

MASTER PLAN UPDATE

Final Technical Report

FEBRUARY 2024

FLYAEX

ALEXANDRIA INTERNATIONAL AIRPORT









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FLYAEX
ALEXANDRIA INTERNATIONAL AIRPORT

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Acronyms

AAGR	Average Annual Growth Rate
AC	Advisory Circular
ACAIS	FAA's Air Carrier Activity Information System
ACE	Aviation Center of Excellence
ACIP	Airport Capital Improvement Program
ACRP	Airport Cooperative Research Program [TRB]
ADG	Airplane Design Group
ADO	Airports District Office [FAA]
ADRM	Airport Development Reference Manual
ADS-B	Automatic Dependent Surveillance-Broadcast
AEX	Alexandria International Airport
AGL	Above Ground Level
AIP	Airport Improvement Program
ALP	Airport Layout Plan
ALSF	Approach Lighting System with Sequence Flashing Lights
AMSL	Above Mean Sea Level
APMS	Airport Pavement Management System
ARFF	Aircraft Rescue and Firefighting
ARP	Airport Reference Point
ARPA	American Rescue Plan Act
ASDA	Accelerate Stop Distance Available
ASV	Annual Service Volume
ATADS	FAA's Air Traffic Activity Data System
ATCT	Airport Traffic Control Tower
AWOS	Automated Weather Observation System
BIL	Bipartisan Infrastructure Law
BTS	Bureau of Transportation Statistics
CAAGR	Compound Average Annual Growth Rate
CAT	Category
CBIS	Checked Baggage Inspection System
CFC	Customer Facility Charge
CFR	Code of Federal Regulation
CIP	Capital Improvement Program
CRRSSA	Coronavirus Response and Relief Supplemental Appropriation Act
DME	Distance Measuring Equipment
DNL	Day Night Average Sound Level

DOA	Department of Aviation
DOD	Department of Defense
EA	Environmental Assessment
EDA	Economic Development Administration
EDS	Explosive Detection System
EIS	Environmental Impact Statement
FAA	Federal Aviation Administration
FBO	Fixed Base Operator
FEMA	Federal Emergency Management Agency
FPPA	Farmland Protection Policy Act
GA	General Aviation
GPS	Global Positioning System
GSE	Ground Support Equipment
HIRL	Hight Intensity Runway Lights
IAP	Instrument Approach Procedure
IATA	International Air Transport Association's
ICAO	International Civil Aviation Organization
ICE	US Immigration and Customs Enforcement's
IFR	Instrument Flight Rules
ILS	Instrument Landing System
IMC	Instrument Meteorological Conditions
IPAC	Information for Planning and Consultation
ISB	Intermediate Staging Base
JPATS	Marshals Service's Justice Prisoner and Alien Transportation System
LADOTD	Louisiana Department of Transportation & Development
LASP	Louisiana Aviation System Plan
LDA	Landing Distance Available
LED	Light Emitting Diode
LNAV	Lateral Navigation
LPDES	Louisiana Pollutant Discharge Eliminations System
LPV	Localizer Performance with Vertical Guidance
MALSR	Medium Intensity Approach Lighting System - Runway Alignment Indicator Lights
MAP	Military Airport Program
MIRL	Medium Intensity Runway Lights
MITL	Medium Intensity Taxiway Lights
MPU	Master Plan Update
MRO	Aircraft Maintenance, Repair and Overhaul
MSL	Mean Sea Level

NAS	National Airspace System
NBAI	National Based Aircraft Inventory Program
NEPA	National Environmental Policy Act
NPIAS	National Plan of Integrated Airport Systems
NRHP	National Register of Historic Places
NWI	National Wetlands Inventory
OCS	Obstacle Clearance Surfaces
OFZ	Obstacle Free Zone
PAPI	Precision Approach Path Indicator Lights
PAR	Precision Approach Radar
PBB	Passenger Boarding Bridges
PCI	Pavement Condition Index
PCN	Pavement Condition Number
PFC	Passenger Facility Charge
REIL	Runway End Identifier Lights
RNAV	Area Navigation
ROFA	Runway Object Free Area
ROFZ	Runway Obstacle Free Zone
RPZ	Runway Protection Zone
RSA	Runway Safety Area
RVR	Runway Visual Range
SAC	Stakeholder Advisory Committee
SAF	Explosive Detection System
SOP	Standard Operating Procedures
TAF	Terminal Area Forecast
TDG	Taxiway Design Group
TDZ	Touchdown Zone
TERPS	United States Standard for Terminal Instrument Procedures
TESM	Taxiway Edge Safety Margin
TFMSC	Traffic Flow Management System Counts
TODA	Takeoff Distance Available
TOFA	Taxiway Object Free Area
TORA	Instrument Approach Procedure
TRB	Transportation Research Board
TSA	Taxiway Safety Area; Transportation Security Administration
UFC	Department of Defense's Unified Facility Criteria
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service

VFR	Visual Flight Rules
VMC	Visual Meteorological Conditions
WAAS	Wide Area Augmentation System
WMM	World Magnetic Model



Chapter 1
Introduction

FLYAEX
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1 INTRODUCTION

1.1 Overview

An Airport Master Plan is a process to plan for the short- (0-5 years), intermediate- (6-10 years), and long-term (11-20 years) airport facility development plan that will serve to meet future aviation activity demand for the Alexandria International Airport (AEX). The FAA recommends that public use airports update their Airport Master Plan approximately every ten years. The previous update of the AEX Airport Master Plan was initiated in 2009 and was subsequently approved and accepted by the England Economic and Industrial Development District (England Authority) in 2012.

The England Authority has initiated this update of the AEX Airport Master Plan (MPU) to ensure the airport continues to operate in a safe and efficient manner and to address changes in the aviation industry both locally and nationally. This MPU will be developed through collective and collaborative planning efforts undertaken by the England Authority, professional aviation planners, participating public agencies and the local public.

This MPU serves as an airport facility planning study that sets forth a conceptual framework for possible future airport development. It is, however, considered by the FAA and other local and state agencies to represent a viable and acceptable plan that paves the way for current on-going and planned eligibility for future funding participation through the FAA's Airport Improvement Program (AIP) and the State of Louisiana's Aviation Trust Fund as administered through the Louisiana Department of Transportation & Development (LADOTD).

Major airport planning elements of this update of the AEX Airport Master Plan include:

- Inventory of Existing Facilities, Conditions, and Capabilities,
- Forecast of Aviation Activity,
- Assessment of Existing Capacity and Identification of Facility Requirements,
- Analysis of Needed Airport Development,
- Refinement of the Airport Development Plan, and
- Development of the Airport Capital Implementation Plan.

Although the AEX MPU is reviewed and accepted by the FAA and the LADOTD, it only reflects the England Authority's goals and growth plans and therefore does not constitute a commitment on the part of either agency to participate in any future airport development planned or depicted in the Airport Master Plan or indicate that the proposed development is environmentally acceptable. As part of its participation, the FAA's role is limited to the review and approval of a limited number of Airport Master Plan components, namely:

- Aviation activity forecasts,
- Selection of one or more Critical Aircraft, and
- Airport Layout Plan (ALP) drawings.

Although typically occurring concurrently to the development of new, or the update of existing Airport Master Plans, the FAA's conditional-approval of the AEX MPU's ALP will follow the England Authority's acceptance of the updated AEX Master Plan.

As part its participation, the LADOTD role is limited to the review of the Airport Master Plan only.

In general, this update of the AEX Airport Master Plan will guide the England Authority's strategy for the airport facility development needed to satisfy current and anticipated future aviation-specific activity demand in a cost-effective, feasible manner while minimizing environmental and socioeconomic impacts. The Airport Master Planning process is tailored to the unique conditions at AEX and will:

- Provide a comprehensive activity forecast to identify anticipated future activity levels at AEX,
- Foster the continued growth of scheduled and non-scheduled passenger, air cargo, military, and general aviation activities,
- Preserve aviation facilities and property to accommodate forecasted growth of aeronautical activity,
- Identify and preserve the ability to grow non-aeronautical development that is compatible with aeronautical operations,
- Assess existing infrastructure and develop a comprehensive plan for updating the infrastructure to accommodate anticipated development at AEX, and
- Incorporate information from the Rapides Area Planning Commission to allow for a comprehensive development plan for AEX and the surrounding area.

The primary investigative and planning actions that will be undertaken as part of this update of the Airport Master Plan will likely include, but will not be limited to:

- Identification and documentation of current and anticipated future airport development needs.
- Identification of proposed airport improvements that will likely be needed to satisfy current and anticipated future aviation-related demand.
- Justification of proposed airport improvement projects through viable, prudent and practicable alternative planning concepts.
- Development of graphical depictions of phased highest and best use airport improvements within designated on-airport land areas.
- Recommendation of a meaningful and realistic Airport Improvement Implementation Plan.
- Recommendation of a financially achievable Airport Capital Improvement Plan to support the Implementation Plan.
- Identification of the likely future need for environmental due diligence, environmental mitigation, agency review and associated permits.
- Identification of what future England Authority actions will likely be required to attain local, state, and federal regulatory approval and funding participation for the recommended airport improvement projects.
- Identification and/or recommendation of a dynamic and flexible process to provide continuing airport planning and facility improvements needed to satisfy anticipated or unforeseen aviation activity demand.

1.1.1 Airport Planning Issues Previously Addressed

The previous 2009 Airport Master Plan Update included the development of a variety of airfield, support facility and roadway access improvement projects spanning a 20-year planning period. Collectively, using 2009 Dollar values, the entirety of the Airport Capital Improvement Project program totaled $369,533,535. As typically segregated, these projects were separated into three distinct planning periods as listed below:

Short-Term (0-5 years)

- Removal of Airspace Obstacles
- Upgrade of ATCT Communication Facilities
- Environmental Assessment for Extension of Runway 14
- Design Services for future Extension of Runway 14
- Airport Land Acquisition for Future Extension of Runway 14
- Extension of Runway 14
- Rehabilitation of Runway 14-32
- Upgrade of Runway 14 ILS to Category II Capabilities
- Rehabilitation Runway 18-36
- Extension of Taxiway A
- Rehabilitation of North, South and Southeast Ramps
- Rehabilitation of Southeast Ramp Area
- Acquisition of New or Additional ARFF Vehicles
- Airfield Sewer Lift Station Improvements
- Environmental Assessment for Relocation of Fuel Farm
- Relocation of Fuel Farm
- Relocation of FAA Radar Facility
- Acquisition of Runway Sweeper
- Property Acquisition for Industrial Park Development
- Access Roadway Widening and Bridge Improvements, and
- Continuation of CFR Part 150 Noise Mitigation Program

Intermediate-Term (6-10 years)

- Expansion of FBO Terminal Apron
- Improvements to Runway Blast Pad and Hold Pads
- Environmental Assessment for Future Extension of Runway 18
- Land Acquisition North of Runway 18
- Extension of Runway 18 Extension and Relocation of Perimeter Road and NAVAIDs
- Roadway Connector Improvements to Billy Mitchell Road / England Drive
- Master Drainage Rehabilitation, and
- Perimeter Road Improvements

Long-Term (11-20 years)

- Large Southeast Apron Hangar
- Southeast Apron and Two Large Hangars
- Full-length Parallel Taxiway and Hold Pad Southwest of Runway 14-32
- Midfield Apron and Access Roads

- Large Southeast Apron, Three Hangars and Automobile Parking, and
- Two 10-Unit T-hangars

1.1.2 Completed Projects from Previous Master Plan Update

It is important to note that many of the planning, design and construction projects conducted at AEX over the years could not have been accomplished without Federal assistance through the FAA's Airport Improvement Program and Military Airport Program. Table 1-1 depicts the FAA grant activity at AEX over the past 18 years.

Table 1-1: FAA Grant Activity

Fiscal Year	Grant Sequence Number	AIP Federal Funds	Work Description
2005	30	$1,364,984	Construct Terminal Building
2006		$5,197,025	Construct Terminal Building
		$404,786	Rehabilitate Taxiway
2007		$128,390	Acquire Equipment
		$101,565	Construct Building
		$1,250,000	Noise Mitigation Measures for Public Buildings
		$810,451	Noise Mitigation Measures for Residences within 70-74 DNL
		$27,775	Security Enhancements
	35	$722,330	Update Airport Master Plan Study
2008	37	$4,993,900	Rehabilitate Taxiway
		$8,036,378	Noise Mitigation Measures for Residences within 70-74 DNL
2009	42	$114,673	Acquire Equipment, Remove Obstructions
	43	$570,000	Construct Fuel Farm
	41	$1,943,686	Rehabilitate Runway - 14/32
	40	$3,236,363	Rehabilitate Runway - 14/32
2010	47	$648,565	Rehabilitate Apron
	45	$857,928	Acquire Aircraft Rescue & Fire Fighting Vehicle
	45	$64,320	Remove Obstructions
	46	$4,200,000	Construct Fuel Farm
		$1,300,000	Noise Mitigation Measures for Public Buildings
		$3,731,592	Noise Mitigation Measures for Residences within 70-74 DNL
		$86,973	Wildlife Hazard Assessments
2011	51	$212,415	Rehabilitate Runway - 14/32

Table 1-1: FAA Grant Activity			
Fiscal Year	**Grant Sequence Number**	**AIP Federal Funds**	**Work Description**
	50	$1,930,232	Rehabilitate Runway - 18/36
		$8,871,029	Noise Mitigation Measures for Residences within 70-74 DNL
	52	$2,441,745	Rehabilitate Apron
	49	$2,171,878	Construct Fuel Farm
2012	55	$1,454,985	Rehabilitate Apron
		$4,511,288	Noise Mitigation Measures for Residences within 70-74 DNL
		$270,000	Conduct Noise Compatibility Plan Study
2013	59	$908,813	Rehabilitate Apron
	58	$150,000	Improve Runway Safety Area - 14/32
2014	60	$94,917	Conduct Environmental Study
	62	$739,739	Install Runway Distance-To-Go Signs - 14/32
	62		Install Runway Distance-To-Go Signs - 18/36
	61	$817,456	Acquire Aircraft Rescue & Fire Fighting Vehicle
	61	$473,800	Rehabilitate Taxiway
		$7,000,000	Noise Mitigation Measures for Residences within 65-69 DNL
2015		$7,000,000	Noise Mitigation Measures for Residences within 65-69 DNL
	64	$934,154	Rehabilitate Runway - 14/32, Remove Obstructions
	66	$6,593,187	Rehabilitate Apron
	68	$1,219,417	Rehabilitate Runway Lighting - 14/32
	68		Rehabilitate Runway Lighting - 18/36
2016	69	$1,692,735	Improve Airport Drainage
			Rehabilitate Apron
			Rehabilitate Taxiway [Taxiway B]
			Rehabilitate Taxiway [Taxiway E]
			Rehabilitate Taxiway Lighting [Taxiway A]
			Rehabilitate Taxiway Lighting [Taxiway B]
			Rehabilitate Taxiway Lighting [Taxiway E]
	71	$4,132,332	Construct Access Road
	70	$2,295,281	Rehabilitate Apron
		$2,855,574	Noise Mitigation Measures for Residences within 65-69 DNL

Table 1-1: FAA Grant Activity			
Fiscal Year	**Grant Sequence Number**	**AIP Federal Funds**	**Work Description**
2017	73	$5,152,405	Construct Service Road [MAP]
	75	$540,000	Improve Service Road [MAP]
	75	$1,307,595	Install Perimeter Fencing not Required by 49 CFR 1542 [MAP]
		$2,297,973	Noise Mitigation Measures for Residences within 65-69 DNL
	76	$1,569,519	Rehabilitate Runway - 18/36
2018		$474,930	Improve Runway Safety Area
2020		$2,266,472	CARES Act Funds
		$4,779,034	Improve Runway Safety Area
		$455,146	CARES Local Match
2021		$3,000,000 $333,333	Acquire land for noise compatibility within 65-69 DNL Covid Relief Local Match
		$30,377	CRSSA Act Concessions
		$1,565,914	CRRSA Act Funds
		 $580,601 $3,228,548 $423,238	Extend Runway Entitlement Discretionary Covid Relief Local Match
		$2,216,569	General ARPA
		$254,250 $28,250	Rehabilitate Runway Covid Relief Local Match
2022		$3,500,000	Acquire land for noise compatibility within 65-69 DNL
		$1,414,607	Rehabilitate Apron
		$1,446,469	Rehabilitate Runway Lighting

Source: FAA Airport Improvement Program (AIP) Grant Histories, 2022

1.1.3 Historical and Anticipated Future Funding Sources

To meet the anticipated need of the England Authority's Airport Capital Improvement Program (ACIP), a variety of funding levels for ACIPs has been traditionally obtained via participating project approval and funding agencies, as well as locally-generated funding derived from on-going revenue-generating and operating activities that would typically include, but not be limited to:

- FAA's Airport Improvement Program (i.e., FAA Entitlement, FAA Discretionary)
- Military Airport Program (MAP)
- Louisiana Department of Transportation and Development

- England Authority
- Private Capital Investments, and
- Other federal, state, and regional assistance programs

With the high cost of improvements, significant portions are eligible for funding by the federal government through the Airport Improvement Program. Current legislation allows for the funding of these projects based upon a 90/10 percentage split between FAA and LADOTD/Local sources, respectively throughout the typical Airport Master Plan's twenty-year period. The FAA's Discretionary funding is based upon an FAA project priority score of 70 or greater (i.e., primary runway improvements, safety improvements, fence line relocations, etc.).

1.1.4 Issues and Emerging Trends

Other factors outside the aviation industry may influence aviation activity. Revision of economic trends and socioeconomic indicators from the state and the region are vital to determine how they may impact future growth. In addition, the regional and local environment can boost airport growth and support opportunities for economic development for the region. During the preparation of this Master Plan Update the Covid 19- Pandemic heavily impacted the economy, it resulted in one of the worst crises worldwide, not only with a substantial loss of life but significant damage to the global economy, being the aviation industry was one of those severely affected due to the closure of markets, travel restriction and stay at home orders. Although the industry has normalized, it is not entirely recovered from the 2020 drop. The aviation industry has proved resilient and has recovered from previous impacts. Today most airports in the US showed signs of recovery in 2023 reaching the pre-pandemic traffic levels of 2019. However, global organizations do not anticipate that worldwide 2019 levels will be achieved before 2024.

The Master Plan Update process began in October of 2019. The forecast efforts were developed between November 2019 and February 2020 and the results were presented to the England Authority and FAA for review in March 2020. Due to the impacts generated by Covid-19 and the uncertainty of the industry's next steps and recovery, the forecasts were revised in 2022 to reflect changes in aviation activity and presented to the FAA for approval in December 2022. The airport received the FAA forecast approval in May of 2023. The 2021 base year used in the approved forecast serves as the starting point of the 20-year master plan development period.

In addition, the FAA updated Advisory Circular (AC)150/5300-13B, *Airport Design* in 2022. Therefore, the alternative analysis and the preferred development plan and ALP were revised to reflect the latest changes, new standards, and technical requirements presented in the AC.

1.2 Goals of the Master Plan Update

At the onset of the planning process for the update of the AEX Airport Master Plan, the England Authority identified and prioritized key goal priorities specific to Alexandria International Airport that needed to be addressed within this study. These goals included, but were not limited to:

- Develop options for continued airside development,
- Phase airport facility development based upon aviation activity demand and airport facility improvement concepts developed as part of the Airport Master Plan,
- Preserve and protect the future development of on-airport land areas and related infrastructures needed to accommodate on-going and anticipated future e-commerce, aircraft maintenance, repair and overhaul (MRO), air cargo, and aircraft manufacturing activities,
- Foster, promote, and accommodate air transport access and related aeronautical support functions and activities,
- Enhance and improve operational efficiencies and security of the passenger terminal,
- Enhance the safety and efficiency of ground-based aeronautical activities and operations, and
- Maximize the development and related AEX-generated economic impacts to support the continued financial health of AEX.

The general goal of an Airport Planning Study is to guide the airport to establish future airport and supporting infrastructure requirements to accommodate the forecasted aviation activity demand while fully meeting current FAA airport design and safety standards. The study will provide a comprehensive development plan aligned with the England Authority's goals and expectations to maximize the airport's safety and efficiency.

1.3 Guidance and Requirements

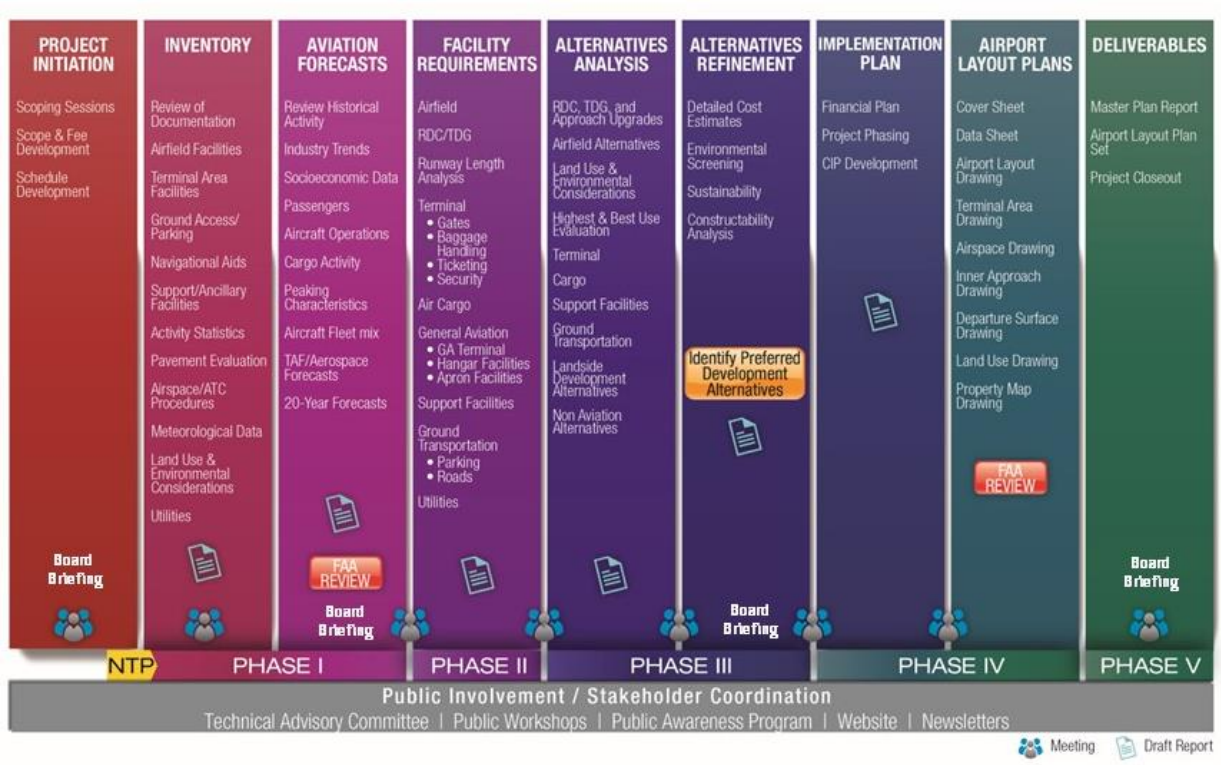
The overall purpose of this Airport Master Plan Update is to provide reasonable guidelines for future airport development to satisfy projected future aviation demand in a cost-effective and timely manner. In support of the purpose and goals identified, the primary objective of this study is to create a 20-year airport development program that will maintain a safe, efficient, economical, and environmentally sustainable airport facility for the England Authority, and the surrounding parishes, cities, and municipalities. **Figure 1-1** shows the key elements of the planning process used for this study following the guidance provided in the FAA Advisory Circular (AC), 150/5070-6B, *Airport Master Plans*.

The FAA reviews the elements contained in the airport master plan to ensure that the appropriate planning techniques have been applied throughout the entire planning process. However, the FAA only approves the following elements:

- Forecasts of Aviation Demand
- Airport Layout Plan

During the Study, representatives from England Authority and the Stakeholder Advisory Committee coordinated regularly with representatives of FAA's District Office to maintain open communication and streamline the agency review and approval process. In addition, the project presented various opportunities for public participation and involvement.

Figure 1-1: Airport Master Planning Process



Source: FAA and Michael Baker International, Inc., 2021.

The update of the Airport Master Plan and Airport Layout Plan Drawing Set will fully follow guidance listed in the current FAA ALP checklist, and provided in the following FAA documents:

- FAA Advisory Circulars
  - AC 150/5000-17, *Critical Aircraft & Regular Use Determination*
  - AC 150/5070-6B, *Airport Master Plans*
  - AC 150/5060-B, *Airport Capacity and Delay*
  - AC 150/5300-13B, *Airport Design*
  - AC 150/5325-4B, *Runway Length Requirements for Airport Design*
- *Standard Operating Procedures (SOP) Checklists 2.0 and 3.0*
- Code of Federal Regulations (CFR)
  - Part 77, *Safe, Efficient Use, and Preservation of the Navigable Airspace*

- FAA Orders
  - Order 1050.1F, *Environmental Impacts: Policies and Procedures*
  - Order 5050.4B, *National Environmental Policy Act (NEPA) Implementing Instructions for Airport Actions*
  - Order 5090.5, *Formulation of the National Plan of Integrated Airport Systems (NPIAS) and Airports Capital Improvement Plan (ACIP)*
  - Order 5100.38D, *AIP Handbook*
  - Order 5200.8, *Runway Safety Area Program*
  - Order 8260.3D, *United States Standard for Terminal Instrument Procedures (TERPS)*
- Airport Cooperative Research Program (ACRP)
  - Report 79, *Evaluation of Airfield Capacity*
  - Report 113, *Guidebook on General Aviation Facility Planning*

1.4 Airport Ownership and Management Structure

AEX is owned and operated by the England Economic and Industrial Development District (EEIDD), commonly referred to as the England Authority. The England Authority was formed in 1991 as an independent political subdivision of the State of Louisiana to take over and redevelop the closing England Air Force Base. Today, the England Authority sets the policies under which Alexandria International Airport and the England Industrial Airpark and Community is operated.

The governing body of the England Authority is a Board of Commissioners comprised of ten business and community leaders appointed by local government entities. The Board members are appointed to serve four-year staggered terms.

It is the mission of the England Authority to secure title to all real and personal property at the former England Air Force Base to develop economic activity to replace that generated by the former Air Base.

Since the base closure in 1992, the England Authority has continued to actively market and develop AEX and England Airpark to its fullest potential. Over the past several years, the England Authority has invested their time and effort towards making key access and infrastructure improvements to protect and maintain their investment and support the overall growth of this facility. A summary of the airport's recent development history is included in this chapter.

1.5 Master Plan Participants and Decision Makers

Historically, England Authority-sponsored studies have implemented a proactive approach to engaging key leaders and agency representatives from the local community to participate in the planning process. Members of the England Authority and key stakeholders within the community joined together to form a Stakeholder Advisory Committee (SAC) to provide important feedback to the Consultant team. The SAC contributed technical input and shared feedback from the organizations they represent. Members also assisted with engaging their constituencies during opportunities for widespread public input. A listing of SAC participants is included in **Table 1-2.**

Table 1-2: Stakeholder Advisory Committee Participants		
Participant	**Title**	**Organization**
Jamal Alexander	Station Manager	Delta Airlines
William Barron	Chairman	EEIDD
Richard Bushnell	Chairman, Capital Projects Committee	EEIDD
Kasey Cater	Assistant Terminal Superintendent	AEX
LTC Ronnie Crosby		Fort Johnson
Scott Gammel, CM	Deputy Director/Aviation Director	EEIDD
Joe Hamner	ARFF Chief	AEX ARFF
Ralph Hennessey	New Executive Director	EEIDD
Philip Jufko	Director of Aviation Planning	Michael Baker International, Inc.
Sandra McQuain	Former Executive Director	EEIDD
Deputy G3 Kirk Mayfield		Fort Johnson
Steve Mohror	General Manager	Million Air
John Norman	Corporate Pilot	
Ray Schindler	Tower Chief	AEX ATCT
David White	Terminal Building Superintendent	AEX
Tina Wilson	Program Manager	LA DOTD

Source: Michael Baker International, Inc., 2019

1.6 Opportunities for Public Participation and Involvement

As part of the long-range vision and Master Plan for the Alexandria International Airport, a series of proactive steps to ensure stakeholder and the public participation and involvement were established to provide the platform upon which to build a greater understanding and consensus between the England Authority, local users, and surrounding communities.

1.6.1 Public Meetings

Following the collection of data, forecast of aviation activity, and determination of airport facility needs, the public was invited to participate in a publicly advertised meeting that collectively served to provide an overview of the airport master planning process, anticipated timeline schedule, and preliminary findings developed as part of the airport planning undertaken to date. Following the England Authority's identification and selection of one or more airport development schemes under consideration for further refinement, the public was provided another opportunity to review the technical findings and airport development alternatives. As part of each meeting, the England Authority solicited input regarding the public's vision and aspirations for the airport and solicited feedback that would be used as

part of the England Authority's refinement and ultimate selection of a preferred airport development alternative and its investment priorities.

1.6.2 Stakeholder Advisory Committee Meetings

At the direction of the England Authority, the opportunity for additional public involvement also occurred through the formation of a Stakeholder Advisory Committee comprised of key leaders and agency representatives from the local community. This Committee met six times throughout the course of the planning process to provide important feedback to the professional airport planning team during the update of the AEX Airport Master Plan.

1.6.3 Review Agency Briefings and Meetings

During key milestones of the Master Plan Update, the planning team conducted informal presentations and meetings with participating governmental Review Agency representatives. The extent of Review Agency participation included but was not limited to the FAA's Louisiana/New Mexico Airports District Office, Louisiana Department of Transportation & Development (LADOTD), City of Alexandria, and Rapides Parish.

1.6.4 Briefings to the England Authority

During key milestones of the update of the AEX Airport Master Plan, the airport master consultant conducted three publicly advertised briefings to the England Airport Authority to report on the progress and findings of the study elements. Following the finalization of the draft version of the Airport Master Plan, the England Authority was given a Final Briefing outlining the incremental airport planning milestones, findings, and recommendation regarding the recommended 20-year development plan for AEX.

1.7 Airport Development History

Throughout the airport's history of development, the role and use of AEX has evolved to reflect the military's continued use of the former military air base and the growing need to provide enhanced aviation-related facilities and services to the flying public. The following sections provide a brief overview of airport's development history and use.

1.7.1 Military Base

In 1939, officials in the Alexandria-Pineville area identified the need for an airport to serve the aviation needs of the community. Research was conducted to identify a suitable site within the area, and, after an extensive search, officials selected a site located due west of Alexandria known as the McNutt Plantation. The McNutt plantation was purchased along with two adjacent plantations forming a 1,339-acre site for airport development. On May 23, 1942, construction commenced and a year later the Alexandria Municipal Airport was completed.

On December 7, 1941, Japan attacked Pearl Harbor mandating US involvement in World War II. During this time, the airport was leased to the Army Air Corps. On October 16, 1942, the airport was officially named Alexandria Army Air Base. The air base initially served as an emergency airstrip for Esler Field which is currently located 13.6 miles to the northeast. In early 1943, the military extended three of the four existing runways to support heavy

bomber operations. In June of the same year, the Alexandria Army Air Base served as a training facility for B-17 pilots and later served B-29 combat crews. In 1944, the air base was renamed Alexandria Army Airfield. With the end of WWII, the base was placed on a standby status and was eventually turned over to the City of Alexandria for use as a municipal airport.

In 1950, the Korean Conflict prompted the reactivation of the airport as Alexandria Air Force Base. Later that same year, the facility was assigned to the Tactical Air Command for the purpose of training tactical fighting units. Alexandria Air Force Base was renamed England Air Force Base in 1955, for Lieutenant Colonel John England, a commander of the 389th Bomber Squadron at the base. From 1950 until 1986, England Air Force Base was home to several wings including the 132nd, 366th, 834th, 401st, 4410th, and 4403rd. During this time, these wings flew a variety of aircraft including the T-33, F-80, T-84, F-86, F-100, and A-7. In 1972, the 23rd Tactical Fighter Wing (TFW) was transferred to England Air Force Base where it operated the A-10 thunderbolt until the base's closure in 1992.

1.7.2 Military to Civilian Use

The end of the Cold War initiated the closure, elimination and realignment of significant US military infrastructure and assets. In 1990, Alexandria Mayor Edward G. Randolph appointed a task force named the "England 2000 Committee." This committee developed two strategic plans known as "Plan A – Save the Base", and "Plan B – Closure Contingency". Despite efforts to save the base, on April 12, 1991, the Secretary of Defense, Richard Cheney, designated the England Air Force Base for closure. To facilitate the base closure, a new committee known as the England Transition Committee was formed.

Due to potential severe economic disruption to the Central Louisiana Region, the Louisiana State Legislature in 1991 initiated ACT 42. ACT 42 created the England Economic and Industrial Development District for the purpose of overseeing the maintenance and improvement of the England Air Force Base for civilian use. By the close of 1992, all military aircraft were reassigned to alternate bases and the US Air Force concluded their Environmental Impact Statement. In March of 1995, following an interim caretaker program and environmental cleanup effort by the military, the base was officially transferred to the England Economic and Industrial Development District.

After the base transfer, the airport continued operating as a general aviation airport from August 1993 through August 1996. In 1996, commercial air service at nearby Esler Regional Airport was transitioned to Alexandria Municipal Airport providing service to Houston, Dallas, Memphis, and Atlanta. This mandated the name change from Alexandria Municipal to Alexandria International Airport (AEX).

When the FAA recommended 100 percent transfer of military property to the England Authority, the agency recognized the long-term potential of AEX to be a major asset in the national aviation transportation system. This Master Plan Update balances needed airport improvements with the goals of the England Authority and the community thus providing a consensus on how to best meet future demand and build upon the potential that has been revealed in the past following the handover to the England Authority. The airport master planning process utilized extensive coordination, technical evaluations, and community participation to create a framework for responsible, engaging, and effective development of

this regional and national asset known as England Airpark and Alexandria International Airport.

1.7.3 Airport-Specific Military Airlift Operations

In conjunction with its commercial mission, the England Authority executed a commercial lease with the US Army providing an Intermediate Staging Base (ISB) for the nation's Joint Readiness Training Center located at Fort Johnson (Formerly Fort Polk). Fort Johnson continues to be a key partner with the England Authority in supporting the future long-term development of AEX as an important regional and national asset.

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Chapter 2
Inventory of Existing Conditions

FLYAEX
ALEXANDRIA INTERNATIONAL AIRPORT

2 INVENTORY OF EXISTING CONDITIONS

The first step in the airport master planning process is an inventory of existing facilities currently available at AEX. This inventory chapter summarizes information collected in late 2018 and early 2019 regarding the current airfield configuration, existing facilities, surrounding airspace, and environmental overview. This chapter summarizes the airport conditions, that going forward in the master plan process, establish the baseline conditions for further analysis and recommendations presented in later chapters. Identification of airside, landside, and surrounding airport facilities, including their respective conditions is critical to the evaluation of facility requirements and opportunities based on existing and forecasted demand.

The information presented in this chapter has been gathered from interviews with airport personnel, users, tenants, local and state records, on-site visits, applicable FAA publications, activity databases, planning guidelines, flight procedures, and airport-specific and local/regional FAA operational and local aircraft basing statistical reports. Inventory information is presented in the following subsections:

- General Airport Information
- Airport Settings and Surroundings
- Environmental Overview
- Airside
- Instrument Approach procedures
- Protection of Navigable space
- Airfield Lighting
- Landside facilities
- Support Facilities

2.1 General Airport Information

This section presents and briefly describes the current setting, physical and operational aspects of the airport. This information is referenced throughout the remainder of the Airport Master Plan for comparison or when addressing potential airport development and planning options and considerations.

2.1.1 City of Alexandria, City of Pineville, Airport, and Surface Access

Alexandria is the ninth-largest city in the state of Louisiana and is the parish seat of Rapides Parish. The city is situated along the south bank of the Red River at the geographic center of the state. It is the principal city of the Alexandria Metropolitan Area encompassing all of Rapides and Grant parishes.

The City of Pineville is located nearby along the north bank of the Red River. Pineville is a mid-size city with a rich 300-year history and plays an important role in the economic development of the region.

Regional surface access from the east or west is available via: Interstate 49 (I-49) to Exit 90, Louisiana Highway 498 (LA 498) (Airbase Road) to England Drive; or via US 71 to LA 498 to

England Drive, or via Louisiana Highway 1 (LA 1) to LA 498 to England Drive; or via Louisiana Highway 28 (LA 28) to Vandenburg Drive (LA 3054).

Local access is provided via: Airbase Road or England Drive from the east or west, Vandenburg Drive from the south, and Harold Miles Park Road form the north.

Figure 1-2 graphically depicts the relative location of City of Alexandria, the Alexandria International Airport, and the system of regional and local surface access routes.

Figure 2-1: AEX Location



Source: ARCGIS.COM Living Atlas

2.1.2 Location, Aeronautical Role, and Services

Alexandria International Airport (IATA: AEX, ICAO: KAEX, and FAA LID: AEX) is located approximately 5 statute miles west of Central Business District of the City of Alexandria, Louisiana. The published geodetic Airport Reference Point (ARP) is Latitude 31° 19' 38.538" North, Longitude: 092° 32' 54.801" West, at a reported filed elevation of 88.1 feet Above Mean Sea level (AMSL). The airport is owned and operated by the England Authority and comprises 3,212 acres.

Although scheduled international commercial service is not currently conducted, charter flights for the US military and US Immigration and Customs Enforcement (ICE) to international destinations routinely operate from the airfield. This includes the transportation of US troops, equipment, and the transfer and removal noncitizens to overseas locations.

As one of the nation's 3,287 public-use airports, AEX is listed within the FAA's (2023-2027) National Plan of Integrated Airport Systems (NPIAS) as a publicly owned Primary Non-Hub Commercial Service Airport with a reported 144,218 passenger enplanements for the year 2021, 50 locally-based aircraft, and a 5-year estimated future AIP-eligible Airport Capital Improvement Plan (ACIP) having an estimated value of $112,244,645.

The airport is currently listed as one of the FAA's certificated Title 14 CFR part 139 airports and has a Class-I Classification with Index "D" Aircraft Rescue and Firefighting (ARFF) capabilities.

AEX accommodates a variety of civilian and military transport-related operations generated through commercial lease agreements with the United States Marshals Service, US Army, one local Fixed Base Operator (FBO), Million Air Alexandria, located at and operating from the airport's South Apron, and two major US Commercial Air Carriers operating at the James L. Meyer Commercial Terminal.

The airport is currently served by Delta and American, providing non-stop passenger service to Hartsfield - Jackson Atlanta International Airport and Dallas-Fort Worth International Airport, respectively. Each Airline serves AEX utilizing Regional Commuter Jets.

United Airlines has served AEX since August 1996; however, the air carrier recently ceased operations at the airport due to the pilot shortage and impacts related to the COVID-19 pandemic. For purposes of this master planning effort, it is anticipated that the airline will reintroduce passenger service at AEX in the future. Detailed location information and data for the airport is provided in **Table 2-1**.

Table 2-1: Airport Location and Identification

Item	Data
Airport Name	Alexandria International Airport
Owner	England Economic and Industrial Development District
Distance from CBD	5 NM/W
FAA Region	ASW
FAA Site Number	07411.*A
FAA Location ID	AEX
NPIAS Identifier	22-0003
Airport Reference Point Latitude:	 31° 19' 38.538" N
Longitude:	92° 32' 54.801" W
Elevation (feet MSL):	88.1 ft.
Acreage	3,688.11
Airport Traffic Pattern	Left Traffic

Source: FAA Form 5010; ADIP; eNASR; Exhibit A Pan American Engineers 2024

Beyond scheduled Title 14 CFR Part 121 Air Carrier service offered by the two commercial service airlines, the airport accommodates a unique variety and mixture of military and non-military operators that utilize traditional military, commercial air carrier and business-class general aviation aircraft. Transport of military personnel by non-military operators are conducted for compensation or hire under Title 14 CFR Part 135. (i.e., as registered and flight plan-filed general aviation operations.) utilizing a variety of aircraft ranging in size and capability that range from large commercial aircraft (e.g., Boeing B737, B747, B757, B767, B777, B787, Airbus A320 and A330) to smaller commuter aircraft (e.g., DHC-8 and Dornier 328).

Most of the military's transport operations are generated by use of Lockheed's C-5 Galaxy, C-130 Hercules, the Boeing C-17 Globemaster, and the KC-10 Extender aircraft, Far smaller levels of military transport operations are generated by the military's use smaller cabin-class aircraft (e.g., Cessna Citation V and Gulfstream V).

AEX is unique because it home to the Joint Readiness Training Center's Intermediate Staging Base for the US Army and is the only civilian airport to be designated as a Power Projection Platform by the Department of Defense. AEX was also designated as a disaster relief staging area by the Louisiana Department of Transportation and Development. This combined with the England Authority's goal to develop the Airpark as an intermodal facility has and will continue to drive enplanements, operations, and development at the airport. The airport also supports local operations by the United States Marshals Service's Justice Prisoner and Alien Transportation System (JPATS) which typically operates at the airport utilizing Boeing 737 series aircraft. In addition, US Immigration and Customs Enforcement currently has six (6) Boeing 737 aircraft based at AEX.

2.1.3 Airports in the Vicinity

Nine public-use general aviation airports are located within a 40-nautical mile radius of Alexandria. Of the airports within the vicinity, AEX has the longest runway (9,352 feet) within a 74 NM radius. The next longest runway in the vicinity resides at Esler Regional Airport (5,999 feet), and the third longest is located at Pollock Airport (4,500 feet). A list of the various publicly-owned civilian airports and their respective facilities is presented in Table 2-2.

There are also many privately-owned airports located within the vicinity of AEX. However, these are typically not for public use and thus require prior permission, except in an emergency. Some of these private airports include Grassroots (05LS), Summerville (LA35), Chandler (9LA6), Tracemont (LA10), Keystone Farms (LA17), Red Hawk (80LA) and Roland (70LA) Airports. There are no known airspace interferences among any area airports and AEX.

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Table 2-2: Vicinity Public-Use Airports				
Airport (FAA Identifier)	**Nautical Miles From AEX**	**Relative Direction From AEX**	**Runways (Length/Width)**	**Approach Capability**
Esler Regional (ESF)	14	East-northeast	9-27 (5,999' x150') 14-32 (5,601' x 150')	ILS; RNAV (GPS) w/LPV; Visual
Pineville (2L0)	5	East	18-36 3,000' x 75' 5W-23W (3,000' x 100' Water)	Visual Visual
Pollock (L66)	10	Northeast	18-36 (4,500' x 75')	Visual
Woodworth (1R4)	12	South	1-19 (3,100' x 75')	Visual
Marksville (MKV)	28	Southeast	4-22 (3,802' x 75')	RNAV (GPS) w/LNAV; VOR/DME-A
Jena (1R1)	29	Northeast	18-36 (3,805' x 75')	Visual
Bunkie (2R6)	28	Southeast	(3,005' x 75')	RNAV (GPS) w/LNAV; VOR/DME-A
Allen Parish (ACP)	35	South	18-36 (5,000' x 75')	RNAV (GPS) w/LPV
Natchitoches Regional (IER)	37	Northwest	17-35 (5,003' x 150')	RNAV (GPS) w/LPV; LOC; NDB

Source: Michael Baker International, Inc., 2019

2.1.4 Local Meteorological Conditions

The recorded local meteorological conditions reflect a mild, temperate climate throughout the year with mean monthly temperatures ranging from 49.3° degrees Fahrenheit (F) in January to 82.80°during the month of August. The maximum daily temperature of 93.5° occurs during the month of August. The mean level of precipitation (rain) ranges from 3.39 inches during the month of September and to 5.47 inches during the month of January. A summary of monthly normals for AEX are shown in **Table 2-3**.

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Table 2-3: Summary of Monthly Normals (1991-2020)				
	Temperature (°F)			**Precipitation (Inches)**
Month	**Daily Max**	**Daily Min**	**Mean**	**Mean**
January	59.6	38.9	49.3	5.47
February	63.6	42.2	52.9	4.22
March	70.7	49.0	59.9	4.92
April	78.1	55.1	66.6	4.94
May	85.4	63.7	74.6	3.94
June	90.5	70.6	80.5	5.14
July	92.6	73.0	82.8	4.60
August	93.5	71.9	82.8	3.32
September	89.0	66.6	77.8	3.39
October	80.1	55.4	67.8	4.73
November	69.3	45.4	57.3	4.60
December	61.2	40.6	50.9	5.28

Source: Summary of Monthly Normals 1991-2020. Station: USW00093915.

2.1.5 Local Magnetic Declination

Using the NOAA National Centers for Environmental Information (NCEI)'s Geomagnetic Calculator and the AEX published geodetic Airport Reference Point (ARP), the declination was calculated using the most recent World Magnetic Model (WMM); The WMM is a predictive-only model and is valid for the current epoch, 2019-2024. The Magnetic Declination Value for AEX was calculated to be: 0° 3' East (± 0° 21') changing by 0° 6' West per year.

The calculated magnetic declination, or magnetic variation, is the angle on the horizontal plane between magnetic north and true north and varies depending on the position on the Earth's surface and changes over time. Runways are named by a number between 01 and 36, which is generally the magnetic azimuth of the runway's heading (in units of 10-degrees) relative to Magnetic North.

2.2 Airport Setting and Surrounding Land Uses

There are two separate political jurisdictions that surround the airport: Rapides Parish and the City of Alexandria. The airport is within the political jurisdiction of Rapides Parish, while areas to the north and southeast of the airport are within the jurisdiction of the City of Alexandria.

This section documents existing land uses and describes future land use trends in proximity to AEX. It also addresses the land use controls in Rapides Parish and the City of Alexandria. The land use data (representing 2019 conditions) described and illustrated in this section

are based on information obtained from the Rapides Area Planning Commission (RAPC), the City of Alexandria, and aerial photography.

An inventory and analysis of the existing land use patterns and characteristics is strategic in determining the compatibility of an airport with the surrounding environment. Identifying residential and other noise-sensitive land uses is instrumental in this process. **Figure 2-2** depicts the existing generalized land uses near AEX and includes the airport boundary, runway designation, and city limits. Land use designations include Agricultural, Airport, Commercial, Community Facility (religious, welfare, charitable, civic, social, fraternal, etc.), Industrial, Institutional (educational, medical, correctional, etc.), Open Space, Recreational, Residential, Roads, and Water.

Land use directly north of AEX consists mostly of open space and agricultural lands. Northeast of AEX, residential land uses are scattered along LA Highway 1 North and Old Boyce Road. Land use directly south of AEX is agricultural, recreational, and residential. Recreational land contains Links on the Bayou Golf Course and Johnny Downs Sports Complex. Residential land to the south includes St. Andrews Estates which is situated between the approaches to both runways. It is important to note that the England Authority has been adamantly opposed to new residential development in close proximity to the airport. Although the St. Andrews Estates development was allowed to proceed, homeowners are limited in their ability to lodge noise complaints due to a provision incorporated in each deed that identifies that homeowners are subject to the impacts of noise, particles, or vibration due to their proximity to the airport. The highest concentrations of residential land use in proximity to AEX are located to the east. These areas are situated along Air Base Road, England Drive, and LA Highway 1 North. Land use west of the airport consists primarily of agriculture.

Land use planning and the adoption, administration, and enforcement of zoning regulations are an exclusive authority of Louisiana's local governments within each of their jurisdictions. This includes authority for airport-compatible land use planning. The FAA does not have the authority to exercise land use control in a local government's jurisdiction.

The RAPC has a Land Development Code updated in 2014. One objective is to ensure that development in the vicinity of airports is compatible with airport operations; and to regulate construction on public property.

Compatible land use for public safety is required to minimize the risk of injury to the general public in the event of an aviation accident. Controls are necessary to prevent interference with effective aircraft accident emergency response and to limit the potential for additional aircraft damage or occupant injury. Land use control is also needed to ensure conditions associated with a use will not interfere with the safe operation of aircraft in flight. Public safety compatibility is established by overlay zoning that limits land uses to minimize risk factors associated with aircraft operations.

The United States Air Force (USAF) developed the England Air Force Base Air Installation Compatible Use Zone (AICUZ) in 1983, in which they defined three zones to be used by local authorities for land use planning. The AICUZ was adopted with both runway extensions in place (i.e., Runway 14-32 – 12,000 feet, and Runway 18-36 – 8,500 feet). Rapides Parish

and the City of Alexandria utilized the USAF's guidance in land use planning around the former USAF installation and incorporated the recommendations in their ordinances.

On October 10, 2005, the Rapides Parish Policy Jury adopted a revision to the Rapides Parish Code, Article III – "Airbase Landing District Ordinance." On December 6, 2005, the Alexandria City Council adopted a revision to City of Alexandria Code of Ordinances, Section 28-5.6 "Airfield Compatibility." The revised ordinances included changes to the size and/or location of the Clear Zone (CZ), Accident Potential Zone 1, and Accident Potential Zone 2 and updated the name Accident Potential Zone to Airport Protection Zone. Currently, the CZ is a rectangular area 2,000 feet wide, measured 1,000 feet to either side of the centerline of the ends of each active runway. For Runways 18, 32, and 36, this rectangular area begins at each runway threshold and extends outward from each runway for 4,000 feet.

The Airport Protection Zone 1 (APZ-I) is 3,000 feet wide, measured 1,500 feet to either side of the centerline of the ends of each active runway. This rectangular area begins 4,000 feet from each runway threshold and extends outward from each runway for a distance of 4,000 feet.

For Runway 14, the CZ begins at the runway threshold and extends outward from the runway for 6,000 feet. This additional distance is intended to protect the area designated for the future extension of Runway 14-32. The APZ I is 3,000 feet wide, measured 1,500 feet to either side of the centerline of the ends of each active runway. This rectangular area begins 6,000 feet from the runway threshold and extends outward from the runway for a distance of 2,000 feet.

The Airport Protection Zone 2 (APZ-II) is a rectangular area 3,000 feet wide, measured 1,500 feet to either side of the centerline of the ends of each active runway. This rectangular area begins at the outer end of APZ-I or 8,000 feet from the runway threshold and from these points extends outward for a distance of 7,000 feet.

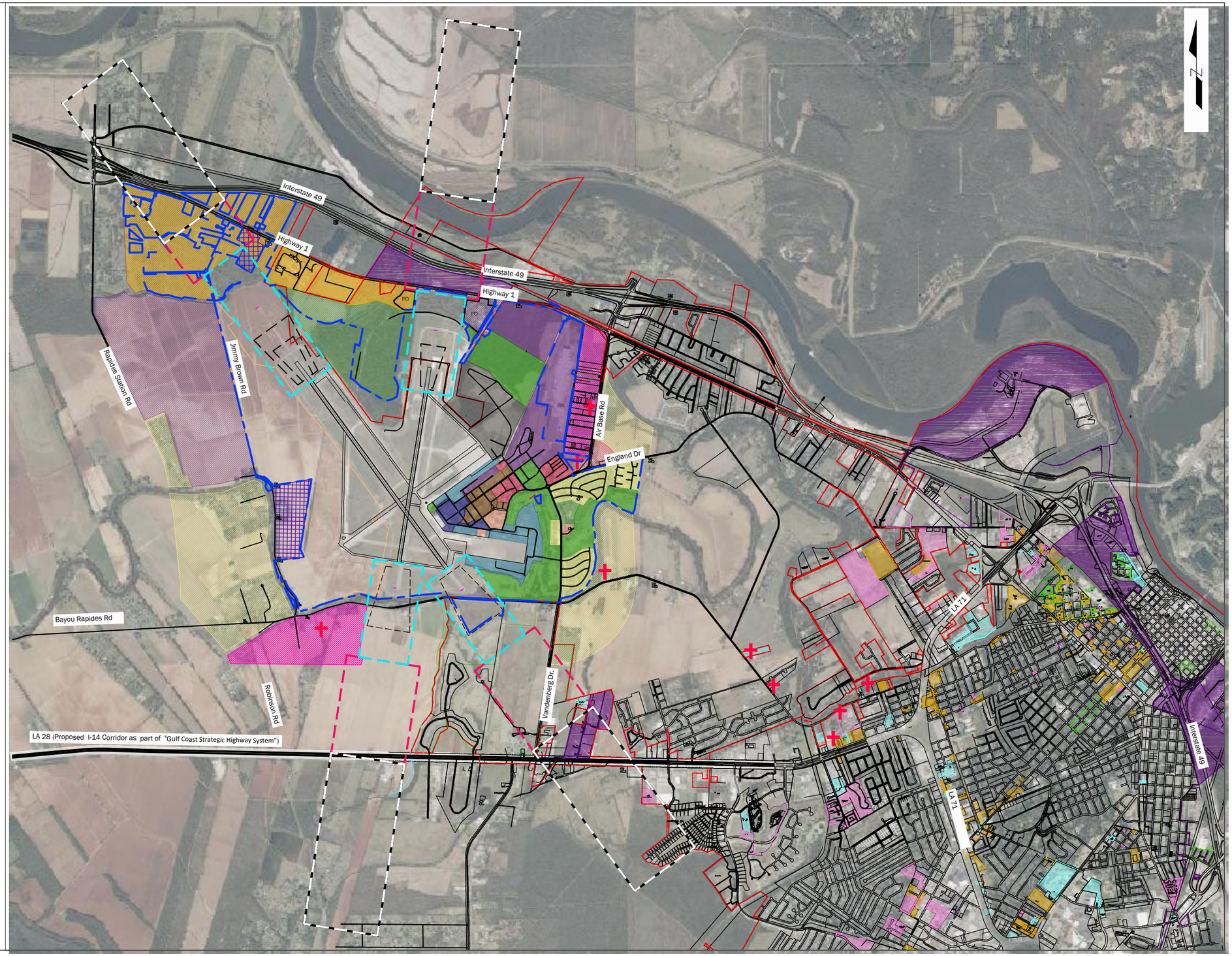
The City and Parish ordinances prescribe the land use restrictions within CZ, APZ-I, and APZ-II. Land within the APZ-I, APZ-II, or CZ may not be used for any purpose other than those described in section 7.8.3 of the RAPC Land Development Code. In addition, FAA height and obstruction criteria is used to determine height limitations in the airport surroundings.

The CZ, APZ-I, and APZ-II around AEX are shown in **Figure 2-2**.

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LEGEND

- England Airpark Boundary
- City of Alexandria Limits
- Community Open Space/Recreation
- Institutional
- Multi-Family Residential
- Offices
- Industrial
- Commercial
- US Army
- Aviation Related
- Airport Landside
- Solar Farm
- Clear Zone
- Accident Potential Zone 1
- Accident Potential Zone 2
- Runway Protection Zone
- Primary Road
- Future Industrial Expansion
- Future Acquisition
- Future Open Space/Recreation
- Future Commercial
- Conservation Residential Development
- Future Business/Commercial/Industrial Mix
- Future Residential/Retail/Light Industrial Mix
- Future Institutional
- Church



5000' 0 5000'

Michael Baker INTERNATIONAL

Airport Surroundings and Land Use

Figure 2-2

2.3 Environmental Overview

As a component of the inventory effort, an environmental overview was conducted to identify environmental considerations that could affect future airport development at AEX. This overview was based on a review of available environmental resource materials and databases, which included:

- Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map[1]
- National Register of Historic Places (NRHP) database[2]
- United States Department of Agriculture, Natural Resources Conservation Service, Web Soil Survey[3]
- United States Environmental Protection Agency (USEPA) NEPAssist database[4]
- United States Fish and Wildlife Service (USFWS) Information for Planning and Consultation (IPAC) Protected Species data[5]
- USFWS Wetlands Mapper[6]
- United States Census American FactFinder database[7]

The environmental information was collected based upon the guidelines set forth in FAA Order 1050.1F, *Environmental Impacts: Policies and Procedures*[8]; FAA Order 5050.4B[9], *National Environmental Policy Act (NEPA) Implementing Instructions for Airport Actions; and*

[1] Federal Emergency Management Agency, "Flood Insurance Rate Map, Rapides Parish, Louisiana, Panel 220145 0140 D," https://map1.msc.fema.gov/idms/IntraView.cgi?KEY=4342556&IFIT=1, 1997 (March 14, 2019).

[2] National Park Service, "NRHP web-based map," https://www.nps.gov/maps/full.html?mapId=7ad17cc9-b808-4ff8-a2f9-a99909164466, (March 13, 2019).

[3] USDA, NRCS "Web Soil Survey," https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx, (March 14, 2019).

[4] USEPA, "NEPAssist," https://nepassisttool.epa.gov/nepassist/nepamap.aspx, (March 14, 2019).

[5] USFWS, "IPaC Information for Planning and Consultation" https://ecos.fws.gov/ipac/ (March 14, 2019).

[6] U.S. Fish and Wildlife Service, "NWI Wetlands Mapper," https://www.fws.gov/wetlands/data/Mapper.html October 17, 2018, (March 14, 2019).

[7] U.S. Census Bureau, "American Fact Finder." https://factfinder.census.gov/faces/nav/jsf/pages/index.xhtml (March 14, 2019).

[8] FAA, Order 1050.1F "Environmental Impacts: Policies and Procedures," https://www.faa.gov/regulations_policies/orders_notices/index.cfm/go/document.current/documentNumber/1050.1, July 16, 2015, (March 14, 2019).

[9] FAA, "Order 5050.4B – National Environmental Policy Act, Implementing Instructions for Airport Actions, "https://www.faa.gov/airports/resources/publications/orders/environmental_5050_4/media/5050-4B_complete.pdf , April, 28, 2006 (March 14, 2019).

FAA's 1050.1F Desk Reference[10], which includes 16 categories of potential areas of impact that must be addressed in compliance with NEPA.

For the purposes of this overview, only the environmental categories deemed applicable to AEX were addressed, with the goal of identifying environmental features that could affect proposed development projects identified in this Master Plan Update. Based on a review of available resource materials, the following paragraphs identify various criteria that should be considered prior to undertaking future development projects. **Figure 2-3** provides an illustration of sensitive environmental features on and surrounding AEX property.

2.3.1 Socioeconomics and Environmental Justice

The United States Census Bureau, 2012-2016 American Community Survey 5-year estimates data were used at the Block Group (BG) level for determining population and income characteristics in the vicinity of AEX. A BG is the smallest geographic division that is used by the United States Census Bureau to categorize data. The BG that contains AEX and five (5) additional BGs that are located closest to AEX were selected for this analysis. **Table 2-4** provides demographic and economic characteristics of these BGs, as compared to the State of Louisiana.

Table 2-4: Select Demographic and Economic Characteristics

Area	Characteristic		
	Total Population	% Minority	% Below Poverty Level
CT 980000 BG 1a	Ranges from 6 to 37	100	Unreliable data
CT 010500 BG 2	1,581	19	18
CT 013800 BG 1	612	54	11
CT 013800 BG 2	752	46	24
CT 013800 BG 3	3,024	26	10
CT 010700 BG 1	1,674	26	9
CT 010700 BG 2	1,133	11	7
Louisiana	4,533,372	37	20[b]

[a] BG containing AEX. For this BG, population is very low with only 14 people and percent below the poverty level of zero in the 2017 estimate. In other years the reported number of people in this BG ranged from 33 to 37 with percent with income below poverty level averaging approximately 24 percent. However, for this particular BG the margin of error exceeded the number of people reported, so the information is unreliable.

[b] Percent with income below poverty level was not available for 2017, so 2016 data were used.

Source: U.S. Census Bureau, 2013-2017 American Community Survey 5-year Estimates.

[10] FAA, 1050.1F Desk Reference, https://www.faa.gov/about/office_org/headquarters_offices/apl/environ_policy_guidance/policy/faa_nepa_order/desk_ref/, July 2015, (March 14, 2019).


Barrett
Rapides
Sandy Bayou
Old Boyce Rd
Highway 1
Colonial Trails Scenic Bywy
Rapides Station Rd
Jimmy Brown Rd
Harold Miles Rd
Industrial Park Site Rd
N 3rd St
Levee Park
Enterprise
Northwestern State Univers of la
Plantation Rd
Bayou Rapides Rd
MacArthur Dr
Rapides Ave
Chester St
Mason St
Masonic Dr
Weil
N Bayou Rapides Rd
School House Rd
Robinson Rd
Vandenburg Dr
Bail Ln
Benjamin St
Elliott St
Heyman Ln
Sailles Blvd
Coope
Highway 28 W
28
Fish Farm
Messina Rd
Keithen Dr
N
September 5, 2023
1:72,224
0 0.5 1 2 mi
0 0.75 1.5 3 km
Toxic Releases (TRI)
Water Dischargers (NPDES)
Water Dischargers (NPDES)
Hazardous Waste (RCRAInfo)
Hazardous Waste (RCRAInfo)
Air Pollution (ICIS-AIR)
Air Pollution (ICIS-AIR)
Search Result (point)
National Register of Historic Places
Airport Points
Impaired Streams
Streams
CONANP, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, USDA, EPA OEI, EPA OEI, OFA

Executive Order 12898: *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*[11], requires federal agencies to identify community issues of concern during the NEPA planning process, particularly those issues relating to decisions that may have a disproportionate impact to low-income or minority populations. To determine if there are environmental justice populations near AEX, the BG data pertaining to individuals living below the poverty level and minority populations were compared to those of the State of Louisiana as a whole. As depicted in **Table 2-4**, CT 980000 BG 1, CT 013800 BG 1, and CT 013800 BG 2 are characterized by minority percentages (100 percent, 54 percent, and 46 percent, respectively) that are higher than those of the State of Louisiana as a whole (37 percent). Additionally, the percentage of individuals living below the poverty level is higher for CT 013800 BG 2 (24 percent) than for the State of Louisiana as a whole (20 percent). Therefore, it can be concluded that CT 013800 BG 1 and CT 013800 BG 2 contain social justice populations. CT 013800 BG 1 is located adjacent to the east and northeast sides of AEX. CT 013800 BG 2 is located further east of AEX. Care should be taken during planning of future airport development projects to ensure that disproportionate impacts do not occur for the populations within these block groups due to effects such as increased noise. For CT 980000 BG1, this is the BG that contains AEX and the population is very low, ranging from 6 to 37 individuals depending on what data table is being reviewed at and what year the data is reported from (for this analysis data from years 2013 through 2017 were reviewed). Since the reported population is less than the range of error for these years the data for this BG were considered unreliable. For the purposes of this limited analysis, CT 980000 BG1 was not considered to contain a social justice population.

2.3.2 Department of Transportation Act, Section 4(f) Properties

Section 4(f) of the Department of Transportation Act of 1966, codified as 49 U.S.C. § 303(c), protects significant publicly owned parks, recreational areas, wildlife and waterfowl refuges, and public or private historic sites. Section 4(f) provides that the Secretary of Transportation may approve a transportation program or project that requires the use of any publicly owned land from a public park, recreation area, or wildlife or waterfowl refuge of national, state, or local significance, or land from any publicly or privately owned historic site of national, state, or local significance, only if there is no feasible and prudent alternative to the use of such land and the program or project includes all possible planning to minimize harm resulting from the use.

A review of Section 4(f) properties was conducted by reviewing the City of Alexandria Parks and Recreation Master Plan and available mapping websites. The following properties that may be considered Section 4(f) properties were identified in the vicinity of AEX (**Figure 2-6**):

[11] Federal Register, Executive Order 12898, https://www.archives.gov/files/federal-register/executive-orders/pdf/12898.pdf, February 11, 1994, (March 13, 2019).

- Harold Miles Park, 100 Harold Miles Road
- Johnny Downs Sports Complex, 271 Vandenburg Drive
- Oakwing Golf Club, 2345 Vandenburg Drive

Development that may impact any of these or other 4(f) properties, either directly or through indirect impacts such as noise that diminish the attributes of the 4(f) property, will require review with respect to section 4(f) regulations.

2.3.3 Hazardous Material Sites

The Resource Conservation and Recovery Act of 1976[12] (RCRA), Subtitle C, established the federal program to manage hazardous wastes from cradle to grave. Subtitle C contains guidance for hazardous waste handling entities regarding generation, transportation, and treatment, storage, or disposal of hazardous waste. The USEPA provides state and local agencies with information, guidance, policy, and regulations to help regulate community waste and to enhance the environmental and economic benefits of source reduction and recycling of solid wastes. Notification of USEPA is necessary if treatment, storage or disposing of hazardous waste is being conducted at a given facility to receive a USEPA Identification Number unless hazardous waste generated at the facility has been exempt.

The USEPA NEPAssist database[13] was used to obtain information regarding potential waste and hazardous material sites shown in **Figure 2-3**. According to NEPAssist, a total of 14 facilities that generate hazardous waste are located around the perimeter of AEX. Twelve of these are small quantity generators, conditionally exempt small quantity generators, or facilities for which no generator status is listed, which is likely because they either no longer generate waste or generate only a small amount. The remaining two facilities, the US Army Fort Johnson Intermediate Staging Base facility, which is located approximately 1,500 feet north of the military/cargo apron on Warrior Avenue, and the Union Tank Car Company/UTLX Manufacturing, which is located approximately 3,000 feet northeast of the military/cargo apron, are listed as large quantity generators. In addition, the Union Tank Car Company is listed in the USEPA's Toxic Release Inventory (TRI) Program database. This does not mean that there is necessarily a violation. Its appearance on the TRI Database indicates that it is a facility that is documented to emit potentially toxic substances to the air or water or to dispose of potentially toxic substances in some type of land disposal, such as a hazardous waste landfill. According to NEPAssist, no brownfields or Superfund sites, or Toxic Substances Control Act sites are located at or in the immediate vicinity of AEX. For planned development at the airport that may result in ground disturbance near existing facilities that handle or generate hazardous waste it is recommended that a qualified hazardous material assessment firm be hired to investigate and determine if remediation is required prior to land acquisition or construction.

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[12] 42 U.S.C. § 6901, "Resource Conservation and Recover Act," https://www.gpo.gov/fdsys/pkg/USCODE-2017-title42/pdf/USCODE-2017-title42-chap82-subchapI-sec6901.pdf, (March 13, 2019).

[13] USEPA, "NEPAssist," https://nepassisttool.epa.gov/nepassist/nepamap.aspx, (March 13, 2019).

2.3.4 Floodplains

The 100-year floodplain boundary delineates a flood elevation that has a one percent chance of being equaled or exceeded any given year. Executive Order 13690, "*Establishing a Federal Flood Risk Management Standard and a Process for Further Soliciting and Considering Stakeholder Input*[14]," and the United States Department of Transportation Order 5650.2[15]," *Floodplain Management and Protection*, requires that all airport development actions must avoid floodplain impacts wherever there is a practicable alternative. In addition, the design must minimize adverse impacts to the floodplain's natural and beneficial values and minimize the likelihood of flood-related risk to human life, health, and welfare. In Rapides Parish, application for development is subject to review with respect to the Flood Damage Prevention ordinance within the Rapides Parish Police Jury's Code of Ordinances.

Review of the most updated FEMA Flood Insurance Rate Map for the area of AEX (See **Figure 2-4**) showed that much of the north side of AEX property, as well as the area immediately adjacent to Bayou Rapides and its tributaries on the south side of AEX are within FEMA Zone AE (Previous A8), which is assigned to areas with a one-percent chance of an annual flood event where the base flood elevation has been determined. In the areas on the north side of AEX the base flood elevation is reported as being 83 feet (referenced to the National Geodetic Vertical Datum of 1929) and the areas adjacent Bayou Rapides are shown with a base flood elevation of 82 feet. The remainder of AEX is within an area designated as "protected from the one percent annual chance (100-year) flood by levee, dike, or other structures subject to possible failure or overtopping during larger floods."

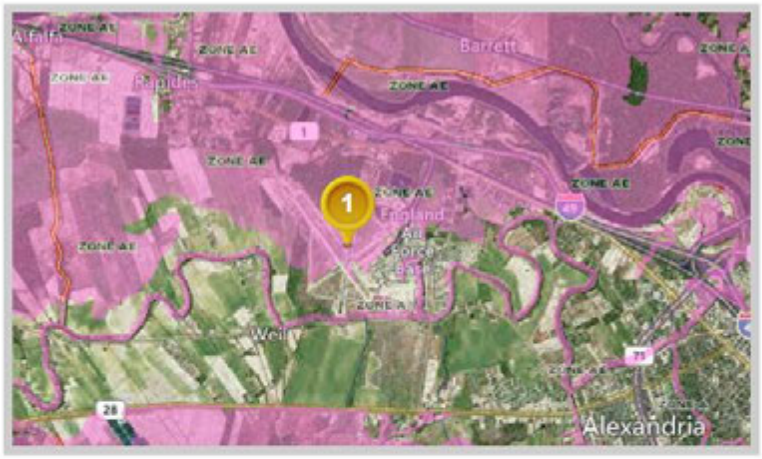
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[14] Federal Register, "Executive Order 13690," https://www.gpo.gov/fdsys/pkg/FR-2015-02-04/pdf/2015-02379.pdf January 30, 2015, (March 13, 2019).

[15] FHWA, "Executive Order 5650.2, Floodplain Management and Protection,"

http://www.fhwa.dot.gov/engineering/hydraulics/policymemo/order56502.pdf, April 23, 1979 (March 13, 2019).

Figure 2-4: Flood Insurance Rate Map



Source: Louisiana Flood Maps Portal

2.3.5 Water Quality

The Federal Water Pollution Control Act, as amended by the Clean Water Act[16] provides the authority to establish water control standards, control discharges into surface and subsurface waters, develop waste treatment management plans and practices, and issue permits for discharges and for dredged and filled materials into surface waters. The Fish and Wildlife Coordination Act requires consultation with the United States Fish and Wildlife Service (USFWS) when any alteration and/or impounding of water resources is expected. Section 402 of the Clean Water Act created the Federal National Pollution Discharge Elimination System (NPDES) permitting program and provided regulations that govern the quality of stormwater discharges into water resources of the United States. In 1996, Louisiana became a state delegated to administer NPDES. Under Louisiana Administrative Code 33 Chapter IX discharge of pollutants from any point source into waters of the state of Louisiana requires a Louisiana Pollutant Discharge Eliminations System (LPDES) permit from the Louisiana Department of Environmental Quality.

[16] U.S. Environmental Protection Agency, "Clean Water Act," https://www3.epa.gov/npdes/pubs/cwatxt.txt (March 13, 2019).

AEX's property is within the Irish Ditch and Big Bayou subbasin within the Vermillion-Teche Basin. It is bordered to the north by Big Bayou, which is a tributary to Bayou Rapides, and to the south by Bayou Rapides. These two bayous, which flow in a generally eastward direction, merge together approximately 1.6 miles east of AEX. From this point, Bayou Rapides continues eastward to its confluence with the Red River approximately 5.5 miles east of AEX. Drainage basins are identified by a Hydrologic Unit Code (HUC) that is established by the United States Geological Survey. HUC codes range from regional (2 digit) to subwatershed (12 digit) code levels. The portion of the Bayou Rapides subwatershed in the vicinity of AEX is HUC 080801020204. Activities at AEX will likely require NPDES permits, a Stormwater Pollution Prevention Plan, and stormwater management systems.

