movement of an airplane under its own power on the surface of an airport.

TAXILANE (TL). The portion of the aircraft parking area used for access between taxiways and aircraft parking positions. A taxilane is outside the movement area, and is normally not controlled by the Air Traffic Control Tower.

TAXIWAY (TW). A defined path established for the taxiing aircraft from one part of an airport to another.

- **Parallel Taxiway.** A taxiway whose centerline is parallel to an adjacent runway.

TAXIWAY/TAXILANE OBJECT FREE AREA (TOFA). Clearing standards which prohibit service vehicle roads, parked aircraft, and other objects, except for objects that need to be located in the OFA for air navigation or aircraft ground maneuvering purposes. Vehicles may operate within the OFA provided they give right of way to oncoming aircraft.

TAXIWAY/TAXILANE SAFETY AREA (TSA). A defined surface alongside the taxiway prepared or suitable for reducing the risk of damage to an airplane unintentionally departing the taxiway.

TAXIWAY DESIGN GROUP (TDG). FAA aircraft classification system for taxiway design based on design aircraft undercarriage dimensions. These include the overall Main Gear Width (MGW) and the Cockpit to Main Gear Distance (CMG).

TECHNICAL ADVISORY COMMITTEE (TAC). A group of individuals that provide input on technical issues.

TERMINAL AREA. A general term used to describe airspace in which approach control service or airport traffic control service is provided.

TERMINAL AREA FORECAST (TAF). The official forecast of aviation activity, both aircraft and enplanements, at FAA facilities. This includes FAA-towered airports, federally contracted towered airports, non-federal towered airports, and many non-towered airports.

TERMINAL INSTRUMENT PROCEDURES (TERPS). Published flight procedure standards for conducting instrument approaches to runways under instrument meteorological conditions. Information on TERPS is contained in FAA Order 8260.3, United States Standard for Terminal Instrument Procedures (TERPS).

THRESHOLD (TH). The beginning of that portion of the runway available for landing. In some instances, the landing threshold may be displaced.

- **Displaced Threshold.** A threshold that is located at a point on the runway other than the designated beginning of the runway.

THRESHOLD LIGHTING. See *Airport Lighting.*

THROUGH-THE-FENCE (TTF) OPERATIONS. Those activities permitted by the airport sponsor through an agreement that permits access to the public landing area by independent entities or operator offering an aeronautical activity or to owners of aircraft based on land adjacent to, but not a part of, the airport property.

The obligation to make an airport available for the use and benefit of the public does not impose any requirement for the airport sponsor to permit ground access by aircraft from adjacent property.

THROUGHPUT CAPACITY. See *Capacity.*

TOUCH AND GO. A training operation in which a landing approach is made, the aircraft touches-down on the runway, but does not fully reduce speed to turn off the runway. Instead, full engine power is applied while still rolling and a takeoff is made, thereby practicing both maneuvers as part of one motion. It counts as two separate aircraft operations.

TOUCHDOWN ZONE LIGHTING. See *Airport Lighting.*

TRACK. The flight path of an aircraft over the surface of the earth.

TRAFFIC PATTERN. The traffic flow that is prescribed for aircraft landing at, taxiing on, or taking off from an airport. The following defines components of a standard traffic pattern:

- **Base Leg.** A flight path at right angles to the landing runway off its approach end. The base leg extends from the downwind leg to the intersection of the extended runway centerline.
- **Crosswind Leg**. A flight path at right angles to the landing runway off its upwind end.
- **Downwind Leg.** A flight path parallel to the landing runway in the direction opposite to landing. The downwind leg normally extends between the crosswind leg and the base leg.
- **Upwind Leg.** A flight path parallel to the landing runway in the direction of the landing.

TRANSITIONAL SURFACE. See *Imaginary Surfaces.*

TRANSIENT OPERATIONS. See *Operation.*

TRANSPORTATION SECURITY ADMINISTRATION (TSA). An agency established in 2001 to safeguard United States transportation systems and to insure safe air travel. TSA operates under the Department of Homeland Security.

TRUE HEADING. A heading relative to the actual North and South Poles of the Earth, rather than the magnetic poles.

TURBINE ENGINE. See *Aircraft Engine.*

TURBOFAN. See *Aircraft Engine.*

TURBOJET. See *Aircraft Engine.*

TURBOPROP. See *Aircraft Engine.*

UNCONTROLLED AIRPORT. See *Airport.*

UNCONTROLLED AIRSPACE. Airspace where an ATC service is not deemed necessary or cannot be provided for practical reasons. Uncontrolled airspace is a generic term that covers Class F and Class G Airspace.

