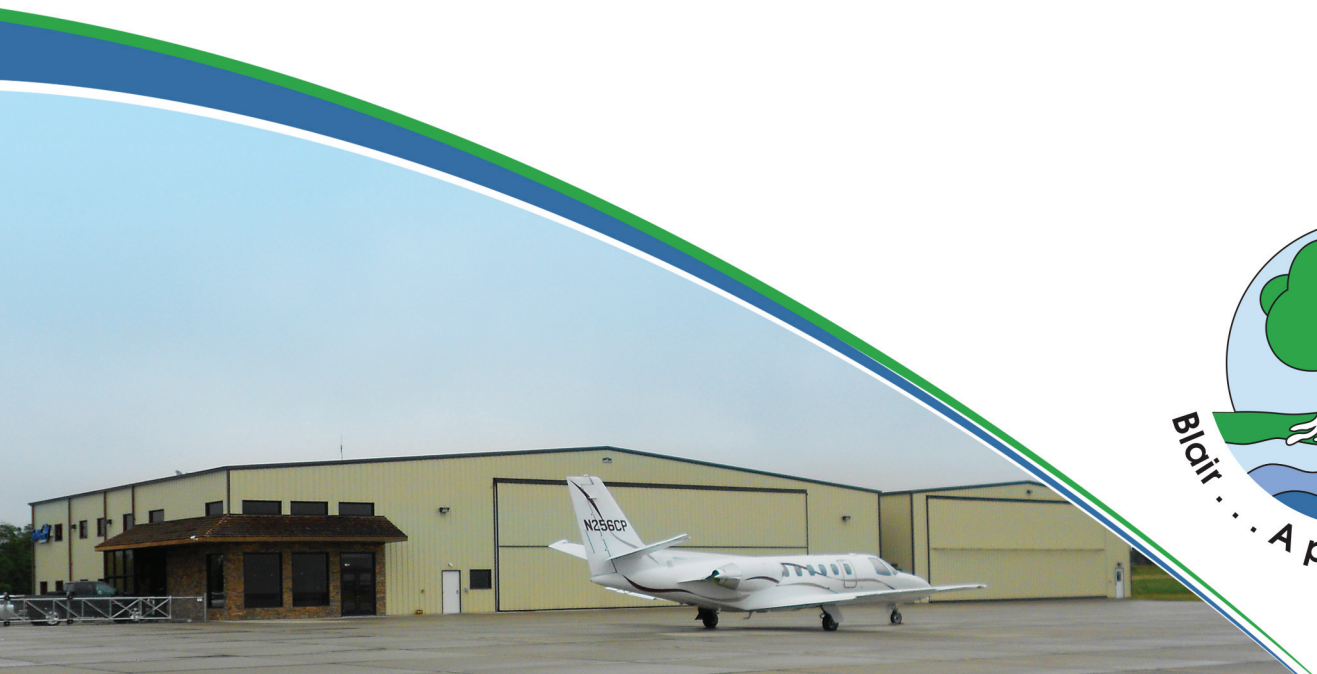
BLAIR
MUNICIPAL AIRPORT







AIRPORT LAYOUT PLAN UPDATE



Blair . . . A promise of quality

AIRPORT LAYOUT PLAN UPDATE

BLAIR MUNICIPAL AIRPORT

Blair, Nebraska

Prepared for:

The City of Blair

Prepared by:

Coffman Associates
Airport Consultants

March 2019

BLAIR
MUNICIPAL AIRPORT

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Appendix A
GLOSSARY OF TERMS

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AIRPORT LAYOUT PLANS

Appendix D
UNITED STATES DEPARTMENT OF AGRICULTURE WILDLIFE HAZARD OVERVIEW

BLAIR
MUNICIPAL AIRPORT

AIRPORT LAYOUT PLAN UPDATE



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BLAIR MUNICIPAL AIRPORT
AIRPORT LAYOUT PLAN UPDATE

This report is intended to provide the Blair Airport Authority, the City of Blair, the Nebraska Department of Transportation– Division of Aeronautics (NDA), and the Federal Aviation Administration (FAA) with a document that depicts the most current plans for airport improvements at Blair Municipal Airport (Airport or BTA). This document will primarily focus on the development direction and facility changes that have taken place since the completion and approval of the last Airport Layout Plan (ALP) in 1999. The report will provide analysis detailing existing and future aviation demand and plans for airport development to meet the demand. The resultant plan will be reflected on an updated ALP drawing set, which consists of a computer-generated drawing that depicts the current and future Airport conditions.

AIRPORT BACKGROUND

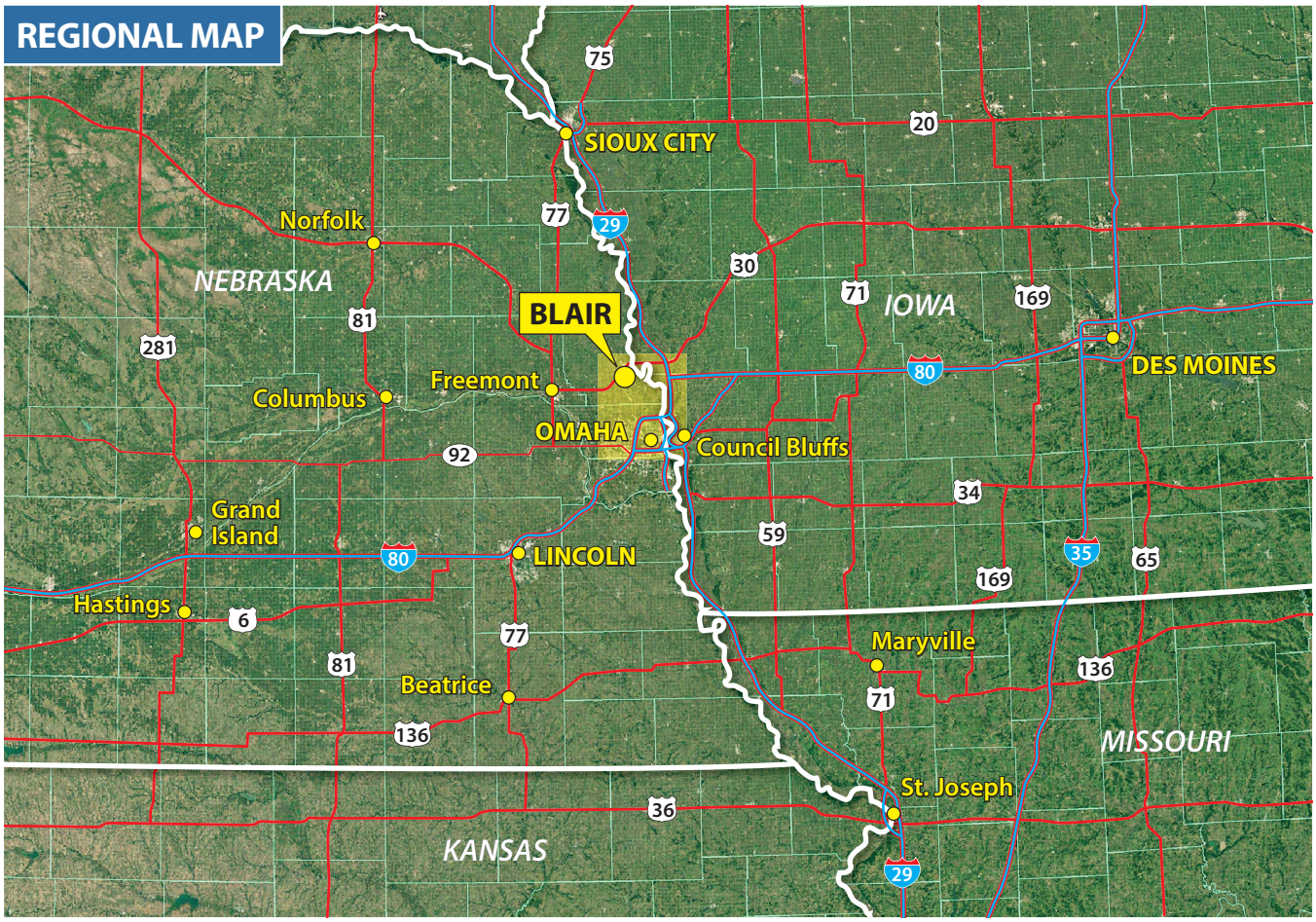
The Airport is located approximately seven miles to the south of the City of Blair, along State Highway 133 in the southeastern quadrant of Washington County, Nebraska. On a regional scale, the Airport is located roughly 15 miles to the north of Omaha, Nebraska. Owned and operated by the Blair Airport Authority, BTA is positioned on approximately 306 acres of land and at an elevation of 1,317.6 feet above mean sea level (MSL). **Exhibit A** depicts the location of the Airport and its surroundings. The Airport was originally established between 1938 and 1941, was located north-northwest of the City of Blair, and consisted of a turf runway and rectangular field measuring 2,650 feet long by 1,400 feet wide. The original Airport was later upgraded to a paved runway section measuring approximately 2,600 feet long and 50 feet wide. This facility was privately-owned and operated by the City of Blair. The original Airport has since been closed and the City of Blair purchased an existing airfield that now serves as BTA. The current Airport location, purchased by the City in 1996, offers amenities such as 24-hour self-service 100 low-lead (LL) and Jet-A fuel, full service quick turn Jet-A fueling, aircraft hangars and tiedown parking, and a pilot's lounge.



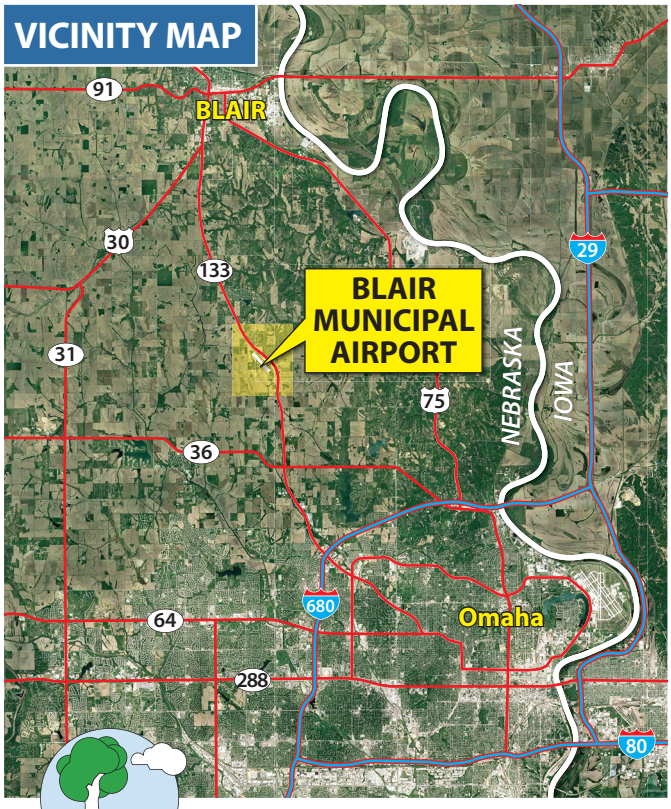




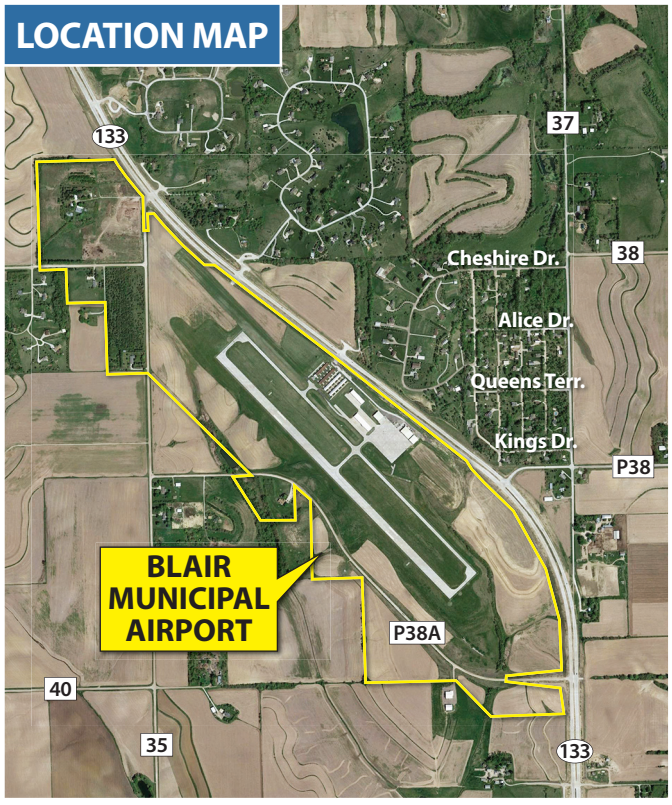
REGIONAL MAP



VICINITY MAP



LOCATION MAP



Since the Airport does not have an airport traffic control tower (ATCT), the number of annual operations (takeoffs and landings) at the airport must be estimated. Total operations were estimated by the FAA in the 2016 *Terminal Area Forecast* (TAF) at 15,500. These operations comprised of 1,600 itinerant operations and 13,900 local operations. Generally, local operations are characterized by training operations. Itinerant operations are those performed by aircraft with a specific origin or destination away from the airport. Typically, itinerant operations increase with business and commercial use since business aircraft are not usually used for large scale training activities. The TAF projections are based upon local and national economic factors, as well as conditions within the aviation industry. Typically, forecasting at airports without an ATCT is based upon historic operations reported in the Airport Master Record Form 5010. This data is generally held constant for the forecast projections unless specified by a local or regional FAA official. Currently (October 2016), the Airport has a total of 60 based aircraft consisting of 48 single engine piston, two multi-engine piston, two turboprop, three jet, and five glider aircraft.



Airport Entrance Sign

BTA is largely surrounded by agricultural land with residential areas situated on the north, northeast, west, and northwestern sides of the Airport. It should be noted, however, that existing houses located on Airport property are owned by the Airport and are used as rental property.

AIRPORT ROLE

BTA is recognized within the FAA's *National Plan of Integrated Airport Systems* (NPIAS) as a Regional General Aviation (GA) airport. The NPIAS is a compilation of airports within the United States that are deemed important to national air transportation by the FAA. Airports included within the NPIAS are qualified for federal funding through the Airport Improvement Program (AIP).

GA airports within the NPIAS must meet certain criteria to be viewed by the federal government as an asset to the air transportation system. Typically, GA airports have at least ten based aircraft and are approximately 20 miles from any other airport listed in the NPIAS. Within the GA designation, airports are further classified as: National, Regional, Local, and Basic. BTA is classified within the Regional category. Regional GA airports are located within metropolitan areas and serve relatively large populations. These airports support regional economies with interstate and some long-distance flying and have high levels of activity, including some jets and multi-engine propeller aircraft. Regional airports average about 100 total based aircraft, and typically include at least three jets.

In addition to its inclusion in the NPIAS, BTA is also included in the *Nebraska Aviation Systems Plan* (NASP), last updated in 2002. Within the NASP, BTA is given the designation of a Regional airport. Minimum standards for this qualification are presented in **Table A**. According to the NASP, the Airport serves as a reliever to Eppley Airfield (OMA) located approximately 12 nautical miles (nm) southeast.

TABLE A
Facility and Service Criteria
NASP Regional Airports

Airport Criteria	Minimum Objective
Airport Reference Code	B-II or Greater
Runway Length	100% of Small Aircraft w/ less than 10 passenger seats
Runway Width	To Meet ARC
Runway Strength	To Meet ARC
Taxiways	Partial Parallel
Navigational Aids	Non-Precision Approach
Visual Aids	PAPIs
Lighting	MIRL, Beacon
Weather	Automated Weather
Services	Phone, restrooms, FBO, Maintenance, Jet Fuel, Ground Transportation, RCO
Facilities	Terminal, Aircraft Apron, Hangars, Auto Parking
Ground Access	Full paved road from associated city to terminal with roadway signs on and off site

ARC: Airport Reference Code
AWOS: Automated Weather Observation System
FBO: Fixed Based Operator
MIRL: Medium Intensity Runway Lighting
PAPI: Precision Approach Path Indicator
RCO: Remote Communications Outlet
Source: Nebraska Department of Aeronautics (2014 Annual Report)

Since the completion of the last update to the ALP in 1999, BTA has received Airport Improvement Program (AIP) funding for various projects, including runway construction, apron and taxiway construction, land acquisition, and this Airport Master Plan Update. AIP grant history since 2002 is presented in **Table B**. Since 2000, BTA has received $14,246,871 in federal AIP funding.

TABLE B
Grant History
Blair Municipal Airport

Year	Project	Grant Sequence Number	Original Grant Amount
1991	Airport Master Plan and Site Selection Study	1	$54,000
1996	Acquire Existing Airport *(tract A)*	2	$690,000
2002	Construct Runway 13/31 [Phase 1] *(tract I, partial tracts O, W, Y, Z & ALP update reimbursement)*	3	$1,153,681
2003	Construct Runway 13/31 [Phase 2] *(includes tracts C, C-1, D E, F, G, H, J, K, L, partial O, W, Y, Z)*	4	$5,422,712
2004	Construct Runway 13/31 [Phase 3]	5	$1,468,524
2005	Construct Apron, Construct Runway [Phase 4] - 13/31, Construct Taxiway, Install Miscellaneous NAVAIDS, Update Airport Master Plan Study	6	$939,051
2009	Construct and Pave Full Parallel Taxiway and Install Taxiway Lights, Install Runway Vertical/Visual Guidance System 13/31	7, 8, 9	$2,208,475
2010	Acquire Miscellaneous Land *(tract AA)*	10	$256,500
2012	Acquire Miscellaneous Land *(tract S)*	11	$318,600
2013	Acquire Snow Removal Equipment *(tractor, blower, blade, broom)*	12	$186,795
2013	Acquire Land for Approaches *(tract B acquisition)*	13	$1,380,000
2015	Acquire Land for Approaches *(tract B relocation)*	14	$1,583,104
2016	Update Airport Master Plan Study	15	$194,400
		Total	**15,855,842**

Source: FAA AIP Grant History.

EXISTING FACILITIES

Airport facilities can be categorized into two separate classifications: airside facilities and landside facilities. The airside facilities are directly associated with aircraft operations. These facilities may include, but are not limited to, runways, taxiways, airport lighting, and navigational aids. Landside facilities pertain to facilities necessary to provide safe and efficient transition from surface transportation to air transportation, as well as support aircraft servicing, storage, maintenance, and safe operation. The existing airside and landside facilities are presented in **Exhibit B**.

AIRSIDE FACILITIES

BTA currently has a single concrete runway: Runway 13-31 (northwest-southeast). Runway 13-31 is 4,200 feet long by 100 feet wide with non-precision markings and two published non-precision instrument approach procedures, which are further detailed in the Vicinity Airspace section. The non-precision markings include runway designation, centerline, and aiming point markings. Runway 13-31 has a runway gradient of 0.5 percent, sloping up from southeast to northwest.

Runways 13 and 31 are equipped with two-light Precision Approach Path Indicators (PAPI-2). Runway 31 is equipped with Runway End Identifier Lights (REILs). The pavement strength rating for Runway 13-31 is 30,000 pounds for single wheel loading (SWL) and 60,000 pounds for dual wheel loading (DWL) aircraft.