As part of the Clean Water Act, states are required to record the condition of surface waters in accordance with Section 303(d) documentation. The 2018 Louisiana Water Quality Integrated Report[17] indicates that Big Bayou is an impaired water. The measured parameters that have been reported at impairment levels are dissolved oxygen and total dissolved solids. Low dissolved oxygen levels were attributed to septic treatment systems which release phosphorus and nitrogen into ground and surface waters causing overgrowth of algae. As algae dies and decays, oxygen levels are depleted, and this can result in die off of aquatic organisms. Elevated total dissolve solids can also be toxic to aquatic life. Sources of such impairment can include erosion of stream, canal, or ditch banks, particularly when the system has been modified or channelized in the past and when the system passes through areas of agricultural land use. Pesticides and fertilizers in stormwater runoff from lawns and agricultural areas dissolve to form salts that contribute to the total dissolved solids.

LPDES Permits for Stormwater Discharges associated with Construction Activity are required for development projects that are greater than one acre. LPDES Construction Permits mandate sediment and erosion control measures prior to, during, and after construction is completed.

2.3.6 Wetlands and Other Jurisdictional Waters of the United States

Executive Order 11990[18], *Protection of Wetlands*, mandates that each federal agency take action to minimize the destruction, loss, or degradation of wetlands, and preserve and enhance their natural values. This Executive Order and the permitting requirements of Section 404[19] of the Clean Water Act require a permit for impacts to Waters of the United States (including wetlands). Permit applications are submitted to the United States Army Corps of Engineers and the Louisiana Department of Environmental Quality issues Clean

[17] Louisiana Department of Environmental Quality, "Water Quality Integrated Report 305(b)/303(d)," http://deq.louisiana.gov/page/water-quality-integrated-report-305b303d, (March 14, 2019).

[18] National Archives, "Executive Orders: Executive Order 11990," https://www.archives.gov/federal-register/codification/executive-order/11990.html, May 24, 1977 (March 14, 2019).

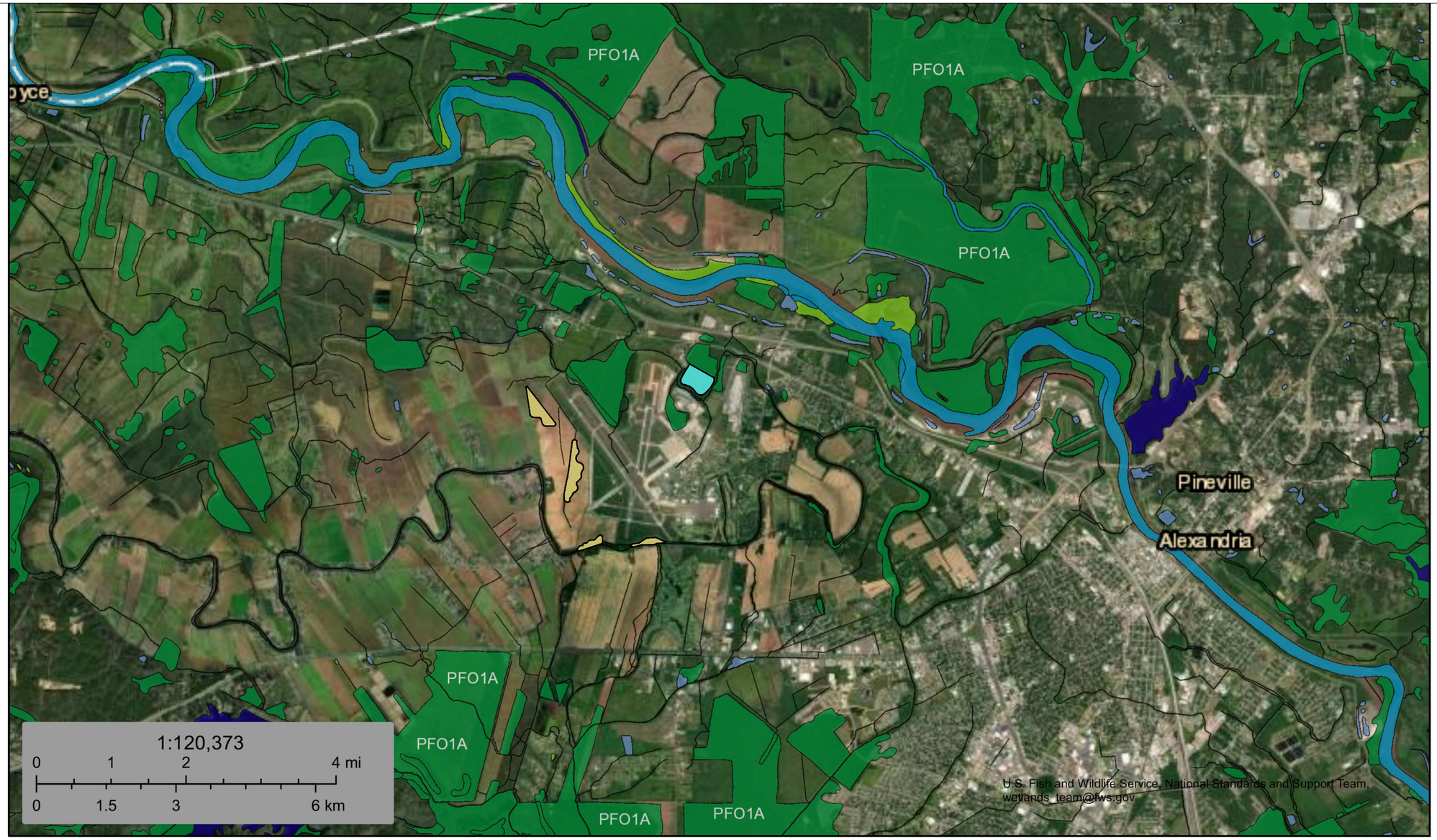
[19] U.S. Environmental Protection Agency, "Section 404 of the Clean Water Act," https://www.epa.gov/cwa-404/clean-water-act-section-404 , October 6, 2016 (March 14, 2019).

Water Act Section 401 water quality certifications. The State of Louisiana also has a separate wetland permitting program, but this permitting program is only applicable to development within Louisiana's Coastal Zone. AEX is located outside of the Coastal Zone therefore no additional state wetland permit is required.

The USFWS National Wetlands Inventory (NWI) Wetland Mapper[20] indicates that there are multiple areas of wetland on or adjacent to AEX property. Large areas of freshwater forested wetlands are mapped between Runways 14 and 18, between the military/cargo apron and the Fort Johnson Intermediate Staging Base, and north of the Staging Base. Two other areas mapped as wetland on the Wetlands Mapper that are on the west side of Runway 14 have been cleared. One of these appears to have been converted to farmland. The only other potential jurisdictional non-wetland surface waters mapped in the area of AEX are Big Bayou, Bayou Rapides, and a lake north of the Fort Johnson Intermediate Staging Base. The locations of the mapped wetlands and surface waters are shown on **Figure 2-5.** There remains a possibility that other wetlands occur on or adjacent to AEX property that do not appear on the NWI mapping or that the actual extent of wetlands is less or different than depicted on the mapping. For future development, particularly in areas that have not been previously developed, it will be important to evaluate each site for the potential presence of wetlands prior to construction.

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[20] U.S. Fish and Wildlife Service, "NWI Wetlands Mapper," https://www.fws.gov/wetlands/data/Mapper.html October 17, 2018, (March 14, 2019).



September 5, 2023

Wetlands

- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine
- Mitigated Wetland
- Dry Pond

National Wetlands Inventory (NWI)
This page was produced by the NWI mapper

2.3.7 Historical, Architectural, Archaeological, and Cultural Resources

The National Historic Preservation Act of 1966[21] and the Archaeological and Historic Preservation Act of 1974[22] provide protection against development impacts that would impact the historical, architectural, archaeological, or cultural resources. The Louisiana Department of Culture, Recreation and Tourism, Office of Cultural Development, Division of Historic Preservation is responsible for reviewing projects and determining their effects on Louisiana's cultural resources as outlined within state and federal laws and regulations. The National Park Service's National Register web-based map utility was used to review records of NRHP-listed properties that are not considered "sensitive or restricted" (such as archaeological sites) near AEX. This review indicated that there are no unrestricted NRHP-listed cultural, historical, or archaeological resources within or adjacent to AEX property[23] as shown in **Figure 2-6.** However, because the search does not include sensitive or restricted sites, sites that have yet to be discovered, or sites that may be eligible for listing but have not been officially listed to-date, this review should only be preliminary.

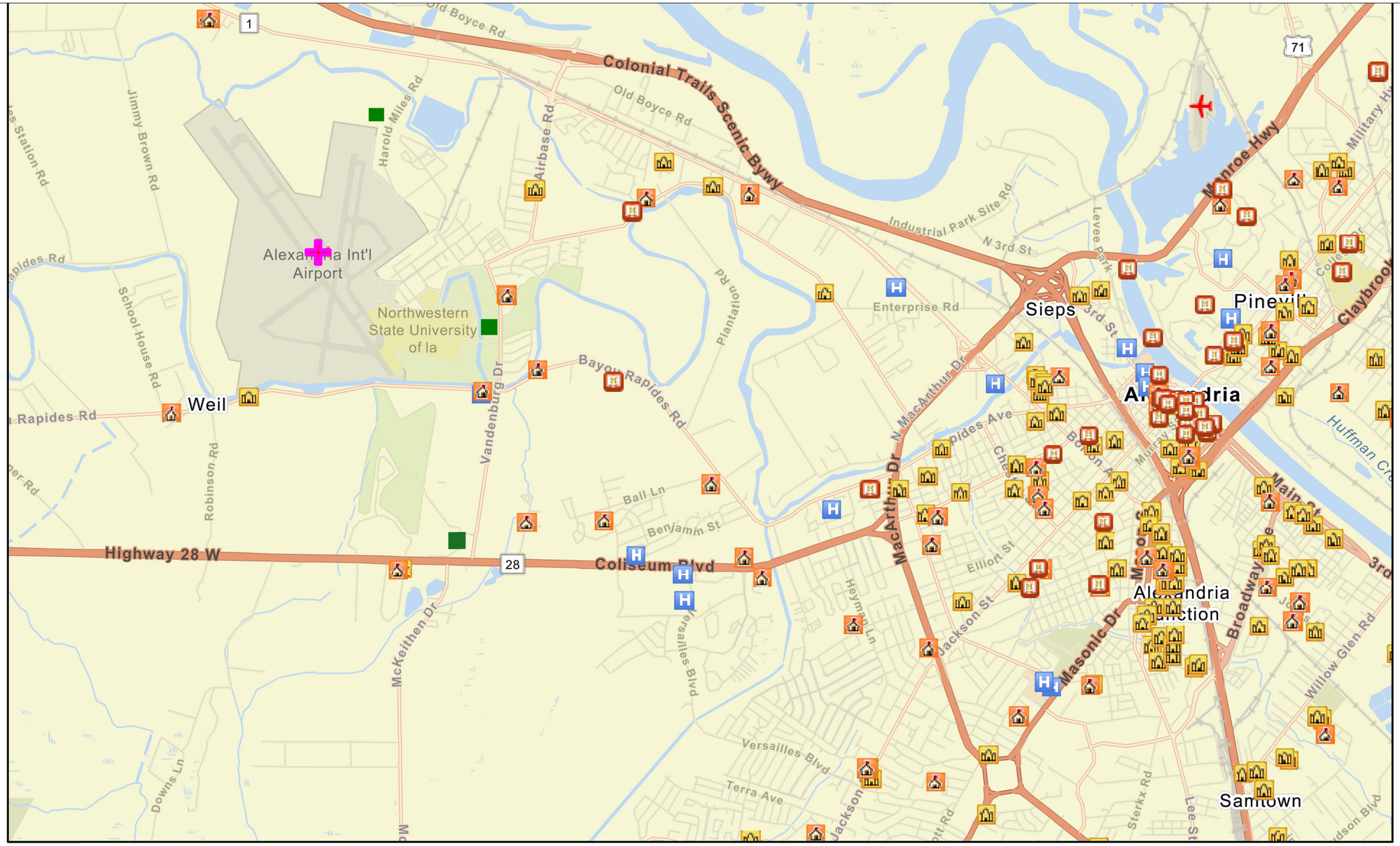
Proposed projects that are in previously undisturbed areas or that may impact buildings or landmarks that are more than 50 years of age have the potential to impact cultural resources. Coordination with the Division of Historic Preservation should occur to evaluate potential effects of such projects prior to construction.

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[21] National Park Service, "National Historic Preservation Act," https://www.nps.gov/subjects/archeology/national-historic-preservation-act.htm.

[22] National Park Service, "Archaeological and Historic Preservation Act" https://www.nps.gov/subjects/archeology/archeological-and-historic-preservation-act.htm.

[23] National Park Service, "NRHP web-based map," https://www.nps.gov/maps/full.html?mapId=7ad17cc9-b808-4ff8-a2f9-a99909164466, (March 14, 2019).



September 5, 2023

Search Result (point)

National Register of Historic Places

Schools

Places of Worship

Hospitals

Airport Points

Section 4(f) Properties

1:72,224

0 0.5 1 2 mi

0 0.75 1.5 3 km

CONANP, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, USDA, EPA OEI, EPA OEI, OFA

2.3.8 Prime and Unique Farmlands

The Farmland Protection Policy Act (FPPA)[24] requires federal or federally funded activities to minimize effects of federal programs on unnecessary and irreversible conversion of prime, unique, or important farmlands to non-agricultural uses. The United States Department of Agriculture, Natural Resources Conservation Service (NRCS) administers the FPPA and issues determinations on whether a site is subject to the FPPA and measures the relative value of the farmland if applicable.

According to the NRCS Web Soil Survey farmland classification data for AEX's property (generated March 14, 2019), all the soils on AEX property consist of soils classified as prime farmland soils.[25] However, according to the FPPA, lands already committed to urban development such as the airport and the associated former AFB base complex, do not meet the definition of prime or unique farmlands.

2.3.9 Threatened and Endangered Species

Pursuant to Section 7 of the Endangered Species Act of 1973, as amended, habitats at AEX were evaluated with respect to suitability for federal- and state-protected species. A list of federally protected species with potential to occur on or near AEX's property was generated from the USFWS IPaC website on March 14, 2019, and updated on September 5, 2023.[26] Species from the IPaC list and the Natural Heritage list were evaluated with respect to habitat requirements and those with potential to occur in the habitats on and near AEX are listed in **Table 2-5**, below. In addition to federally listed species, migratory birds of conservation concern may be present at or near AEX. Depending on project scope and timing, vegetation clearing may require compliance with USFWS guidelines to protect migratory birds under the Migratory Bird Treaty Act.[27].

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[24] Farmland Protection Policy Act https://www.nrcs.usda.gov/conservation-basics/natural-resource-concerns/land/cropland/farmland-protection-policy-act.

[25] USDA, NRCS "Web Soil Survey," https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx, (March 14, 2019).

[26] USFWS, "IPaC Information for Planning and Consultation" https://ecos.fws.gov/ipac/ (September 2023).

[27] Federal Register, "Migratory Bird Treaty Act" https://www.federalregister.gov/documents/2023/07/31/2023-15551/general-provisions-revised-list-of-migratory-birds.

Table 2-5: Potential Federal and State Protected Species in Vicinity of AEX			
Scientific Name	**Common Name**	**Federal Status**	**State Status**
Haliaeetus leucocephalus	Bald eagle	Non-BCC Vulnerable	
Myotis septentrionalis	Northern long-eared bat	Endangered	Endangered
Picoides borealis	Red-cockaded Woodpecker	Endangered	Endangered
Grus americana	Whooping Crane	EXPN	
Macrochelys temminckii	Alligator Snapping Turtle	Proposed Threatened	
Margaritifera hembeli	Louisiana Pearlshell	Threatened	
Danaus plexippus	Monarch Butterfly	Candidate	

Sources: IPaC list generated for AEX property on September 5, 2023, and Louisiana Natural Heritage Program list of species for Rapides Parish

Note: EXPN - Experimental Population, Non-Essential

2.4 Airside Facilities

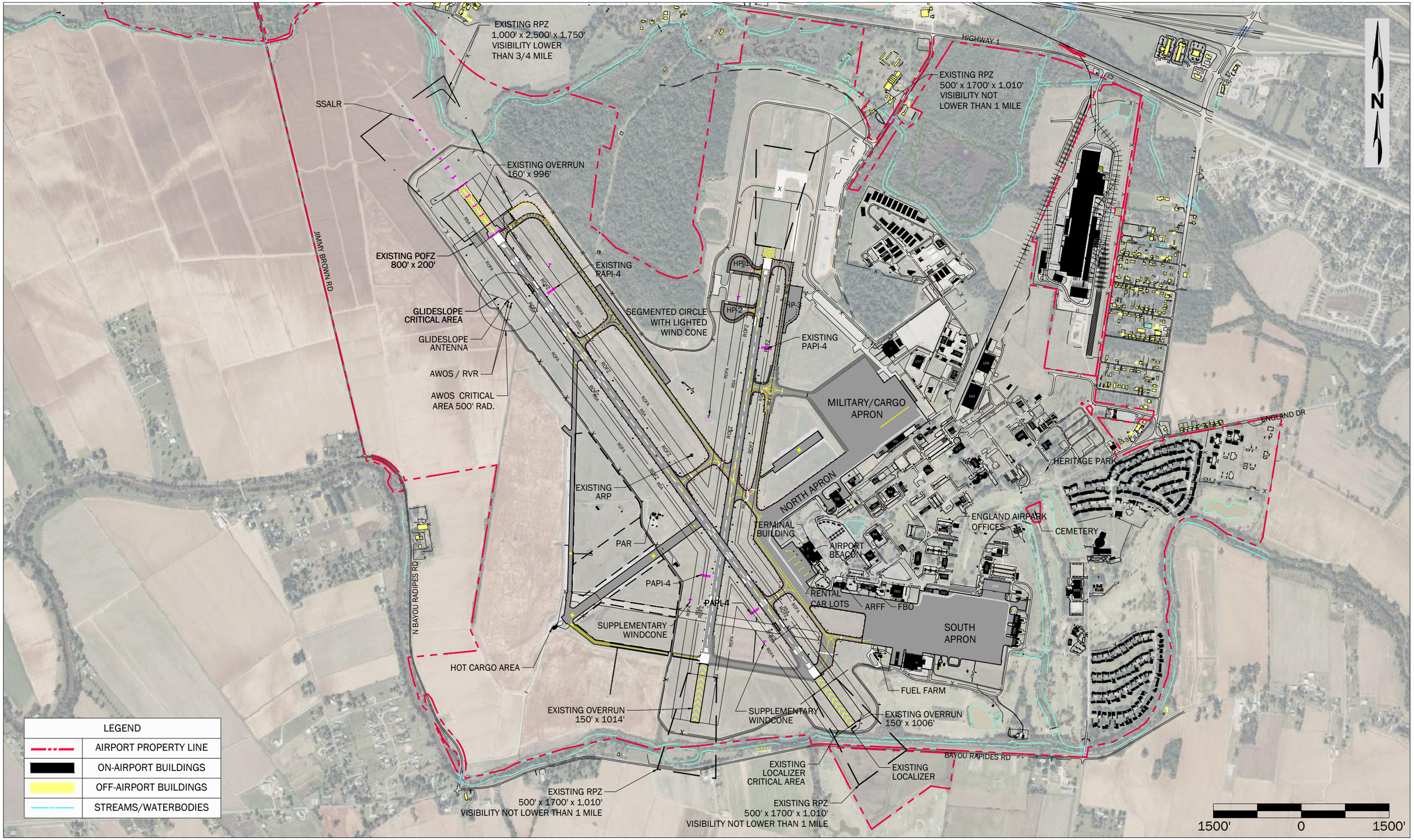
The term "airfield" (also referred to as "airside") typically comprises facilities, geometries and protection of land uses and navigable airspace that, collectively, serves to directly support the safe and efficient operation of aircraft on the ground and while conducting approach or departure operations to or from the runway environment. Physical facilities include, but are not limited to runways, taxiways, visual and electronic navigational aids (NAVAIDS), airfield lighting, pavement markings, and airfield signage. Other non-facility attributes include the protection of the runway-taxiway environment, land uses beyond each runway end and overlying imaginary planes protecting navigable airspace.

Existing airfield facilities and supporting attributes at AEX are depicted in **Figure 2-7**.

2.4.1 Runways

The airfield is comprised of two paved intersecting runways each having the capability to accommodate commercial and military aircraft operations safely and efficiently.

Runway 14-32 oriented in a northwest/southeast orientation serves as the airport's Primary Runway. It is served by a Category-I Precision Instrument Landing System (ILS) and published Precision Instrument Approach Procedure (IAP) offering horizontal and vertical navigational guidance to the Runway 14 threshold. Both Runways 14 and 32 are supported by Global Positioning System (GPS) - Wide Area Augmentation System (WAAS)-based Localizer Performance with Vertical guidance (LPV) procedures. Although LPV IAPs by function are very similar to the precision ILS, they are not considered precision approaches. Runway 18-36 oriented in a North-northeast/South-southwest orientation serves as the airport's Secondary Runway. Both Runways 18 and 36 are served by GPS/WAAS-capable (LPV) IAPs.


EXISTING RPZ
1,000' x 2,500' x 1,750'
VISIBILITY LOWER
THAN 3/4 MILE
SSALR
EXISTING OVERRUN
160' x 996'
JIMMY BROWN RD
EXISTING POFZ
800' x 200'
EXISTING
PAPI-4
GLIDESLOPE
CRITICAL AREA
GLIDESLOPE
ANTENNA
AWOS / RVR
AWOS CRITICAL
AREA 500' RAD.
HIGHWAY 1
EXISTING RPZ
500' x 1700' x 1,010'
VISIBILITY NOT
LOWER THAN 1 MILE
SEGMENTED CIRCLE
WITH LIGHTED
WIND CONE
HP-1
HP-2
HP-3
EXISTING
PAPI-4
MILITARY/CARGO
APRON
ENGLAND DR
HERITAGE PARK
EXISTING
ARP
NORTH APRON
TERMINAL
BUILDING
ENGLAND AIRPARK
OFFICES
CEMETERY
PAR
AIRPORT
BEACON
PAPI-4
PAPI-4
RENTAL
CAR LOTS
ARFF
FBO
SUPPLEMENTARY
WINDCONE
SOUTH
APRON
N BAYOU RAPIDES RD
HOT CARGO AREA
FUEL FARM
EXISTING OVERRUN
150' x 1014'
SUPPLEMENTARY
WINDCONE
EXISTING OVERRUN
150' x 1006'
BAYOU RAPIDES RD
EXISTING
LOCALIZER
CRITICAL AREA
EXISTING
LOCALIZER
EXISTING RPZ
500' x 1700' x 1,010'
VISIBILITY NOT LOWER THAN 1 MILE
EXISTING RPZ
500' x 1700' x 1,010'
VISIBILITY NOT LOWER THAN 1 MILE
N
LEGEND
AIRPORT PROPERTY LINE
ON-AIRPORT BUILDINGS
OFF-AIRPORT BUILDINGS
STREAMS/WATERBODIES
1500'
0
1500'

Tables 2-6, 2-7 and 2-8 present the data and information detailing the respective existing physical attributes, operational capabilities, and safety-related geometries of each of the airport's two runways based upon their design, runway-to-parallel taxiway centerline separations and/or availability of published IAPs.

Table 2-6: Existing Runway Design Characteristics and Capabilities

Item	Runway 14-32		Runway 18-36	
	14	32	18	36
Aircraft Approach Category (AAC)	D		D	
Airplane Design Group (ADG)	V		IV	
Visibility Minimums (Miles)	Lower than ¾ mile but not lower than ½ mile	Not lower than 1 mile	Not lower than 1 mile	Not lower than 1 mile
Visibility Minimums (RVR feet)	2,400	5,000	N/A	N/A
Runway Design Code (RDC)	D-V-2400	D-V-5000	D-IV-5000	D-IV-5000
Approach Reference Code (APRC)	D-VI-2400	D-VI-5000	D-IV-5000 D-V-5000	D-IV-5000 D-V-5000
Departure Reference Code (DPRC)	D-VI	D-VI	D-IV D-V	D-VI D-V

Source: Alexandria International Airport Layout Plan Update, 2009, The LPA Group Inc., FAA Advisory Circular 150/5300-13A, Change 1, Airport Design. Compiled by Michael Baker International, 2019.

Table 2-7: Existing Runway Design Characteristics

Item	Runway 14-32		Runway 18-36	
	14	32	18	36
Runway Length (feet)	9,352		7,001	
Displaced Threshold (feet)	N/A	N/A	N/A	N/A
Runway Width (feet)	150	150	150	150
True Bearing (degrees)	143° 58' 6.8645"	323° 58' 39.8358"	188° 58' 46.8648"	08°58' 40.3154"
Magnetic Declination	0° 8' East (± 0° 21') changing by 0° 6' West per year			
Gradient	+0.045%	-0.045%	+0.047%	-0.047%
Shoulder width (feet)	Paved	Paved	Unpaved	Unpaved
Blast Pad/Overrrun				
Width (feet):	160	150	200	150
Length (feet)	996	1,006	200	1,014

Table 2-7: Existing Runway Design Characteristics				
Item	**Runway 14-32**		**Runway 18-36**	
	14	**32**	**18**	**36**
Surface Type / Condition	Concrete Good		Concrete and Asphalt Good	
Surface Treatment	Grooved		Grooved	
Single Wheel (S):	81,000	81,000	75,000	75,000
Dual Wheel (D):	180,000	180,000	130,000	130,000
Two Dual Wheel in Tandem (2D):	330,000	330,000	191,000	191,000
Two Dual Wheel in Tandem/Two Dual Wheels in Double Tandem Body (2D/2D2):	850,000	850,000	502,000	502,000
Runway End Coordinates				
Latitude:	N 31° 20' 16.3585"	N 31° 19' 01.5055"	N 31° 20' 12.228"	N 31° 19' 03.7929"
Longitude:	W 092° 33' 33.2167"	W 092° 32' 29.8022"	W 092° 32' 39.5447"	W 092° 32' 52.1432"
Elevation:	83.7	88.0	83.5	86.7
Runway Markings / Condition	Precision Instrument / Good	Precision Instrument / Good	NPI / Good	NPI / Good
Runway Lighting Type	HIRL		HIRL	
Visual Glideslope Indicator	P4L	P4L	P4L	P4L
Runway End Identifier Lights (REILS)	No	Yes	Yes	Yes
Approach Lighting System	MALSR	None	None	None

Source: FAA ADIP September 2023.

Table 2-8: Current Runway Safety-Related Geometry				
Design Standard	**Dimensions**			
	Runway 14	**Runway 32**	**Runway 18**	**Runway 36**
Runway Safety Area (RSA)				
Length Beyond Departure End (feet)	1,000	1,000	1,000	1,000
Length Prior to Threshold (feet)	600	600	600	600
Width (feet)	500	500	500	500
Runway Object Free Area (ROFA)				
Length Beyond Runway End (feet)	1,000	1,000	1,000	1,000
Length Prior to Threshold (feet)	600	600	600	600
Width (feet)	800	800	800	800
Runway Obstacle Free Zone (ROFZ)				
Length (feet)	200	200	200	200
Width (feet)	400	400	400	400
Inner-Approach OFZ (See Note)				
Length (feet)	2,600	N/A	N/A	N/A
Width (feet)	400	N/A	N/A	N/A
Slope (feet)	50:1	N/A	N/A	N/A
Inner-transitional OFZ	Yes	N/A	N/A	N/A
Precision Obstacle Free Zone (POFZ)				
Length (feet)	200	N/A	N/A	N/A
Width (feet)	800	N/A	N/A	N/A
Approach Runway Protection Zone (RPZ)				
Length (feet)	2,500	1,700	1,700	1,700
Inner Width (feet)	1,000	500	500	500
Outer Width (feet)	1,750	1,010	1,010	1,010
Area (Acres)	78.914	29.465	29.465	29.465
Departure Runway Protection Zone (RPZ)				
Length (feet)	1,700	1,700	1,700	1,700
Inner Width (feet)	500	500	500	500
Outer Width (feet)	1.010	1,010	1,010	1,010
Area (Acres)	29.465	29.465	29.465	29.465

Source: FAA AC 150/5300-13B, Airport Design. Compiled by Michael Baker International, 2019, Revised September 2023.

Note: The Inner-approach OFZ begins at 200 feet from the runway threshold at the same elevation of the runway threshold and extends 200 feet beyond the last light of the Approach Lighting System (ALS). The inner-approach OFZ applies only to the runways with an ALS.

2.4.2 Available Runway Lengths and Declared Distances

The published available runway lengths at public use airports reflect the end-to-end physical extent of the runway that is deemed available for satisfying minimum (airport and environment-specific) aircraft operational performance requirements. Declared Distances represent an Airport Owner's or Airport Operator's declaration of available runway lengths that must be considered by pilots when calculating the minimum runway lengths required to satisfy airport environment-specific aircraft operational performance requirements related to runway takeoff lengths, runway rejected takeoff lengths, and runway landing distance requirements.

The four designated FAA Declared Distances are:

- Takeoff Run Available (TORA)
- Takeoff Distance Available (TODA)
- Accelerate Stop Distance Available (ASDA)
- Landing Distance Available (LDA)

Table 2-9 summarizes the current FAA-published Declared Distances available for each of the two AEX runways.

Table 2-9: AEX Declared Distances

Item	Declared Distances (Feet)			
	TORA	TODA	ASDA	LDA
14	9,352	9,352	9,352	9,352
32	9,352	9,352	9,352	9,352
18	7,001	7,001	7,001	7,001
36	7,001	7,001	7,001	7,001

Source: FAA Digital Chart Supplement: Alexandria International Airport - 25 April 2019 to 20 June 2019.
Compiled by Michael Baker, International., Inc.

2.4.3 Local Meteorological Conditions

The safe and efficient operation of smaller light aircraft are also highly affected by the effects of ambient air temperature, prevailing wind directions and speed, types and levels of precipitation, cloud base ceiling heights and visibility. Each of these factors, when considered individually, or in combination have a direct affect upon all phases of flight, particularly during the most critical phases of flight, landing and takeoff operations.

Weather can significantly affect aircraft operations. Low cloud base ceilings, fog and rain may impede visibility at or around an airport while thunderstorms and lightning can cause serious disruption during flight and particularly during aircraft takeoff and landing operations. Preferably, aircraft takeoff and land into the wind, or with minimal tail wind. When prevailing winds blow across the runway, these "crosswinds" can require a pilot to use another runway or divert to an alternative airport. The local ambient air temperature also

plays a key part in the engine performance and aerodynamic capabilities of aircraft particularly during hot day conditions.

It is for this reason that the recommendations offered as part of this Airport Master Plan Update are based upon consideration of locally reported meteorological conditions and the associated need for properly aligned runways having adequate takeoff and landing lengths to accommodate the anticipated increase in operational demand imposed by larger cabin-class general aviation aircraft at AEX.

2.4.3.1 Local Aviation-related Meteorological Conditions

For the purpose of flight planning and operation of aircraft during flight, reported ceiling cloud base height above the ground and horizontal visibility both measured in feet are used to describe and report aviation-related meteorological conditions. Aircraft operate under two distinct categories of operational flight rules: Visual Flight Rules (VFR) and Instrument Flight Rules (IFR). These flight rules are linked to the two categories of weather conditions: Visual Meteorological Conditions (VMC) and Instrument Meteorological Conditions (IMC).

VMC are expressed in terms of visibility, distance from clouds, and ceiling base ceiling heights meeting or exceeding the minimums specified for operation of aircraft under VFR. During VMC, pilots may operate under VFR and typically navigate by orientation to geographic and other visual references and the pilot is responsible for seeing other aircraft and maintaining safe separation. VMC reflects local reported meteorological conditions where cloud base ceiling heights are equal to or greater than 1,000 feet as measure above ground level (AGL) and reported visibilities are equal to or greater than 3 statute miles.

Similarly, local IMC reflects local reported meteorological conditions where visibility is below 3 statute miles, or when the reported cloud base ceiling is less than 1,000 feet as measure AGL. All flights in IMC must be conducted by an instrument-rated pilot and under an IFR Flight Plan.

Table 2-10 summarizes the locally observed and reported prevailing meteorological conditions for the 10-year period (2011-2021). These weather observations provide a representative statistical breakdown of the meteorological environments within which pilots will be able to operate under certain weather conditions and operating regulations at AEX.

Table 2-10: Prevailing Meteorological Conditions

Meteorological Condition	Ceiling (Feet)	Visibility (Statute Miles)	Observations
All Weather			116,426 (100%) Observations
VMC	≥ 1,000	≥ 3 Miles	94,637 (81.29%) Observations
IMC	< 1,000	< 3 Miles	22,922 (19.69%) Observations

Source: National Climatic Data Center (NCDC) Weather Station: 747540 Alexandria Intl Airport. Record Period: 2011-2020. Percentages may not add up due to calm or inoperative Surface Observation monitoring conditions.

2.4.4 Runway Orientation and Wind Coverage Percentiles

The location and orientation of a single runway, or a combined system of multiple runways vary at all airports based upon available land, local terrain, topographical relief, air traffic operational, and airfield capacity needs. A runway's orientation relative to the direction of prevailing winds also provides the capability to ensure the safe and efficient use of the airfield while also preserving the overall utility of the airport. The optimum orientation and number runways are typically based upon a variety of factors that include, but are not limited to:

- avoidance of adverse runway construction-related environmental impacts,
- surrounding land uses,
- community overflight patterns,
- aircraft-generated noise exposure impacts,
- relative location and proximity of surrounding natural geographical relief or topography, and
- direction of origin and speed of the local prevailing winds.

The direction and speed of local prevailing winds directly influence the orientation of a runway because winds affect aircraft operational performance and capabilities in varying degrees. Ideally, a runway should be aligned with the local prevailing winds by direction of origin. Generally, the smaller the aircraft, the more it is affected by wind, particularly during crosswind conditions where the wind direction is not aligned with the runway centerline during aircraft takeoff and landing operations. The most advantageous runway orientation, based solely on wind, provides the greatest percentile of wind coverage and the least amount of crosswind as calculated and expressed as a crosswind component.

The Runway Design Code (RDC) is a coding system developed by the FAA to relate runway design criteria to the operational and physical characteristics of the airplane types that operate at a particular airport. It determines the standards that apply to a specific runway and parallel taxiway allowing optimal safe operations by the critical aircraft under desired meteorological conditions. The RDC is based on existing and planned development and does not have any operational application.

The RDC has three components relating to the airport design aircraft. The first component, depicted by a letter, is the Aircraft Approach Category (AAC) and relates to aircraft approach speed. The second component, depicted by a Roman numeral, is the Airplane Design Group (ADG) and relates to airplane wingspan and/or tail height. The third component is approach visibility minimums.

Generally, aircraft approach speed applies to runways and runway length related features. Airplane wingspan primarily relates to separation criteria and width-related features.

Airports expected to accommodate single-engine airplanes normally fall into ARC A-I or B-I. Airports serving larger general aviation and commuter-type planes are usually ARC B-II or B-III. Small to medium-sized airports serving air carriers are usually ARC C-III, while larger air carrier airports are usually ARC D-VI or D-V.

A review of the FAA's 2021 Calendar Year Traffic Flow Management System Counts (TFMSC) Operations and Performance Data for AEX serves to verify that the airport fully

accommodates sustained operations by both civilian and military aircraft of all sizes and engine that had RDC characteristics that ranged from A-I to D-V.

Runway wind coverage for each of the AEX's two runways as measured and reported for this AEX Airport Master Plan, was calculated as the percent of time crosswind components were below an acceptable velocity.

When a runway's orientation relative to prevailing winds provides less than 95 percent runway wind coverage for the aircraft which are forecast to use the airport on a regular basis, a crosswind runway is recommended. Accordingly, the runway wind coverage percentile for AEX was computed by individual runway and the combination of both runways on the basis of four different maximum allowable crosswind components affecting aircraft that range size from the smallest general aviation aircraft having a maximum crosswind component limitation of 10.5 knots, to the largest of commercial and/or military aircraft having a maximum crosswind component limit of 20 knots.

Utilizing historical 10-year Surface Observation data collected at and reported for the Alexandria International Airport Station (AEX) for the period 2011 through 2020, runway wind coverage percentile assessments were calculated for All Weather-, Visual- and Instrument Meteorological Conditions. As shown in Table 2-11, the runway orientations at AEX, when assessed individually, or as a combined system of two runways, provides adequate wind coverage (i.e., greater than 95 percent) when considering the maximum allowable Crosswind Component Speeds of 10.5, 13, 16, and 20 knots.

Based upon this analysis, each runway alone, or when conceded as a system of two runways provide the minimum required wind coverage of 95 percent.

Table 2-11: Prevailing Meteorological Conditions

Meteorological Condition	Runway Designation	Wind Coverage Percentage (%) Allowable Crosswind Component (Knots)			
		10.5	13	16	20
All Weather	14-32	97.40	98.82	99.73	99.93
	18-36	96.09	98.07	99.41	99.85
	Combined	99.26	99.72	99.92	99.98
Visual	14-32	97.59	98.99	99.83	99.97
	18-36	96.37	98.27	99.53	99.91
	Combined	99.40	99.40	99.96	100.00
Instrument	14-32	96.61	98.14	99.35	99.78
	18-36	94.73	97.19	98.91	99.62
	Combined	99.68	98.68	99.75	99.92

Source: National Climatic Data Center (NCDC) Weather Station: 747540 Alexandria International Airport. Record Period: 2011-2020. Percentages may not add up due to calm or inoperative Surface Observation monitoring conditions.

2.4.5 Taxiways

2.4.5.1 Taxiway A

Taxiway A is a full-length parallel taxiway of concrete design located along the northeast side of Runway 14-32. The taxiway provides entrance/exit taxiway connectors and a run-up area at the north end. The taxiway provides access to the runway via five intervening 90-degree exit taxiway connectors (A1, A2, A3, A4 and A5). The taxiway is 75 feet wide with asphalt-paved shoulders and a runway-to-taxiway centerline separation of 800 feet at its north end and 538 feet at its south end. The taxiway pavement is reported to be in good condition.

2.4.5.2 Taxiway B

Taxiway B is a partial parallel taxiway of concrete design that is located along the northeast side of Runway 18-36. The taxiway was constructed in conjunction with the establishment of the Military/Cargo Apron and provides direct access to the runway via two entrance/exit taxiway connectors (B1 and B2). The taxiway is 75 feet wide with asphalt-paved shoulders and a runway-to-taxiway centerline separation of 400 feet. The taxiway is reported to be in good condition.

2.4.5.3 Taxiway E

Taxiway E is of concrete design and connects the approach ends of Runway 36 and Runway 32. The taxiway is 75 feet in width and has asphalt-paved shoulders. The taxiway is reported to be in good[28] condition.

2.4.6 Handling and Loading of Military Ordinance

At the north end of Runway 18-36 there are three concrete structures, “Hot Pads” (designated as H1, H2 and H3), that are designed and utilized for the handling and loading of live military ordinance. Hot Pads H1 and H2 are located west of and connect to the runway. Hot Pad H3 is located east of the runway and connects to Taxiway B due east of H2.

Protective offsets are identified around each Hot Pad to reflect “Inhabited Building Distance (IBD) and “Glass Break” Zones. Portions of the Hot Pad offsets extend off airport property. Therefore, property acquisition or easement of the associated property should be considered to prevent future incompatible development.

In addition to the three designated Hot Pads, an additional undesignated asphalt-paved area located adjacent to and east of Taxiway A near the Taxiway A1 connector provides for the military’s periodic handling and loading of live military ordinance when military aircraft utilize Runway 14-32.

[28] Alexandria International Airport - Airfield Survey July 2021/AF Form 1174

2.4.7 Apron Areas

2.4.7.1 North Apron

The North Apron is located within the airfield's northeast quadrant, is of concrete design, approximately 12 acres in size, "L"-shaped having a northeast/southwest orientation and is adjacent to and connected to Taxiway A. The North Apron is leased for exercise use by the military for its JPATS and JRTC training activities. The North Apron can readily accommodate the temporary parking of commercial and military aircraft and the related staging of aircraft, military personnel, and support equipment. The North Apron is reported to be in good condition.

2.4.7.2 South Apron

The South Apron is located within the airfield's southeast quadrant, is of concrete design, approximately 64 acres in size, and primarily supports general aviation activity generated by the FBO and its related leaseholds that include hangar facilities. The apron is sized to compliment and support the military's Maximum On Ground (MOG) parking accommodation requirement of 24 C-5/B747 type aircraft. The South Apron is reported to be in good condition.

The South Apron also houses the operation of the airport's Aviation Career and Education (ACE) initiative, a result of the partnership between the England Authority, Louisiana State University of Alexandria (LSUA), and Central Louisiana Technical and Community College (CLTCC).

2.4.7.3 Military/Cargo Apron

The Military/Cargo Apron is located within the airfield's northeast quadrant, is of concrete design, approximately 48 acres in size, generally square in shape and is used for the loading and offloading of military personnel, cargo, equipment, and supplies. The Military/Cargo Apron is east of and adjacent to the Military's North Apron and is accessed via the North apron or Taxiway B at the B2 taxiway connector intersection. The Military/Cargo apron is reported to be in good condition.

2.4.7.4 Helicopter Parking Area

There is a significant concrete pad situated in the central area of the airfield, east of Runway 18-36 and west of the North Apron. This pad was once a part of the old concrete runway system, but now serves as a parking and fixed area refueling point (FARP) for helicopter operations. The helicopter parking area spans around 3.2 acres of pavement that is in a state of disrepair.

2.4.8 Visual and Electronic Navigational Aids

The following describes the visual and electronic type navigational aids (NAVAIDS) available to pilots when making landings to the approach end of the airport's four runways.

2.4.8.1 Precision Approach Path Indicators System

Precision Approach Path Indicators (PAPIs) provide pilots with visual approach glide slope guidance to and over the runway threshold. Each AEX runway is equipped with a PAPI system that consists of four upwardly aimed light units (two red and two white) that are aligned perpendicular to the runway centerline and located on the left side of the runway. Each PAPI system is aimed to provide a 3-degree visual glide path to the approach end of the runway at an established vertical Threshold Crossing Height. Based upon sustained approach operations conducted by aircraft having ADG V wingspan and tail height characteristics, the visual threshold crossing heights established for AEX's four runways range in height from 71.0 to 79.5 feet. All PAPIs are reported to be in good working condition.

Tables 2-12 and 2-13 list the respective information, data, and attributes of each of the airports four Visual Glideslope Indicators.

Table 2-12: Runway 14-32 Visual Glideslope Indicator Data

Item	Runway 14	Runway 32
VGSI Lights Type	PAPI-4 (Left Side)	PAPI-4 (left Side)
Owner	AEX	AEX
Pilot Control Frequency	CTAF 127.350	CTAF 127.350
Threshold Crossing Height (Feet Above Threshold)	71.0 FT	79.5 FT
Commission Date	06/27/2018	06/27/2018
Glide Path Angle	3.00	3.00
Runway Abeam Reference Point Latitude	N 31° 20' 05.5920"	N 31° 19' 13.8480"
Reference Point Longitude	W 092° 33' 24.0950"	W 092° 32' 40.2550"
Runway Reference Point Elevation	84.3 FT	86.6 FT
Reference Point Distance from Threshold	1,345 FT	1,542 FT
Height Group	4	4

*Source: FAA Airport Details for KAEX, Chart Date 07/26/2012. FAA Form 5010-1, Airport Master Record: KAEX Site Number: 07411*A. Compiled by Michael Baker International, 2019*

Table 2-13: Runway 18-36 Visual Glideslope Indicator Data

Item	Runway 18	Runway 36
VGSI Lights Type	PAPI-4L	PAPI-4L
Owner	AEX	AEX
Pilot Control Frequency	CTAF 127.350	CTAF 127.350
Threshold Crossing Height (Feet Above Threshold)	78.9	77.0
Commission Date	06/27/2018	06/27/2018
Glide Path Angle	3.00	3.00
Runway Abeam Reference Point Latitude	N 31° 19' 57.4500"	N 31° 19' 18.3680"

Runway Abeam Reference Point Longitude	W 092° 32' 42.2710"	W 092° 32' 49.4640"
Runway Reference Point Elevation	83.7	85.7
Reference Point Distance from Threshold	1,512	1,491
Height Group	4	4

*Source: FAA Airport Details for KAEX, Chart Date 07/26/2012. FAA Form 5010-1, Airport Master Record: KAEX Site Number: 07411*A. Compiled by Michael Baker International, 2019*

2.4.9 Airport Rotating Beacon

The airport's rotating beacon provides visual indication of the airport's relative location and operations at night or during low visibility conditions. The rotating beacon is situated atop the Airport Traffic Control Tower facility collocated with the Passenger Terminal in the airport's southeast quadrant. The beacon emits sequenced flashes of green and white light that provides visual verification of the presence, relative location, and operation of a Civil Land Airport. The airport rotating beacon is reported to be in good operating condition.

2.4.10 Segmented Circle

The airport's Segmented Circle is located approximately 1,180 feet north of the intersection of Runway 18-36 and Taxiway A and serves as a visual aid to pilots overflying the airport traffic pattern, The Segmented Circle provides visual information regarding prevailing wind direction and speed, landing strip direction, and any runway-specific nonstandard airport traffic pattern turning requirements. The Segmented Circle is comprised of the following elements that are unique to AEX:

- Centrally-located Landing Direction Indicator (lighted windcone), and
- Two Landing Strip Indicators (Runway 14-32 only without Traffic Pattern Indicators).

2.4.11 Airfield Windcones

Three lighted windcones are established at strategic locations on the airfield to be readily visible by aircraft either on close-in arrival operations or near the runway entry point for departure operations. The windcones are reported to be in good working condition.

2.4.12 Instrument Landing System

Runway 14 is equipped and served by a ground-based Instrument Landing System (ILS) that electronically provides on-board aircraft navigation system receivers with precision vertical and horizontal navigation guidance information. Properly equipped and qualified pilots execute ILS Precision Instrument Approach Procedures.

Two separate and unique antenna systems, Localizer and Glide Slope antennas respectively, generate and radiate radio signals outward and upward along the aircraft's final approach path to the runway threshold. The Localizer antenna provides lateral course guidance (e.g., left or right of the extended runway centerline approach path). The Glide Slope antenna provides vertical course guidance (e.g., above or below a 3-degree approach glide path.) As part of the ILS, Runway 14 is equipped with High-intensity Runway Edge Lights (HIRLs) and

Precision Instrument Runway pavement markings and a Simplified Short Approach Lighting System with Runway Alignment Lights (SSALR).

When only the Localizer Antenna is operational, a Localizer Only non-precision instrument approach is available to provide electronic horizontal navigation guidance to the approach end of the runway. The ILS serving Runway 14 is reported to be in good working condition.

2.4.13 Distance Measuring Equipment

Although located remotely, two published Non-precision Instrument Approach Procedures serving Runway 14 and Runway 32 require the use of Distance Measuring Equipment (DME) that is co-located with the Alexandria VORTAC facility located approximately 5 statute miles southeast of the airport's Airport Reference Point (ARP). When interrogated by on-board DME equipment in the aircraft, the facility provides slant distance information to the pilot that is utilized by the pilot for IAP distance and dead reckoning purposes. The DME serving AEX is reported to be in good working condition.

2.4.14 Runway Visual Range

Runway Visual Range (RVR) systems are ground-based facilities that automatically report visibility conditions for aircraft pilots when conducting take-offs or landings. Runway 14 and Runway 32 are each served by two strategically located RVR stations located at the Touchdown and Rollout location of each respective runway. The RVR stations serving Runway 14-32 is reported to be in good working condition.

2.4.15 Alexandria VORTAC

Although remotely located approximately 5 statute miles southeast of the airport, the Runway 14 Precision Instrument ILS and the two Non-precision Instrument Approach Procedures (IAPs) serving Runway 14 and Runway 32, respectively, utilize the Alexandria VORTAC facility. The VORTAC facility is reported to be in good working condition.

2.4.16 Runway End Identifier Lights

A collocated pair of unidirectional synchronized flashing lights called Runway End Identifier Lights (REILs) are located on each side of the runway threshold to be visible to aircraft pilots during landing operations. REILs serve to provide positive identification of the approach end of the runway to pilots when the approach end of the runway is proximity to other distractive lighting, or during periods of reduced visibility. The REILS located at the approach end of Runways 32, 18, and 36 are reported to be in good working condition.

2.4.17 Medium Intensity Approach Lighting System with Runway Alignment Indicator Lights

Runway 14 is equipped with a Medium Intensity Approach Lighting System with Runway Alignment Indicator Lights (MALSR) that facilitates and is part of the published Precision Instrument ILS, and Non-precision Instrument RNAV (GPS) and VOR/DME IAPs to Runway 14 offering minimum visibility minimums down to 2,400 feet (½ mile). The MALSR is reported to be in good operating condition.

2.4.18 Precision Approach Radar (PAR)

The military's Precision Approach Radar (PAR) facility is located approximately 1,300 feet northwest of the intersection of the airport's two runways. Controllers monitoring the PAR displays observe each aircraft's position and issue instructions during the Ground-Controlled Approach (GCA) to the pilot that keep the aircraft on course and glidepath during final approach. It is similar to an instrument landing system (ILS) but requires control instructions.

The PAR at AEX is currently out of service and not fulfilling the operational needs of the military, and its relocation has been discussed with the Airport Staff and DOD representatives. The relocation of the PAR facilities in the future will be evaluated in the Alternatives Analysis.

2.5 Instrument Approach Procedures

2.5.1 Published Instrument Approach Procedures

The FAA develops standard instrument procedures to facilitate safe navigation around obstructions and obstacles identified through the analysis of the airspace surfaces developed in accordance with 14 CFR Part 97, *Standard Instrument Procedures*, referencing applicable instrument procedure standards as prescribed in FAA Order 8260.3C, *United States Standard for Terminal Instrument Procedures* (TERPS). This part prescribes standard instrument approach procedures to civil airports in the United States and the weather minimums that apply to landings under IFR at those airports. This part also prescribes obstacle departure procedures (ODPs) for certain civil airports in the United States and the weather minimums that apply to takeoffs under IFR at civil airports in the United States.

The airport is served by a variety of NAVAIDS that are visual or electronic in nature. IAPs facilitate the transition from the airspace to the airport and are considered to play an important the airport's capability to accept and accommodate aircraft landing approach operations during periods of local low ceiling and/or low visibility meteorological conditions. IAPs may be affected by penetrations of part 77 Civil Airport Imaginary Surfaces or runway end-specific to the Approach Departure Surfaces (i.e., Obstacle Clearance Surfaces).

Table 2-14 lists the IAPs currently serving AEX. When equipped and qualified, pilots can execute a Precision Instrument Approach Procedure to Runway 14 when the locally reported cloud base ceiling and visibility are reported to be as low as 200 feet above ground levels and ½ mile respectively.

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Table 2-14: AEX Instrument Approach Procedure Summary					
IAP Description	**NAVAID Type**	**Lowest Published Minimums (Cloud Base/ Visibility)**	**NAVAID Identifier**	**Amendment**	**Publication Date**
ILS or LOC RWY 14	ILS	S-ILS 346'/2400'	I-ERJ	1C	08/11/2022
RNAV (GPS) RWY 14	GPS/WAAS	LPV 346'/2400'	CH 56417 W14A	1C	08/11/2022
RNAV (GPS) RWY 18	GPS/WAAS	LPV 395'/1-Mile	CH 61200 W18A	1B	03/25/2021
RNAV (GPS) RWY 32	GPS/WAAS	LPV 340'/5000'	CH 50110 W32A	1C	08/11/2022
RNAV (GPS) RWY 36	GPS/WAAS	LPV 500'/ 1-Mile	APP CRS 006	Orig-D	08/11/2022
VOR RWY 14	VORTAC	S-14 500/4000'	CH 116.1/108 VORTAC AEX	Orig-F	08/11/2022

Source: FAA Instrument Approach Procedures Publication SC-4 with effective dates: 10 AUG 2023 to 07 SEP 2023

2.5.2 WAAS-Enhanced Electronic Navigational Capabilities

Today, through the advent of space-based satellite navigation systems, improved availability of newer RNAV or GPS instrument approach procedures to runways are being developed by the FAA as part of its Next Generation Air Transportation System (NextGen) that serve to increase the safety, efficiency, capacity, predictability, and resiliency of the national aviation system. More importantly, it is the FAA's goal to enhance the instrument approach procedure capabilities of all public use airports similar to AEX. This NextGen-based overhaul brings together innovative technologies, capabilities, and procedures that improve how instrument-rated pilots fly from departure to arrival that, in certain applications, reduce or eliminate the need for traditional on-airport ground-based navigational systems. More than 90,000 general aviation aircraft, including approximately 8,000 business jets and turboprops, are equipped to fly WAAS-enabled LPV or LP procedures. The widespread and growing availability of LPV and LP procedures, and the high equipage rate in the general aviation fleet, are enabling the FAA to retire some ground-based navigation aids.

As of July 2018, the FAA has published nearly 7,000 RNAV (GPS) approach charts for aircraft equipped primarily with GPS or GPS enhanced with WAAS, 3,922 having Localizer Performance with Vertical guidance (LPV) approach procedures serving 1,906 airports of which, 1,143 are non-ILS airports. Currently, there are also 668 Localizer Performance (LP) approach procedures in the U.S. serving 498 airports. Approach procedures with LP minimums are used at runways where obstacles or other infrastructure limitations prevent the FAA from publishing a vertically guided approach. As part of NextGen, the FAA plans to meet any new requests for Category I approach procedures, those with ground-based

localizer and glideslope guidance, with RNAV (GPS) approaches that have LPV minima. A total of 317 US general aviation airports, five of which are in Louisiana (including AEX) were served by WAAS LPV IAPs offering 200-foot ceiling and ½ statute mile visibility minimums similar to that of a Category-I ILS.

Pilots are now benefiting from the proliferation of Area Navigation (RNAV) Global Positioning System (GPS) approaches and lower minimums provided by WAAS-enabled systems. Aircraft equipped with WAAS can fly precise satellite-enabled RNAV (GPS) approach procedures with localizer performance with vertical guidance (LPV) and localizer performance (LP) minimums without vertical guidance. LPV minimums provide capabilities similar to ILS with horizontal and vertical guidance, while LP provides only horizontal guidance. By developing an RNAV approach to a runway not currently serving an existing ILS approach, safety is enhanced regardless of visibility or time of day. LPV approaches take advantage of the refined accuracy of WAAS lateral and vertical guidance to provide an approach very similar to a Category I ILS. Like an ILS, an LPV has vertical guidance and is flown to a Decision Altitude (DA).

2.6 Protection of Navigable Airspace

At AEX each runway has published electronic ground-based or WAAS-based IAPs that provide varying minimum cloud base and visibility minimums. Accordingly, protection of navigable airspace to provide the safe and efficient use each IAP is prescribed by Code of Federal Regulations (CFR) Title 14: *Aeronautics and Space*, part 77, *Safe, Efficient Use, and Preservation of the Navigable Airspace*, §77.19, *Civil Airport Imaginary Surfaces*.

Runway 14 is classified as having CFR part 77 Approach Surfaces that serve "Other Than Utility" runways with a Precision Instrument approach capability having published minimum visibility minimums ½ mile or less. Runways 32, 18, and 36 are classified as having CFR 14 part 77 Approach Surfaces that serve "Other Than Utility" runways having Non-precision Instrument approach capabilities with published minimum visibility minimums greater than ¾ mile. An "Other Than Utility" runway is intended to be used by propeller driven aircraft with a maximum gross weight greater than 12,500 pounds and/or jet aircraft of any gross weight.

Runway 18 currently has no controlling obstructions published; and the FAA reports that the runway provides a minimum visual approach glide path slope of 34:1.

Runway 36 currently has published and noted non-lighted controlling obstructions. The surveyed tree cluster is located approximately 1,798 feet from the departure end of the runway, 322 feet right of the extended runway centerline and has heights up to 76 feet above mean sea level (AMSL). The FAA reports that the controlling obstacle provides a minimum visual approach glide path slope of 21:1. There are no reported close-in obstructions within the first 200 feet of the approach to the runway end.

Runway 14 currently has no published and noted controlling obstructions beyond the departure end of the runway. The FAA reports that the controlling obstacle provides a minimum visual approach glide path slope of 50:1.

Runway 32 currently has no published or noted controlling obstructions that are located beyond the departure end of the runway. The FAA reports that the controlling obstacle

provides a minimum visual approach glide path slope of 50:1. There are no reported close-in obstructions within the first 200 feet of the approach to the runway end.

Table 2-15: CFR part 77 Surface Dimensions

Item	Dimensions (feet)			
	Non-Precision Instrument Runway			Precision Instrument Runway
	Runway 32	Runway 18	Runway 36	Runway 14
Width of the primary surface and approach surface width at the inner end	500	500	500	1,000
Radius of Horizontal Surface	10,000	10,000	10,000	10,000
Approach Surface width at end	3,500	3,500	3,500	16,000
Approach Surface Length	10,000	10,000	10,000	10,000 40,000
Approach Slope	34:1	34:1	34:1	50:1 40:1

Source: Code of Federal Regulations (CFR) Title 14: Aeronautics and Space, part 77, Safe, Efficient Use, and Preservation of the Navigable Airspace, §77.19, Civil Airport Imaginary Surfaces.

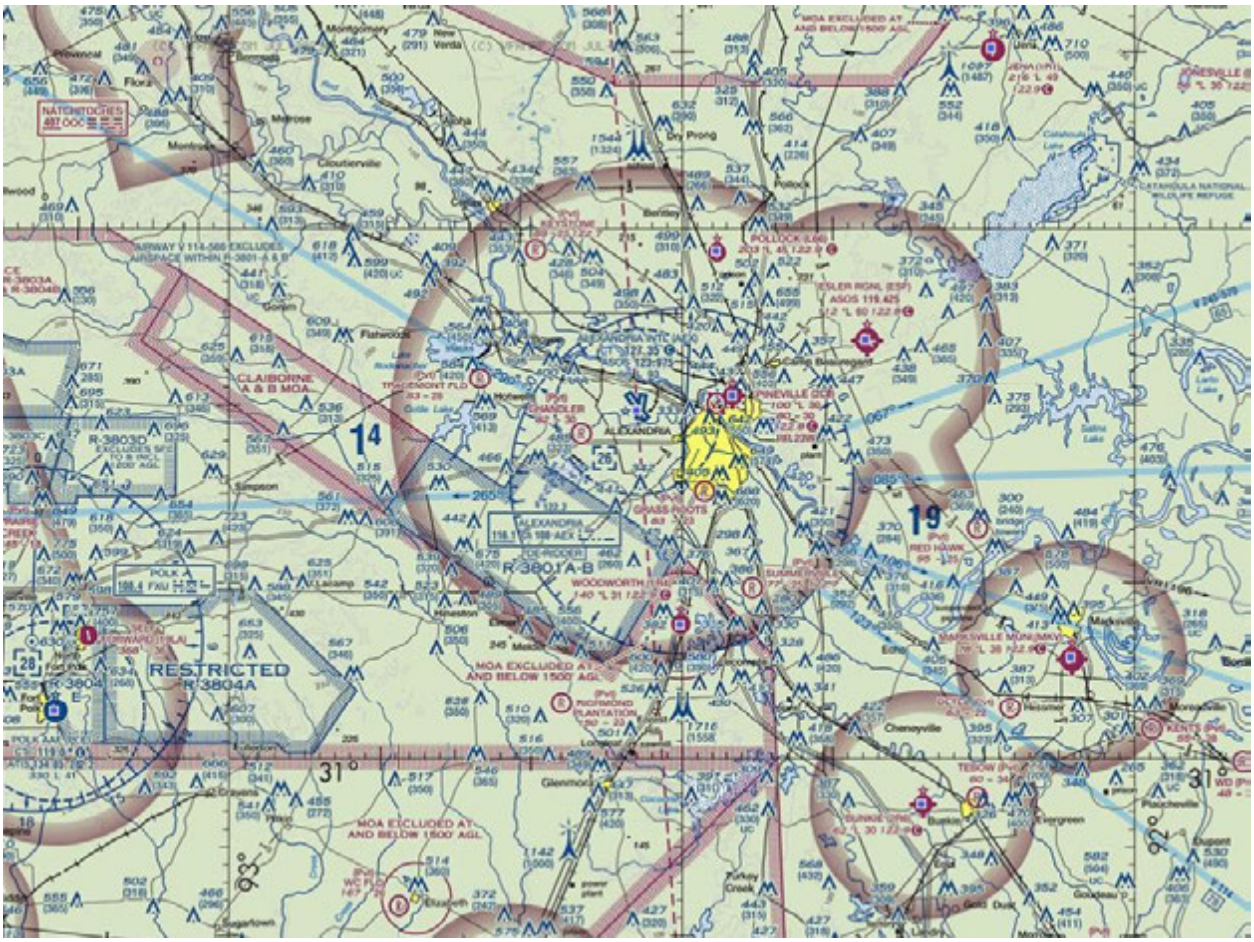
2.6.1 Airspace Characteristics

Alexandria International Airport is surrounded by Class D airspace extending upward from the surface to and including 2,600 feet MSL within a 4.7-mile radius of the airport.

Class E airspace extending upward from 700 feet above the surface within a 14-mile radius of Alexandria International Airport and within a 7.7-mile radius of Esler Regional Airport and within 1.7 miles each side of the 154° radial of the Esler VORTAC extending from the 7.7-mile radius to 10.6 miles southeast of the airport. **Figure 2-8** shows the airspace surrounding AEX.

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Figure 2-8: Sectional Aeronautical Chart



Source: vfrmap.com – July 2023

Special use airspace includes areas where activities are confined because of their nature. Special use areas are classified into the following: prohibited areas, restricted areas, waring areas, military operations areas, alert areas, controlled firing areas, and national security areas. Table 2-16 summarizes the special use airspace near AEX.

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Table 2-16: Vicinity Special Use Airspace				
Special Use Airspace	**Relative Direction from AEX**	**MOA Floor Altitude (MSL Unless Noted)**	**Time of Use (local) Monday – Friday**	**Controlling / Contact Agency**
Military Operations Areas (MOA)				
Warrior 1 Low	West; Southwest	100' AGL – 9,999'	7:00 am – 10:00 pm	Houston Center
Warrior 1 High		10,000'	7:00 am – 10:00 pm	Houston Center
Warrior 2 Low	South; Southwest	100' AGL – 9,999'	7:00 am – 10:00 pm	Houston Center
Warrior 2 High		10,000'	7:00 am – 10:00 pm	Houston Center
Warrior 3 Low	Southwest	100' AGL – 9,999'	7:00 am – 10:00 pm	Houston Center
Warrior 3 High		10,000'	7:00 am – 10:00 pm	Houston Center
Jena 1	North	100' AGL – 5,000'	8:00 am – 10:00 pm	Houston Center
Hackett	Northwest	7,000'	7:30 am – 10:00 pm	Fort Worth Center
Claiborne A&B	West	100' AGL – 9,999'	7:30 am – 10:00 pm	Fort Polk Approach
Restricted Areas				
R-3801A	South: Southwest	Ground Level –9,999'	8:00 am – 10:00 pm	Fort Polk Approach
R-3801B		10,000'– 17,999'	8:00 am – 10:00 pm	Fort Polk Approach

Source: FAA Order JO 7400.10B, 2/16/2020

2.7 Airfield Lighting

The airport is equipped with a variety of lighting systems that collectively serve to safely accommodate aircraft operational activity during nighttime hours and/or during inclement weather conditions and/or periods of reduced visibility.

All airfield lighting electrical requirements at AEX are currently provided from an electrical vault that is supplemented with an emergency backup generator. The electrical vault and generator are located within an open area located south of Runway 14-32 and west of Runway 18-36.

2.7.1 Runway Edge Lighting

Both runways are equipped with High Intensity Runway Lights (HIRL) and are reported to be in good working condition.

2.7.2 Taxiway Edge Lighting

All major taxiways are equipped with Light Emitting Diode (LED)-type Medium Intensity Taxiway Lights (MITL) and are reported to be in good working condition.

2.7.3 Apron Lighting

Apron lighting is used to illuminate apron and ramp areas for the purposes of safety and security. Clusters of high wattage sodium and/or metal halide lamps are currently situated atop high mast light poles to provide lighting for both the North and South Apron areas. A total of 31 of these "High-Mast" style lights are in use near the apron areas and are reported to be in poor working condition. Future LED improvements to this lighting system will be addressed in subsequent chapters of this master plan.

2.7.4 Airfield Signage

The airfield is fully equipped with illuminated airfield informational, directional guidance, and mandatory instructional signs. Runways 14-32 and 18-36 are each equipped with Runway Distance Remaining signs. Other airfield signage includes mandatory instruction signs.

2.8 Landside Facilities

2.8.1 Terminal Area

The commercial passenger terminal area at AEX is located on the eastern side of the airfield. The terminal area encompasses the terminal building, public parking, rental car facilities, landside access, and the commercial apron. Other facilities that are within or adjacent to the Terminal Area include:

- Airport Traffic Control Tower
- Additional Parking Lots
- Airport Rescue and Firefighting Facility
- Fixed Based Operator Facilities, and
- General Aviation Apron.

The terminal opened in December of 2006 and is comprised of three levels equating to 107,187 square feet of space. The terminal provides four common-use gates to serve the airport's existing tenant airlines (American and Delta Airlines), as well as an integrated airport traffic control tower. Terminal access is provided via England Drive, Vandenburg Drive, Chappie James Avenue, and Frank Andrews Boulevard.

The public parking located in front of the terminal building can accommodate approximately 717 automobiles.

The landside terminal area at AEX consists of the various elements essential for commercial air service, including concessions, rental car counters, baggage claim and bag makeup, ticket counters, airline offices, hold rooms, public restrooms, circulation areas, and utility areas such as mechanical, electrical and communication areas.

2.8.1.1 Commercial Passenger Terminal Facilities

The terminal is equipped with all the amenities required of a commercial service terminal, including an integrated Airport Traffic Control Tower (ATCT). The terminal is divided into three levels.

The ticketing area is located on the northern portion of Level 1. The central corridor has escalators on both sides and an elevator to connect to the second level. The area is dedicated to passenger arrivals in the southern part of the terminal first level. It includes the baggage claim area and the rental car counters.

The second level has 35,900 square feet, which are divided into security screening, hold rooms, a food court, and a waiting area.

The third level comprises approximately 10,300 square feet of space, with approximately 2,560 square feet dedicated to the conference room. It also allocates balcony seating. The interior of the balcony seating is open to level 2 below, creating a clear story view of the passenger waiting area. The 2,400 square foot conference room is equipped with meeting amenities, audio-visual equipment, and a bar for serving food and/or drinks.

Ticketing

The terminal offers 16 check-in counters within approximately 3,700 square feet of space; airline operators occupy four counters each. In addition to the ticket counters, self-check-in kiosks are located in the ticketing area for passenger convenience. There are additional ticket kiosks near the northernmost portion of the lower level. The ticket corridor has enough space for passengers to queue and move around comfortably. Moreover, seating areas are available along the western terminal perimeter.

Passenger Screening Area

The TSA screening area is centrally located on the second level. It includes one single screening lane and two rooms used by the TSA staff for administrative functions, passenger searches, and interviews. The TSA facilities encompass an area of approximately 881 square feet. During peak periods, this area is reported to be constrained. Therefore, future facility needs and potential solutions to resolve this issue will be addressed in the facility requirements and airport alternatives discussions of this report.

Holdrooms

The holdrooms and gate area is comprised of approximately 8,020 square feet. The configuration is an open space offering four gates; each gate area provides about 40 seats (160 seats total), an airline counter, and circulation space. Restrooms are also offered in this sterile area located at opposite ends of the holdrooms. Currently, this area is reported to be constrained during peak periods. Future facility needs and expansion recommendations are further addressed in the facility requirements and airport alternatives discussions of this master plan.

Baggage Claim

The baggage claim area encompasses approximately 4,396 square feet of public space with a single baggage claim device. There is enough space to the south for an additional device in the future. Currently, this area is used for public seating. Although the baggage claim system was constructed in 2006, the equipment is one-of-a-kind, making system maintenance or parts replacement difficult. Future expansion or replacement needs to address this issue will be identified in the facility requirements chapter.

Rental Car

Currently, three rental car companies operate at AEX (Avis, Budget, and National). However, there are a total of four rental car counters with offices (approximately 1,093 square feet total) located adjacent to the baggage claim area. The pickup and return lots are located south of the terminal.

2.8.1.2 Terminal Curbside

Three lanes of traffic at the terminal curbside run to and from the passenger terminal building. The two lanes adjacent to the terminal building have a covered roof to protect passengers from weather and are primarily used for passenger pickup and drop-off. The third lane, which is uncovered, is used as a traffic bypass lane.

2.8.1.3 Auto Parking

The main passenger auto parking lot is located in front of the terminal building, with a capacity of approximately 717 spaces. Two lots are designated as employee parking east of the terminal. The first lot is located close to the ARFF facility on Billy Mitchell Blvd. This lot is shared between ARFF personnel, Million Air employees, and terminal employees. The second lot is located directly across the street from the first lot and is dedicated solely to employee use. The northern lot contains between 50 and 60 spaces, and the southern (ARFF) lot contains approximately 40 spaces.

2.8.2 Airport Traffic Control Tower

The AEX Airport Traffic Control Tower (ATCT) facility is located atop the passenger terminal. It is operational 24 hours per day and staffed by the DOD and the Louisiana Air National Guard 259th Air Traffic Control Squadron through a joint agreement with the FAA. Typical staffing protocol for AEX comprises two controllers on duty between 6:00 a.m. and 8:00 p.m., with one controller on duty between 8:00 p.m. and 6:00 a.m. The ATCT is 212 ft AMSL (approximately 137 ft AGL). Information pertaining to the ATCT is shown in **Table 2-17**.