UNIVERSAL INTEGRATED COMMUNICATIONS (UNICOM). An air-ground communication facility operated by a private agency to provide advisory service at uncontrolled airport. Aircraft call the ground station to make announcements of their intentions. In some cases, the ground station is not staffed. If no one is staffing the ground station, pilots broadcast their location and intentions over the UNICOM or CTAF channel. When the ground station is closed this is done without an acknowledgement.

UPWIND LEG. See *Traffic Pattern.*

UTILITY RUNWAY. See *Runway.*

VISIBILITY. A measure of the horizontal opacity of the atmosphere at which prominent unlighted objects may be seen and identified by day and prominent lighted objects may be seen and identified by night; and is expressed in terms of the horizontal distance at which a person should be able to see and identify, is measured in statute miles.

VISUAL APPROACH. An approach conducted on an IFR flight plan which authorizes the pilot to proceed visually and clear of clouds to the airport. The pilot, at all times, must have either the airport or the preceding aircraft in sight. Reported weather at the airport must be ceiling at or above 1,000 feet and visibility of three miles or greater.

VISUAL APPROACH SLOPE INDICATOR (VASI). See *Navigational Aid.*

VISUAL FLIGHT RULES (VFR). Procedures for the conduct of flight in weather conditions above Visual Flight Rules (VFR) weather minimums. The term VFR is often also used to define weather conditions and type of flight plan under which an aircraft is operating. VFR is defined as the weather condition whenever the cloud ceiling is at least 1,000 feet above ground level and visibility is at least three statue miles.

VISUAL METEOROLOGICAL CONDITIONS (VMC). Meteorological conditions expressed in terms of specific visibility and ceiling conditions which are equal to or greater than the threshold values for IMC.

VISUAL RUNWAY. See *Runway.*

VOR. See *Navigation Aid.*

VORTAC. See *Navigation Aid.*

WAKE TURBULENCE. The air turbulence caused by a moving aircraft, originating at the tips of the wings. The turbulence is caused by vortices generated by an aircraft's wingtips as it travels through the air. This turbulence is greatest when the aircraft is taking off and landing.

WIDE AREA AUGMENTATION SYSTEM (WAAS). An enhancement of the GPS that includes integrity broadcasts, differential correction, and additional ranging signals for the purpose of providing the accuracy, integrity, availability, and continuity required to support all phases of flight.

WILDLIFE ATTRACTANTS. Any human-made structure, land-use practice, or human-made or natural geographic feature that can attract or sustain hazardous wildlife within the approach or departure airspace or the airport's AOA. These attractants can include architectural features, landscaping, waste disposal sites, wastewater treatment facilities, agricultural or aquaculture activities, surface mining, or wetlands.

WILDLIFE HAZARD ASSESSMENT (WHA). An FAA assessment to assess the potential of, and mitigate the risk of wildlife strikes at an airport. It includes an analysis of the airport's wildlife strike history; the identification of the wildlife species observed and their numbers, locations, local movements, and daily and seasonal occurrences; the identification and location of features on and near the airport that attract wildlife; a description of wildlife hazards to aircraft operations; and ultimately, if required, a Wildlife Hazard Management Plan (WHMP) to identify measures to be implemented to reduce the risk of wildlife strikes.

WIND COVERAGE. The percent of time for which aeronautical operations are considered safe due to acceptable crosswind components.

WIND DIRECTION. The opposite direction in which the windsock is pointing, and is specified in terms of a magnetic heading.

WINDSOCK (WIND CONE). A conical textile tube designed to indicate wind direction and relative wind speed.

WINGSPAN. The maximum horizontal distance from one wingtip to the other wingtip, including the horizontal component of any extensions such as winglets or raked wingtips.