Runway 13-31 is served by a 35-foot wide full length parallel taxiway, with a separation distance of 400 feet from runway centerline to taxiway centerline. The parallel taxiway provides access to Runway 13-31 at each runway end and at runway mid-point. Medium intensity taxiway lighting (MITL) is also in place, accommodating all taxiways serving Runway 13-31.



Two-Light Precision Approach Path Indicator

Upon the most recent inspection per the Airport Master Record (dated July 15, 2015), runway pavement was described as being in good condition. Runway 13-31 is equipped with medium intensity runway lighting (MIRL). Lighting and visual approach systems including the PAPI-2s, REILs, and MIRL serving BTA can be activated via pilot-controlled lighting operated over the common air traffic frequency (CTAF) 123.05 MHz. **Table C** contains more information on the runway and taxiway system serving BTA.

Navigational aids (NAVAIDS) include a lighted wind indicator and a green and white rotating beacon that remains in operation from sunset to sunrise.

TABLE C
Airside Facilities Data
Blair Municipal Airport

	Runway 13-31
Runway Length (feet)	4,200’
Runway Width (feet)	100’
Runway Surface Material	Concrete
Condition	Good
Pavement Markings	Non-Precision
Runway Weight Bearing Capacity	
--Single Wheel Weight Bearing Capacity	30,000 lbs.
--Dual Wheel Weight Bearing Capacity	60,000 lbs.
Runway Lighting	MIRL
Taxiway Lighting	MITL
Approach Aids	PAPI-2 (13, 31); REILs (31)
Instrument Approach Procedures	RNAV (GPS)
Weather or Navigational Aids	AWOS CTAF/UNICOM Lighted Wind Indicator Rotating Beacon

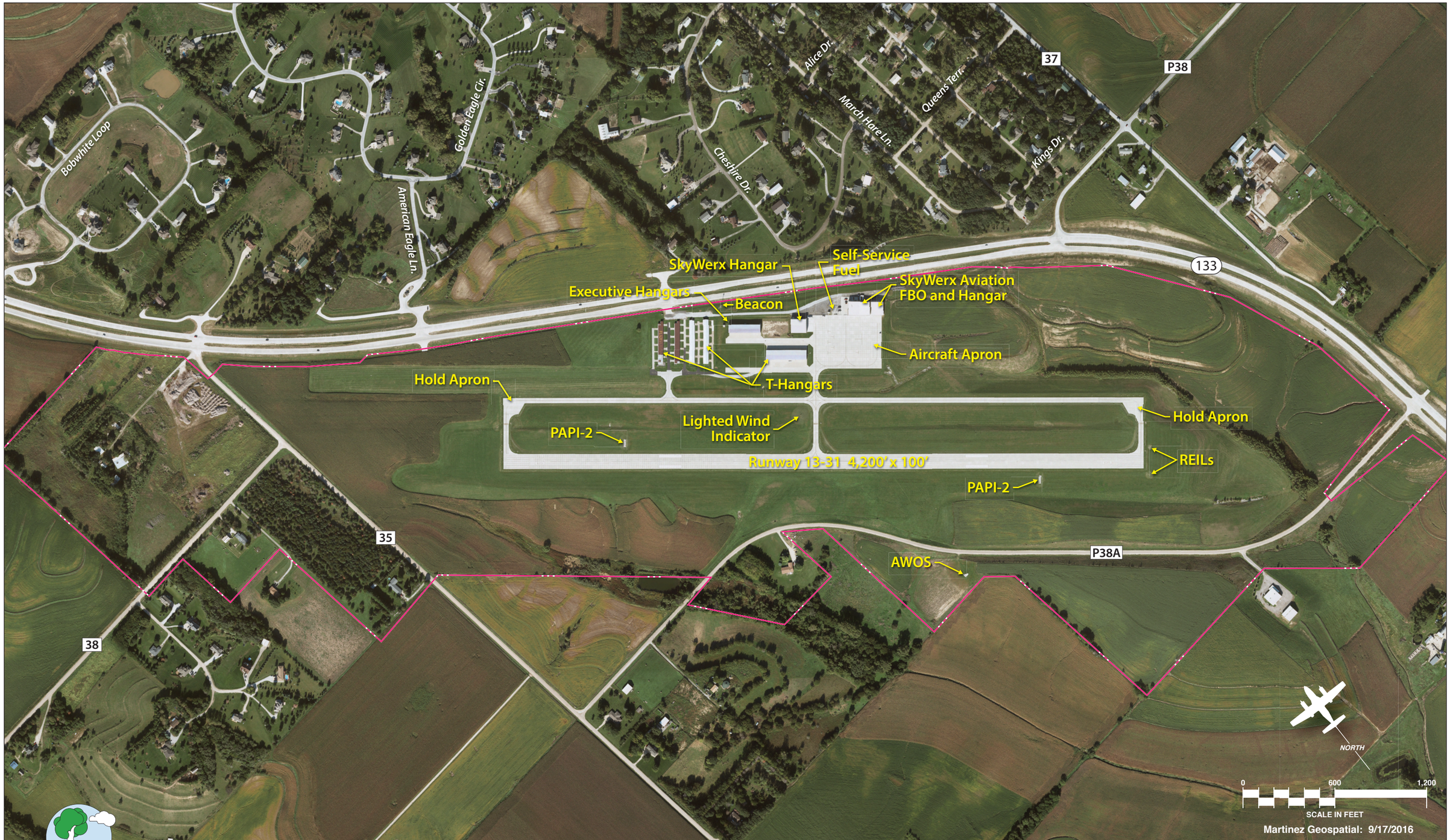

Bobwhite Loop
Golden Eagle Cir.
American Eagle Ln.
Chestfire Dr.
Alice Dr.
March Hare Ln.
Queens Terr.
Kings Dr.
37
P38
133
SkyWerx Hangar
Self-Service Fuel
SkyWerx Aviation FBO and Hangar
Executive Hangars
Beacon
Aircraft Apron
T-Hangars
Hold Apron
PAPI-2
Lighted Wind Indicator
Hold Apron
Runway 13-31 4,200' x 100'
REILs
PAPI-2
35
P38A
AWOS
38
NORTH
0
600
1,200
SCALE IN FEET
Martinez Geospatial: 9/17/2016

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TABLE C (Continued)
Airside Facilities Data
Blair Municipal Airport

Notes:
AWOS: Automated Weather Observation System
CTAF: Common Air Traffic Frequency
MIRL: Medium Intensity Runway Lighting
MITL: Medium Intensity Taxiway Lighting
PAPI: Precision Approach Path Indicator
RNAV: Radio Navigation
GPS: Global Positioning System
REIL: Runway End Identifier Lights UNICOM: Universal Communication Frequency

Source: FAA Airport Master Record (Form 5010-1).

As previously noted, the Airport is served by a CTAF/universal communication frequency (UNICOM), 123.05 MHz, which can be utilized by pilots to communicate with one another, as well as activate the airport lighting systems by keying the microphone. In addition, BTA is served by an automated weather observation system III (AWOS-III P/T). The AWOS-III P/T automatically records the following weather conditions:

- Wind speed, gusts, and direction
- Temperature
- Dew point
- Altimeter setting
- Density altitude
- Visibility
- Precipitation accumulation
- Cloud height
- Present weather identification
- Thunderstorm/lightning reporting

This information is transmitted at regular intervals on the Airport's AWOS-III P/T aeronautical advisory frequency (120.225 MHz) or via a local telephone number (402-426-0448), where a computer-generated voice will present Airport weather information. AWOS-III P/T broadcasts are updated on a minute-by-minute basis and provide arriving and departing pilots with the current weather conditions.

Instrument approaches and departures are handled by Omaha Approach and Departure Control on frequency 120.1 MHz.

LANDSIDE FACILITIES

BTA offers several amenities to pilots, catering to both transient and based aircraft. SkyWerx Aviation operates as the Airport's fixed base operator (FBO). Aircraft hangars and apron area are also available for both transient and based aircraft. Building and facility footprint measurements can be viewed in **Table D**. SkyWerx Aviation is currently in the process of building a new hangar that will have a footprint of 11,700 square feet (sf), which is included in the executive box hangar total presented in **Table D**. The

aircraft apron has seven marked tiedown positions, including six small aircraft positions and one large aircraft position. The aircraft apron and movement area encompasses approximately 16,900 square yards. At this time, BTA has approximately 103,400 sf of hangar space on the airfield. Hangar styles available include T-hangars, executive box, and conventional.

The SkyWerx FBO facility is a two-level structure with a footprint of approximately 2,600 sf and a total of 5,000 sf of enclosed space. The facility offers provisions for passengers as well as pilots, including a lobby with wireless internet, an executive lounge, conference rooms, rental cars, and complimentary refreshments. Pilot services and amenities include a pilot lounge equipped with a large screen television, quiet room, flight planning room, private shower, complimentary crew car, quick turn Jet-A fuel, and heated hangar space. SkyWerx does not charge ramp, handling, or landing fees.

TABLE D
Landside Facility Data
Blair Municipal Airport

	Total Footprint Area	Approximate Aircraft Capacity
SkyWerx FBO	5,000* sf	-
T-Hangars	54,600 sf	50
Executive Box	22,800 sf	7
Conventional Hangars	26,000 sf	10
Apron and Movement Area	16,900 sy	-

*Two level facility with 2,600 square footprint
Sf: Square feet
Sy: Square yards
Source: Google Maps Satellite Photo (2016).

The Airport is partially surrounded by basic fencing and is served by two controlled access gates to prevent inadvertent access by unauthorized personnel as well as wildlife.



SkyWerx FBO and Hangar

Fuel facilities available at BTA include self-serve Jet-A and 100LL available for purchase with a credit card on a 24-hour basis. Fuel is stored in two underground 12,000-gallon tanks (one tank designated for Jet-A and the other 100LL) that were constructed in 2009 and are located northwest of the terminal area.

The Airport's primary water source is provided by the Papio-Missouri River Natural Resources District (NRD). In addition, there is an existing well on the airfield, located west of the rotating beacon; however, the well has been deemed insufficient to meet the needs of the Airport upon its expansion. A single-phase power source supplied by Omaha Public Power District (OPPD) through a transformer is located between the easternmost T-hangars and Highway 133.

As a GA airport, BTA is not required to have on-site aircraft rescue and firefighting (ARFF) equipment/facilities. The Airport falls under the jurisdiction of Fort Calhoun Fire Hall, which would respond to on-airport emergencies. The nearest fire station to the Airport is located approximately 7.5 miles to the southeast by road.

The Airport can be readily accessed from Highway 133. The automobile parking lot lies in close proximity to Highway 133 on the west side and can be entered from a short access road from the highway. Automobile parking is designated in two common parking areas. Total parking area consists of approximately 14,700 square feet and includes 21 marked parking spaces as well as unmarked spaces. The unmarked parking area is estimated to be capable of accommodating approximately 22 vehicles. Apron and hangar areas are separated from the parking lot by security fencing with access controlled by entrance gates.

VICINITY AIRPORTS

A review of other public-use airports with at least one paved runway within a 30-nautical mile radius of BTA was conducted to identify and distinguish the types of air service provided in the region. It is important to consider the capabilities and limitations of these airports when planning for future changes or improvements at BTA. **Exhibit C** provides information on public-use airports within the vicinity of BTA. Information pertaining to each airport was obtained from FAA Form 5010-1, Airport Master Record.

VICINITY AIRSPACE

The airspace within the National Air Transportation System (NAS) is divided into six different categories or classes. The airspace classifications that make up the NAS are presented in **Exhibit D**. These categories of airspace are made up of Classes A, B, C, D, E and G airspace. Each class of airspace contains its own criteria that must be met in terms of required aircraft equipment, operating flight rules (visual or instrument flight rules), and procedures. Classes A, B, C, D, and E are considered controlled airspace which requires pilot communication with the controlling agency prior to airspace entry and throughout operation within the designated airspace. Pilot communication procedures, required pilot ratings, and required minimum aircraft equipment vary depending upon the class of airspace, as well as the type of flight rules in use. Class G airspace is uncontrolled and extends from the surface to the base of the overlying Class E airspace. Although ATC has no authority or responsibility to control air traffic within this airspace, pilots should remember there are visual flight rule minimums that apply to Class G airspace.

BTA lies within Class E Airspace, which is a form of controlled airspace; however, only pilots operating under instrument flight rules (IFR) are required to be in communication with the controlling air traffic agency. Pilots operating under visual flight rules (VFR) are not required to be in communication with the controlling agency when operating in Class E Airspace.

BTA is 12 nautical miles (nm) from Eppley Airfield and 20 nm from Offutt Air Force Base, both of which are encompassed by Class C airspace. **Exhibit E** presents the classifications of airspace within the vicinity of BTA. Numerous Victor Airways are also in the nearby vicinity of the Airport. Victor Airways are corridors of airspace that are eight miles wide and extend from 1,200 feet up to, but not including, 18,000 feet. These airways are navigational routes that extend between VOR navigational facilities. Victor Airways near BTA extend from the Omaha Very High Frequency Omnidirectional Range, coupled with Tactical Aircraft Control and Navigation (VORTACs) navigational aids. These Victor Airways include V138, V159, V6-8, V172, V181, and V307.

As previously mentioned, Runways 13 and 31 are served by Area Navigation (RNAV) global positioning system (GPS) non-precision instrument approach systems. This system enables pilots to locate and land at the Airport during low visibility conditions. The instrument procedures are a series of electronic navigational aids, coupled with maneuvers predetermined by the FAA to ensure safe navigation to the Airport in reduced visibility conditions. The lowest minimums available provide for landing with a minimum cloud ceiling of 300 feet above ground level (AGL) and visibility of 7/8 of a mile utilizing the RNAV GPS localizer performance with vertical guidance (LPV) and lateral navigation/vertical navigation (LNAV/VNAV) approach. Circling approaches are also available with minimums of not less than 500 feet AGL cloud ceilings and visibility of 2 miles.

The approved approaches for the Airport are for categories A, B, and C aircraft only. Category A aircraft are those with approach speeds of less than 91 knots. Category B aircraft have approach speeds of 91 knots or greater, but less than 121 knots. Category C aircraft have approach speeds of 121 knots or greater, but less than 141 knots. **Exhibit F** presents each instrument approach and its associated cloud ceiling and visibility minimums.

SOCIOECONOMIC CHARACTERISTICS

Socioeconomic characteristics can provide valuable information and insight in terms of the growth and economic well-being of the study area. This information can contribute to the understanding and determination of the aviation service level requirements, as well as forecasting future operation and based aircraft levels.

POPULATION

The historical population for the State of Nebraska was determined in 1990 by the United States Census Bureau to be over 1.57 million. As of July 1, 2015, the Census Bureau calculated a population total of approximately 1.89 million. This total represents a compound annual growth rate (CAGR) of roughly 0.74 percent from 1990-2015. Over the same period, the Omaha-Council Bluffs MSA experienced a population growth of 275,732 residents. This equates to a 1.44 percent CAGR. The population total for Washington County was reported at 16,607 in 1990 and has grown to an estimated 20,248 in 2015, resulting in a CAGR of approximately 0.80 percent. From 1990 to 2015, the City of Blair population grew from

Northern Omaha Airport (3NO)



Airport NPIAS Classification ..... NA
FAA Asset Study Classification ..... NA
Location from BTA ..... 4.8 nm SE
Elevation ..... 1,324 ft
Weather Reporting..... None
ATCT ..... None
Annual Operations 14,235
Based Aircraft..... 57
Enplaned Passengers ..... None

Runways	17-35
Length	3,173
Width	40
Pavement Strength	
SWL	28,000
DWL	NA
Lighting	LIRL
Marking	Numbers only
Approach Aids	None
Instrument Approach Procedures	None

Services Provided: Aircraft hangars and tiedowns, 100LL fuel, Minor airframe and powerplant mainenance.

Eppley Airfeld (OMA)

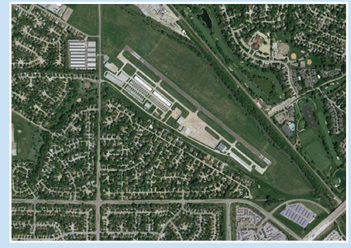


Airport NPIAS Classification .. Medium Hub
FAA Asset Study Classification ..... NA
Location from BTA ..... 11.8 nm SE
Elevation ..... 984.5 ft
Weather Reporting..... ASOS
ATCT ..... Yes
Annual Operations 94,900
Based Aircraft 118
Enplaned Passengers 2,018,738

Runways	14R-32L	14L-32R	18-36
Length	9,502	8,500	8,154
Width	150	150	150
Pavement Strength			
SWL	100,000	100,000	150,000
DWL	184,000	209,000	175,000
Lighting	HIRL	HIRL	HIRL
Marking	PI	PI	PI
Approach Aids	RVR	RVR	RVR
	ALSF-2, MALSR	MALSR, ALSF-2	MALSR
	PAPI-4	PAPI-4	PAPI-4
Instrument Approach Procedures	ILS/DME	ILS/DME	ILS/DME

Services Provided: Aircraft hangars and tiedowns, Jet A and 100LL fuel, major airframe and powerplant maintenance, and oxygen.

Millard Airport (MLE)



Airport NPIAS Classification ..... Reliever
FAA Asset Study Classification ..... Regional
Location from BTA ..... 13.1 nm S
Elevation ..... 1,050.7 ft
Weather Reporting ..... AWOS
ATCT ..... No
Annual Operations 72,270
Based Aircraft 95
Enplaned Passengers ..... None

Runways	12-30
Length	3,801
Width	75
Pavement Strength	
SWL	25,000
DWL	28,000
Lighting	MIRL
Marking	NPI
Approach Aids	PAPI-2
	REIL
Instrument Approach Procedures	GPS

Services Provided: Aircraft hangars and tiedowns, 100LL and Jet-A fuel, major airframe and powerplant mainenance, and oxygen.

Council Bluffs Municipal Airport (CBF)



Airport NPIAS Classification ..... GA
FAA Asset Study Classification ..... Regional
Location from BTA ..... 18.3 nm ESE
Elevation ..... 1,244.8 ft
Weather Reporting ..... AWOS
ATCT ..... No
Annual Operations 46,355
Based Aircraft 88
Enplaned Passengers 982

Runways	18-36	14-32
Length	5,500	3,650
Width	100	60
Pavement Strength		
SWL	30,000	30,000
DWL	60,000	30,000
Lighting	HIRL	MIRL
Marking	NPI	NPI
Approach Aids	PAPI-2	PAPI-2
	REIL	REIL
Instrument Approach Procedures	GPS, ILS/GPS	GPS

Services Provided: Aircraft hangars and tiedowns, Jet A and 100LL fuel, major airframe and powerplant maintenance, and oxygen.

Fremont Municipal Airport (FET)



Airport NPIAS Classification ..... GA
FAA Asset Study Classification ..... Local
Location from BTA ..... 18.7 nm W
Elevation ..... 1,204 ft
Weather Reporting ..... AWOS
ATCT ..... No
Annual Operations 22,265
Based Aircraft 58
Enplaned Passengers ..... None

Runways	14-32
Length	6,353
Width	100
Pavement Strength	
SWL	8,000
DWL	48,000
Lighting	MIRL
Marking	NPI
Approach Aids	PAPI-2
	REIL
Instrument Approach Procedures	VOR/GPS, GPS

Services Provided: Aircraft tiedowns, Jet A and 100LL fuel, major airframe and powerplant maintenance, and oxygen.