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Table 2-17: Airport Traffic Control Tower	
Item	**Data**
Facility ID	AEX
Facility Name	Alexandria International Airport
Operator	FAA Contract Tower
Staffing	Louisiana Air National Guard 259th ATC Squadron
Tower Call	Alexandria
Hours of Operation	24 hours daily
Frequencies	
Tower	127.35 MHz/269.2 MHz
Ground	121.9 MHz/372 MHz
Location	
Latitud	31°19'22.83"
Longitude	92°32'31.31"
Elevations (feet MSL)	
Top	212

Source: FAA eNASR

2.8.3 Other Landside Facilities

Other landside facilities, as shown in **Table 2-18**, include workshops, hangars, storage areas, and other structures that lend themselves to aviation or aviation-related activity. The location of these facilities are indicated in **Figure 2-7.**

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Table 2-18: Other Landside Facilities				
Bldg. #	**Description**	**Area (SF)**	**Use**	**Note**
525	iAero	41,087	Hangar	Approx. 33,389 SF of hangar
814	Maintenance	34,176	Shop	
816	Shop / Storage	4,800	Shop / Storage	
820	National Guard ATCT Offices	8,443	Office	
834	Maintenance Shop	5,472	Shop	
1707	Vehicles Maintenance Shop	4,631	Offices	
1708	Offices	4,631	Offices	
2102	Jet Engine Maintenance Shop	37,000	Shop / Storage	
2106	FBO Terminal	18,000	FBO	
2107	Shop / Storage	13,963	Shop / Storage	
2108	Shop / Storage	9,695	Shop / Storage	
2502	Maintenance Hangar	51,704	Hangar/FBO	39,027 SF of hangar space (2 hangars 12,677 SF of FBO)
2503	Maintenance Hangar	10,137	Hangar	
2504	Maintenance Hangar	16,766	Hangar	
2505	Maintenance Hangar	17,355	Hangar	
2528	SHP Non-Destr. Insp.	3,983	Shop / Hangar	
2614	T-Hangar	14,000	Hangar	
2618	Jet Engine Test Cell	3,493	Shop	

Compiled by: Michael Baker International, Inc., 2020

2.8.4 Fixed Base Operator (FBO)

Million Air of Alexandria operates the only Fixed Base Operator (FBO) serving the aviation community at AEX. The main office and FBO terminal are in the former passenger terminal building east of the ARFF station. It can be accessed via Taxiway A on the north side of the South Apron.

Operating as a full-service FBO, Million Air provides a variety of services for locally-based and visiting transient civilian and military aircraft owner operators that include, but are not limited to:

- Aviation fuel
- Aircraft ground handling

- Oxygen service
- Aircraft parking (ramp or tiedown)
- Hangars
- Hangar leasing / sales
- GPU / Power cart
- Passenger terminal and lounge
- Aircraft charters, and
- Aircraft maintenance

Million Air is open 24 hours a day, seven days a week and has 28 Full-time and 1 Part-time employees.

2.9 Support Facilities

2.9.1 Fuel

Since completion of the previous Master Plan, fuel farm facilities were relocated to a more secure location near the southwest corner of the South Apron in compliance with FAA regulations. Access to these facilities is provided via FAA Avenue. The relocation was triggered to provide more efficient services closer to the airfield and expand the airport's fueling capabilities.

The fuel farm is comprised of two 319,000-gallon above-ground Jet-A fuel storage tanks, one 10,000-gallon AVGAS above-ground fuel storage tank, and two waste fuel tanks.

Fuel is transported to and from the fuel farm area to aircraft via various fuel delivery trucks leased and operated by the FBO.

Facility Functions[29]:

- Two 600 gpm Jet A Offloading
- Two 600 gpm Jet A Fillstands
- 1200 gpm Jet A Pumphouse
- 1.200 gpm Jet A Transfer/ Recirculation
- 300 gpm Avgas Offloading
- 300 gpm Avgas Fillstand
- Cla-val Control Valves
- Jet A and Avgas Bulk Storage
- Automatic Tank Gauging System (ATG)
- Oil Water Separator by Highland Tank

2.9.2 Aircraft Rescue and Fire Fighting

The England Airpark Fire Department operates and maintains airport's Aircraft Rescue and Fire Fighting (ARFF) fire station, emergency response and firefighting training activities. The

[29] AFTEC- https://www.aftecusa.com/portfolio/fuel-farm-upgrade-alexandria-louisiana/

England Airpark Fire Department operates 24 hours a day, 7 days a week with 16 full-time and 5 part-time employees with alternating 24-hour shifts comprised of 6 Firefighters and 1 Captain. The Fire Chief is also on duty Monday through Friday. All off duty personnel are subject to emergency recall in the event of large-scale emergencies.

The England Airpark Fire Department operates and maintains a centrally-located fire station that places ARFF personnel and equipment less than three minutes within the midpoint of the most distant runway and under one and one-half minutes to the farthest points of both the South and North ramp areas.

The ARFF is equipped with modern FAA Aircraft and Federal Emergency Management Agency-approved P-25 communication systems allowing for direct communications to all mutual aid partners, the Parish Communications Center/Emergency Operations Center, and the Airport Traffic Control Tower.

The England Airpark Fire Department operates by direct dispatch from the AEX ATCT and the Rapides Parish 911 Communications Center. Personnel also receive emergency activation directly to their personal telephone by the Active 911 System. This system also allows for immediate notification and call back of off duty personnel in the event they are needed.

The England Airpark Fire Department trains regularly with other local mutual aid departments who provide valuable assistance including equipment and manpower in the event of large-scale incidents. Current agreements are in place with Rapides Parish Fire District 2, City of Alexandria Fire Department, Oak Hill Fire Department, Cotile Fire Department, Town of Boyce Fire Department, and the Fort Johnson Fire Department.

CFR part 139 sets forth minimum safety standards (i.e., Index A through E) for emergency response personnel and equipment requirements at commercial service airports. An airport's ARFF Index is determined by a combination of two factors: the total length and average number of daily departures of air carrier aircraft operating at the airport.

Although scheduled service is provided two major US air carriers utilizing Commuter Regional Jets, the airport accommodates a wide variety of other civilian and military transport-related aircraft operations generated by the US Army's Intermediate Staging Base and the US Marshals Service's Justice Prisoner and Alien Transportation System activities. These additional activities utilize much larger civilian and military aircraft that include, but are not limited to: Boeing (B737, B747, B757, B767, B777, B787), and Airbus (A320 and A330) commercial aircraft, as well as Lockheed C-5 Galaxy, C-130 Hercules, and Boeing C-17 Globemaster, and KC-10 Extender military aircraft.

To support the safety needs of these larger aircraft, the England Airpark Fire Department has a full complement of ARFF equipment that, collectively, provide the capability to meet or exceed the requirement of ARFF Index D (and with advance notice, Index E) that includes air carrier aircraft that are least 159 feet, but less than 200 feet in length.

ARFF Index D requires that the AEX ARFF facility have, at a minimum, three vehicles that combined can carry enough water to produce at least 4,000 gallons of Aqueous Film Forming Foam agent (AFFF). In addition, at least one of the abovementioned vehicles must contain either 450 pounds of sodium-based dry chemical, halon 1211, or clean agent or

450 pounds of potassium-based dry chemical and water with a commensurate quantity of AFFF to total 100 gallons for simultaneous dry chemical and AFFF application.

The England Airpark Fire Department's compliment of facilities, equipment, response vehicles, fire-fighting capacities, and operational roles are detailed below.

Fire Station

The England Airpark Fire Department Fire Station is approximately 11,000 square feet in size of which 5,000 square feet is utilized for vehicle storage and equipment bays. The remaining 6,000 square feet is used for operations, administration, storage, and crew quarters. The Fire Station is equipped with an alerting system (connected direct to the AEX ATCT and 9-1-1 system), a backup communications center, training areas, an automatic backup generator power system, a modern environmentally-friendly wash rack and storage for dry chemical agent, resupply equipment, Halotron resupply materials, medical supplies, and full-service breathing air resupply compressor.

FOX 2

A 2000 E-1 Titan 8x8 Class V ARFF Vehicle with High Reach Extending Turret (HRET) and aircraft piercing tip. The vehicle caries 3000 gallons of water, 400 gallons of 3% Mil Spec AFFF Foam, 450 pounds of potassium-based dry chemical agent. Further enhancement includes Forward Infrared Imaging Radar (FLIR), and seating for three personnel. The fire pump is rated at 2,000 gallon of water/foam mixture per minute while the dry chemical can be discharged by a hand line or simultaneously with water from the bumper turret at over 16 pounds per second. The HRET can extend more than 54 feet.

FOX 4

A 2010 Oshkosh Striker 6x6 Class V ARFF Vehicle (like the FOX 6 Oshkosh Global Striker), the vehicle caries 3,000 gallons of water, 400 gallons of 3% Mil Spec AFFF Foam, 450 pounds of potassium-based dry chemical agent in addition to 460 pounds of Halotron I (clean agent that is similar to Halon). Other enhancements include FLIR, seating for three personnel, and a 6,000-watt elevated light tower. The fire pump is rated at 1,950 gallon of water/foam per minute. The dry chemical can be discharged by a hand line or simultaneously with water from the bumper turret at over 16 pounds per second. The Halotron I system operates by a hand line at the rate 6 to7 pounds per second.

FOX 5

A 2009 Pierce 4x4 Class III Rapid Intervention Vehicle (RIV) offering increased maneuverability and capability to access areas where larger vehicles may be delayed. The RIV maintains seating for four 4 firefighters, carries 500 gallons of water, 60 gallons of foam, and 450 pounds of potassium-based dry chemical. All extinguishing agents can be discharged by handlines or via a bumper mounted turret. This unit also carries additional ladders, hand tools, generators, portable lighting, hazardous material response supplies,

handheld thermo imaging camera (TIC), temperature guns, as well as various rescue tools including hydraulic rescue units or "Jaws of Life".

FOX 6

A 2015 Oshkosh Global Striker 6x6 Class V ARFF Vehicle with High Reach Extending Turret (HRET) with aircraft piercing tip. The vehicle carries 3,000 gallons of water, 400 gallons of 3% Mil Spec AFFF Foam, 450 pounds of potassium-based dry chemical agent and 400 gallons of foam. The unit can discharge 12,000 gallons of water/foam mix before reservicing is required. Other enhancements include FLIR, seating for three personnel, and enhanced scene lighting. The fire pump is rated at 2,000 gallon of water per minute (1,250 gpm each turret of water/foam mixture). The dry chemical can be discharged by a hand line or simultaneously with water from the bumper turret at over 16 pounds per second. The HRET can extend more than 54 feet.

ENGINE 3

A Pumper Truck is currently utilized for structural responses on the Airpark as well as a supply unit for ARFF Vehicles. In addition to structural related equipment, the unit has a 1,500 gallons per minute (gpm) pump, carries 1,200 of large diameter supply hose, 1,000 gallons of water, additional handheld TIC, multi gas meter, hazardous material supplies, Multi Gas Detection Tool, temperature gun, and TIC. This unit also serves as the Primary Medical Response Unit for the Airpark.

ENGINE 1

A reserve (backup) Pumper Truck is utilized for structural responses on the Airpark as well as a Supply Unit for ARFF vehicles. In addition to structural related equipment, this unit has a 1,250-gpm pump, carries 1,200 of large diameter supply hose and 1,000 gallons of water.

RESCUE 1

Light Rescue Unit/Command Unit is utilized by the Shift Supervisor and carries additional specialized rescue equipment (hydraulic, saws, ropes, litters), medical supplies, ladders, tools, hazardous material equipment, reference materials, and additional portable lighting.

RESCUE 2

Reserve Rescue Unit/Utility Vehicle and Ramp Patrol/F Foreign Object Debris (FOD) Unit.

FOX 1

Fire Chief Command and Major Incident Support Vehicle. This unit is fully equipped to operate and support any emergency from small- to large-scale multi agency operations.

MCT-1

This Mass Casualty Trailer is housed at the Airfield Maintenance Building and can be transported to an incident by either fire department or airfield maintenance staff.

FOAM 1

The Foam Resupply Trailer is located on the flight line and allows ARFF units to be resupplied on scene when and where needed.

Engine 22

An IHC 4X2 vehicle carries 1,500 gallons of water and provides Primary Mutual Aid services.

Engine 26

An IHC 4X2 vehicle carries 1,500 gallons of water and provides Primary Mutual Aid services.

Car 2

A Ford F550 4X2 serves as Rescue/Command Unit

Medic 2

A Ford Explorer 4X2 serves as Medical/Man Power Unit

Equipment Trailer

The enclosed Equipment Trailer supports mass casualty incidents, hazardous material response, Urban Search & Rescue (USAR) Support, as well as large incident rehab and command post support.

2.9.3 Airport Maintenance Facilities

AEX uses most of the first level of the Terminal to store airport maintenance equipment in conjunction with the baggage outbound area. The site needs to be correctly designed, and improvements to optimize storage and the make-up space are needed.

2.9.4 Airport Administration Office

The airport manager and staff offices are located east of the Terminal building, between Van Gossen Avenue and Arnold Drive. The offices are collocated in the same building with the England Airpark and Community offices.

Staff assigned to the terminal operation and safety comply with their duties in the terminal building, apron, and other airport areas as required.

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2.9.5 Utilities

The airport is served by several utilities as listed in **Table 2-19.**

Table 2-19: Airport Utility and Service Providers

Service	Provider
Cable	Suddenlink Communications
Electricity	Cleco Corporation
Fire Protection	England Authority
Gas	City of Alexandria
Sanitary Sewer	City of Alexandria
Telephone	AT&T
Trash removal	Tenant choice
Water	City of Alexandria

Source: England Authority, 2020

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Chapter 3
Aviation Activity Forecast

FLYAEX
ALEXANDRIA INTERNATIONAL AIRPORT

3 AVIATION ACTIVITY FORECASTS

3.1 Introduction and Background

Aviation activity forecasts (i.e., forecasts of future number of regional airline passenger enplanements, aircraft operations and levels of locally-based aircraft) provide the basis for justifying the planning and proposed development identified in the airport sponsor's Airport Capital Improvement Program (ACIP). Aviation activity forecasts are typically prepared as part of an update to the airport's current Master Plan, but forecasts may also be updated independently as the first step in assessing the changes in activity on an airport's needs. Forecasts should be realistic, based on the most recent data available, and reflect the current and anticipated future conditions at the airport.

Forecasts of future aviation activity for the Alexandria International Airport, (AEX) serve as key components of the airport owner's (i.e., airport sponsor's) efforts to bring the airport up to date with current information, standards, and requirements. For example, an updated Airport Master Plan incorporates assessments of current airport facility and aircraft traffic activity levels, updates the forecasts of future aviation activity specific to the airport, assesses airfield design and safety-related measures relative to current Federal Aviation Administration (FAA) airport guidance and facility design standards, and approximates the timing of airport facility capital expenditures. The last comprehensive forecasting effort for AEX was conducted as part of the 2008 Airport Master Plan Update, with a planning period beginning in 2008 and extending through 2027.

Aviation activity forecasting actions, collectively, facilitate the prudent planning and timely development of airport facilities. They provide the platform for development decisions related to the purpose, size, location, and appropriate geometric design of planned and appropriately phased airport facility development. These actions typically include, but are not limited to:

- airfield pavements (i.e., runways, taxiways, and holding aprons),
- visual and electronic navigational aids,
- approach lighting systems,
- airfield pavement edge lighting,
- aircraft hangar and tiedown facilities,
- airport traffic control towers,
- landside facilities, and
- terminal space.

Failure to properly plan for the future can result in negative consequences to an airport's capacity, activity, safety, and efficiency. A primary objective of forecasting is to provide information needed to determine whether existing airport facilities would adequately serve future needs. In most growth scenarios, the estimated levels of future demand may suggest the expansion, renewal, strengthening, or other improvements to airport structures or facilities.

This aviation forecasting element of the Airport Master Plan update, projects commercial, general aviation, and military activity over a 20-year planning period. Following suggested

Airport Master Plan activity forecast methodologies, a 2021 "Base Year" reflects the starting point of a 20-year (year 2022 through 2041) forecast period. The activity forecast that is typically subdivided into: a five-year short-term (2022 through 2026) forecast period, a five-year intermediate-term (2027 through 2031) forecast period, and a longer ten-year long-term (2032-2041) forecast period. Within this aviation activity forecast to better facilitate capital projection needs within the 10-year long-term period is subdivided into two separate five-year periods. This 20-year forecast of aviation activity will be subsequently referenced and used as part of the development of the Airport Master Plan's recommended phased-development of airport facility improvements and the commensurate ACIP.

The following elements of this Airport Master Plan Forecast of Aviation Activity section are addressed as follows:

- Section 3.2 - Required FAA Review and Approval of Airport Master Plan Forecasts
- Section 3.3 - Historical and Baseline Activity Analysis
- Section 3.4 - Forecast of Aviation Activity

3.2 Required FAA Review and Approval of Airport Master Plan Forecasts

The FAA has a responsibility to review and approve aviation activity forecasts developed by others that are submitted to the agency in conjunction with airport planning, including Airport Master Plans and associated environmental studies. The FAA reviews such forecasts with the objective of including them in its March 2022 (2021 Model) Terminal Area Forecast Detail Report (TAF) that is prepared specifically for AEX annually, and the National Plan of Integrated Airport Systems (NPIAS). In addition, aviation activity forecasts are an important input to benefit-cost analyses associated with airport development. The FAA reviews these analyses when Airport Sponsor-based requests for federal funding are submitted.

As developed specifically for this update of the AEX Airport Master Plan, the review and approval of the aviation activity falls upon the FAA's Louisiana/New Mexico Airports District Office (ADO) or the FAA's Regional Airports Division (RO) Office, each located in Fort Worth, Texas.

The FAA reviews the sponsors' data with a particular focus on the justification and timing of proposed development projects. Along with airport operators, sponsors include state and local planning agencies. The federally-funded plans must be consistent with FAA forecasts of aeronautical activity, follow FAA guidelines, and be reviewed and accepted by FAA personnel familiar with local conditions and should be:

- realistic,
- based on the latest available data,
- reflect the current conditions at the airport,
- supported by information in the study, and
- provide an adequate justification for airport planning and development.

As defined in FAA Order 5090.5, *Formulation of the National Plan of Integrated Airport Systems* and the ACIP, the ADO and FAA's RO must approve the Airport Sponsor's aviation activity forecasts and the determination of one or more Critical Design Aircraft. Aviation activity forecasts supplied by the Airport Sponsor should be consistent with the FAA's TAF published for the airport. Forecasts of annual scheduled Commercial Service and/or Air Taxi

passenger enplanements, number of locally-based aircraft, and total aircraft operations (a landing or takeoff) are considered consistent with the TAF if the forecasts differ by less than 10 percent in the 5-year forecast period, and 15 percent in the 10-year forecast period. If the forecast is not consistent with the TAF, differences must be resolved if the forecast is to be used in FAA decision-making. This may involve revisions to the airport sponsor's submitted forecasts, adjustments to the TAF, or both.

The FAA's forecast approval process typically constitutes an approval for planning purposes only, which allows the Airport Sponsor to plan future airport facility improvement projects that are considered to be consistent with the long-term growth expectations as graphically depicted and denoted on the FAA-Conditionally-approved Airport Layout Plan Drawing (ALP) and ALP Drawing Set. In most cases, prior to issuing a federal funding Grant, the FAA will require updated information demonstrating that a proposed project is justified by activity at the time, or by activity that would directly result from the implementation of the proposed project. This policy helps to ensure that funding is directed towards critical projects throughout the US.

3.3 Review of Historical and 2021 Base Year Aviation Activity

Operating as a Primary Non-Hub Commercial Service Airport, AEX accommodates and serves a wide variety of aviation users that include scheduled CFR Part 121 regional airlines, non-scheduled (i.e., on-demand) commercial air taxi and larger commercial airline operators, general aviation, governmental agencies, and the Department of Defense. Accordingly, to look forward, historical activity trends must be considered, understood, and quantified to determine what the likelihood may be for aviation activity growth during the Airport Master Plan's 20-year planning period.

The uniqueness of aviation activities that are conducted each year at the Alexandria International Airport are addressed and quantified within Section 4, System Role Analysis, of the Louisiana Department of Transportation and Development's (LADOTD) Louisiana Aviation System Plan (LASP) June 2015 Technical Report. Based upon airport management surveys, 21 unique aviation activities occur at AEX that ranks within the LASP as having the highest score of 74 out of 120 total possible points reflecting a greater variety and level of activity when compared to other Louisiana airports.

Beyond any comparison to any other air carrier airport within the state or the region as a whole, it is important to note that a wide variety of aviation air lift activities include itinerant (i.e., nonlocally-based visiting) operations generated by unscheduled (i.e., on-demand) operators utilizing a wide variety of large air carrier and smaller commuter-type civil commercial aircraft serving the air lift demand generated by: the general aviation sector, Department of Defense (DOD), Justice Prisoner and Alien Transportation System (JPATS), and US Customs and Border Patrol- US Immigration and Customs Enforcement's (ICE). The number of operations generated by each of the respective operators vary each year based upon their unique nature of operation and aeronautical role and the local needs of each agency.

Due to the varied nature of unique military air lift operations conducted at AEX and to best ascertain and quantify the level of aviation activity, a historical 21-year 12-month historical

average was used to represent the "typical level of recurring military aviation activity at the airport for the aviation activity forecast 2021 Base Year."

The COVID-19 pandemic had a profound impact on the US aviation industry. For example, national-wide airline enplaned passenger traffic in April 2020 was reported to be 96 percent lower than April 2019, and remained 60 percent below 2019 levels throughout 2020. These adverse effects cascaded across all airport sectors, aviation-related repair activities, and throughout the entire aviation supply chain.

As can be appreciated, the effects of the 2020 COVID-19 pandemic has touched all aviation industry sectors at AEX with marked decreases in the reported number of air carrier passenger enplanements and deplanements, per-trip passenger seating load factors, and the number of aircraft operations generated by the business and recreational general aviation sector. As reported by the USDOT's BTS Database, one notable example was the percentile decrease in the number of reported regional airline passenger enplanements and related passenger load factors (i.e., number of available seats divided by the number of enplaned passengers) reported by each of the airport's four regional air carriers, American, Delta, PSA, and United operating smaller 50- to 70- seat regional commuter-type airliners. Passenger enplanements decreased 48 percent between 2019 and 2020, but have since recovered 93 percent over the 2020 level as of the end of 2021. Similarly, reported passenger enplanement load factors also decreased 31 percent between 2019 and 2020, but have also recovered 32 percent by the end of 2021.

At the outset of the update of this Airport Master Plan that began in 2019, the aviation activity forecast was initially developed referencing 2018 as the forecast's Base Year with intentions to further update the aviation activity forecast (if needed using the CY 2019 as the base year) during the execution of the Master Plan's follow-on planning elements. It was evident within the first quarter of 2020 that the precipitous drop within all sectors of the aviation industry would require a reexamination of how the pandemic would affect AEX, and all other air carrier airports within the state, region, and entire nation-wide aviation sector as a whole.

Referencing the 2021 Base Year, the following published sources of aviation activity data and information were referenced and used as appropriate to formulate the "Existing Conditions" forecast Base Line:

- FAA's Air Traffic Activity Data System (ATADS)
- FAA's Traffic Flow Management System Counts (TFMSC)
- US Department of Transportation (USDOT) Bureau of Transportation Statistics (BTS) Databases (T-100 Domestic Segment and Historical Load Factors)
- FAA's Air Carrier Activity Information System (ACAIS)
- FAA's Terminal Area Forecast for AEX
- Louisiana Department of Transportation and Development's (DOTD) Louisiana Aviation System Plan (LASP) June 2015 Technical Report

3.3.1 FAA Air Traffic Activity Data System

During the 12-month 2021 calendar year, the ATADS reported 2,366 (8.54 percent) operations conducted by large civilian air carrier aircraft providing non-scheduled on-

demand air lift services for the DOD, JPATS, and ICE each having unique operation roles and functions at AEX. For that same period, the system reported 6,049 (21.82 percent) Air Taxi aircraft operations of which 5,931 were also similarly reported by BTS as primarily representing regional passenger jet operations collectively conducted by the four commercial service regional airlines: American, Delta, PSA, and United.

Although international commercial flight operations are not conducted by any of the four regional air carriers, the DOD typically charters both large civilian and commuter-type air carrier aircraft as non-scheduled flights for domestic and international transport of military personnel. The JPATS operates one of its two Boeing 737-400 series aircraft domestically and ICE exclusively utilized chartered large air carrier aircraft for both domestic and international transport of passengers.

A total of 12,772 operations (46.08 percent) were reported as representing general aviation activity of which, 3,452 (12.45 percent) reported as being generated by visiting itinerant aircraft primarily comprised of large cabin-class turboprop and jet aircraft and, 9,320 (33.62 percent) reported as being generated by smaller privately-owned recreational aircraft primarily operating within the airport traffic pattern.

When developing forecasts of future CFR Part 135 air taxi activity that has typically served the general aviation and military-demand segments at the airport, careful attention was given to segregating and quantifying each type of civilian or military aircraft by the role its operation in support of typical civilian general aviation demand, as well as the missions and function of the DOD, JPATS and ICE. For forecasting purposes, it was assumed that all non-scheduled aviation activity was generated in sole support of DOD, JPATS and ICE activities.

To that end, the ATADS operational totals for the 2021 Base Year were carefully examined and categorized by use to provide an understanding of how aviation activity occurs at the airport. This serves to provide a reasonable base upon which to forecast future levels of aviation activity for the forecast 20-year period.

As reported by ATADS, the local Airport Traffic Control Tower (ATCT) reported a combined total of 6,531 itinerant and local military operations utilizing various makes and types of fixed wing and rotor-wing military aircraft. The ATCT also reported a total of 2,366 operations by larger makes and models of larger air carrier aircraft operating under CFR Part 121 in direct support of transport of military personnel bringing the total number of military operations to 8,897. The ATCT also reported a total of 6,049 operations by aircraft that were classified as representing Air Taxi operations that included the BTS-reported total of 5.931 operations conducted by the four regional airlines leaving the remaining 118 Air Taxi Operations as serving traditional CFR Part 135 general aviation demand needs.

It is important to note that military operations occurring at AEX are generated by both traditional military and non-scheduled commercial air carrier aircraft in support of the military's (AEX-specific) troop deployment and readiness training needs. As such, the number, type, and level of military-related aircraft activity at AEX varies each year.

3.3.2 FAA Traffic Flow Management System Counts

Inspection of the FAA's TFMSC database for the 21-year historical period 2001 through 2021 served to confirm information provided by ATADS for the forecast 2021 Base Year

listing a very unique and wide variety of different civilian and military makes and models of aircraft that collectively serve and directly support DOD, JPATS and ICE activity at the airport.

The various civilian CFR Part 121 air carrier, civilian CFR Part 135, and military aircraft operations generated by each respective group was found to vary considerably each year, and included the following makes and models of aircraft:

3.3.2.1 Regional Air Carriers (Scheduled CFR Part 121)

- Aérospatiale/Alenia ATR 42-200/300/320/400
- Aérospatiale/Alenia ATR 72
- Bombardier or Canadair CRJ-100/200/700/900
- Bombardier DHC8 100/200/300/Q400
- De Havilland DHC-7/8
- Dornier 328 Series
- Embraer Brasilia EMB 110/120
- Embraer ERJ 135/140/145/170/175
- Saab 2000

3.3.2.2 DOD, JPATS, and ICE (Fixed Wing CFR Part 121 Non-Scheduled Air Carrier Aircraft)

- Airbus 300 B4-600
- Airbus 310 All Series
- Airbus 319
- Airbus 320
- Airbus 321
- Airbus 330-200/300/900 Neo Series
- Airbus 340-500
- Airbus 350/350-900
- Airbus 400M Atlas
- Antonov AN-124 Ruslan
- Antonov AN-24
- Antonov AN-32 Firekiller
- Boeing (Douglas) DC 8-70
- Boeing (Douglas) DC 9-95
- Boeing (Douglas) MD 11
- Boeing (Douglas) MD 80 /81/82/87/88 Series
- Boeing 707-300
- Boeing 717 / 717-200
- Boeing 727 / 100RE Super 27 / 200 Series
- Boeing 737 Max 7/8/9
- Boeing 737-200/VC96/300/400/500/600/700/800/900 Series
- Boeing 747-200/300/400 Series
- Boeing 757-200/300 Series
- Boeing 767-200/300/400 Series
- Boeing 777-200/300 Series
- Boeing 787-800/9 Dreamliner
- Lockheed L-1011 Tristar

- McDonald Douglas DC 9-10/30/50
- McDonnell-Douglas DC-10-10/30/40
- McDonnell-Douglas DC-7/7B
- Raytheon Beechcraft 1900 / C-123
- Military (CFR Part 135 Non-Scheduled Air Taxi Aircraft)
- British Aerospace BAC 111
- Beech Airliner 99
- Boeing (Douglas) DC 3
- Cessna 404 Titan
- Convair CV-240/340/440/CV-540/580/600/640/VC-131H
- De Havilland Canada DHC-6 Twin Otter
- Dornier 328 Series
- Fairchild Swearingen SA-226T/TB Merlin 3
- Fokker Friendship F27
- Raytheon Beechcraft 1900 Freighter
- Saab SF 340
- Short 330
- Shorts 360
- Shorts Skyvan SC7
- Swearingen Merlin 4/4A Metro2

3.3.2.3 Military (Fixed Wing)

- Airbus Casa C-295
- Airbus CASA CN-235
- Alenia C-27J Spartan
- AV-8B Harrier
- BAe Systems T-45 Hawk Trainer
- BAe-3100 Jetstream
- Beechcraft 1900/C-12J
- Beechcraft T-34B /C Mentor Trainer
- Beechcraft T-6A Texan Trainer
- Boeing (Douglas) C-9 Nightingale
- Boeing (Douglas) MD 80 Series
- Boeing (Douglas) MD 83
- Boeing 727-100 (C-22)
- Boeing 737-T43
- Boeing AV-8 Harrier
- Boeing B-52 Stratofortress
- Boeing C-135
- Boeing C17 / 17A Globemaster 3
- Boeing E-3F Sentry
- Boeing E-6 Mercury
- Boeing F-15 / 15E Strike Eagle
- Boeing FA-18 Hornet
- Boeing KC-135 Stratotanker
- Boeing OV-10 Bronco

- Boeing P-8 Poseidon
- Boeing QF Fighter
- Boeing Raptor F22
- Boeing Sentry TF33/E3C
- Boeing Startlifter
- Boeing VCC-25
- Cessna T37 Trainer
- Douglas KC-10
- Embraer KC390
- Fuji T1 Trainer
- Grumman C-2 Greyhound
- Grumman F-14 Tomcat
- Grumman Prowler A6
- Learjet 35A, Military
- Lockheed 130 Hercules
- Lockheed C-130J Hercules
- Lockheed C141 Starlifter
- Lockheed C-5
- Lockheed CFM Super Galaxy
- Lockheed F-117 Nighthawk
- Lockheed F-16 Fighting Falcon
- Lockheed L-100 Hercules
- Lockheed Martin F-35A/B
- Lockheed P-3C Orion
- McDonnell Douglas C-9
- North American Commander 112
- Northrop F-5 Freedom Fighter
- Northrop T-38 A/C Talon
- Northrup T38 Trainer
- Pilatus PC-9 Trainer
- Raytheon Texan 2
- Rockwell B-1 Lancer

3.3.2.4 Military (Rotor Wing)

- Bell 204
- Bell Agusta HD-10
- Bell Huey Cobra
- Bell H-58
- Bell OH-58D Kiowa Warrior Helo
- Bell UH-1H Iroquois
- Bell-Boeing V22-Osprey
- Boeing AH-64 Longbow Apache
- Boeing Apache Helicopter
- Boeing CH-46
- Boeing CH-47 Chinook
- Boeing Vertol HT-17 Chinook

- Boeing Vertol UH-46 Sea Knight
- Eurocopter UH-72 Lakota
- Sikorski Blackhawk Helicopter
- Sikorski HH-60G Pave Hawk
- Sikorski MH-53J Pave Low IIIE
- Sikorsky Blackhawk S-70
- Sikorsky MH-60 Black Hawk
- Sikorsky RH-53 Sea Stallion
- Sikorsky SH-60 Seahawk
- Sikorsky T-46 Super Stallion

3.3.2.5 General Aviation Fixed-Wing CFR Part 91 (ADG III/IV)

- Cessna Turbo Stationair 7
- Dassault Falcon F7X
- Bombardier BD-700 Global 5000
- Gulfstream V/G500

3.3.2.6 General Aviation Rotor-Wing CFR Part 91

- Aérospatiale AS-366
- Aérospatiale AS-550
- Agusta AB-139
- Agusta AB-206 LongRanger
- Agusta SAAF-109
- Bell 222
- Bell 230
- Bell 407
- Bell 412 Sentinel
- Bell 429
- Bell 430
- Eurocopter BK-117
- Eurocopter EC-135
- Eurocopter Ecureuil AS-35
- Eurocopter Super 105

3.3.3 Review of FAA Terminal Area Forecast

The March 2022 (2021 Model) TAF Detail Report is the official FAA forecast of aviation activity for US airports. It contains active airports in the NPIAS including FAA-towered airports, federal contract-towered airports, non-federal towered airports, and non-towered airports. Forecasts are prepared for major users of the National Airspace System including air carrier, air taxi/commuter, general aviation, and military. The forecasts are prepared to meet the budget and planning needs of the FAA and provide information for use by state and local authorities, the aviation industry, and the public. In the 2021 TAF, forecasts of passenger enplanements and commercial operations at airports with more than 100,000 enplanements in FY 2019 are based on origin and destination (O&D) models of passenger flow.

Each of the TAF-reported aircraft activity categories includes the following:

- **Local Operations**, which are conducted by aircraft operating in the traffic pattern or within sight of the tower, aircraft known to be departing or arriving from flight in local practice areas, or aircraft executing practice instrument approaches at the airport.
- **Itinerant Operations**, which are all aircraft operations other than local operations. Essentially, these represent takeoffs and landings of aircraft going from one airport to another.
- **Air Carrier Operations**, which represent either takeoffs or landings of commercial aircraft with seating capacity of more than 60 seats.
- **Commuter/Air Taxi Operations**, which are one category. Commuter operations include takeoffs and landings by aircraft with 60 or fewer seats that transport regional passengers on scheduled commercial flights. Air taxi operations include takeoffs and landings by aircraft with 60 or fewer seats conducted on non-scheduled or for-hire flights.
- **Itinerant General Aviation and Local Civil Operations**, which represent all civil aviation aircraft takeoffs and landings not classified as commercial. As reported by ATADS, general aviation activity at AEX for calendar year 2021 was relatively modest and comprised activity generated by itinerant and local aircraft operations.
- **Military Operations** represent takeoffs and landings by military aircraft. Operations are either itinerant or local flights.
- A total of 52 locally-based aircraft were reported but is typical of the relative mix and interaction of general aviation activity at Commercial Service Airports.

A summary of the AEX historical operations obtained from the FAA's TAF developed specifically for AEX for the period between 2000 and 2020 is presented in **Table 3-1** and shown in **Figure 3-1**.

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Table 3-1: 2000-2021 Historical FAA TAF Aircraft Operations											
Year	Itinerant (IT) Activity						Local (LOC) Activity				Total Operations
	Air Carrier	Air Taxi	GA	Military	IT Total	% Total	Civil	Military	LOC Total	% Total	
2000	1,649	13,528	5,637	3,067	23,881	41.04%	23,152	11,160	34,312	58.96%	58,193
2001	1,969	10,764	5,462	3,457	21,652	35.80%	27,085	11,737	38,822	64.20%	60,474
2002	1,428	9,689	5,008	3,803	19,928	34.59%	25,305	12,382	37,687	65.41%	57,615
2003	1,414	9,622	5,439	3,290	19,765	35.89%	27,170	8,135	35,305	64.11%	55,070
2004	1,669	9,068	5,471	3,146	19,354	37.50%	24,632	7,626	32,258	62.50%	51,612
2005	2,049	8,249	5,421	4,099	19,818	32.79%	24,661	15,952	40,613	67.21%	60,431
2006	1,469	8,549	5,193	3,661	18,872	34.60%	28,499	7,174	35,673	65.40%	54,545
2007	1,743	10,484	5,006	3,951	21,184	41.74%	24,077	5,486	29,563	58.26%	50,747
2008	1,923	9,705	4,655	4,879	21,162	51.38%	14,439	5,589	20,028	48.62%	41,190
2009	2,359	9,903	3,913	5,240	21,415	53.36%	11,764	6,953	18,717	46.64%	40,132
2010	2,123	9,237	3,730	4,296	19,386	55.02%	11,183	4,664	15,847	44.98%	35,233
2011	2,035	8,169	5,345	5,814	21,363	43.88%	18,015	9,302	27,317	56.12%	48,680
2012	2,147	8,903	3,642	5,527	20,219	57.20%	9,612	5,517	15,129	42.80%	35,348
2013	1,882	8,334	3,527	4,668	18,411	50.62%	9,361	8,599	17,960	49.38%	36,371
2014	1,830	7,113	3,930	4,569	17,442	55.12%	7,901	6,298	14,199	44.88%	31,641
2015	1,708	6,288	3,924	3,593	15,513	55.12%	6,190	6,440	12,630	44.88%	28,143
2016	1,699	7,031	4,296	3,362	16,388	50.58%	8,711	7,299	16,010	49.42%	32,398
2017	2,226	6,966	3,914	3,116	16,222	53.11%	7,730	6,595	14,325	46.89%	30,547
2018	2,081	7,047	3,671	2,837	15,636	52.01%	8,221	6,208	14,429	47.99%	30,065
2019	2,286	6,729	3,933	2,485	15,433	55.24%	8,711	3,792	12,503	44.86%	27,936
2020	2,044	5,005	3,013	1,624	11,686	42.11%	7,810	3,253	11,063	57.89%	22,749

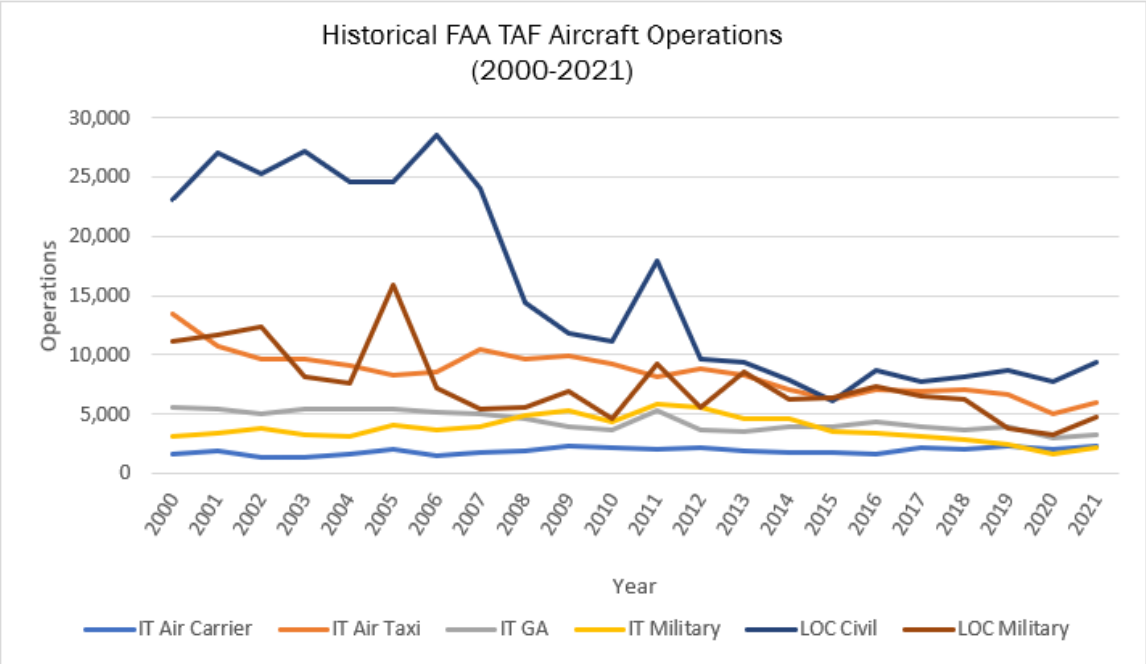
Table 3-1: 2000-2021 Historical FAA TAF Aircraft Operations											
Year	**Itinerant (IT) Activity**						**Local (LOC) Activity**				**Total Operations**
	Air Carrier	**Air Taxi**	**GA**	**Military**	**IT Total**	**% Total**	**Civil**	**Military**	**LOC Total**	**% Total**	
2021	2,311	6,052	3,255	2,167	13,785	49.47%	9,377	4,705	14,082	50.53%	27,867
CAAGR 2000-2005	4.44%	-9.42%	-0.78%	5.97%	-3.66%		1.27%	7.41%	3.43%		0.76%
CAAGR 2006-2010	9.64%	1.95%	-7.93%	4.07%	0.67%		-20.85%	-10.21%	-18.36%		-10.35%
CAAGR 2011-2015	-4.28%	-6.33%	-7.44%	-11.34%	-7.69%		-23.44%	-8.78%	-17.54%		-12.80%
CAAGR 2016-2021	6.34%	-2.95%	-5.40%	-8.41%	-3.40%		1.48%	-8.41%	-25.34%		-29.68%

Source: FAA 2021 AEX TAF and Michael Baker International, Inc., May 2022.

CAAGR – Compound Average Annual Growth Rate

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Figure 3-1: Historical FAA TAF Aircraft Operations (2000-2021)



Source: FAA AEX TAF 2021 Compiled by Michael Baker International, Inc., March 2022.

When reviewing this 22-year record of aircraft activity specific to AEX, it is important to note that, for reasons earlier explained, changes related to the entry and exit of major and/or regional low-cost airline carriers, as well as changes in the local and national economy, all serve to affect aviation activity at all airports. It is further important to refine the examination of these historical aircraft activity levels to the last three to five years to better assess the likely future short- to intermediate-term aircraft activity levels at AEX.

A review of the most recent 6-year period 2016 through 2021 indicates that AEX larger air carrier aircraft operational activity increased at a Compound Average Annual Growth Rate (CAAGR) of 6.34 percent. There was, however, a CAAGR of -2.95 percent annualized decrease in the number of Commuter/Air Taxi aircraft operations for the same period.

Itinerant and local general aviation activity at AEX is indicative of the national general aviation sector, and because of the relatively low number of these type of aircraft activities, had an overall CAAGR of -0.58 percent over the six-year period that is lower than the FAA's Aerospace Forecast projections of general aviation hours flown that is limited to a CAAGR of 1.0 percent for the Fiscal Years 2021-2041 forecast.

When reviewing historical TAF-reported scheduled passenger enplanement activity for the same 20-year period, the annual number of Air Carrier (i.e., Chartered non-scheduled flights) varied markedly and did not match similar passenger enplanement data as reported by the DOT's BTS T-100 Domestic Segment Database or the FAA's ACAIS Database. This may be primarily due to the inconsistent reporting provided by non-scheduled airline operators serving the DOD as well as the nature of non-publicized information regarding the origin, destination and frequency of passenger transport provided by JPATS and ICE.

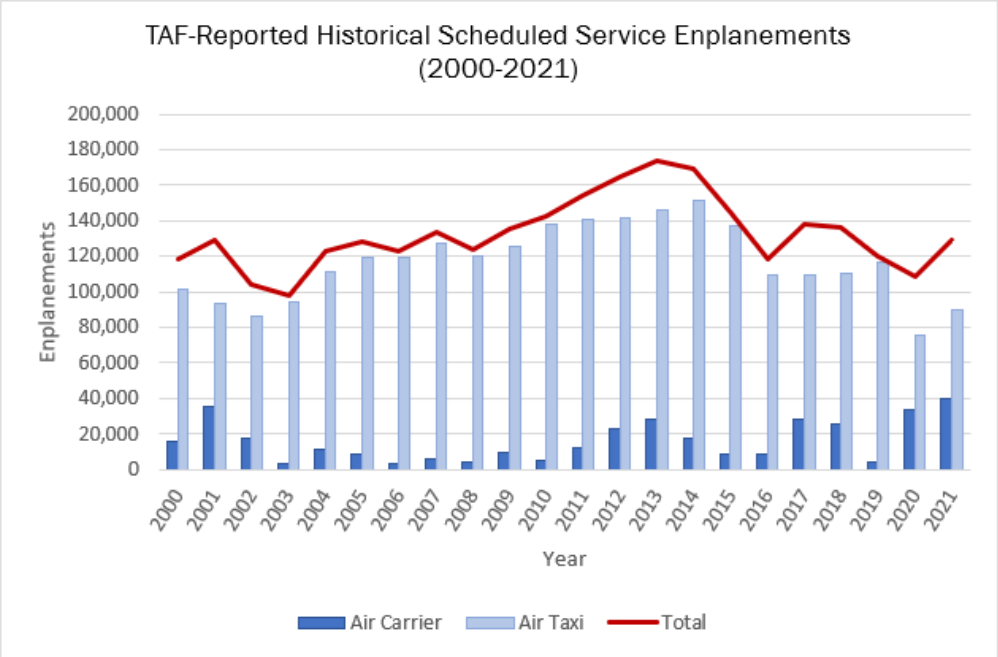
As can be readily seen in **Table 3-2** and **Figure 3-2**, AEX experiences inconsistent reported levels of passenger enplanements primarily due to the nature and air lift role of the non-scheduled CFR Part 121 and Part 135 transports of military troops and equipment and the non-published information regarding transport of JPATS and ICE passengers.

Table 3-2: 2000-2021 Historical TAF Passenger Enplanements

Year	Passenger Enplanement Activity			
	Air Carrier	Air Taxi	TAF Total	ACAIS Total
2000	16,123	101,801	117,924	122,744
2001	35,697	93,250	128,947	122,638
2002	17,863	85,976	103,839	99,827
2003	3,562	94,444	98,006	112,497
2004	11,665	111,373	123,038	153,124
2005	8,556	119,664	128,220	138,494
2006	2,949	119,491	122,440	137,283
2007	6,122	127,485	133,607	145,761
2008	4,215	119,912	124,127	140,062
2009	9,724	125,208	134,932	154,736
2010	5,098	137,695	142,793	179,129
2011	12,548	141,073	153,621	188,286
2012	22,972	141,685	164,657	189,476
2013	28,024	145,887	173,911	183,899
2014	17,874	151,207	169,081	175,526
2015	8,293	136,863	145,156	159,252
2016	8,259	109,803	118,062	129,776
2017	27,780	109,760	137,540	156,145
2018	25,253	110,700	135,953	143,173
2019	3,722	116,240	119,962	141,832
2020	33,527	75,160	108,687	113,513
2021	39,977	89,473	129,450	144,218
CAAGR 2000-2005	-11.90%	3.29%	16.88%	
CAAGR 2006-2010	-9.84%	2.84%	2.18%	
CAAGR 2011-2015	10.22%	-0.12%	0.33%	
CAAGR 2016-2021	29.97%	-6.84%	-1.89%	

Source: FAA AEX 2021 TAF, FAA Air Carrier Activity Information System (ACAIS), and Michael Baker International, Inc., March 2022.
CAAGR – Compound Average Annual Growth Rate

Figure 3-2: 2000-2021 TAF -Reported Historical Scheduled Service Enplanements



Sources: FAA TAF 2021, and Michael Baker International, Inc., March 2022.

3.3.4 USDOT's BTS Database

Inspection of data published by the US Department of Transportation's Bureau of Transportation Statistics (BTS T-100 Domestic Segment and Historical Load Factors) for the calendar year 2021 revealed that scheduled domestic regional airline activity at AEX was (and continues to be) offered by four US air carriers operating short- and medium-haul feeder flights to and from Dallas-Fort Worth International Airport (American Eagle), Charlotte Douglas International Airport (PSA Airlines, Inc.), Hartsville-Jackson Atlanta International Airport (Delta Connection) and Houston Intercontinental Airport (United ExpressJet). Each Airline serves AEX using 50-70 seat Regional Commuter Jets.

- Endeavor Air, a wholly-owned subsidiary of Delta Airlines operating as the Delta Connection using 50-seat CRJ-200, 69-seat CRJ-700, and 76-seat CRJ-900 aircraft.
- SkyWest Airlines, Inc., operating as United Express using CRJ-200ER/J440 50-seat aircraft.
- Commutair (aka Champlain Enterprises, Inc.) operating as United Express using Embraer E145 50-seat aircraft.
- Envoy Air, Inc., a wholly owned subsidiary of American Airlines Group, operating as the American Eagle brand using EMB-145 50-seat, and EMB-140 44-seat aircraft.
- PSA operating as American Eagle operating CRJ-700 65-seat and CRJ-900 76-seat aircraft.

The airport's four regional air carriers, American, Delta, PSA, and United operating smaller 50- to 70- seat regional commuter-type airliners operate exclusively out of the terminal and have not historically provided air lift services to the military.

Other air carrier airlines conducted a varying number of aircraft activities as reported by the BTS in direct and exclusive air lift support to military DOD and ICE included:

- Allegiant Airlines using Airbus Industrie A319 and A320-100/200 series aircraft provided non-scheduled military passenger transport services. During five months of the year, the airline conducted a total of 11 departures to a total of five different US city destinations enplaning 924 military passengers.
- Kaiser Air, Inc. operating as an international airline using Boeing 737-700/700LR/MAX 7 series aircraft during two months of the year conducted a total of 5 departures to three different international destinations enplaning 502 passengers.
- Omni Air International, LLC, operating as an international airline using Boeing 767-200/ER series aircraft conducted a total of 1 departure to a single international destination enplaning 108 passengers.
- USA Jet Airlines, Inc. operating as a domestic air cargo operator using Dassault Falcon 20 aircraft and McDonnell Douglas MD-83 aircraft conducted a total of two departure to two different US city destinations and enplaned 22,331 pounds of air cargo.
- WestJet Airlines Ltd. operating as an international passenger airline using the Boeing 787-800 Dreamliner aircraft conducted a total of five international departures to two different Canada destinations and enplaned 465 international passengers.
- Eastern Airlines f/k/a Dynamic Airways, LLC operating as a domestic international passenger airline using the Boeing 767-300/ER aircraft conducted a single international departure to a single Brazil destination and enplaned 194 international passengers.
- Swift Air, LLC d/b/a Eastern Air Lines d/b/a Eastern operating as a non-scheduled domestic and international passenger transport operator to ICE using Boeing 737-300 Boeing 737-400, Boeing 737-800 series aircraft, conducted 707 domestic and 122 international departures enplaning a total of 21,158 domestics and 10,938 international passengers respectively.

However, it should be noted that the DOT's BTS data reporting does not reflect the full count and/or depth of the aircraft fleet of non-scheduled larger air carriers and smaller regional airliners that operate at AEX. This is evidenced by the imbalance of reported arrivals and departures when compared to what is typically reported by the FAA's TFMSC, ATADS, and most importantly, the FAA's annual reporting of ACAIS that provides passenger enplanement data for both scheduled and non-scheduled activity at the airport. It should be noted that ACAIS-reported annual number of passenger enplanements are far higher than reported by the FAA's TAF as developed annually for the airport.

Although these discrepancies exist between the various reporting systems, the ACAIS data was found to provide the most thorough and meaningful information regarding passenger enplanements. As listed in **Tables 3-3** and **3-4** and shown in **Figures 3-3** and **3-4** respectively.

Table 3-3: 2001-2021 Historical FAA ACAIS-Reported Passenger Enplanements			
Year	AEX Passenger Enplanements		
	Scheduled	Non-Scheduled	Total
2001	88,767	33,871	122,638
2002	88,515	10,312	99,827
2003	96,297	16,200	112,497
2004	118,398	34,726	153,124
2005	118,391	20,103	138,494
2006	118,917	18,366	137,283
2007	129,005	17,797	146,802
2008	118,320	21,742	140,062
2009	125,685	29,051	154,736
2010	133,462	45,667	179,129
2011	133,627	54,659	188,286
2012	133,230	56,246	189,476
2013	132,424	51,475	183,899
2014	126,726	48,800	175,526
2015	121,854	37,398	159,252
2016	110,871	18,905	129,776
2017	108,459	47,686	156,145
2018	114,202	28,971	143,173
2019	118,441	23,391	141,832
2020	61,868	51,645	113,513
2021	97,834	46,384	144,218

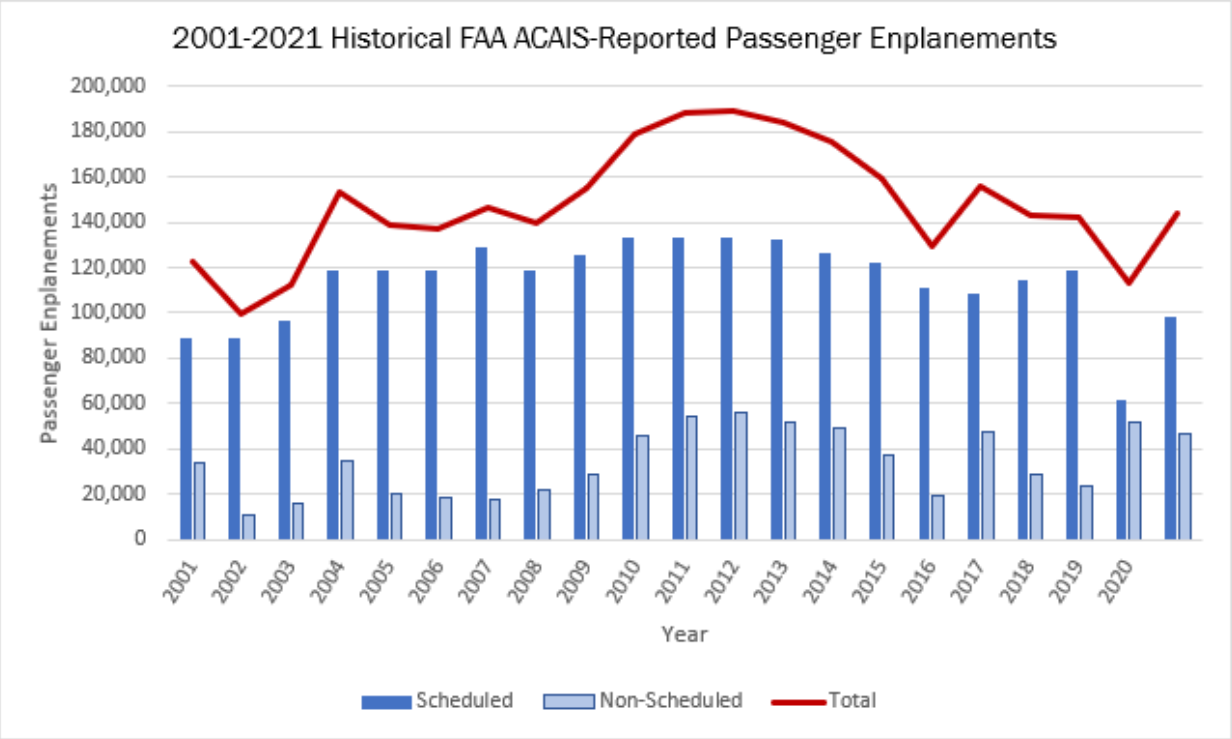
Source: Calendar Year 2001-2021 Passenger enplanement data is extracted from the Air Carrier Activity Information System (ACAIS) (AEX).

Compiled by Michael Baker International, Inc., May 2022.

CAAGR – Compound Average Annual Growth Rate

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Figure 3-3: Historical ACAIS-Reported Passenger Enplanements (2021-2021)

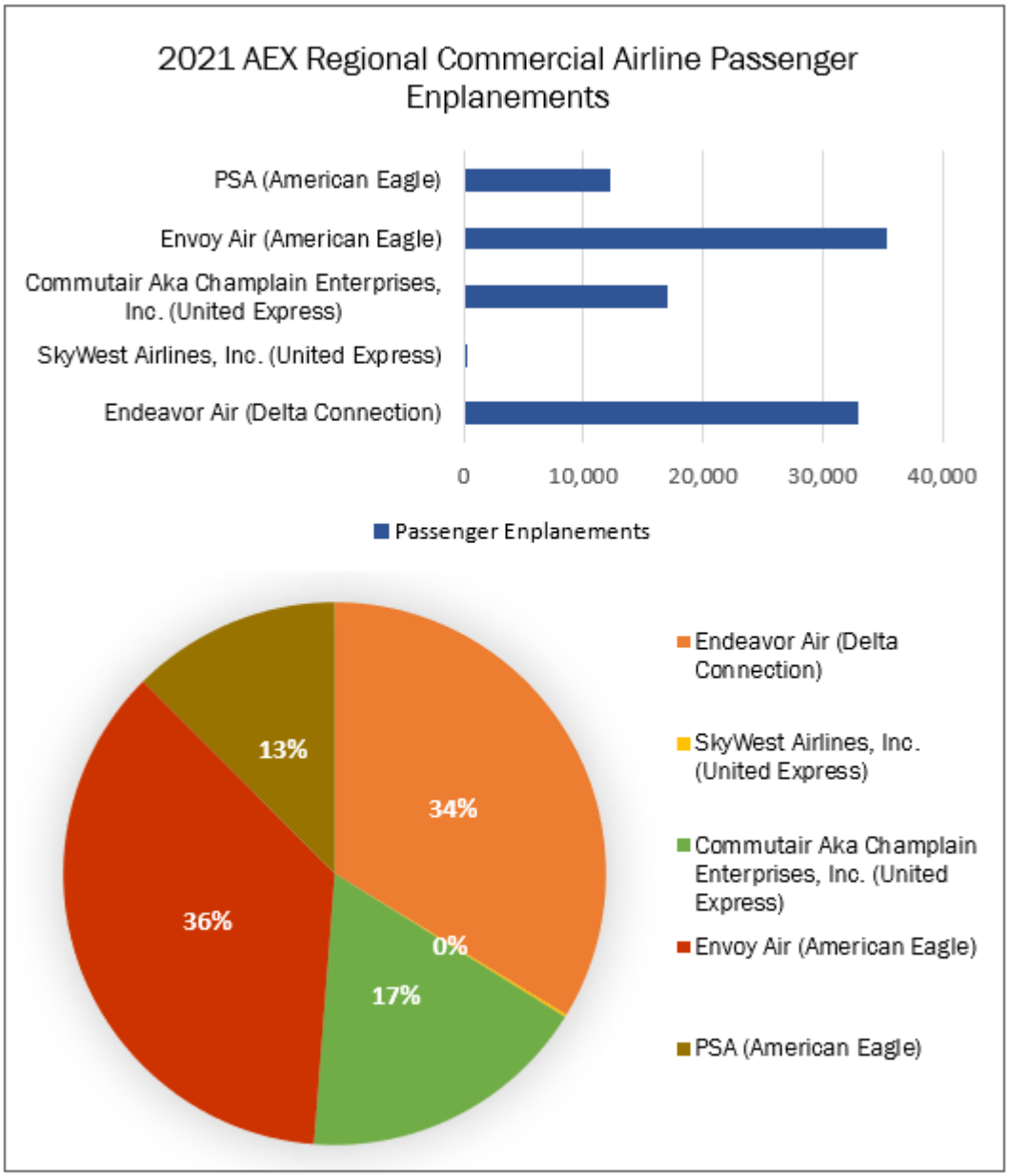


Source: Calendar Year 2001-2021 Passenger enplanement data is extracted from the Air Carrier Activity Information System (ACAIS) (AEX).
Compiled by Michael Baker International, Inc., May 2022

Table 3-4: 2021 AEX Regional Commercial Airline Passenger Enplanements		
Commercial Part 121 Regional Scheduled Airline	**Passenger Enplanements**	**Share Percent**
Endeavor Air (Delta Connection)	32,818	33.70%
SkyWest Airlines, Inc. (United Express)	159	0.16%
Commutair Aka Champlain Enterprises, Inc. (United Express)	16,907	17.36%
Envoy Air (American Eagle)	35,342	36.30%
PSA (American Eagle)	12,143	12.47%
Total	97,369	100.00%

Source: Calendar Year 2021 Passenger enplanement data is extracted from the Air Carrier Activity Information System (ACAIS) (AEX).
Compiled by Michael Baker International, Inc., May 2022

Figure 3-4: 2021 AEX Regional Commercial Air Carrier Destinations



Source: Calendar Year 2021 Passenger enplanement data is extracted from the Air Carrier Activity Information System (ACAIS) (AEX). Compiled by Michael Baker International, Inc., May 2022

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As reported by the DOT's BTS, air cargo movements to and from AEX during 2021 was conducted by a very small and limited number of domestic airlines as listed in **Table 3-5**.

Table 3-5: 2021 AEX Air Cargo Activity

Airline	2021 Deplanements (Pounds)	Arriving From	2021 Enplanements (Pounds)	Departing To
Envoy Air (American Eagle)	21,649	Dallas-Fort Worth, TX	3,196	Dallas-Fort Worth, TX
PSA (American Eagle)	268	Charlotte, NC	3	Charlotte, NC
United Air Lines Inc. (Diversion)	1,909	Chicago, IL	1,909	Houston, TX
USA Jet Airlines Inc.	22,331	Grand Rapids, MI Raleigh/ Durham, NC	22,331	Laredo, TX / San Antonio, TX
Total	**45,328**		**26,610**	

Source: BTS T-100 Domestic Segment database Calendar Year 2021
Compiled by Michael Baker International, Inc., March 2022.

Beyond the limited amount of belly cargo that is occasionally carried by any one of the four regional air carriers serving the airport, other air cargo movements occur at varying levels each year by non-scheduled air carrier aircraft serving the DOD. Airport records indicate that historically over the past 18-year period (2004- 2021), a total of 152,763 tons of air cargo have been handled in association with recuring military activities that are conducted multiple times per year. On average cargo tonnage generated by the military at the airport each year was approximately 8,487 tons. This type and extent of air cargo activity conducted by and commensurate with the military activity at the airport is anticipated to continue throughout the 20-year forecast period.

3.3.4.1 Aircraft Passenger Load Factors

Commercial aircraft passenger load factors are a common aviation commercial service metric used to measure and compare the relative use of available aircraft passenger seats purchased for a given flight. All commercial service airline operators strive to achieve the highest factors that are mathematically calculated as actual passenger-seat miles as a proportion of available seat-miles in percent factors (i.e., percentages of passengers vs. available seats on a per flight basis).

A review of the passenger enplanements and associated per flight load factor percentiles between 2011 through 2019 for the entire US system of air carrier airports and that of Louisiana's seven Primary Commercial Service airports revealed that, although varying by airport, passenger load factor percentages for each respective airport remained fairly consistent throughout the period. The effect of the COVID-19 pandemic on national airport and regional airport airline activity between 2020 and 2021 is clearly evidenced by the steep drop in passenger load factor percentiles across the system.

3.3.4.2 Originating Regional Airline Passenger Enplanements

For the FAA, the key variable for airlines is the number of passenger enplanements or departures that occur from a commercial service airport. The number of annual enplanements determines how much Airport Improvement Program (AIP) entitlement funds an airport will receive for that year and also determines AEX's Aeronautical Service Role within the FAA's NPIAS. The NPIAS identifies nearly 3,330 existing and proposed airports that are included in the national airport system, the roles they currently serve, and the amounts and types of airport development eligible for federal funding under the AIP over the next 5 years. The NPIAS contains all commercial service airports, all reliever airports, and selected public-owned general aviation airports.

As way of comparison, the BTS reported passenger load factor and originating passenger enplanement data were reviewed for the ten-year period 2011-2021 and are listed in **Table 3-6** and graphically shown in **Figure 3-5**. As can been seen for the most recent period 2020 to 2021, MLU and MSY ranked first and second respectively in the recovery of passenger load factor growth, followed by BTR. Passenger load factors for AEX for the same period mirrored the national and regional trend and experienced a one-year decrease of 26.80 percent followed by a 13.56 percent recovery in 2021.

For the same period, there was a steep decline in passenger enplanement levels across the entire system of air carrier airports with a similar one-year upward recovery. Within the region, LFT and LCH experienced the greatest one-year recovery of passenger enplanement levels while AEX experienced a year-over-year increase of 57.38 percent.

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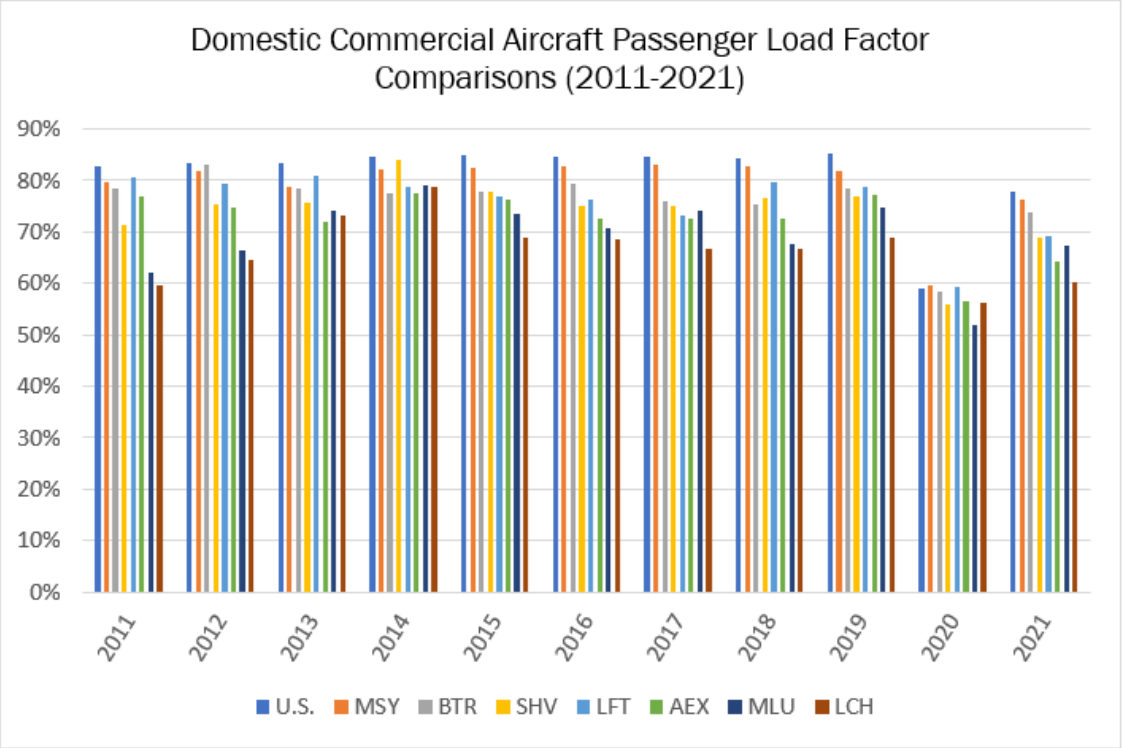
Table 3-6: 2011-2021 Historical Scheduled Domestic Commercial Aircraft Passenger Load Factor and Passenger Enplanement Comparisons at Selected Airports								
Year	US	MSY	BTR	SHV	LFT	AEX	MLU	LCH
Passenger Load Factor (Percent of All Seats Available)								
2011	82.87%	79.63%	78.54%	71.28%	80.66%	**76.87%**	62.04%	59.56%
2012	83.36%	81.72%	83.08%	75.31%	79.25%	**74.68%**	66.46%	64.66%
2013	83.47%	78.83%	78.46%	75.68%	81.01%	**71.81%**	74.15%	73.30%
2014	84.49%	82.21%	77.66%	84.03%	78.74%	**77.58%**	79.18%	78.65%
2015	84.98%	82.41%	77.83%	77.92%	76.88%	**76.43%**	73.60%	68.88%
2016	84.59%	82.88%	79.22%	74.95%	76.15%	**72.44%**	70.76%	68.57%
2017	84.57%	82.96%	76.06%	75.05%	73.20%	**72.69%**	74.01%	66.85%
2018	84.46%	82.77%	75.23%	76.64%	79.69%	**72.69%**	67.68%	66.85%
2019	85.11%	81.73%	78.39%	76.81%	78.81%	**77.25%**	74.67%	68.90%
2020	58.88%	59.49%	58.45%	56.05%	59.35%	**56.55%**	51.82%	56.29%
2021	77.68%	76.12%	73.76%	68.89%	69.27%	**64.22%**	67.26%	60.27%
CAAGR 2011-2019	0.33%	0.33%	-0.02%	0.94%	-0.29%	**-0.06%**	2.34%	1.84%
CAAGR 2019-2020	-30.82%	-27.21%	-25.44%	-27.03%	-24.69%	**-26.80%**	-30.60%	-18.30%
CAAGR 2020-2021	31.93%	27.95%	26.19%	22.91%	16.71%	**13.56%**	29.80%	7.07%
Originating Passenger Enplanements								
2011	638,247,667	4,209,117	391,590	262,342	219,582	188,286	104,882	60,884
2019	811,545,260	6,755,705	395,451	323,961	264,025	141,832	113,637	62,032
2020	335,086,792	2,598,348	173,101	153,352	117,892	113,513	54,505	32,051
2021	611,917,247	4,028,251	274,154	245,299	206,416	144,218	81,896	52,724

Table 3-6: 2011-2021 Historical Scheduled Domestic Commercial Aircraft Passenger Load Factor and Passenger Enplanement Comparisons at Selected Airports								
Year	US	MSY	BTR	SHV	LFT	AEX	MLU	LCH
CAAGR 2011-2019	3.05%	6.09%	0.12%	2.67%	2.33%	-3.48%	1.01%	0.23%
CAAGR 2019-2020	-58.71%	-61.54%	-56.23%	-52.66%	-55.35%	-19.97%	-52.04%	-48.33%
CAAGR 2020-2021	82.61%	55.03%	58.38%	59.96%	75.09%	27.05%	50.25%	64.50%

Source: BTS Load Factor and Passenger Enplanement Database.
Calendar Year 2011-2021 Passenger load factor data for all airports was extracted from the BTS Load Factor and Passenger Enplanement Database,
Calendar Year 2011, 2019, 2020 and 2021 Passenger enplanement data for AEX was extracted from the FAA's Air Carrier Activity Information System (ACAIS)
Complied by Michael Baker International, Inc., May 2022
Abbreviations:
CAAGR – Compound Average Annual Growth Rate
MSY – Louis Armstrong New Orleans International Airport
BTR – Baton Rouge Metropolitan Airport
SHV – Shreveport Regional Airport
LFT – Lafayette Regional Airport
AEX – Alexandria International Airport
MLU – Monroe Regional Airport
LCH – Lake Charles Regional Airport
US – All US Commercial Airports

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Figure 3-5: Historical Scheduled Domestic Commercial Aircraft Passenger Load Factor and Passenger Enplanement Comparisons (2011-2021) at Selected Airports



Source: BTS Load Factor and Passenger Enplanement Database,
Complied by Michael Baker International, Inc., March 2022

3.3.5 2021 Base Year Aviation Activity Summary

A summary of each sector of aviation activity occurring at AEX for the 2021 Base Year is listed in **Table 3-7** and was used as the starting point from which to project future annualized levels of aviation activity throughout the 20-year forecast period.

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Table 3-7: 2021 Base Year Aviation Activity Summary					
Baseline All Part 121 Scheduled Regional Airline Factors					
Item	**Operations**	**Seats**	**Average Seats (Seats ÷ Operations)**	**Passengers**	**Load Factor (Passengers ÷ Seats)**
Arrival/Passenger Deplanement Factors					
Endeavor Air (Delta Connection)	1,046	53,257	50.91	31,742	59.60%
SkyWest Airlines, Inc. (United Express)	7	350	50.00	273	77.71%
Commutair Aka Champlain Enterprises, Inc. (United Express)	592	29,600	50.34	16,565	56.27%
Envoy Air (American Eagle)	1,056	52,554	49.76	31,083	59.14%
PSA (American Eagle)	271	17,956	66.26	11,096	66.31%
Total	**2,972**	**153,717**	**51.72**	**90,759**	**59.04%**
Departure/Passenger Enplanement Factors					
Endeavor Air (Delta Connection)	1,045	53,212	50.92	32,818	61.17%
SkyWest Airlines, Inc. (United Express)	7	350	50.00	159	45.43%
Commutair Aka Champlain Enterprises, Inc. (United Express)	583	29,150	50.00	16,907	58.00%
Envoy Air (American Eagle)	1,054	52,454	49.77	35,342	67.38%
PSA (American Eagle)	270	17,891	66.26	12,143	67.87%
Total	**2,959**	**153,057**	**51.73**	**97,369**	**63.62%**

Source: Enplanements: FAA's Air Carrier Activity Information System (ACAIS)., Deplanements: BTS T-100 Domestic Segment database. Compiled by Michael Baker International, Inc., May 2022.