Appendix B

Presentations

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B. APPENDIX B, PRESENTATIONS

B.1 Project Advisory Committee Kickoff Meeting, October 10, 2016

Today's Agenda

We will:

- Become familiar with
  - The Project Team
  - Elements of a Master Plan
  - The Master Plan Process
  - Our Project Timeline & Next Steps
- Develop a forward-thinking vision for AKO

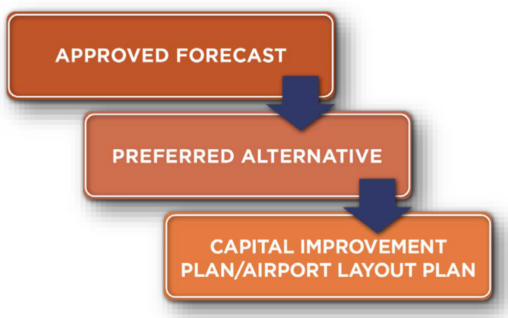
JVIATION

AKO Master Plan Team

JVIATION

Master Plan Elements

The Master Plan is a ***20 year plan*** to understand the needs of current and future users of the airport. This is important to ensure that ***safe and orderly development*** of the airport occurs in a manner that is ***reflective of community values and goals***. This plan is developed through a ***purposeful, inclusive and educational process***.

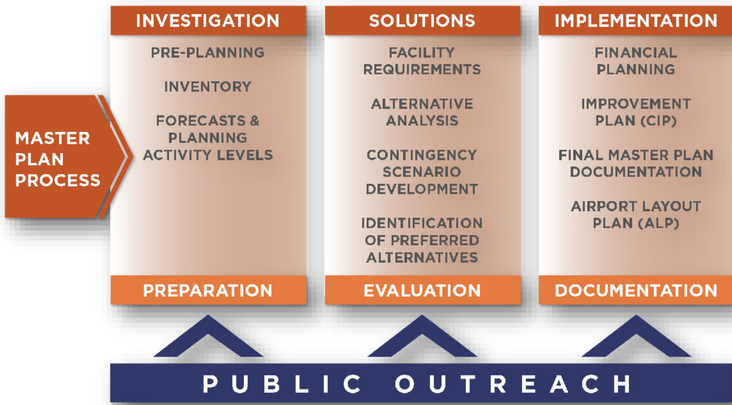


Key Features

- Planning is not prejudicial or constrained – *no predetermined outcomes*
- Plan must be based on current conditions, community input, FAA design standards, and forecasts

JVIATION

How We Master Plan….



JVIATION

It's a Collaborative Process…

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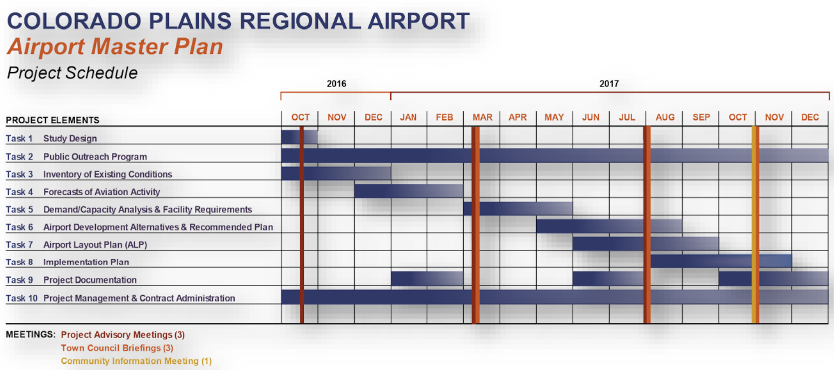
Next Steps



Work in Progress…

- Data collection
- Development of project website
- Distribution of tenant & user survey
- Development of Introduction, Inventory & Forecasts draft Chapters
- Next meeting – March 2017

JVIATION

B.2 Project Advisory Committee Meeting, April 25, 2017

Today's Agenda

We will:

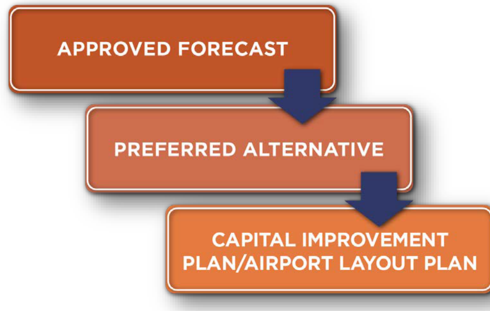
- Become familiar with
  - Elements of a Master Plan
  - The Master Plan Process
  - Update on Study Elements
  - Our Project Timeline & Next Steps

- Develop a forward-thinking vision for AKO

JVIATION

Master Plan Elements

The Master Plan is a ***20-year plan*** to understand the needs of current and future users of the airport. This is important to ensure that ***safe and orderly development*** of the airport occurs in a manner that is ***reflective of community values and goals***. This plan is developed through a ***purposeful, inclusive and educational process***.