KEY

ALSF-2	- Standard 2,400-foot high intensity approach lighting system with sequenced flashers (CAT II confi guration)
ATCT	- Airport Traffic Control Tower
ASOS	- Automated surface observation station
AWOS	- Automated Weather Observation System
DME	- Distance measuring equipment
DWL	- Dual Wheel Loading
GPS	- Global Positioning System
HIRL/LIRL	- High/Low intensity runway edge lighting
ILS	- Instrument landing system
MALSR	- Medium Intensity Approach Lighting System with Runway Alignment Indicator Lights
MIRL	- Medium Intensity Runway Lighting
NDB	- Nondirectional radio beacon
NPI	- Non-Precision Instrument
NPIAS	- National Plan of Integrated Airport Systems
PAPI	- Precision Approach Path Indicator
REIL	- Runway End Identifier Lights
RVR	- Runway visibility range
SWL	- Single Wheel Loading
VOR	- VHF Omni-Directional Range



Tekamah Municipal Airport (TQE)



Airport NPIAS Classification ..... GA
FAA Asset Study Classification ..... Local
Location from BTA ..... 21.2 nm N
Elevation ..... 1026.8 ft
Weather Reporting ..... ASOS
ATCT ..... No
Annual Operations 23,725
Based Aircraft 28
Enplaned Passengers ..... None

Runways	15-33
Length	4,000
Width	75
Pavement Strength	
SWL	30,000
DWL	45,000
Lighting	MIRL
Marking	NPI
Approach Aids	
	REIL
Instrument Approach Procedures	GPS

Services Provided: Aircraft tiedowns, 100LL fuel, major airframe and powerplant maintenance.

Wahoo Municipal Airport (AHQ)



Airport NPIAS Classification ..... GA
FAA Asset Study Classification ..... Local
Location from BTA ..... 24.2 nm WSW
Elevation ..... 1223.7 ft
Weather Reporting ..... AWOS
ATCT ..... No
Annual Operations 16,425
Based Aircraft 35
Enplaned Passengers ..... None

Runways	2-20	13-31
Length	4,100	3,290
Width	75	150
Pavement Strength		
SWL	20,000	Turf
DWL	NA	NA
Lighting	MIRL	None
Marking	NPI	None
Approach Aids	PAPI-2	None
	REIL	
Instrument Approach Procedures	GPS/NDB (20)	

Services Provided: Aircraft hangars and tiedowns, Jet A and 100LL fuel, major airframe and power plant maintenance.

Scribner State Airport (SCB)



Airport NPIAS Classification ..... GA
FAA Asset Study Classification ..... Local
Location from BTA ..... 26.2 nm WNW
Elevation ..... 1,324.9 ft
Weather Reporting ..... None
ATCT ..... None
Annual Operations 2,548
Based Aircraft 19
Enplaned Passengers ..... None

Runways	17-35	12-30
Length	4,200	3,199
Width	75	60
Pavement Strength		
SWL	25,000	NA
DWL	NA	NA
Lighting	MIRL	None
Marking	NPI	Basic
Approach Aids	None	None
Instrument Approach Procedures	GPS/VOR (35)	

Services Provided: Aircraft hangars and tiedowns, and 100LL fuel.

Woodbine Municipal Airport (3Y4)



Airport NPIAS Classification ..... NA
FAA Asset Study Classification ..... NA
Location from BTA ..... 27.1 nm NE
Elevation ..... 1,068 ft
Weather Reporting ..... None
ATCT ..... None
Annual Operations 504
Based Aircraft 3
Enplaned Passengers ..... None

Runways	17-35
Length	2,045
Width	95
Pavement Strength	
SWL	Turf
DWL	NA
Lighting	LIRL
Marking	NA
Approach Aids	None
Instrument Approach Procedures	None

Services Provided: None.

Plattsmouth Municipal Airport (PMV)



Airport NPIAS Classification ..... GA
FAA Asset Study Classification ..... Local
Location from BTA ..... 29.3 nm SSE
Elevation ..... 1,204.4 ft
Weather Reporting ..... AWOS
ATCT ..... No
Annual Operations 20,440
Based Aircraft 43
Enplaned Passengers ..... None

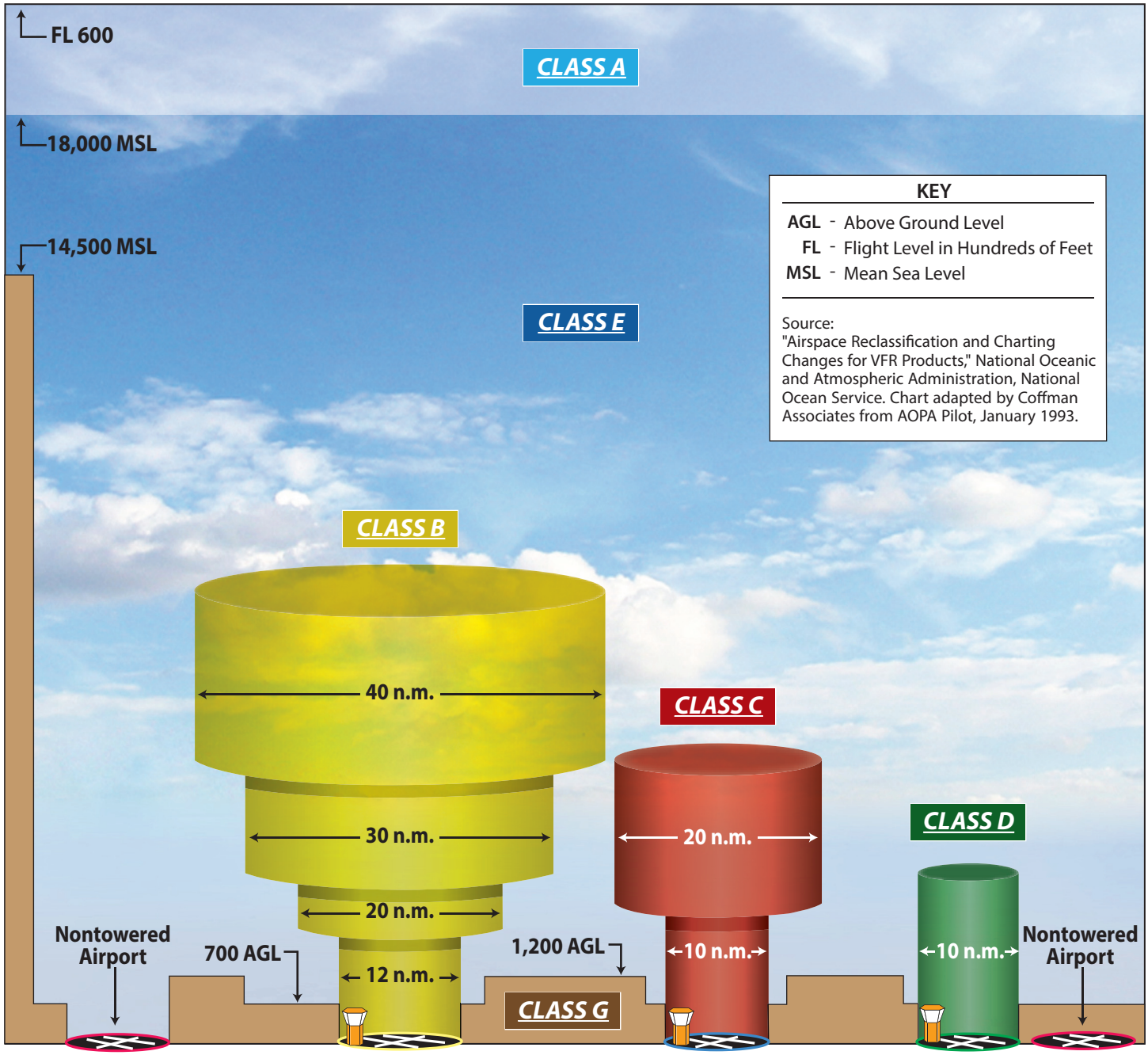
Runways	16-34
Length	5,500
Width	100
Pavement Strength	
SWL	30,000
DWL	45,000
Lighting	MIRL
Marking	NPI
Approach Aids	PAPI-2
	REIL
Instrument Approch Procedures	GPS/NDB

Services Provided: Aircraft hangars and tiedowns, 100LL and Jet-A fuel, majaor airframe and powerplant maintenance, and oxygen.

KEY

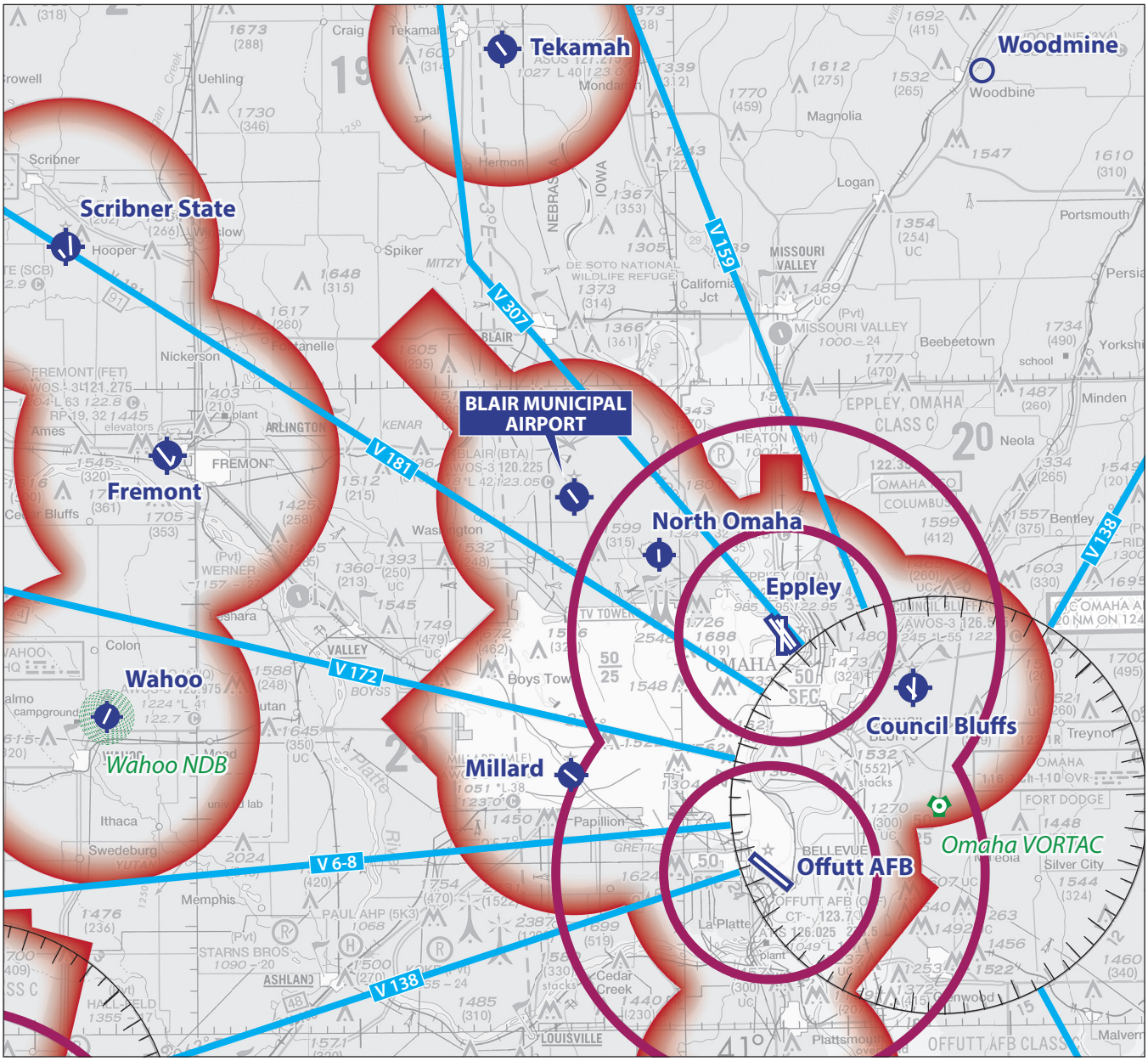
ALSF-2	- Standard 2,400-foot high intensity approach lighting system with sequenced flashers (CAT II confi guration)
ATCT	- Airport Traffic Control Tower
ASOS	- Automated surface observation station
AWOS	- Automated Weather Observation System
DME	- Distance measuring equipment
DWL	- Dual Wheel Loading
GPS	- Global Positioning System
HIRL/LIRL	- High/Low intensity runway edge lighting
ILS	- Instrument landing system
MALSR	- Medium Intensity Approach Lighting System with Runway Alignment Indicator Lights
MIRL	- Medium Intensity Runway Lighting
NDB	- Nondirectional radio beacon
NPI	- Non-Precision Instrument
NPIAS	- National Plan of Integrated Airport Systems
PAPI	- Precision Approach Path Indicator
REIL	- Runway End Identifier Lights
RVR	- Runway visibility range
SWL	- Single Wheel Loading
VOR	- VHF Omni-Directional Range





DEFINITION OF AIRSPACE CLASSIFICATIONS

CLASS A	Generally airspace above 18,000 feet MSL up to and including FL 600.
CLASS B	Generally multi-layered airspace from the surface up to 10,000 feet MSL surrounding the nation's busiest airports.
CLASS C	Generally airspace from the surface to 4,000 feet AGL surrounding towered airports with service by radar approach control.
CLASS D	Generally airspace from the surface to 2,500 feet AGL surrounding towered airports.
CLASS E	Generally controlled airspace that is not Class A, Class B, Class C, or Class D.
CLASS G	Generally uncontrolled airspace that is not Class A, Class B, Class C, Class D, or Class E.



LEGEND

- Airport with other than hard-surfaced runways
- Airport with hard-surfaced runways 1,500' to 8,069' in length
- Airports with hard-surfaced runways greater than 8,069' or some multiple runways less than 8,069'
- Non-Directional Radiobeacon (NDB)
- VORTAC
- Compass Rose
- Class C Airspace (Mode C)
- Class E Airspace with floor 700 ft. above surface
- Victor Airways

NORTH

Source: Omaha Sectional Chart, US Department of Commerce, National Oceanic and Atmospheric Administration, July 21, 2016

BLAIR, NEBRASKA — AL-10376 (FAA) — 16147

WAAS CH 87138 W13A | APP CRS 134° | Rwy Idg 4200 | TDZE 1318 | Apt Elev 1318

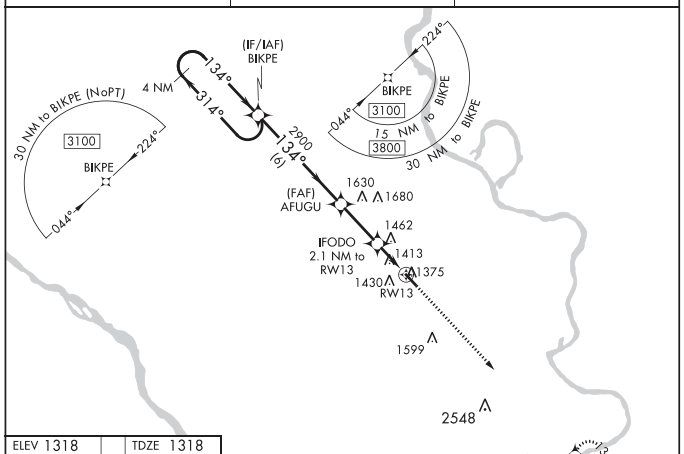
RNAV (GPS) RWY 13

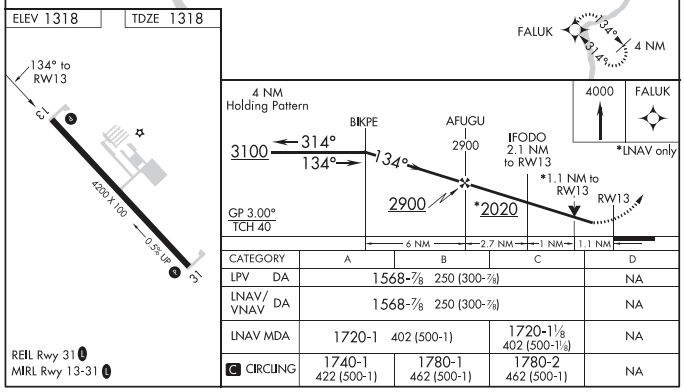
BLAIR MUNI (BTA)

For uncompensated Baro-VNAV systems, LNAV/VNAV NA below -17°C (2°F) or above 54°C (130°F). Baro-VNAV and VDP NA when using Eppley Airfield altimeter setting. DME/DME RNP-0.3 NA. Helicopter visibility reduction below ¾ SM NA. When local altimeter setting not received, use Eppley Airfield altimeter setting and increase LPV and LNAV/VNAV DA to 1642 and visibility to 1⅛ mile all Cats, increase all MDA 80 feet and LNAV Cat C visibility to 1⅜ mile.

MISSED APPROACH: Climb to 4000 direct FALUK and hold.

AWOS-3	OMAHA APP CON	UNICOM
120.225	120.1 354.05	123.05 (CTAF)





CATEGORY	A	B	C	D
LPV DA	1568-⅞ 250 (300-⅞)			NA
LNAV/VNAV DA	1568-⅞ 250 (300-⅞)			NA
LNAV MDA	1720-1 402 (500-1)		1720-1⅛ 402 (500-1⅛)	NA
C CIRCLING	1740-1 422 (500-1)	1780-1 462 (500-1)	1780-2 462 (500-1)	NA

REIL Rwy 31 L
MIRL Rwy 13-31 L

BLAIR, NEBRASKA
Amdt 1 26MAY16

41°25'N-96°07'W

BLAIR MUNI (BTA)

RNAV (GPS) RWY 13

NC-2, 18 AUG 2016 to 15 SEP 2016

NC-2, 18 AUG 2016 to 15 SEP 2016

BLAIR, NEBRASKA — AL-10376 (FAA) — 16147

WAAS CH 49238 W31A | APP CRS 314° | Rwy Idg 4200 | TDZE 1314 | Apt Elev 1318

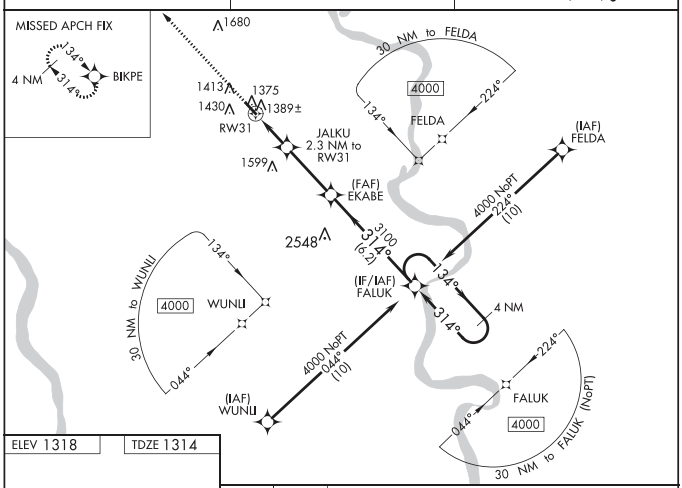
RNAV (GPS) RWY 31

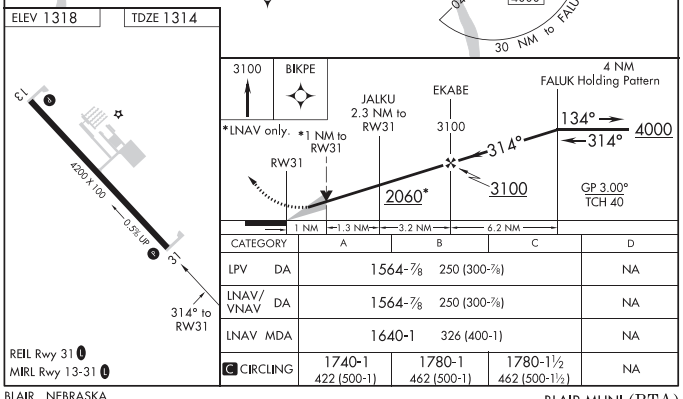
BLAIR MUNI (BTA)

For uncompensated Baro-VNAV systems, LNAV/VNAV NA below -17°C (2°F) or above 54°C (130°F). Baro-VNAV and VDP NA when using Eppley Airfield altimeter setting. DME/DME RNP-0.3 NA. When local altimeter setting not received, use Eppley field altimeter setting and increase LPV and LNAV/VNAV DA to 1638 and visibility to 1⅛ mile all Cats, increase all MDA 80 feet and LNAV Cat C visibility to 1⅛ mile.