Notes:

1. *Limited to Scheduled Commercial Scheduled Regional Commuter Airlines Serving AEX.*
2. *As reported, there is no reconciliation regarding the different reported number of scheduled regional airline arrivals and departures, It is assumed (albeit not listed above) that there was an equal number of (the higher 2,972) BTS-reported arrivals and departures.*

Baseline (Belly) Air Cargo Factors		
Item	**Operations**	**Cargo Volume (Pounds)**
Inbound/Deplaned		
Freight	868	44,248

Table 3-7: 2021 Base Year Aviation Activity Summary		
Outbound/Enplaned		
Freight	1,982	25,530
Total	**2,850**	**69,778**

Source: BTS T-100 Domestic Segment database and Michael Baker International, Inc., 2021.

Baseline Military Factors	
Item	**Operations**
Itinerant Operations / % of Total	4,611 / 51.15%
Local Operations / % of Total	4,404 / 48.85%
Total Operations	**9,015 / 100%**

Source: FAA AEX ATADS (Itinerant military activity counts specific to AEX military air lift needs include 2,127 military, 2,366 large air carrier, and 118 smaller air taxi commuter-type aircraft operations)

Compiled by Michael Baker International, Inc., 2022.

Baseline General Aviation Factors	
Item	**Operations or Based Aircraft**
Itinerant and Local Operations (Excludes Schedule Regional Airlines Counted as Air Taxi)	
Itinerant Operations / % of Total	3,570 / 27.70%
Local Operations / % of Total	9,320/ 72.30%
Total Operations	**12,890**
Operations by Aircraft Type	
Single-and Multi-Engine Piston	4,752
Turboprop	873
Jet	1,672
Helicopter	5,475
Total Operations	**12,772**
Based Aircraft by Type	
Single-Engine Piston (SEP)	25
Multi-Engine Piston (MEP)	5
Turboprop	7
Jet	11
Helicopter	4
Total Based Aircraft	**52**

Sources: FAA AEX ATADS 2021, AEX TFMSC 2021. FAA AEX 2021 TAF, AEX FAA Form 5010-1 3/24/2022,
General Aviation Helicopter Annual Operations from AEX ATCT estimates May 13, 2022
Based Aircraft By Type from AEX Management 5/12/2022
Compiled by Michael Baker International, Inc., May 2022.

3.4 Forecast of Aviation Activity

The forecast of aviation activity at AEX encompasses projections of continued scheduled regional airline operations, associated regional airline passenger enplanements, general aviation operations, military operations, and levels of locally-based general aviation aircraft.

3.4.1 Aviation Activity Forecast Periods and Facility Development Planning

For the purpose of this update of the Airport Master Plan and the development of an FAA-approved Forecast of Aviation Activity, three separate and distinct planning horizons are addressed, namely: the first five-year Near-term planning period 2022-2026, the second follow-on five-year Intermediate-term planning period 2027 through 2031, and the last ten-year Long-term planning period 2032-through 2041. To better facilitate the identification and quantification of needed airport facility improvements, the Long-term planning period was subdivided into two separate five years periods 2032-through 2036 and 2037 through 2041 respectively.

3.4.2 Forecast of Scheduled and Non-Scheduled Air Carrier Passenger Enplanements

Due to the varying nature of passenger enplanements generated by scheduled CFR Part 121 regional air carriers and that of larger CFR Part 121 non-scheduled air carrier operators serving the DOD, JPATS, and ICE, the forecast of originating passenger enplanements was developed to reflect both scheduled and non-scheduled air carrier operations throughout the 20-year forecast and planning period.

3.4.2.1 Forecast of Scheduled Regional Air Carrier Passenger Enplanements

The forecast of AEX scheduled regional aircraft enplanements was derived through the review and reference of the FAA's various forecasts of regional commuter passenger enplanement levels and year over-year growth rates. A review of the FAA's projection of US Commercial Air Carriers Domestic Enplanements by Carrier Group was published in their FAA Aerospace Forecast (Fiscal Years 2021-2041).

The FAA's March 2022 TAF for AEX projects large air carrier passenger enplanements to increase at a CAAGR of 0.28 percent, regional air carrier passenger enplanements to increase at a CAAGR of 2.27 percent, and the total of all passenger enplanements to increase at a CAAGR of 1.73 percent over the same 20-year period. For comparison purposes, the similar passenger enplanement forecasts previously published within the Louisiana Aviation System Plan (LASP) were based on a CAAGR of 1.4 percent over a 32-year period (2011-2043). Based upon that review of the two enplanement forecasts, the forecast of passenger enplanements for this Airport Master Plan Update, was assumed to take the higher CAAGR of 2.27 percent as projected within the FAA's TAF over the Airport Master Plan's 20-year forecast period.

As shown in **Table 3-8** and **Figure 3-5**, the commercial regional passenger enplanements are projected to increase at a CAAGR of 2.27 percent over the 20-year forecast period.

3.4.3 Commercial Regional Passenger Load Factors

The forecast of AEX commercial regional aircraft enplanement load factors was derived using the FAA's projection of US Commercial Air Carriers Domestic Enplanements by Carrier Group published in their FAA Aerospace Forecast. As shown in **Table 3-8**, the commercial regional aircraft passenger load factors are projected to increase at a CAAGR of 0.07 percent over the 20-year forecast period.

3.4.4 Scheduled Regional Commercial Aircraft Operations

In theory, the number of enplaned passengers and typical aircraft passenger load factors each serve to drive the number of commercial regional aircraft operations given the same number of available seats. The forecast of commercial regional aircraft operations was based on the assumption that within the first five years of the 20-year forecast period, the gauge of regional airliner would increase to offer regularly-scheduled service using the CRJ-70 aircraft that is currently used by Envoy, PSA, and Skywest at the Baton Rouge Metropolitan/Ryan Field Airport. All three airlines currently offer service at AEX using the smaller 50-seat airliner aircraft. The 2026 average load factor of 74.31 percent was derived using the average BTS-reported load factor for the three respective airlines for the 2021 Base year, then increased at the projected FAA's regional airline load factor CAGR of 0.70 percent throughout the remainder of the 20-year forecast period.

The total number of annual scheduled regional airline passenger enplanements was divided by the resultant number of used seats to derive the annual number of required 76-seat regional aircraft operations.

As shown in **Table 3-8** and **Figures 3-6** and **3-7**, the annual number of combined arrival and departure commercial regional aircraft operations are projected to increase at a CAAGR of 0.26 percent over the 20-year forecast period. This CAGR is conservative in that the timing of the increased air aircraft gauge and the associated available number available seats increasing from 50 to 65 within the 20-year forecast period is unknown.

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Table 3-8: Forecast of Scheduled Commercial Regional Airline Passenger Enplanements, Deplanements, Load Factors, and Aircraft Operations					
Year	**Enplanements**	**Aircraft Seats**	**Load Factor**	**Occupied Seats**	**Operations**
2021	97,369	51.73	63.62%	32.91	2,959
2026	108,934	65	74.57%	48.47	2,247
2031	121,872	65	74.83%	48.63	2,506
2036	136,347	65	75.09%	48.81	2,793
2041	152,541	65	75.36%	48.98	3,114
CAAGR 2021-2041	2.27%	1.15%	0.85%	2.01%	0.23%

Year	Deplanements	Aircraft Seats	Load Factor	Occupied Seats	Operations
2021	90,759	51.73	59.04%	30.54	2,972
2026	100,539	65	68.83%	44.74	2,247
2031	113,598	65	69.73%	45.33	2,506
2036	127,091	65	70.00%	45.50	2,793
2041	142,185	65	70.25%	45.66	3,114
CAAGR 2021-2041	2.27%	1.15%	0.87%	2.03%	0.26%

Year	Enplaned Passengers	Deplaned Passengers	Total Passengers	Total Operations
2021	97,369	90,759	188,128	5,918
2026	108,934	100,539	209,473	4,494
2031	121,872	113,598	235,470	5,012
2036	136,347	127,091	263,438	5,586
2041	152,541	142,185	294,726	6,228
CAAGR 2021-2041	2.27%	2.27%	2.27%	0.26%

Sources:

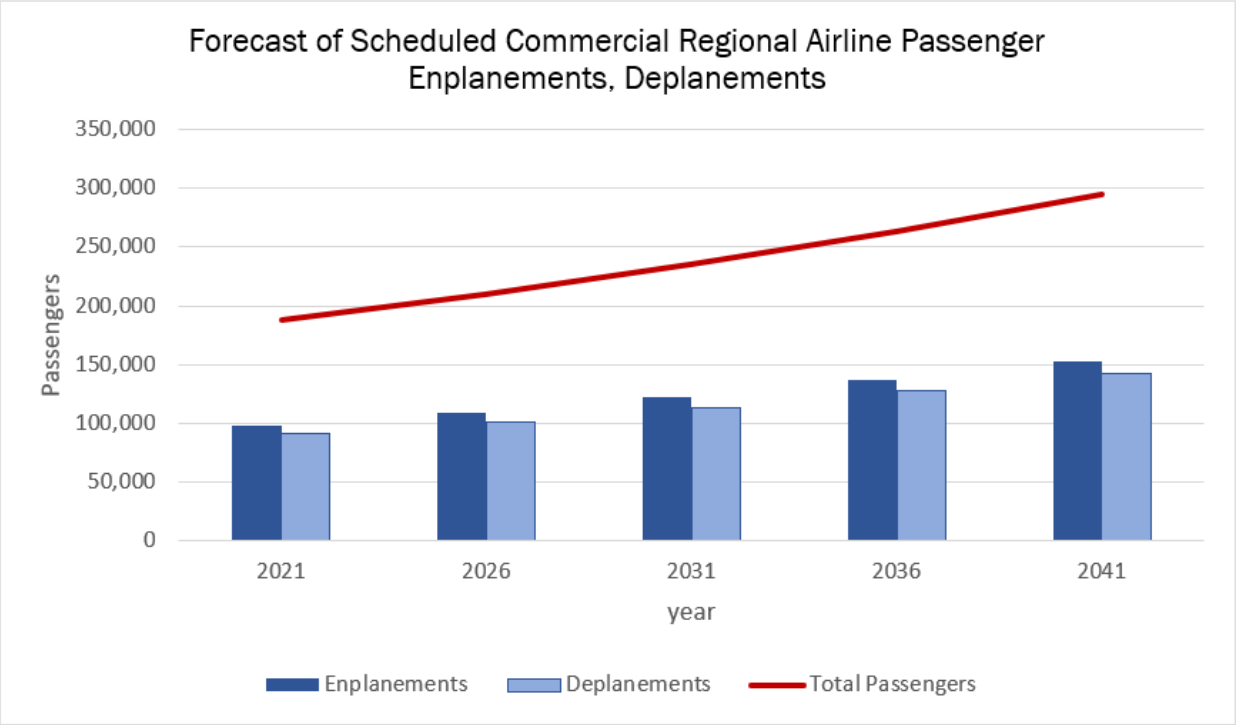
2021 CY Enplanement and Passenger Load Factors derived from AEX BTS Regional Airline Load Factor and Passenger Enplanement Database,

2026 through 2041 CY Enplanement /Deplanement Passenger Load Factors derived from BTR BTS Regional Airline Load Factor and Passenger Enplanement Database,

2026 through 2041 CY Aircraft Operations derived assuming equal number or arrival/departure operations that yielded resultant passenger load factors percentiles.

Note: Forecast by Michael Baker International, May 2022.

Figure 3-6: AEX Commercial Regional Air Carrier Domestic Enplanements/Deplanements (2021-2041)

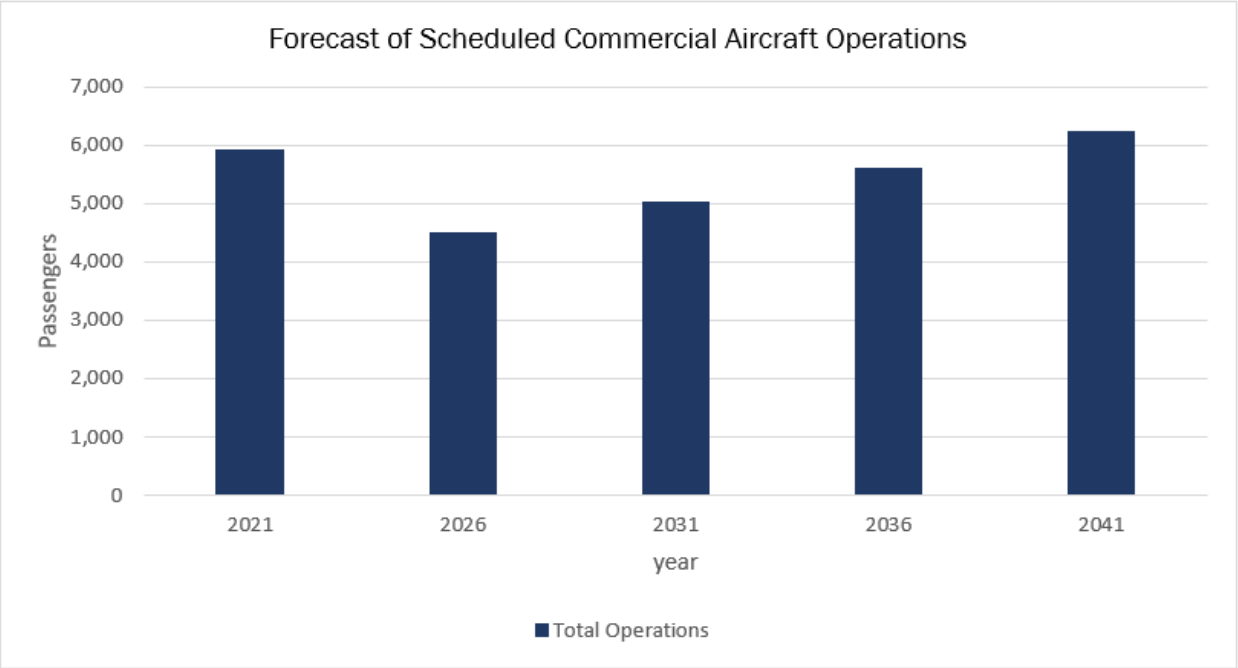


Source: 2021 CY Enplanement and Passenger Load Factors derived from AEX BTS Regional Airline Load Factor and Passenger Enplanement Database

Note: Forecast by Michael Baker International, March 2022.

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Figure 3-7: AEX Total Commercial Regional Air Carrier Aircraft Operations (2021-2041)



Source: 2021 CY Enplanement and Passenger Load Factors derived from AEX BTS Regional Airline Load Factor and Passenger Enplanement Database

Note: Forecast by Michael Baker International, March 2022.

3.4.5 Military and Non-Scheduled CFR Part 121 Airline Operations Forecast

Military aviation activity at AEX is composed of operations by traditional military aircraft as well as operation conducted by non-scheduled operators utilizing larger mainline air carrier aircraft operating under CFR Part 121. Non-scheduled CFR Part 121 aircraft operations serving the DOD as well as JPATS and ICE are anticipated to continue throughout the 20-year forecast period albeit at varying year-over-year operational levels as demand dictates.

Because AEX does not operate as one of the nation's 21 Joint-Use Airports, federal law does not allow the FAA to consider forecasts of aviation activity that would be part and parcel of airport facility improvement considerations that, by nature of the project or improvement, may potentially solely benefit another federal agency (e.g., the Department of Defense). Prudent 20-year airport master planning, however, can and should include forecasts of military-related aircraft activity if conducted under non-scheduled provisions under applicable FAA regulations in 14 CFR Parts 121.

However, civil aircraft operated by civil operators under military or other federal government agency contracts as civil operations are counted by ATADS as civil aircraft activity for documenting aeronautical activity for civil airport planning. For example, civil aircraft operating under contract with the US Forest Service for aerial firefighting activities, or non-scheduled military aircraft flights should be considered as part of the forecast of aviation

activity and the identification of and planning for future airport facility and/or capacity-related improvements.

As reported by the ATADS, BTS, and ACAIS for the 10-year historical period 2011 through 2021, annual military activity at the airport generated, on average, 9,521 traditional military aircraft operations, 2,020 non-scheduled CFR Part 121 air carrier operations carrying 42,324 military personnel. For forecasting purposes and recognizing the military's past and anticipated continued future use of non-scheduled civilian aircraft for military air lift and personnel transport purposes, the 10-year average reported activity levels were held at a constant level throughout the 20-year forecast period and are listed in **Table 3-9**.

Table 3-9: Military Operations Forecast

Year	Itinerant (IT)	Itinerant (IT)		Local (LOC)		Total Military Operations
	Military Aircraft Operations	Non-Scheduled CFR Part 121 Air Carrier Operations	Percent of Total	Military Aircraft Operations	Percent of Total	
2021	2,127	2,366	50.05%	4,404	49.50%	8,897
2011-2021 Average	3,543	2,020	48.20%	5,978	51.80%	11,541
2026	3,543	2,020	48.20%	5,978	51.80%	11,541
2031	3,543	2,020	48.20%	5,978	51.80%	11,541
2036	3,543	2,020	48.20%	5,978	51.80%	11,541
2041	3,543	2,020	48.20%	5,978	51.80%	11,541
CAAGR 2021-2041	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

Source:
2021 CY AEX FAA OPSNET Tower Operations Standard Report From 01/2021 To 12/2021
2021 FAA ACAIS Non-Scheduled Passenger Enplanement Data 01/2001 To 12/2021
Complied by Michael Baker International, Inc., May 2022

3.5 General Aviation Operations

Many elements compose the broad definition of general aviation activity. In simplest terms, general aviation includes all segments of the aviation industry except those conducted by scheduled air carriers and the military. General aviation activities may include pilot training, sightseeing, aerial photography, law enforcement, and medical flights, as well as business, corporate, and personal travel. General aviation operations are divided into the categories of local or itinerant. Local operations are arrivals or departures performed by aircraft that remain within the airport traffic pattern, or those that occur within sight of the airport. Local operations are most often associated with training activity and flight instruction (e.g., touch-and-goes). Itinerant operations are arrivals or departures that do not remain within the airport traffic pattern and/or that originate from another airport. The FAA defines an operation as either a single aircraft landing or takeoff. Under this definition, touch-and-goes are considered two operations (one takeoff plus one landing) and are deemed local

operations. Itinerant operations are typically comprised of private, business/corporate, and air taxi flight activity, but may also include law enforcement and medical flights.

The FAA's March 2022 TAF for AEX for the 20-year period 2021 through 2041 projects a CAAGR of 1.30 percent growth in itinerant general aviation operations and a CAAGR of -0.06 percent growth in local general aviation operations or a CAAGR of 0.32 percent when considering the total number of operations.

Referencing the Hours Flown methodology as used in the FAA's Aerospace Forecasts (FY 2021-2041), the projected average annual growth rate of national general aviation hours flown applies the single projected CAAGR to the total number of each airport's 2021 general aviation operations. In this projection methodology, future general aviation operations are projected based on the assumption that general aviation operations are directly correlated to the number of hours flown and that if the average hours flown per operation remains constant, total operations must increase if total hours flown are projected to increase. In comparison, Table 29 of that forecast projects a CAAGR of 0.70 percent in general aviation hours flown. This CAAGR is primarily derived based upon information collected as part of the FAA's 2001-2010 and 2012-2018 General Aviation and Part 135 Activity Survey (GA Survey). In this projection methodology, future general aviation operations are projected based on the assumption that general aviation operations are directly correlated to the number of hours flown and that if the average hours flown per operation remains constant, total operations must increase if total hours flown are projected to increase. For the purpose of this aviation activity forecast, projections of future itinerant and local general aviation operations at AEX mirrors the FAA's CAAGR 0.70 percent projections of general aviation aircraft hours flown.

In addition to using the FAA's hours flown methodology to project future general aviation aircraft activity levels, a constant annual number of anticipated single-engine aircraft operational operations that would be generated by a local CFR Part 141 Flight and Pilot Traning School (Acadian Aviation) was added to each of the forecast horizon years. Based upon discussions with Acadian Aviation, it was estimated that, on average, approximately 2,640 single-engine aircraft operations will be generated annually by the school's training activities. These flight training operations were added to each of the projected single-engine operations forecast throughout the 20-year forecast period.

The forecast of general aviation aircraft activity is listed in **Table 3-10** and shown in **Figure 3-8**.

Table 3-10: General Aviation Operations Forecast

Year	Itinerant (IT)		Local (LOC)		Total GA Operations
	Operations	% Total	Operations	% Total	
2021	3,452	27.03%	9,320	72.97%	12,772
2026	4,289	27.03%	11,580	72.97%	15,869
2031	4,417	27.03%	11,923	72.97%	16,340
2036	4,548	27.03%	12,277	72.97%	16,825

Table 3-10: General Aviation Operations Forecast					
Year	Itinerant (IT)		Local (LOC)		Total GA Operations
	Operations	% Total	Operations	% Total	
2041	4,684	27.03%	12,646	72.97%	17,330
CAAGR 2021-2041	1.54%		1.54%		1.54%

Sources: Base year 2021 general aviation aircraft operations derived from 2021 AEX ATADS combined total of itinerant and local operational counts.

Forecast of Active General Aviation and Air Taxi Hours Flown 0.70 CAAGR derived from Aerospace Forecast Fiscal Years 2021-2041.

2026 through 2041 Single engine growth rate reflects a reported average of 2,640 annual flight training operations added to CAGR of 0.7 percent.

Compiled by Michael Baker International, Inc., May 2022.

Figure 3-8: General Aviation Operations Forecast (2021-2041)



Sources: Base year 2021 general aviation aircraft operations derived from 2021 AEX ATADS combined total of itinerant and local operational counts. Forecast of Active General Aviation and Air Taxi Hours Flown 0.70 CAAGR derived from Aerospace Forecast Fiscal Years 2021-2041.

Compiled by Michael Baker International, Inc., March 2022.

As shown in **Table 3-11** and **Figure 3-9**, the general aviation operations by aircraft type forecast was determined by using the same FAA forecast for Active General Aviation and Air Taxi Hours Flown.

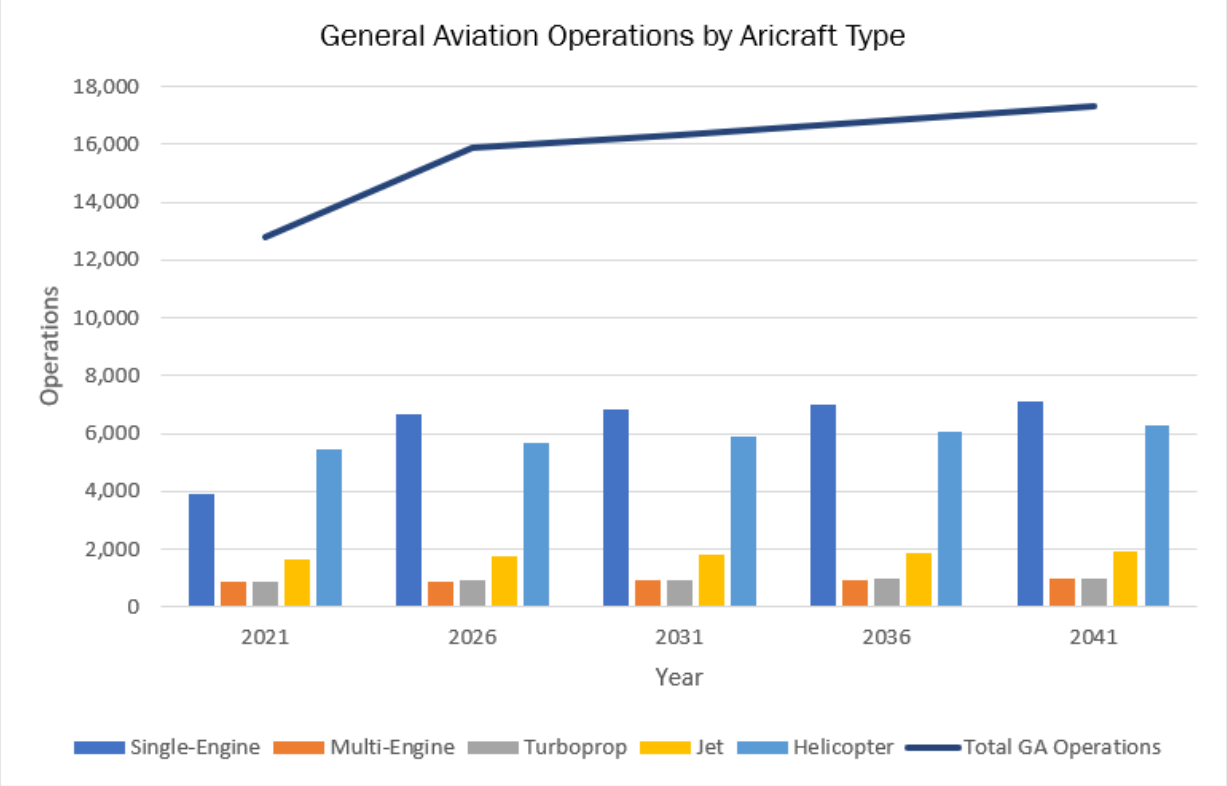
Table 3-11: 2021-2041 General Aviation Operations by Aircraft Type Forecast						
Year	Single-Engine Piston (SEP)	Multi-Engine Piston (MEP)	Turboprop	Jet	Helicopter	Total GA Operations
2021	3,906	850	873	1,672	5,475	12,772
2026	6,685	880	904	1,731	5,669	15,869
2031	6,828	912	936	1,793	5,871	16,340
2036	6,977	944	969	1,856	6,079	16,825
2041	7,131	978	1,004	1,922	6,295	17,330
CAAGR 2021-2041	3,06%	0.70%	0.70%	0.70%	0.70%	1.54%

Sources: 2021-2041 FAA Aerospace Forecast of Active General Aviation and Air Taxi Hours Flown.

2026 through 2041 Single engine growth rate reflects a reported average of 2,640 annual flight training operations added to CAGR 0.7 percent.

Compiled by Michael Baker International, Inc., May 2022.

Figure 3-9: 2021-2041 General Aviation Operations by Aircraft Type



Sources: 2021-2041 FAA Aerospace Forecast of Active General Aviation and Air Taxi Hours Flown

Compiled by Michael Baker International, Inc., May 2022.

3.6 Based General Aviation Aircraft Forecast

A review of the FAA's TAF AEX 2021 through 2041 forecast period reveals a projected CAAGR of 1.57 for the annualized growth of locally-based aircraft. Similarly, the state's 2015 LASP Technical Report identified and selected the same CAAGR of 1.57 as part of its preferred "Top-Down Methodology" for state-wide annualized growth of based aircraft over a 32-year period (2011-2043). Accordingly for the purpose of this aviation activity forecast, a CAAGR of 1.57 was selected for the projection of locally-based aircraft at AEX over the 20-year forecast period as shown in **Table 3-12** and **Figure 3-10.**

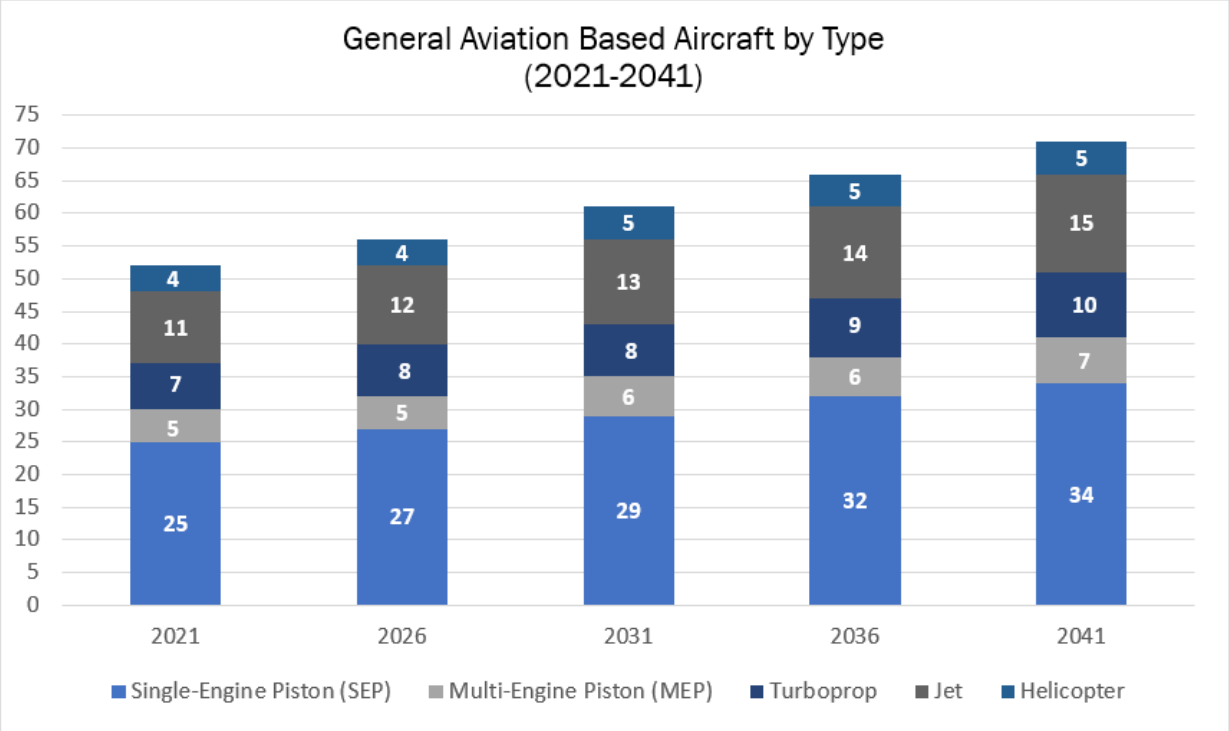
Table 3-12: 2021-2041 General Aviation Based Aircraft by Type Forecast

Year	Single-Engine Piston (SEP)	Multi-Engine Piston (MEP)	Turboprop	Jet	Helicopter	Total GA Based Aircraft
2021	25	5	7	11	4	52
2026	27	5	8	12	4	56
2031	29	6	8	13	5	61
2036	32	6	9	14	5	66
2041	34	7	10	15	5	71
CAAGR 2021-2041	1.57%	1.57%	1.57%	1.57%	1.57%	1.57%

Source: AEX Airport Management May 2022.
Compiled by Michael Baker International, Inc., May 2022

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Figure 3-10: AEX General Aviation Based Aircraft by Type (2021-2041)



Source: AEX Airport Management May 2022.
Compiled by Michael Baker International, Inc., May 2022

3.7 Combined Aircraft Operations Forecasts

Table 3-13 lists and **Figure 3-11** denotes the combined projections of future aircraft operations for all operational segments.

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Table 3-13: 2021-2041 Combined Local and Itinerant Operations Forecast											
Year	Itinerant (IT)						Local (LOC)				Total Operations
	Military-Non-Scheduled CFR Part 121 Air Carrier	Scheduled CFR Part 121 Regional Carrier	Military	General Aviation	Total	Percent	Military	General Aviation	Total	Percent	
2021	2,366	5,918	2,127	3,452	13,863	50.25%	4,404	9,320	13,724	49.75%	27,587
2026	2,020	4,494	3,543	4,289	14,346	44.97%	5,978	11,580	17,558	55.03%	31,904
2031	2,020	5,012	3,543	4,417	14,992	46.47%	5,978	11,293	17,271	53.53%	32,263
2036	2,020	5,586	3,543	4,548	15,697	46.23%	5,978	12,277	18,255	53.77%	33,952
2041	2,020	6,228	3,543	4,684	16,475	46.94%	5,978	12,646	18,624	53.06%	35,099
CAAGR 2021-2041	0.00%	0.26%	0.00%	1.54%	0.87%		0.00%	1.54%	1.54%		1.21%

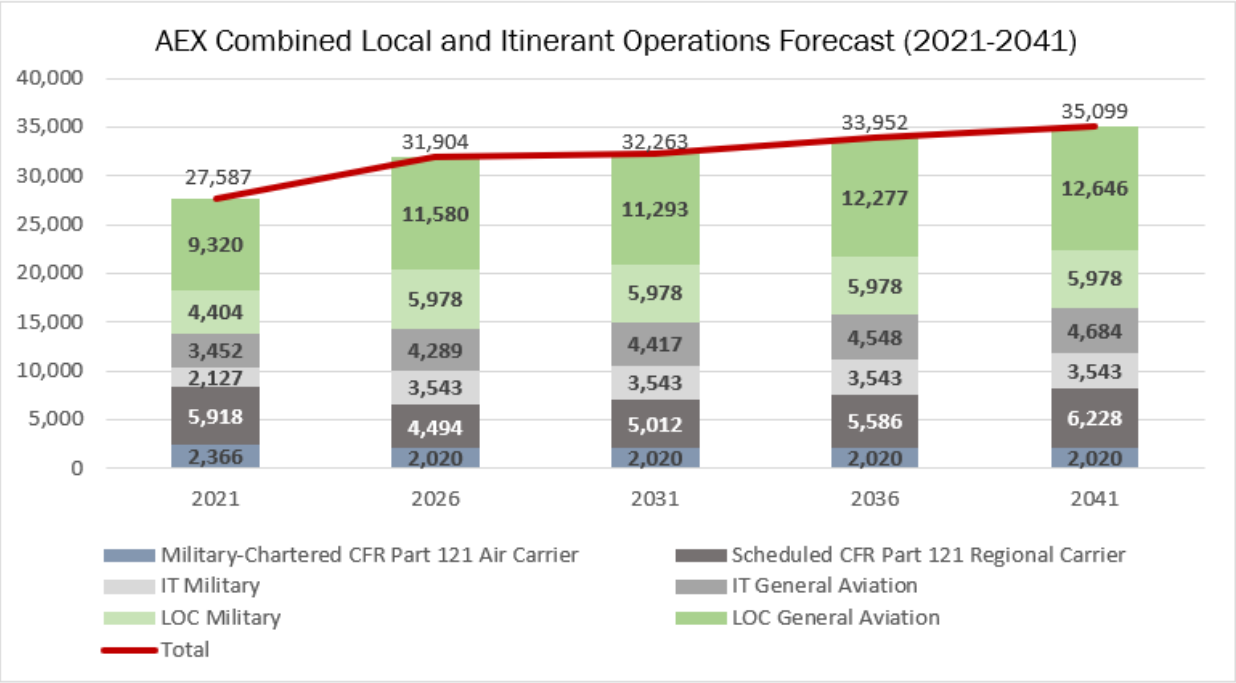
Source: Michael Baker International, Inc., May 2022.

Military-Non-scheduled CFR Part 121 Air Carrier and traditional military operations held constant based on 2021 Forecast Base Year.

2021 Itinerant vs Local operational percentile split held constant throughout 20-year forecast period.

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Figure 3-11: AEX Combined Local and Itinerant Operations Forecast



Source: Michael Baker International, Inc., May 2022.

Military-Non-scheduled CFR Part 121 Air Carrier and traditional military operations held constant based on 2021 Forecast Base Year.

2021 Itinerant vs Local operational percentile split held constant throughout 20-year forecast period.

Compound Average Annual Growth Rate (CAGR) held constant throughout 20-year forecast period.

3.8 Instrument Operations Forecast

As reported by FAA's ATADS for AEX for the 10-calendar year period 2011 through 2021, aircraft operating at AEX under Instrument Flight Rules (IFR) represented 52.80 percent of all aircraft operations. During the 20-year forecast period, it is assumed that the relative share, or percentile split between IFR and Visual Flight Rules (VFR) aircraft operations conducted will remain relatively constant. Therefore, it was assumed, for forecasting purposes, the relative spilt between IFR and VFR aircraft operations at AEX would be held constant throughout the 20-year forecast period as listed in **Table 3-14** and shown in **Figure 3-12**.

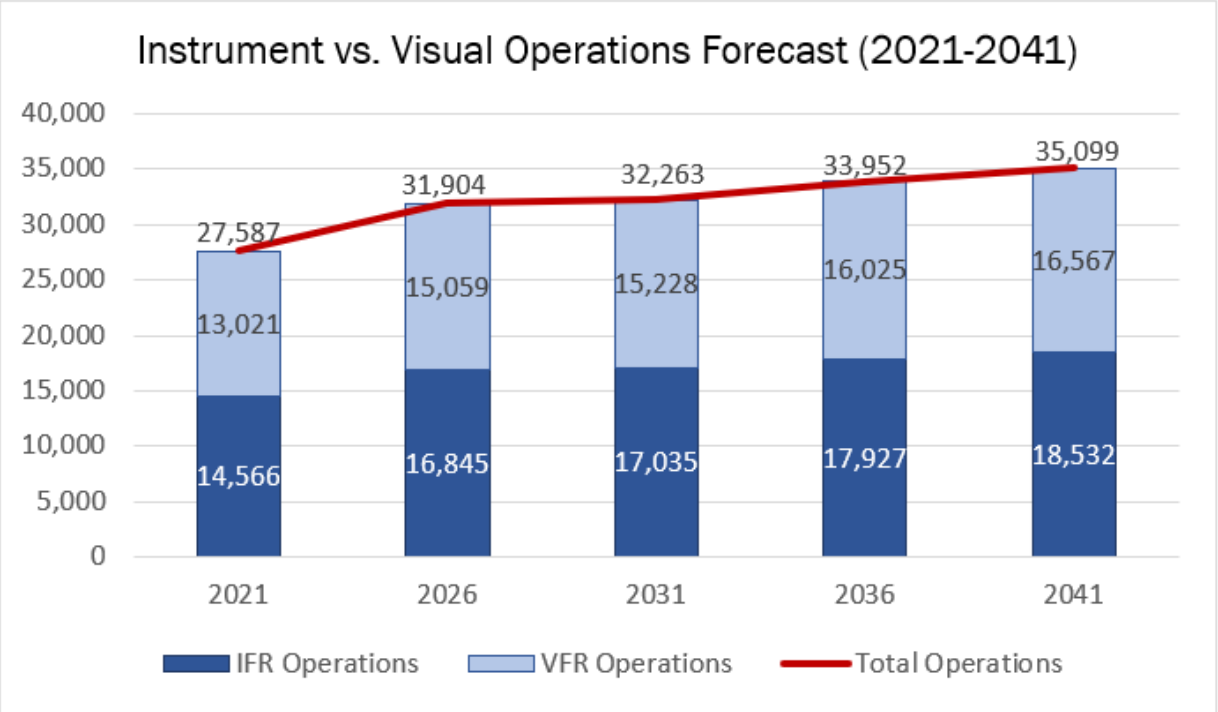
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Table 3-14: 2021-2041 Instrument vs. Visual Operations Forecast					
Year	Total Operations	Instrument (IFR)		Visual (VFR)	
		Operations	% Total Operations	Operations	% Total Operations
2021	27,587	14,566	52.80%	13,021	47.20%
2026	31,904	16,845	52.80%	15,059	47.20%
2031	32,263	17,035	52.80%	15,228	47.20%
2036	33,952	17,927	52.80%	16,025	47.20%
2041	35,099	18,532	52.80%	16,567	47.20%
CAAGR 2021-2041	1.21%	1.21%		1.21%	

Source: CY 2011 through 2021 FAA AEX ATADS and Michael Baker International, Inc., May 2022.

Note: CY 2011 through 2021 FAA AEX ATADS used to derive 10-year average Instrument vs Visual operational percentile split that was held constant through 20-year forecast period.

Figure 3-12: Instrument vs. Visual Operations Forecast



Sources: CY 2011 through 2021 FAA AEX ATADS and Michael Baker International, Inc., 2022.

Note: CY 2011 through 2021 FAA AEX ATADS used to derive 10-year average Instrument vs. Visual operational percentile split that was held constant through 20-year forecast period.

3.9 Peaking Forecasts

This section includes the peaking forecasts for all aircraft operations (takeoffs and landings) as recorded by the AEX Airport Traffic Control Tower (ATCT) and as reported by the FAA's ATADS for the 2021 12-month calendar year.

Peaking forecasts are conducted so that airports can plan for times when the highest concentration of activity occurs. Aircraft operational peaking considerations are typically used for the determination of passenger terminal and related automobile parking planning considerations and will be considered as part of the Airport Master Plan's identification of facility requirements. **Table 3-15** presents the peak activity forecasts for AEX for each component.

- **Peak Month (PM)** – The peak activity by month occurred in March having 3,280 aircraft operations that represented 11.8 percent of the calendar year's activity.
- **Average Day Peak Month (ADPM)** – The Average Day of the Peak Month (March) was calculated to be approximately 106 operations (3,280/31).
- **Average Peak Day / Peak Hour (ADPH)** – The ADPH at AEX can include a combination of touch-and-go training operations and itinerant activity and was estimated at the assumed industry average rate of 15 percent of the ADPM. The IFR and VFR peak hours were calculated based on the percentages previously shown in **Table 3-14**.

Table 3-15: Aircraft Operation Peaking Forecasts

Year	PM	ADPM	ADPH	IFR Peak Hour	VFR Peak Hour
2021	3,280	106	16	8	8
2026	3.355	111	17	9	8
2031	3.374	116	17	9	8
2036	3.391	119	18	10	8
2041	3.403	127	19	10	9
CAAGR 2021-2041	0.18%	0.91%	0.86%	9.50%	0.59%

Source: 2021 Peaking characteristics derived from 2021 AEX ATADS.
CAAGR – Compound Average Annual Growth Rate
Compiled by Michael Baker International, Inc., May 2022.

3.10 Forecast Summary

According to the FAA's June 2008 Review and Approval of Aviation Forecasts guidance, total passenger enplanements, operations, and based aircraft forecasts are considered consistent with the TAF if they differ by less than 10 percent in the five-year forecast period and 15 percent in the 10-year forecast period.

It should be noted that because of the unique nature of non-scheduled CFR Part 121 air carrier activity and lack of consistent reporting as part of the DOT's TranStat BTS T-100 Domestic Segment Database reporting system, the forecast of passenger enplanements at AEX was presented in two scenarios: 1) enplanement levels solely associated with regional air carrier activity, and 2) a static average annual passenger enplanement level for non-scheduled air carrier activity supporting the military's personnel transport needs.

As shown in **Table 3-16**, the regional air carrier passenger enplanements within the first 10-year forecast period exceeded the allowable 10-percent differential but are within the

15 percent differential within the remaining 10-year forecast period. The total number of aircraft operations within the first 10-year period also slightly exceeds the allowable 10 percent differential and exceeds the 15 percent differential within the remaining 10-year forecast period. The forecast of locally-based aircraft within the first and second 10-year forecast all were within the allowable 10 percent and 15 percent differential limits respectively.

Table 3-16: FAA 2021 TAF Comparison

Item	2021	2026	2031	2036	2041	CAAGR 2021-2041
Scheduled Regional Air Carrier and Non-Schedule Air Carrier Enplanements						
Master Plan	139,693	151,258	164,196	178,671	194,865	1.68%
March 2022 TAF	89,473	124,292	130,173	135,406	140,042	2.27%
Difference	56%	22%	26%	32%	39%	
Operations						
Master Plan	27,587	31,904	32,263	33,952	35,099	1.21%
March 2022 TAF	27,867	26,214	26,127	26,281	26,413	-0.27%
Difference	-1%	22%	23%	29%	33%	
Based Aircraft						
Master Plan	52	56	61	66	71	1.57%
March 2022 TAF	52	56	61	66	71	1.57%
Difference	0.00%	0.00%	0.00%	0.00%	0.00%	

Source:

FAA 2021 AEX TAF and Michael Baker International, May 2022

Note: Passenger enplanement totals reflect combined CFR Part 121 scheduled regional airline and larger non-scheduled airline activity

Compiled by Michael Baker International, Inc., May 2022.

3.11 Identification and Forecast of AEX Critical Aircraft or Critical Design Aircraft

Per Advisory Circular 150/5000-17, *Critical Aircraft and Regular Use Determination,* the appropriate airport design standards for a specific runway, taxiway, taxilane, apron, or other facility at AEX, a "Critical Aircraft", "Design Aircraft", or "Critical Design Aircraft". This is typically accomplished through the use of multiple- source data reporting aircraft operational by (i.e., Aircraft Approach Category (AAC) designations A through E that are based upon aircraft approach speeds, physical dimensions, Airplane Design Group (ADG) wingspan width or tail height, and/or Taxiway Design Group (TDG) pavement edge fillet design designations 1-6 that are based upon aircraft-specific wheel base width and main gear distance from the

cockpit) for the previous 12-month period. The Critical Design Aircraft represents a specific aircraft make and model, or a "composite" or "family" of several aircraft having similar characteristics that currently or are anticipated to make regular use of the airport. Similar characteristics refers to the practice of grouping aircraft by comparable operational performance (i.e., AAC, ADG, and/or TDG). Regular use is also typically considered to represent 500 annual operations or more within a 12-month calendar period, including both itinerant and local operations, but excluding local touch-and-go operations.

This is to recognize that it is sometimes necessary for airfield planning and development to group aircraft with similar characteristics together instead of requiring a single aircraft type to exceed the regular use threshold alone. For example, aircraft with similar wingspans and/or approach speeds may be grouped to determine the most demanding AAC and/or ADG, respectively. Aircraft with similar runway length requirements can also be grouped to determine the future runway length at an airport.

The specific rules and guidelines for determining the applicable Critical Design Aircraft is contained in the current version of AC 150/5000-17. The AC defines the term Critical Aircraft and provides guidance on the use of Critical Design Aircraft in facility planning and design studies, and related FAA decision making, for federally obligated airports. Specifically, this AC establishes a common, uniform definition of Critical Design Aircraft for all deliberations of the FAA Office of Airports, inclusive of planning and environmental, design and engineering, and financial decision-making regarding airport development. The Critical Design Aircraft determination is a key consideration in FAA decision making on project justification.

According to FAA Order 5090.5, *Formulation of the NPIAS and Airport Capital Improvement Program (ACIP)*, the Critical Aircraft is used to identify the appropriate Airport Reference Code for airport design criteria (such as dimensional standards and appropriate pavement strength) and is contained within FAA AC 150/5300-13B, *Airport Design*.

Per AC 150/5000-17, aircraft operations must be counted with enough detail to determine the most demanding aircraft or grouping of aircraft with similar characteristics that regularly use the airport. Due to the unique nature of DOD military activities and their traditional and anticipated future use of large non-scheduled CFR Part 121 civilian air carrier aircraft, the aircraft operational counts included the 21-year historical period using the FAA's TFMSC. This FAA-published data provided information regarding aircraft operational traffic counts to and from AEX by AAC, ADG and TDG designations as captured by the FAA's enroute computers when pilots operate under filed Flight Plans to and from every landing facility, both in the US and in nearby TFMSC-report participating countries.

As part of the identification of AEX's current and/or forecast of anticipated future Critical Design Aircraft, the TFMSC data was reviewed and utilized including the following meaningful information and data:

- Date of Operation (January 2001 through December 2021)
- Type of Flight (Domestic, International)
- User Class (Air Carrier, Air Taxi, General Aviation, Military)
- Weight Class (Small, Medium, Large equipment)
- Physical Class (Piston, Turbine, or Jet)

- Aircraft Type (Make, Model),
- Aircraft Approach Category (A through D),
- Airplane Design Group (I through VI),
- Taxiway Design Group (1A through 6), and
- Number and Type of Aircraft Operation (Arrival or Departure).

To supplement the collection and to fortify the assessment of the type and mix of aircraft operational activity at AEX, the FAA's ATADS was also referenced to document AEX ATCT reported annual total of itinerant and local aircraft operations conducted to, from or at AEX under IFR or VFR conditions.

The ATADS provided operational data for the following users of the airport:

- Air Carriers (representing non-scheduled large mainline airliner aircraft operations conducted under CFR Part 121)
- Air Taxis (representing scheduled commercial regional air carrier operations conducted under CFR Part 121 or non-scheduled on-demand air service aircraft operations conducted under CFR Part 135)
- General Aviation (representing aircraft operations conducted in CFR Part 91 not for hire business and recreation flights), and
- Military (representing flight of operation conducted by the US Department of Defense (DOD) using military aircraft that include bombers, fighters, transports, trainer aircraft, and reconnaissance aircraft)

Beyond any comparison to any other air carrier airport within the state or the region as a whole, it is important to note that AEX accommodates a wide variety of unique aviation activities that include non-scheduled itinerant (i.e., non-locally-based or visiting) aircraft operations by large civilian air carrier and/or smaller regional air carrier aircraft while providing air lift services to: the US Military, Justice Prisoner and Alien Transportation System, or US Customs and Border Patrol's Immigration and Customs Enforcement. The number of aircraft operations generated by each of these operators has historically varied in magnitude and periodic intensity each year reflecting the unique nature or their respective operational and/or aeronautical role.

It is important to note that the TFMSC data is limited to the reporting of recorded data related to aircraft arriving to or departing from AEX while operating under filed-IFR Flight Plans (regardless of meteorological conditions). Therefore, the TFMSC does not report all other non-flight plan-filed aircraft operations to or from the airport, or those occurring within the Airport Traffic Pattern. When comparing annual totals of aircraft operations as reported by TFMSC to those reported by the ATADS that reports all itinerant and local civil and military aircraft operations conducted as filed IFR or non-filed VFR flights, the TFMSC total aircraft counts will be far lower.

When developing forecasts of future military-related aircraft activity at AEX, careful attention was given to the need to segregating and quantifying each flight as being generated by civilian or military aircraft and by the nature and operational role if in supporting the military's mission and function at AEX in support of the military's (AEX-specific) troop deployment and readiness training needs.

Because AEX does not operate as one of the nation's 21 Joint-Use Airports, federal law does not allow the FAA to consider forecasts of future aviation activity levels that would be part and parcel of airport facility improvement considerations that, by nature of the project or improvement, may potentially solely benefit another federal agency (e.g., the DOD). However, for airport master planning purposes, the airport master plan forecast of aviation activity can and should include forecasts of military-related aircraft activity if such operations as conducted by mainline civilian air carrier and/or regional airline aircraft when conducted under non-scheduled provisions under applicable FAA regulations in 14 CFR Parts 121.

Therefore, non-scheduled civil aircraft operations under military or other federal government agency contracts included within the historical 21-year period as reported by TFMSC were considered eligible for consideration and quantification as part of the forecast of aviation activity as well as the identification of and planning for future airport facility and/or capacity-related improvements. It should be noted that the number of reported non-scheduled civilian aircraft operations conducted solely in support of military operations varies considerably each year.

Based upon these average annual aircraft operational totals for the 21-year historical period, the Critical Design Aircraft was identified as having AAC "D" and ADG "IV" (D-IV) operational and dimensional characteristics as shown in **Tables 3-17 and 3-18**.

The Boeing 767-400 aircraft was selected to represent the AEX Critical Design Aircraft that will be used as part of the update of the Airport Master Plan as part of the assessment of existing, and determination of future needed airfield facilities at AEX and is referenced in **Table 3-19**. This characterization and designation are anticipated to remain unchanged throughout the 20-year forecast period.

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Table 3-17: Identification of Critical Design Aircraft (2001-2021)												
Years	Class	Airplane Approach Category					Airplane Design Group					
		A	B	C	D	Total	I	II	III	IV	V	Total
2001-2021	Scheduled Regional Airline	2	15,540	87,810				99,836	3,516			
2001-2021	Non-Scheduled Airline	74	36,579	24,385	17,203		126	36,451	36,324	3,875		
2001-2021	Military	894	7,406	14,498	3,707	1,913		1,400	65	78,241		
2001-2021	Total	970	59,525	26,693	20,910	1,913	16,815	110	429	10,218	64	782

Source: FAA's Traffic Flow Management System Counts (TFMSC), CY 2001 through 2021
Compiled by: Michael Baker International, Inc., May 2022.
Note 1: TFMSC-reported totals for AAC A and B and ADG I and II aircraft operations were limited to IFR-filed activity.
Note 2: TFMSC-reported aircraft operational counts rounded to whole numbers.

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Table 3-18: Identification of Critical Design Aircraft (Average Year)												
Years	Class	Airplane Approach Category					Airplane Design Group					
		A	B	C	D	Total	I	II	III	IV	V	Total
Average Year	Scheduled Regional Airline	<1	740	4,181	0	0	4,922	0	4,754	167	0	0
Average Year	Non-Scheduled Airline	4	1,742	1,161	**819**	0	3,726	6	1,736	1,730	185	67
Average Year	Military	43	353	690	177	91	1,353	801	5	20	**487**	3
Average Year	Total	46	2,835	1271	996	91	10,001	807	6,495	1918	67	70

Source: FAA's Traffic Flow Management System Counts (TFMSC), CY 2001 through 2021
Compiled by: Michael Baker International, Inc., May 2022.
Note 1: TFMSC-reported totals for AAC A and B and ADG I and II aircraft operations were limited to IFR-filed activity.
Note 2: TFMSC-reported aircraft operational counts rounded to whole numbers.

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Table 3-19: Critical Design Aircraft Forecast					
	2021	2026	2031	2036	2041
Aircraft Approach Category (AAC)	D	D	D	D	D
Airplane Design Group (ADG)	IV	IV	IV	IV	IV
Taxiway Design Group (TDG)	5	5	5	5	5
Existing Critical Design Aircraft	Boeing 767-400 Series				
Future Critical Design Aircraft	Boeing 767-400 Series				

Source: Michael Baker International, Inc., May 2022.

3.12 Recognition and Consideration of Sustained Operations by Larger Aircraft in Support of DOD Military Role and Mission at AEX

Although a reasonable and prudent methodology was used to identify and declare a representative civilian make and model of AEX's Critical Design Aircraft, it should be carefully noted that the nature of the DOD's military readiness training and rotational cycles dictates a sustained, but less frequent use of the world's largest fleet of civilian and military aircraft at the airport.

This is clearly demonstrated in **Table 3-20** when considering the wide variety, type, and sizes of civilian and military aircraft that have, and will continue to operate at the airport throughout the foreseeable future. It is however, fully recognized that although the DOD's frequency of use of older aircraft has and will diminish over time, the military will continue to replace these older legacy aircraft with similarly-sized makes and models as needed throughout the 20-year forecast period.

Table 3-20: Listing of Larger DOD Aircraft at AEX	
Aircraft	Operations (2001-2021)
Airplane Design Group IV (Wingspans ranging from 45 to 59.9 feet)	
Airbus A300 B4-600	2
Airbus A310	4
Airbus A400M Atlas	3
B762 - Boeing 767-200/300/400 Series	1,206
Boeing (Douglas) DC 10-10/30/40	394
Boeing (Douglas) DC 8-70	2
Boeing (Douglas) MD 11	240
Boeing 707-300	16

Table 3-20: Listing of Larger DOD Aircraft at AEX	
Aircraft	**Operations (2001-2021)**
Boeing 757-200/200 Series	1,636
Boeing C17 Globemaster 3	2,092
Boeing E-3F Sentry	8
Boeing E-6 Mercury	22
Boeing Startlifter	162
Boeing/KC-135 Stratotanker	270
Douglas KC-10	12
Lockheed 130 Hercules	7,640
Lockheed L-100 Hercules	8
Lockheed L-1011 Tristar	362
McDonnell-Douglas MD 10	8
Rockwell B-1 Lancer	2
21-Year Total/Average Year	**14,089/671**
Airplane Design Group V (Wingspans ranging from 60 to 65.9 feet)	
Airbus A330-200/300/900 Series	252
A350 - Airbus 350 / -900 Series	6
B52 - Boeing B-52 Stratofortress	2
B742 - Boeing 747-200/300/400 Series	786
B772 - Boeing 777-200/300Er Series	340
B788 - Boeing 787-800/-9 Dreamliner	20
EC25 - Boeing VCC-25	2
21-Year Total/Average Year	**1,408/67**
Airplane Design Group VI (Wingspans ranging from 66 to 79.9 feet)	
Antonov AN-124 Ruslan	66
CFM Super Galaxy	782
21-Year Total/Average Year	**848/40**

Source: FAA's Traffic Flow Management System Counts (TFMSC), CY 2001 through 2021
Compiled by: Michael Baker International, May 2022



Chapter 4
Airport Capacity Assessment and Facility Requirements

FLYAEX
ALEXANDRIA INTERNATIONAL AIRPORT

4 AIRPORT CAPACITY ASSESSMENT AND FACILITY REQUIREMENTS

4.1 Introduction

The purpose of the airport capacity assessment and identification of facility needs is to evaluate the ability of the runway airfield system and supporting landside facilities to accommodate existing and future projected aviation activity at Alexandria International Airport (AEX).

The airport capacity assessment serves to identify annual service volume and hourly capacity, as well as aircraft operational delay for future airport operations planning. Airfield design standards were also reviewed to identify current design standards and future needs. Facility requirements for current and future aviation demand were evaluated.

The aviation forecasting element of the Airport Master Plan Update projects commercial, general aviation, and military activity over a 20-year planning period. Following suggested Airport Master Plan activity forecast methodologies, a 2021 "Base Year" reflects the starting point of a 20-year (year 2022 through 2041) forecast period. The activity forecast is typically subdivided into a five-year short-term (2022 through 2026) forecast period, a five-year intermediate term (2027 through 2031) forecast period, and a ten-year long-term (2032-2041) forecast period. This 20-year forecast of aviation activity will be subsequently referenced and used to develop the Airport Master Plan's recommendations for future airport facility improvements and to formulate the AEX Airport Capital Improvement Program (ACIP).

4.2 Measure of Annual and Hourly Runway Throughput Capacity

FAA Advisory Circular (AC) 150/5060-5, *Airport Capacity and Delay*, is just one of many tools that airport planners use to develop reasonable estimates of available airfield capacity. Airfield capacity is measured and reported as a calculated estimate of aircraft operations that occur or are projected to occur within an established measurable period (e.g., hourly, daily, and yearly). When aircraft operational demand exceeds the calculated runway throughput capacity of a single runway, or a system of interconnected runways, aircraft operational delay is incurred. As aircraft operational demand increases over time, without commensurate increases in available capacity, unacceptable levels of aircraft operational delay may occur.

The development and use of this AC and it's suggested methodologies is best suited for airfields having one or more runways supported by full-length parallel taxiways and multiple exit taxiway connectors. When considering the current and projected future levels of aircraft operations over a 12-month period, and the potential to accommodate a wide range of aircraft, the AC suggests that airports having a single runway may, inherently, offer aircraft operational throughput capacities ranging from 230,000 to 240,000 annual aircraft operations without the incurrence of unacceptable levels of average aircraft operational delay. These capacity values are based upon varying relative percentile levels of operations

generated by large and heavy aircraft. These stated theoretical throughput values, however, are based upon the following current or planned future conditions:

- Percentage of arriving aircraft equals the percentage of departing aircraft.
- Touch-and-Go operations are less than 50 percent of all operations.
- A full-length parallel taxiway having ample and optimally-place runway entrance/exit taxiways.
- No airspace limitations
- Available Instrument Landing System
- Available Airport Traffic Control

As AEX's runway system fully offers and has the associated benefit of all of these attributes, Figure 2-1, *Capacity and ASV for Long Range Planning* of the AC was referenced for comparative master planning purposes.

The aircraft fleet mix for AEX during the Airport Master Plan's Base Year 2021 was determined using aircraft information provided by the FAA's Traffic Flow Management System Counts (TFMSC) data base and the Bureau of Transportation Statistics (BTS) information presented in Chapter 3 of this technical report. For purposes of this airfield capacity analysis, the aircraft mix discussed in this section is the relative percentage of operations conducted by each of four classes of aircraft shown in **Table 4-1**, based upon maximum certified takeoff weight and wake turbulence classification. These classes should not be confused with the aircraft approach categories referenced later in this chapter.

Table 4-1: Aircraft Classifications

Aircraft Class	Maximum Certified Takeoff Weight (pounds)	Number Engines	Wake Turbulence Classification
A	12,500 or less	Single	Small
B		Multi	
C	12,500 - 300,000	Multi	Large
D	Over 300,000	Multi	Heavy

Source: FAA AC 150/5060-5, Airport Capacity and Delay.

The FAA's handbook methodology uses the term "Mix Index" to describe an airport's fleet mix. The FAA defines the Mix Index as the percentage of Class C operations plus three times the percentage of Class D operations. By applying this calculation to the fleet mix percentages for the airport, a Mix Index of 37.0 percent is obtained using the following equation:

Class C Operations (34.0%) + (3 * Class D Operations (1%)) = Mix Index (37.0%)

The Annual Service Volume (ASV) is a reasonable estimate of an airport's annual capacity. ASV considers differences in runway use, aircraft mix, weather conditions, and other factors that would be encountered over a year. Based upon the runway configuration and mix index for AEX, the ASV is determined to be 200,000 operations per year with an hourly capacity of 77 VFR operations per hour and 57 IFR operations per hour.

4.2.1 Aircraft Operational Delay

Aircraft operational delay is the difference in time between a constrained and an unconstrained aircraft operation. As the level of aircraft operations increase as a relative proportion of the calculated ASV value, aircraft operational delay increases. The level of aircraft operations at AEX for the year 2021 represented approximately 13.90 percent of the calculated ASV (27,718/200,000), thus indicating virtually no associated aircraft operational delay. At the end of the 20-year forecasting period (2041), this relative percentage will be approximately 16.60 percent (33,176/200,000), continuing to reflect little or no associated aircraft operational delay.

The aircraft operations forecast for AEX indicates that projected aircraft operations (33,176 operations annually in 2041) through the 20-year planning period are not expected to exceed the ASV (200,000 operations annually). When annual aircraft operations approach or exceed approximately 65 percent of ASV (i.e., approaching or exceeding 130,000 annual operations) planning considerations for increasing ASV capacity should be initiated such that additional airfield capacity is available when ASV is calculated to be 100 percent. Therefore, the capacity of the airfield system will not be exceeded, (and is not subject to current planning for future capacity improvements) and will be able to fully satisfy existing and projected future aircraft operational demand for the forecast period without induced adverse effects to aircraft operations and associated aircraft operational delay.

4.3 Runway Orientation and Wind Coverage

As previously discussed in Chapter 2, runway wind coverage for each of AEX's two runways as measured and reported for this update of the AEX Airport Master Plan, was calculated as the percentage of time crosswind components were below an acceptable velocity.

When a runway's orientation relative to prevailing winds provides less than 95 percent runway wind coverage for the aircraft which are forecast to use the airport on a regular basis, a crosswind runway is recommended. Accordingly, the runway wind coverage percentile for AEX was computed by individual runway and the combination of both runways on the basis of four different maximum allowable crosswind components affecting aircraft that range size from the smallest general aviation aircraft having a maximum crosswind component limitation of 10.5 knots, to the largest of commercial and/or military aircraft having a maximum crosswind component limit of 20 knots.

Utilizing historical 10-year surface observation data collected at and reported for weather station 747540 at Alexandria international Airport, for the period 2011 through 2020, runway wind coverage percentile assessments were calculated for All Weather-, Visual- and Instrument Meteorological Conditions (IMC). As shown in **Table 4-2**, the runway orientations at AEX, when assessed individually, or as a combined system of two runways, provides adequate wind coverage (i.e., greater than 95 percent) when considering the maximum allowable crosswind component Speeds of 10.5, 13, 16, and 20 knots.

Table 4-2: Runway Wind Coverage					
Meteorological Conditions	Runway Designation	Wind Coverage Percentage			
		Allowable Crosswind Component (Knots)			
		10.5	13	16	20
All Weather	14-32	97.40%	98.82%	99.73%	99.93%
	18-36	96.09%	98.07%	99.41%	99.85%
	Combined	99.26%	99.72%	99.92%	99.98%
Visual	14-32	97.59%	98.99%	99.83%	99.97%
	18-36	96.37%	98.27%	99.53%	99.91%
	Combined	99.40%	99.40%	99.96%	100.00%
Instrument	14-32	96.61%	98.14%	99.35%	99.78%
	18-36	94.73%	97.19%	98.91%	99.62%
	Combined	98.68%	98.68%	99.75%	99.92%

Source: FAA Airport Data Information Portal (ADIP) 06/18/2021, Station: 747540 Alexandria Intl Airport. Annual Period: 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020.

Based upon this analysis, each runway alone, or when considered as a system of two runways provide the minimum required wind coverage of 95 percent.

4.4 Protection of Navigable Airspace

4.4.1 CFR Part 77 Civil Airport Imaginary Surfaces

The England Authority has elected to establish the protection of navigable airspace to accommodate future development and implementation of published instrument approach procedures to all runway ends. Future development of instrument approach procedures to each runway end and instrument departures from each runway end are to be protected to the extent necessary to meet the standards contained in 14 CFR Part 77, *Safe, Efficient Use, and Preservation of the Navigable Airspace*.

As listed in **Table 4-3,** the airport is currently served by seven published Instrument Approach Procedures (IAPs) that vary by runway end and published approach cloud ceiling and visibility minimums. At such time that the approach minimums for all runway ends (except Runway 14) are improved (i.e., lowered), the current protection of navigable airspace is considered to be adequate. If, however, future precision instrument approach capabilities are required or desired, CFR Part 77 Precision Instrument Civil Airport Imaginary Surfaces must be established. These approach surfaces have variable upwardly rising slopes that would extend along the extended runway centerline 10,200 feet from the existing or future ends of Runways 18, 36, and 32.

Instrument Departure Surfaces must be considered. Other surfaces associated with electronic and visual NAVAIDs should also be considered, such as keeping Visual Glideslope Indicator (VGSI) surfaces clear of penetration by natural and/or man-made objects. The

approach surfaces defined in this paragraph are not the approach surfaces defined in CFR Part 77.

The existing AEX Obstacle Clearance Surfaces (OCS) established for each runway end were evaluated. The England Authority should continue to monitor and review all proposals for the erection of temporary or permanent objects in proximity to the airport as filed by proponents via the FAA's Form 7460-1 and Obstruction Evaluation/Airport Airspace Analysis (OE/AAA) notification process. Further, the England Authority should maintain its current pro-active role within this review process, with the goal of reducing or eliminating any potential penetrations to the various approach and departure surfaces to preserve the safe and efficient use of the airport.

Table 4-3: AEX Published Instrument Approach Procedures

IAP Name	Approach Type	Cloud Ceiling MSL (AGL)	Lowest Visibility	CFR Part 77 Approach Surface	150/530013B OCS Type
ILS OR LOC RWY 14	Precision Approach	346 (201)	½ Mile	Precision	Table 3-4 Surfaces 5/6
RNAV (GPS) RWY 14	Approach with Vertical Guidance	346 (261)	½ Mile	Non-Precision	Table 3-4 Surfaces 5/6
RNAV (GPS) RWY 18	Approach with Vertical Guidance	395 (311)	1-Mile	Non-Precision	Table 3-4 Surfaces 5/6
RNAV (GPS) RWY 32	Approach with Vertical Guidance	340 (251)	1-Mile	Non-Precision	Table 3-4 Surfaces 5/6
RNAV (GPS) RWY 36	Approach with Vertical Guidance	500 (413)	1-Mile	Non-Precision	Table 3-4 Surfaces 5/6
VOR/DME RWY 32	Non-Precision Approach	520 (431)	1-Mile	Non-Precision	Table 3-3 Surface 4
VOR RWY 14	Non-Precision Approach	520 (431)	1-Mile	Non-Precision	Table 3-3 Surface 4

Source: FAA Published Instrument Approach Procedures, SC4, 20 April 2023 to 18 May 2023

4.5 Runway Design Standards Analysis

Runway design standards are provided by FAA AC 150/5300-13B, *Airport Design* and FAA AC 150/5325-4B, *Runway Length Requirements for Airport Design*. As shown below, Runways 14-32 and 18-36 do not meet the current runway length requirements for the airport's critical aircraft.

4.5.1 Runway Length Requirements

4.5.1.1 FAA Runway Length Planning Guidance

Runway length requirements for AEX were evaluated in accordance with FAA AC 150/5325-4B, *Runway Length Requirements for Airport Design*. This AC provides guidelines for airport designers and planners to determine recommended runway lengths for new runways or extensions to existing runways. The FAA's mandatory use of this AC and its standards and guidelines are recommended strictly for use in the design of civil airport runway improvement projects receiving federal funding.

When planning for the required physical geometric design and layout of airfield pavements (i.e., runways and taxiways), aircraft operational aspects such as aircraft approach speeds and wingspan widths are considered. For runway length considerations, however, aircraft operational weights are used as part of the FAA's recommendations regarding runway lengths that would be required to fully accommodate the safe operation of aircraft during takeoff and landing operations.

The previous master plan evaluated the runway length requirements following FAA AC 150/5325-4B based on the critical aircraft. It established that the primary Runway 14-32 requires a length of 12,000 feet.

Following the five-step process outlined in the AC, this master plan update revalidates the runway length requirements for AEX.

Step 1: Identify the list of critical design airplanes that will make regular use of the runway:

An analysis of the current and future critical aircraft was prepared as part of the Forecasts of Aviation Activity contained in Chapter 3. It was established that the Boeing 767-400 aircraft would represent the existing and future Critical Design Aircraft for AEX.

Step 2: Identify the airplanes that will require the longest runway lengths at maximum certificated takeoff weight (MTOW):

The existing and future critical aircraft at AEX is the Boeing 767-400 aircraft with an MTOW of 450,000 pounds.

Step 3: Determine the method that will be used for establishing the recommended runway length:

Using Table 1-1 from AC 150/5325-4B: the Boeing 767-400 aircraft has an MTOW of over 60,000 pounds. Therefore, the individual large airplane approach is required to evaluate the runway length requirements. For this effort, the Boeing 767 Airplane Characteristics for Airport Planning Manual was used.

Steps 4 and 5 – Determine Recommended Runway Length and apply any necessary adjustments:

Within Chapter 4 of the AC, *Runway Lengths for Regional Jets and those Airplanes with a Maximum Certificated Takeoff Weight of More than 60,000 Pounds*, the FAA recommends runway lengths based upon the following:

- Critical design airplane's Airport Planning Manual (APM),

- The maximum certificated takeoff weight or takeoff operating weight for short-haul routes,
- Maximum certificated landing weight,
- Airport elevation above mean sea level,
- Effective runway gradient,
- and the mean daily maximum temperature of the hottest month at the airport.

Taking the FAA's "design approach," recommended runway lengths for this weight category of airplanes are based on performance curves developed by United States Federal Aviation Regulations (FAR) and Certification Specifications (CS).