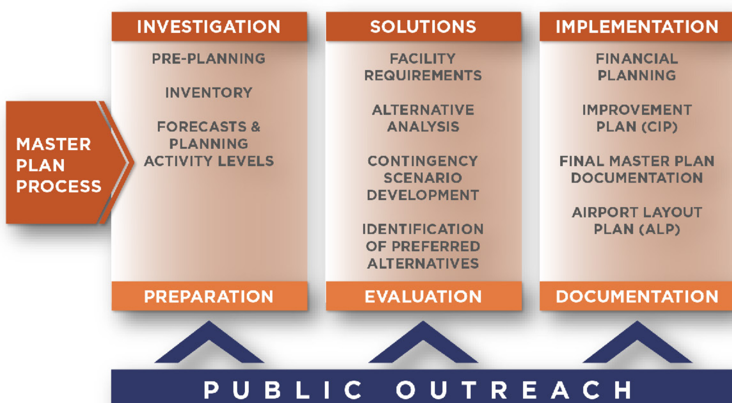


Key Features

- Planning is not prejudicial or constrained – *no predetermined outcomes*
- Plan must be based on current conditions, community input, FAA design standards, and forecasts

JVIATION

How We Master Plan....



JVIATION

Visioning Exercise

10-year visioning to consider the opportunities that lay ahead and how they may **influence** how the Airport is **developed** and **operated** in the future.

Vision Statement….


Akron
COLORADO PLAINS REGIONAL AIRPORT

1.5 Colorado Plains Regional Airport Vision Statement

As part of the Master Plan process, a visioning meeting was held with members of the PAC. The meeting included a 10-year visioning exercise whereby members of the PAC considered the opportunities that lay ahead for the Airport and how they may influence how the Airport is developed and operating in the future.

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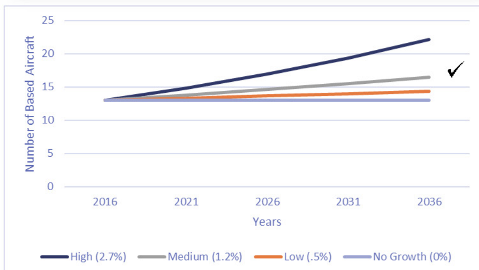
Inventory

Category	Elements
Airfield Facilities	Runway, taxiways, lighting
Landside Facilities	Terminal building, aprons, tiedowns, cargo/other operations, airfield maintenance equipment, fuel farm, access roadways, auto parking, and other facilities
Airspace System	Air traffic service area, communications, airspace, navigational aids, airspace surfaces
Airport Setting	Socioeconomic, land use, future development initiatives, area geopolitical topics
Environmental Setting	Air quality, noise, biological resources, cultural resources, etc.
Other Data	Operational data, financial data, aerial survey/AGIS

Based Aircraft Forecast

Year	High Growth	Medium Growth	Low Growth	No Growth
2015	13	13	13	13
Projections				
2021	15	14	13	13
2026	17	15	14	13
2031	19	16	14	13
2036	22	17	14	13
AAGR	**2.7%**	**1.2% ✓**	**.5%**	**0%**



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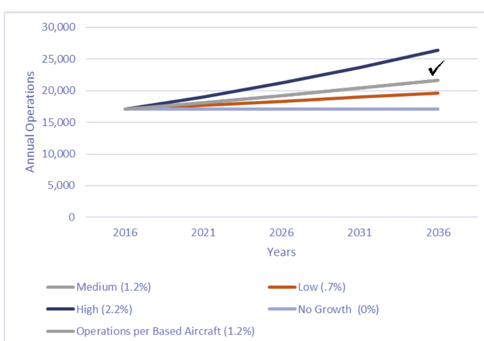

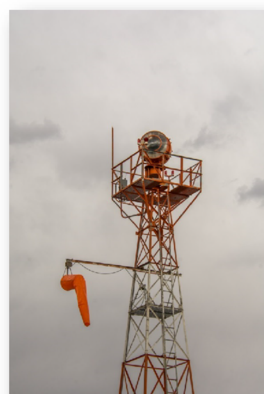

JVIATION

Airport Reference Code

- Based on:
  - Aircraft with at least 500 operations per year
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JVIATION

Runway Orientation - Wind Analysis

- Wind Coverage - percentage of time crosswind components are below an acceptable velocity (B-II: 13 knots)
- FAA AC 150/5300-13A states "desirable wind coverage for an airport is 95%"