MISSED APPROACH: Climb to 3100 direct BIKPE and hold.

AWOS-3	OMAHA APP CON	UNICOM
120.225	120.1 354.05	123.05 (CTAF)





CATEGORY	A	B	C	D
LPV DA	1564-⅞ 250 (300-⅞)			NA
LNAV/VNAV DA	1564-⅞ 250 (300-⅞)			NA
LNAV MDA	1640-1 326 (400-1)			NA
C CIRCLING	1740-1 422 (500-1)	1780-1 462 (500-1)	1780-1½ 462 (500-1½)	NA

REIL Rwy 31 L
MIRL Rwy 13-31 L

BLAIR, NEBRASKA
Amdt 1 26MAY16

41°25'N-96°07'W

BLAIR MUNI (BTA)

RNAV (GPS) RWY 31

NC-2, 18 AUG 2016 to 15 SEP 2016

NC-2, 18 AUG 2016 to 15 SEP 2016

6,860 to 7,975 for a CAGR of 0.60 percent. In the past five years, population in Washington County and the City of Blair has remained relatively static. From 2010-2015, the City of Blair experienced a -0.04 percent CAGR, while Washington County experienced a 0.01 percent CAGR. **Table E** further presents historical population information.

TABLE E
Historical Population

	Year				
	1990	2010	2015	CAGR 1990-2015	CAGR 2010-2015
City of Blair	6,860	7,990	7,975	0.60%	-0.04%
Washington County	16,607	20,234	20,248	0.80%	0.01%
Omaha-Council Bluffs MSA	639,580	868,113	915,312	1.44%	1.06%
State of Nebraska	1,578,417	1,830,025	1,896,190	0.74%	0.71%

CAGR: Compound Annual Growth Rate
Source: U.S. Census Bureau

Population projections through 2036 retrieved from the 2016 Woods and Poole Complete Economic and Demographic Data Source are presented in **Table F**. According to Woods and Poole, the State of Nebraska is projected to grow at a CAGR of 0.43 percent through 2036, reaching a population total of 2.17 million. The Omaha-Council Bluffs MSA population is forecasted to grow at a CAGR of 1.10 percent, resulting in a population of 1.15 million by 2036. Washington County population is forecasted to grow at a CAGR of 0.78 percent through 2036, reaching 23,859 by 2036.

TABLE F
Forecast Population

Area	2015	2021	2026	2036	CAGR 2015-2036
Washington County	20,248	21,445	22,304	23,859	0.78%
Omaha-Council Bluffs MSA	915,312	1,006,424	1,055,381	1,150,861	1.10%
State of Nebraska	1,896,190	1,974,407	2,043,887	2,174,816	0.43%

CAGR: Compound Annual Growth Rate
Source: U.S. Census Bureau, The Complete Economic and Demographic Data Source, Woods & Poole, 2016.

EMPLOYMENT AND PERSONAL INCOME

An overview of the community's employment and personal income base can provide pertinent information regarding the economic health of the community. Generally speaking, the economic well-being of the community is greatly influenced by the variety and availability of employment opportunities, as well as wages offered by local employers. **Table G** summarizes employment and income data obtained from Woods and Poole, Complete Economic and Demographic Data Source, over the past 25 years for Washington County, Omaha-Council Bluffs MSA, the State of Nebraska, and the United States.

TABLE G
Employment and Income Data

	1990	2010	2015	CAGR 1990-2015
Washington County				
Total Employment	7,192	11,022	11,549	1.91%
Income Per Capita (2009 Dollars)	$27,503	$40,841	$45,100	2.00%
Mean Household Income (2009 Dollars)	$74,151	$104,244	$108,315	1.53%
Omaha-Council Bluffs MSA				
Total Employment	457,871	584,225	631,353	1.29%
Income Per Capita (2009 Dollars)	$29,248	$42,117	$45,238	1.76%
Mean Household Income (2009 Dollars)	$76,563	$106,953	$111,797	1.53%
State of Nebraska				
Total Employment	988,059	1,214,225	1,295,543	1.09%
Income Per Capita (2009 Dollars)	$27,388	$39,372	$44,194	1.93%
Mean Household Income (2009 Dollars)	$70,049	$97,468	$106,536	1.69%
United States				
Total Employment	249,622,800	309,347,700	321,545,000	1.02%
Income Per Capita (2009 Dollars)	$29,050	$39,622	$42,928	1.57%
Mean Household Income (2009 Dollars)	$76,860	$102,642	$108,025	1.37%

Source: The Complete Economic and Demographic Data Source, Woods & Poole, 2016.

SWOT ANALYSIS

A SWOT analysis is a strategic business planning technique used to identify **S**trengths, **W**eaknesses, **O**pportunities, and **T**hreats associated with an action or plan. The SWOT analysis involves identifying an action, objective, or element, and then identifying the internal and external forces that are positively and negatively impacting that action, objective, or element in a given environment. For this study, the SWOT analysis factors are being applied to BTA within the confines of the ALP Update and Narrative Report. As a result, it provides a continuous vision and direction for the development of the planning effort.

SWOT DEFINITIONS

As previously discussed, this SWOT analysis groups information into two categories:

- Internal – attributes of the airport and market area that may be considered strengths or weaknesses to the action, objective, or element.
- External – attributes of the industry that may pose as opportunities or threats to the action, objective, or element.

The SWOT further categorizes information into one of the following:

- Strengths – internal attributes of the airport that are helpful to achieving the action, objective, or element.
- Weaknesses – internal attributes of the airport that are harmful to achieving the action, objective, or element.
- Opportunities – external attributes of the industry that are helpful to achieving the action, objective, or element.
- Threats – external attributes of the industry that are harmful to achieving the action, objective, or element.

The SWOT analysis for BTA is based upon information gathered, including a kick-off planning advisory committee (PAC) meeting that was conducted in September 2016. The PAC is a diversified group of Airport stakeholders that represent several interests in the airport. A SWOT analysis was conducted with this group to identify key factors that might be addressed in the ALP Update and Narrative Report. A summary of the results from the SWOT analysis exercise is summarized in **Table H**. These results were utilized to frame the subjective or judgmental processing of the data presented in the planning effort.

TABLE H
SWOT Analysis Results
Blair Municipal Airport

	STRENGTHS	WEAKNESSES
INTERNAL (attributes of the airport market area)	• Location: quick access to Highway 133 and BTA is located between Blair and Omaha. • Many people tend to believe that BTA is associated with the City of Blair. • The Airport Authority serves as a barrier between the City of Blair and the Airport. • Airport location on top of a hill. • SkyWerx FBO is very strong, providing excellent personnel and no fees. • BTA has the ability to expand. • The Airport has a very "new" appearance. • BTA offers facilities such as AWOS and GPS approaches.	• The Airport Authority does not always keep the City's best interests in mind in terms of liabilities. • No flight training currently available at BTA. • Funding can be difficult to secure. • The construction of the next large hangar will require a taxiway. • Vehicle parking is constricted. • Aggregate roads produce large amounts of dust. • A runway extension will severely limit the current infrastructure. • Lack of aircraft maintenance. • No incentives are available from the State of Nebraska for new infrastructure.
	OPPORTUNITIES	**THREATS**
EXTERNAL (attributes of the industry)	• To date, three additional jets are considering basing at BTA. • Potential for aircraft maintenance at BTA. • BTA could benefit from increased aviation interest in the area. • New legislation regarding the class three medical may spark new aviation interest.	• BTA is in close proximity to Millard Airport. • Lack of general aviation pilots. • Privatization of air traffic control. • Fewer active aircraft. • ADS-B requirements may damper general aviation activity.

FORECASTS OF AVIATION DEMAND



SkyWerx FBO, Hangars, and Aircraft Apron

Facility planning requires a definition of demand that may be expected to occur during the useful life of the facility's crucial components. For BTA, this involves projecting aviation demand for a 20-year timeframe. In this report, forecasts of county registered aircraft, based aircraft, based aircraft fleet mix, annual airport operations, and forecasts of airport peaking characteristics are projected.

The forecasts generated may be used for a multitude of purposes, including facility needs assessments as well as environmental evaluations. The forecasts will be submitted to the FAA for review and approval to ensure accuracy and reasonable projection of aviation activity. The intent of the projections is to enable the Airport to make facility improvements to meet demand in the most efficient and cost-effective manner possible.

It should be noted that aviation activity can be affected by numerous outside influences on a local, regional, and national level. As a result, forecasts of aviation demand should be used only for advisory purposes. It is recommended that planning strategies remain flexible enough to accommodate any unforeseen facility needs.

FORECASTING APPROACH

Typically, the most accurate and reliable forecasting approach is derived from multiple analytical forecasting techniques. Analytical forecasting methodologies typically consist of regression analysis, trend analysis and extrapolation, market share or ratio analysis, and smoothing. Through the use of multiple forecasting techniques based upon each aviation demand indicator, an envelope of aviation demand projections can be generated.

Regression Analysis can be described as a forecasting technique that correlates certain aviation demand variables (such as passenger enplanements or operations) with economic measures. When using regression analysis, the technique should be limited to relatively simple models containing independent variables for which reliable forecasts are available (such as population or income forecasts).

Trend Analysis and Extrapolation is a forecasting technique that records historical activity (such as airport operations) and projects this pattern into the future. Oftentimes, this technique can be beneficial when local conditions of the study area are differentiated from the region or other airports.

Market Share or Ratio Analysis can be described as a forecasting technique that assumes the existence of a top-down relationship between national, regional, and local forecasts. The local forecasts are presented as a market share of regional forecasts, and regional forecasts are presented as a market share of national forecasts. Typically, historical market shares are calculated and used as a base to project future market shares.

Smoothing is a statistical forecasting technique that can be applied to historical data, giving greater weight to the most recent trends and conditions. Generally, this technique is most effective when generating short-term forecasts.

NATIONAL GENERAL AVIATION TRENDS

The FAA forecasts the fleet mix and hours flown for single engine piston aircraft, multi-engine piston aircraft, turboprops, business jets, piston and turbine helicopters, light sport, experimental, and others (gliders and balloons). The FAA forecasts "active aircraft," not total aircraft. An active aircraft is one that is flown at least one hour during the year. From 2010 through 2013, the FAA undertook an effort to have all aircraft owners re-register their aircraft. This effort resulted in a 10.5 percent decrease in the number of active general aviation aircraft, mostly in the piston category.

The long term outlook for general aviation is favorable, led by gains in turbine aircraft activity. The active general aviation fleet is forecast to increase 0.2 percent a year between 2015 and 2036, equating to an absolute increase in the fleet of about 7,000 units. While steady growth in both GDP and corporate profits results in continued growth of the turbine and rotorcraft fleets, the largest segment of the fleet – fixed-wing piston aircraft - continues to shrink over the FAA's forecast.

In 2015, the general aviation industry experienced its first decline in aircraft deliveries since 2010. While the single engine piston aircraft deliveries by U.S. manufacturers continued to grow and business jet deliveries recorded a very modest increase compared to the previous year, turboprop deliveries declined by 10 percent, and the much smaller category of multi-engine piston deliveries declined 40 percent.

In 2015, the FAA estimated there were 138,135 piston-powered aircraft in the national fleet. The total number of piston-powered aircraft in the fleet is forecast to decline by 0.7 percent from 2015-2036, resulting in 118,855 by 2036. This includes -0.7 percent annually for single engine pistons and -0.5 percent for multi-engine pistons.

Total turbine aircraft are forecast to grow at an annual growth rate of 2.1 percent through 2036. The FAA estimates there were 29,040 turbine-powered aircraft in the national fleet in 2015, and there will be 44,655 by 2036. This includes annual growth rates of 1.3 percent for turboprops, 2.5 percent for business jets, and 2.3 percent for turbine helicopters.

While comprising a much smaller portion of the general aviation fleet, experimental aircraft, typically identified as home-built aircraft, are projected to grow annually by 0.9 percent through 2036. The FAA estimates there were 26,435 experimental aircraft in 2016, and these are projected to grow to 31,640 by 2036. Sport aircraft are forecast to grow 4.5 percent annually through the long term, growing from 2,410 in 2015 to 6,100 by 2036. **Exhibit G** presents the historical and forecast U.S. active general aviation aircraft.

The FAA also forecasts total operations based upon activity at control towers across the U.S. Operations are categorized as air carrier, air taxi/commuter, general aviation, and military.

General aviation operations, both local and itinerant, declined significantly as a result of the 2008-2009 recession and subsequent slow recovery. Through 2036, total general aviation operations are forecast to grow 0.3 percent annually. Air taxi/commuter operations are forecast to decline by 3.4 percent through 2025, and then increase slightly through the remainder of the forecast period. Overall, air taxi/commuter operations are forecast to decline by 1.1 percent annually from 2015 through 2036.

General Aviation Aircraft Shipments and Revenue

As previously discussed, the 2008-2009 economic recession has had a negative impact on general aviation aircraft production, and the industry has been slow to recover. Aircraft manufacturing declined for three straight years from 2008 through 2010. According to the General Aviation Manufacturers Association (GAMA), there is optimism that aircraft manufacturing will stabilize and return to growth, which has been evidenced since 2011. **Table J** presents historical data related to general aviation aircraft shipments.

Worldwide shipments of general aviation airplanes decreased in 2015 with a total of 2,331 units delivered around the globe compared to 2,454 units in 2014. Worldwide general aviation billings were also lower than the previous year. In 2015, $24 billion in new general aviation aircraft were shipped, but yearend results were mixed across the market segments. Results were impacted by economic uncertainty in key markets, including Brazil, Europe, and China; however, the U.S. experienced stronger delivery numbers, which is cause for cautious optimism.

Business Jets: General aviation manufacturers delivered 718 business jets in 2015, as compared to 722 units in 2014. The industry's continued investment in new products helped maintain the delivery rate for business jets.

Turboprops: In 2015, 557 turboprop airplanes were delivered to customers around the world, a decline from the 603 delivered in 2014. Overall, the turboprop market is still significantly stronger over the past five years compared to years prior to 2011.

Pistons: Piston deliveries declined from 1,129 units during 2014 to 1,056 in 2015. Two-thirds of piston shipments were to North American customers, a significant increase from the 2014 North American market share of 55.1 percent.

TABLE J
Annual General Aviation Airplane Shipments
Manufactured Worldwide and Factory Net Billings

Year	Total	SEP	MEP	TP	J	Net Billings ($millions)
1994	1,132	544	77	233	278	3,749
1995	1,251	605	61	285	300	4,294
1996	1,437	731	70	320	316	4,936
1997	1,840	1043	80	279	438	7,170
1998	2,457	1508	98	336	515	8,604
1999	2,808	1689	112	340	667	11,560
2000	3,147	1,877	103	415	752	13,496
2001	2,998	1,645	147	422	784	13,868
2002	2,677	1,591	130	280	676	11,778
2003	2,686	1,825	71	272	518	9,998
2004	2,962	1,999	52	319	592	12,093
2005	3,590	2,326	139	375	750	15,156
2006	4,054	2,513	242	412	887	18,815
2007	4,277	2,417	258	465	1,137	21,837
2008	3,974	1,943	176	538	1,317	24,846
2009	2,283	893	70	446	874	19,474
2010	2,024	781	108	368	767	19,715
2011	2,120	761	137	526	696	19,042
2012	2,164	817	91	584	672	18,895
2013	2,353	908	122	645	678	23,450
2014	2,454	986	143	603	722	24,499
2015	2,331	946	110	557	718	24,120

SEP - Single Engine Piston; MEP - Multi-Engine Piston; TP - Turboprop; J - Turbofan/Turbojet

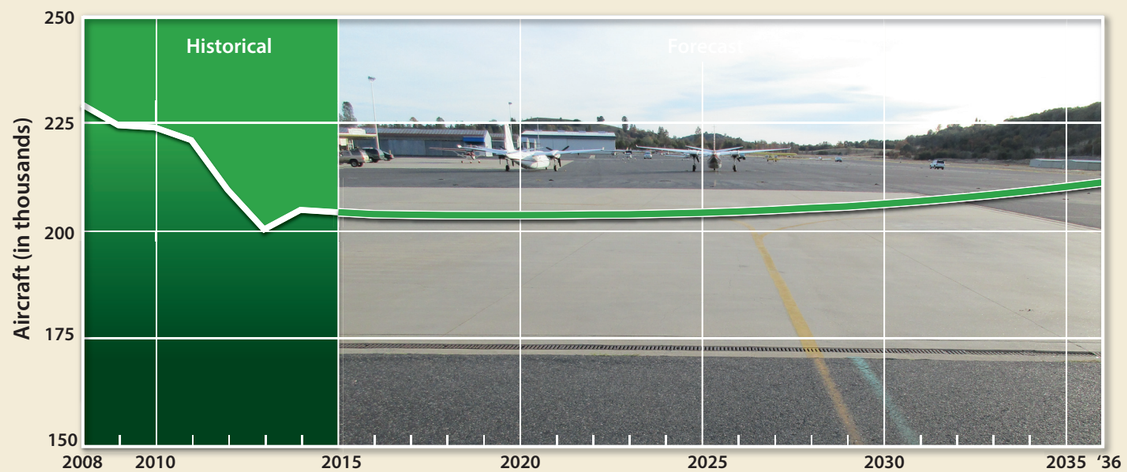
Source: General Aviation Manufacturers Association *2015 General Aviation Statistical Databook & 2016 Industry Outlook*

AIRPORT SERVICE AREA FORECASTS

In determining aviation demand for an airport, it is necessary to identify the role of that airport. BTA is classified as a Regional GA airport in the NPIAS. As such, the primary role of the Airport is to serve the needs of GA in the service area. GA is a term used to describe a diverse range of aviation activities, which includes all segments of the aviation industry except commercial air carriers and the military. GA is the largest component of the national aviation system and includes activities such as pilot training, recreational flying, and the use of sophisticated turboprop and jet aircraft for business and corporate use.