The requirements identified in this section are based on AEX's mean daily maximum temperature of 93.5 degrees Fahrenheit (F) during the hottest month and above mean sea level elevation of 88.1 feet, and the Federal Aviation Administration / European Union Aviation Safety Agency Takeoff Runway Length Requirements for the Boeing 767-400 (Critical Aircraft).

In addition, for federally funded projects, "the airport designer must take into account the length of haul (range) that is flown by airplanes on a substantial use basis. The length of haul range will determine the operating takeoff weight for the design airplanes under evaluation"[30]. Considering that AEX is not only a commercial airport but also accommodates military operations from the US Army Intermediate Staging Base (ISB), and operations from the US Immigration and Customs Enforcement (ICE) facility, for this analysis 100 percent useful load factors were evaluated as depicted in **Figure 4-1**, **Figure 4-2,** and **Table 4-4**.

Table 4-4: Runway Length Requirements – Boeing 767-400ER

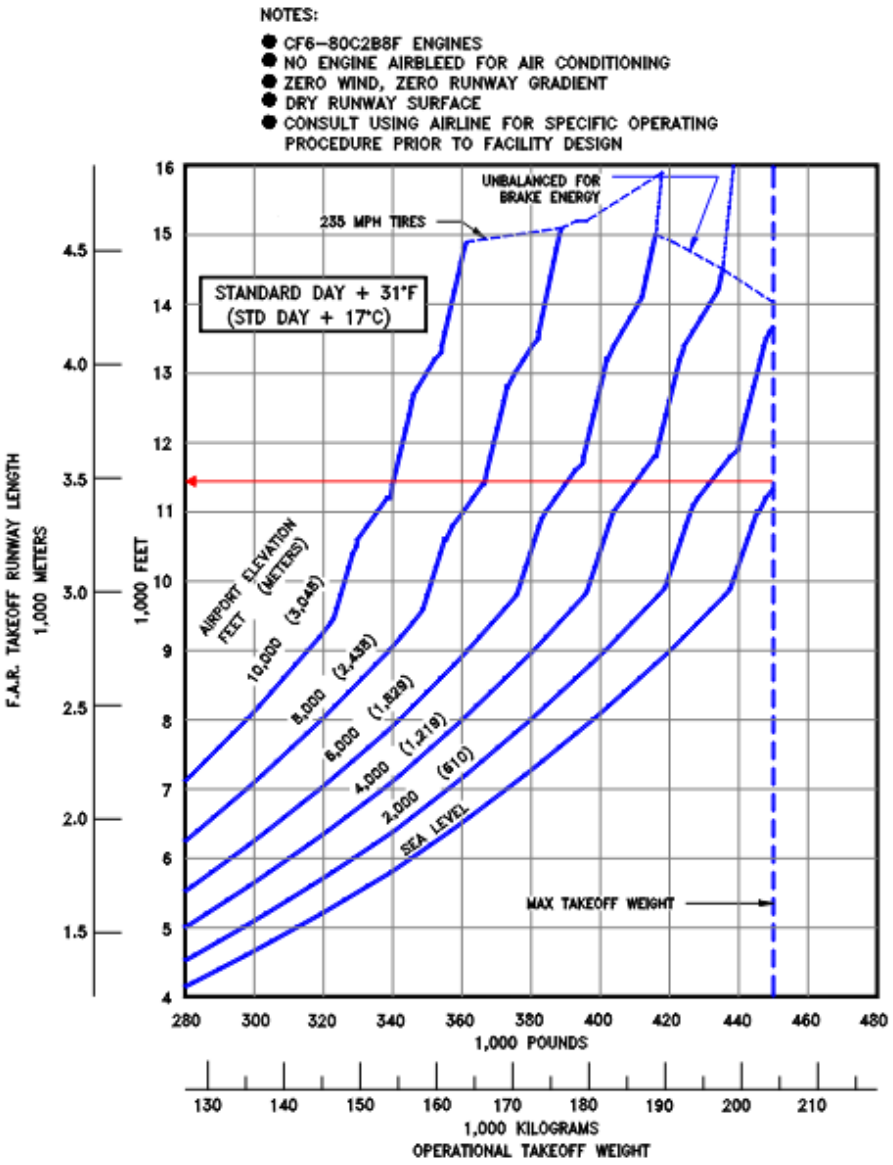
Aircraft	767-400ER (CF6-80C2B8F Engines)
Mean daily maximum temperature of hottest month	93.5°F
Airport Elevation	88.1 MSL
Maximum Design landing Weight	350,000 LBS
Maximum Design Takeoff Weight	450,000 LBS
Difference runway centerline elevations	4.3 FT
Takeoff Length for Elevation (dry pavement) (STD+31F)	11,440 FT
Adjusted Takeoff Length for effective runway gradients	11,483 FT
Takeoff length requirement	11,500 FT
Landing Runway Length Requirements Flaps 30 Wet Runway	7,150 FT
Landing Length Requirement	7,200 FT
Runway Length Requirement	11,500 FT

Source: Michael Baker international Calculations based on Boeing - 767 Airplane Characteristics for Airport Planning - D6-58328 July 2021

[30] FAA Advisory Circular 150/5325-4B, *Runway Length Requirements for Airport Design*

Figure 4-1:
FAA/EASA Takeoff Runway Length Boeing 767-400ER

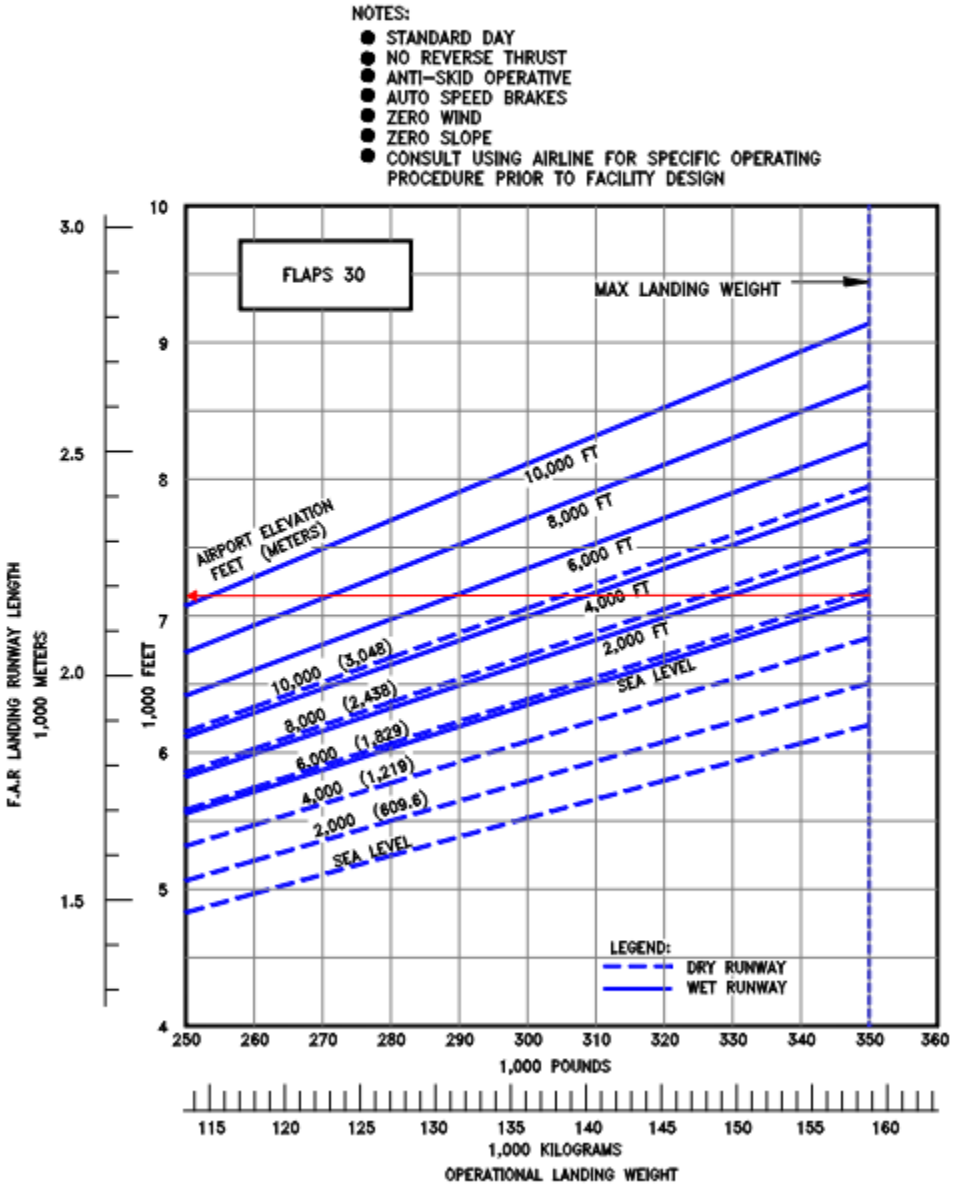
3.3.26 FAA/EASA Takeoff Runway Length Requirements - Standard Day + 31°F (STD + 17°C), Dry Runway Surface: Model 767-400ER (CF6-80C2B8F Engines)



Source: Boeing Airplane Characteristics for Airport Planning, 2021

Figure 4-2:
FAA/EASA Landing Runway Length Boeing 767-400ER

3.4.10 FAA/EASA Landing Runway Length Requirements – Flaps 30: Model 767-400ER



Source: Boeing Airplane Characteristics for Airport Planning, 2021

Based solely on the 767-400 ER Airplane Characteristics for Airport Planning document found on the Boeing website, Runway 14-32's currently available runway length of 9,352 feet does not satisfy the FAA's recommended minimum runway length needed to fully accommodate the fleet of individual large air carrier aircraft weighing 60,000 pounds or more.

Due to the nature of DOD and ICE activities occurring at AEX, other larger ADG V aircraft operations also occur at the airport. However, ADG V aircraft operations do not occur frequently enough to be considered "Regular use" as defined by the FAA. For this reason, the master plan also evaluates the runway length requirements for the Boeing 747-400 ER as the representative aircraft for ADG V aircraft operating at AEX to preserve the airport's capability to fulfill its military/governmental operational role in the future. The analysis is presented in **Figure 4-3, Figure 4-4,** and **Table 4-5.**

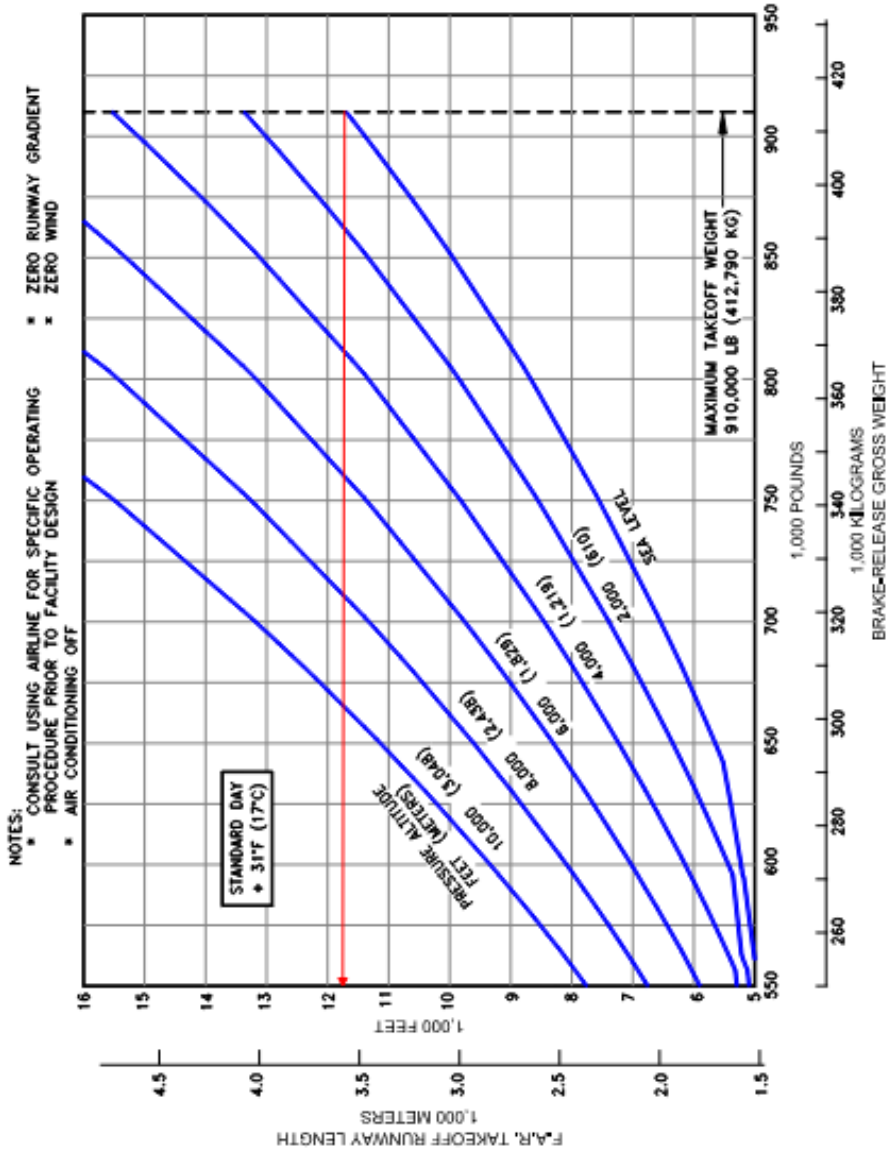
Table 4-5: Runway Length Requirements – Boeing 747-400 ER

Aircraft	747-400 ER (RB211-524H8)
Mean Daily Maximum Temperature of Hottest Month	93.5°F
Airport Elevation	88.1 MSL
Maximum Design Landing Weight	666,000 LBS
Maximum Design Takeoff Weight	910,000 LBS
Difference Between Runway Centerline Elevations	4.3 FT
Takeoff Length for Elevation (dry pavement) (STD+31°F)	11,780 FT
Adjusted Takeoff Length for Effective Runway Gradients	11,823 FT
Takeoff Length Requirement	11,900 FT
Landing Length Requirement (Flaps 30 Wet Runway)	8,428 FT
Landing Length Requirement	8,500 FT
Runway Length Requirement	11,900 FT

Source: Michael Baker International calculations are based on Boeing 747-400 Airplane Characteristics for Airport Planning - D6-58326, December 2002.

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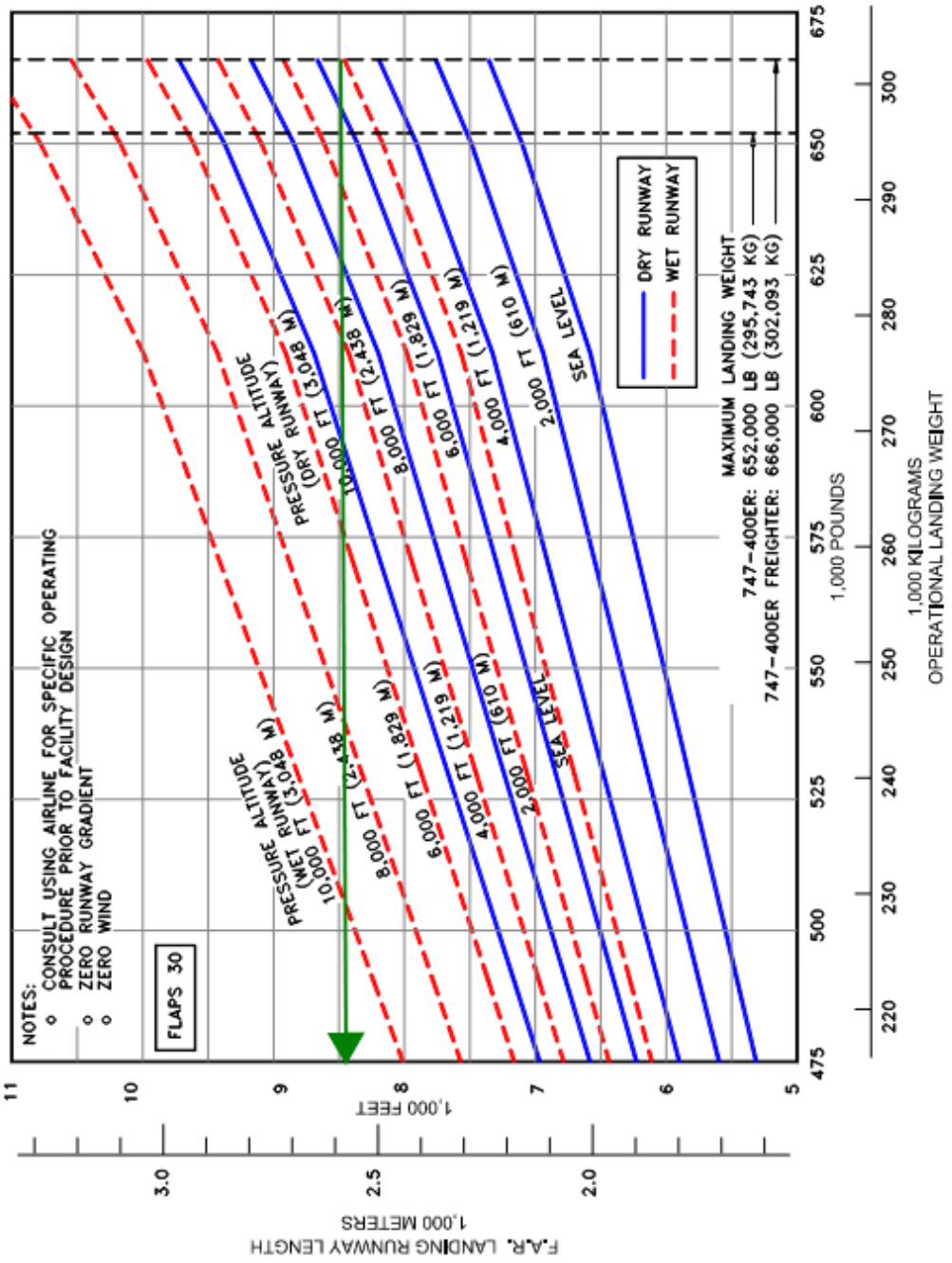
Figure 4-3:
FAA/EASA Takeoff Runway Length Boeing 747-400ER



3.3.20 F.A.R. TAKEOFF RUNWAY LENGTH REQUIREMENTS ▪
STANDARD DAY + 31°F (STD + 17°C)
MODEL 747-400ER FREIGHTER (RB211-524H8-T ENGINES)

Source: Michael Baker international calculations are based on Boeing 747-400 Airplane Characteristics for Airport Planning - D6-58326, December 2002.

Figure 4-4:
FAA/EASA Landing Runway Length Boeing 747-400ER



3.4.4 F.A.R. LANDING RUNWAY LENGTH REQUIREMENTS - FLAPS 30
MODEL 747-400ER, -400ER FREIGHTER

Source: Michael Baker international calculations are based on Boeing 747-400 Airplane Characteristics for Airport Planning - D6-58326, December 2002.

When considering the critical aircraft Boeing 767-400ER, and the 747-400ER, it was determined that a minimum runway length of 11,900 feet is required for AEX. This result is consistent with recommendations from previous master plans to extend Runway 14-32 to 12,000 feet.

Ideally, the "secondary" primary runway should have the same characteristics as the primary runway; however, previous planning efforts determined that extending the secondary Runway 18-36 to the same length as the primary runway would not be possible. The previous runway length analyses defined that a total minimum runway length of approximately 8,000 feet could support operations of the most demanding aircraft regularly using that runway.

After several meetings with airport management, airport tenants, and aircraft operators, it was concluded that Runway 18-36 requires an extension of 1,502 feet. The Runway 18-36 extension project is ongoing, and these recommendations will be considered as airport development alternatives are further evaluated.

4.5.2 Runway Shoulders

Runway shoulders provide resistance to blast erosion and accommodate the passage of maintenance and emergency equipment and the occasional passage of an aircraft veering from the runway. A stabilized surface, such as turf, normally reduces the possibility of soil erosion and engine ingestion of foreign objects. Soil not suitable for turf establishment requires a stabilized or low-cost paved surface. However, paved shoulders are required for runways accommodating ADG-IV and higher aircraft.

Runway 14-32 currently has 35-foot-wide paved shoulders in excellent condition in accordance with ADG-V standards. These shoulders were recently constructed in 2022. For Runway 18-36, paved 35-foot-wide paved shoulders are only provided along portions of the east side of the runway near Taxiway B-2. In the future, paved shoulders are recommended for the entirety of Runway 18-36 to accommodate ADG D-IV aircraft operations.

4.5.3 Runway End Blast Pad

Paved runway blast pads provide blast erosion protection beyond runway ends. Blast pads at runway ends should extend across the full width of the runway plus the shoulders.

A 996-foot long by 160-foot-wide overrun is provided at the end of Runway 14 and a 1,006-foot-long by 150-foot-wide overrun is located at the end of Runway 32. However, the overruns do not meet the existing blast pad standard of 220 feet wide by 400 feet long for ADG D-V. Standard D-V runway blast pads are recommended for end of Runway 14-32 in the future.

A 1,014-foot long by 150-foot-wide overrun is provided at the end of Runway 36 and a 200-foot-long by 200-foot-wide blast pad is located at the end of Runway 18. However, the overrun does not meet the existing blast pad standard of 200 feet wide by 200 feet long for ADG D-IV. Standard D-IV runway blast pads are recommended for each end of Runway 18-36 in the future.

4.5.4 Runway Line of Sight

The FAA identifies runway line-of-sight requirements to facilitate coordination among aircraft, and between vehicles that are operating on active runways. For runways with full-parallel taxiways like AEX, the FAA's line-of-sight design standard states that any point five feet above the runway centerline must be mutually visible with any other point five feet above the runway centerline for a distance equal to half the length of the runway length.

At AEX, the Runway 14-32 and Runway 18-36 profiles meet the FAA's line-of-sight design standard.

4.6 Runway Protection Standards

Runway protection standards are provided by FAA AC 150/5300-13B, *Airport Design* and FAA AC 150/5325-4B, *Runway Length Requirements for Airport Design.* As designed and quantified, the runway protection geometry at AEX meets RDC D-V design standards for Runway 14-32 and RDC-D-IV standards for Runway 18-36. These items are discussed in further detail in the upcoming sections.

4.6.1 Runway Safety Area

The Runway Safety Area (RSA) is a defined surface surrounding the runway prepared or suitable for reducing the risk of damage to aircraft in the event of an undershoot, overshoot, or excursion from the runway. The RSA must be cleared and graded and have no potentially hazardous ruts, humps, depressions, or other surface variations. The required size of the RSA for Runway 14-32 with an applicable RDC of D-V, and Runway 18-36 with an applicable RDC of D-IV design standards are listed in **Tables 4-6** and **4-7**. The RSAs for Runways 14-32 and 18-36 are a full 500 feet wide and extend 1,000 feet beyond the runway threshold in accordance with current RDC D-IV and D-V design standards.

4.6.2 Runway Object Free Area

The object free area is an area centered on the surface of a runway, taxiway, or taxilane centerline provided to enhance the safety of aircraft operations by remaining clear of objects, except for objects that need to be in the object free area for air navigation or aircraft ground maneuvering. The Runway Object Free Area (ROFA) for each runway is 800 feet wide and extends 1,000 feet beyond the end of each runway in accordance with FAA design standards. The required size of the ROFA for each runway is listed in **Tables 4-6** and **4-7**

4.6.3 Runway Obstacle Free Zone

The Obstacle Free Zone (OFZ) is the three-dimensional airspace along the runway and extended runway centerline. It is required to be clear of obstacles for protection of aircraft landing or taking off from the runway and for missed approaches. The required size of the applicable Runway Obstacle Free Zones for large aircraft (over 12,500 pounds) are listed in **Tables 4-6** and **4-7**.

4.6.4 Approach/Departure Runway Protection Zones

The Runway Protection Zone (RPZ) is an area at ground level prior to the threshold or beyond the runway end that is designed to enhance the safety and protection of people and property on the ground. The required size of each approach or departure RPZ for each runway for the applicable RDC of D-V and D-IV design standards (i.e., for Runways 14-32 and 18-36, respectively) is listed in **Tables 4-6** and **4-7**, Runway Separation Standards.

4.6.5 Runway-to-Parallel Taxiway Centerline Separation

The runway centerline to parallel taxiway centerline separation standard for an RDC of D-IV is 400 feet. Although the parallel taxiway separations at AEX currently meet or exceed this standard, the separation for portions of existing or proposed parallel taxiways may need to be increased as improved precision approach capability is considered in the future. Future recommendations for changes to the parallel taxiway system will be further evaluated during the airport alternatives development process.

4.6.6 Aircraft Holding Position

The runway centerline to aircraft holding position standard for an RDC of D-V and D-IV is 250 feet. With the current Runway 14-32 and Runway 18-36 centerline to aircraft holding position distance of 250 feet, AEX currently meets this design standard. However, changes to the future aircraft holding positions may be warranted as improved precision approach capability is considered in the future. This will be further evaluated during the Airport Alternatives process.

4.6.7 Aircraft Parking Area

The runway centerline to closest aircraft parking position separation standard for an RDC of D-V and D-IV is 500 feet. With the current centerline separation of 520 feet, AEX meets this design standard.

4.6.8 Runway Design Standard Compliance Needs Summary

The runway design standards for AEX are summarized in **Tables 4-6** and **4-7**. The runways fully satisfy current RDC D-V and D-IV airport design standards except for the runway length requirements. Extensions to Runways 14-32 and 18-36 are recommended to full satisfy current RDC D-V and D-IV requirements.

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Table 4-6: Runway Design Standard Matrix – Runway 14-32 Runway Design Code (RDC): D-V-2400			
Item	**Standard**	**Existing**	**Satisfies Requirements**
Runway Design			
Runway Length	11,900 ft	9,352 ft	No
Runway Width	150 ft	150 ft	Yes
Shoulder Width	30 ft	35 ft	Yes
Blast Pad Width	220 ft	160 ft	No
Blast Pad Length	400 ft	996 ft	Yes
Crosswind Component	20 knots	20 knots	Yes
Runway Protection			
Runway Safety Area (RSA)			
Length Beyond Departure End	1,000 ft	1,000 ft	Yes
Length Prior to Threshold[1]	600 ft	500 ft	Yes
Width	500 ft	500 ft	Yes
Runway Object Free Area (ROFA)			
Length Beyond Runway End	1,000 ft	1,000 ft	Yes
Length Prior to Threshold	600 ft	600 ft	Yes
Width	800 ft	800 ft	Yes
Runway Obstacle Free Zone (ROFZ)			
Length	200 ft	200 ft	Yes
Width	400 ft	400 ft	Yes
Approach Runway Protection Zone (RPZ)			
Length	1,700 ft	1,700 ft	Yes
Inner Width	500 ft	500 ft	Yes
Outer Width	1,010 ft	1,010 ft	Yes
Departure Runway Protection Zone (RPZ)			
Length	1,700 ft	1,700 ft	Yes
Inner Width	500 ft	500 ft	Yes
Outer Width	1,010 ft	1,010 ft	Yes
Runway Separation (Runway Centerline to)			
Holding Position	250 ft	280 ft	Yes
Parallel Taxiway / Taxilane Centerline	400 ft	802 ft	Yes
Aircraft Parking Area	500 ft	525 ft	Yes

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

Table 4-7: Runway Design Standard Matrix – Runway 18-36 Runway Design Code (RDC): D-IV- 5000			
Item	**Standard**	**Existing**	**Satisfies Requirements**
Runway Design			
Runway Length	8,503 ft	7,001 ft	No
Runway Width	150 ft	150 ft	Yes
Shoulder Width	20 ft	35 ft	Yes (Partial)
Blast Pad Width	200 ft	200 ft	Yes
Blast Pad Length	200 ft	200 ft	Yes
Crosswind Component	20 knots	20 knots	Yes
Runway Protection			
Runway Safety Area (RSA)			
Length Beyond Departure End	1,000 ft	1,000 ft	Yes
Length Prior to Threshold	600 ft	500 ft	Yes
Width	500 ft	500 ft	Yes
Runway Object Free Area (ROFA)			
Length Beyond Runway End	1,000 ft	1,000 ft	Yes
Length Prior to Threshold	600 ft	600 ft	Yes
Width	800 ft	800 ft	Yes
Runway Obstacle Free Zone (ROFZ)			
Length	200 ft	200 ft	Yes
Width	400 ft	400 ft	Yes
Approach Runway Protection Zone (RPZ)			
Length	1,700 ft	1,700 ft	Yes
Inner Width	500 ft	500 ft	Yes
Outer Width	1,010 ft	1,010 ft	Yes
Departure Runway Protection Zone (RPZ)			
Length	1,700 ft	1,700 ft	Yes
Inner Width	500 ft	500 ft	Yes
Outer Width	1,010 ft	1,010 ft	Yes
Runway Separation (Runway Centerline to)			
Holding Position	250 ft	250 ft	Yes
Parallel Taxiway / Taxilane Centerline	400 ft	400 ft	Yes
Aircraft Parking Area	500 ft	525 ft	Yes

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

4.6.9 Runway Pavement Strength

One of the most important features of airfield pavement is its ability to withstand repeated use by the most weight-demanding aircraft operating at the airport. As currently reported within the Airport Master Record (FAA Form 5010-1) for AEX, the runways asphalt is reported to be in good condition. The pavement strength of Runway 18-36 is considered sufficient to provide the required minimum single-wheel (S) load bearing capacity of 75,000 pounds, double wheel (D) load bearing capacity of 130,000 pounds, dual tandem wheel (2D) load bearing capacity of 191,000 pounds, and dual tandem wheel (2D/2DS) load bearing capacity of 502,000 pounds. The pavement strength of Runway 14-32 is considered sufficient to provide a S load bearing capacity of 81,000 pounds, D load bearing capacity of 180,000 pounds, 2D load bearing capacity of 330,000 pounds, and 2D/2DS load bearing capacity of 850,000 pounds.

4.7 Taxiway Design Standards

4.7.1 Taxiway Design Group

Taxiway width and fillet standards, and in some instances, runway-to-taxiway and taxiway separation requirements, are determined by Taxiway Design Group (TDG). Previous guidance on taxiway design was based only on Airplane Design Groups (ADG). ADGs are based on wingspan and tail height, but not the dimensions of the aircraft undercarriage. The design of pavement fillets must consider such undercarriage dimensions. Thus, the following guidance establishes TDGs, based on the overall Main Gear Width (MGW) and the Cockpit to Main Gear (CMG) distance. TDG standards can be found in AC 150/5300-13B, *Airport Design*, Table 4-2.

TDG-5 design characteristics are applicable and existing taxiway pavements can fully accommodate taxi movements of AEX's current Critical Aircraft (Boeing 767-400), which requires TDG-5 taxiway intersection fillet geometries. **Table 4-8** lists the design standards for taxiways based on the TDG.

Table 4-8: Design Standards Based on Taxiway Design Group

Type	1A	1B	2A	2B	3	4	5	6
Taxiway Width	25 FT	25 FT	35 FT	35 FT	50 FT	50 FT	75 FT	75 FT
Taxiway Edge Safety Margin	5 FT	5 FT	7.5 FT	7.5 FT	10 FT	10 FT	14 FT	14 FT
Taxiway Shoulder Width	10 FT	10 FT	15 FT	15 FT	20 FT	20 FT	30 FT	30 FT

Source: AC 150/5300-13B, Table 4-2. Design Standards Based on Taxiway Design Group (TDG)

4.7.2 Taxiway Width

Taxiway pavement requirements are based on the dimensions of the airplane's undercarriage, which includes the MGW and CMG. All taxiways at AEX are 75 feet wide satisfying the required width for TDG-5.

4.7.3 Taxiway Shoulders

Unprotected soils adjacent to taxiways are susceptible to erosion, which can result in engine ingestion problems for jet engines that overhang the edge of the taxiway pavement. Soil with turf not suitable for this purpose requires a stabilized or low-cost paved surface.

Some taxiways (portions of Taxiways B and E) at AEX have 30-foot-wide paved shoulders meeting the TDG 5 requirement.. In the future, shoulder improvements are recommended on all taxiways as new pavement improvements are conducted.

4.7.4 Taxiway Safety Area

The Taxiway Safety Area (TSA) is a defined surface alongside the taxiway centered about the taxiway centerline and is prepared or suitable for reducing the risk of damage to an aircraft deviating from the taxiway. The TSA also provides a suitable travel surface and area for rescue and fire-fighting operations. The current width of the TSA is 214 feet satisfying requirements to fully protect taxiway movements of aircraft having ADG V wingspans.

4.7.5 Taxiway Object Free Area

The Taxiway Object Free Area (TOFA) is centered on the taxiway centerline. The TOFA clearing standards prohibit service vehicle roads, parked aircraft, and other objects, except for objects that need to be in the OFA for air navigation or aircraft ground maneuvering. The current width of the TOFA is established at a width of 285 feet (ADG V). This designated width provides the 285-foot TOFA required to fully protect taxiway movements of aircraft having ADG V wingspans.

4.7.6 Taxiway Edge Safety Margin

Prior to the FAA's issuance of AC 150/5300-13B, *Airport Design*, taxiway intersection design guidance referenced and used pre-established ADGs that were based on aircraft wingspan and tail height, but not the dimensions of the aircraft's undercarriage. The updated AC defines and references TDGs that relate to the undercarriage dimensions of the aircraft and the need to assure that the aircraft's inner-most main gear turning path remains with a defined (i.e., 10-foot wide) Taxiway Edge Safety Margin (TESM), and the extent of remaining full-strength pavement situated within the limits of the required TESM.

When considering taxiway design to regularly accommodate AEX's Critical Aircraft (Boeing 767-400) having a CMG length of 93.34 feet, and a main gear (i.e., outer-to-outer) width of 35.76 feet, the application and use of TDG-5 taxiway design criteria having a minimum TESM width of 14 feet is required. This requirement is based on identification of a Critical Aircraft as the most demanding aircraft type, or grouping of aircraft with similar characteristics, that make regular use of the airport as defined by FAA AC 150/5000-17, *Critical Aircraft and Regular Use Determination.*

4.7.7 Taxiway Centerline to Fixed or Moveable Object

The Taxiway Centerline to Fixed or Moveable Object distance associated with ADG V aircraft movements is 142.5 feet. The airport currently meets this design standard.

4.7.8 Taxiway Design Standard Compliance Needs Summary

AEX meets ADG V and TDG-5 taxiway design standards, based on the design aircraft at the airport. However, improvements to meet the current taxiway geometry standards are required.

The need to modify or construct paved shoulders adjacent to paved surfaces to satisfy their respective TDG recommended design standards will be addressed further as part of the airport alternatives analysis of the Master Plan.

4.8 Airfield Facility Requirements

4.8.1 Lighting

Runway 14-32 is equipped with High Intensity Runway Lights (HIRLs) located along the edge of the runway. The Runway 14 end is also equipped with a Medium Intensity Approach Lighting System (MALSR), a simple approach lighting system commonly used for non-precision approach runways. Runway 32 is equipped with Runway End Identifier Lights (REILS). Runway 18-36 is equipped with HIRLs and REILs on each end. As airfield lights reach the end of their useful life, lighting improvements should be considered in conjunction with other new development and rehabilitation projects.

4.8.2 Marking and Signage

AC 150/5340-1M, *Standards for Airport Markings,* contains standards for markings used on airport runways, taxiways, and aprons. Runway 14-32 is properly marked in support of precision instrument approach operations. Runway 18-36 is properly marked for non-precision instrument operations. All taxiways are properly marked and in good condition.

4.9 Aircraft Hangar and Apron Tiedown Space Requirements

Although the airport is currently designed to fully accommodate 52 based aircraft, (25 single-engine pistons, 5 multi-engine, 7 turboprop, 4 helicopters, and 11 jets), it is expected that the number of aircraft based at the airport will increase to 71 by 2041. Accordingly, hangar and apron tie-down/parking space needs for based aircraft must be identified to accommodate the parking and sheltering needs of these aircraft throughout the 20-year planning period.

4.9.1 Hangar Facility Needs

Based on the number and type of hangar facilities at AEX, there is a current and anticipated future need for additional aircraft storage space for single-engine aircraft, multi-engine aircraft, turboprops, jets, and helicopters over the 20-year planning period.

Projections of future based aircraft hangar storage and apron tie-down needs were developed using the FAA-approved aviation activity forecast for this Master Plan Update and the 2021 Base Year distribution of aircraft storage at the airport by aircraft type. As shown in **Table 4-8** and for space planning purposes only, the distribution of based aircraft represents a CAAGR of 1.57 percent over the 20-year planning period.

The identification of additional based aircraft hangar space, or the location, layout and spacing for apron tie-downs are primarily based on the type, make, and model of aircraft that are known to currently operate, or that are anticipated to operate at the airport. Small single-engine aircraft can be accommodated in t-hangars, generally designed to accommodate 5 to 20 aircraft in a single building. A lower-cost option is the apron tie-down. However, apron tie-down parking positions do not protect aircraft from the environment. Multi-engine and turbo-prop aircraft are more expensive, and aircraft owners generally prefer the protection provided by a t-hangar or, in the case of larger aircraft, a conventional hangar. The general preference is to store jet aircraft in conventional hangars. Helicopters are generally stored in conventional hangars or on the tie-down apron, depending on their use. Smaller helicopters may also be accommodated in t-hangars. Table 4-9 presents the distribution of based aircraft forecasted for the planning period.

Table 4-9: AEX Forecast of Based Aircraft

Aircraft Type	2021	2026	2031	2036	2041
Single-Engine (Non-Jet)	25	27	29	32	34
Multi-Engine (Non-Jet)	5	5	6	6	7
Helicopter	4	4	5	5	5
Turboprops	7	8	8	9	10
Jets	11	12	13	14	15
Total Based Aircraft	**52**	**56**	**31**	**66**	**71**

Source: Michael Baker International, Inc., May 2022

The 20-year forecast of based aircraft identifies the need to accommodate the storage needs of 19 additional aircraft (e.g., nine single-engine, two multi-engine, one helicopter, three turboprops, and four jets). During the airport alternative analysis options of future hangar development will be evaluated.

4.9.2 Itinerant Aircraft Apron and Tiedown Space Requirements

The itinerant apron (General Aviation Parking Area) provides for the movement and parking of visiting general aviation aircraft that operate at AEX. Itinerant apron space requirements are typically based on calculated current and projected future Average Day Peak Month (ADPM) aircraft activity levels, relative percentage mix of local and transient operations, and aircraft type and size. Using industry accepted FAA planning guidance, the following procedural planning steps were used to identify required itinerant aircraft apron space:

- *Step 1*. Determine ADPM general aviation aircraft operations for the 2021 base year and all forecast planning years.
- *Step 2*. Increase ADPM aircraft operations by 10 percent.
- *Step 3*. Determine the relative percentage mix of local and itinerant aircraft operations as listed in Section 3.5, Table 3-10 General Aviation Operations Forecast (27.03 percent of the total aircraft operations were determined as itinerant).

- *Step 4*. Derive total itinerant operations by multiplying the value derived in step 2 by the itinerant percentage value.
- *Step 5*. Assume that 100 percent of all itinerant arrival operations require apron space.
- *Step 6*. Increase the value derived in step 4 by 10 percent.

Table 4-10 shows the itinerant aircraft apron area needs assessment for the 20-year planning period.

Table 4-10: AEX Itinerant Apron Area Needs Assessment

Step		2021	2026	2031	2036	2041
1	Average Day Peak Month Operations	49	60	62	64	66
2	Increase by 10%	53	66	68	70	73
3	Percent Itinerant Traffic (Assumed to Remain Constant)	27%	27%	27%	27%	27%
4	Total Itinerant Operations	14	18	18	19	20
5	Assumed 100% Need Transient Apron Space	14	18	18	19	20
6	Increase by 10%	16	20	20	21	22
	Total Itinerant Aircraft Requiring Apron	**16**	**20**	**20**	**21**	**20**

Source: Michael Baker International, Inc, 2022
Calculations have been rounded.

Table 4-11 distributes the itinerant aircraft operations by type for the 20-year planning period. When mathematically distributing assignment of aircraft by type, whole numbers were used for conservative planning.

Table 4-11: Itinerant Aircraft Occupancy Needs by Aircraft Type

Fiscal Year	Single Engine	Multi Engine/ Turboprop	Jet Engine	Helicopter	Total
2021	5	2	2	7	16
2026	9	2	2	7	20
2031	9	2	2	7	20
2036	9	2	2	8	21
2041	9	2	3	8	22

Source: Michael Baker International, Inc, 2022

Table 4-12 shows the spacing requirements in square yards for the aircraft fleet mix. The basis for this spacing was determined by analyzing ADG B-I and B-II aircraft that are known and anticipated to operate at AEX. This includes both the tie-down space and the required taxilane OFA to and from the tie-down position.

Table 4-12: Itinerant Aircraft Apron Area Needs by Aircraft Type				
	Single Engine	Multi Engine/ Turboprop	Jet Engine	Helicopter
Apron Space Needs (Square Yards)	713	972	1,890	713

Source: Michael Baker International, Inc, 2022

Approximately 17,640 square yards are needed throughout the 20-year planning period. The airport accommodates itinerant operations mainly in the South Apron area. However, various tenants distributed along the apron also use the ramp, including ICE, Million Air, and ACE. Therefore, it is recommended that a specific area is designated to accommodate itinerant operations at the South Apron. Table 4-13 shows the aircraft-specific and total itinerant apron area needs.

Table 4-13: Itinerant Aircraft Total Apron Area (SY) Needs by Aircraft Type					
Year	Single Engine	Multi Engine/ Turboprop	Jet Engine	Helicopter	Total
2021	3,466	1,944	3,780	4,858	14,048
2026	5,934	1,944	3,780	5,032	16,690
2031	6,061	1,944	3,780	5,211	16,996
2036	6,193	1,944	3,780	5,396	17,313
2041	6,330	1,944	3,780	5,588	17,642

Source: Michael Baker International, Inc, 2021

4.9.3 Navigational Aids and Approach Procedures

Navigational Aids are used for airport approaches and allow pilots to navigate to the airport and runway ends. Runway 14 is served with a MALSR, with a published vertically guided visibility minimum of ½ statute mile, similar to that offered as part of a precision Instrument Approach Procedure (IAP) traditionally provided by ground-based instrument landing systems.

The FAA is solely responsible for operating and maintaining the MALSR, ODALs, Glide Slope, Localizer, and off-airport NDB/DME navigational facilities.

The REILs and VASIs serving Runways 18 and 36, Airport Rotating Beacon, Precision Approach Radar (PAR), and the Automated Surface Observing System (ASOS) are reportedly in good working order and without needing repair. These facilities are not anticipated to require upgrade or replacement within the 20-year planning period.

The existing approach procedures are sufficient; however, the enhancement of the vertically guided landing approaches under instrument meteorological conditions through Wide Area Augmentation System (WAAS) for a Global Positioning Satellite (GPS) approach to Runways 32 and 36 and improvement of the approach lighting system on Runway 18 with the establishment of a MALSR should be considered in the future. The possibility of

providing such improvements at AEX in the future will be considered as part of the Alternatives Analysis.

AEX also has PAR capability, primarily used for military operations. Similar to an ILS, PAR is the "primary radar equipment used by the military to determine the position of an aircraft during final approach, in terms of lateral and vertical deviations relative to a nominal approach path, and in range relative to touchdown."[31] PAR's benefit is that it does not require any onboard equipment; however, the PAR requires a high degree of training of the radar controller and the pilot. Very few facilities in the world still offer PAR approaches, with most of the approaches used in a military setting.

The PAR at AEX is not fulfilling the operational needs of the military, and its relocation has been discussed with the Airport Staff and DOD representatives. The relocation of the PAR facilities in the future will be evaluated in the Alternatives Analysis.

4.9.4 Windcone/Segmented Circle

The segmented circle and windcone and supplemental wind cones are in good condition and are anticipated to adequately serve the airport throughout the 20-year planning period.

4.10 Passenger Terminal Area

4.10.1 Terminal Apron

The Terminal Apron is located southeast of the intersection of Runways 14-32 and 18-36. It consists of approximately 24,500 square yards of concrete pavement for the parking and maneuvering of commercial aircraft utilizing the nearby passenger terminal facilities. Aircraft access to this area is by way of Taxiway A.

The apron offers four aircraft parking positions; one designed to accommodate ADG III aircraft (i.e., Boeing 737-4), the other three accommodating ADG II aircraft (i.e., ERJ-145 and CRJ-200). Currently, the terminal apron accommodates regional air carrier operations, projected to grow 2.27 percent over the 20-year forecast period. The regional air carriers, American, Delta, and PSA, are not expecting a change in the aircraft fleet size that operates at AEX. The terminal apron satisfies existing demand and can accommodate forecasted regional air carrier activity during the planning period. However, airlines have identified the need for an expanded Ground Support Equipment (GSE) area to enhance operations, which will be further evaluated as part of the Airport Alternatives phase of the Master Plan.

[31] FAA - Pilot/Controller Glossary

4.10.2 Passenger Terminal Building

The airport is served by a single Passenger Terminal Building comprised of three levels with 107,187 square feet of space. The terminal is equipped with all the amenities required of a commercial service terminal, including an integrated Airport Traffic Control Tower (ATCT).

After airport visits and meetings with the Airport Staff and the air carriers, a general capacity assessment of the terminal building facilities was conducted. The main findings were based on the current operations, needs of the air carriers, and potential requirements to serve future demand.

The terminal building serves the passengers transported by the commercial service regional airlines: American, Delta, and PSA which have historically operated ERJ-145 and CRJ-200 aircraft with an average of 50 seats offered. However, over the course of this master plan update airlines have ceased operating 50-seat aircraft at AEX. As of 2022, aircraft configurations operating at AEX have increased to 70 to 90 seats with the potential to increase to 100 + seats in the future. The forecast of aviation activity chapter indicates that in 2021 AEX moved 188,128 passengers and expects that number to grow at an AAGR of 2.27 percent during the forecast period reaching 294,726 passengers in 2041. Approximately 52 percent are enplaned passengers.

An operations peak hour analysis was evaluated in Chapter 3 for AEX; however, a detailed commercial passenger peak hour analysis was not developed for this master plan update. Accordingly, to the aviation activity forecast, approximately 20 percent of operations at AEX correspond to scheduled CFR Part 121 regional carrier activity.

To evaluate the terminal building requirements, it is assumed that from the total airport operations, the commercial apron will serve 2 commercial operations simultaneously during the design peak hour.

Ticketing: Each airline has an assigned number of counters required for its check-in process. The queue area is sufficient to accommodate the peak hour demand of departing passengers as the adoption of new technologies allows some passengers to proceed directly to the security screening process.

Outbound Baggage Screening: Each airline operates a separate induction belt to transport baggage to the TSA screening and sorting areas; however, only one belt has direct access to the CT scanner. The other conveyors have adapted a rollover system to manually deliver the bags to the TSA screening area. The current configuration is deficient and impacts outbound screening operations. It is also important to note that the current conveyor equipment is reaching its useful service life and it is recommended that the system be replaced and upgraded in the future. Further analysis and preliminary design activities beyond the scope of this master plan is also recommended.

Security: AEX has a single screening checkpoint located at the second level of the Passenger Terminal Building. This lane accommodates the current traffic; however, the queuing area becomes congested during peak-hour operations and extends into the central hall to the escalators. In addition, during the peak hour, the screening process becomes overloaded due to equipment throughput and available space. It is recommended that the security screening checkpoint be expanded to include an additional screening lane with required

equipment and an improved passenger queuing area. This recommendation was confirmed with TSA staff as part of the stakeholder review process.

Holdroom: The terminal offers 40 seats per holdroom, serving each of the four gate areas (160 seats total). Following the level of service recommendations prescribed in the International Air Transport Association's (IATA) *Airport Development Reference Manual* (ADRM), it was determined that each holdroom should provide seating to accommodate between 50 to 70 percent of the aircraft seats provided by the design aircraft each gate serves during the peak hour. As mentioned before, the average capacity of an aircraft operating at the terminal is between 70 and 90 seats. AEX reported an average load factor of 75 percent between 2011 and 2019. However, considering the industry standard load factor of 85 percent, for an aircraft with 90 seats, a minimum of 38 seats per holdroom should be offered to provide an optimal level of service. In addition, AEX has an open holdroom configuration that allows passengers to use seats in the adjacent holdroom areas. As mentioned previously, it is assumed that AEX currently serves two simultaneous flights during the peak hour. Thus, the entire holdroom area associated with the four gates is sufficient to accommodate peak hour demand conditions with the minimum requirements for an optimal level of service. However, in the event that an additional air carrier enters the AEX market, or the airlines update their operational fleet mix in the future, the expansion of the holdroom will need to be reevaluated. Holdroom capacity requirements should be assessed every five years to support future holdroom expansion and improvements. Terminal Building requirements are summarized in **Table 4-14.**

Table 4-14: Terminal Building Requirements

Category	Requirements
Ticketing	No improvements recommended/adequate for the current number of airlines.
Baggage Handling	An adequate outbound baggage conveyor system is required – airlines operate separate induction belts to transport the bags to the TSA screening and sorting areas. It is recommended that the system be replaced and upgraded.
Security Screening	Only one screening lane exists, and queuing becomes congested during peak hours. Reconfiguring the queuing area and adding a second screening checkpoint is recommended.
Holdroom	Holdroom capacity requirements should be assessed every five years to incorporate additional air carriers or potential changes in airline equipment.
Other services and amenities	No Improvements recommended.

Source: Michael Baker International, Inc., 2021

Furthermore, it is advised that a detailed terminal analysis be conducted between five to ten years to validate changes in airline business models, load factors, and new services required by the passengers.

4.10.3 Automobile Parking Requirements

4.10.3.1 Public Parking

The main parking lot located in front of the passenger terminal provides short- and long-term parking to accommodate the vehicular parking needs of passengers and visitors as determined by the frequency and nature of the scheduled airline and passenger charter operations. Existing vehicle parking is reported to be sufficient during peak operational periods. Therefore, the parking lot has enough storage capacity to serve demand over the next 20 years, not requiring an expansion or additional parking spaces. However, having one exit lane does not provide the operational efficiency required during peak periods, nor does it utilize the latest technology expected at commercial service airports (i.e., autopay lane). As a result, an additional exit lane is proposed to implement autopay and improve the level of service for vehicular parking,

Pavement is in fair condition and should be regularly maintained in accordance with the airport's pavement maintenance program.

4.10.3.2 Employee Parking

Employee parking associated with the passenger terminal operation is provided northeast of the terminal offering approximately 48 parking spaces and an additional 15 spaces in front of it, along Billy Mitchel Boulevard. The number of employee parking facilities is sufficient; however, this area is not ADA compliant, and access to the parking spaces is not secured as the area is sometimes used by passengers. Additionally, existing employee parking facilities are not located near the terminal building and require long walking distances by the employees. Improvements related to the location and access control will be evaluated during the analysis of airport alternatives.

It is important to note that all parking facilities associated with new development proposed in this Airport Master Plan must meet applicable local code requirements.

4.10.3.3 Rental Car Parking

Currently, rental car services are available on airport. Rental car ready/return lots are collocated next to the terminal. According to FAA AC 150/5360-13A, *Airport Terminal Planning*, a minimum of 10 ready/return spaces for each rental car agency is recommended. The existing car ready lot has a capacity of 67 spaces and the return lot can accommodate 93 vehicles, providing enough capacity for the planning period. Moreover, it is desirable to effectively distinguish the ready lot from the return lot to optimize service and operations. Improvements needed to address these issues will be evaluated during the analysis of airport alternatives.

4.11 Cargo Facilities

AEX currently does not have a designated cargo area. As described in Chapter 3, air cargo movements to and from AEX during 2021 were conducted by a minimal and limited number of domestic airlines transporting less than 100,000 pounds in 2021. Other cargo activity at the airport is Military related. However, the previous master plan evaluated the potential for industrial development on the west side of the airfield. Development of this type of business

activity can incentivize the movement of cargo through AEX by taking advantage of available parcels providing airside access.

Related development options will be considered as part of the analysis of airport alternatives.

4.12 Support Facilities

As described in AC 150/5070-6B, *Airport Master Plans*, support facilities include a wide range of functions intended to ensure the smooth, efficient, and safe operation of the airport. The FAA provides design guidelines for these facilities in a variety of ACs and Airport Cooperative Research Program (ACRP) reports. However, the requirements identified in this section were also influenced by interviews with airport staff, airport tenants, and users which facilitated a better understanding of the existing and future support facilities.

4.12.1 Airport/Airfield Maintenance, Equipment, and Facilities

England Authority staff are responsible for the day-to-day maintenance functions on the airfield, including record keeping, and repairs. Pavement maintenance includes crack sealing, seal coating, and striping. Other general maintenance responsibilities include safety area repairs, mowing, and general electrical repairs. Equipment and materials to perform general airport maintenance functions are available and stored in the lower level of the terminal building. Both deicing and light maintenance equipment are stored in the same location shared with baggage handling making the area congested. Maintenance offices are also located in the terminal building. The alternatives analysis will evaluate options for the relocation of equipment storage in the future.

4.12.2 Aircraft Rescue and Firefighting Services

The airport is currently a 14 CFR Part 139, Class I certificated airport, categorized as ARFF Index D. The existing ARFF facility constructed in 2004 is located adjacent to the south apron, east of the rental car parking facilities and is accessible via Billy Mitchell Boulevard. Over the 20-year planning horizon, a requirement to increase the ARFF Index is not expected. The existing equipment should be replaced as it reaches the end of its useful service life.

4.12.3 Aircraft Fueling Storage Requirements

Since completion of the previous Master Plan, Fuel Farm facilities were relocated to a more secure location near the southwest corner of the South Apron in compliance with FAA regulations. Access to these facilities is provided via FAA Avenue. This fuel farm has adequate capacity to serve the airport's needs over the next 20 years. Therefore, no capacity expansion is foreseen.

However, aviation agencies and organizations worldwide, including the FAA, have set the goal of becoming carbon neutral. In addition, International Air Transport Association (IATA) airline members are collectively committed to emission reduction. Sustainable Aviation Fuels (SAF) can play a significant role in reducing aviation emissions. It is predicted that airlines in the near future will start requesting a supply of SAF at airports throughout the US.

The International Energy Agency (IEA) anticipates biofuels will account for approximately 10% of aviation fuel demand by 2030 and reach 20 percent by 2040[32].

The airport is aligned with the industry's vision on SAF. Therefore, the potential of implementing an area to provide Sustainable Aviation Fuel storage will be further evaluated during the alternatives analysis phase of the project.

The remainder of this page is intentionally left blank.

[32] IEA (2019), Are aviation biofuels ready for take-off? IEA, Paris https://www.iea.org/commentaries/are-aviation-biofuels-ready-for-take-off

4.13 Summary of Facility Requirements

Table 4-15 summarizes recommendations to satisfy AEX's facility requirements.

Table 4-15: Summary of Facility Requirements

Category	Requirements
Airfield Capacity and Configuration	No improvements recommended.
Design Aircraft and Airport Reference Code (ARC)	Existing - B767-400 (D-IV)/Future – B767-400 (D-IV)
Runway Orientation and Wind Coverage	No improvements recommended.
Runway Length	Lengthen Runway 14-32 to 12,000 ft and Runway 18-36 to 8,503 FT
Runway Strength	No improvements recommended.
Protection of Navigable Airspace	No improvements recommended.
Instrument Approaches and Runway End Siting	IAPs - To be determined in alternatives analysis. Potential OCS penetrations to be resolved in alternatives.
Runway Design Standards	Runway Blast Pads for Runway 14-32 and Runway 36
Runway Protection Standards	No improvements recommended.
Taxiway/Taxilane Design Standards	Taxiway Shoulders recommended.
Airfield Lighting	No improvements recommended.
Airfield Markings	No improvements recommended.
Airfield Signage	No improvements recommended.
Visual Navigational Aids	Improvements of ALS of all runway's ends are recommended.
Apron	Expand Itinerant Apron (17,642 SY needed). Construct apron areas to accommodate future helicopter parking (Blackhawk and Chinook aircraft).
Terminal Apron	Replace Passenger Boarding Bridges at end of useful service life. Consolidate GSE storage areas.
Terminal Building	Baggage Handling Improvements and Security Screening Check Point expansion is recommended. Evaluate Holdroom expansion/improvements every 5 years.
Based Aircraft Storage	Additional aircraft storage (corporate and T-hangars)
Fueling Facilities	Identify an area for SAF storage.
Automobile Access	Regularly maintain pavement and markings and provide technology enhancements.
Automobile Parking	Employee parking improvements with access control.
Maintenance Storage	Relocation/consolidation of maintenance and GSE equipment within the Terminal Area is recommended.

Source: Michael Baker International, Inc., 2022



Chapter 5
Airport Alternatives

FLYAEX
ALEXANDRIA INTERNATIONAL AIRPORT

5 AIRPORT ALTERNATIVES

This chapter includes the development of graphical alternatives which propose methods to either resolve deficiencies or construct new facilities needed to meet future demand expectations at Alexandria International Airport (AEX). The alternatives include potential improvements to both airside and landside facilities as well as a review of surrounding land use compatibility.

These preliminary alternatives for AEX, are intended for discussion purposes between the various stakeholders, including the England Authority, the Stakeholder Advisory Committee (SAC) for this project, and the public. The individual components of each preliminary alternative were evaluated to aid in the selection of a preferred airport development option that represents the desired development plan for the 20-year planning period. For that reason, the preliminary alternatives should be viewed as flexible development plans that may be refined or combined to best satisfy the needs of the airport and its stakeholders.

The main intent of the preliminary alternatives is to evaluate realistic airfield development options that satisfy the facility requirements identified in the previous chapter and to analyze the aviation and non-aviation development and redevelopment possibilities for available airport property. The preferred airport development option, as presented in Chapter 6, Preferred Airport Development, illustrates the recommended layout of landside developments, such as the passenger terminal, air cargo facilities, hangars, aprons, solar farm, and support facilities. Therefore, the preliminary alternatives should be viewed as a broad examination of relationships between required and desired airside and landside developments to provide a clear understanding of the airport's possibilities and limitations.

The following elements are covered within this chapter:

- Alternatives Analysis Process
- Instrument Approach Analysis
- Land Use
- Airfield System
- Aprons and Hangars
- Terminal Improvements
- Westside Development
- Airport Support Facilities

5.1 Alternatives Analysis Process

The alternatives analysis process is based on guidance provided in Federal Aviation Administration (FAA) Advisory Circular (AC) 150/5070-6B, *Airport Master Plans*. The development and analysis of alternatives incorporates input from the England Authority, stakeholders, and the general public. An organized approach to identifying and evaluating a variety of alternatives is essential to effective planning. This includes identifying a standard set of evaluation criteria based on the goals and objectives of the England Authority and existing constraints which will impact the development of alternatives.

5.1.1 Evaluation Criteria

In AC 150/5070-6B, the FAA recommends a standard set of criteria to evaluate development alternatives according to an airport's unique situation. The evaluation process should feature "generally accepted planning principles, be replicable, consistently applied, and documented." As a result, a set of evaluation criteria were established for use in this alternatives analysis. The criteria are strategic, qualitative, and quantitative to ensure that the evaluation process remained at a master planning level of detail. The selected evaluation criteria shown in **Table 5-1** include:

Table 5-1: Evaluation Criteria

Criteria	Definition
Achievement of Objective	This criterion is based on achieving the specific need identified in the Facility Requirements chapter. Alternatives are assessed based on the degree to which they satisfy the objective.
Airport Design Standards	The proposed development should satisfy applicable airport design standards and maintain or improve the safety and efficiency of the airport.
Flexibility	The alternative should support a reasonable level of flexibility to accommodate changes in demand and include the ability to expand in the future.
Collateral Impacts	This criterion evaluates the extent to which an alternative requires changes or improvements to existing airport facilities which otherwise would not require changes or improvements (e.g., Relocation of a road that is impacted by an MRO alternative is considered a collateral impact).
Probable Cost	The preferred alternative should be cost effective, within the means of the England Authority to secure funding and minimize the long-term financial commitment by the Authority or its tenants.
Efficiency of Construction Phasing	Construction of the proposed improvements should be implemented without undue interference to existing operations.
Environmental Compatibility	The preferred alternative should be consistent with environmental regulations and minimize impacts to the environmental impact categories identified in FAA Orders 1050.1F *Environmental Impacts: Policies and Procedures Desk Reference* and 5050.4B, *National Environmental Policy Act (NEPA) Implementing Instructions for Airport Actions*. Future development should support growth while minimizing impacts to the environment.

Source: AC 150/5070-6B, Airport Master Plans; Michael Baker International, 2021

5.2 Instrument Approach Analysis

Currently, Runway 14 is equipped with a Category I (CAT-I) Instrument Landing System (ILS) and an associated Medium Intensity Approach Lighting System with Runway Alignment Indicator Lights (MALSR).

The ILS provides both vertical and horizontal electronic guidance during poor visibility conditions. Precision approaches are classified into three categories, "CAT-I, CAT-II, and CAT-III," based on the Height Above Threshold or minimum descent altitude, and the visibility or Runway Visual Range information listed in **Table 5-2**.

Table 5-2: Approach Categories

Category	Decision Height (HATh)	Visibility	Runway Visual Range (RVR)
CAT-I	≥ 200 feet	≥ ½ Statue mile	≥ 1,800 feet
CAT-II	< 200 feet but no ≥ 100 feet	< ½ Statue mile	≥ 1,200 feet
CAT-III	< 100 feet	< ½ Statue mile	< 1,200 feet

Source: FAA Advisory Circular (AC) 150/5300-13B, Airport Design

The previous AEX Master Plan Update recommended upgrading the Instrument Approach System to CAT-II as part of the future extension of Runway 14-32. After analysis and discussion with the SAC and the England Authority, it was established that the previous instrument approach recommendations are still valid. In addition to commercial passenger service, AEX continues to be used for emergency disaster relief operations, military training and deployments, and US Immigration and Customs Enforcement (ICE) Operations. In the future, flight training operations are also expected to take a more prominent role at the airport.

Furthermore, the previous master plan also recommended the implementation of a CAT-I Precision Instrument Approach on Runways 18, 36, and 32 in the future. This recommendation continues to be valid, mainly because Runway 18-36, as a secondary primary runway, will accommodate aircraft operations during the future extension and pavement rehabilitation of Runway 14-32. This runway closure is anticipated for a period of at least two years.

FAA requirements for a CAT-II ILS include installing an Approach Lighting System with Sequence Flashing Lights (ALSF-2). A typical ALSF-2 system consists of 247 steady burning lights: including green threshold lights (49 lights), red side row-bar lamps (9 rows, 54 lamps), and high intensity steady burning white lights (144), plus an additional 15 flashing lights commonly referred to as strobes. The strobes flash in sequence, starting with the strobe farthest from the runway and ending with the strobe closest to the runway threshold. The lights are spaced at 100 feet intervals from the runway threshold outward to 2,400 feet.

Additionally, as part of the extension of Runway 14-32, the Glide Slope will be relocated and an appropriate precision instrument approach lighting system should be implemented, including High-Intensity Runway Lights (HIRL), Touchdown Zone (TDZ) lighting and centerline

lighting as detailed in FAA Order 8400.13F, *Procedures for the Evaluation and Approval of Facilities for Special Authorization Category I Operations and All Category II and III Operations*.

The CAT-I Instrument Landing System proposed for Runways 18, 36, and 32 will require a Simplified Short Approach Lighting System with Runway Alignment Indicator Lights (SSALR), a MALSR, or ALSF-1/ALSF-2; HIRLs; and a TDZ sensor of a Runway Visual Range (RVR) reporting system.

As part of the proposed improvements to Runways 18, 36, and 32, all the associated components supporting a future MALSR are included, as well as HIRLs for the runway extension.

Figure 5-1 shows the ultimate location of the proposed ALSF-2 system for Runway 14 and the MALSR improvements for Runways 18, 36, and 32.

The benefits of implementing Precision Instrument Approaches for both primary runway ends include the reliability that the airport can provide to pilots under low visibility conditions and enhancing aircraft safety during approach operations. However, this requires greater separation and expanded safety areas that must be protected for its future implementation.

In addition to the equipment and navigational aids (NAVAIDS) associated with Precision Instrument Approaches for Runway 14 (CAT-II) and Runways 18, 36, and 32 (CAT-I), it is imperative to protect the airspace from vertical obstructions in accordance with 14 CFR Part 77, *Safe, Efficient Use, and Preservation of the Navigable Airspace*, Approach and Departure Surfaces for Instrument Runways, and Obstacle Free Zones (OFZ).

An analysis of the local airspace was conducted to identify vertical obstructions that could impact the proposed approach procedures. The results of this analysis are incorporated into the Airport Layout Plan (ALP) component of this Master Plan.

5.2.1 Satellite Navigation

As technology advances, with the implementation of the Wide Area Augmentation System (WAAS) in the US National Airspace System (NAS), there is an alternative for airports to obtain ILS like approach capabilities without the installation of ground-based navigation equipment. Today "aircraft can access over 4,000 runway ends in poor weather conditions with minimums as low as 200 feet"[33]. A WAAS Localizer Performance with Vertical guidance (LPV) approach provides a similar level of service to the Category I Instrument Landing System (ILS)." With this technology in mind, it is recommended to evaluate reducing the minimums of the LPV approaches for Runways 32 and 36 in the future. "The visibility requirement for the approach is partly dependent upon the airfield infrastructure. Achieving

[33] https://www.faa.gov/sites/faa.gov/files/2021-12/WAAS_quick_facts.pdf.

Note: As of December 2, 2021, there are 4,099 LPVs serving 1,979 airports, 1,209 are non-ILS airports. The FAA is adding additional WAAS procedures each year.

the lowest visibility requires a benign obstacle environment and appropriate airport infrastructure to support the approach."[34]

Additionally, the Ground Based Augmentation System (GBAS), initially referred to as the Local Area Augmentation System (LAAS), provides another alternative with different infrastructure requirements. GBAS utilizes multiple antennas to make the GPS measurements at the local airport it serves. The implementation of GBAS at AEX would require ground equipment that includes four reference receivers, a GBAS ground facility, and a VHF data broadcast transmitter. This ground equipment is complemented by GBAS avionics installed on the aircraft.

Currently, GBAS is the only feasible Satellite-based system capable of achieving CAT-II/III precision approach capability. The FAA is in the process of incorporating International Civil Aviation Organization (ICAO) Standards and Recommended Practices (SARPS) of those categories in the US.

GBAS (LAAS) further increases the accuracy of GPS and improves signal integrity warnings. Precision approach capability requires obstruction planes and approach lighting systems to meet 14 CFR Part 77 standards for ILS approaches. This delays the implementation of RNAV (GPS) precision approach capability due to the cost of certifying each runway. Both systems improve accuracy, and its implementation could be revised as a future alternative for implementing CAT-I precision approaches for Runways 32 and 36.

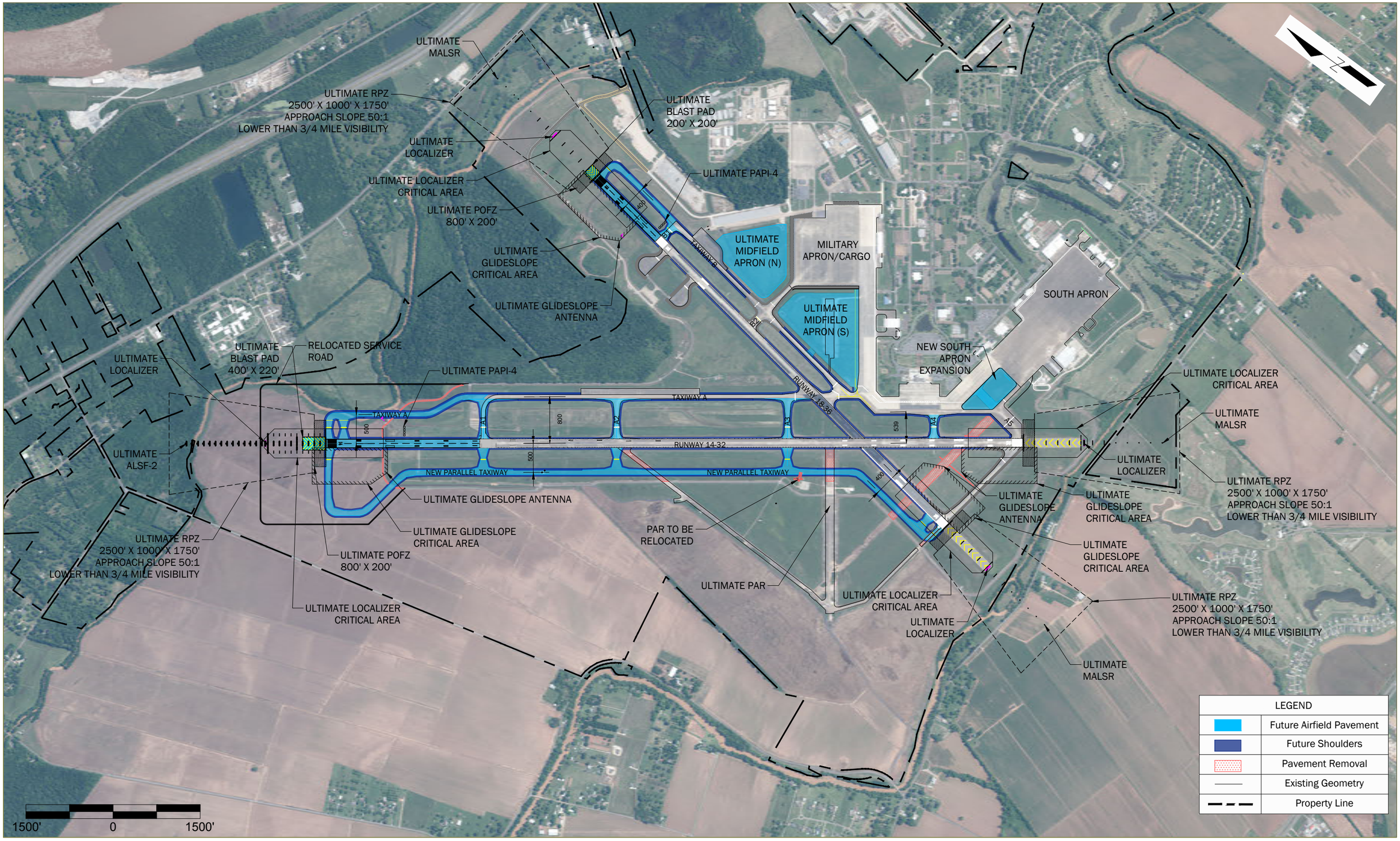
5.2.2 Precision Approach Radar

As detailed in the requirements chapter. The Precision Approach Radar (PAR) at AEX is not fulfilling the operational needs of the military, and its relocation has been discussed with the Airport Staff and DOD representatives. As discussed later in this chapter, the existing PAR facilities will be impacted by the new parallel taxiway proposed on the west side of the airport due to the 500-foot separation requirement associated with implementing a future CAT-II precision approach to Runway 14. As a result, PAR facilities are proposed in a new location that supports adequate performance and does not interfere with the development of future airport infrastructure. The proposed site to relocate the PAR facilities is depicted in the **Figure 5-1.**

5.3 Land Use

On- and off-airport land use was extensively evaluated by the previous airport master plan update. This Master Plan Update revalidated these uses and recommended some changes to better support existing and future airport needs. Several of the land use recommendations from the previous plan are carried forward in this study.