Current Runway Wind Coverage

	10.5 knots	13 knots	16 knots	20 knots
All WX	76.83%	86.05%	94.23%	98.3%
IFR	73.48%	81.88%	90.52%	96.87%
VFR	79.41%	88.23%	95.71%	98.83%

Ultimate Runway Wind Coverage

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All WX	95.12%	98.49%	99.53%	99.9%
IFR	94.31%	97.73%	99.16%	99.79%
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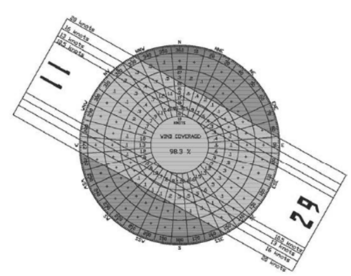
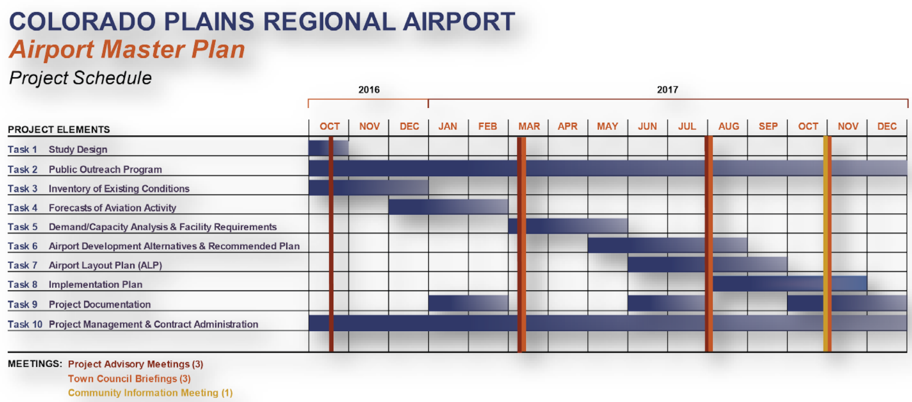


JVIATION

Next Steps



Work in Progress…

- Facility Requirements
- Alternatives Development
- Financial Plan
- Next meeting – August/September 2017

JVIATION

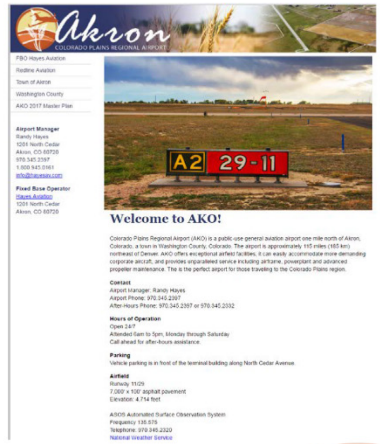
Master Plan Website

http://sites.jviation.com/ako/MP/index.html

JVIATION

New Airport Website

http://sites.jviation.com/ako/new/index.html



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B.3 Town Council Briefing, May 31, 2018

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APPROVED FORECAST → PREFERRED ALTERNATIVE → CAPITAL IMPROVEMENT PLAN/AIRPORT LAYOUT PLAN

Key Features

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JVIATION

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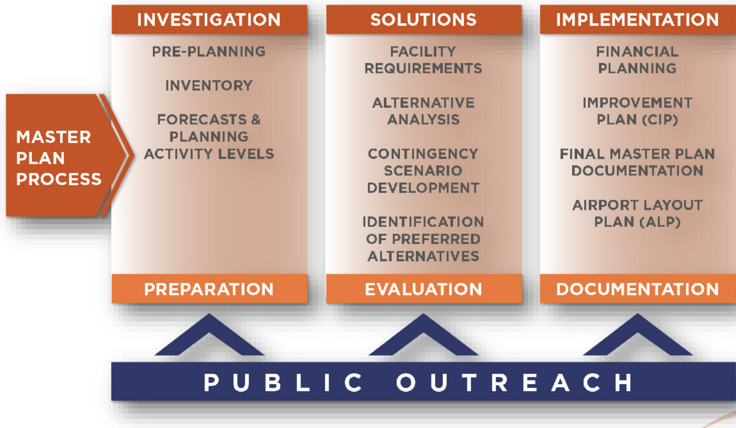

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What does the Airport mean to...?