U.S. ACTIVE GENERAL AVIATION AIRCRAFT

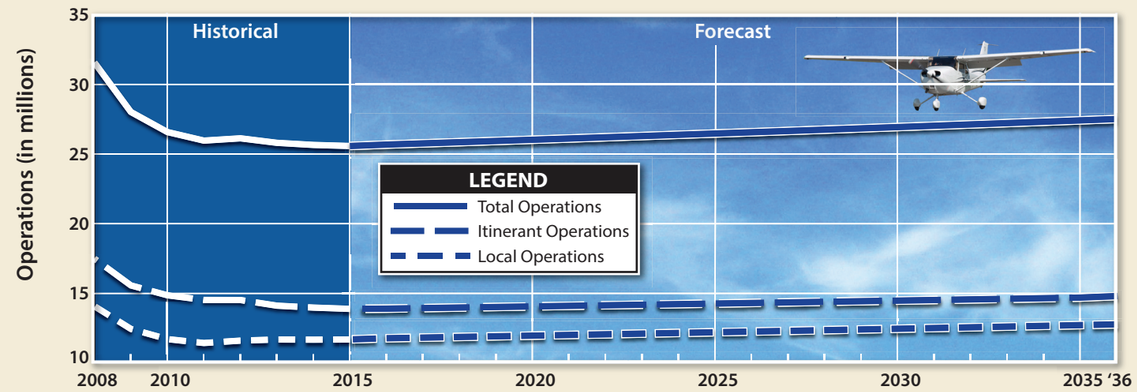
	2015	2021	2026	2036	AAGR 2015-2036
Fixed Wing					
Piston					
Single Engine	125,050	120,485	115,960	107,780	-0.7%
Multi-Engine	13,085	12,810	12,545	11,765	-0.5%
Turbine					
Turboprop	9,570	9,190	9,600	12,280	1.3%
Turbojet	12,475	13,680	15,340	12,280	2.5%
Rotorcraft					
Piston	3,245	3,690	4,090	4,915	2.1%
Turbine	6,995	8,020	8,990	11,020	2.3%
Experimental					
	26,435	27,485	28,500	31,365	0.9%
Sport Aircraft					
	2,410	3,310	4,230	5,940	4.5%
Other					
	4,615	4,525	4,490	4,445	-0.2%
Total Pistons	141,380	136,985	132,595	124,460	-0.6%
Total Turbines	29,040	30,890	33,930	43,475	2.1%
Total Fleet	203,880	203,195	203,745	209,685	0.2%



Notes: An active aircraft is one that has a current registration and was flown at least one hour during the calendar year.

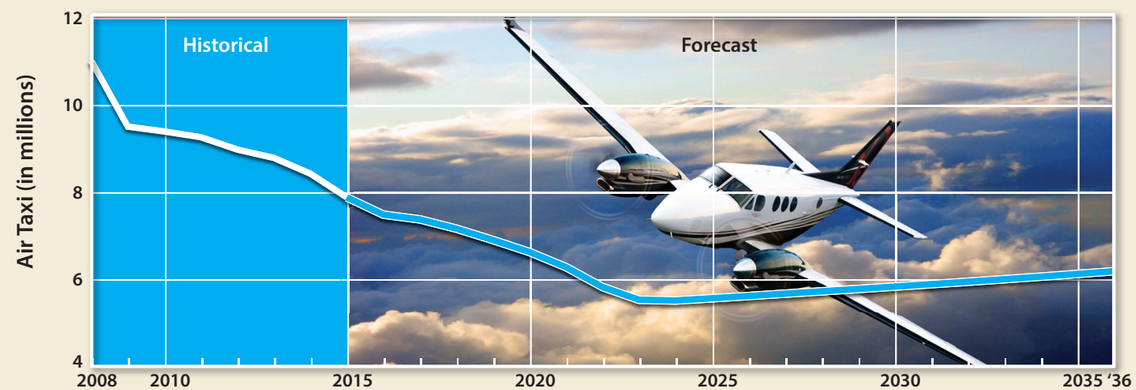
U.S. GENERAL AVIATION OPERATIONS

	2015	2021	2026	2036	AAGR 2015-2036
Itinerant					
	13,886,867	14,062,324	14,267,238	14,697,640	0.3%
Local					
	11,691,349	11,963,428	12,205,656	12,718,674	0.4%
Total GA Operations	**25,578,216**	**26,025,752**	**26,472,894**	**27,416,314**	**0.3%**



U.S. GENERAL AVIATION AIR TAXI

	2015	2020	2025	2035	AAGR 2015-2036
Air Taxi/Commuter Operations					
Itinerant	7,895,017	6,640,509	5,579,158	6,137,321	-1.1%



Source: FAA Aerospace Foreast - Fiscal Years 2016-2036

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The initial step in determining the GA demand for an airport is to define its generalized service area. The airport service area is a generalized geographical area where there is a potential market for airport services, particularly based aircraft. Access to GA airports and transportation networks enter the equation to determine the size of a service area, as well as the quality of aviation facilities, distance, and other subjective criteria.

Typically, the service area for a rural Regional GA airport can extend up to and even beyond 30 miles. The proximity and level of GA services are largely the defining factors when describing the GA service area. A description of nearby airports was previously completed in the Vicinity Airports section, as presented on **Exhibit C**. There are 10 public-use airports located within 30 nautical miles of the Airport. It should be noted that there are also 15 privately owned airports located within the 30-nautical mile radius.

Omaha's Eppley Airfield and Millard Airport as well as Council Bluffs Municipal Airport provide the greatest regional competition for general aviation demand as they both offer comparable services and facilities to BTA and are located closer to the larger population centers of greater Omaha area. As such, many aircraft in the region have elected to base at Eppley Airfield, Millard Airport, and Council Bluffs Municipal Airport, with a substantial amount also basing at Northern Omaha Airport. Millard Airport and Council Bluffs Municipal Airport will likely continue to attract and accommodate a significant amount of the greater Omaha demand; however, it should be noted that BTA is currently well positioned to accommodate aviation demands, especially on the north/north-western sides of the greater Omaha area. Moreover, Eppley Airfield has and will continue to primarily serve larger more sophisticated general aviation aircraft with the smaller aircraft electing the other regional airports.

When discussing the GA service area, two primary demand segments need to be addressed. The first component is the airport's ability to attract based aircraft. Almost universally, aircraft owners choose to base at an airport nearer their home or business. Convenience is the most common reason for basing in close proximity. Based on the current and historical registered aircraft data, depicted on **Exhibit H**, the number of local and regional aircraft owners within the standard 30-statute mile radius surrounding BTA has increased slightly from 659 in 1995 to 684 in 2015, while aircraft registrations totaled 784 in 2005. However, it should be mentioned that the FAA embarked on a re-registration process between 2010 and 2013 and saw an overall 10.5 percent decline in active aircraft. This decline appears to be represented in the registered aircraft figures for the 30-mile radius surrounding BTA as well. In addition, registered aircraft within the Counties of Douglas, Sarpy, and Washington were also examined as approximately 75 percent of BTA based aircraft are registered within these counties. The tri-county area experienced a registered aircraft total of 525 in 1995, 580 in 2000, 623 in 2005, 606 in 2010, and 522 in 2015 respectively.

Another primary reason for basing an aircraft at an airport is the availability of aircraft hangars at a reasonable lease rate. Based on Airport discussions with local and regional aircraft owners, there is potential for additional aircraft to base at BTA if additional hangar storage was provided. It is important to note that many aircraft owners prefer to operate at less congested airports if given the option.

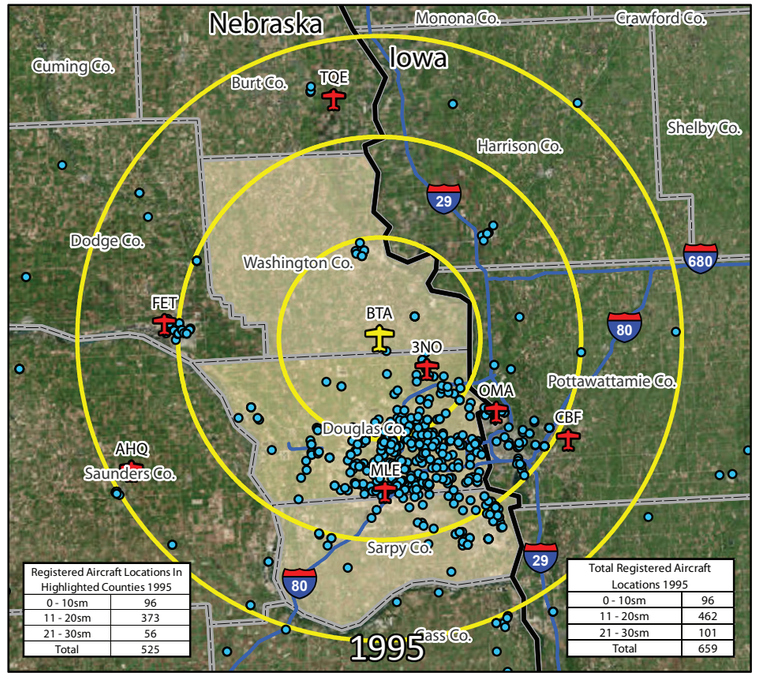
The second demand segment to consider is itinerant aircraft operations. In most cases, itinerant aircraft operators will also elect to utilize airports nearer their intended destination. This, however, is highly dependent on the airport's capabilities to accommodate the aircraft operator. As a result, airports with better services and facilities are more likely to attract a larger portion of the region's itinerant aircraft operations.

With several competing GA airports in the region, BTA's primary service area is defined by its convenience to its users. Millard Municipal is better positioned to serve southern Douglas County, and Council Bluffs Municipal Airport and Eppley Airfield are better positioned to serve eastern Douglas County. As a result, BTA's primary service area consists of Washington County and northern Douglas County. Beyond convenience, aircraft owners also consider the availability of affordable hangars and other services when basing their aircraft. For this reason, a secondary service area for BTA extends for a 30-mile radius to encompass the entirety of the greater Omaha region including all of Washington, Douglas, and Sarpy Counties.

Registered Aircraft Forecast

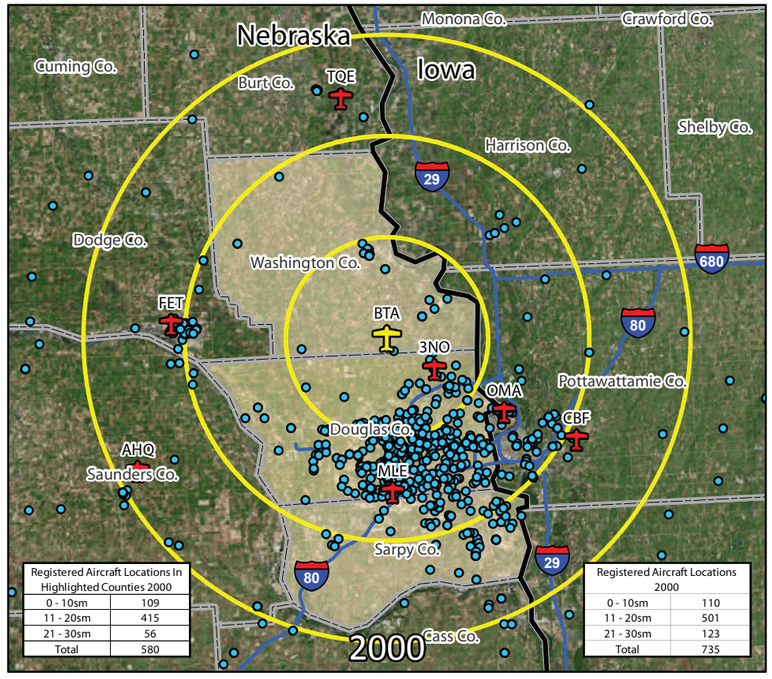
Table K depicts the historical registered aircraft for the Counties of Douglas, Sarpy, and Washington for years 1993 to 2015. The registered aircraft in the area generally show an increasing trend from years 1993 through 2007. However, after 2007, the service area experienced a downward trend in aircraft registration, reaching lows of 521 and 522 registered aircraft in 2014 and 2015 respectively. The historical U.S. active GA aircraft trends closely mirror the registered aircraft trends of the Airport service area. The U.S. has experienced a decrease in active GA aircraft since 2007, reaching a low of 198,780 in 2015. Similarly, the turbojet category reflects national trends as historic service area jet registrations show a growth trend, particularly since 2007. Although there are no recently prepared forecasts for the Airport service area regarding registered aircraft, one was prepared for this study using market share projection and ratio projection methods.

When projecting the registered aircraft, it is helpful to calculate the service area's market share of the total active GA aircraft in the U.S. In conducting this market share analysis, comparison of the service area aircraft ownership trends against the nation's ownership trends can be carried out. **Table L** details the market share analysis, which shows the service area market share of the U.S. active GA aircraft fleet has not fluctuated significantly, ranging from a high of 0.28 percent in 2005 to a low of 0.25 percent in 2014. Holding the 2015 market share of 0.26 percent constant, the market share can be applied to the forecast of U.S. active GA aircraft to generate the forecast registered aircraft in the Airport service area. According to this projection, 548 aircraft could be registered in the tri-county service area by 2036, yielding a CAGR of 0.23 percent. In addition, an increasing market share percentage was also applied. Despite the declining ten-year market share trend, there is potential for increased market share growth should the greater Omaha area economy grow as projected. Utilizing this forecasting technique, registered aircraft within the service area will reach 674 by 2036 and grow at a CAGR of 1.23 percent. Subsequently, the increasing market share forecast has been selected as the preferred planning forecast.



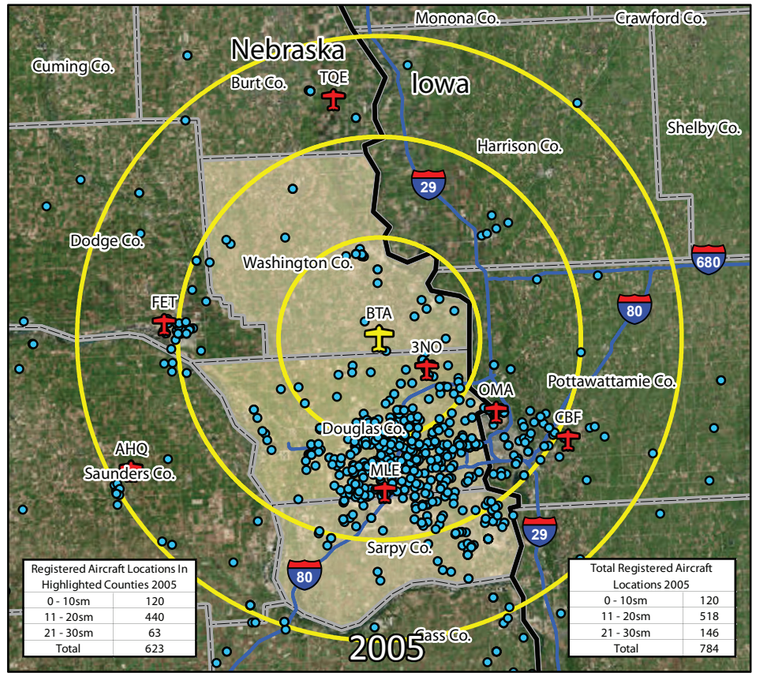
Registered Aircraft Locations In Highlighted Counties 1995	
0 - 10sm	96
11 - 20sm	373
21 - 30sm	56
Total	525

Total Registered Aircraft Locations 1995	
0 - 10sm	96
11 - 20sm	462
21 - 30sm	101
Total	659



Registered Aircraft Locations In Highlighted Counties 2000	
0 - 10sm	109
11 - 20sm	415
21 - 30sm	56
Total	580

Registered Aircraft Locations 2000	
0 - 10sm	110
11 - 20sm	501
21 - 30sm	123
Total	735

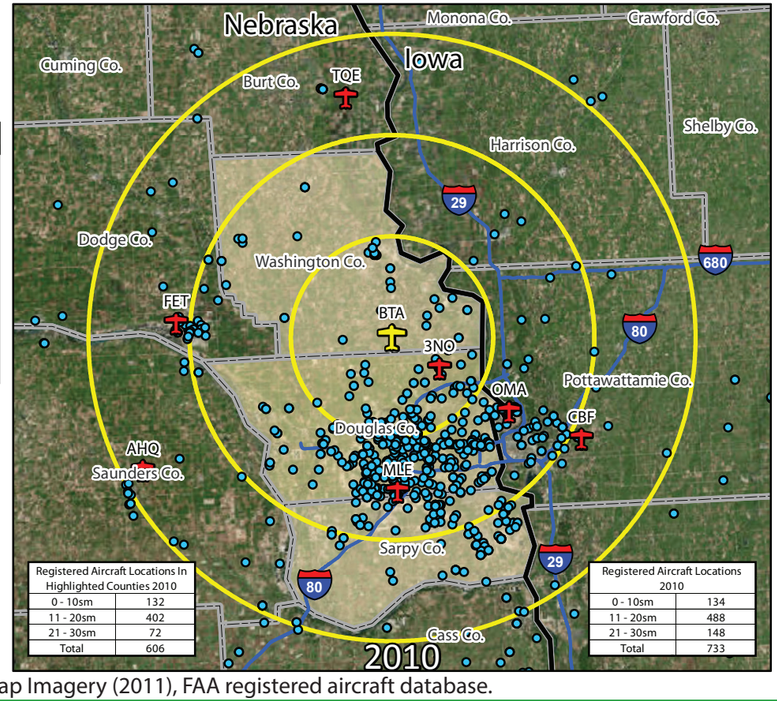


Registered Aircraft Locations In Highlighted Counties 2005	
0 - 10sm	120
11 - 20sm	440
21 - 30sm	63
Total	623

Total Registered Aircraft Locations 2005	
0 - 10sm	120
11 - 20sm	518
21 - 30sm	146
Total	784

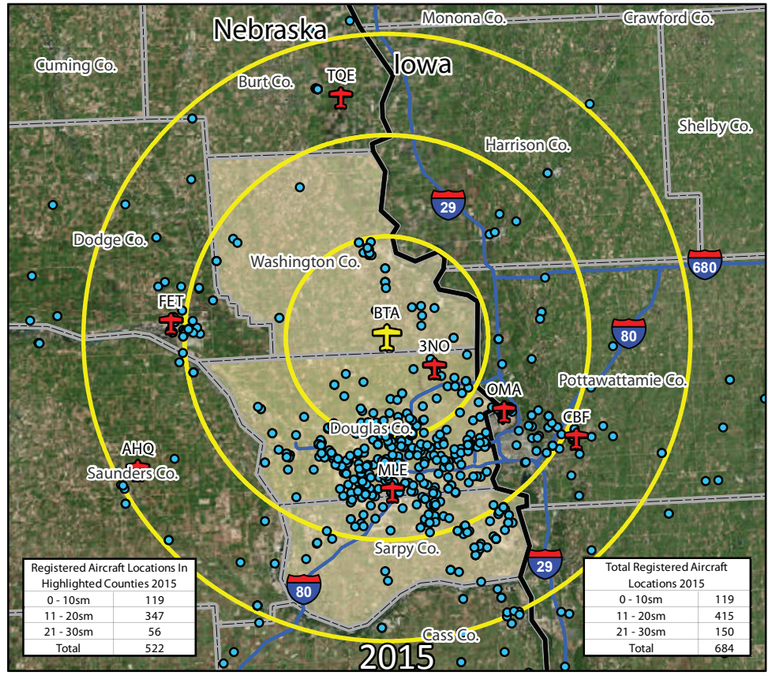
LEGEND

- County Boundary
- State Boundary
- 10/20/30 Statute Mile Radius
- Blair Municipal Airport
- Registered Aircraft Location



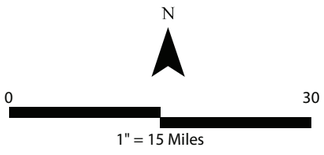
Registered Aircraft Locations In Highlighted Counties 2010	
0 - 10sm	132
11 - 20sm	402
21 - 30sm	72
Total	606

Registered Aircraft Locations 2010	
0 - 10sm	134
11 - 20sm	488
21 - 30sm	148
Total	733



Registered Aircraft Locations In Highlighted Counties 2015	
0 - 10sm	119
11 - 20sm	347
21 - 30sm	56
Total	522

Total Registered Aircraft Locations 2015	
0 - 10sm	119
11 - 20sm	415
21 - 30sm	150
Total	684



Source: ESRI Basemap Imagery (2011), FAA registered aircraft database.