[34] FAA – Maximizing Airport Operations Using WAAS


ULTIMATE MALSR
ULTIMATE RPZ
2500' X 1000' X 1750'
APPROACH SLOPE 50:1
LOWER THAN 3/4 MILE VISIBILITY
ULTIMATE LOCALIZER
ULTIMATE LOCALIZER CRITICAL AREA
ULTIMATE POFZ
800' X 200'
ULTIMATE GLIDESLOPE CRITICAL AREA
ULTIMATE GLIDESLOPE ANTENNA
ULTIMATE BLAST PAD
200' X 200'
ULTIMATE PAPI-4
ULTIMATE MIDFIELD APRON (N)
MILITARY APRON/CARGO
ULTIMATE MIDFIELD APRON (S)
SOUTH APRON
NEW SOUTH APRON EXPANSION
TAXIWAY B
TAXIWAY A
RUNWAY 18-36
RUNWAY 14-32
NEW PARALLEL TAXIWAY
ULTIMATE BLAST PAD
400' X 220'
RELOCATED SERVICE ROAD
ULTIMATE PAPI-4
ULTIMATE LOCALIZER
ULTIMATE ALSF-2
ULTIMATE RPZ
2500' X 1000' X 1750'
APPROACH SLOPE 50:1
LOWER THAN 3/4 MILE VISIBILITY
ULTIMATE POFZ
800' X 200'
ULTIMATE GLIDESLOPE ANTENNA
ULTIMATE GLIDESLOPE CRITICAL AREA
ULTIMATE LOCALIZER CRITICAL AREA
PAR TO BE RELOCATED
ULTIMATE PAR
ULTIMATE LOCALIZER CRITICAL AREA
ULTIMATE LOCALIZER
ULTIMATE GLIDESLOPE ANTENNA
ULTIMATE GLIDESLOPE CRITICAL AREA
ULTIMATE GLIDESLOPE CRITICAL AREA
ULTIMATE LOCALIZER CRITICAL AREA
ULTIMATE MALSR
ULTIMATE LOCALIZER
ULTIMATE RPZ
2500' X 1000' X 1750'
APPROACH SLOPE 50:1
LOWER THAN 3/4 MILE VISIBILITY
ULTIMATE RPZ
2500' X 1000' X 1750'
APPROACH SLOPE 50:1
LOWER THAN 3/4 MILE VISIBILITY
ULTIMATE MALSR
LEGEND
Future Airfield Pavement
Future Shoulders
Pavement Removal
Existing Geometry
Property Line
1500'
0
1500'

Land uses discussed in this report are divided into the following primary areas:

- **Airside use**: Includes all the space required for aeronautical operations; it encompasses the existing infrastructure and the future development proposed in the alternatives described in this chapter.
- **Airport landside**: Includes the areas required to support the overall airport operation, including services to employees and passengers.
- **Business and industrial campus**: Encompasses the future development of aviation-related infrastructure, solar farm and other industrial or business development that would take advantage of the airport's proximity.
- **England Airpark and community**: Supports the development proposed by the previous master plan, which includes no related aviation services. The Airpark supports economic development opportunities for Alexandria and the Central Louisiana region, and additional long-term opportunities to enhance the community's relationship with the airport through the presence of natural resources and recreational sites.

Recommended on- and off-airport land uses are presented in **Figure 5-2.**

5.3.1 Access Roads

Improved airport connectivity is vital to connect future developments with the interstate and regional road infrastructure. The improved connectivity between Alexandria, Central Louisiana, and AEX/England Airpark will enhance new development opportunities and support the interests of future tenants.

The previous master plan highlighted essential vehicular node improvements to enhanced access to AEX, England Airpark, and the surrounding community. In addition, the Rapides Area Planning Commission (RAPC) has proposed three beltways near the airport. These beltways will facilitate future access between I-49, the airport, and the I-14 corridor proposed as part of the Gulf Coast Strategic Highway System. This update of the AEX Master Plan integrates these vehicular node improvements, and other road enhancements. Recommended roadway improvements are also depicted in **Figure 5-2**.

Additional roadway improvements to support airport operations and connectivity with future development are evaluated for each alternative.

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5.4 Airfield System

The AEX airfield system includes two intersecting runways, two main parallel taxiways, apron areas, and other facilities. According to FAA design standards, Runway 14-32 and Taxiway A meet the infrastructure requirements associated with Runway Design Code (RDC) D-V. The RDC has two components, D which indicates the aircraft approach category (AAC), and V, which indicates the airplane design group (ADG). The AAC is based on the aircraft approach speed, which in this case, the approach speed is less than 166 knots). The ADG is determined by the aircraft wingspan and tail height. For ADG V, the tail height is less than 66 feet, and the wingspan is less than 214 feet. The most common aircraft types in this category include the Boeing 747, Boeing 777, Airbus 330, and Airbus 340, among others. The RDC is used for planning and design purposes only and does not limit the aircraft that may operate safely at the airport.

This Master Plan Update revisited the previous runway length analyses and revalidated the requirements to accommodate the current critical aircraft (Boeing 767-400) and to fulfill AEX's civilian and military roles. After this review, it was determined that the previous master plan's recommendation of extending Runway 14-32 to 12,000 feet is still valid. However, in previous studies, it was determined that Runway 18-36 will need to be extended to 8,503 feet to accommodate the needs of the current aircraft fleet mix. At the time this report, the extension of Runway 18-36 was currently under design. The construction and commissioning efforts of the runway are expected to be completed in 2024.

In the following sections, this Master Plan Update evaluates alternatives to improve the operational efficiency of the airfield based on the FAA-approved operations forecast and airport needs detailed in the previous chapters.

5.4.1 Runway 14-32

Following the revision and update of the runway length analyses, the results confirmed the conclusion of the previous master plan and FAA-approved ALP, determining that an extension of Runway 14-32 to 12,000 feet is recommended (see **Figure 5-3**). The runway extension will include a 400 foot by 220-foot blast pad to comply with RDC D-V design standards.

Runway 14-32 will continue to be categorized as RDC D-V and a Category II (CAT-II) precision approach is anticipated in the future. As a result, the required runway to taxiway separations and associated critical areas are being preserved in the proposed airfield development option.

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LEGEND

- Improved/Proposed Road
- Community Open Space/Recreation
- Institutional
- Multi-Family Residential
- Offices
- Industrial
- Commercial
- US Army
- Aviation Related
- Airport Landside
- Solar Farm
- Clear Zone
- Accident Potential Zone 1
- Accident Potential Zone 2
- Runway Protection Zone
- Primary Road
- Future Industrial Expansion
- Future Acquisition
- Future Open Space/Recreation
- Future Commercial
- Conservation Residential Development
- Future Business/Commercial/Industrial Mix
- Future Residential/Retail/Light Industrial Mix
- Future Institutional
- (1) Terminal Building
- (2) Main Public Parking
- (3) Runway Expansion
- (4) Rail Spur
- (5) Institutional/Educational Campus
- (6) Oakwing Golf Course
- (7) FAA Radar Facility
- (8) Multi-Family Residential Development
- (9) England Oaks Senior Community
- (10) Airpark Administrative Offices
- (11) Neighborhood Development
- (12) Recreation/Town Square
- (13) Market Square/Mixed Use
- (14) Parking Lot
- (15) Passive Open Space Amenity
- (16) Inter-Modal Use
- (17) Airport Observation Park
- (18) Hospitality Uses
- (19) Westside Campus
- (20) Community Center
- (21) Union Tank Car
- FEMA Short-Term use
- Improved Vehicular Access Point
- Property Line

2000' 0 2000'



An additional parallel taxiway is proposed to support the future development of aeronautical facilities on the airport's west side. The resulting two parallel taxiways serving Runway 14-32 will improve the movement of aircraft, creating the ability for arriving and departing aircraft to operate without traffic interruption.

The CAT-II precision approach capability for Runway 14 will provide for more reliable approaches under low visibility conditions. To implement this proposed action, a minimum runway-to-taxiway centerline separation of 500 feet is provided in the airside development alternative for an RDC D-V runway with visibility minimums lower than ½ mile, a height above threshold (HATh) lower than 200 feet but not lower than 100 feet, and a runway visual range (RVR) of not less than 1,200 feet.

This separation would also be sufficient to accommodate CAT-III precision approaches (HATh lower than 100 feet) for an RDC D-V. However, if an RDC D-VI is required in the future, the separation would need to be increased to 550 feet. According to existing and forecast operations, RDC D-VI operations are not anticipated to occur at AEX on a regular basis over the 20-year planning period.

The previous master plan proposed a runway centerline to taxiway centerline separation of 600 feet. This was due to design requirements that have since changed. Under current FAA airport design standards there is no justification to implement a greater separation distance than 500 feet at AEX, other than the implementation of runway-to-taxiway separation for reverse turns from a high-speed exit for a Taxiway Design Group 6 (TDG-6) aircraft, which is not foreseen. The existing glideslope and associated navigational aids should be relocated in the future to coincide with the extension of Runway 14-32.

5.4.2 Runway 18-36

Runway 18-36 is the "secondary" primary runway and is currently 7,001 feet long and 150 feet wide. The FAA recommends that a "secondary" primary runway should have the same characteristics as the primary runway. However, the previous master plan update established that it would not be feasible for Runway 18-36 to have the same runway length as Runway 14-32. It concluded that approximately 8,000 feet of runway would be sufficient to serve the most demanding aircraft operating on that runway. However, as described in previous paragraphs, the primary Runway 14-32 will also be extended, and full-length pavement reconstruction is required.

To successfully implement the Runway 14-32 improvements, it is foreseen that Runway 14 32 will remain closed for at least two years. During that time, Runway 18-36 should be capable of absorbing not only its current traffic but the aircraft that are limited to using Runway 14-32 because of their size and weight.

To accommodate the current aircraft fleet mix on Runway 18-36, the runway should be extended and provide the associated improvements to ensure compliance with FAA design and safety standards. During the extension of Runway 18-36 and Taxiway B design efforts, and after consultation with several commercial charter operators, it was established that an extension of 1,502 feet could accommodate their operation with some acceptable weight restrictions.

Consequently, to accommodate aircraft traffic during the construction of the Runway 14-32 extension and pavement rehabilitation, it is recommended to extend Runway 18-36 from 7,001 feet to 8,503 feet, as shown in **Figure 5-3.**

The airport has executed various enabling projects to create sufficient space to accommodate the runway extension and its associated obstacle free zones and safety areas. Some of these projects include:

- Rerouting some internal airport service roads
- Clearing obstacle penetrations of 14 CFR Part 77 imaginary surfaces
- Site preparation
- Gated perimeter fencing improvements.

As mentioned before, the design of the Runway 18-36 extension is currently in progress. The requirements and recommendations of the design process have been coordinated with the master planning team to provide infrastructure that serves the current and future airport needs identified in this Master Plan Update.

As described under the runway length analysis section of this report, Runway 18-36 will remain as a D-IV runway, and all FAA design standards will be followed. The extension of parallel Taxiway B shall be designed in accordance with TDG-5 design standards.

The 1,502-foot runway extension includes a 200-foot by 200-foot blast pad, complying with FAA standards. Pavement re-marking, runway and taxiway lighting, relocation of NAVAIDS and other related improvements are included in this extension project.

The main goal of this proposed development is to accommodate larger aircraft operations on this runway. For that, the pavement strength should be evaluated and adapted to satisfy the project objectives. In addition, it is recommended to construct paved shoulders along the entirety of Runway 18-36.

5.4.3 Taxiways

5.4.3.1 New Parallel Taxiway

The west side of the airport provides several economic development opportunities for the England Authority. However, much of the existing airside infrastructure leads to the east side of the airfield where the passenger terminal and aircraft parking aprons are located.

A second parallel taxiway to Runway 14-32 is proposed to support the movement of aircraft between the airfield environment and the future developments on the west side of the airport, as depicted in **Figure 5-3**. The new parallel taxiway will begin at the new Runway 14 threshold in support of the proposed 2,650-foot extension of Runway 14-32.

As described in the runway development section, a runway-to-taxiway centerline separation of 500 feet should be provided to support the obstacle free zones required for CAT-II precision approach procedures. With this increased separation, the proposed construction will impact existing Precision Approach Radar (PAR) facilities, requiring relocation to the west.

ULTIMATE BLAST PAD 200' X 200'
TAXIWAY 'B' EXTENSION'
ULTIMATE MIDFIELD APRON (N)
MILITARY APRON/CARGO
NORTH APRON EXPANSION
SOUTH APRON
ULTIMATE MIDFIELD APRON (S)
NEW SOUTH APRON EXPANSION
RELOCATED SERVICE ROAD
TAXIWAY 'A' EXTENSION'
TAXIWAY A
TAXIWAY B
RUNWAY 14-32
RUNWAY 18-36
NEW PARALLEL TAXIWAY
ULTIMATE BLAST PAD 400' X 220'
NEW PARALLEL TAXIWAY
PAR TO BE RELOCATED
ULTIMATE PAR
1000' 0 1000'

LEGEND	
	Future Airfield Pavement
	Future Shoulders
	Pavement Removal
	Existing Geometry
	Property Line

The first portion of the new parallel taxiway at the Runway 14 end needs to be offset to avoid the relocated glideslope critical area and allow taxiing aircraft to be completely perpendicular to the runway before the approach.

The results of the master plan evaluation indicate that the initial portion of the new parallel taxiway needs to be displaced, providing a separation of 1,204 feet from the runway centerline. Also, a 45-degree turn is recommended to achieve the required 500-foot runway centerline to parallel taxiway centerline separation.

Runway 14-32 intersects with Runway 18-36 at 6,593 feet from the Runway 14 threshold; at this point the new parallel taxiway changes direction to align parallel to Runway 18-36. The RDC of Runway 18-36 is D-IV-5000. Proposed precision approach procedures for this runway, require a 400-foot separation between runway and taxiway centerlines for this segment. This also concurs with recommendations of the previous Master Plan and the existing separation between Runway 18-36 and Taxiway B.

Also, three TDG-5 taxiway connectors are proposed to align with the existing ones currently serving Taxiway A.

5.4.3.2 Taxiway A

Taxiway A is categorized as TDG-5 and runs parallel to Runway 14-32, with a runway-to-taxiway centerline separation of 800 feet. As shown in **Figure 5-3**, the extension of Taxiway A is required to allow aircraft movement to the new runway threshold. This extension will commence at the current taxiway end, up to the proposed Runway 14 threshold, with a 30-degree turn, to keep the new infrastructure inside the airport property and mitigate for potential construction impacts. The Taxiway A extension will have a 500-foot separation from the runway centerline, complying with the separation requirements for CAT-II precision approaches.

The extension of Taxiway A includes a bypass taxiway at the end of the runway providing a centerline separation between parallel taxiways of 249.5 feet, in accordance with ADG V design standards. The existing runway entrance will be reconfigured to a crossover taxiway with TDG-5 taxiway fillet geometry.

5.4.3.3 Taxiway B

As shown in **Figure 5-3**, Taxiway B will be extended to provide adequate access to the new end of Runway 18. The existing runway entrance will be reconfigured as a 90-degree turn connection. A bypass taxiway is also recommended near the new runway entrance to increase operational efficiency.

Taxiway B has two connectors. Taxiway B2 is the main connector serving the Military/Cargo Apron; this is the newest taxiway and complies with TDG-5 design geometry.

Taxiways A and B intersect at the entrance of the North Apron. The crossing centerlines will be reconfigured to coordinate with the proposed North Apron expansion and its TDG-4 taxilane. No other additional taxiway connectors are required.

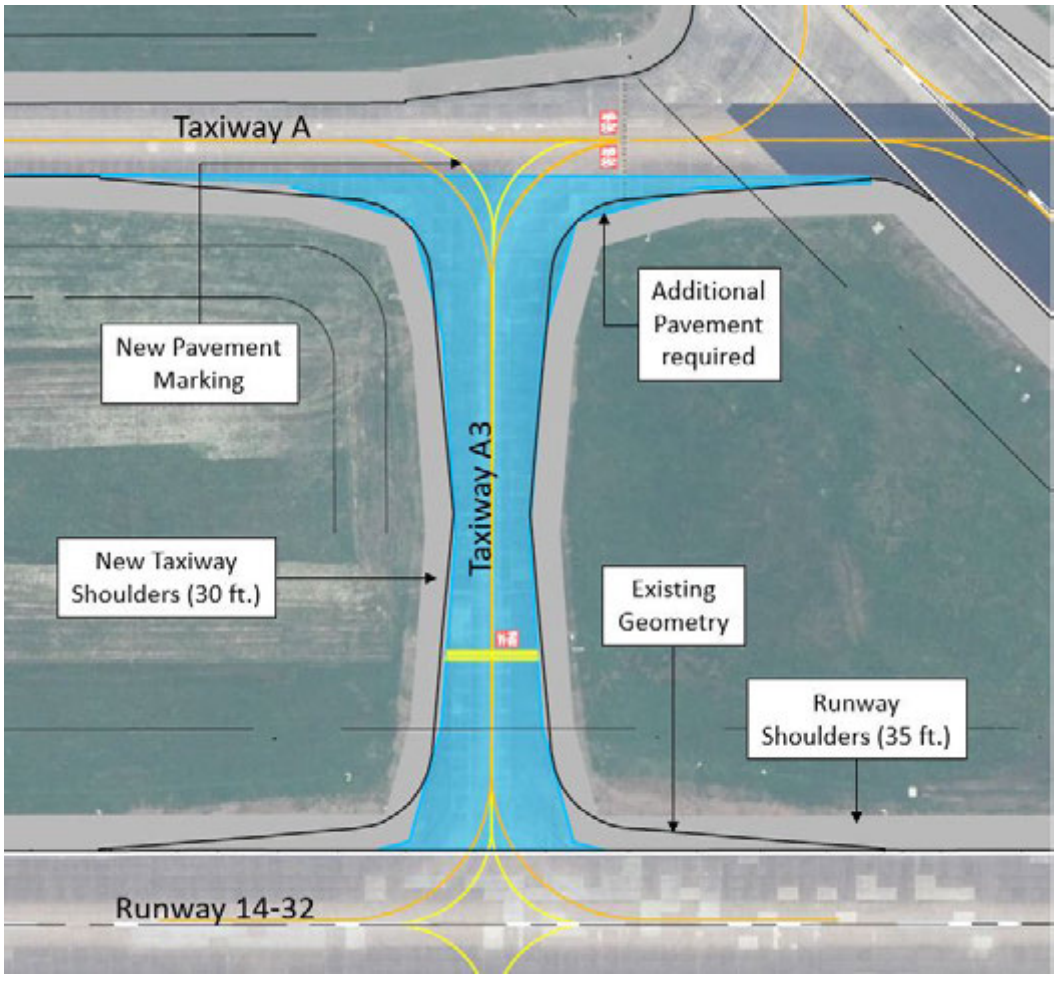
5.4.3.4 Taxiway Geometry

The existing taxiway fillet and pavement geometry was reviewed to ensure compliance with current FAA Taxiway Design Group standards introduced after the completion of the previous master plan. TDG 5 is established as the main category overall at the airport. As such, additional pavement is needed in some areas, especially those associated with fillet connections to Taxiway A.

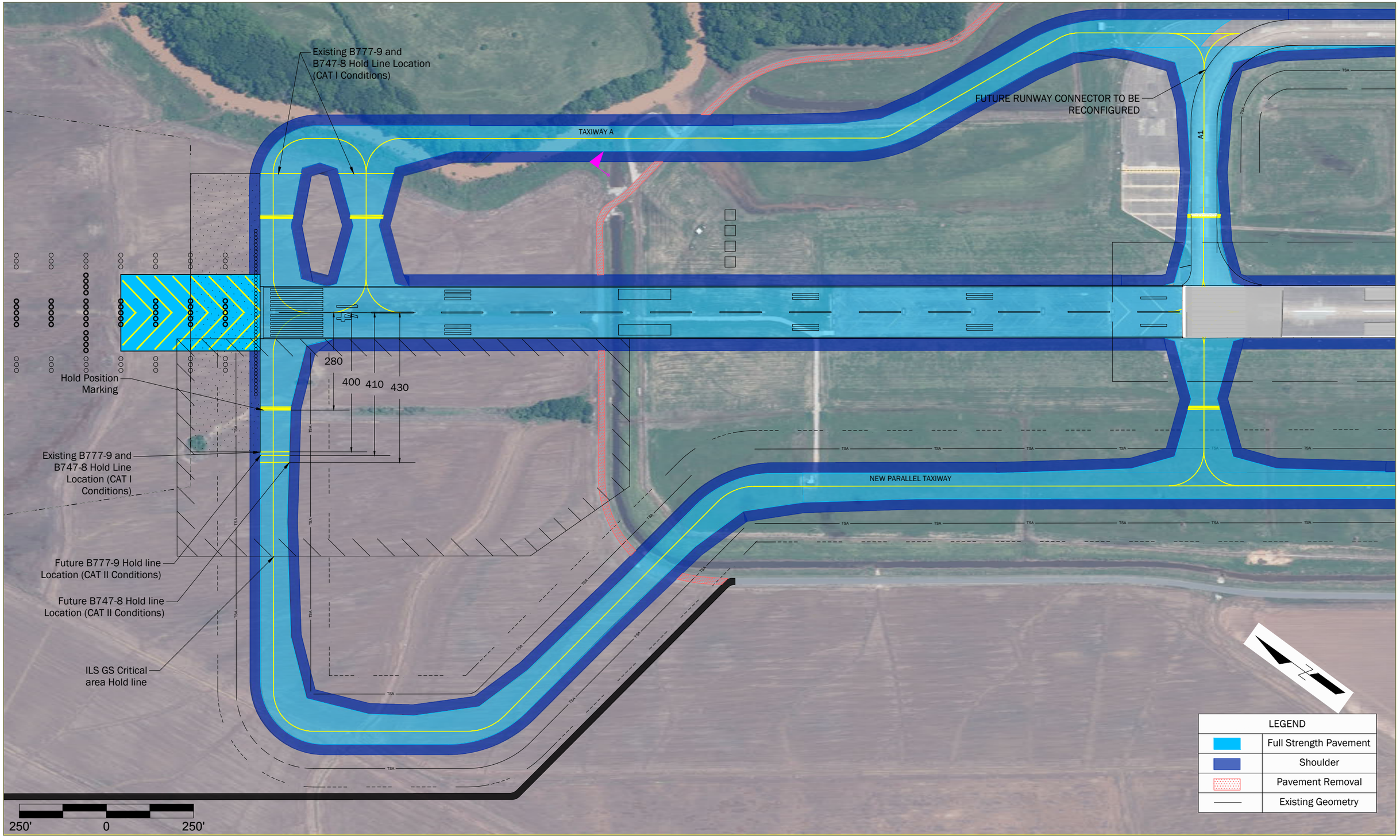
Figures 5-4 to **5-8** show a comparison between the existing pavement and the required pavement fillet design that considers the undercarriage dimension of the Critical Aircraft.

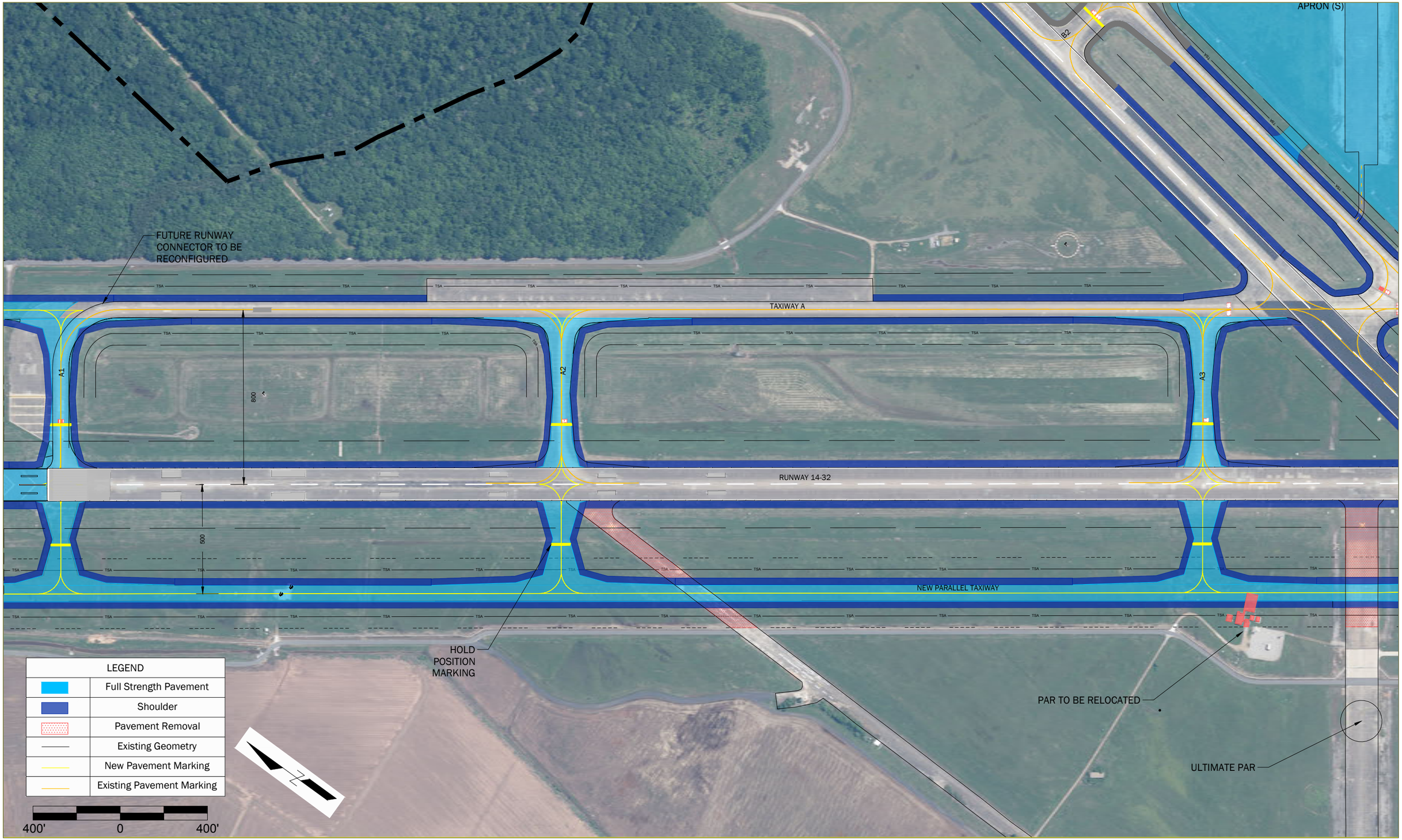
Figure 5-4 shows Taxiway A3 as an example of the improvements required to meet the fillet requirements associated with TDG-5 geometry standards.

Figure 5-4: Existing Geometry vs. TDG-5 Fillets (Example)



Source: Michael Baker International, Inc.


Existing B777-9 and
B747-8 Hold Line
Location (CAT I
Conditions)
TAXIWAY A
FUTURE RUNWAY CONNECTOR TO BE
RECONFIGURED
A1
TSA
280
400
410
430
Hold Position
Marking
Existing B777-9 and
B747-8 Hold Line
Location (CAT I
Conditions)
NEW PARALLEL TAXIWAY
Future B777-9 Hold line
Location (CAT II Conditions)
Future B747-8 Hold line
Location (CAT II Conditions)
ILS GS Critical
area Hold line
250'
0
250'
LEGEND
Full Strength Pavement
Shoulder
Pavement Removal
Existing Geometry



Michael Baker INTERNATIONAL

Airside Option - Taxiway 'A' and New Parallel Taxiway

Figure 5-6

NEW PAVEMENT MARKING NORTH APRON EXPANSION

New taxilane

A3

A4

A5

RUNWAY 18-36

539

NEW PARALLEL TAXIWAY

PAR TO BE RELOCATED

ULTIMATE PAR

HOLD POSITION RDC D-IV

400

LEGEND	
	Full Strength Pavement
	Shoulder
	Pavement Removal
	Existing Geometry
	New Pavement Marking
	Existing Pavement Marking

400' 0 400'

ULTIMATE
BLAST PAD
200' X 200'

FUTURE RUNWAY
CONNECTOR TO BE
RECONFIGURED

FUTURE SUPPLEMENTAL
WIND CONE

TAXIWAY B

ULTIMATE
MIDFIELD
APRON (N)

MILITARY
APRON/CARGO

ULTIMATE
MIDFIELD
APRON (S)

North Apron

LEGEND	
	Full Strength Pavement
	Shoulder
	Pavement Removal
	Existing Geometry
	New Pavement Marking
	Existing Pavement Marking

400' 0 400'

The Consultant revised the runway entrance taxiway geometry located at the Runway 32 end and evaluated the opportunity to redesign this taxiway with TDG 5 fillets. Using this additional pavement as a holding bay for small aircraft improves operational efficiency, avoiding delays, and it is not considered a safety risk of confusion for the pilot. Taxiways E and B2 currently comply with the TDG 5 fillet geometry.

A runway shoulder improvement project for Runway 14-32 to meet the 35-foot-wide FAA design standard was completed in 2022. As a complement, it is recommended that all taxiways have 30-foot paved shoulders, running the full length of the taxiways in accordance with TDG 5 design standards.

5.4.4 Holding Positions and Obstacle Free Zone Analysis

Holding positions associated with Runway 14-32 are located 280 feet from the runway centerline for each connector in accordance with RDC D-V design standards. The location is based on the approach visibility minimums, approach category, and airplane design group. Each position is also located to keep the Obstacle Free Zone (OFZ) clear during aircraft operations. The shape of the OFZ surface is dependent on the approach minimum for the runway. To evaluate those surfaces, the most demanding aircraft that operate at AEX were considered (i.e., Boeing 777-9 and Boeing 747-8).

Additional ILS critical area holding position markings should be located 400 feet from the Runway 14 threshold when CAT-I precision approaches are in operation; However, when the proposed CAT-II precision instrument procedures are in place, the ILS critical area holding position should be located 410 feet from the runway centerline to prevent the Boeing 777-9 aircraft fuselage from penetrating the inner transitional OFZ and 430 feet from the centerline during Boeing 747-8 operations.

Figure 5-9 depicts the results of the OFZ analysis by approach category and most demanding aircraft that would utilize the new parallel taxiway and Taxiway A.

As mentioned previously, the new parallel taxiway should be offset to avoid the glideslope critical area. For this reason, it is recommended to add a holding position 700 feet from the runway centerline for the new parallel taxiway.

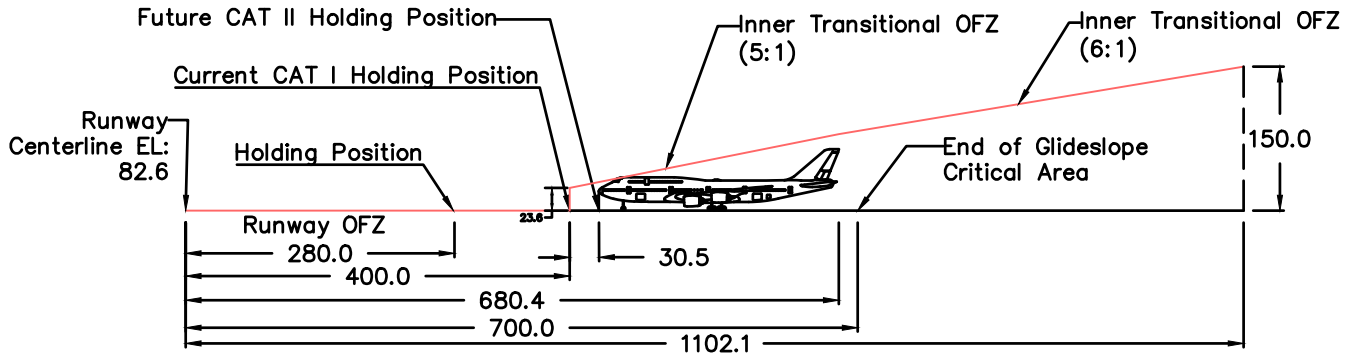
Runway 18-36 is expected to continue supporting RDC D-IV operations, resulting in a holding position distance of 250 feet from the runway centerline. Moreover, an ILS critical area holding position should be located at 400 feet when CAT-I precision approaches are active.

It is essential to highlight that the holding position markings recommended in this section should be coordinated with the FAA and ATCT to determine the final location of the holding position markings and/or which operational procedures should take place.

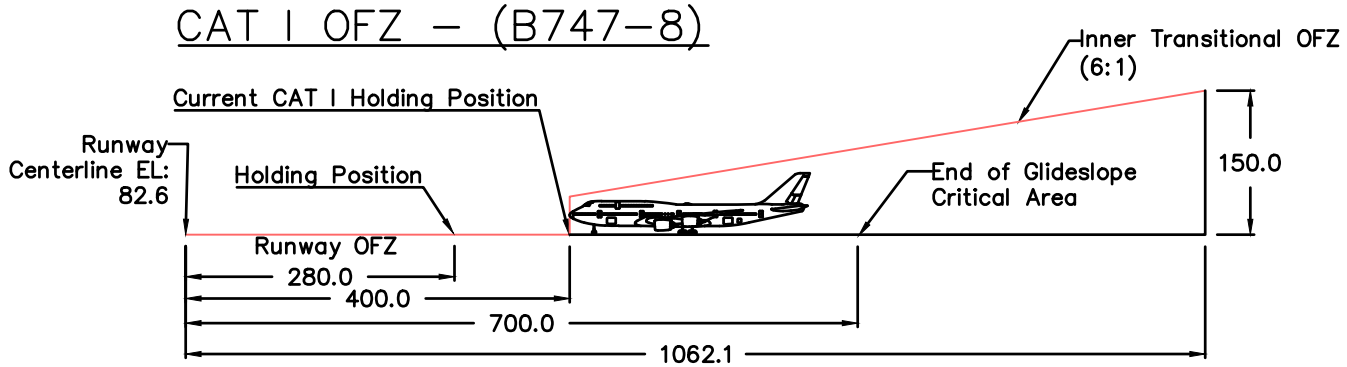
Table 5-3 summarizes the proposed airfield improvements.

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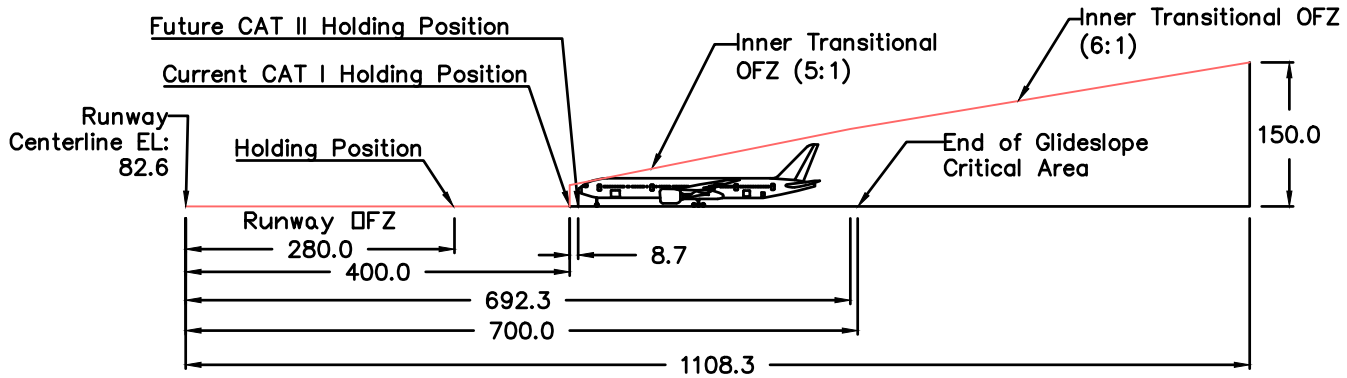
CAT II OFZ – (B747-8)



CAT I OFZ – (B747-8)



CAT II OFZ – (B777-9)



CAT I OFZ – (B777-9)

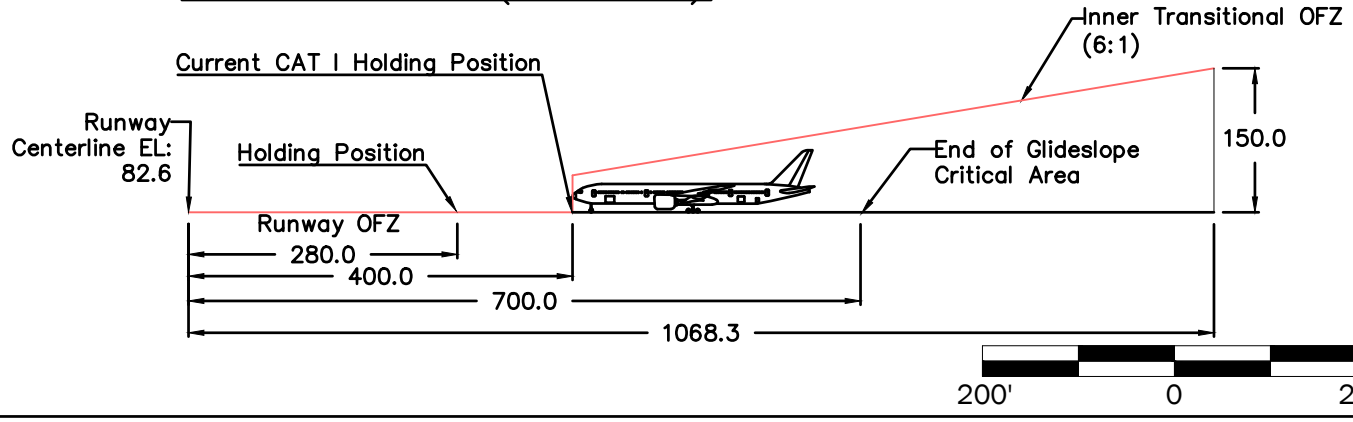


Table 5-3: Proposed Airfield Improvements		
Item	**Description**	**Details**
Runway 14-32 Extension	Runway length analysis	Length: 2,648 LF
Runway 18-36 Extension	To accommodate traffic when the Primary runway is closed	Length: 1,502 LF
Taxiway A Extension	To connect with the new Runway 14 threshold	30-Degree turn
Taxiway A Bypass	To enhance traffic flow	TDG-5
New Parallel Taxiway	From Runway 14 threshold to Runway 36 threshold avoiding Glide Slope critical area	45-degree turn
New Taxiway Connectors on New Parallel Taxiway	Three symmetrically distributed to existing Taxiway A connectors	TDG-5
New Parallel Taxiway Bypass	To connect with existing RW 36-threshold	TDG-5
Taxiway A Runway Entrance A1	To be reconfigured to a 90-degree connector	TDG-5
Taxiways A2-A3-A4 Geometry	Pavement to be added to comply with TDG-5 fillets	TDG-5
Taxiway B Extension	To connect with the future Runway 18 threshold	Length: 1,502 LF
Taxiway B Bypass	To enhance traffic flow	
Taxiway B Runway Entrance	To be reconfigured to a 90-degree connector	TDG-5
Runway 18 Blast Pad	End of Runway 18	200 FT x 200 FT
Pavement Removal	Removal of old existing pavement located inside the TOFA and ROFA	
Taxiways Pavement Marking	Update pavement marking centerlines following TDG fillets	
North Apron Taxilane	Extension of the North Apron to accommodate a TDG-4 taxilane. Re-path of entrance centerlines from intersection of Taxiways A and B	
Taxiway Shoulder	Construction of taxiway shoulders overall airport	Width: 30 FT

Source: Michael Baker International, 2021

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5.5 Aprons and Hangars

AEX has four apron areas, each one dedicated to a specific aviation sector. Given this particular condition, the Master Plan Update analyzed different options for each apron's future development, based on the airport requirements determined in the previous chapters, and discussions with airport management and the Stakeholder Advisory Committee.

The North and South Apron accommodate General Aviation activity and Military operations from the US Army Intermediate Staging Base (ISB). Also, the airport is home to a US Immigration and Customs Enforcement (ICE) facility. ICE is a key operator at AEX, and the future development of the airport, specifically in the South Apron area, is influenced by ICE's needs and operational requirements.

The Military/Cargo Apron serves the needs of larger military and commercial charter aircraft dedicated to the transport of cargo (equipment and supplies) and personnel. The Terminal Apron serves the commercial airline operations that currently occur at AEX (American and Delta).

5.5.1 South Apron

Airport staff indicated that the South Apron is an area of high importance for future development. The airport desires to develop storage facilities for aircraft including individual box hangars, and additional apron parking for aircraft, while accommodating aircraft movements and providing apron space in support of ICE aircraft operations. The South Apron development alternatives discussed in this section identify opportunities to utilize available space in an efficient manner. The evaluation criteria considered include operational, environmental, and functional concerns. Two development alternatives are discussed below.

The existing South Apron has an area of approximately 210,000 square yards (803 feet by 2,373 feet). This apron area is used by multiple airport tenants including Million Air, the Jet Engine Maintenance shop, ICE, the military, and other maintenance, and storage hangar tenants. Currently, ICE actively uses the southern portion of the apron to park Boeing 737 and 767 aircraft parallel to its facility. In like manner, the rest of the apron area is used to park aircraft that are not being worked on outside of the respective maintenance hangars.

5.5.1.1 Previous South Apron Area Development Plan

In the 2009 Master Plan and ALP Update, the previous South Apron area development plan considered the need of a future aircraft parking and maintenance, repair, and overhaul (MRO) facility at the airport. This plan proposed a TDG-5 dual taxilane system around the apron providing the option of parking aircraft in the middle of the apron while using some of the property around the apron for various sizes of MRO facilities and hangars. It also looks to add additional pavement to the grassed infield area adjacent to Taxiway A. Paving this area creates another point of access to the north side of the South Apron as well as additional parking for aircraft in that area.

5.5.1.2 Overview of South Apron Area Development Alternatives

Like the previous apron area development plan, South Apron Alternatives 1 and 2 address the airport's needs for alternative taxiway and taxilane access to the north side of the South Apron taxiing from Taxiway A and Runway 32. These alternatives also utilize the property adjacent to the South Apron for the future development of MRO facilities, individual box hangars, and aircraft parking along with automobile parking associated with the development of these areas. Some ideas and concepts focused on hangar development and the addition of pavement have been carried forward from the previous Master Plan and ALP Update. Although similar concepts and ideas from the previous apron area plan have been implemented, AEX has acquired new airport tenants, like ICE, that affect the approach taken when developing updated alternatives for the South Apron. The primary focus of these apron alternatives is to accommodate the safe and efficient movement of aircraft while providing enough apron for ICE to effectively operate and park aircraft. Additionally, the alternatives evaluate the ability of underutilized areas on the airport property to support the development of aircraft maintenance hangar facilities and associated apron parking.

5.5.1.3 South Apron Alternative 1

According to discussions with Airport Management, there is a desire to pave the entire grassed infield section of the South Apron. South Apron Alternative 1 (see **Figure 5-10**) proposes this additional pavement. This addition makes it possible to add a TDG-5 taxilane from Runway 32 and Taxiway A to the South Apron's north side. The TDG-5 taxilane object free area (TOFA) of 270 feet, allows the option to park two rows of aircraft; however, only one row can accommodate ADG II aircraft (i.e., Beechcraft 19) while the other row serves ADG I aircraft (i.e., Cessna Citation) simultaneously. Another option is to accommodate only one row of ADG III or larger aircraft. The taxilane leads towards the existing Passenger Terminal and ARFF facility and provides enough apron for aircraft to park in front of the FBO to meet the itinerant apron requirements identified in Chapter 4.

In total, South Apron Alternative 1 proposes four individual ADG II box hangars. These hangars are all 120 feet by 100 feet, providing the largest ADG II aircraft 20 feet of clearance from the plane's nose and 10 feet clearance from each wingtip to accommodate the storage of equipment. Fifty feet of separation is provided between the hangars to meet fire protection and airport development standards. All the box hangars are located in areas with sufficient ground access. Three of these box hangars are proposed in the northeast corner of the South Apron. These hangars can be accessed by Billy Mitchell Boulevard. The fourth box hangar, which is proposed just east of the ARFF facility, can be accessed by the portion of Billy Mitchell Boulevard that runs across the north side of the airport parallel to the South Apron.

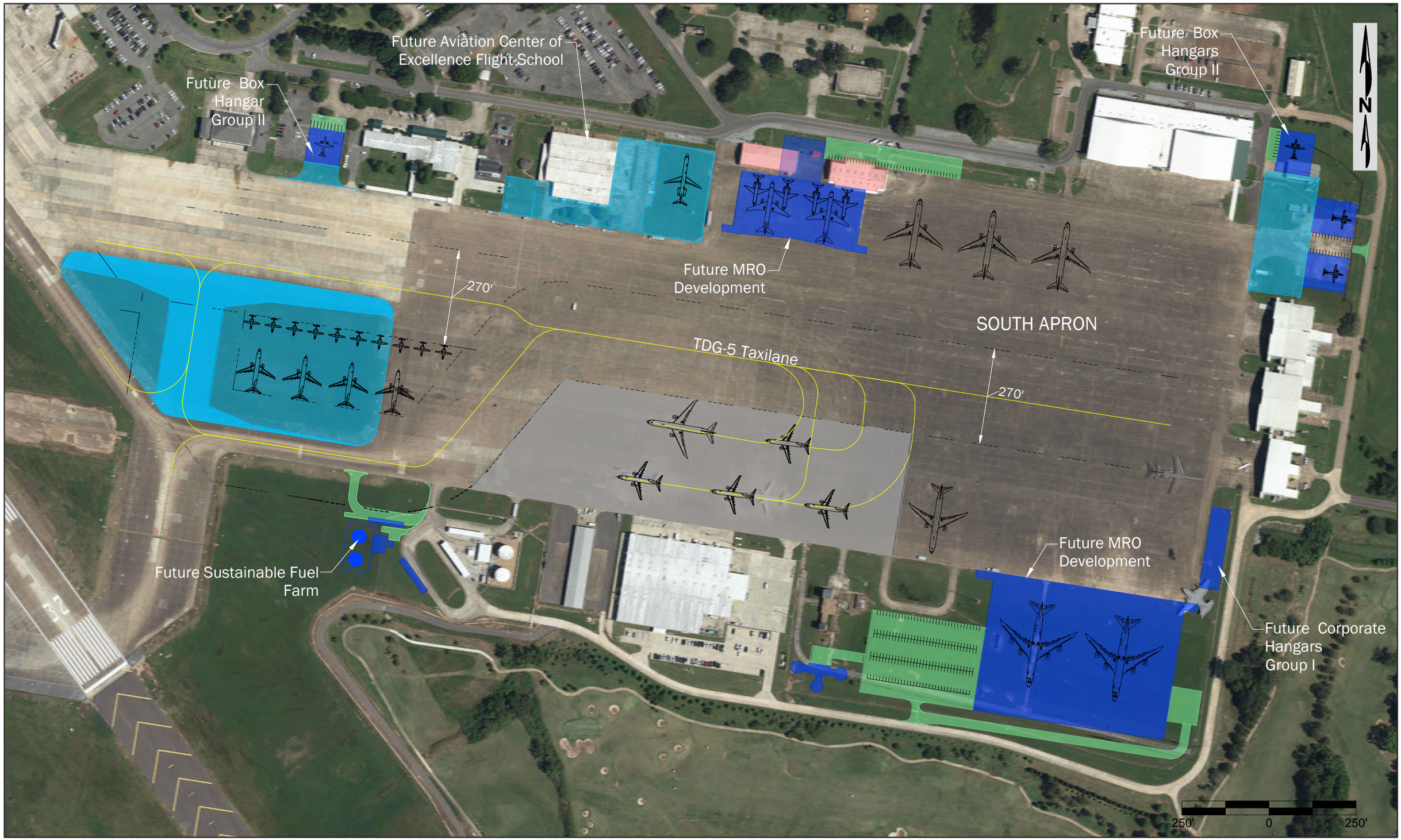
At the apron's southeast corner, a row of hangars for ADG I aircraft is proposed in support of increased demand for aircraft storage. The area could accommodate four aircraft in a box hangar layout. T-hangars could provide more parking capacity, however; that would require maneuvering area on both sides of the T-hangars, similar to the existing ones next to the fuel farm. Access to the box hangars would be provided via Billy Mitchell Boulevard.

Another need that was established from the discussions with airport staff is the addition of MRO Facilities. Alternative 1 proposes two new MRO facilities, a large MRO facility capable

of housing ADG V aircraft located near the apron's southeast corner, and a smaller facility located near the apron's north side. The placement of the larger facility to the south allows for additional ICE aircraft parking, but only provides room to park one ADG V aircraft adjacent to the proposed MRO facility. The placement and size of the smaller MRO facility located on the north side of the apron can accommodate ADG IV or smaller aircraft and provides apron space for additional aircraft parking to the east of the facility, addressing the airport's need to provide additional on apron aircraft parking. Just to the west of this MRO facility is a proposed apron area for additional aircraft parking. The idea is for aircraft to be able to use this area in the immediate future, and ultimately use it to park aircraft in support of the new Aviation Center of Excellence (ACE) flight school.

In the previous master plan update, a dual taxilane system was proposed to accommodate wide-body aircraft. However, the addition of ICE operations at the airport makes the dual taxilane system unachievable. Therefore, Alternative 1 proposes a single TDG 5 taxilane that runs through the middle of the apron. This taxilane and its associated TOFA allows for enough apron space for aircraft to be parked on either side of it while maintaining the appropriate TDG-5 separations. The placement of the proposed taxilane gives ICE approximately 398,000 square feet of apron in front of its facility to support the movement and parking of Boeing 737 and 767 aircraft parallel to the facility.

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5.5.1.5 South Apron Alternative 2

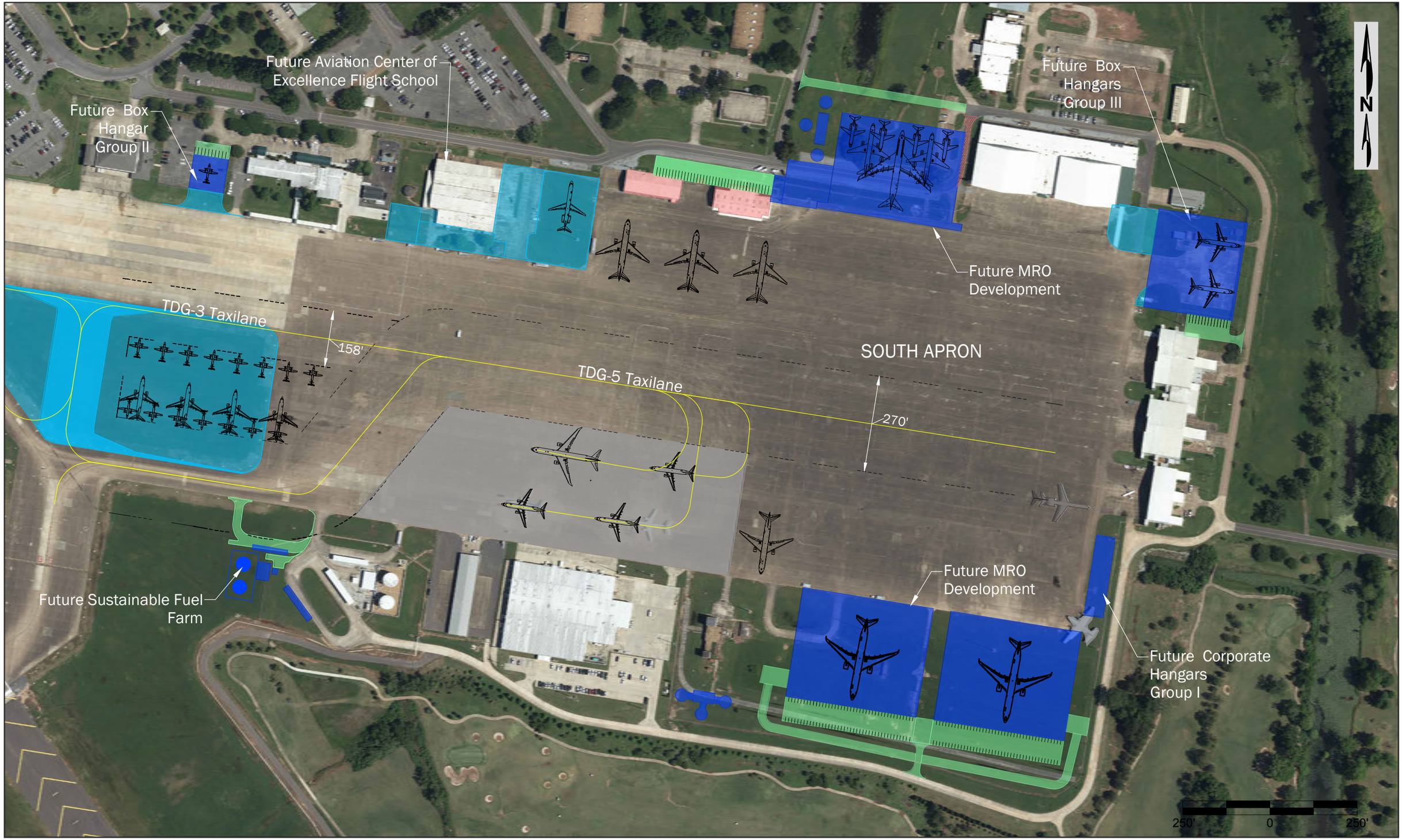
As shown in **Figure 5-11,** South Apron Alternative 2 carries over several of the same ideals as Alternative 1. In this alternative the grass infield on the South Apron is still proposed to be fully paved. This will provide a route for aircraft to taxi to the apron's north side. The taxilane running across the northern portion of this apron will be designed to TDG 3 standards, in contrast with the TDG 5 taxilane proposed in Alternative 1. This will provide more available apron on the north side and in the proposed paved area that can be used for aircraft parking, including multiple rows for ADG II and smaller sized aircraft or one row of parking for ADG III or larger aircraft. As this alternative restricts the flow of large aircraft across the northern taxilane, the southern taxilane serves as the only exit and entrance option for larger aircraft to the South Apron.

In Alternative 1, there was a focus on individual box hangars for ADG II aircraft. Alternative 2 only proposes two box hangars. However, the box hangar proposed in the apron's northeast corner is approximately 260 feet by 280 feet. Although this alternative offers fewer individual box hangars, the larger hangar is capable of accommodating multiple ADG II or smaller aircraft simultaneously. The ADG II box hangar located east of the ARFF facility is carried over from Alternative 1. This alternative also includes the ADG I hangars proposed at the southeast corner of the apron. All hangars proposed can be accessed by Billy Mitchell Boulevard.

Alternative 2 proposes multiple MRO facilities as well. Compared to the previous alternative, a larger facility is located on the apron's north side, and two smaller facilities are located near the southeast corner. The facilities' location and size eliminate some of the area that can be used for aircraft parking by ICE and others, but still addresses the airport's desire to for MRO facilities on both the north and south sides of the South Apron. The two smaller MRO Facilities can each accommodate up to one ADG V aircraft at a time. Multiple aircraft can park to the west of the northern MRO facility. Carried over from Alternative 1 is the proposed paved area west of the North MRO facility that can be used to park additional aircraft or be used for training purposes by students enrolled at the mechanic training school (Building 2102) located on the northern side of the South Apron.

Alternative 2 also includes a TDG 5 taxilane that runs through the middle of the South Apron. Aircraft operated by ICE will be able to use this taxilane to gain access to the ICE operations area. Compared to the previous alternative, the proposed MRO facility on the south end of the apron reduces the amount of available apron area for ICE from 398,000 square feet to approximately 347,000 square feet.

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5.5.2 North Apron - Military/Cargo Apron

The Military/Cargo Apron and the North Apron both serve military and general aviation aircraft. The North Apron is the closest one to the Runway 18-36, which connects with the North Apron through the partial parallel Taxiway B and its connector B2 that leads with a 90 degree turn directly to the Military/Cargo Apron. Taxiway B ends at the intersection with Taxiway A at the west corner of the North Apron.

The existing North Apron has an approximate area of 1,723 feet by 295 feet, and it is mostly used for General Aviation (GA) and military operations. It connects with the Military/Cargo Apron to the northeast, creating an opportunity to share resources between these two infrastructures. During peak periods, the North Apron is used for parking/staging of military helicopters used for training activities, utilizing the available parking space at that ramp.

Additionally, it is foreseen that the North Apron area is suitable to accommodate general aviation demand. Currently, the North Apron taxilane has a TDG-5 designation. However, the parking space available can only accommodate ADG II aircraft without penetrating the TOFA.

5.5.2.1 Previous North Apron Area Development Plan

The 2009 Master Plan Update proposed to pave the grassed area between the Military/Cargo Apron and the North Apron to accommodate helicopter parking. According to Airport Management, the development of this area is needed to serve the high demand for military helicopter parking, while the North Apron is needed for fixed-wing aircraft parking.

5.5.2.2 North Apron Area Development Alternative

The master planning process proposes alternatives that respond to the current and future airport needs and forecast activity, identifying opportunities to optimize the use of the existing infrastructure or for new infrastructure development. During the Master Plan Update, different development options were analyzed for the North Apron to build an appropriate alternative that reflects the airport's objective.

These development options attempt to serve ADG IV aircraft without interfering with helicopter operations and provide enough parking space to safely accommodate military operations in conjunction with the projected General Aviation aircraft movements. To achieve that goal, the alternative shown in **Figure 5-12** includes the expansion of the North Apron and provides opportunities for hangar development and helicopter parking.

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N
New Midfield Apron (N)
Forwarding Arming and Refueling
New Midfield Apron (S)
Military/Cargo Apron
Vehicular Access Point
Reserved for Future Hangar Development
Wash Rack
TDG-4 Taxilane
North Apron
Mayer Avenue
Future Airport Observation Area
120'
100'
200'
300'
Reserved for Future Box Hangar Development
Kegleman Boulevard
Frank Andrews Boulevard
Chaple James Avenue
450'
0
450'

5.5.2.3 Apron Expansion

The North Apron expansion will provide enough apron space to park ADG IV aircraft like the C-17 Globemaster without penetrating the taxilane TOFA. This expansion would require additional pavement, approximately 85 feet wide, and the relocation of the TDG-4 taxilane centerline to the north. This action also requires the reconfiguration of the Taxiway A and Taxiway B intersection.

5.5.2.4 New Hangars

Adjacent to the North Apron, three individual ADG II box hangars are proposed with a shared apron area. Each hangar is 120 feet by 100 feet with 50 feet of separation to meet fire protection requirements. Parking and access to the hangar area is provided via Mayer Avenue.

Additionally, an area of 200 feet by 300 feet is reserved for future military hangar development use on the south side of the Military/Cargo Apron.

5.5.2.5 Helicopter Parking

Carrying over the previous master plan recommendation of developing two mid-field aprons dedicated to helicopter parking, this Master Plan Update also recommends paving the grassed areas adjacent to the Military/Cargo Apron to accommodate future military helicopter parking needs. This proposed development option incorporates underground drainage facilities to optimize helicopter parking capacity.

Since the previous study, revised design criteria contained in FAA AC 150/5390-2C, *Heliport Design*, and the Department of Defense's Unified Facility Criteria (UFC) were used to define the appropriate dimensions for the helicopter parking layout. Since this area is primarily used by military aircraft, it is recommended to prioritize compliance with the UFC.

According to the UFC, mass parking of rotary-wing aircraft will require an apron designated for rotary-wing aircraft; Thus, the layout to serve the helicopter activity has been divided into two separate zones:

- In the northern area configuration (114,952 square yards), helicopters park in a single-lane, perpendicular to the taxilane, providing adequate rotor blade clearances to all sizes of rotary-wing aircraft, except the CH-47 and CH-53. The parking space dimensions recommended by the UFC for this group of aircraft is a width of 80 feet and a length of 100 feet. However, to comply with the FAA requirements, the recommended parking space dimension for the new AEX helicopter apron will be 90 feet wide by 100 feet long. This apron would be capable of parking 42 UH-60 Blackhawk helicopters.
- The southern area (142,712 square yards.) differs from the above, as the separation between rotors and the aircraft bodies for the CH-47 Chinook is greater than the other helicopters. The parking space dimensions for the CH-47 are 100 feet wide by 150 feet long. This area can accommodate 27 CH-47 Chinook helicopters.

Moreover, the Forward Arming and Refueling Point (FARP) would be relocated to the northside of the Military/Cargo Apron, while a wash rack can be accommodated in the southern area.

The proposed helicopter aprons include taxilanes to provide safe passage of the aircraft across the apron based on the type of aircraft, in compliance with the technical specifications described in UFC-3-260-01.

5.5.2.6 Other Infrastructure

As previously mentioned, Taxiway B2 leads directly from the Military/Cargo Apron to the runway, which is discouraged by FAA airfield design criteria. As there are no other options to resolve this issue, a holding bar marking is recommended on Taxiway B2 prior to its intersection with Taxiway B.

Based upon discussions with Airport Management and stakeholders, a 107,239 square foot parcel has been reserved next to the Terminal Building for an observation park, open to the community.

No changes at the Military/Cargo Apron layout are foreseen.

5.5.3 Terminal Apron

The Terminal Apron serves all the commercial passenger flight activities. The apron has four stands with its associated Passenger Boarding Bridges (PBB). One of the stands can accommodate ADG III aircraft (i.e., Boeing 737-4), the other three accommodate ADG II aircraft (i.e., ERJ-145 and CRJ-200).

After evaluating the apron capacity in contrast to the forecast demand and the fleet mix, it was established that the existing apron is capable of accommodating forecast demand throughout the 20-year planning horizon of the Master Plan Update. However, as the PBBs achieve their useful life, the airport should incorporate PBB replacement into their Capital Improvement Program.

5.5.4 Ground Support Equipment Areas

Airlines are requesting a Ground Support Equipment (GSE) area to perform light maintenance activities. Currently, this is accomplished under the Terminal Building in an area used for deicing equipment storage.

Moving the maintenance area next to the Terminal would provide capacity relief for the storage area underneath the building. A centralized location for the storage of deicing machines and fluid could be located adjacent to the existing Delta GSE area, requiring pavement expansion, a power connection, and drainage infrastructure.

The proposed terminal area development also includes the installation of an additional power generator to support the terminal operation during an emergency. This requirement was initial identified in August 2020, after Hurricane Laura passed through Alexandria and impacted AEX terminal operations.

The improvements proposed for the Terminal Apron area are depicted in **Figure 5-13.**



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5.6 Terminal Improvements

AEX's Terminal building, inaugurated in December 2006, is in good condition. The Terminal has three levels and an integrated Airport Traffic Control Tower, providing sufficient area for landside passenger processes and services.

The capacity assessment concluded that the Terminal has the capacity to accommodate passenger demand over the next twenty years, offering an adequate level of service. However, other requirements were identified as part of this Master Plan Update to improve the operational efficiency of the Terminal.

5.6.1 Check-in – Outbound Baggage Screening

The number of ticket counters and available queuing space satisfies current and future needs. As mentioned during the requirements analysis, the check-in counters respond to the airlines' check-in processes, except for the outbound baggage conveyors.

It is recommended that the airport develop a well-designed and well-placed Checked Baggage Inspection System (CBIS) that includes an Explosive Detection System (EDS) to minimize impacts to TSA, airport, and airline operations. The current configuration impacts the efficiency and reliability of the system.

According to TSA Planning Guidelines and Design Standards for CBIS, input lines should merge in a mainline to create a main delivery conveyor line that delivers baggage to the EDS line. Once the baggage has been screened and cleared, a mainline that converges the different screening levels should transport the bags to the make-up area.[35]

The Master Plan Update recommends the reconfiguration of the Baggage Handling System and replacing the equipment for more recent and improved models. A future design project of the area shall be conducted to design a system that complies with TSA standards.

5.6.2 Security

As part of the Master Plan Update, the planning team evaluated the current needs and held meetings with TSA representatives to assess future requirements. As a result, it is recommended that the Security Screening Area be expanded to add a second screening checkpoint. This expansion shown in **Figure 5-14** will allow the airport to reconfigure the queuing space efficiently while keeping the hold room's exit gate in the current location and without impacting other terminal facilities.

[35] TSA -Planning Guidelines and Design Standards Version 6.0 for Checked Baggage Inspection Systems-Version 6.0


MECH RM
OFFICE
SHELL SPACE
TEL./COM.
MEZZANINE
AIRPORT SECURITY
TOILET
SHELL SPACE (CONCESSION)
TOILET
SHELL SPACE (CONCESSION)
SHELL SPACE (CONCESSION)
ELEC
TEL./COM.
PUBLIC CIRCULATION
TSA OFFICE
SEARCH RM
EXIT
TO GATES
HOLD ROOMS
20'
0
20'

5.6.3 Holdroom

As reported in Chapter 4, the holdroom presently accommodate the current traffic providing the minimum area and sitting space to serve demand during peak hour conditions for the four gates. Currently, no expansions are required. However, in the event that an additional air carrier enters the AEX market, or the airlines update the operational fleet mix in the future, the expansion of the holdroom may need to be reevaluated. Holdroom capacity requirements should be assessed every five years to incorporate additional air carriers or potential changes in airline equipment.

5.6.4 Baggage Claim

Baggage claim functions are located on the lower level of the Terminal. Although baggage claim facilities are sized sufficiently to meet future demand, it is recommended that maintenance be conducted regularly on the baggage claim system to maximize its useful service life. The equipment is a one-of a kind design making it difficult to find replacement parts required for maintenance and repairs.

5.6.5 Parking

AEX has different parking lots in the airport's surroundings as part of the England Airpark. In front of the terminal building is the main parking lot for public access; this is a paid parking facility for short- and long-term use.

Rental Car Parking is located on the east side of the terminal. The area is divided into the "return" and "ready" lots, respectively. The Employee Parking Lot is located further to the east, along Billy Mitchell Boulevard.

Although the capacity assessment determined that the existing infrastructure could serve the forecasted demand during the planning period, after meetings with the airport staff and the Stakeholder Advisory Committee, other operational and functional issues were identified. The following options are intended to resolve those issues.

5.6.5.1 Main Parking Lot – Visitors and Passengers

The capacity assessment reflected that the main parking lot has enough capacity to serve demand over the next 20 years, not requiring an expansion or additional parking spaces. However, having one exit lane does not provide the operational efficiency required during peak hour periods, nor does it utilize the latest technology expected at airports (i.e., autopay lane).

As a result, an additional exit lane is proposed to implement autopay and improve the level of service for vehicular parking, as shown in **Figure 5-15.** According to Airport Management, parking area pavement maintenance projects are ongoing.

5.6.5.2 Employee Parking

Employee Parking is located northeast of the terminal. The area is approximately 14,700 square feet in size with 48 parking spaces. An additional lane of 15 parking spaces is also located at the front, along Billy Mitchel Boulevard.

Both employee parking lots lack ADA parking space and are unsecured. The areas are sometimes used by passengers, thus reducing the available space for employees. To improve this condition, the Master Plan recommends the installation of arm gates with controlled access by a proximity card or decal provided by the airport to employees.

It is also recommended to remove the parking lane along Billy Mitchell Boulevard and establish additional parking spaces closer to the terminal building to reduce the walking distance, add the required ADA spaces, and improve the employee parking experience.

Currently, the airport has over 50 direct permanent employees; it is projected to provide at least 60 to 70 parking spaces at the new location to offer sufficient parking space for concession employees in addition to permanent staff and the Authority personnel.

This new employee parking is proposed between the car rental parking lots. The apron fence would be relocated to the southwest to provide enough room to accommodate the required parking spaces. A dedicated entrance/exit with gated access, and a terminal access walkway is provided as depicted in **Figure 5-15.**

5.6.5.3 Car Rental Facilities

The rental car companies that operate at AEX park their vehicles at the parking lot next to the Passenger Terminal. The adjacent parking lot is dedicated to picking up ready vehicles – "clean cars." It has an area of 22,765 square feet with a capacity of approximately 67 parking positions. The return parking lot area is 34,756 square feet and has a capacity of approximately 93 parking positions.

During the airport site visit and discussions with the airport management, it was observed that the rental car parking lot is often mistakenly used as passenger parking, or sometimes passengers return the rented car to the ready lot instead of the return lot.

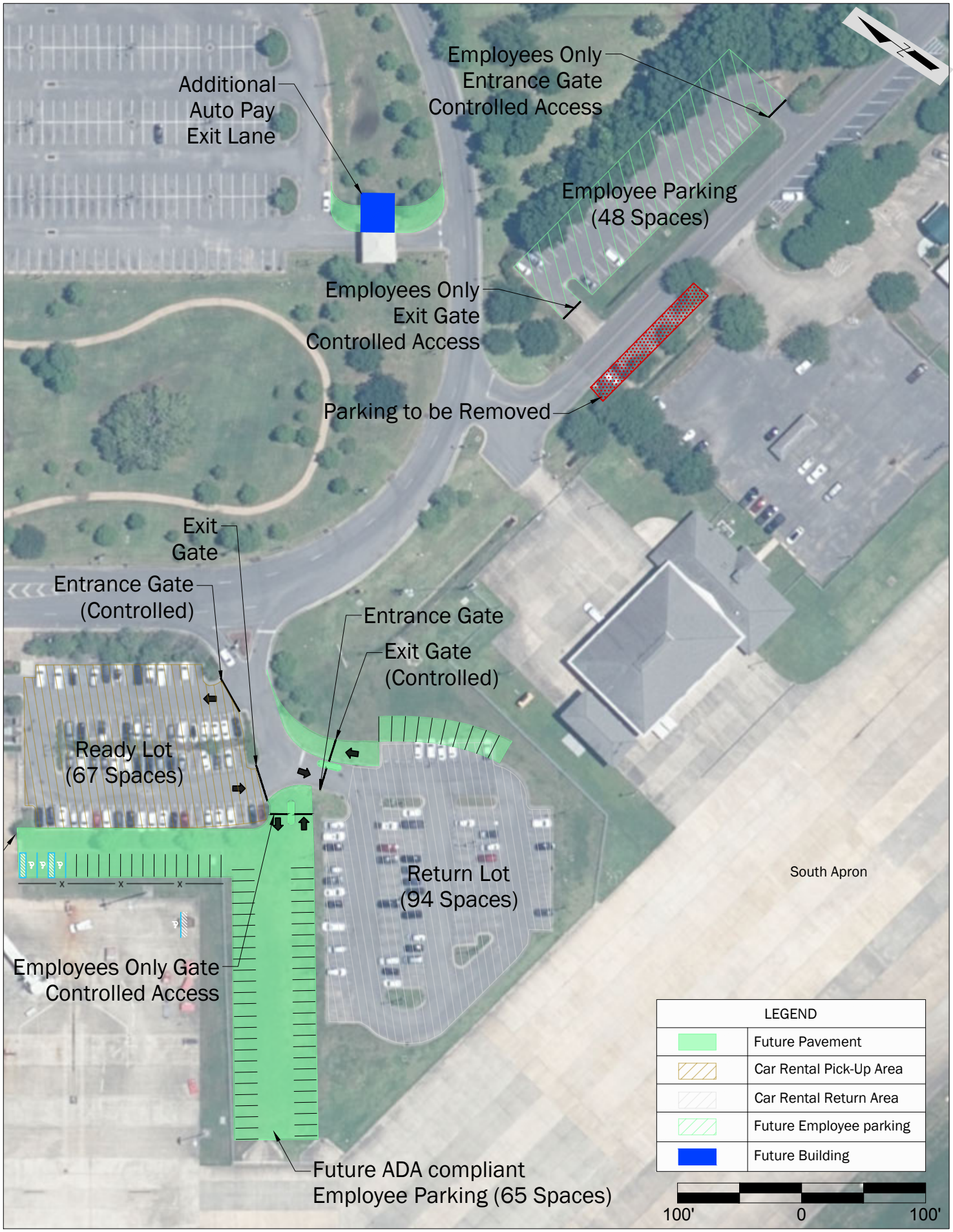
The rental car companies have requested a system that maintains separation between the ready vehicles and the return vehicles. As a solution, arm gates to exits and entries on both parking lots are proposed to address this need.