Stakeholder	Meaning
Community/Residents	- Flight training - Jobs in aviation/technology - Access to medical evacuation services - Connection to energy and agriculture businesses - Reaching beyond Akron
Businesses	- Pro-business attitude to attract entrepreneurs - Agriculture support facilities – quarantine for Ag freight - UAV opportunities
Transients	- Pilot facilities and services, at a competitive price - Specialized aircraft maintenance, fosters other aspects of maintenance - Similar case study – Uvalde, TX - Excellent airfield capabilities within a large region
Based Aircraft Owners and Tenants	- Pilot facilities and services, at a competitive price - Aircraft fuel, maintenance and storage - Excellent airfield capabilities - Pilot proficiency, training

JVIATION

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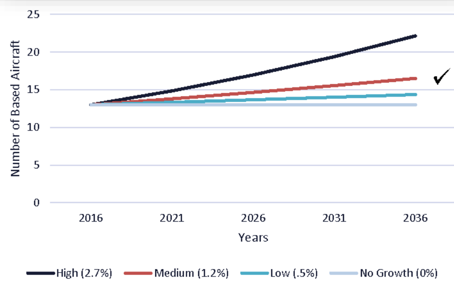

JVIATION

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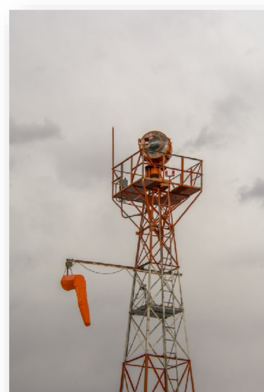

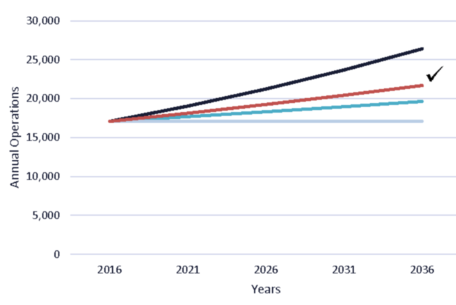

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JVIATION

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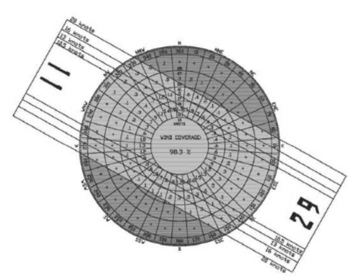

Ultimate Runway Wind Coverage

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With additional crosswind Runway 1/19

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Facility Requirements

Facility	Future Requirement	Justification
Terminal Construction	New terminal building, access and parking	Create a safer, more updated space for customers
Apron Reconstruction	Pave a new apron for existing and future aircraft	Increase safety and reduce foreign object debris (FOD)
Hangar Development	T-hangar and box hangar development	As demand warrants
Runway Development	Ultimate - crosswind runway to meet FAA wind coverage recommendations. Future - shift Runway 11/29 while maintaining width	Maintain width and ARC C-III as a regional resource and benefit to airport users. Crosswind runway to meet wind coverage
Approach Capabilities	Lower instrument approach visibility minimums to ¾-mile	Address needs of existing users and attract others during adverse weather conditions
Taxiway Improvements	Extend taxiway the full length of the runway and other enhancements	Increase safety and airfield efficiency. Meet design standards
Maintenance Equipment Storage	Storage building for airfield maintenance equipment	Needed if airfield maintenance responsibilities were to shift to AKO
Airfield Perimeter Fencing	Supplement existing fencing near terminal building to encompass entire airport property	Security and wildlife management
In-fill Development	Hangar and non-aeronautical development within vacant spaces	Development where practical

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Airfield Alternatives

Various airfield configurations studied:

- No Change
- Shift Runway for Safety Areas
- Shift Runway for Safety Areas and RPZ
- B-II, Lower Minimums
- Crosswind Runway
  - Crosswind Turf Runway

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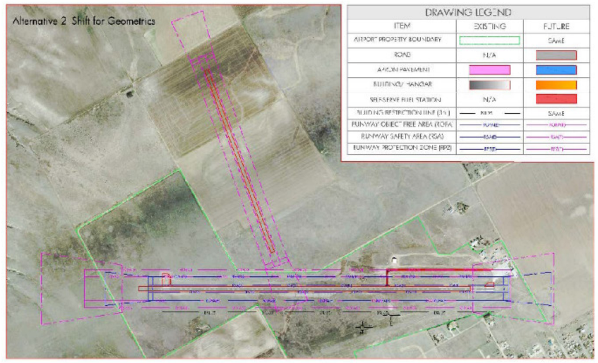
Preferred Airfield Alternative

Staged Approach:

- Future: B-II, Lower Minimums on Rwy 11
- Extend Taxiway to Full Length
- Ultimate: C-III, Shift Runway for Safety Areas
- Ultimate: Crosswind Turf Runway



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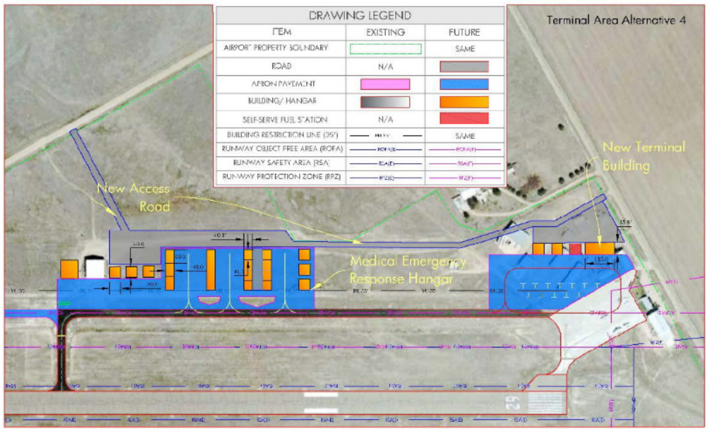
Terminal Area Alternatives

Various terminal area configurations studied:

- Renovate Existing
- New North/Central
- New South/Central
- New North/East

JVIATION

Preferred Terminal Area Alternative



- Meets Design Requirements
- Meets/Exceeds Demand
- Minimal Impact During Construction
- Visibility and Convenient Access
- Uses Existing Apron

Cost Estimates

	Timing	FAA/State Cost*	Town/Private Cost	Total Cost
Airfield Development:				
Future: B-II, Lower Minimums Rwy 11	Future	Minimal	Minimal	Minimal
Extend Taxiway A to Full Length	Future	$ 5,415,000	$ 285,000	$ 5,700,000
C-III, Shift Runway for Safety Areas	Ultimate	2,280,000	120,000	2,400,000
Crosswind Turf Runway	Ultimate	2,128,000	112,000	2,240,000
Terminal Area Development:				
North/East Terminal Expansion	Future	8,700,000	3,800,000	12,500,000
TOTAL		$ 18,523,000	$ 4,317,000	$ 22,840,000

Future – Within 20-year planning period, as demand warrants
Ultimate – Beyond 20-year planning period
FAA pays 90% of eligible costs, State pays 5% of eligible costs

Note: The Town or FAA are not obligated to carry out these projects. This effort preserves the opportunity.

Next Steps

Work in Progress…

- Integrate comments from this meeting
- Finalize Alternatives Development chapter
- Financial/Implementation Plan chapter
- On-going Airport Layout Plan development – submission to FAA

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Master Plan Website

http://sites.jviation.com/ako/MP/index.html

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Appendix C

Airport Recycling, Reuse, and Waste Reduction Plan

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C. APPENDIX C, AIRPORT RECYCLING, REUSE, AND WASTE REDUCTION PLAN

C.1 Introduction

The FAA Modernization and Reform Act (FMRA) of 2012 was signed into law, which amended Title 49 of the United States Code. The law included a number of changes to the Airport Improvement Program (AIP), two of which relate to recycling, reuse, and waste reduction at airports. Section 132(b) of the FMRA expanded the definition of airport planning to include, "developing a plan for recycling and minimizing the generation of airport solid waste, consistent with applicable State and local recycling laws, including the cost of a waste audit." Section 133 of the FMRA added a provision requiring airports that have or plan to prepare a master plan, and that receive AIP funding for an eligible project, ensure that the new or updated master plan addresses issues relating to solid waste recycling at the Airport. This includes:

- The feasibility of solid waste recycling at the Airport.
- Minimizing the generation of solid waste at the Airport
- Operation and maintenance requirements.
- Review of waste management contracts.
- The potential for cost savings or the generation of revenue.

As defined by Congress, "recycling" refers to any program, practice, or opportunity to reduce the amount of waste disposed in a landfill. This includes reuse and waste reduction as well as the recycling of materials.

The Federal Aviation Administration (FAA) issued a memorandum on September 30, 2014, to provide guidance on preparing airport recycling, reuse, and waste reduction plans as an element of airport master plans, as well as within a sustainability document, or as a standalone document. The guidance is mandatory when preparing an airport master plan.