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TABLE K
Historical Registered Aircraft
Douglas, Sarpy, and Washington Counties

Year	Helicopter	MEP	Other*	SEP	Turbojet	Turboprop	Total
1993	9	56	28	362	23	13	491
1994	9	59	24	374	24	14	504
1995	10	67	25	381	27	15	525
1996	12	68	26	369	30	20	525
1997	17	66	25	369	25	22	524
1998	17	63	23	392	27	22	544
1999	17	58	24	386	32	24	541
2000	19	56	26	422	35	22	580
2001	18	50	27	411	45	39	590
2002	18	47	27	412	46	38	588
2003	18	40	25	407	50	55	595
2004	20	43	23	425	48	54	613
2005	19	47	26	431	46	54	623
2006	19	60	28	443	36	28	614
2007	17	60	38	443	36	34	628
2008	17	49	39	433	44	40	622
2009	16	47	39	431	42	27	602
2010	17	41	42	431	44	31	606
2011	18	40	42	422	43	31	596
2012	17	32	41	389	54	30	563
2013	16	32	40	367	53	27	535
2014	16	26	34	363	60	22	521
2015	19	24	32	368	55	24	522

MEP: Multi-Engine Piston
SEP: Single Engine Piston
*The "Other" aircraft category refers to aircraft such as gliders, electric aircraft, balloons, and dirigibles.
Source: FAA Registered Aircraft

TABLE L
Registered Aircraft Forecast
Douglas, Sarpy, and Washington Counties

Year	Tri-County Registered Aircraft	U.S. Active GA Aircraft	% of U.S. Active GA Aircraft	Tri-County Population	Aircraft per 1,000 Residents
2005	623	224,257	0.28%	648,214	0.96
2006	614	221,942	0.28%	657,883	0.93
2007	628	231,606	0.27%	667,160	0.94
2008	622	228,664	0.27%	677,410	0.92
2009	602	223,876	0.27%	688,173	0.87
2010	606	223,370	0.27%	696,184	0.87
2011	596	220,453	0.27%	707,607	0.84
2012	563	209,034	0.27%	717,723	0.78
2013	535	199,927	0.27%	727,648	0.74
2014	521	204,408	0.25%	736,541	0.71
2015	522	203,880	0.26%	746,004	0.70

TABLE L (Continued)
Registered Aircraft Forecast
Douglas, Sarpy, and Washington Counties

Year	Tri-County Registered Aircraft	U.S. Active GA Aircraft	% of U.S. Active GA Aircraft	Tri-County Population	Aircraft per 1,000 Residents
2021	528	203,225	0.26%	795,207	0.66
2026	530	204,030	0.26%	840,228	0.63
2036	548	210,695	0.26%	929,975	0.59
Increasing Market Share Projection of U.S. Active GA Aircraft (CAGR 1.23%)—Selected					
2021	569	203,225	0.28%	795,207	0.72
2026	612	204,030	0.30%	840,228	0.73
2036	674	210,695	0.32%	929,975	0.72
Constant Ratio Projection Per Capita (CAGR 1.06%)					
2021	557	203,225	0.27%	795,207	0.70
2026	588	204,030	0.29%	840,228	0.70
2036	651	210,695	0.31%	929,975	0.70
Increasing Ratio Projection Per Capita (CAGR 1.94%)					
2021	581	203,225	0.29%	795,207	0.73
2026	655	204,030	0.32%	840,228	0.78
2036	781	210,695	0.37%	929,975	0.84

Source: Historical Registered Aircraft – FAA Aircraft Registry; Historical and Forecast U.S. Active GA Aircraft – FAA Aerospace Forecasts, Fiscal Years 2016-2036 (2016); Historical Population –U.S. Census Bureau, Forecast Population – Woods and Poole Complete Economic and Demographic Data Source (2016).

Population trends have also been used to analyze and project aircraft registrations within the tri-county service area. This projection method analyzes the service area population as a ratio of the historical registered aircraft per 1,000 residents. In 2015, the U.S. Census Bureau calculated the population of the tri-county service area to be approximately 746,004. The forecast population is expected to increase to 929,975 by 2036. The ratio of registered aircraft to 1,000 population has been trending down from a high of 0.96 in 2005 to a low of 0.70 in 2015. A constant ratio projection maintaining the current ratio of 0.70 yields 651 aircraft in the tri-county service area by 2036, growing at a CAGR of 1.06 percent.

An increasing ratio projection of aircraft per 1,000 people was applied to the projected population to reflect a return to the historic average ratio of 0.84. This projection yields a total of 781 registered aircraft and a CAGR of 1.94 percent.

The increasing market share projection of U.S. active GA aircraft was selected as the planning forecast as it is a reflection of the historical trends and forecast economic and population growth potential within the region.

Based Aircraft Forecast



T-Hangars

With respect to the most current Airport records, there are currently 60 aircraft based at the Airport. Building upon the projections previously developed, market share analysis and trend line projection forecasting approaches were used to generate forecasts for the future based aircraft totals at BTA. As presented in **Table M**, from 2005 to 2015, BTA has experienced an increase in the market share of registered aircraft within the tri-county area, growing from 6.58 percent to 11.49 percent. Holding the current market share constant at 11.49 percent, future based aircraft projections were calculated by applying the tri-county registered aircraft projection to the market share of registered aircraft. This approach results in a projection of 77 based aircraft by the year 2036. Based on the historic trend, an increasing market share projection was also applied, resulting in 90 based aircraft by 2036 and a CAGR of 1.95 percent.

Additional projections were prepared by examining the ratio of based aircraft to population. Historic data shows that the ratio of based aircraft per 1,000 residents decreased from 2005 to 2010 but grew strongly in the past five years to a high of 0.080 in 2015. Holding the current value of 0.080 based aircraft per 1,000 residents constant results in a projection of 74 based aircraft by 2036. An increasing ratio of based aircraft per 1,000 residents was also applied to the forecast tri-county population. Over the past ten years, the ratio has grown by 0.017. Maintaining this trend results in a projection of 106 based aircraft by 2036.

The FAA's TAF for BTA has also been considered. The TAF reflects a current based aircraft level of 49, which is 11 fewer than what is currently reported by Airport records. The TAF reflects a zero-growth projection, maintaining based aircraft at 49 through 2036. It is common for the FAA TAF to reflect a zero-growth forecast for non-towered GA airports. Since the TAF does not reflect current conditions nor does it consider the potential for future growth, it is used for comparison purposes only and is not considered a reliable forecast.

As such, the increasing market share projection has been selected as the preferred planning forecast. This projection has been selected based upon historic based aircraft trends and the potential for new hangar facilities that can support increased based aircraft demand. It should be mentioned, however, that the selected planning forecast is based upon an unconstrained growth model. The ability for the Airport to generate funding for aircraft hangars and capital improvement projects may be a limiting factor to based aircraft growth.

TABLE M
Based Aircraft Forecast
Blair Municipal Airport

Year	BTA Based Aircraft	Tri-County Registrations	BTA Market Share	Tri-County Population	Aircraft per 1,000 Residents
2005	41	623	6.58%	648,214	0.063
2006	41	614	6.68%	657,883	0.062
2007	41	628	6.53%	667,160	0.061
2008	38	622	6.11%	677,410	0.056
2009	38	602	6.31%	688,173	0.055
2010	30	606	4.95%	696,184	0.043
2011	34	596	5.70%	707,607	0.048
2012	40	563	7.10%	717,723	0.056
2013	52	535	9.72%	727,648	0.071
2014	49	521	9.40%	736,541	0.067
2015	60	522	11.49%	746,004	0.080
Constant Market Share Projection of Registered Aircraft (CAGR 1.22%)					
2021	65	569	11.49%	795,207	0.082
2026	70	612	11.49%	840,228	0.084
2036	77	674	11.49%	929,975	0.083
Increasing Market Share Projection of Registered Aircraft (CAGR 1.95%)—Selected Forecast (Unconstrained)					
2021	67	569	11.75%	795,207	0.084
2026	75	612	12.25%	840,228	0.089
2036	90	674	13.35%	929,975	0.097
Constant Ratio Projection Per 1,000 Residents (CAGR 1.03%)					
2021	64	569	11.18%	795,207	0.080
2026	67	612	10.98%	840,228	0.080
2036	74	674	11.03%	929,975	0.080
Increasing Ratio Projection per 1,000 County Residents (CAGR 2.75%)					
2021	71	569	12.44%	795,207	0.089
2026	82	612	13.32%	840,228	0.097
2036	106	674	15.73%	929,975	0.114
FAA TAF (CAGR -0.96%)					
2021	49	569	8.61%	795,207	0.062
2026	49	612	8.01%	840,228	0.058
2036	49	674	7.27%	929,975	0.053

Note: 2015 BTA based aircraft number from current Airport records, 9/30/2016. Historical based aircraft totals from 2005-2014 derived from FAA TAF.
Source: Historical Registered Aircraft – FAA Aircraft Registry; Historical Population –U.S. Census Bureau, Forecast Population – Woods and Poole Complete Economic and Demographic Data Source (2016); Airport Communication.

Based Aircraft Fleet Mix

The current fleet mix based at BTA consists of 47 single engine piston aircraft, two multi-engine piston aircraft, one turboprop, and 10 jets. Given that the total number of aircraft based at the Airport is projected to increase, it is important to have an idea of the type of aircraft expected to utilize the airfield. A

forecast of the fleet mix will ensure that adequate facilities are planned to accommodate these aircraft in the future. **Table N** presents the current based aircraft at BTA.

TABLE N
Current Based Aircraft
Blair Municipal Airport

Number of Aircraft	N-Number	Aircraft Make/Model	Aircraft Type
1	N106CT	FLIGHT DESIGN GMBH CTSW	SEP
2	N10ZT	CESSNA 172N	SEP
3	N1426U	CESSNA 172M	SEP
4	N1700B	BEECH M35	SEP
5	N18GY	CESSNA 550	Jet
6	N1990X	CESSNA 182H	SEP
7	N1MP	PIPER PA-28- 180	SEP
8	N214CF	CESSNA 182T	SEP
9	N217TH	CESSNA 560	Jet
10	N2313Q	PIPER PA 46-350P	SEP
11	N234WC	VANS AIRCRAFT RV-4	SEP
12	N256CP	CESSNA S550	Jet
13	N26244	GRUMMAN AA-5A	SEP
14	N277JM	CESSNA 551	Jet
15	N2824Z	PIPER PA-22- 150	SEP
16	N319SH	CZECH AIRCRAFT WORKS SPORTCRUISER	SEP
17	N32004	PIPER PA-28- 151	SEP
18	N330EA	SOCATA TBM 700	TP
19	N3419A	PIPER PA-22- 135	SEP
20	N36AH	VANS AIRCRAFT RV-6	SEP
21	N39773	PIPER PA-32RT- 300T	SEP
22	N4116G	CESSNA 340A	MEP
23	N425WY	CESSNA 550	Jet
24	N4300U	PIPER PA-28- 181	SEP
25	N440RS	KITFOX IV	SEP
26	N444JK	PIPER PA-23- 250	MEP
27	N449L	GLASAIR IIS FT	SEP
28	N44DZ	PIPER PA-32- 260	SEP
29	N44ZT	MOONEY M20J	SEP
30	N455FL	PIPER PA-28- 140	SEP
31	N48ZG	VANS AIRCRAFT RV-12	SEP
32	N51365	CESSNA 150J	SEP
33	N5172X	CHAMPION 7ECA	SEP
34	N5226H	PIPER PA-16	SEP
35	N5336R	CESSNA 172M	SEP
36	N533HT	CIRRUS SR22	SEP
37	N550GM	CESSNA 550	Jet

TABLE N (Continued)
Current Based Aircraft
Blair Municipal Airport

Number of Aircraft	N-Number	Aircraft Make/Model	Aircraft Type
38	N6167E	CESSNA 150C	SEP
39	N6232R	CESSNA 150E	SEP
40	N6612N	TAYLORCRAFT BC12D-85	SEP
41	N6645M	STINSON 108-3	SEP
42	N66MQ	CESSNA 550	Jet
43	N7144R	PIPER PA-28- 140	SEP
44	N730JB	RENEGADE SPIRIT	SEP
45	N732HC	CESSNA T210L	SEP
46	N7367M	CESSNA 175	SEP
47	N736RW	CESSNA R172K	SEP
48	N7370Z	PIPER PA-25- 235	SEP
49	N7402	CESSNA 680	Jet
50	N758SL	CESSNA 550	Jet
51	N8782W	PIPER PA-28- 235	SEP
52	N8963M	BEECH 35-B33	SEP
53	N8985R	CHAMPION 7FC	SEP
54	N9045G	CESSNA 182N	SEP
55	N19RC	Cessna 525	Jet
56	N9529L	GRUMMAN AA-5	SEP
57	N9878U	GRUMMAN AA-5A	SEP
58	N99036	ERCOUPE 415- C	SEP
59	N9991A	CESSNA 170A	SEP
60*	NA	ULTRALIGHT EAGLE	SEP

*Aircraft not registered within FAA Registered Aircraft Database
SEP: Single Engine Piston
MEP: Multi-Engine Piston
TP: Turboprop
Source: Airport communication; Basedaircraft.com

The projection for the fleet mix of based aircraft was generated by comparing the existing fleet mix of based aircraft at BTA with the U.S. GA fleet trends as well as Airport communication. The forecast for the active U.S. GA fleet shows declining trends in the single and multi-engine categories; however, the larger and more sophisticated aircraft such as turboprop and turbojet are forecast to increase. In addition, both piston and turbine rotorcraft are projected to increase through 2036. It should be noted that three jet aircraft owners are currently considering basing their aircraft at BTA. Taking the national trends and Airport communication into consideration, a projected based aircraft fleet mix has been prepared and is detailed in **Table P**.

TABLE P
Based Aircraft Fleet Mix
Blair Municipal Airport

Aircraft Type	2016	%	2021	%	2026	%	2036	%
Single Engine Piston	47	78.33%	51	76.12%	55	73.33%	66	73.33%
Multi-Engine Piston	2	3.33%	2	2.99%	2	2.67%	1	1.11%
Turboprop	1	1.67%	2	2.99%	3	4.00%	5	5.56%
Jet	10	16.67%	12	17.91%	14	18.67%	16	17.78%
Helicopters	0	0.00%	0	0.00%	1	1.33%	2	2.22%
Total	**60**	**100.00%**	**67**	**100.00%**	**75**	**100.00%**	**90**	**100.00%**

Source: Airport communication; Basedaircraft.com; Coffman Associates analysis

General Aviation Operations

General aviation operations are classified as either local or itinerant. A local operation is a take-off or landing performed by an aircraft that operates within sight of the airport, or which executes simulated approaches or touch-and-go operations at the airport. Generally, local operations are characterized by training operations. Itinerant operations are those performed by aircraft with a specific origin or destination away from the airport. Typically, itinerant operations increase with business and commercial use, since business aircraft are not typically used for large scale training activities.

Although the FAA TAF estimates operational levels for BTA, it is viewed that the current TAF, which presents a flat-line forecast of 15,500 total operations through 2036, does not represent the current operational level occurring at the Airport. As such, the FAA recommends applying an approved forecast model specifically developed for small non-towered GA airports. The report entitled *Model for Estimating General Aviation Operations at Non-Towered Airports Using Towered and Non-Towered Airport Data* (GRA, Inc. 2001) presents the methodology and formula for the model. Independent variables used in the model include airport characteristics, demographics, and geographic features. The model was derived using a combined data set for small towered and non-towered GA airports and incorporates a dummy variable to distinguish the two airport types. Specifically, the model utilizes the following variables:

- Based aircraft;
- Percent of aircraft based at the airport among general aviation airports within 100 miles;
- Number of FAR 141 flight training schools at the airport;
- Population within 100 miles;
- Ratio of population within 25 miles and within 100 miles.

The model factors each of these variables so that both local and national factors are considered when estimating operations. The model results in a total annual GA operations estimate of 27,437. **Table Q** presents the calculations of operations for the Airport.

TABLE Q
Model for Estimating Operations at Non-Towered Airports
Blair Municipal Airport

Function	Category	2015
	775	775
+	241 (BA)	14,460
-	0.14 (BA2)	504
+	31,478 (%100mi)	1,172
+	5,577 (VITFSnum)	0
+	.001 (Pop100)	1,846
-	3,736 (WACAORAK)	0
+	12,121 (Pop25/100)	9,688
=	**Total**	**27,437**

Function Definitions

BA - Based Aircraft: 60
BA2 - Based Aircraft Squared: 3,600
%100mi - % Based aircraft among based GA aircraft within 100 miles: 3.724%
VITFSnum - # of FAR 141 flight schools on airport: 0
Pop100 - Population within 100 miles: 1,025,762
WACAORAK - 1 if WA, CA, OR, AK; 0 otherwise: 0
Pop25/100 - Ratio of Pop 25 to Pop 100 (proportion between 1 and 0): 0.799283

Source: 2015 Estimate of operations – Derived from *Model for Estimating General Aviation Operations at Non-Towered Airports*, Equation #15, FAA Statistics and Forecast Branch (July 2001).

Itinerant General Aviation Operations Forecast

Utilizing the operations estimate derived from the model described above, four forecast of itinerant general aviation operations have been developed and are presented in **Table R**. The forecasts presented examine and/or manipulate variables, such as BTA's market share of itinerant operations, forecast growth rates in the FAA's *Aerospace Forecast 2016-2036*, and operations per based aircraft. The first projection considers the Airport maintaining its market share of total U.S. itinerant GA operations at a constant level. In 2015, BTA accounted for 0.021 percent of U.S. itinerant operations. By carrying this percentage forward to the plan years of this study, a forecast emerges generating a CAGR of 0.43 percent and 3,096 itinerant GA operations by year 2036. The second forecast considers an increasing BTA market share of national GA itinerant operations and produces a CAGR of 2.90 percent and 5,160 operations by 2036.