At the ready lot, the entrance gate could be located at the first right turn. This entrance should be controlled by a system that provides security and avoids the entry of non-rental vehicles. This control could be provided by a code, proximity card, or a decal provided by the rental companies.

The exit of the ready lot could be located at the second right turn. The exit should have an arm gate to prevent access. However, the arm gate could be activated only by a proximity sensor located inside the parking lot. In that way, it is ensured that no vehicle could gain access from outside the lot.

The entrance and exit to the return lot would remain the same from the Billy Mitchell Boulevard. It is proposed to extend the entrance pavement to provide a double lane entrance and exit divided by a concrete island. Both should have arm gates to avoid any intrusion. Similar to the ready lot, controlled gates should be provided at this location.

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Additional
Auto Pay
Exit Lane
Employees Only
Entrance Gate
Controlled Access
Employee Parking
(48 Spaces)
Employees Only
Exit Gate
Controlled Access
Parking to be Removed
Exit
Gate
Entrance Gate
(Controlled)
Entrance Gate
Exit Gate
(Controlled)
Ready Lot
(67 Spaces)
Return Lot
(94 Spaces)
South Apron
Employees Only Gate
Controlled Access
Future ADA compliant
Employee Parking (65 Spaces)
LEGEND
Future Pavement
Car Rental Pick-Up Area
Car Rental Return Area
Future Employee parking
Future Building
100'
0
100'

5.7 Westside Development

The previous update of the master plan proposed a Westside Business/Industrial Campus to incentivize the airport and the region's economic development. The planning team validated this option and updated it based on the current airport needs and the future potential for development projects on the airport's westside.

The previous master plan proposed approximately 822 acres for that use; however, it is essential to reflect that the parallel taxiway recommended in this Master Plan Update is 500 feet from the runway centerline in contrast with the 600 feet proposed by the previous master plan. The proposed taxiway configuration at the Runway 14 end reduces the available space for other development. Other parcels included in the last master plan are not incorporated in this development option as those are not located on airport property. The resulting Westside Development area proposed in this study encompasses approximately 722 acres that would be subdivided by parcels.

The previous master plan alternative proposed 31 parcels (an average of 25 acres each). However, based on revised requirements and discussions with the airport management, new projects and tenants were identified, resulting in the adaptation of the proposed layout.

Currently, the England Authority has leased an area on the southwest side to FEMA as an emergency distribution center. This is a 2-year lease; however, the tenant is interested in developing a long-term distribution center. The parcels where FEMA operations take place are highlighted in **Figure 5-18.**

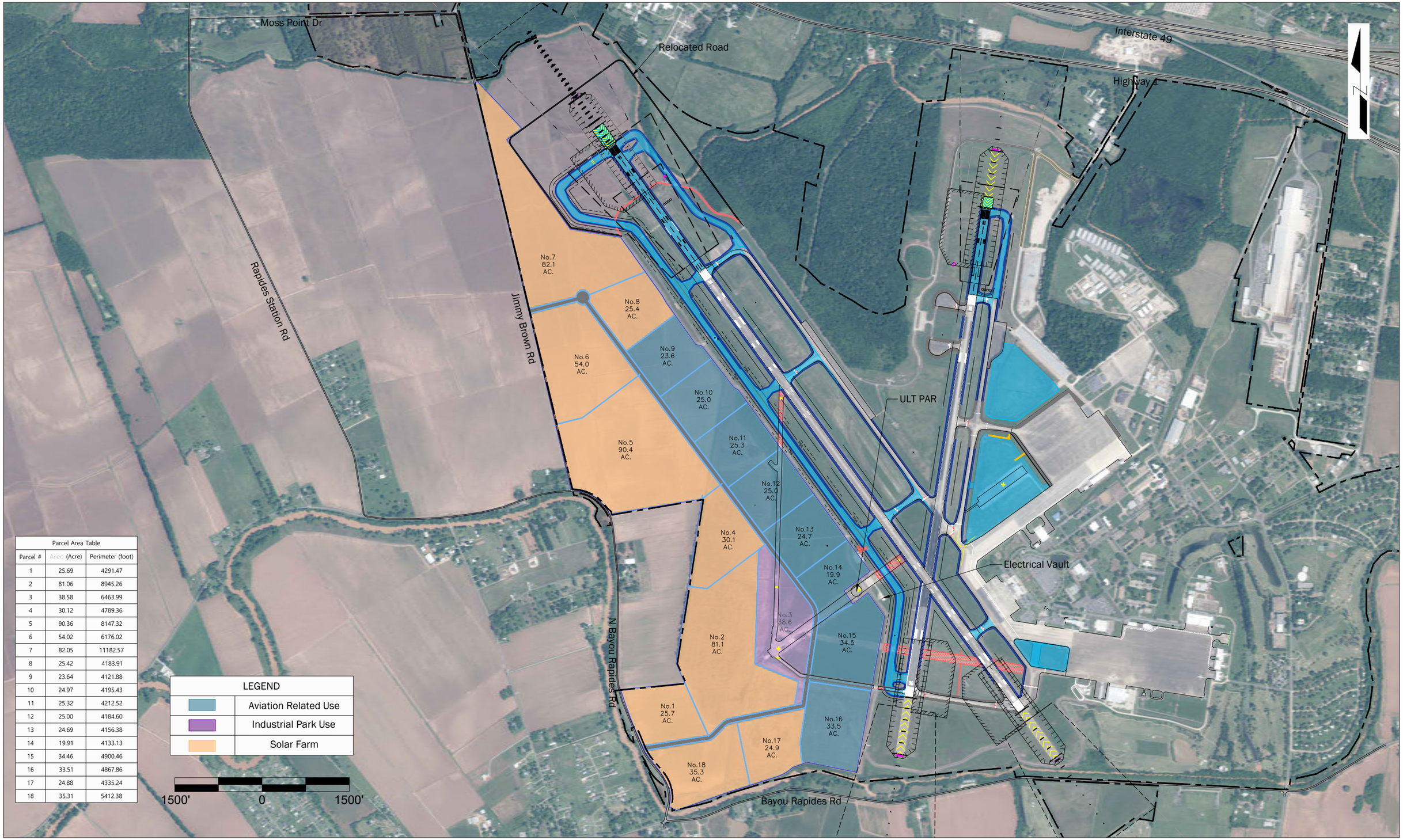
The airport also has the vision of developing a solar farm within the Westside Development Area which requires modifying the division of parcels. **Figure 5-16** depicts that the proposed Westside Development includes 18 parcels. The westernmost lots would be dedicated to solar farm development. These parcels are the largest and extend along Jimmy Brown Road and N. Bayou Rapides Road.

The parcels with airside access to the new parallel taxiway should be destined for aviation-related uses (i.e., FBO, Air Cargo, or MRO facilities). Other parcels could be used for industrial or business development (i.e., warehouses, distribution centers, or other related activities).

The Westside Alternative includes the development of internal roads to allow connectivity with principal roads and facilitate the mobility of workers and clients. Access to the Westside Business/Industrial Campus is available via North Bayou Rapides Road, continuing to Jimmy Brown Road.

Other roadway improvements include a road connection between Interstate 49 and Louisiana Highway 1 to connect to the future Westside Business/Industrial Campus.

Furthermore, the west side development also includes the selected site for relocation the precision approach radar (PAR) facility, which should be reserved. In addition, any impact on the Electrical Vault should be avoided (see **Figure 5-18**).



Parcel Area Table		
Parcel #	Area (Acre)	Perimeter (foot)
1	25.69	4291.47
2	81.06	8945.26
3	38.58	6463.99
4	30.12	4789.36
5	90.36	8147.32
6	54.02	6176.02
7	82.05	11182.57
8	25.42	4183.91
9	23.64	4121.88
10	24.97	4195.43
11	25.32	4212.52
12	25.00	4184.60
13	24.69	4156.38
14	19.91	4133.13
15	34.46	4900.46
16	33.51	4867.86
17	24.88	4335.24
18	35.31	5412.38

Westside Development Option - Parcels

Figure 5-16

5.7.1 Air Cargo

In recent years, US airports have experienced significant growth in air cargo operations. Air cargo carriers are demanding more space at airports around the country, particularly in support of the exponential growth of E-commerce, even more, accelerated by the current Covid-19 Pandemic. Demand for such facilities is market driven and this plan offers the ability to take advantage of such opportunities in the future.

To provide AEX with a plan to maximize revenue development opportunities that take advantage of the future runway extension and new parallel taxiway, the Westside Development plan includes the construction of air cargo facilities with an apron area capable of accommodating a typical cargo aircraft as large as the Boeing 747-8F. This area is suitable for aviation-related development due to its accessibility to the airfield and the community. Although the airport's westside does not currently have the utility infrastructure to readily construct the proposed facilities, this area is best reserved to accommodate long-term demand for cargo/logistics facilities in support of the Master Plan's land use recommendations.

The Westside Development Option demonstrates that three Air Cargo Terminal facilities of 200,000 square feet each could be constructed, as it also requires new taxiways (including the full-length parallel taxiway west of Runway 14-32), ramp/aircraft parking construction and utilities infrastructure to access the facilities from the west side of the airport. The Cargo Terminals are designed to be constructed in phases to better accommodate future market conditions, demand, and infrastructure requirements.

The proposed cargo development option is depicted in **Figure 5-17.**

5.7.2 Other Aviation-Related Development

As mentioned previously, the parcels next to the new parallel runway are also suitable for other aviation-related uses, such as a future FBO, aircraft hangars, or MRO facilities that could be developed in addition to the cargo facilities, as shown in **Figure 5-18**.

During the alternative's development process, Airport Management provided feedback indicating their desire to preserve an additional area to develop a large-scale MRO or aviation manufacturing facility capable of accommodating larger wide-body aircraft (i.e., Boeing 747-8F and Boeing 777). As a result, a 220,000-square foot MRO hangar facility is proposed southeast of the cargo development area. The proposed MRO hangar and associated apron accommodate up to two Boeing 747-8F aircraft. It is important to note that this is one of the few areas available for such large-scale development and the proposed site is conveniently located near I-49. However, the new airfield development (i.e., parallel taxiway, airfield lighting, and apron improvements) also requires supporting infrastructure such as roadway access and utilities.

In the past there have been inquiries regarding the potential of developing other general aviation facilities on the west side of the airport. As a result, the Westside Development Option reserves two sites capable of accommodating a future FBO, hangar development, and the support services for those operations.

RUNWAY 14-32

NEW PARALLEL RUNWAY

747-8F (Typ.)

Fence

ACT
200,000 sf

Proposed
Parking

ACT
200,000 sf

Proposed
Parking

ACT
200,000 sf

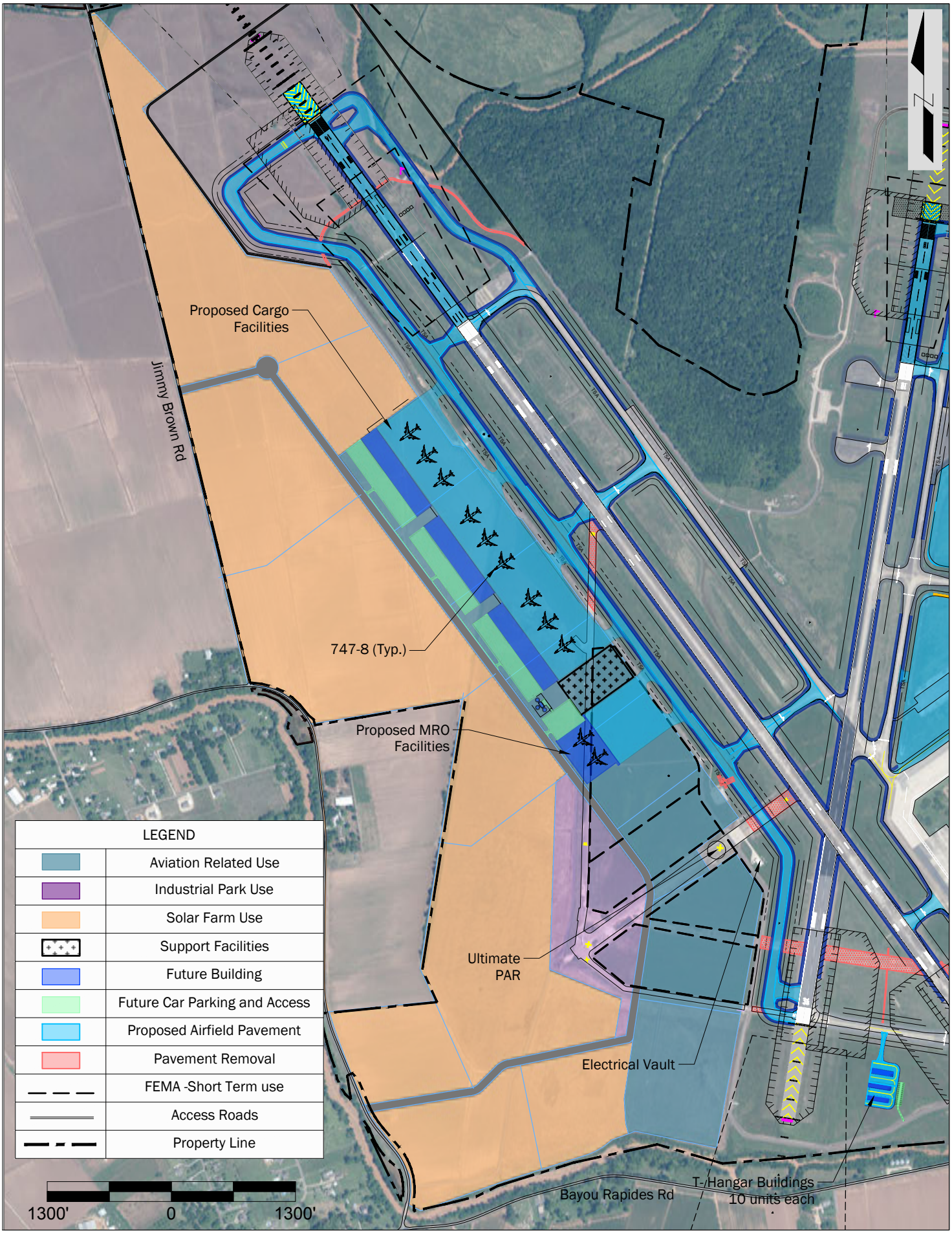
Proposed
Parking



Key Map - N.T.S.

LEGEND	
	Proposed Airfield Pavemet
	Shoulder
	Pavement Removal
	Apron GSE
	Proposed Building
	Proposed Parking and access

250' 0 250'


Proposed Cargo Facilities
Jimmy Brown Rd
747-8 (Typ.)
Proposed MRO Facilities
Ultimate PAR
Electrical Vault
T-/Hangar Buildings 10 units each
Bayou Rapides Rd
LEGEND
Aviation Related Use
Industrial Park Use
Solar Farm Use
Support Facilities
Future Building
Future Car Parking and Access
Proposed Airfield Pavement
Pavement Removal
FEMA -Short Term use
Access Roads
Property Line
1300'
0
1300'

5.7.3 Solar Farm

Renewable energy is gaining more attention every day. As the technology matures, solar systems have become more reliable and provide an alternative energy source that results in cleaner air and fewer greenhouse gases that contribute to climate change.

Several airports in the US have considered solar farm opportunities as part of the airport master planning process. The solar energy can be used to support airport operations, reduce carbon emissions on the path towards reaching carbon neutrality, and provide a source of generating electricity for the regional system.

Following the industry trends and the airport's commitment to generate a more sustainable operation, AEX desires to collaborate with a developer to construct a solar farm on the westside of the airport in areas not preserved for aeronautical development.

Figure 5-16 reflects the sites proposed for this development. The proposed development area is certified and ready for use. The expectation is to develop approximately 500 acres of solar farm, which would make it one of the largest airport-based solar farms in the US.

To successfully complete this project, efficient planning, design, and coordination between entities is vital, as well as following FAA technical guidance. The developer and the airport must prevent any incompatible use or impact on aeronautical operations.

5.7.4 Industrial Use

The Westside Campus could also accommodate other non-aviation related uses. The area shown in **Figure 5-18** is well-suited for warehousing, logistics, and business-related developments that could take advantage of the airport's proximity to the regional transportation system and proposed cargo facilities. This is an opportunity to create additional revenue streams for the airport and boost the socioeconomic development of the airport and the England Airpark.

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5.8 Airport Support Facilities

5.8.1 Aircraft Fuel Storage

The previous master plan recommended relocating the fuel farm from the northeast quadrant of the airport to a more secure location that follows FAA regulations.

As a result, the airport relocated the fuel farm to the South Apron with adequate capacity to serve the airport's needs over the next 20 years. Therefore, additional expansion is not foreseen.

However, as mentioned in the requirements chapter, the aviation industry has set the goal of becoming carbon neutral. ICAO Conference on Aviation and Alternative Fuels (CAAF/2) recognized that the sustainability of alternative aviation fuels is of essential importance to the efforts of international civil aviation to reduce its CO2 emissions.

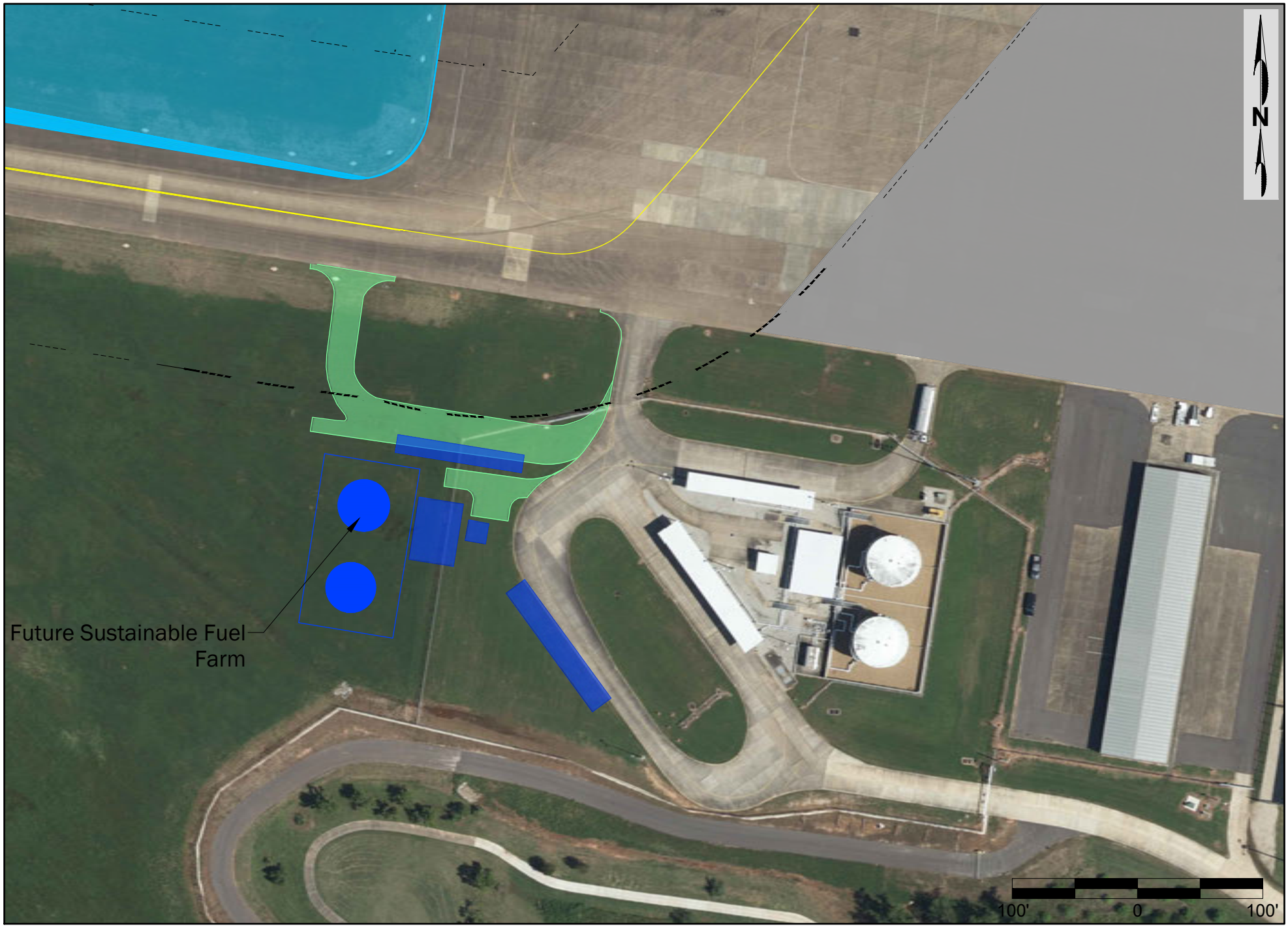
In addition, several leading airlines are signing significant forward purchase agreements which help provide offtake certainty to new energy suppliers, allowing them to finance new plants. As a result, it is anticipated that airlines, in the short-term future, will start requesting a supply of Sustainable Aviation Fuel (SAF) at airports throughout the US.

The Master Plan Update recommends reserving an area adjacent to the existing Fuel Farm to accommodate SAF storage in the future. SAF storage and supply requirements are consistent with the existing fuel farm. These facilities could be developed by the airport or in conjunction with a supplier with this capability. The SAF storage area is depicted on **Figure 5-19.**

5.8.2 Airport Maintenance Storage Facilities

Currently, airport maintenance storage facilities are located at ground level of the Terminal Building adjacent to the baggage return and makeup areas. As mentioned previously, this area is congested because it is also used to store deicing equipment and perform light maintenance activities. Relocating that equipment as proposed in the Terminal Apron section will provide more space to improve baggage handling activities.

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N
Future Sustainable Fuel Farm
100'
0
100'



Chapter 6
Preferred Airport Development

FLYAEX
ALEXANDRIA INTERNATIONAL AIRPORT

6 PREFERRED AIRPORT DEVELOPMENT

Based on input from England Authority staff, the Stakeholder Advisory Committee, and comments from the public, refinements to the alternatives are needed to address issues raised or direction received during the review process. As a result, this process involves the revision of options or the combination of individual alternatives into a new preferred development plan for implementation.

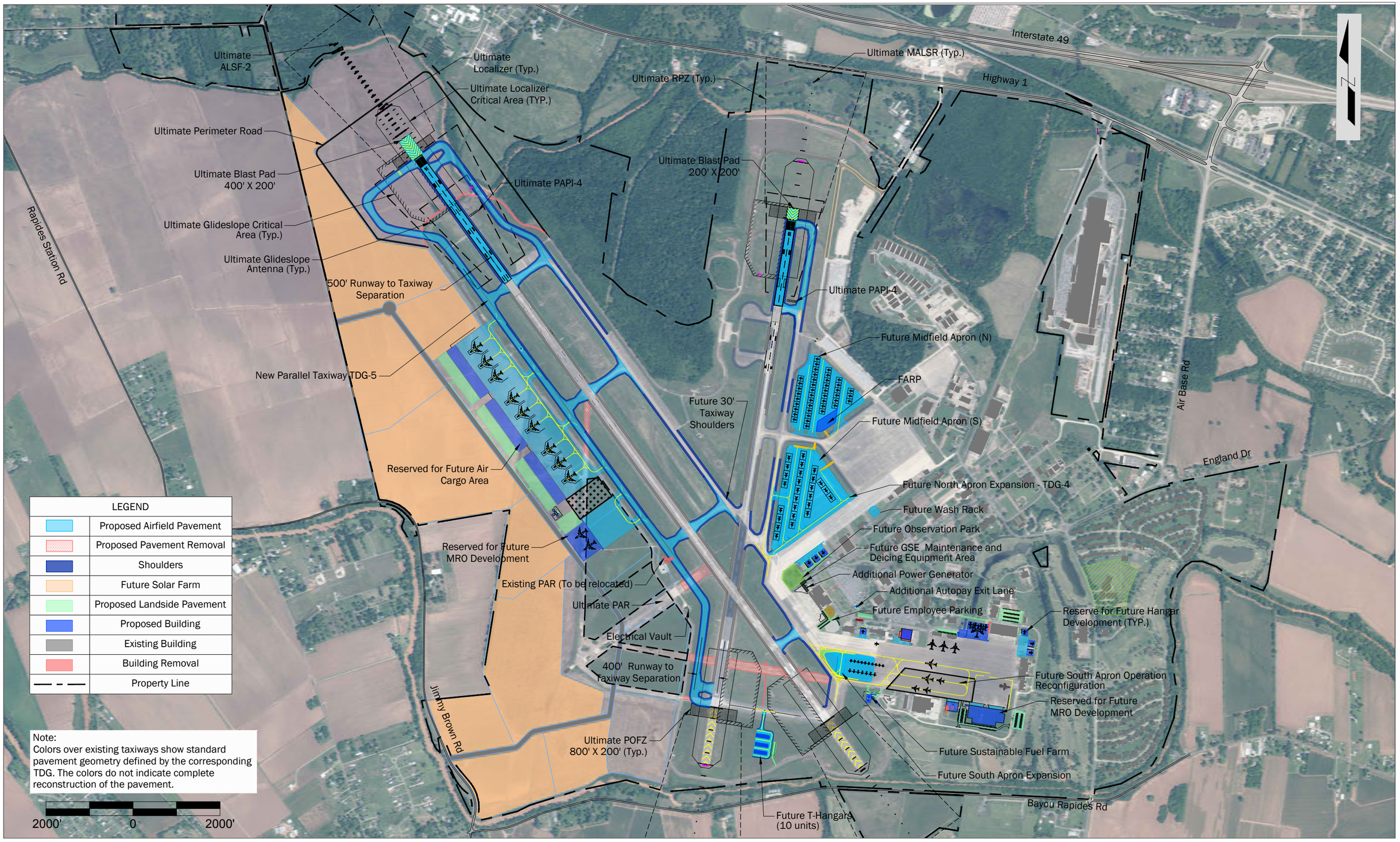
This chapter identifies and documents the rationale for the refinement of the airport alternatives. At the end of this process, the revised analysis focuses on the Master Plan's recommendations. In addition to these recommendations, a more detailed list of capital improvement projects is presented in Chapter 7, Implementation Plan. The preferred airport development plan will ultimately be utilized as the foundation for preparation of the Airport Layout Plan drawing set.

After consulting with stakeholders and analyzing the pros and cons of each alternative presented in the previous chapter, a combination of the proposed facilities and future improvements results in a preferred airport development plan based upon its capabilities, capacity, and implementation benefits.

The preferred development plan includes the expansion of aircraft parking aprons, new hangar development, and the improvement of passenger terminal facilities, landside access, and additional support facilities. Furthermore, areas dedicated to industrial park and solar farm development are also included in the plan to account for future growth and the highest and best use of airport property.

The preferred airport development plan is depicted in **Figure 6-1**.

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Ultimate ALSF-2
Ultimate Localizer (Typ.)
Ultimate Localizer Critical Area (TYP.)
Ultimate RPZ (Typ.)
Ultimate MALSR (Typ.)
Interstate 49
Highway 1
Ultimate Perimeter Road
Ultimate Blast Pad 400' X 200'
Ultimate PAPI-4
Ultimate Blast Pad 200' X 200'
Ultimate Glideslope Critical Area (Typ.)
Ultimate Glideslope Antenna (Typ.)
Rapides Station Rd
500' Runway to Taxiway Separation
Ultimate PAPI-4
Future Midfield Apron (N)
FARP
New Parallel Taxiway TDG-5
Future 30' Taxiway Shoulders
Future Midfield Apron (S)
Air Base Rd
England Dr
Reserved for Future Air Cargo Area
Future North Apron Expansion - TDG-4
Future Wash Rack
Future Observation Park
Future GSE Maintenance and Deicing Equipment Area
Additional Power Generator
Additional Autopay Exit Lane
Future Employee Parking
Reserve for Future Hangar Development (TYP.)
Reserved for Future MRO Development
Existing PAR (To be relocated)
Ultimate PAR
Electrical Vault
400' Runway to Taxiway Separation
Future South Apron Operation Reconfiguration
Reserved for Future MRO Development
Jimmy Brown Rd
Ultimate POFZ 800' X 200' (Typ.)
Future Sustainable Fuel Farm
Future South Apron Expansion
Bayou Rapides Rd
Future T-Hangars (10 units)
N
LEGEND
Proposed Airfield Pavement
Proposed Pavement Removal
Shoulders
Future Solar Farm
Proposed Landside Pavement
Proposed Building
Existing Building
Building Removal
Property Line
Note:
Colors over existing taxiways show standard pavement geometry defined by the corresponding TDG. The colors do not indicate complete reconstruction of the pavement.
2000'
0
2000'

6.1 Instrument Approach Improvements

The preferred airport development plan includes improving instrument approach procedures for all runways to support commercial, military, and emergency disaster relief operations at AEX.

Currently, Runway 14 is the best equipped with a Category I (CAT-I) Instrument Landing System (ILS) and an associated Medium Intensity Approach Lighting System with Runway Alignment Indicator Lights (MALSR). However, upgrading the Instrument Approach System to Category II (CAT-II) is recommended to complement the future extension of Runway 14-32. For this matter, the following additional and improved lighting and ancillary equipment are required as described in FAA Order 8400.13F, *Procedures for the Evaluation and Approval of Facilities for Special Authorization Category I Operations and All Category II and III Operations*.

- ALSF-2
- High-Intensity Runway Lights (HIRL)
- Touchdown Zone (TDZ) lighting
- Runway centerline lighting
- Touchdown, midpoint, and rollout RVR sensors

After Runway 18 is extended, a CAT-I Precision Instrument Approach will be implemented. The runway extension will maintain the HIRL; however, a MALSR and a TDZ sensor of an RVR reporting system will be required.

Finally, the preferred airport development plan also includes the implementation of CAT-I Precision Instrument Approaches for Runways 32 and 36. Traditional ILS technology is included in the recommendations. However, as technology advances and new and improved satellite navigation procedures like the Wide Area Augmentation System (WAAS) are more established in the US, it is possible that those runways could obtain precision approach minimums equivalent to a traditional CAT-I ILS without the installation of ground-based navigation equipment. WAAS enhances the GPS signal to allow aircraft to fly within a precisely contained flight path. WAAS also enables the essential NextGen capability of Automatic Dependent Surveillance-Broadcast (ADS-B)[36].

Additionally, the airspace should be protected from vertical obstructions in accordance with 14 CFR Part 77, *Safe, Efficient Use, and Preservation of the Navigable Airspace*, including approach and departure surfaces and Obstacle Free Zones, to implement the recommended instrument approach procedure improvements in the future.

6.2 Airfield System Development

The preferred airfield development includes the extension of both runways. Runway 14-32, which is AEX's primary runway, will continue to be categorized as a D-V runway with an

[36]https://www.faa.gov/about/office_org/headquarters_offices/ato/service_units/techops/navservices/gnss/waas/benefits

extension of 2,648 feet to reach a total length of 12,000 feet. The runway extension also requires that parallel Taxiway A be extended to connect with the future threshold. Due to the implementation of a CAT-II ILS on Runway 14-32, the extension of Taxiway A will require a taxiway centerline to runway centerline separation of 500 feet. Currently, Taxiway A has 800 feet of separation from Runway 14-32. However, the extension will include a 30-degree turn to keep the future infrastructure inside airport property, reduce the runway-to-taxiway separation to 500 feet, and avoid future impacts. Additionally, a full parallel taxiway is proposed on the west side of Runway 14-32 to open the area for future aeronautical activities on airport property. The future parallel taxiway will be located at a taxiway centerline to runway centerline separation of 500 feet from Runway 14-32. At the intersection of the runways, the new taxiway will turn to the south and run parallel to Runway 18-36 with a separation of 400 feet from the taxiway centerline to the centerline of Runway 18-36.

The construction of the new parallel taxiway will require relocation of existing Precision Approach Radar (PAR) facilities. Additionally, the taxiway must avoid crossing the glideslope critical area, requiring a separation of 1,204 feet at the northern portion of the taxiway.

Runway 18-36 will also be extended to 8,503 feet, along with Taxiway B, maintaining its RDC D-IV classification. This project is currently under design; with that in mind, the airport has executed various enabling projects to complete the extension. The preferred alternative has been coordinated with the design effort to fulfill the airport's current and future needs.

The preferred airport development plan also recommends that all taxiway connectors are constructed in accordance with TDG–5 design standards, requiring additional pavement in most cases. Moreover, the preferred airport development plan incorporates paved shoulders, required for taxiways, taxilanes, and aprons accommodating ADG-IV and higher aircraft.

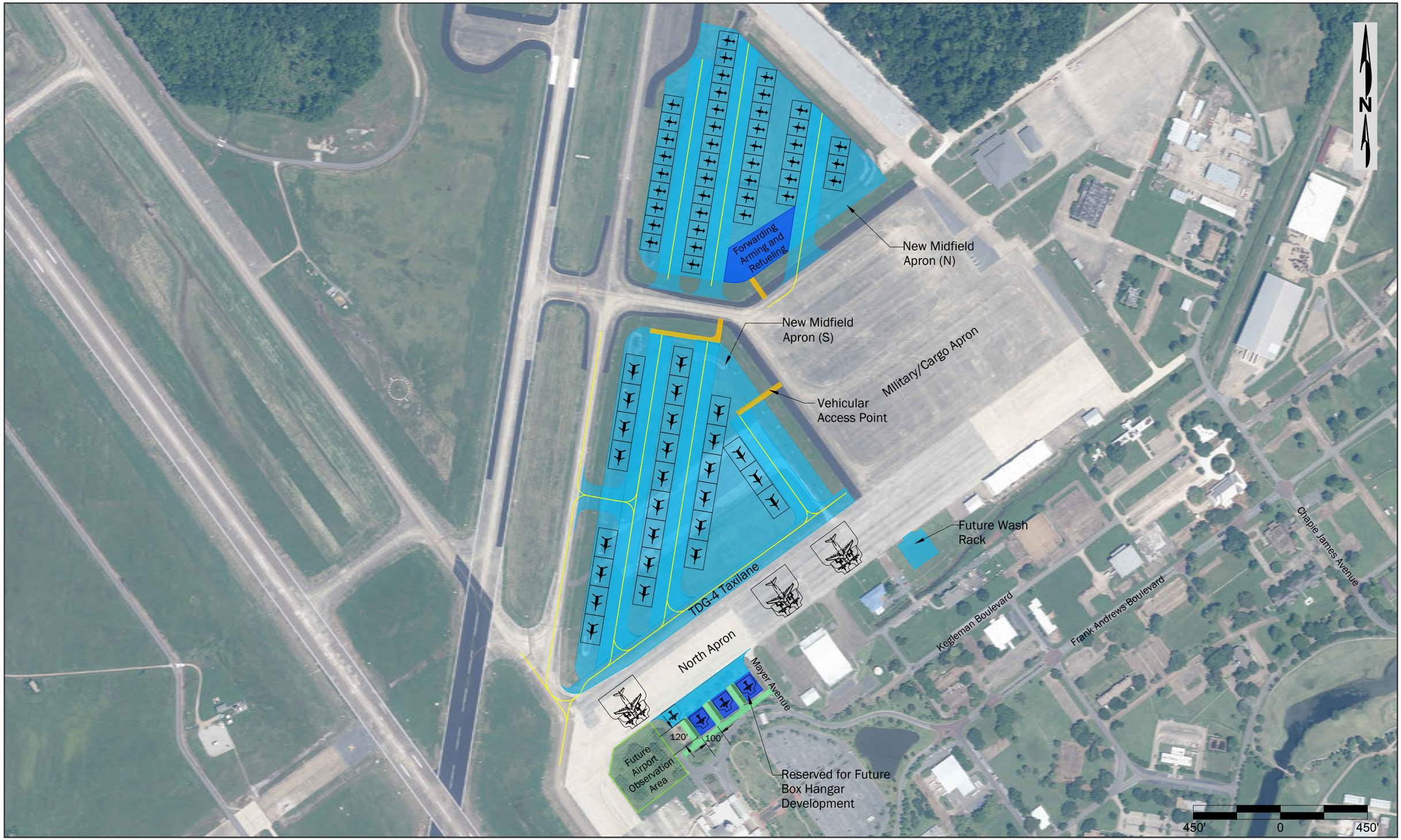
All Navaids, markings, and signs should be modified accordingly as a result of the recommended runway development.

6.3 Aprons and Hangars

As discussed in the airport alternatives chapter, AEX has four aprons with specific functions. Various alternatives were evaluated and discussed with the Stakeholder Advisory Committee, the England Authority, and the public to obtain a refined and preferred development option that optimizes airport operations without impacting any aeronautical activity present at the airport. The following sections describe the main aspects of each apron's preferred outcome over the next twenty years.

6.3.1 Terminal Apron

The preferred airport development plan maintains the existing Terminal Apron configuration and proposes improving existing GSE storage and maintenance areas. As shown in **Figure 6-1**, a dedicated site to perform light GSE maintenance and a location to store deicing equipment are proposed at the northwest corner of the Terminal Apron area. The preferred development also considers the replacement of passenger boarding bridges as they near the limits of their useful service life.


N
New Midfield Apron (N)
Forwarding Arming and Refueling
New Midfield Apron (S)
Military/Cargo Apron
Vehicular Access Point
Future Wash Rack
TDG-4 Taxilane
North Apron
Mayer Avenue
120'
100'
Future Airport Observation Area
Reserved for Future Box Hangar Development
Kegleman Boulevard
Frank Andrews Boulevard
Chapie James Avenue
450'
0
450'

6.3.2 North Apron and Military/Cargo Apron

As evaluated during the alternatives analysis, the proximity of the North Apron and the Military/Cargo Apron allows for a combination of activities between these two areas. Even though the North Apron's primary use is general aviation, during peak periods of military activity, the North Apron is also used for military aircraft parking and related activities thus reducing the available parking for general aviation aircraft. To address this concern, after discussions with airport management, it was established that the preferred development in this area would include expanding the North Apron to accommodate a TDG-4 taxilane and an area capable of parking ADG IV aircraft. The apron's existing taxilane would be relocated, requiring the reconfiguration of the intersection between Taxiway A and Taxiway B, as depicted in **Figure 6-2**.

At the same time, the preferred development plan recommends paving and marking the midfield area to accommodate helicopter parking. The proposed midfield aprons would accommodate approximately 40 Black Hawk and 26 Chinook helicopters without impacting North Apron operations.

The new midfield aprons would include taxilanes and vehicular service roads. Also, it is recommended to relocate the Forward Aiming and Refueling Point (FARP) to the future North Midfield Apron. During the review process, airport staff requested that the previously proposed wash rack be expanded and relocated to an area south of the military apron to accommodate larger aircraft (i.e., C-17).

The preferred airport development plan also includes a group of box hangars with a shared apron in front of the facilities. The hangars will be designed to accommodate ADG II aircraft. Each hangar is 120 feet by 100 feet, with a separation of 50 feet between hangars to comply with National Fire Protection Association (NFPA) recommendations. The hangars will have independent parking facilities and access will be provided via Mayer Avenue.

6.3.3 South Apron

Multiple development alternatives were previously evaluated for the South Apron area. However, based upon feedback from airport staff and key stakeholders, it was determined that ICE operations would be one of the leading considerations influencing the preferred development of this area. As shown in **Figure 6-3,** the preferred airport development plan recommends dedicating 65,700 square yards of the South Apron to the ICE operation in an effort to avoid interfering with general aviation activities. The dedicated area will allow ICE aircraft to park parallel to their facility in two rows. The two taxilanes can accommodate ADG-IV/TDG-5 aircraft like the Boeing 767, which is one of the largest aircraft regularly serving the ICE operation. Aircraft will be able to power in and out without interfering with other ICE aircraft activities or other nearby facilities.

In the center of the apron, a main ADG-V/TDG-5 taxilane will connect Taxiway A with all the South Apron facilities, including ICE. The taxilane object free area (TLOFA) of 270 feet will reduce the area available for aircraft parking in front of the FBO. However, it will provide enough space to park ADG II aircraft in front of the facility.

The preferred airport development plan also proposes to pave the existing grassed infield section to provide an additional TDG-5 taxilane crossing the South Apron from south to

north. After protecting the surrounding taxiway object free areas (TOFAs), 14,320 square yards of paved area will be available for aircraft parking. This area will be capable of accommodating 7 ADG II aircraft in one row and 10 ADG I aircraft in a second row, separated by an ADG II taxilane providing power in and out capabilities, or a single row of ADG III aircraft parking.

The preferred airport development plan includes additional corporate hangars to support general aviation needs to serve ADG II and ADG III aircraft. One of the hangars is proposed between the existing FBO and ARFF facilities, with dedicated vehicular parking and a small ramp connection to the apron. The ADG III hangars would be located at the northeast corner of the apron with a shared apron entrance, vehicular parking, and landside access via Billy Mitchell Boulevard. This area can accommodate three corporate hangars with a dimension of 120 feet by 100 feet each.

Other improvements include the development of three future MRO hangars capable of accommodating ADG V aircraft like the Boeing 747 with enough space in front of the facilities to park and maneuver aircraft without impacting the TLOFA.

During the alternative's evaluation process, airport management and stakeholder advisory committee members indicated that it was preferred to develop T-Hangars on the south side of the airport between the ends of Runway 32 and Runway 36, instead of the location proposed during the preliminary alternatives analysis. The preferred location optimizes the operation and storage of small aircraft, accommodating three rows of t-hangar buildings with independent taxilanes. Airside access to this new hangar area would be provided via Taxiway E, while landside access would be available via the Airport Perimeter Road and controlled by gates.

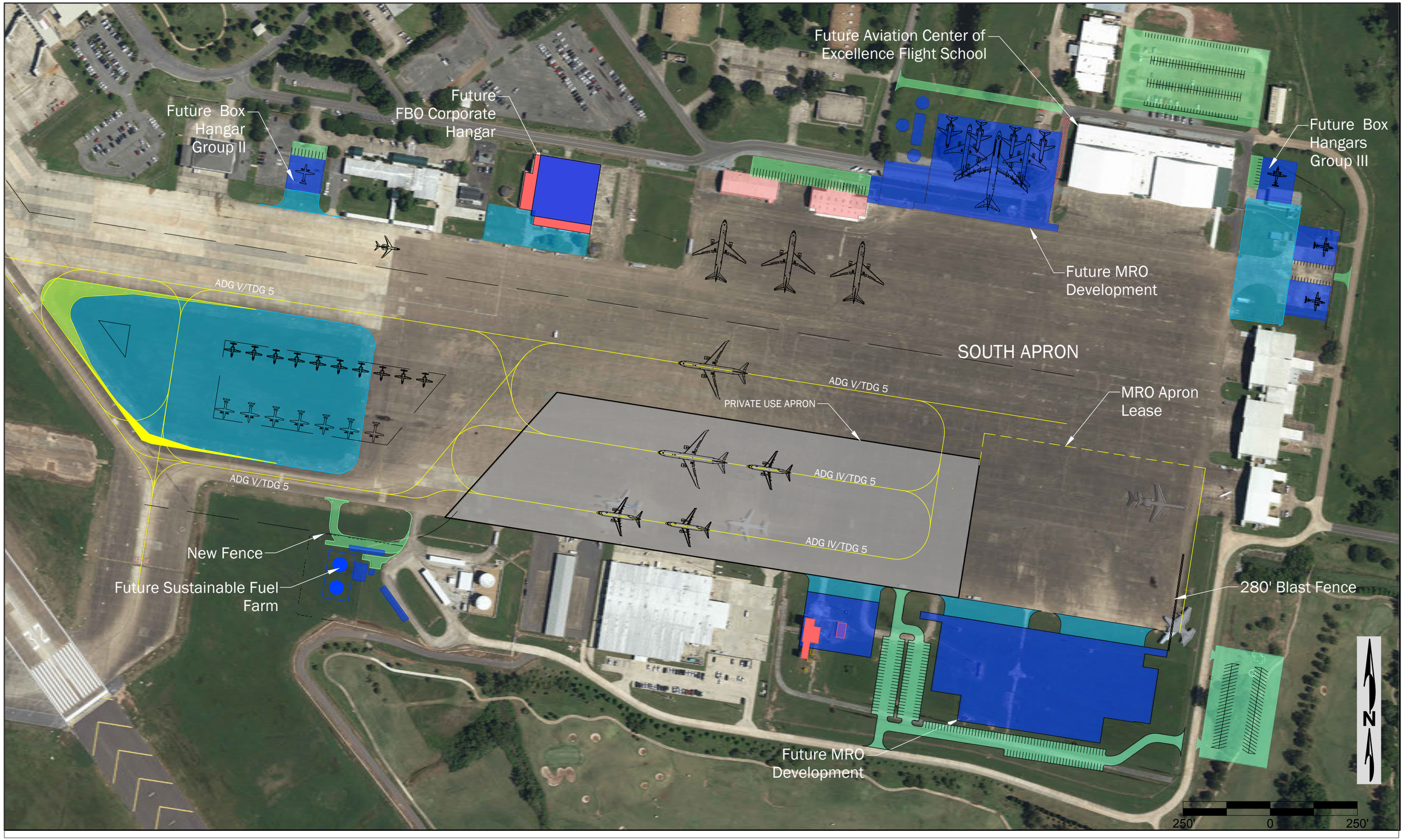
Finally, a future location for the Aviation Center of Excellence (ACE) is proposed to be housed within the existing FBO hangar complex along Billy Mitchell Boulevard. As a result, a future FBO hangar (30,625 SF) is proposed at the existing ACE hangar site with pavement improvements in front of the building connecting to the apron. 3,300 square yards of additional paved area will be provided to facilitate the parking and movement of aircraft.

6.4 Airport Support Facilities

6.4.1 Fuel Facilities

The preferred alternative reserves a site next to the existing fuel farm to expand its operation to offer Sustainable Aviation Fuel (SAF). Currently, commercial airlines are committed to increasing the use of alternative fuels to achieve the net-zero goals requiring the expansion of SAF availability at commercial airports worldwide.

The facilities to supply SAF could be developed by the airport or in conjunction with a supplier offering this capability.


Future Box Hangar Group II
Future FBO Corporate Hangar
Future Aviation Center of Excellence Flight School
Future Box Hangars Group III
Future MRO Development
SOUTH APRON
ADG V/TDG 5
ADG V/TDG 5
PRIVATE USE APRON
MRO Apron Lease
ADG V/TDG 5
ADG IV/TDG 5
ADG IV/TDG 5
New Fence
Future Sustainable Fuel Farm
280' Blast Fence
Future MRO Development
32
250'
0
250'

6.4.2 Airport Maintenance Storage Facilities and GSE Areas

As described earlier, the preferred airport development plan proposes assigning a dedicated area to perform light maintenance and storage of GSE and deicing equipment next to the Terminal Apron. The new GSE area will reduce congestion within the terminal basement area and better accommodate the movement of baggage carts and the storage of airport maintenance equipment.

Also in this area, an additional power generator is proposed adjacent to the Passenger Terminal to support future energy needs during emergency operations.

6.5 Terminal Improvements

The preferred airport development plan incorporates the following Passenger Terminal improvements recommended during the alternatives analysis to support forecasted demand over the 20-year planning period.

- Reconfigure the inbound baggage handling system following the TSA guidelines and standards and replace the equipment with more up-to-date and improved models. A future design project of the area should be conducted to ensure compliance with the most current TSA standards.
- Expand the security screening area with an additional screening checkpoint and reconfigure the queuing area.

6.6 Vehicular Parking and Rental Car Facilities

The capacity analysis confirmed that the existing vehicular parking facilities meet the airport's future needs. However, the intent of the preferred airport development plan is to optimize its functionality and operability for passengers and airport staff. Therefore, the following actions are proposed:

- Expand the exit gate of the main parking lot and implement automatic pay technology.
- Install controlled access gates for employee parking lots.
- Remove the existing parking lane along Billy Mitchell Boulevard.
- Construct a new employee parking lot next to the terminal building to offer sufficient parking capacity for concession employees, permanent staff, and the Authority personnel.
- Implement technological solutions to segregate the car rental parking facilities (return lot and ready lot) and prohibit the entrance of non-rental vehicles to those facilities.

6.7 Westside Development

As part of the preferred airport development plan, the proposed westside development would improve economic development opportunities for England Airpark, incentivizing use of the airport's property for sustainable and compatible land uses. After constructing the future parallel taxiway, approximately 722 acres will be available for future development. This land will be preserved for the following development opportunities: solar farm, aeronautical facilities, and an industrial campus.

After meetings with the England Authority and stakeholders, it was determined that approximately 500 acres will be reserved for future solar farm development. The parcels adjacent to the parallel taxiway would be used in support of aeronautical activities including air cargo, MRO, or aircraft hangar storage. The remaining areas can be used to develop facilities that support aviation activities like warehouses, distribution centers, or even an emergency operation center.

All future development can be accessed via North Bayou Rapides Road, continuing to Jimmy Brown Road with an internal road to connect the proposed facilities. Utility infrastructure will be required in support of the proposed development.

Airside components of the proposed westside development also include the relocation of the PAR and maintaining the electrical vault at its current location.

As described earlier, developing the west side of the airport provides an opportunity to expand the aviation services provided at AEX. The preferred westside development shown in **Figure 6-1** presents a recommended option to build air cargo facilities with an apron to accommodate a typical wide-body cargo aircraft like the Boeing 747-8. The cargo terminal shown is 200,000 square feet in size and includes associated landside access and parking facilities. Additionally, a large scale 220,000 square foot MRO or aviation manufacturing facility capable of accommodating larger wide-body aircraft (i.e., Boeing 747-8 and Boeing 777) can be developed in this area to offer maintenance services to cargo and passenger air carriers. The proposed development can be implemented in phases as dictated by market demand.

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Chapter 7
Implementation Plan

FLYAEX
ALEXANDRIA INTERNATIONAL AIRPORT

7 IMPLEMENTATION PLAN

7.1 Overview

The objective of this chapter is to set forth a strategic financial plan (Financial Plan) which provides for the financial implementation of the recommended improvements identified in this Master Plan Update over a 20-year planning period (Development Period).

Included as part of the Financial Plan is an overview of the capital improvements proposed for Alexandria International Airport (AEX) over the 20-year Development Period. The implementation plan will be divided into the three planning periods as identified in Chapter 3, Forecast of Aviation Activity, with an emphasis on the Short-Term Development Period. The base year, or starting point of the study, is 2021. However, to provide realistic assumptions regarding the availability of funding at the time of this report, the projects implemented in 2022 have not been included in the funding analysis.

Analyses assessing the financial implications of the England Authority undertaking the Proposed Projects and the Authority's ability to generate future revenues sufficient to exceed projected operating and capital expenses during the Short-Term Development Period are examined. The following summarizes the components of the Financial Plan:

- A detailed funding plan for the Proposed Projects was prepared with an emphasis on the Short-Term Development Period. Recommended projects were evaluated to determine eligibility for funding by the Federal Aviation Administration (FAA) Airport Improvement Program (AIP), Louisiana Department of Transportation and Development (LADOTD), other funding sources, and Third Party/Tenant Financing. The local funding requirement was identified.
- A compilation and review of the England Authority's historical revenues and expenses for the past five years to identify historical trends.
- A detailed description of the Alexandria International Airport Financial Structure including an order of magnitude estimate of airport revenues that would be generated by the traffic forecasted in Chapter 3, Forecasts of Aviation Demand.
- A historical cash flow analysis detailing both operating income and historical outside funding levels.

7.2 Proposed Projects Summary

Based on the projected facility requirements identified in Chapter 4, Facility Requirements, a list of preferred airport development alternatives was developed as part of Chapter 5, Airport Alternatives Analysis, and Chapter 6, Alternatives Refinement. The cost estimates associated with the recommended proposed projects in this Study are intended to be order of magnitude presented in 2020 dollars and include estimated engineering fees and contingencies. Costs shown later in the funding plan section of this chapter are escalated at a 3.0 percent inflation rate based upon the proposed phasing of the projects.

To provide realistic assumptions regarding the availability of funding for the proposed projects, it is necessary to estimate the phasing requirements of each project based on the

need for enhanced safety, security and/or demand for the facilities during the Development Period.

For this Implementation Plan, each project was placed into one of three general project phasing periods based on each project's estimated implementation. Below are the project phasing periods used for this purpose.

- Short-Term Development Period – Projects anticipated to be implemented within 0 to 5 years following the Study. The short-term projects identified in this section are shown over a period of five years. (2022-2026)
- Mid-Term Development Period – Projects anticipated to be implemented between 6 to 10 years following the Study. (2027-2031)
- Long-Term Development Period – Projects anticipated to be implemented between 11 to 20 years following the Study. (2032-2041)

7.3 Capital Improvement Program

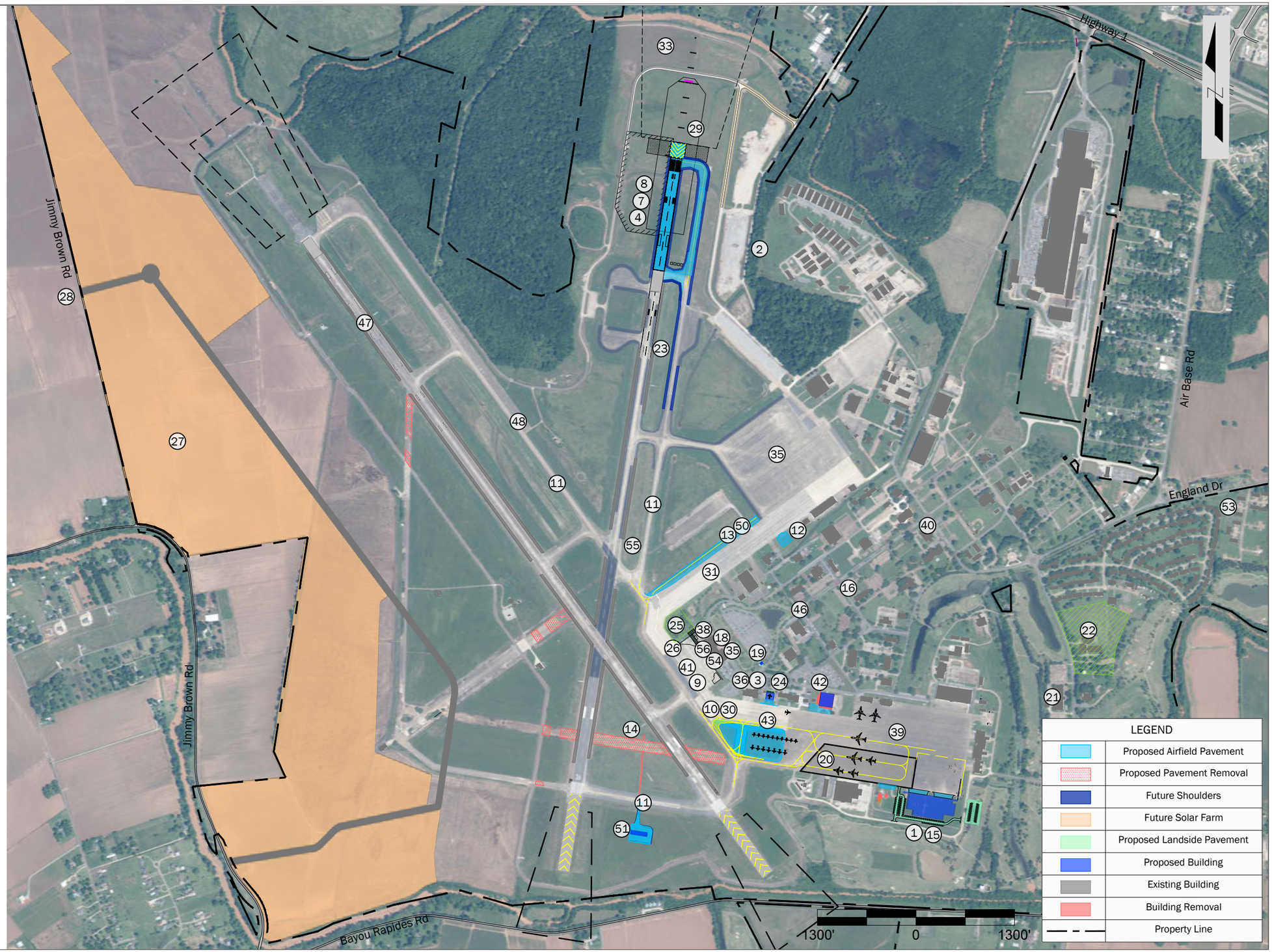
The Capital Improvement Program (CIP) includes cost estimates and development phasing for the various projects identified in **Figures 7-1, 7-2,** and **7-3**. The proposed development is also identified within the Airport Layout Plan (ALP) drawing found in Chapter 8, Airport Layout Plan. A subsequent section of this chapter will address the financial feasibility of the Short-Term Development Period. The cost projections should be used for planning purposes only and do not imply that funding will be available. Each year indicates the initiation of design and/or environmental efforts and it is assumed that construction would be undertaken either in that same year or the following year.

The CIP projects shown in **Table 7-1** have been segregated into Short-Term Development Period (2022-2026), Mid-Term Development Period will follow during years six to ten and Long-Term Development Period will encompass years 11 to 20.

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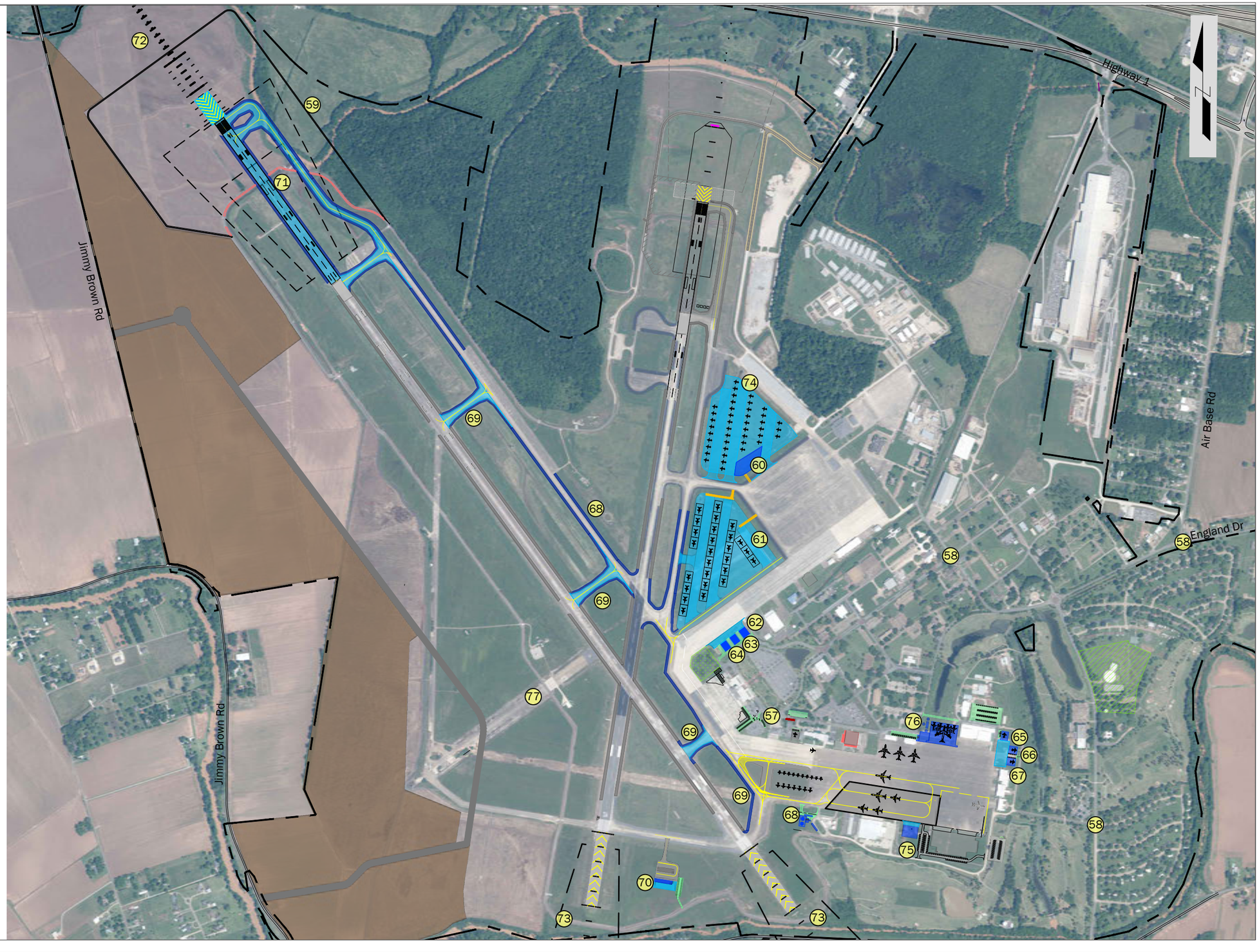
PROJECT LIST - SHORT TERM

1. Large Wide Body MRO Hangar - Design Only
2. Airfield wildlife Mitigation and Fencing - Phase III and IV
3. ARFF Vehicle
4. Extension of Runway 18 - Phase I
5. Part 150 Noise Program
6. Remove Wildlife Habitat
7. Extension of Runway 18 - Phase II
8. Extension of Runway 18 - Phase III
9. Emergency Ramp Lighting Rehabilitation
10. South Ramp Expansion - Design only
11. Taxiway & Ramp Rehabilitation (Taxiway A, B, E)
12. Construction of Wash Rack
13. North Apron Expansion - Design Only
14. Closed Pavement & Obstacle Removal
15. Large Wide Body MRO Hangar Construction
16. Airport Access Road Rehabilitation - Phase I
17. Part 150 Noise Program
18. Outbound Baggage Equipment Rehabilitation
19. Additional Autopay Exit Lane
20. ICE Operations Area
21. Residential Development I
22. Green Space
23. Taxiway B Shoulders (Upper side)
24. Box Hangar A - South Apron
25. Observation Park
26. GSE Areas Improvement
27. Solar Farm
28. Westside Access Roads
29. Extension of Runway 18 - Phase IV Precision Approach
30. South Ramp Expansion - Phase I (Itinerant Ramp)
31. Taxiway & Ramp Rehabilitation - (North Ramp)
32. ARFF Bunker Gear
33. Runway Obstacle Removal
34. GIS Airfield Development - Phase I
35. Replacement Air Traffic Control Equipment
36. ARFF Vehicle & Associated Equipment
37. Wildlife Hazard Mitigation & Obstacle Removal
38. Installation of Airfield Emergency Generator
39. Taxiway & Ramp Rehabilitation - (South Ramp)
40. Terminal Area Efficiency and Safety Rehabilitation
41. Passenger Boarding Bridge Replacement
42. Future FBO Corporate Hangar
43. South Ramp Expansion - Phase II (Itinerant Ramp)
44. Safety Area and Associated Drainage - Phase I
45. GIS Airfield Development - Phase II
46. Airport Access Road Rehabilitation - Phase II
47. Runway 14-32 Rehabilitation
48. Taxiway & Ramp Rehabilitation - Phase IV (Taxiway A)
49. Safety Area and Associated Drainage - Phase II
50. North Apron Expansion - Phase II
51. T-Hangar westside - Phase I (10 Unit)
52. Runway Obstacle Removal (Runway 36 Approach)
53. Residential Development II
54. Inbound Baggage Reconfiguration
55. GIS Airfield Development - Phase III
56. Additional Security Screening Check Point



PROJECT LIST - MID TERM

57. Parking and Rental Car Improvements
58. Roads Intersection Improvements
59. Perimeter Road Relocation
60. FARP Relocation
61. Midfield Apron (S) and Airfield Improvements
62. Box Hangar B - North Apron
63. Box Hangar C - North Apron
64. Box Hangar D - North Apron
65. Box Hangars E- South Apron
66. Box Hangars F- South Apron
67. Box Hangars G- South Apron
68. Fuel Farm Expansion
69. Taxiway A Improvements
70. T-Hangar westside - Phase II (10 Unit)
71. Runway 14 Extension and Airfield Improvements
72. Runway 14 CATII Implementation
73. Precision Approaches (32 and 36)
74. Midfield Apron (N)
75. Hangar H Development
76. MRO B - South Apron
77. PAR Relocation



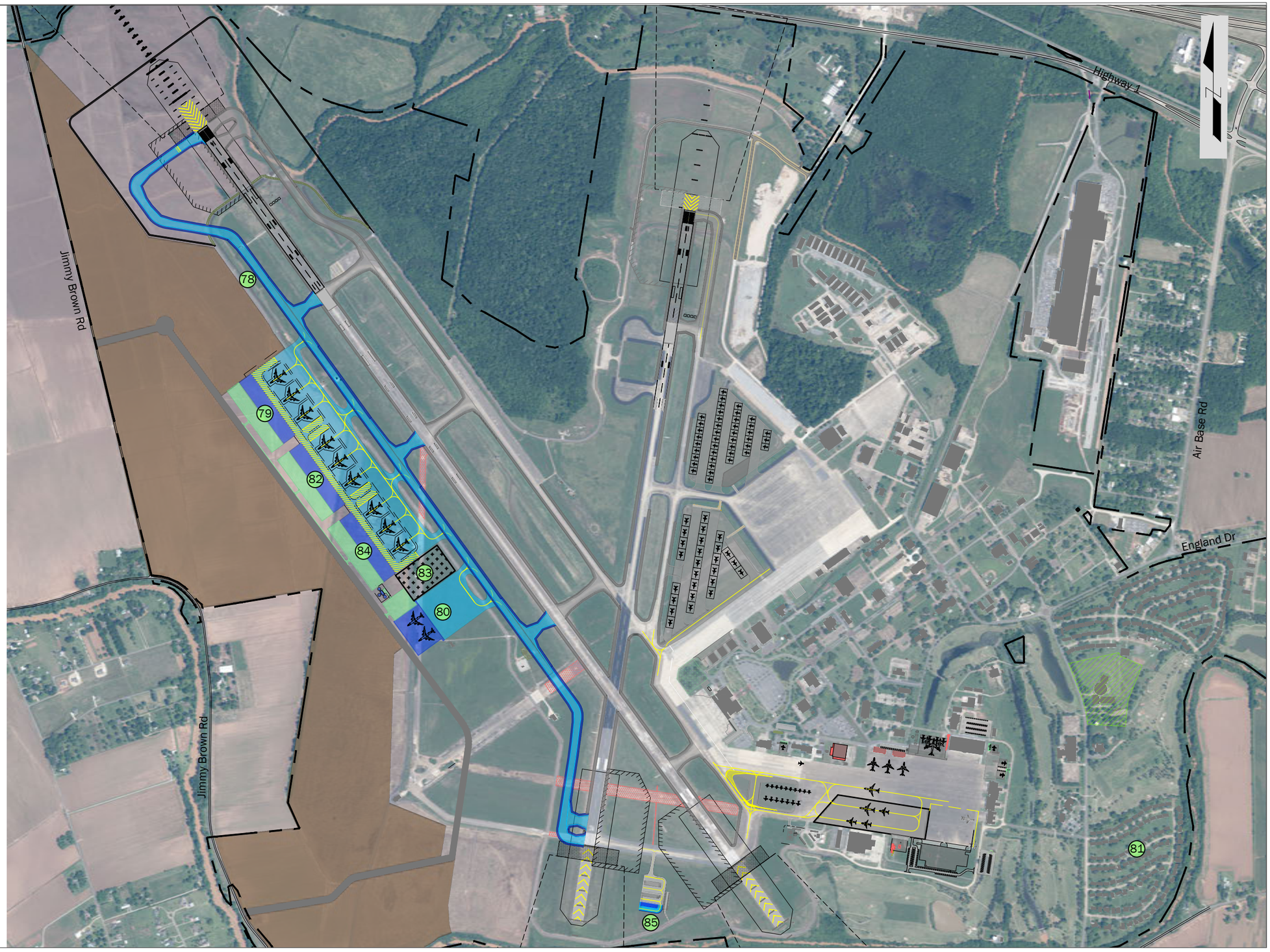
LEGEND	
	Proposed Airfield Pavement
	Proposed Pavement Removal
	Shoulders
	Future Solar Farm
	Proposed Landside Pavement
	Proposed Building
	Existing Building
	Building Removal
	Property Line

Note:
Colors over existing taxiways show standard pavement geometry defined by the corresponding TDG. The colors do not indicate complete reconstruction of the pavement.