The purpose of this chapter is to review the Town of Akron's current recycling, reuse, and waste program, and to provide guidance on ways to reduce waste and improve recycling and reuse at the Airport, in compliance with the FAA's guidance.

C.2 Airport Description and Background

Colorado Plains Regional Airport (AKO or the Airport) is a general aviation airport located in Washington County in northeast Colorado. The Airport is owned by the Town of Akron and is managed on a day-to-day basis by Hayes Aviation, in coordination with Town departments. Additional facility information is presented in **Chapter 1, Introduction** and **Chapter 2, Inventory**.

As noted in **Chapter 3, Forecasts of Aviation Activity**, the number of operations and based aircraft at AKO have fluctuated over the past ten years. The forecasts anticipate growth in activity in the future. AKO accommodates a variety of users, including an emergency medical services, corporate, business, and private operators.

C.3 Existing Waste Sources

The identification and evaluation of sources of waste at an airport can be complicated. There are numerous groups, agreements, operational styles, and collection/disposal processes that play into the overall generation of waste at a given airport. The three primary sources of waste at AKO are the airfield, the terminal building, and hangars/tenants. The sources of waste, per the FAA's September 30, 2014 memo, can be further broken down by how much control the Airport has on the generation and disposal of waste. The three levels of control are:

1. Areas where the Airport has direct control of waste management (public space, office space, terminal building, airfield). These areas are controlled by the Airport and they are able to introduce recycling, reuse, and waste reduction programs directly.
2. Areas where the Airport has no direct control but can influence waste management (tenants). These are areas owned by the airport; however, they are leased out to tenants. The Airport can recommend that recycling, reuse, and waste reduction programs be used and can include language in the tenant contracts, but realistically can't control what is done.
3. Areas where the Airport has no control or influence over waste management. These are areas the Airport neither owns or leases (none of which are included in this chapter).

Table C-1 shows the identified areas of waste generation, what waste is generated, and the Airport's level of control.

TABLE C-1: WASTE GENERATION

Area	Waste Generated	Control
Area 1: Airfield	General debris found on airfield. Construction material (asphalt, concrete, wood, metal)	Direct Control
Area 2: Terminal Building	Plastic, glass, aluminum, oil, batteries, trash	Direct Control
Area 3: Hangars/Tenants	Plastic, glass, aluminum, oil, batteries, trash	No Direct Control but can Influence

Source: Airport Management

C.4 Local Recycling and Waste Management Programs

Akron residents have access to two programs:

1. The Town has a local landfill[1] for trash; this landfill is available to all residents of Washington County.
2. In addition to the landfill, Waste Management, offers trash and recycling services in Akron. Waste Management opened a facility in 2013 in Sterling, Colorado (approximately 35 miles from Akron). They "offer curbside single stream, commercial single stream and drop-off recycling… With Single Stream Recycling, sorted items are compacted, bailed and put on pallets for use in making new products, such as plastics, bottles, paper, cardboard boxes and cans."[2].

C.5 Overview of Airport Recycling, Reuse, and Waste Management

Airports throughout the United States are "greening" their operations. The FAA and the U.S. Congress have directed airports to develop reuse, recycling, and waste management programs. Airports, other government agencies, and private companies have seen financial as well as environmental benefits from adopting environmentally sustainable practices, including recycling, reuse, and waste management programs. In

[1] https://www.colorado.gov/pacific/washingtoncounty/landfill-0
[2] http://www.journal-advocate.com/sterling-local_news/ci_24533108/waste-management-celebrates-grand-opening-new-recycling-center

response, airports have installed solar panels and energy efficient light fixtures, use low-emission vehicles in their fleets, constructed LEED[3] certified buildings, and have changed their waste management programs.

As one agency within a larger government entity (county, municipality, state), airports typically use the recycling, reuse, and waste management programs that are in place throughout the larger government entity, as is the case at AKO. A number of commercial service and general aviation airports have adopted their own individual reuse, recycling, and waste management programs, in part because of their financial benefits, and also because they reduce waste and energy usage.

The U.S. Environmental Protection Agency (EPA) published a guide titled *Developing and Implementing an Airport Recycling Program* to help airport managers who want to create a more environmentally-friendly waste operation. The EPA hierarchy of waste management prioritizes source reduction, then reuse, recycling and finally disposal in landfills. However, the EPA's guide focuses on recycling as a positive first step for airports to take as they conquer their waste issues.

C.6 Recycling at AKO

According to Airport Management, there is not currently a program written for the Airport's recycling.

[3] LEED = Leadership in Energy and Environmental Design

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