The national itinerant GA operations forecasts presented in the FAA's *Aerospace Forecast 2016-2036* were also examined. Using the Aerospace Forecast base year of 2015, the forecasted growth rate of 0.30 percent was carried forward throughout the planning horizon. This technique forecasts 3,016 annual GA itinerant operations by 2036. An additional forecast was prepared by examining the Airport's operations per based aircraft. By maintaining a constant ratio of operations per based aircraft of 50 through the planning period, a forecast of 4,500 itinerant GA operations by 2036 and CAGR of 2.23 percent results.

TABLE R
Itinerant GA Ops Forecast
Blair Municipal Airport

Year	BTA Itinerant GA Operations	U.S. ATCT Itinerant GA Operations	Market Share of Itinerant Operations	BTA Based Aircraft	Itinerant Operations per Based Aircraft
2015	2,832	13,755,000	0.021%	60	47
Constant Market Share Projection (CAGR 0.43%)					
2021	2,962	14,103,000	0.021%	67	44
2026	3,005	14,309,000	0.021%	75	40
2036	3,096	14,742,000	0.021%	90	34
Increasing Market Share Projection (CAGR 2.90%)					
2021	3,526	14,103,000	0.025%	67	53
2026	4,150	14,309,000	0.029%	75	55
2036	5,160	14,742,000	0.035%	90	57
FAA *Aerospace Forecast* (CAGR 0.30%)					
2021	2,883	14,103,000	0.020%	67	43
2026	2,927	14,309,000	0.020%	75	39
2036	3,016	14,742,000	0.020%	90	34
Constant Operations per Based Aircraft (CAGR 2.23%)—Selected Forecast					
2021	3,350	14,103,000	0.024%	67	50
2026	3,750	14,309,000	0.026%	75	50
2036	4,500	14,742,000	0.031%	90	50

Sources: Airport based aircraft information; *FAA Aerospace Forecast 2016-2036*; FAA Form 5010; 2015 Estimate of operations – Derived from *Model for Estimating General Aviation Operations at Non-Towered Airports*, Equation #15, FAA Statistics and Forecast Branch (July 2001); Coffman Associates analysis.

Ultimately, the constant operations per based aircraft projection has been carried forward as the selected forecast. The potential for facility upgrades make it possible for BTA to grow its market share and to maintain a ratio of 50 operations per based aircraft. The potential for new facilities catering to itinerant traffic may draw more transient aircraft. The selected forecast maintains a reasonable level of operations per based aircraft, while modestly increasing the Airport's market share.

Local General Aviation Operations Forecast

A similar methodology was utilized to generate a planning forecast for local GA operations. Four forecasts were developed, with the first considering the Airport maintaining a constant percentage of U.S. local GA operations. The second forecast applies an increasing market share of local operations per based aircraft throughout the planning horizon. These forecasts generated CAGRs of 0.41 and 2.88 percent, respectively. Local GA operations forecasts are shown in **Table S**.

TABLE S
Local GA Ops Forecast
Blair Municipal Airport

Year	BTA Local GA Operations	U.S. ATCT Local GA Operations	Market Share of Local Operations	BTA Based Aircraft	Local Operations per Based Aircraft
2015	24,605	13,755,000	0.210%	60	410
Constant Market Share Projection (CAGR 0.41%)					
2021	25,223	14,103,000	0.210%	67	376
2026	25,736	14,309,000	0.210%	75	343
2036	26,821	14,742,000	0.210%	90	298
Increasing Market Share Projection (CAGR 2.88%)					
2021	30,028	14,103,000	0.250%	67	448
2026	35,540	14,309,000	0.290%	75	474
2036	44,702	14,742,000	0.350%	90	497
FAA *Aerospace Forecast* (CAGR 0.40%)					
2021	25,201	14,103,000	0.210%	67	376
2026	25,709	14,309,000	0.210%	75	343
2036	26,756	14,742,000	0.209%	90	297
Constant Operations per Based Aircraft (CAGR 1.83%)—Selected Forecast					
2021	26,800	14,103,000	0.223%	67	400
2026	30,000	14,309,000	0.245%	75	400
2036	36,000	14,742,000	0.282%	90	400

Sources: Airport based aircraft information; *FAA Aerospace Forecast 2016-2036*; FAA Form 5010; 2015 Estimate of operations – Derived from *Model for Estimating General Aviation Operations at Non-Towered Airports*, Equation #15, FAA Statistics and Forecast Branch (July 2001); Coffman Associates analysis.

The FAA's Aerospace Forecast 2016-2036 was also examined for comparison. The national local GA operations forecast growth rate of 0.4 percent was applied to the forecast years of the report, which generated a total of 26,756 GA local operations at BTA by 2036. Finally, a constant operations per based aircraft forecast was also prepared. This method forecasts a total of 36,000 operations by 2036 at a CAGR of 1.83 percent.

The constant operations per based aircraft has been selected as the planning forecast. The potential for increased based aircraft indicates possible growth to BTA's local operational levels and increased market share of national local GA operations.

Air Taxi and Military Operations Forecast

Air taxi operations are those with authority to provide "on-demand" transportation of persons or property via aircraft with fewer than 60 passenger seats. Air taxi includes a broad range of operations, including some smaller commercial service aircraft, some charter aircraft, air cargo aircraft, many fractional ownership aircraft, and air ambulance services.

Based on an examination of flight plans filed and closed on the ground from years 2013-2015, it was determined that BTA experiences approximately 100 annual air taxi operations. Per the FAA *Aerospace Forecasts*, the air taxi/commuter operations category is projected to decline by 1.1 percent annually through 2036. However, with strong based business jet growth projected for the Airport, it is reasonable to assume that some of these aircraft will be utilized for air taxi (Part 135) operations. Thus, a new air taxi forecast was generated for this report and is presented in **Table T**.

TABLE T
Air Taxi Ops Forecast
Blair Municipal Airport

Year	BTA Air Taxi	U.S. ATCT Air Taxi Operations	Market Share of Air Taxi Operations	BTA Based Business Jets	Air Taxi Operations per Based Business Jet
2015	100	7,895,000	0.0013%	10	10
Constant Market Share Projection of U.S. Air Taxi Operations (CAGR -1.02%)					
2021	82	6,294,000	0.0013%	12	7
2026	73	5,631,000	0.0013%	14	5
2036	81	6,199,000	0.0013%	16	5
Increasing Market Share Projection of U.S. Air Taxi Operations - Low (CAGR 1.49%)					
2021	94	6,294,000	0.0015%	12	8
2026	101	5,631,000	0.0018%	14	7
2036	136	6,199,000	0.0022%	16	9
Increasing Market Share Projection of U.S. Air Taxi Operations - Medium (CAGR 7.97%)—Selected Forecast					
2021	300	6,294,000	0.0048%	12	25
2026	350	5,631,000	0.0062%	14	25
2036	500	6,199,000	0.0081%	16	31
Increasing Market Share Projection of U.S. Air Taxi Operations - High (CAGR 10.07%)					
2021	330	6,294,000	0.0052%	12	28
2026	455	5,631,000	0.0081%	14	33
2036	750	6,199,000	0.0121%	16	47

Sources: Airport based aircraft information; *FAA Aerospace Forecast 2016-2036*; FAA Form 5010; 2015 Estimate of operations – Derived from *Model for Estimating General Aviation Operations at Non-Towered Airports*, Equation #15, FAA Statistics and Forecast Branch (July 2001); Coffman Associates analysis.

In an effort to generate a reliable air taxi operations forecast, four different forecasting techniques were examined. The first forecast analyzes the existing BTA market share of U.S. air taxi operations, which is held at a constant throughout the planning period. This forecast yields a total of 81 air taxi operations by year 2036 at a CAGR of -1.02 percent. The second forecast also examines the BTA market share of U.S. air taxi operations and applies a slightly increasing market share percentage yielding a CAGR of 1.49 percent and a total of 136 air taxi operations by year 2036.

In addition, medium and high increasing BTA market share percentages of U.S. air taxi operations were also examined. Each forecast yields a total of 500 and 750 air taxi operations by year 2036 at an increased CAGR of 7.97 percent and 10.07 percent respectively. Accounting for the potential for based business

jet growths, the medium increasing market share projection has been selected as the preferred planning forecast.

Military aircraft can and do utilize civilian airports across the country. Current operational data does not identify any military operations at BTA. Forecasting of military activity is inherently difficult because of the national security nature of their operations and the fact that their mission can change on a daily basis. Thus, it is typical for the FAA to utilize a flat-line number for military operations. At BTA, the FAA TAF reflects no annual military operations. For the purposes of the Master Plan, military operations are not forecasted to account for any operations at BTA through the planning period.

Annual Instrument Approaches

Forecasts of annual instrument approaches (AIAs) provide guidance in determining an airport's requirements for navigational aid facilities. An instrument approach is defined by the FAA as "an approach to an airport with intent to land by an aircraft in accordance with an IFR flight plan, when visibility is less than three miles and/or when the ceiling is at or below the minimum approach altitude." To qualify as an instrument approach, aircraft must land at an airport after following one of the published instrument approach procedures. Forecasts of annual instrument approaches (AIAs) provide guidance in determining an airport's requirements for navigational aid facilities. Practice or training approaches do not count as AIAs, nor do instrument approaches that occur in visual conditions.

It is highly unusual for pilots to perform local operations when IFR conditions are in effect. AIAs may be expected to increase as itinerant operations and operations by more sophisticated aircraft (e.g., turboprops and business jets) increase through the planning period. For this reason, AIA projections consider a constant estimate of three percent of annual itinerant operations. The projections are presented in **Table U**.

TABLE U
Annual Instrument Approaches (AIAs)
Blair Municipal Airport

Year	AIAs	Itinerant Operations	Ratio
2015	88	2,932	3.00%
2021	110	3,650	3.00%
2026	123	4,100	3.00%
2036	150	5,000	3.00%

Source: Coffman Associates analysis

Operations Forecast Summary

Table V presents the aggregate total of estimated current operational totals as well as the operational forecasts for the planning horizon.

TABLE V
Operations Forecast Summary
Blair Municipal Airport

Year	Based Aircraft	Air Taxi Operations	Itinerant GA Operations	Military Operations	Local GA Operations	Total Operations
2015	60	100	2,832	0	24,605	27,537
Constant Ratio Projection						
2021	67	300	3,350	0	26,800	30,450
2026	75	350	3,750	0	30,000	34,100
2036	90	500	4,500	0	36,000	41,000

Source: 2015 Estimate of operations – Derived from *Model for Estimating General Aviation Operations at Non-Towered Airports*, Equation #15, FAA Statistics and Forecast Branch (July 2001); Coffman Associates analysis.

Peak Period Forecasts

Peaking characteristics are an important aspect in generating airport capacity and facility requirements. It should be noted that because BTA does not have a control tower, the generalized peaking characteristics of other non-towered general aviation airports have been used for the purpose of this study. The peaking periods used to develop the capacity analysis and facility requirements are described below.

- Peak Month – The calendar month in which traffic activity is highest.
- Design Day – The average day in the peak month. This indicator is easily derived by dividing the peak month by the number of days in the month.
- Busy Day – The busy day of a typical week in the peak month.
- Design Hour – The peak hour within the design day.

For the purposes of this study, the peak month was estimated at ten percent of the annual operations. By 2036, the estimated peak month is projected to reach 4,050 operations. The design day is estimated by dividing the peak month by its number of days and the busy day is calculated at 1.25 times the design day. The design hour is then calculated at 15 percent of the design day. These projections can be viewed in **Table W**.

TABLE W
Peak Period Forecasts
Blair Municipal Airport

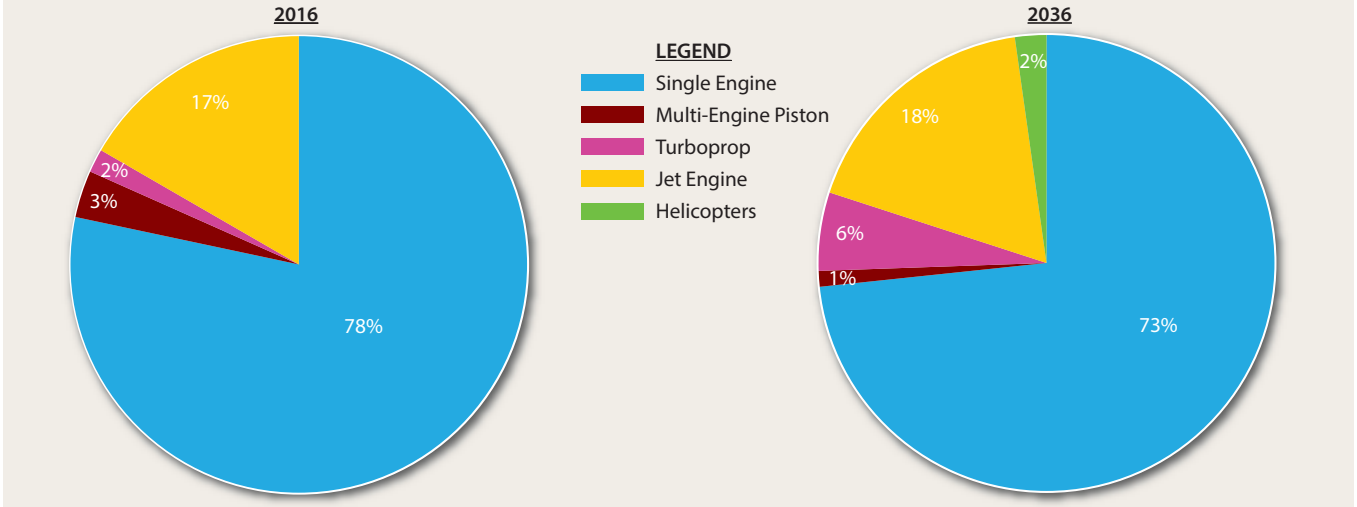
Year	2015	2021	2026	2036
Annual	27,537	30,450	34,100	41,000
Peak Month	2,754	3,045	3,410	4,100
Design Day	89	98	110	132
Busy Day	111	123	138	165
Design Hour	13	15	17	20

FORECAST SUMMARY

This section has provided demand-based forecasts of aviation activity at BTA over the next 20 years. An attempt has been made to define the projections in terms of short (1-5 years), intermediate (6-10 years), and long (11-20 years) term planning horizons. **Exhibit J** presents a 20-year forecast summary. Elements,

	BASE YEAR	FORECAST 2021	FORECAST 2026	FORECAST 2036
Itinerant				
Air Taxi	100	300	350	500
General Aviation	2,832	3,350	3,750	4,500
Total Itinerant	**2,932**	**3,650**	**4,100**	**5,000**
Local				
General Aviation	24,605	26,800	30,000	36,000
Total Local	**24,605**	**26,800**	**30,000**	**36,000**
ANNUAL OPERATIONS	**27,537**	**30,450**	**34,100**	**41,000**
BASED AIRCRAFT FORECAST				
Single Engine	47	51	55	66
Multi-Engine Piston	2	2	2	1
Turboprop	1	2	3	5
Jet	10	12	14	16
Rotor	0	0	1	2
Total Based Aircraft	**60**	**67**	**75**	**90**
Annual Instrument Approaches	***88***	***110***	***123***	***150***

Based Aircraft Forecasts





such as local socioeconomic indicators, anticipated regional development, historical aviation data, and national aviation trends, were all considered when determining future conditions.

AIRPORT/AIRCRAFT/RUNWAY CLASSIFICATION

The FAA has established multiple aircraft classification systems that group aircraft based upon performance (approach speed in landing configuration) and on design characteristics (wingspan and landing gear configuration). These classification systems are used to design certain airport elements, such as separation standards, safety areas, runways, taxiways, and aprons, based upon the aircraft expected to use the airport facilities most frequently.

AIRCRAFT CLASSIFICATION



Transient Aircraft

The use of appropriate FAA design standards is generally based upon the characteristics of aircraft commonly using or expected to use the airport facilities. The aircraft used to design the airport is designated as the critical aircraft. The design criteria used in the aircraft classification process are presented in **Exhibit K**. An airport's critical aircraft can be a single aircraft or a collection of multiple aircraft commonly using the airport that fit into a single aircraft category. The design aircraft or collection of aircraft is classified by three different categories: Aircraft Approach Category (AAC), Airplane Design Group (ADG), and Taxiway Design Group (TDG). The FAA Advisory Circular (AC) 150/5300-13A, *Airport Design,* describes the following classification systems and parameters.

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

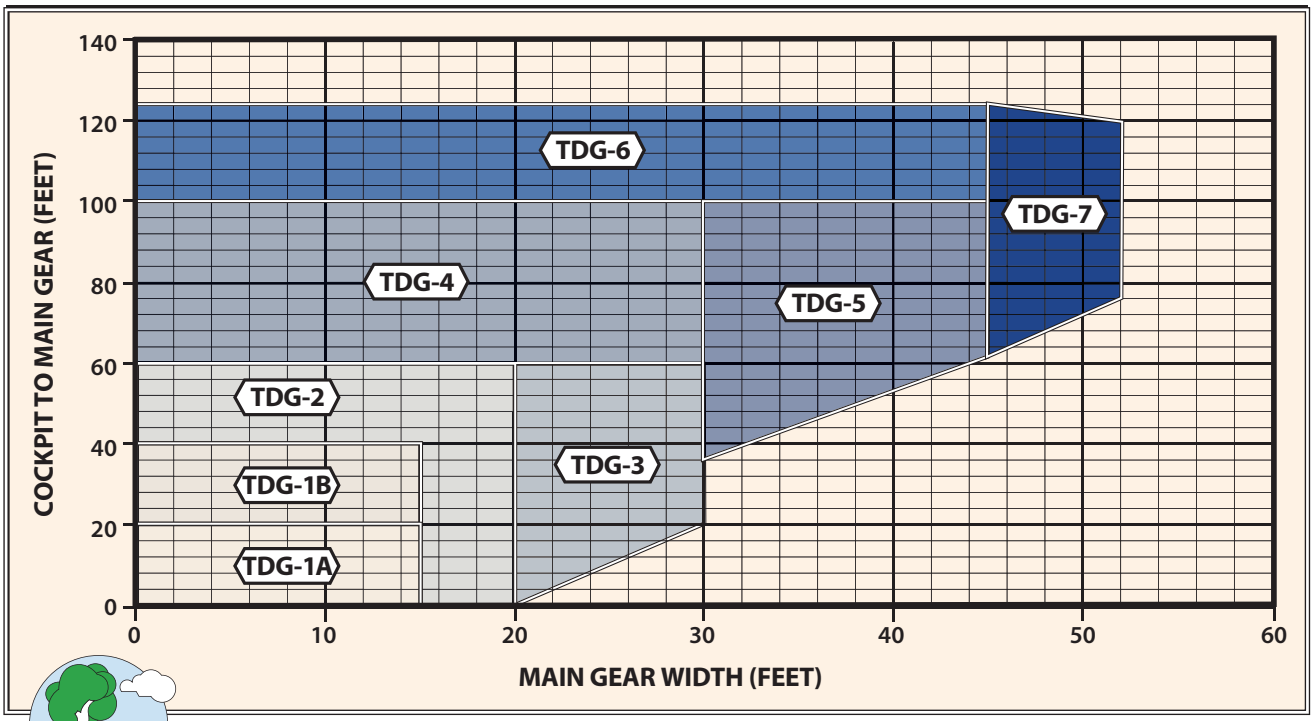
AIRCRAFT APPROACH CATEGORY (AAC)	
Category	**Approach Speed**
A	less than 91 knots
B	91 knots or more but less than 121 knots
C	121 knots or more but less than 141 knots
D	141 knots or more but less than 166 knots
E	166 knots or more

AIRPLANE DESIGN GROUP (ADG)		
Group #	**Tail Height (ft)**	**Wingspan (ft)**
I	<20	<49
II	20-<30	49-<79
III	30-<45	70-<118
IV	45-<60	118-<171
V	60-<66	171-<214
VI	66-<80	214-<262

VISIBILITY MINIMUMS	
RVR* (ft)	**Flight Visibility Category (statute miles)**
VIS	3-mile or greater visibility minimums
5,000	Not lower than 1-mile
4,000	Lower than 1-mile but not lower than ¾-mile
2,400	Lower than ¾-mile but not lower than ½-mile
1,600	Lower than ½-mile but not lower than ¼-mile
1,200	Lower than ¼-mile

***RVR**: Runway Visual Range

TAXIWAY DESIGN GROUP (TDG)



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

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

Taxiway Design Group (TDG): A classification of airplanes based on outer-to-outer main gear width (MGW) and cockpit to main gear (CMG) distance. The TDG relates to the dimensions of the under-carriage of the design aircraft. The taxiway design elements determined by the application of the TDG include the taxiway width, taxiway edge safety margin, taxiway shoulder width, taxiway fillet dimensions, and in some cases, the separation distance between parallel taxiway/taxilanes. Other taxiway elements, such as the taxiway safety area (TSA) taxiway/taxilane object free area (TOFA), taxiway/taxilane separation to parallel taxiway/taxilanes or fixed or movable objects, and taxiway/taxilane wingtip clearances are determined solely based on the wingspan (ADG) of the design aircraft utilizing those surfaces. It is appropriate for a taxiway to be planned and built to different taxiway design standards based on expected use.