1300' 0 1300'

PROJECT LIST - LONG TERM

78. Parallel Taxiway
79. Air Cargo Development Phase 1
80. MRO C Development (Westside)
81. Residential Development III
82. Air Cargo Development Phase 2
83. Support Services (Westside)
84. Air Cargo Development Phase 3
85. T-Hangar westside - Phase III (10 Unit)



LEGEND	
	Proposed Airfield Pavement
	Proposed Pavement Removal
	Shoulders
	Future Solar Farm
	Proposed Landside Pavement
	Proposed Building
	Existing Building
	Building Removal
	Property Line

1300' 0 1300'

Table 7-1: Schedule of Project Costs and Phasing – Capital Improvement Program (CIP)						
No.	**Project**	**Start Year**	**Short-Term (0-5 years)**	**Mid-Term (6-10 years)**	**Long-Term (11-20 years)**	**Total**
Short-Term Development Period (2022-2026)						
1	Large Wide Body MRO Hangar - Design Only	2022	$1,500,000			$1,500,000
2	Airfield wildlife Mitigation and Fencing - Phase III (+Phase IV)	2022	$3,400,000			$3,400,000
3	ARFF Vehicle	2022	$850,000			$850,000
4	Extension of Runway 18 and Associated Improvements - Phase I	2022	$21,430,129			$21,430,129
5	Part 150 Noise Program	2022	$3,333,333			$3,333,333
6	Remove Wildlife Habitat; Environmental Assessment; Mitigation	2023	$5,796,917			$5,796,917
7	Extension of Runway 18 and Associated Improvements - Phase II	2023	$2,307,370			$2,307,370
8	Extension of Runway 18 and Associated Improvements - Phase III	2023	$4,043,352			$4,043,352
9	Emergency Ramp Lighting Rehabilitation	2023	$480,219			$480,219
10	South Ramp Expansion - Design only	2023	$689,056			$689,056
11	Taxiway & Ramp Rehabilitation (Taxiway A, B, E)	2023	$628,350			$628,350
12	Construction of Wash Rack	2023	$3,000,000			$3,000,000
13	North Apron Expansion - Design Only	2023	$750,000			$750,000
14	Closed Pavement & Obstacle Removal	2023	$1,639,091			$1,639,091
15	Large Wide Body MRO Hangar Construction	2023	$49,569,014			$49,569,014
16	Airport Access Road Rehabilitation - Phase I	2023	$2,513,272			$2,513,272
17	Part 150 Noise Program	2023	$3,642,423			$3,642,423
18	Outbound Baggage Equipment Rehabilitation	2023	$350,000			$350,000

Table 7-1: Schedule of Project Costs and Phasing – Capital Improvement Program (CIP)						
No.	**Project**	**Start Year**	**Short-Term (0-5 years)**	**Mid-Term (6-10 years)**	**Long-Term (11-20 years)**	**Total**
19	Additional Autopay Exit Lane	2023	$308,889			$308,889
20	ICE Operations Area	2023	$42,781			$42,781
21	Residential Development I	2023	$27,318,175			$27,318,175
22	Green Space	2023	$255,350			$255,350
23	Taxiway B Shoulders (Upper side)	2023	$1,847,824			$1,847,824
24	Box Hangar A - South Apron	2023	$2,454,724			$2,454,724
25	Observation Park	2023	$125,609			$125,609
26	GSE Areas Improvement	2023	$2,832,703			$2,832,703
27	Solar Farm	2023	$50,000,000			$50,000,000
28	Westside Access Roads	2023	$2,732,537			$2,732,537
29	Extension of Runway 18 and Associated Improvements - Phase IV Precision Approach	2024	$3,944,734			$3,944,734
30	South Ramp Expansion - Phase I (Itinerant Aircraft Parking)	2024	$7,825,180			$7,825,180
31	Taxiway & Ramp Rehabilitation - (North Ramp)	2024	$759,718			$759,718
32	ARFF Bunker Gear	2024	$84,413			$84,413
33	Runway Obstacle Removal	2024	$619,030			$619,030
34	GIS Airfield Development - Phase I	2024	$815,994			$815,994
35	Replacement Air Traffic Control Equipment	2024	$815,994			$815,994
36	ARFF Vehicle & Associated Equipment	2024	$1,350,611			$1,350,611
37	Wildlife Hazard Mitigation & Obstacle Removal	2024	$1,097,371			$1,097,371
38	Installation of Airfield Emergency Generator (Power Generator)	2024	$731,581			$731,581
39	Taxiway & Ramp Rehabilitation - (South Ramp)	2024	$1,378,748			$1,378,748

Table 7-1: Schedule of Project Costs and Phasing – Capital Improvement Program (CIP)						
No.	**Project**	**Start Year**	**Short-Term (0-5 years)**	**Mid-Term (6-10 years)**	**Long-Term (11-20 years)**	**Total**
40	Terminal Area Efficiency and Safety Rehabilitation	2024	$2,000,905			$2,000,905
41	Passenger Boarding Bridge Replacement	2024	$8,099,438			$8,099,438
42	Future FBO Corporate Hangar	2024	$7,995,938			$7,995,938
43	South Ramp Expansion - Phase II (Itinerant Aircraft Parking)	2025	$8,059,935			$8,059,935
44	Safety Area and Associated Drainage - Phase I	2025	$12,880,823			$12,880,823
45	GIS Airfield Development - Phase II	2025	$1,101,310			$1,101,310
46	Airport Access Road Rehabilitation - Phase II	2025	$2,028,730			$2,028,730
47	Runway 14-32 Rehabilitation	2026	$4,661,011			$4,661,011
48	Taxiway A & Ramp Rehabilitation - Phase IV (Taxiway A)	2026	$719,024			$719,024
49	Safety Area and Associated Drainage - Phase II	2026	$5,306,899			$5,306,899
50	North Apron Expansion - Phase II	2026	$2,865,726			$2,865,726
51	T-Hangar westside - Phase I (10 Unit)	2026	$4,897,893			$4,897,893
52	Runway Obstacle Removal (Runway 36 Approach)	2026	$289,819			$289,819
53	Residential Development II	2026	$53,352,094			$53,352,094
54	Inbound Baggage Reconfiguration	2026	$417,918			$417,918
55	GIS Airfield Development - Phase III	2026	$1,134,350			$1,134,350
56	Additional Security Screening Check Point	2026	$447,770			$447,770
Subtotal of Short-Term Projects			**$329,532,766**			**$329,532,766**

Table 7-1: Schedule of Project Costs and Phasing – Capital Improvement Program (CIP)						
No.	**Project**	**Start Year**	**Short-Term (0-5 years)**	**Mid-Term (6-10 years)**	**Long-Term (11-20 years)**	**Total**
Mid-Term Development Period (2027-2031)						
57	Parking and Rental Car Improvements	2027	$1,884,380			$1,884,380
58	Roads Intersection Improvements	2027		$778,204		$778,204
59	Perimeter Road Relocation	2027		$1,912,577		$1,912,577
60	FARP Relocation	2028		$3,914,491		$3,914,491
61	Midfield Apron (S) and Airfield Improvements	2028		$79,468,943		$79,468,943
62	Box Hangar B - North Apron	2028		$3,962,663		$3,962,663
63	Box Hangar C - North Apron	2028		$3,885,364		$3,885,364
64	Box Hangar D - North Apron	2028		$4,254,697		$4,254,697
65	Box Hangars E- South Apron	2029		$3,051,023		$3,051,023
66	Box Hangars F- South Apron	2029		$4,560,204		$4,560,204
67	Box Hangars G- South Apron	2029		$4,576,018		$4,576,018
68	Fuel Farm Expansion	2029		$11,090,120		$11,090,120
69	Taxiway A Improvements	2029		$23,679,573		$23,679,573
70	T-Hangar westside - Phase II (10 Unit)	2029		$2,075,003		$2,075,003
71	Runway 14 Extension and Airfield Improvements	2030		$67,297,941		$67,297,941
72	Runway 14 CATII Implementation	2030		$6,565,419		$6,565,419
73	Precision Approaches (32 and 36)	2030		$9,895,110		$9,895,110
74	Midfield Apron (N)	2030		$60,449,337		$60,449,337
75	Hangar H Development	2030		$8,137,373		$8,137,373
76	MRO B - South Apron	2031		$22,681,979		$22,681,979
77	PAR Relocation	2031		$2,652,978		$2,652,978
Subtotal of Mid-Term Projects				**$326,773,395**		**$326,773,395**

Table 7-1: Schedule of Project Costs and Phasing – Capital Improvement Program (CIP)						
No.	**Project**	**Start Year**	**Short-Term (0-5 years)**	**Mid-Term (6-10 years)**	**Long-Term (11-20 years)**	**Total**
Long-Term Development Period (2032-2041)						
78	Parallel Taxiway	2032			$110,243,581	$110,243,581
79	Air Cargo Development Phase 1	2033			$103,324,067	$103,324,067
80	MRO C Development (Westside)	2034			$96,029,564	$96,029,564
81	Residential Development III	2035			$110,504,073	$110,504,073
82	Air Cargo Development Phase 2	2036			$121,447,436	$121,447,436
83	Support Services (Westside)	2038			$1,358,557	$1,358,557
84	Air Cargo Development Phase 3	2040			$127,063,318	$127,063,318
85	T-Hangar westside - Phase III (10 Unit)	2041			$2,958,458	$2,958,458
Subtotal of Long-Term Projects					**$672,929,054**	**$672,929,054**
TOTAL ESTIMATED COST			**$329,532,766**	**$326,773,395**	**$672,929,054**	**$1,329,235,216**

Sources: Michael Baker International, 2023 and England Authority

7.4 Sources of Funding

Large-scale development projects at an airport are typically beyond the normal annual budget capacity and cannot be supported solely with self-generated funds. In these situations, it is not uncommon for an airport to seek funding from outside sources. These sources can either provide funding for projects outright or be combined with one another to reach the necessary funding level.

In some cases, funding sources are capped on an annual or lifetime basis, such as with FAA entitlement funds. Therefore, it is not uncommon for airports to phase projects to maximize grants to collect the necessary funding. Most sources do not guarantee funding and applicable projects must compete against one another.

Funding sources for this Financial Plan were analyzed and summarized from various governing bodies, including: The Federal Government, State Government, and England Authority, and through activity at AEX. These potential funding sources include:

- Federal Government:
    - FAA Airport Improvement Program (AIP)
    - Bipartisan Infrastructure Law (BIL)
    - Military Airport Program (MAP)
    - Department of Defense (DOD)
    - Economic Development Assistance Programs
    - Transportation Infrastructure Finance and Innovation Act (TIFIA)
- State Government:
    - Louisiana Department of Transportation and Development (LADOTD)
    - Louisiana Development Services Agency
- Local Government
    - City of Alexandria
    - Rapides Parish
    - Greater Alexandria Economic Development Agency (GAEDA)
- England Authority/Alexandria International Airport
    - Passenger Facility Charge
    - Customer Facility Charge
    - Bonds
    - England Authority Capital Reserves
    - Public Private Partnerships / Third-Party Development
    - Other Funding

As an airport, AEX is in a unique position to take advantage of funding sources from governmental agencies and even negotiating with tenants to fund projects that will directly benefit their operations. The identified possible funding sources listed are not all encompassing, as grants programs tend to open and close due to government funding availability. It is recommended that, when the England Authority is prepared to begin the initial planning for any project included herein, be coordinated with the grant entity to discuss the project's justification and benefits.

7.4.1 The Airport

The airport is owned and operated by the England Economic and Industrial Development District (England Authority) and is an independent political subdivision of the State of Louisiana and governed by a board of directors. The ten-member board consists of three members appointed by the Rapides Parish Police Jury; three members appointed by the mayor of the City of Alexandria, and confirmed by the city council; one member appointed by the mayor of the City of Pineville and confirmed by the board of aldermen; one member appointed by a majority of the remaining incorporated municipalities in Rapides Parish, based upon resolutions approved by the respective boards of aldermen; and two members nominated by the board of directors of the Chamber of Commerce of Central Louisiana and appointment by resolutions duly adopted by majority votes of the Rapides Parish Police Jury and Alexandria City Council. The day-to-day operation of the airport is delegated to the Deputy Director of the airport.

A more thorough discussion on existing airport facilities can be found in Chapter 1, Inventory of Existing Conditions.

7.4.2 Federal Funding

7.4.2.1 FAA Airport Improvement Program (AIP)

Federal funding for airports is coordinated through the FAA. AIP funding is generated through taxes levied on passenger tickets and aviation fuel and is typically prioritized to enhance safety, security, capacity, and to mitigate noise.

The two major sources of funding managed by the FAA are a part of the Airport Improvement Program which, according to the FAA, "provides grants to public agencies — and, in some cases, to private owners and entities — for the planning and development of public-use airports that are included in the *National Plan of Integrated Airport Systems (NPIAS)*."[37] The two categories of AIP funding are: entitlements grants and discretionary grants. It is estimated that about two-thirds of the AIP's annual funds are allocated to airports via entitlement grants based on a formula that considers airport activity, passengers, and/or cargo weight, depending on the airport. Discretionary funding is made up of the remaining one-third of the AIP's annual funds and is set aside for specific projects based on their overall importance and priority. AIP grants are to be used for specific eligible capital projects, equipment, and certain types of planning and environmental studies. The funds are programmed to cover no more than 90 percent of project costs, depending on statutory requirements, at airports the size of AEX. They cannot be used for airport operating expenses or for the cost of debt financing and interest costs.[38]

Accepting these grants from the FAA includes the acceptance of certain obligations and conditions (Grant Assurances) required by the FAA. According to the FAA, these obligations generally include operating and maintaining the airport in a safe and serviceable condition,

[37] FAA - https://www.faa.gov/airports/aip

[38] https://www.faa.gov/airports/aip/overview#grant

not granting exclusive rights, mitigating hazards to airspace, and charging, collecting, and using airport revenue properly[39].

As of the 2023-2027 NPIAS Report, the FAA classified AEX as a non-hub primary airport, meaning the passenger enplanements at AEX are less than 0.05 percent of the national total of all enplanements, but greater than 10,000 a year, which impacts the amount of funding AEX receives from the FAA AIP entitlement fund (passenger entitlements) on an annual basis. On average, AEX receives between $730,000 to $1,500,000 annually depending on the level of appropriations from Congress, annually. Over the last several years, that amount has been approximately $1,500,000 per year.

The CIP identifies recommended projects and associated cost estimates for the 20-year planning period at AEX. FAA Order 5100.38D, *Airport Improvement Program (AIP) Handbook*, sets forth the official policy and procedures to be used in the administration of AIP grants. Table 7-2 lists typical examples of eligible and ineligible AIP projects.

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[39] https://www.faa.gov/sites/faa.gov/files/airports/aip/grantapportion_data/FY-2022-Primary-Entitlements.pdf

Table 7-2: Examples of Eligible vs. Ineligible AIP Projects	
Eligible Projects	**Ineligible Projects**
Runway construction/rehabilitation	Maintenance equipment and vehicles
Taxiway construction/rehabilitation	Office and office equipment
Apron construction/rehabilitation	Fuel farms*
Airfield lighting	Landscaping
Airfield signage	Artworks
Airfield drainage	Aircraft hangars*
Land acquisition	Industrial Park development
Weather observation stations (AWOS)	Marketing plans
NAVAIDs such as REILs and PAPIs	Training
Planning studies	Improvements for commercial enterprises
Environmental studies	Maintenance or repairs of buildings
Safety area improvements	
Airport layout plans (ALPs)	
Access roads only located on airport property	
Removing, lowering, moving, marking, and lighting hazards	
Glycol Recovery Trucks/Glycol Vacuum Trucks**	

Source: FAA AIP Overview, FAA website.
**May be eligible. Contact your local Airport District or Regional Office for more information.*
***To be eligible, the vehicles must be owned and operated by the airport and meet the Buy American Preference specified in the AIP grant. Contact your local Airport District or Regional Office for more information.*

In addition, the following must also apply for FAA to consider a project for AIP funding:
The project sponsorship requirements have been met.
The project is reasonably consistent with the plans of planning agencies for the development of the area in which the airport is located.
Sufficient funds are available for the portion of the project not paid for by the Federal Government.
The project will be completed without undue delay.
The airport location is included in the current version of the NPIAS.
The project involves more than $25,000 in AIP funds.
The project is depicted on a current airport layout plan approved by FAA. All safety issues have been addressed.

The formula for calculating an airport's AIP entitlement under the current authorization is set forth below in **Table 7-3**.

Table 7-3: AIP Entitlement Formula		
Passenger Level	**Appropriations Less Than $3,200,000,000**	**Appropriations More Than $3,200,000,000**
First 50,000	$7.80	$15.60
Second 50,000	$5.20	$10.40
Next 400,000	$2.60	$5.20
Next 500,000	$0.65	$1.30
Each additional	$0.50	$1.00

Source: FAA AIP Handbook
Compiled by: Newton & Associates, Inc.

The FAA also provides discretionary grant funds on a priority or competitive basis. On March 15, 2022, the President signed Public Law 117-103, "*Further Consolidated Appropriations Act, 2022,*" which includes a Supplemental amount of $547,909,100 for discretionary grants under the AIP statute, 49 U.S.C. Chapters 471 and 475. The purpose of

the supplemental discretionary grant program is to make grants to eligible airports for airport construction projects, associated airport capital planning, noise planning and noise mitigation projects, and energy and environmental sustainability projects.[40] All Supplemental funds will be awarded by September 30, 2024. See **Table 7-4** for AEX's AIP Grant History.

Table 7-4: AIP Grant History

Year	Airport Improvement	
	Entitlement	Discretionary
2018	$474,930	$0
2019	0	0
2020	4,779,034	0
2021	834,851	6,228,548
2022	1,414,607	3,500,000
Total	**$7,503,422**	**$9,728,548**

Source: FAA AIP Handbook.
Compiled by: Newton & Associates, Inc.

7.4.2.2 Bipartisan Infrastructure Law

The Bipartisan Infrastructure and Investment Jobs Act (Bipartisan Infrastructure Law or BIL) was enacted and signed into law November 15, 20121. The Bipartisan Infrastructure Law authorizes up to $108 billion for public transportation – the largest federal investment in public transportation in the nation's history. The purpose of the BIL legislation is to advance public transportation in America's communities through four key priorities: safety, modernization, climate, and equity. The BIL includes approximately $25 billion for the National Airspace System, approximately $5 billion is for improvements to FAA-owned facilities and equipment. FAA's Office of Airports (ARP) will administer the remaining approximately $20 billion in grant funds for airport infrastructure, terminal development, including multimodal terminal development including on-airport rail access projects, and airport owned airport traffic control towers.[41] The Bipartisan Infrastructure Law will distribute these funds over the five-year period FY 2022 through FY 2026.

The $20 billion is allocated over five years ($4 billion annually) by the Airport Infrastructure Grants (AIG), which includes the AIG Allocated and AIG Competitive Funds. AIG Allocated funds are specific, annual allocations to each eligible airport. These amounts are allocated separately for primary and non-primary airports. AEX received $1,616,469 for FY2022 and expects $1,620,802 for FY2023 from the AIG allocated funds, in addition to the AIP

[40] https://www.faa.gov/airports/aip/aip_supplemental_appropriation

[41] FAA - Bipartisan Infrastructure Law Frequently Asked Questions- February 2022

Entitlements. AIG Competitive funds are awarded annually through a competitive Notice of Funding Opportunity (NOFO) process specifically for Federal Contract Tower improvements. The AIG grant funds follow the AIP policies, requiring a sponsor local match of 10 percent.

Approximately $4.85 billion ($970 million annually) is distributed by the competitive Airport Terminal Program (ATP). Airports can compete for ATP grants under BIL and the grants can be used for justified terminal development projects as defined under 49 USC 7102(28), including multi-modal terminal development and on-airport rail access projects. The sponsor's match is 20 percent for large- and medium-hub airports and five percent for small-hub, non-hub, and non-primary airports.

7.4.2.3 FAA Military Airport Program

As a former military use airport, AEX is eligible to receive funding through the FAA's Military Airport Program. Through this program, the FAA is able to award grant funding to "civilian sponsors" who are converting, or have already converted, military airfields to civilian or joint military/civilian use. This funding can be used for projects not typically covered by AIP funding, such as building or rehabilitating surface parking lots, fuel farms, hangars, utility systems, access roads, and cargo buildings.

AEX was selected to participate in the 2009 Military Airport Program (MAP) and reselected in 2016. This program has a maximum term of five (5) fiscal years requiring reselection in 2021. A total of 15 airports may participate in the MAP at any one time; AEX is not included in the MAP at this time. Prior to that date, AEX received approximately $25 million over the course of 10 years.

7.4.2.4 Economic Development Assistance Programs

Outside of FAA funding, AEX is eligible to apply for funding from the Economic Development Administration (EDA). This program is tasked with providing strategic investments to promote job creation and attract private investments to economically distressed areas of the US. According to the EDA, the program "solicits applications from applicants in order to provide investments that support construction, non-construction, planning, technical assistance, and revolving loan fund projects under EDA's Public Works and Economic Adjustment Assistance programs."[42]

This funding has a project award ceiling of $3 million and requires a local match. The match is determined based on the level of economic distress a given community has experienced. These levels are gauged depending on the level of unemployment or average income per capita compared to national rates. Applications are reviewed on a revolving basis every month and are coordinated with a regional EDA Office and a local economic development organization.

Successful EDA grant applications are often directly tied to the number of potential jobs created once the project is completed. AEX's future development program has a number of

[42] https://www.grants.gov/web/grants/search-grants.html?keywords=EDA

cargo facility projects and roadways associated with these projects which would compete well for EDA funding.

7.4.2.5 Coronavirus Response and Relief Supplemental Appropriation Act (CRRSSA)

The Coronavirus Response and Relief Supplemental Appropriation Act (CRRSSA) was signed into law on December 27, 2020, and included nearly $2 billion in funds to be awarded as economic relief to eligible US airports to respond to the COVID-19 pandemic. The FAA distributed these funds through the Airport Coronavirus Response Grant Program prior to the ARPA funding. Under this grant program, non-primary commercial service and general aviation airports shared $45 million based on their airport categories, such as National, Regional, Local, and Basic. These funds provided economic relief to airports around the country affected by the COVID-19 pandemic.

7.4.2.6 American Rescue Plan Act of 2021 (ARPA)

On March 11, 2021, the President signed the $8 billion American Rescue Plan Act of 2021 into law. The purpose of this legislation was earmarked to assist US airports address, prepare for and respond to the corona virus and COVID-19.

To distribute these funds, the FAA established the Airport Rescue Grants. The FAA makes grants to all airports that are part of the national airport system, including all commercial service airports, all reliever airports, and some public-owned general aviation airports.

Non-primary commercial service and general aviation airports will share $100 million based on FAA NPIAS categories, such as National, Regional, Local, and Basic. Even though the funds will be available only for operational expenses and debt service, ARPA provided additional funds to make the 2021 AIP and 2021 Supplemental Discretionary grants at 100 percent Federal share and make the amendments to the 2020 AIP multi-year grants at 100 percent shares.

7.4.3 State Government:

7.4.3.1 Louisiana Department of Transportation and Development

The Louisiana Department of Transportation and Development provides funds under the Airport Construction and Development Program; Priority funding is provided if an eligible applicant is able to secure at least 90 percent of funding for a project from federal or local sources. Funds are used to match federal funding. The program planning model was updated and published in May of 2022. Projects should comply with the following prerequisites:

Funding is provided for the following types of projects: (1) Air Carrier Capital Outlay; and (2) General Aviation Capital Outlay.

- *Professional Services Agreement*: The airport sponsor shall hold a current executed agreement with an engineer or consultant to perform the work for the project(s) identified in the Project Application.
- *Environmental Clearance:* Environmental clearance documentation (if applicable) shall be included with a Project Application.

- *Airport Layout Plan*: The project shall be identified on the airport's approved airport layout plan.
- *Prior Phase Progress*: Progress should be sufficiently underway in the prior phase(s) of work for the project (i.e., design in progress for a construction project).

For FY 2022-2023, AEX has available $1,616,469 in federal funds and $179,608 as part of the Air Carrier Capital Outlay State Match[43].

Aviation Trust Funds may not be used as a match for projects funded with Passenger Facility Charges (PFC).

7.4.3.2 Louisiana State Capital Bill

The Louisiana legislature approves a capital budget every two years with the goal of funding needed improvements to public services and facilities across the state, including schools, roads and bridges, waterways, and parks. The current bill includes more than $500 million for local infrastructure projects through the Public Works Commission, including local roads, bridges, water-supply systems, storm sewers and wastewater systems.

The England Authority will continue to seek funding for key projects within the study's Capital Improvement Program for inclusion in future Louisiana State Capital Bills.

7.4.4 Alexandria International Airport

7.4.4.1 Passenger Facility Charge (PFC) Program

Arguably, the most important source of restricted revenue available to fund certain qualified airport capital development projects at commercial passenger service airports in the United States is the initiation and expansion in the use of Passenger Facility Charges[44] (PFCs). The Aviation Safety and Capacity Expansion Act of 1990 (ASECEA) authorized the Secretary of the Department of Transportation to grant public agencies which control commercial service airports enplaning more than 2,500 annual passengers the authority to impose a PFC for each passenger boarding an aircraft (enplanement) at a given airport. The purpose of the PFC Program is to preserve or enhance safety, security, capacity, competition, and mitigate the impact of aircraft noise. The ASECEA provides that PFC revenues may only be used for projects approved by the FAA including: (i) payment of all or part of allowable project costs; (ii) for an airport's AIP matching funds; (iii) to augment AIP funded projects; and (iv) for payment of debt service, including finance and costs associated with eligible airport projects funded with bonds.

Under existing authorization by Congress, airport sponsors may impose a PFC at a level of up to $4.50 per enplaned revenue passenger. These charges are collected by the air carriers when tickets are sold and are later remitted to the airport, less a handling fee of $0.11 per

[43] Airport Construction and Development Priority Program FY 2022-2023, Office of Multimodal Commerce LADOTD

[44] FAA - Passenger Facility Charge (PFC) Program: https://www.faa.gov/airports/pfc

PFC collected. Based on the estimated revenue passenger enplanement levels during the Short-Term Development Period, the AEX can anticipate approximately $550,000 in PFC revenue each year. AEX collected $2,096,725 for the period FY 2018 through FY 2022.

The England Authority has applied for and received approval from FAA to collect and use $15,500,835 from the FAA. The most recent application, PFC number 21-03-C-00-AEX was approved in the amount of $3,238,220. The estimated charge expiration date for this application is October 1, 2032. See the FAA Decision Summary in **Table 7-5**.

Table 7-5: FAA Decision Summary Report

Application Number	Approved for Collection	Approved for Use
99-01-C-00-AEX	$5,378,352	$5,378,352
99-01-C-01-AEX	$0	$0
99-01-C-02-AEX	$4,906,575	$4,906,575
99-01-C-03-AEX	$0	$0
17-02-C-00-AEX	$1,977,688	$1,977,688
21-03-C-00-AEX	$3,238,220	$3,238,220
Report Total	$15,500,835	$15,500,835

Source: FAA PFC Monthly Reports, 2023

7.4.4.2 Customer Facility Charge (CFC)

Rental car customer facility charges (CFCs) are another type of restricted airport revenue similar to the PFC. The primary distinction between a CFC and a PFC is a PFC must be approved by the FAA. A CFC is a charge commonly paid by rental car customers per the number of contract days that a person has rented a vehicle. The CFC can be negotiated and implemented contractually between the AEX and a rental car company(s). Generally, CFC revenue is limited to (i) funding rental car facilities at an airport; (ii) rental car related capital expense (debt service), and (iii) certain rental car related operating and maintenance expenses in some cases. AEX Charges a $6.00 CFC which is charged and collected by the rental car companies and then submitted to AEX. According to AEX's annual Form 127 the airport collected $3,202,092 over the period FY 2018 through FY 2022 as listed in **Table 7-6.**

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Table 7-6 Historical CFC Collections	
Year	**Collected**
2018	$706,416
2019	$748,554
2020	$648,942
2021	$540,840
2022	$557,340
Total FY 2018 - FY 2022	$3,202,092

Source: England Authority, 2023

7.4.4.3 Bonds

Proceeds from the issuance of municipal bonds are a common source of funding for airport sponsors in the United States. To obtain these funds, airports seek access to the capital markets on reasonable terms for short, intermediate, and long term-financing needs. The most commonly used financing instruments to fund major airport capital development programs are tax-exempt or tax-advantaged municipal debt, including General Obligation Bonds, General Airport Revenue Bonds, Industrial Development Bonds, and Special Facility Bonds.

- *Revenue Bonds:* Revenue bonds pledge the revenues of an airport sponsor to the repayment of debt service. These are the most common source of funding at larger commercial service airports. Revenue bonds are popular because they allow for the development of new projects without the need for local financial support or affect the bonding capacity of the municipality. However, their use is limited to airports with a sufficient operating surplus to cover the debt service. Projected Net Revenues must exceed debt service requirements by at least 1.25 times and up to 2.0 times, depending on the strength of the bond issuer and the underlying assumptions with respect to the market risk for the bonds. Interest rates are dependent on the coverage ratio, but in any case, will be higher than for general obligation bonds.

- *Special Facility Revenue Bonds:* Special facility revenue bonds are normally issued by an airport for the construction of a facility for a third-party and backed by the revenues generated from that facility. This method of funding can be used for such facilities as maintenance hangars, airline reservation centers, terminal buildings, and air cargo terminals.

- *Industrial Development Bonds:* Industrial development bonds can be issued by states, local government, or an airport authority to fund the construction of an airport industrial park or other facilities that may attract business and increase non-aeronautical leasing revenues.

In 2017, AEX bond indebtedness increased to $4,448,000 to fund improvements at the airport. This consists of the outstanding debt for the FY 2013A bonds and the new Series 2017A and Series 2017B Bonds (“the Series 2017 Bonds”). According to the England

Economic and Industrial Development Districts' FY 2017 Audit, the Series 2017 Bonds were issued to fund a new rental car maintenance facility and an access road to the facility. The debt for the Series 2013A Bonds and the Series 2017B Bonds are scheduled to be paid off by April 1, 2027.

Table 7-7: Bond Indebtedness (as of June 30, 2017)	
Series 2013A Bonds	$565,000
Series 2017A Bonds	3,046,000
Series 2017B Bonds	837,000
Total	$4,448,000

Source: England Authority, 2023

7.4.5 Public Private Partnerships / Third-Party Development

Funding by third parties or tenants is a viable source for certain of the proposed projects included in all phases of the development periods and ultimate/strategic initiative projects. This source of funding is facility related and directly reduces the amount that must be funded by the England Authority. Third party/tenant funding is a particularly important arrangement to pay the cost of proprietary facilities that may be ineligible for FAA participation such as hangars, air cargo facilities and non-aeronautical development.

Third party/tenant funding may take many forms depending upon the particular facility to be constructed. The third party or tenant may either pay for facilities directly or pledge to pay debt service on municipal or special facility bonds issued by the sponsor to construct the proposed facilities. One option in this regard would be to request proposals for development of such facilities to determine the level of interest in the industry to pursue development opportunities. A proposal could be structured to allow non-tenant investors the opportunity to build and lease facilities which would otherwise be funded by the tenant or the owner. This would require a minimal initial capital investment from the district.

It should be noted that third party or tenant facilities would likely be financed by the users. Alternatively, financing would be through the use of industrial development bonds or special facility bonds (as described previously in this chapter). Such types of financing would likely require a long-term lease (up to 30 years) to allow for the third party or tenant's recovery of its investment in the facility. The airport would collect land rental payments and benefit from the residual value of the facility reverting to the airport upon expiration of the lease.

7.4.6 Other Funding

As previously mentioned, this list of funding sources is not all-encompassing and there could be several other opportunities, depending on the project type. In addition to the sources described before, certain projects listed within the Airport Master Plan's Capital Improvement Program could include funding from outside, third-party development and potential DOTD road infrastructure grants.

It is recommended that a comprehensive review of funding sources be evaluated for each project as their trigger points are approached.

7.5 Financial Feasibility of Master Plan

The England Authority's financial operations are accounted for on a Fiscal Year (FY) basis. As the owner and operator of Alexandria International Airport, the Authority has the right to enter into agreements, leases, and contracts with tenants and to grant rights, privileges, and services related to the use of the airport. In exchange, tenants compensate the England Authority for use of airport facilities and consumption of services. A review of AEX's finances was conducted to determine the financial feasibility of the projects recommended throughout this Airport Master Plan's Capital Improvement Program.

7.5.1 Capital Improvement Program Funding Plan

As a part of the master plan process, a comprehensive list of recommended development projects is incorporated into the airport's Capital Improvement Program. These projects are then analyzed from a financial feasibility perspective, and a funding strategy is developed. The following **Tables 7-8, 7-9, and 7-10** outline this strategy and break down the projects over the course of the planning period. It is important to note this strategy was developed from a limited review of financial documents, and assumptions were made based on knowledge of historical funding at AEX, as well as insight into funding practices at airports of similar size and function as AEX.

In addition, it is important to note that projects developed in 2022 have not been included in this strategy since those projects already have funding assigned.

Within this proposed funding strategy, assumptions for funding of some projects have been made that may contradict the current financial operation of AEX. These assumptions have been made to propose additional funding streams for projects in the event AEX's financial operation is adapted and is conducive to these assumptions (i.e., a PFC is implemented, or a third party approaches the England Authority for development).

It is recommended that the proposed strategy be utilized as the genesis of a more in-depth planning session when developing the airport's annual Airport Capital Improvement Plan (ACIP) submission to the FAA. This session should consider the proposed funding opportunities mentioned along with any new information that may have developed since the publishing of this strategy, as well as consider any assumptions that may or may not have changed, and/or were not considered.

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Table 7-8: Short-Term Funding

Project Cost				Government Funding									Local Funding				Total Funding
#	Project	YR	Actual Cost (3% Inflation)	Entitlement	Discretionary	Other AIP (Supplemental / F&E)	Noise Program	BIL	MAP	DCIP	State Match	State Only	3rd Party	Authority Funds	CFC	PFC	
6	Remove Wildlife Habitat; Environmental Assessment; Mitigation	2023	$ 5,796,917		$ 3,000,000						$ 300,000	$ 2,496,917					$ 5,796,917
7	Extension of Runway 18 and Associated Improvements - Phase II	2023	2,307,370									2,307,370					2,307,370
8	Extension of Runway 18 and Associated Improvements - Phase III	2023	4,043,352	1,366,055				805,000			241,223	1,631,074					4,043,352
9	Emergency Ramp Lighting Rehabilitation	2023	480,219	75,260				244,000			43,947	117,011					480,219
10	South Ramp Expansion - Design only	2023	689,056					567,469			63,052	58,535					689,056
11	Taxiway & Ramp Rehabilitation (Taxiway A, B, E)	2023	628,350									628,350					628,350
12	Construction of Wash Rack	2023	3,000,000							3,000,000							3,000,000
13	North Apron Expansion - Design Only	2023	750,000									750,000					750,000
14	Closed Pavement & Obstacle Removal	2023	1,639,091									1,639,091					1,639,091
15	Large Wide Body MRO Hangar Construction	2023	49,569,014										49,569,014				49,569,014
16	Airport Access Road Rehabilitation - Phase I	2023	2,513,272									2,513,272					2,513,272
17	Part 150 Noise Program	2023	3,642,423				3,278,181				364,242						3,642,423
18	Inbound Baggage Equipment Rehabilitation	2023	350,000											350,000			350,000
19	Additional Autopay Exit Lane	2023	308,889											308,889			308,889
20	ICE Operations Area	2023	42,781									42,781					42,781
21	Residential Development I	2023	27,318,175										27,318,175				27,318,175
22	Green Space	2023	255,350											255,350			255,350
23	Taxiway B Shoulders (Upper side)	2023	1,847,824		1,663,042						184,782						1,847,824
24	Box Hangar A - South Apron	2023	2,454,724										2,209,251	245,473			2,454,724
25	Observation Park	2023	125,609									125,609					125,609
26	GSE Areas Improvement	2023	2,832,703									2,832,703					2,832,703
27	Solar Farm	2023	50,000,000										50,000,000				50,000,000
28	Westside Access Roads	2023	2,732,537									2,732,537					2,732,537
29	Extension of Runway 18 and Associated Improvements - Phase IV Precision Approach	2024	3,944,734									3,944,734					3,944,734

Table 7-8: Short-Term Funding

Project Cost				Government Funding									Local Funding				Total Funding
#	Project	YR	Actual Cost (3% Inflation)	Entitlement	Discretionary	Other AIP (Supplemental / F&E)	Noise Program	BIL	MAP	DCIP	State Match	State Only	3rd Party	Authority Funds	CFC	PFC	
30	South Ramp Expansion - Phase I (Itinerant Aircraft Parking)	2024	7,825,180	1,441,315				1,616,469			34,822	4,732,574					7,825,180
31	Taxiway & Ramp Rehabilitation - (North Ramp)	2024	759,718									759,718					759,718
32	ARFF Bunker Gear	2024	84,413									84,413					84,413
33	Runway Obstacle Removal	2024	619,030									619,030					619,030
34	GIS Airfield Development - Phase I	2024	815,994									815,994					815,994
35	Replacement Air Traffic Control Equipment	2024	815,994			734,394						81,599					815,994
36	ARFF Vehicle & Associated Equipment	2024	1,350,611		1,215,550						135,061						1,350,611
37	Wildlife Hazard Mitigation & Obstacle Removal	2024	1,097,371									1,097,371					1,097,371
38	Installation of Airfield Emergency Generator (Power Generator)	2024	731,581									731,581					731,581
39	Taxiway & Ramp Rehabilitation - (South Ramp)	2024	1,378,748									1,378,748					1,378,748
40	Terminal Area Efficiency and Safety Rehabilitation	2024	2,000,905			1,600,000						400,905					2,000,905
41	Passenger Boarding Bridge Replacement	2024	8,099,438			7,289,494					809,944						8,099,438
42	Future FBO Corporate Hangar	2025	7,995,938									3,997,969	3,997,969				7,995,938
43	South Ramp Expansion - Phase II (Itinerant Aircraft Parking)	2025	8,059,935	1,441,315							168,614	6,450,006					8,059,935
44	Safety Area and Associated Drainage - Phase I	2025	12,880,823		9,000,000						1,111,111	2,769,712					12,880,823
45	GIS Airfield Development - Phase II	2025	1,101,310									1,101,310					1,101,310
46	Airport Access Road Rehabilitation - Phase II	2025	2,028,730									2,028,730					2,028,730
47	Runway 14-32 Rehabilitation	2026	4,661,011	899,361							108,397	3,653,253					4,661,011
48	Taxiway & Ramp Rehabilitation - Phase IV (Taxiway A)	2026	719,024	541,954							60,217	116,853					719,024
49	Safety Area and Associated Drainage - Phase II	2026	5,306,899		4,000,000						444,444	862,455					5,306,899
50	North Apron Expansion - Phase II	2026	2,865,726									2,865,726					2,865,726
51	T-Hangar Westside - Phase I (10 Unit)	2026	4,897,893									4,897,893					4,897,893

Table 7-8: Short-Term Funding

Project Cost				Government Funding									Local Funding				Total Funding
#	Project	YR	Actual Cost (3% Inflation)	Entitlement	Discretionary	Other AIP (Supplemental / F&E)	Noise Program	BIL	MAP	DCIP	State Match	State Only	3rd Party	Authority Funds	CFC	PFC	
52	Runway Obstacle Removal (Runway 36 Approach)	2026	298,513			268,662					29,851						298,513
53	Residential Development II	2026	53,352,094										40,014,071	13,338,024			53,352,094
54	Inbound Baggage Reconfiguration	2026	417,918											417,918			417,918
55	GIS Airfield Development - Phase III	2026	1,134,350									1,134,350					1,134,350
56	Additional Security Screening Check Point	2026	447,770									447,770					447,770
	Subtotal of Short-Term Projects		**$299,019,304**	**$5,765,261**	**$18,878,592**	**$9,892,550**	**$3,278,181**	**$3,232,938**	**$0**	**$3,000,000**	**$4,099,708**	**$ 62,847,942**	**$173,108,480**	**$14,915,654**	**$0**	**$0**	**$299,019,304**

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Table 7-9: Mid-Term Funding

Project Cost				Government Funding									Local Funding				Total Funding
#	Project	YR	Actual Cost (3% Inflation)	Entitlement	Discretionary	Other AIP (Supplemental/ F&E)	Noise Program	BIL	MAP	DCIP	State Match	State Only	3rd Party	Authority Funds	CFC	PFC	
57	Parking and Rental Car Improvements	2027	$1,884,380											$942,190	$942,190		$1,887,380
58	Roads Intersection Improvements	2027	778,204									778,204					778,204
59	Perimeter Road Relocation	2027	1,912,577									1,912,577					1,912,577
60	FARP Relocation	2028	3,914,491						3,914,491								3,914,491
61	Midfield Apron (S) and Airfield Improvements	2028	79,468,943	2,882,630	68,639,418						7,946,894						79,468,943
62	Box Hangar B - North Apron	2028	3,962,663									396,266	3,566,397				3,962,663
63	Box Hangar C - North Apron	2028	3,885,364									388,536	3,496,827				3,885,364
64	Box Hangar D - North Apron	2028	4,254,697									425,470	3,829,227				4,254,697
65	Box Hangars E - South Apron	2029	3,051,023									305,102	2,745,921				3,051,023
66	Box Hangars F - South Apron	2029	4,560,204									456,020	4,104,184				4,560,204
67	Box Hangars G- South Apron	2029	4,576,018									457,602	4,118,416				4,576,018
68	Fuel Farm Expansion	2029	11,090,120									11,090,120					11,090,120
69	Taxiway A Improvements	2029	23,679,573	1,441,315	19,870,301						2,367,957						23,679,573
70	T-Hangar westside - Phase II (10 Unit)	2029	2,075,003									207,500	1,867,503				2,075,003
71	Runway 14 Extension and Associated Airfield Improvements	2030	67,297,941		$60,568,147						$6,729,794						67,297,941
72	Runway 14 CATII Implementation	2030	6,565,419									$6,565,419					6,565,419
73	Precision Approaches (32 and 36)	2030	9,895,110									9,895,110					9,895,110
74	Midfield Apron (N)	2030	60,449,337	1,441,315	52,963,088						6,044,934						60,449,337
75	Hangar H Development	2030	8,137,373									481,950	7,665,423				8,137,373
76	MRO B - South Apron	2031	22,681,979	1,125,878									21,556,101				22,681,979
77	PAR Relocation	2031	2,652,978						2,652,978								2,652,978
	Subtotal Mid-Term Projects		**$326,773,395**	**$6,891,139**	**$202,040,954**	**$0**	**$0**	**$0**	**$6,567,469**	**$0**	**$23,089,579**	**$33,359,876**	**$52,939,998**	**$942,190**	**$942,190**	**$0**	**$326,773,395**

Table 7-10: Long-Term Funding																	
				Government Funding									Local Funding				Total Funding
#	Project	YR	Actual Cost (3% Inflation)	Entitlement	Discretionary	Other AIP (Supplemental/ F&E)	Noise Program	BIL	MAP	DCIP	State Match	State Only	3rd Party	Authority Funds	CFC	PFC	
78	Parallel Taxiway	2032	$110,243,581	$2,882,630	$96,336,592						$11,024,358						$110,243,581
79	Air Cargo Development Phase 1	2033	103,324,067									19,874,746	83,449,321				103,324,067
80	MRO C Development (Westside)	2034	96,029,564										96,029,564				96,029,564
81	Residential Development III	2034	110,504,073								11,050,407	99,459,666					110,504,073
82	Air Cargo Development Phase 2	2035	121,447,436										121,447,436				121,447,436
83	Support Services (Westside)	2036	1,358,557									1,358,557					1,358,557
84	Air Cargo Development Phase 3	2039	127,063,318										127,063,318				127,063,318
85	T-Hangar westside - Phase III (10 Unit)	2039	2,958,458									2,958,458					2,958,458
	Subtotal of Long-Term Projects		**$672,929,054**	**$2,882,630**	**$96,336,592**	**$0**	**$0**	**$0**	**$0**	**$0**	**$22,074,765**	**$123,645,427**	**$427,989,639**	**$0**	**$0**	**$0**	**$672,929,054**

Source: Michael Baker International and Newton & Associates, Inc., 2023.

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7.5.2 Alexandria International Airport Financial Structure

AEX is operated as a financial entity within the England Authority. The Fiscal Year 2023 Budget was presented to the Authority on June 28, 2023 and included a road map for the year, referred to as Work Plan for FY 2022-2023 as well as its financial strategies. Management developed an operating budget of $14,637,637 as well as a capital budget of $48,742,499. It is important that this budget is for the entire England Economic and Industrial Development District.

The England Authority structure is comprised of five divisions: Administration, Airport, Airpark, Military Services, and Community Services. Each division generates revenues and expenditures. According to its FY 2022 audit, the Authority generated $11,530,8321 in revenue, of which, $1,358,447 consisted of aeronautical revenue[45] as listed in **Table 7-11**.

Aeronautical revenue at AEX includes airline aviation leases, landing and ramps fees, FBO lease, fuel flowage fees and T-hangars. Non-aeronautical revenue generated by the England Airpark & Community is comprised by land and building leases, residential and other leasing, community Center, Oakwing Golf Course, terminal concessions, rental car, and parking lot.

AEX's financial Structure is listed in **Tables 7-11, 7-12** and **7-13**.

Table 7-11: England Authority Operating Revenue (FY 2018 -2022)

Account	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022
Aeronautical Operating Revenue	$1,4822,638	$1,450,135	$1,266,158	$1,178,439	$1,358,447
Non-Aeronautical Operating Revenue	8,030,320	8,108,726	7,736,628	8,298,330	9,740,377
Total Operating Revenue	$9,512,958	$9,558,861	$9,002,786	$9,476,769	$11,098,824
Percent Change	N/A	**0.48%**	**-5.82%**	**5.26%**	**17.12%**

Source: England Authority – FAA Form 127 Operating and Financial Summary

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[45] According to the FAA Form 127 Operating and Financial Summary

Table 7-12: England Authority Operating Expenses (FY 2018-2022)					
Account	**FY 2018**	**FY 2019**	**FY 2020**	**FY 2021**	**FY 2022**
Salary & Benefits	$2,197,679	$2,032,123	$2,546,235	$2,639,046	$2,887,203
Communication & Utilities	674,107	687,544	621,378	792,336	1,110,668
Supplies & Materials	724,519	740,838	622,335	467,616	562,383
Contractual Services	4,141,813	4,788,967	4,403,435	3,145,175	2,939,285
Insurance Claims & Settlements	400,644	461,941	470,394	450,564	584,681
Other Operating Expenses	999,577	1,483,891	876,134	1,488,680	3,364,805
Total Operating Expenses	**$9,138,339**	**$10,195,304**	**$9,539,911**	**$8,983,417**	**$11,449,025**
Operating Income (Deficit)	**$374,619**	**($636,443)**	**($537,125)**	**$493,352**	**($350,201)**
Debt Service	573,645	428,378	429,271	432,952	437,351
Other (Includes Interest Expense)	85,499	81,043	73,226	64,836	56,191
Grand Total Operating Expenses	**$9,422,864**	**$11,341,168**	**$10,579,533**	**$8,987,853**	**$12,292,768**
Percent Change	**N/A**	**20.36%**	**-6.72%**	**-15.04%**	**36.77%**

Source: England Authority – FAA Form 127 Operating and Financial Summary

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Table 7-13: England Economic and Industrial Development District Statement of Revenues, Expenses, and Changes in Net Position		
	30-Jun-21	30-Jun-22
Operating Revenues		
Lease Revenues and Other Fees	$8,557,104	$9,413,741
Contract Facility Charges	540,840	557,340
Passenger Facility Charges	337,341	439,815
Miscellaneous	282,152	1,119,936
Total Operating Revenue	**$9,717,437**	**$11,530,832**
Operating Expenses		
Salaries and Wages	$2,014,046	$2,162,937
Payroll Taxes and Employee Benefits	625,000	724,266
General and Administrative Expenses	641,267	923,887
Contract Services	3,048,715	2,939,285
Repairs and Maintenance	1,297,977	2,061,477
Depreciation	7,239,598	7,183,597
Supplies/Others	467,616	1,526,505
Utilities	792,336	1,110,668
Total Operating Expenses	**$16,126,555**	**$18,632,622**
Operating Loss	**($6,406,115)**	**($7,101,790)**
Non-Operating Revenues (Expense)		
Federal Grants	$4,701,699	$3,323,399
State grants	75,000	126,410
Noise mitigation program	(1,567,177)	(2,675,643)
Investment income	16,119	164,709
Gain on disposition of Capital assets	0	0
Interest expense	(64,836)	(56,160
Total Non-Operating Revenues	**$3,160,805**	**$882,715**

Table 7-13: England Economic and Industrial Development District Statement of Revenues, Expenses, and Changes in Net Position		
	30-Jun-21	30-Jun-22
Loss Before Contributions	**($3,248,313)**	**($6,219,075)**
Capital Contributions		
Federal Grants	$5,419,032	$4,176,583
State Grants	1,502,049	1,930,831
Total Capital Contributions	**$6,921,108**	**$6,107,414**
Change in Net Position	**$3,672,795**	**($111,661)**
Net Position Beginning at Started	$220,073,392	$223,746,187
Net position, ending	**$223,746,187**	**$223,634,526**

Source: England Economic and Industrial Development District Financial Report, Years Ending June 30, 2021 and June 30, 2022.

Outside funding (e.g., Federal Funding) can be put towards an up-front portion of a development project, while the remainder is covered via a bond. Airports are also able to use FAA entitlement funding towards debt principal payments; however, this funding cannot be used towards any finance interest. FAA discretionary money is not allowed to be used to make debt payments. Generally, discretionary money is dedicated towards projects to pay for a portion of outright costs ahead of construction and cannot be used to pay for costs after a project has been completed.

7.5.3 Cash Flow

Airport cash flow, as shown in Table 7-14, refers to the collection of revenues earned or received, and payment of expenses incurred during a fiscal year. The ability of the airport to use positive cash flows and unrestricted reserves as a source of funding depends on its ability to generate airport revenues in excess of the cost of operating, maintaining and improving the airport.

Surplus annual cash flows are deposited by the Authority into one of several unrestricted reserve accounts. The Authority can accumulate any such annual surpluses and any investment interest in the reserve accounts and use a portion of the available balances to pay a part of the development costs for the capital projects.

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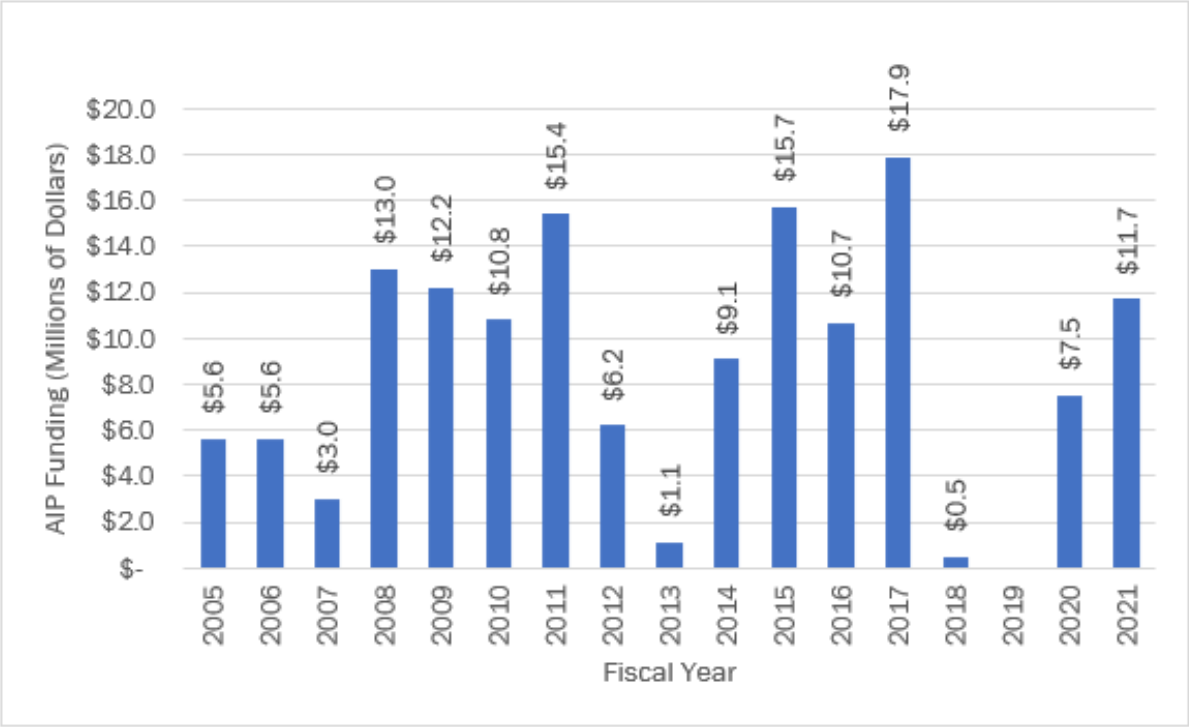
Table 7-14: Cash flow for Operating Activities Year Ended June 30, 2022	
Receipts from operations	$11,240,944
Payments to suppliers for goods and services	(8,569,096)
Payment to employees and for employees related costs	(2,878,627)
Net Cash Provided By operation activities	($206,779)

Source: England Economic and Industrial Development District Financial Report Year Ended June 30, 2022

According to the FAA's AIP Grant History, AEX has received approximately $146,000,000 in AIP funding for capital projects since 2005 including approximately $39 million for noise mitigation measures for residences within 70-74 DNL, and an additional $19.2 million for residences within 65-69 DNL.

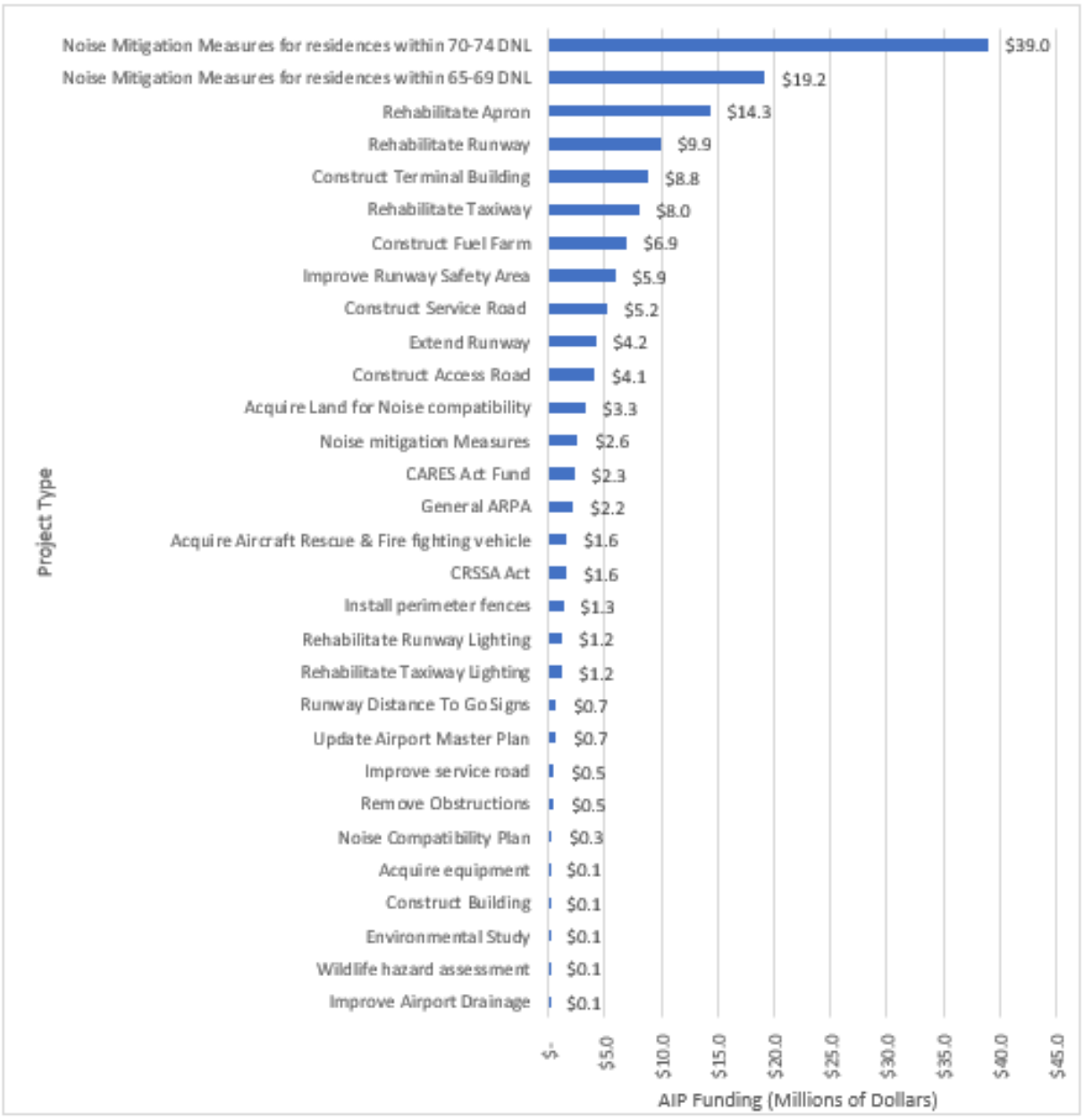
Figure 7-4 provides a historical timeline of the FAA AIP funding AEX has received since 2005 and **Figure 7-5** shows a detail of the projects funded.

Figure 7-4: AEX Historical AIP Funding



Source: FAA Airport Improvement Program (AIP) Grant Histories

Figure 7-5: AEX AIP Funding by Project Type



Source: FAA Airport Improvement Program (AIP) Grant Histories

7.6 Master Plan Implementation

This analysis provides the results of evaluating the financial feasibility of implementing the Master Plan Capital Improvement Program for AEX during the planning period from 2023 through 2042.

7.6.1 Estimated Project Costs and Development Schedule

The Capital Improvement Program (CIP) Estimated Project Costs and Development Schedule is derived from previous results of the Master Plan analysis. The CIP for capital expansion and improvement projects is projected for the Short-Term planning period from 2023 through 2026, for the Mid-Term from 2027 through 2031 and for the Long Term from 2032 through 2041. As mentioned previously, projects for 2022 have been excluded from this analysis. For each of these planning periods, **Table 7-15** presents the AEX Capital Improvement Program including estimated costs and anticipated development schedule for the identified projects.

As shown in **Table 7-15**, the total estimated cost of projects is $1.24 billion, including inflation. The estimated costs for projects scheduled during the period 2023 through 2041 are adjusted by an assumed 3 percent rate of annual inflation.

Short-Term Projects are estimated to cost a total of $247.8 million. These Short-Term projects are generally well defined and anticipated to fill existing known needs for the airport. Mid- and Long-Term projects are less defined and will take place when the actual need for the facility arises. A number of the projects included in the overall Study will require Third Party investment and would only be driven by the market need. Those projects would most likely not proceed without outside investment.

Table 7-15: AEX Capital Improvement Program by Planning Period

Planning Period	Cumulative Totals
Short-Term Projects	$247,803,616
Mid-Term Projects	$326,773,395
Long Term Projects	$672,929,054
Total Project Cost	$1,247,506,065

Source: Michael Baker International Inc., 2023

7.6.2 Funding Sources and Use of Capital Funds

The Authority does not anticipate funding any development with future revenue bonds. The Authority may utilize a short-term credit facility to fund some projects, but it is anticipated that most projects will be funded by Authority reserves/net operating revenue combined with Federal grants or third-party financing.

A summary of the sources of capital funding by type for each planning period for the AEX CIP is presented below in **Tables 7-16 and 7-17.**

Table 7-16: AEX Capital Improvement Plan and Master Plan Project Summary of Funding Sources – Federal and State						
Planning Period	Funding Source					
	FAA	Noise Program	BIL	MAP	DCIP	State
Short-Term Projects	$34,536,402	$3,278,181	$3,232,938	$0	$3,000,000	$66,947,650
Mid-Term Projects	$208,932,093	$0	$0	$6,567,469	$0	$56,449,455
Long-Term Projects	$99,219,223	$0	$0	$0	$0	$145,720,192
Total Project Cost	$342,687,718	$3,278,181	$3,232,938	$6,567,469	$3,000,000	$269,117,297

Source: Michael Baker International Inc., 2023

Table 7-17: AEX Capital Improvement Plan and Master Plan Project Summary of Funding Sources - Other				
Planning Period	Funding Source			
	Third Party	Authority Funds	CFC's	PFC's
Short-Term Projects	$173,108,480	$14,915,654	$0	$0
Mid-Term Projects	$52,939,998	$942,190	$942,190	$0
Long-Term Projects	$427,989,639	$0	$0	$0
Total Project Cost	$654,038,117	$15,857,843	$942,190	$0

Source: Michael Baker International Inc. 2023

The overall AEX Capital Improvement Plan is highly dependent on multiple external funding sources, including significant FAA AIP funds and State funds. Of the total AIP funds, $317.3 million will be discretionary, and those projects identified for discretionary funding will be considered grant dependent. Those projects would only move forward if the grant funding is awarded. The projects that require third-party funds ($604.04 million) would also not move forward without the independent funding associated with those projects. Each year, the FAA prioritizes the projects in order to determine which projects will be awarded the finite discretionary funds. It is very possible that in a given year, discretionary funds will not be available for projects in this Master Plan Update, and when that occurs, the project will be deferred.

7.6.3 Financial Plan Summary

The financial feasibility for the master plan update recommended development relies on achievement of the forecast of aviation activity. Actual aviation traffic may temporarily vary from the projected levels of activity without a significant adverse impact on the capital program. If decreased traffic levels occur and persist, implementation of all the proposed projects may not be financially feasible. It should also be noted that if the forecast activity levels are not met, then a number of the planned capital improvements may not be necessary.

The financial feasibility of future projects will be determined by the provisions of existing and future leases, funding levels and financial participation rates of federal and state grant programs, the availability of other funding sources, and the ability to generate internal cash flow from operations at AEX.

The financial projections were prepared on the basis of available information and assumptions set forth in this chapter as well as those provided in the Capital Program Financial Feasibility Analysis provided and published by the England Authority. This information was analyzed to ensure that the proposed capital program outlined in the Study was feasible with regard to the financial characteristics of AEX individually as well as when considered with the resources available to the England Authority as a whole. It is believed that such information and assumptions provide a reasonable basis for the projections to the level of detail appropriate for an airport master plan. Some of the assumptions used to develop the projections may not be realized, and unanticipated events or circumstances may occur. Therefore, the actual results will vary from those projected, and such variations could be material. Also, a number of the projects included in the Study will require Third Party investment and would only be driven by the market need. Those projects would not proceed without outside investment.

Based on these assumptions, the capital program outlined in the Study for Short-Term projects can reasonably be financed in the future. Due to the nature of the timing of Mid- and Long-Term projected development, the feasibility of the funding of those projects should be analyzed closer to the fruition of those projects.

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Chapter 8
Airport Layout Plan Set

FLYAEX
ALEXANDRIA INTERNATIONAL AIRPORT

8 AIRPORT LAYOUT PLANS SET

8.1 Introduction

The Airport Layout Plan (ALP) serves as the graphical blueprint for future airport development. The updated development recommendations presented in this master plan update are pictorially summarized in the ALP drawing set and include the preferred concepts for airfield development, landside facility development, and other reserved areas for non-aviation use. The ALP drawing set represents a scaled, graphic presentation of the airport's 20-year development program, thereby providing AEX with a feasible improvement plan that would increase the capability and safety of aircraft operations, promote compatibility with existing and proposed developments, and further upgrade the airport to effectively serve the anticipated demands of commercial, military/government, corporate, and general aviation traffic.

The dimensional information in the drawings identifies existing and planned future compliance with FAA airport design standards and state/local goals. The ALP Drawing Set was developed following the guidance outlined in Federal Aviation Administration's (FAA) Advisory Circulars (AC) 150/5070-6B, *Airport Master Plans (Change 2)*, 150/5300-13B, *Airport Design*, FAA's Office of Airports (ARP) *Standard Operating Procedure (SOP) 2.0*, *Standard Operating Procedure for FAA Review and Approval of Airport Layout Plans*, and other supporting FAA-published ACs and Orders. Information and data presented or depicted in the ALP drawing set were not developed or intended to be used for design engineering accuracy.

The ALP drawing set includes the following individual drawing sheets:

- Title Sheet (Sheet 1)
- Airport Data Sheets (Sheets 2 and 3)
- Airport Layout Plan Existing Conditions Drawing (Sheet 4)
- Airport Layout Plan Future Conditions Drawing (Sheet 5)
- Terminal Area Plan (Sheets 6 and 7)
- Airport Airspace Drawing (Sheets 8 to 13)
- Inner Portion of the Approach Surface Drawings (Sheets 14 to 17)
- Runway Departure Surface Drawings (Sheets 18 and 19)
- Land Use Drawing (Sheet 20)
- Obstruction Tables (Sheets 21 to 45)

8.2 Title Sheet

The Title Sheet includes the ALP Drawing Set publication date, airport name, airport owner (Sponsor), Vicinity and Location Maps, Drawing Index, State Grant Identifier, and Airport Sponsor Approval Signature Block.

8.3 Airport Data Sheet

The Airport Data Sheet provides key informational and data elements depicted on the Airport Layout Plan Drawing reflecting current FAA-mandated airport design standards. Tabular-

listed data and information includes geodetic coordinates and Above Mean Sea Level (MSL) elevations for the Airport Reference Point, each runway end, runway centerline high and low elevations, runways centerline true bearing azimuths, and modification to Airport Design Standards Data Tables. For clarity, information has been subdivided into two sheets. The second Airport Data Sheet depicts the All-Weather and IFR wind rose information, graphics, and the existing buildings table.

8.4 Airport Layout Plan Drawings

The Airport Layout Plan Drawing (ALP) depicts all existing and planned future airport facility developments as proposed within the 20-year Airport Master Plan Update. To facilitate the review of planned facility improvements, separate ALPs depict existing/future and ultimate conditions, respectively. Only the Future ALP is accepted, conditionally approved, and retained on file by the FAA for future federal (i.e., FAA) funding authorization and/or participation. The ALP provides informational and dimensional data to demonstrate conformance with current and applicable FAA airport design standards as prescribed in FAA AC 150/5300-13B, *Airport Design*. Denoted or depicted ALP information includes, but is not limited to, runways, taxiways, airfield lighting, visual and electronic navigational aids, terminal facilities, hangars, other non-aviation or support buildings, aircraft parking areas, automobile and truck parking, and airport access elements, as well as general, aerial photogrammetric mapping and geodetic survey source notes.

8.5 Terminal Area Drawings

The Terminal Area Drawing depicts on-airport non-airfield land areas reserved for existing and planned future terminal facilities, supporting landside developments, and adjacencies. The drawing reflects existing and recommended development of the passenger and general aviation terminal areas as identified in this study. The terminal concept focuses on flexibility for future expansion and includes recommendations for access and parking, airfield access, aircraft apron layout, as well as necessary security access to the airfield.

8.6 Airport Airspace Drawings

Title 14 of the Code of Federal Aviation Regulations (14 CFR) *Part 77, Safe, Efficient Use, and Preservation of the Navigable Airspace*, prescribes airspace standards, which establish criteria for evaluating navigable airspace. Airport imaginary surfaces are established relative to the airport runway and the types of approaches it provides. The size of each imaginary surface is based on the runway category with respect to the existing and proposed visual, non-precision, or precision approaches for that runway. The slope and dimensions of the respective approach surfaces are determined by the most demanding, existing, or proposed approach for each runway.

- Primary Surface – A rectangular area symmetrically located about the runway centerline, extending 200 feet beyond each runway end. Its elevation is the same as the nearest point along the runway edge. The primary surface for both Runway 14-32 and for Runway 18-36 is 1000 feet wide,.
- Horizontal Surface – An oval-shaped, flat area situated 150 feet above the published airport elevation of 88.05 feet Above Mean Sea Level (AMSL) at AEX. Its dimensions

are determined by connecting 10,000-foot arcs starting 200 feet beyond the future runway ends. The horizontal surface elevation for AEX is 238.05 feet AMSL.

- Conical Surface – A sloping area whose inner perimeter conforms to the shape of the horizontal surface. It extends outward for 4,000 feet, measured horizontally, and slopes upward at a 20:1 ratio. At AEX, the conical surface extends upward to an elevation of 438.05 feet AMSL.
- Transitional Surface – A sloping area beginning at the edges of the primary and approach surfaces and sloping upward and outward at a ratio of 7:1.
- Approach Surface – This surface begins at the ends of the primary surface and slopes upward at a predetermined ratio while at the same time flaring out horizontally. The width and elevation of the inner ends conform to that of the primary surface, while the slope, length, and outer width are determined by the runway service category and existing or proposed non-precision instrument approach procedures. The approach surface length for Runway 18-36 and Runway 32 is 10,000 feet at a slope of 34 to 1. Runway 14 is a precision Instrument Runway requiring the approach surface to extend for a horizontal distance of 10,000 feet at a slope of 50 to 1 and an additional 40,000 feet at 40 to 1.
- FAR Part 77 Obstruction Tables associated with these drawings are subdivided by existing and future conditions and included in the following tables:
    - Runway 14-32 Existing Part 77 Obstructions (Sheet 21)
    - Runway 18-36 Existing Part 77 Obstructions (Sheet 25)
    - Runway 14-32 Ultimate Part 77 Obstructions (Sheets 29 to 30)
    - Runway 18-36 Ultimate Part 77 Obstructions (Sheet 39)

8.7 Inner Portion of the Approach Surface Drawings

The Inner Portion of the Approach Surface Drawings show both plan and profile views of the approach surfaces beyond each runway end. The purpose of these drawings is to locate and document existing objects that represent obstructions to navigable airspace within the existing and proposed approach slopes for each runway. Additionally, the drawings show the ground profile and terrain features along the extended centerline of each runway end.

Any controlling structures, such as roadways, natural ground elevations, and trees, are also shown on the Inner Portion of the Approach Surface Drawings, if applicable. Additionally, fixed objects located along the extended runway centerlines are illustrated on the sheets to indicate the relative distance to the approach surfaces. As applicable, obstructions to navigable airspace are listed in an obstruction data table, along with a recommended action for each obstruction. For clarity purposes, the Inner Portion of the Approach Surface Drawings were subdivided into four sheets depicting each respective runway end's approach obstructions. Tables associated with these drawings are subdivided by existing and future conditions and included in the following tables:

- Runway 14-32 Existing Approach Obstructions (Sheet 22)
- Runway 18-36 Existing Approach Obstructions (Sheet 26)
- Runway 14-32 Ultimate Approach Obstructions (Sheets 31 to 34)
- Runway 18-36 Ultimate Approach Obstructions (Sheets 40 to 42)

8.8 Runway Departure Surface Drawings

The Runway Departure Surface Drawing depict the plan and profile-view of the TERPS Instrument Departure Surfaces that are located at the end of each runway serving instrument departure operations. Like other airspace-related drawings, penetrations of the TERPS Departure Surface are tabular-listed, describing the type of obstruction, surface penetrated, amount of penetration, and recommended mitigation. For clarity purposes, the Runway Departure Surface Drawing was subdivided into two sheets depicting the end of each runway. The Departure Surface Drawing includes general, base mapping, and geodetic survey source notes. Departure Obstruction Tables are subdivided by existing and future conditions and included in the following tables:

- Runway 14-32 Existing Departure Obstructions (Sheet 23)
- Runway 18-36 Existing Approach Obstructions (Sheet 27)
- Runway 14-32 Ultimate Approach Obstructions (Sheets 35 to 36)
- Runway 18-36 Ultimate Approach Obstructions (Sheet 43)

8.9 Existing and Future Land Use Drawings

The Land Use Drawing depicts existing land uses on and off the airport. On-airport land uses are designated by functional use and their respective relative location, proximity, or direct access to the airfield. The Land Use Drawing includes land uses surrounding the airport as identified and classified by local municipal governments and/or planning agencies. The Land Use Drawing also identifies future Land use proposed on-airport property to support the preferred airport development plan and to maintain compatible land uses within the airport surroundings.

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