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

AIRPORT AND RUNWAY CLASSIFICATION

The airport and runway classifications, along with the aircraft classifications defined above, are used to determine the appropriate FAA design standards to which the airfield facilities are to be designed and built.

Airport Reference Code (ARC): An airport designation that signifies the airport's highest runway design code (RDC), minus the third (visibility) component of the RDC. The ARC is used for planning and design purposes only and does not limit the aircraft capable of operating safely on the airport. The current ALP, which was last updated in October 1999 and will be updated as part of this study, indicates that the Airport is currently designed to ARC B-II standards.

Runway Design Code (RDC): A code signifying the design standards to which the runway is to be built. The RDC is based upon planned development and has no operational component.

The AAC, ADG, and runway visual range (RVR) are combined to form the RDC of a particular runway. The RDC provides the information needed to determine certain design standards that apply. The first component, depicted by a letter, is the AAC and relates to aircraft approach speed (operational characteristics). The second component, depicted by a Roman numeral, is the ADG and relates to either the aircraft wingspan or tail height (physical characteristics), whichever is most restrictive. The third component relates to the visibility minimums expressed by RVR values in feet of 1,200 (⅛-mile), 1,600 (¼- mile), 2,400 (½-mile), 4,000 (¾-mile), and 5,000 (1-mile). The RVR values approximate standard visibility minimums

A-I



- Beech Baron 55
- **Beech Bonanza**
- Cessna 150
- Cessna 172
- Cessna Citation Mustang
- Eclipse 500/550
- Piper Archer
- Piper Seneca

B-I



- Beech Baron 58
- Beech King Air 100
- Cessna 402
- **Cessna 421**
- Piper Navajo
- Piper Cheyenne
- Swearingen Metroliner
- Cessna Citation I (525)

B-II



- Super King Air 200
- Cessna 441
- DHC Twin Otter
- Super King Air 350
- Beech 1900
- Citation Excel (560), Sovereign (680)
- Falcon 50, 900, 2000
- **Citation Bravo (550)**
- Embraer 120

A-III, B-III



- DHC Dash 7
- **DHC Dash 8**
- DC-3
- Convair 580
- Fairchild F-27
- ATR 72
- ATP

C-I, D-I



- Beech 400
- **Lear** 31, **35**, 45, 60
- Israeli Westwind

C-II, D-II



- Cessna Citation X (750)
- Gulfstream 100, 200,300
- Challenger 300/600
- **ERJ-135, 140, 145**
- CRJ-200/700
- Embraer Regional Jet
- Lockheed JetStar
- Hawker 800

C-III, D-III *less than 100,000 lbs.*



- ERJ-170
- CRJ 705, 900
- Falcon 7X
- **Gulfstream 500**, 550, 650
- Global Express, Global 5000
- Q-400

C-III, D-III *over 100,000 lbs.*



- ERJ-90
- Boeing Business Jet
- B-727
- **B-737**-300, **700**, 800
- MD-80, DC-9
- A319, A320

C-IV, D-IV



- **B-757**
- B-767
- C-130 Hercules
- DC-8-70
- MD-11

D-V



- **B-747-400**
- B-777
- B-787
- A-330, A-340

Note: Aircraft pictured is identified in bold type.

for instrument approaches to the runways. The third component should read "VIS" for runways designed for visual approach use only.

Numerous airfield design standards are based upon the RDC. The RDC of any given runway is used to determine specific airfield design standards, which include imaginary surfaces established by the FAA to protect aircraft operational areas in order to keep them free of obstructions that could possibly affect the safe operation of aircraft. Airfield design standards at BTA are further described later in the report.

Approach Reference Code (APRC): A code signifying the current operational capabilities of a runway and associated parallel taxiway with regard to landing operations. Like the RDC, the APRC is composed of the same three components: the AAC, ADG, and RVR. The APRC describes the current operational capabilities of a runway under particular meteorological conditions where no special operating procedures are necessary, as opposed to the RDC, which is based upon planned development with no operational component. The APRC for a runway is established based upon the minimum runway to taxiway centerline separation.

Currently, the runway to taxiway centerline separation for Runway 13-31 is 400 feet. Given that Runway 13-31 is served by non-precision instrument approach procedures with minimums not lower than ¾ mile, Runway 13-31 meets standards for APRC D/IV/4000 and D/V/4000.

Departure Reference Code (DPRC): A code signifying the current operational capabilities of a runway and associated parallel taxiway with regard to take-off operations. The DPRC represents those aircraft that can take off from a runway while any aircraft are present on adjacent taxiways, under particular meteorological conditions with no special operating conditions. The DPRC is similar to the APRC but is composed of two components: AAC and ADG. A runway may have more than one DPRC depending on the parallel taxiway separation distance.

The runway to taxiway centerline separation for Runway 13-31 is currently 400 feet which meets FAA design standards for DPRC D/IV and D/V.

CRITICAL DESIGN AIRCRAFT

The selection of airport design criteria is based upon the aircraft currently using or expected to use the airport. The critical aircraft is used to establish the design parameters of the airport. These criteria are typically based upon the most demanding aircraft using the airfield facilities on a relatively frequent basis. The critical design aircraft can be a single aircraft or a composite of multiple aircraft that represent a collection of aircraft characteristics. Upon the selection of multiple aircraft, the most demanding aircraft characteristics are used to establish the design criteria of the airport based upon the AAC, ADG, and TDG. If the airport contains multiple runways, a critical design aircraft will be established for each runway.

The primary consideration for a critical design aircraft is to ensure safe operation of the aircraft using the airport. If an aircraft larger than the critical design aircraft is to operate at the airport, it may result in reduced safety margins, or an unsafe operation. However, airports typically do not establish design criteria based solely upon the largest aircraft using the airfield facilities if it operates on an infrequent basis.

The critical design aircraft can be defined as an aircraft conducting at least 500 annual operations at an airport or the most regularly scheduled aircraft in commercial service. When planning for future airport facilities, it is extremely important to consider the demands of aircraft operating at the airport in the future. As a result of the separation standards based upon the critical aircraft, caution must be exercised to ensure that short-term development does not preclude the long-term needs of the airport. Thus, it is important to strike a balance between the facility needs of aircraft currently operating at the airport and the facility needs of aircraft projected to operate at the airport. Although precautions must be taken to ensure long-term airport development, airports with critical aircraft that do not use the airport facilities on a regular basis are unable to operate economically due to added development and maintenance expenses.

AIRPORT DESIGN AIRCRAFT

It is imperative to have an accurate understanding of what type of aircraft operate at the airport both now and in the future. The type of aircraft utilizing airport facilities can have a significant impact on numerous design criteria. Thus, an aircraft activity study by type and aircraft category can be beneficial in determining future airport standards that must be met in order to accommodate certain aircraft.

The most recent annual data was obtained from the FAA's Traffic Flow Management System Counts (TFMSC), a program maintained by the FAA to monitor the amount and type of aircraft activity at airports. Typically, information is added to the system when pilots file flight plans and/or when flights are detected by the National Airspace System (NAS) on radar. The TFMSC program includes commercial service (air carrier and air taxi), military, and general aviation aircraft. Although the program is capable of identifying the aircraft operating under IFR filed flight plans and on radar, TFMSC does not account for all aircraft operating without a flight plan due to limited radar coverage. Thus, it is possible for an airport to experience additional operations that are not counted within TFMSC. Despite its shortcomings, the program is a valuable source of information when it comes to identifying the primary airport users and type of aircraft operating at the airport on a regular basis.

For the purpose of this study, a TFMSC report was generated to identify the primary Airport users and aircraft operating at BTA. **Exhibit M** presents the operational mix of turbine aircraft reported by TFMSC to be operating at BTA.

Although many of the aircraft identified by the TFMSC report fall within the A/B-I small aircraft category, numerous aircraft identifying with the B-II category were identified as well. Of the B-II aircraft identified,

JET OPERATIONS BY AIRPORT REFERENCE CODE

ARC	Aircraft	2008	2009	2010	2011	2012	2013	2014	2015
A-I	Cessna Citation Mustang	0	0	0	0	2	62	4	4
A-I	Eclipse 400/500	0	0	6	8	2	14	34	40
A-I	Epic Dynasty	0	0	10	14	4	6	0	2
A-I	Piper Malibu/Meridian	0	2	8	10	4	12	4	6
Total		**0**	**2**	**24**	**32**	**12**	**94**	**42**	**52**
A-II	Cessna 425	0	0	0	0	0	4	14	24
A-II	Pilatus PC-12	0	4	4	2	0	12	22	2
Total		**0**	**4**	**4**	**2**	**0**	**16**	**36**	**26**
B-I	Beechjet 400	0	2	0	0	0	0	0	0
B-I	Cessna Citation I/SP	0	0	0	0	0	4	16	16
B-I	Cessna CJ1	10	4	2	4	0	4	4	0
B-I	Embraer Phenom 100	0	0	2	2	0	2	0	2
B-I	Mitsubishi MU-2	4	2	0	0	0	0	4	0
B-I	Piaggio P180 Avanti	0	0	4	0	2	0	0	0
B-I	Piper Cheyenne	4	0	32	2	6	2	2	0
B-I	Raytheon Premier I	0	0	0	0	0	0	0	2
B-I	Swearingen Merlin 2/4	0	0	0	4	0	0	4	0
B-I	TBM-7/850	0	0	0	0	2	14	214	252
Total		**18**	**8**	**40**	**12**	**10**	**26**	**244**	**272**
B-II	Aero Commander 680/900/1000	0	0	0	0	0	0	6	0
B-II	Cessna 441 Conquest	0	0	6	8	0	0	0	0
B-II	Cessna Caravan	2	0	0	2	0	0	0	0
B-II	Cessna Citation Bravo/SP	0	4	4	0	52	160	170	164
B-II	Cessna Citation Excel/XLS	0	0	0	0	0	0	6	0
B-II	Cessna Citation III/VI/VII	0	0	0	0	0	0	0	2
B-II	Cessna Citation Sovereign	0	0	0	0	0	0	50	222
B-II	Cessna Citation V/Encore/Ultra	0	2	0	0	62	236	190	0
B-II	Cessna CJ2, CJ3, CJ4	0	0	0	0	0	0	6	4
B-II	Dassault Falcon 20/50	6	0	0	0	0	0	0	0
B-II	King Air 90/200/300/350	4	10	28	10	94	188	306	260
Total		**12**	**16**	**38**	**20**	**208**	**584**	**734**	**652**
C-I	Learjet 30 Series	0	0	0	0	0	0	0	2
Total		**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**
C-II	Challenger 300/600	0	0	2	18	0	0	0	2
C-II	Embraer ERJ 135/140/145/Legacy	2	0	0	0	0	0	0	0
Total		**2**	**0**	**2**	**18**	**0**	**0**	**0**	**2**

AIRPORT REFERENCE CODE OPERATIONS SUMMARY

Jet Operations by Airport Reference Code

ARC	2008	2009	2010	2011	2012	2013	2014	2015
A-I	0	2	24	32	12	94	42	52
A-II	0	4	4	2	0	16	36	26
B-I	18	8	40	12	10	26	244	272
B-II	12	16	38	20	208	584	734	652
C-I	0	0	0	0	0	0	0	2
C-II	2	0	2	18	0	0	0	2
Total	**32**	**30**	**108**	**84**	**230**	**720**	**1056**	**1006**

Jet Operations By Approach Category

AAC	2008	2009	2010	2011	2012	2013	2014	2015
A	0	6	28	34	12	110	78	78
B	30	24	78	32	218	610	978	924
C	2	0	2	18	0	0	0	4
Total	**32**	**30**	**108**	**84**	**230**	**720**	**1056**	**1006**

Jet Operations By Airplane Design Group

ADG	2008	2009	2010	2011	2012	2013	2014	2015
I	18	10	64	44	22	120	286	326
II	14	20	44	40	208	600	770	680
Total	**32**	**30**	**108**	**84**	**230**	**720**	**1056**	**1006**

Source: Traffic Flow Management System Counts

some have a maximum takeoff weight (MTOW) of less than 12,500 pounds, identifying with the small aircraft category, while others have MTOWs greater than 12,500 pounds which are classified as large aircraft. The operational characteristics of the B-II category turbine aircraft operating at BTA can be viewed in **Table X**.

TABLE X
Category B-II Aircraft Characteristics
Blair Municipal Airport

	MTOW (lbs)	Approach Speed (kts)	Wingspan (ft)	Tail Height (ft)
Beech King Air 90	10,100	101	50.00	14.25
Cessna 441 Conquest	9,925	100	49.30	13.10
Commander 680	6,750	97	49.08	15.00
King Air 100	11,800	111	45.92	15.42
King Air 200	12,500	102	54.50	14.80
King Air 350	15,000	99	57.90	14.30
Citation Excel/XLS	22,000	114	53.50	16.80
Citation II/Bravo	14,800	112	52.17	15.00
Citation Ultra/Encore	16,830	107	55.80	17.20
Citation Sovereign	30,775	112	72.33	20.33
Dassault Falcon/Mystère 50	40,780	113	61.92	22.92

The 1999 ALP designates the ARC as B-II; however, the ARC is based strictly upon the B-II category, or family of similar aircraft, as opposed to identifying a specific critical aircraft. Based upon the TFMSC analysis as well as based aircraft records, category B-II remains a prevalent ARC designation for BTA. It should be noted that numerous B-II category aircraft are currently based at BTA, including a Cessna Citation Sovereign which is the largest based aircraft. The Citation Sovereign is classified within TDG IB due to the dimensions of the undercarriage of the aircraft. Thus, the airport design aircraft is best described as B-II-IB. Although aircraft more demanding than B-II were identified utilizing the Airport, these aircraft do not conduct at least 500 annual operations to justify a larger critical design aircraft.

EXISTING RUNWAY DESIGN

As previously discussed, each runway is designated as RDC. The RDC relates to specific design criteria set forth by the FAA that should be met. The RDC is determined by the particular aircraft or category of aircraft expected to use each runway.

Runway 13-31 Runway Design Code

Runway 13-31 is the primary runway and should be designed to accommodate the critical design aircraft. This runway is currently 4,200 feet in length and 100 feet wide. The runway is equipped with instrument approach procedures with visibility minimums down to 7/8 of a mile. Given these characteristics, Runway 13-31 is currently categorized as B-II-4000.

FUTURE RUNWAY DESIGN

The aviation demand forecasts indicate the potential for continued growth in turbine activity at the Airport. This includes 16 based jets and five turboprops by the long-term planning horizon. The type and size of business jets and turboprops using the Airport regularly can impact the design standards to be applied to the airport system. Therefore, it is important to have an understanding of what type of aircraft may use the Airport in the future. Factors such as population and employment growth in the airport service area, the proximity and level of service of other regional airports, and development at the Airport can influence future activity.

Most operations throughout the planning period of this Master Plan are expected to be by aircraft within AACs A and B and within ADGs I and II. However, the trend toward manufacturing of a larger percentage of medium and large business jets, in AACs C and D, may lead to greater utilization of these aircraft (particularly those in AAC C) at BTA by the long-term planning horizon. BTA has 10 based business jets with the potential for two more soon and a forecast total of 16 by 2036. With projected growth in based jets and air taxi operations at BTA, it is reasonable to consider AAC C aircraft, such as the Cessna Citation X, as being a future based aircraft or frequent operator at the Airport. The evidence supporting a potential shift to AAC C verifies the currently approved ALP, which ultimately defines Runway 13-31 as ARC C-II. Thus, the planning effort will consider ARC C-II as the critical design category and the future RDC to be C-II-4000.

FACILITY REQUIREMENTS AND ALTERNATIVE DEVELOPMENT ANALYSIS

As mentioned previously, components of an airport contain both airside and landside facilities. Airside facilities include facilities that are related to the approach, departure, and ground movement of aircraft on the airport. Airside facility components encompass runways, taxiways, navigational approach aids, airport signage, marking, and lighting. Landside facilities are needed on an airport to foster the interface of air and ground transportation. Landside facility components include GA terminal facilities, aircraft hangars and tiedowns, aircraft parking aprons, automobile parking, and airport support facilities.

This portion of the report will not only explore facility requirements, but also alternative ways to meet those requirements. Each functional area interrelates and affects the development potential of the others. Therefore, all areas are examined individually, and then coordinated as a whole, to ensure the final

plan is functional, efficient, and cost-effective. The total impact of all these factors on the Airport must be evaluated to determine if the investment in BTA will meet the needs of the Blair Airport Authority and City of Blair, both during and beyond the 20-year planning period.

It is the goal of this alternatives discussion to produce a balanced development plan to best serve forecast aviation demands. However, before defining and discussing specific alternatives, Airport development objectives should be considered. As owner and operator, the Blair Airport Authority provides the overall guidance for the operation and development of the Airport. It is of primary concern that the Airport is marketed, developed, and operated for the betterment of the community and its users. With this in mind, the following development objectives have been defined for this planning effort:

- To develop a facility with a focus on self-sufficiency in both operational and developmental cost recovery;
- To develop a safe, efficient, and attractive aviation facility in accordance with applicable federal, state, and local regulations, including best practices for safety and security;
- To conform to the intent of applicable FAA and/or NDA Division of Aeronautics design standards and other appropriate planning guidelines;
- To plan for the highest and best use of Airport land;
- To develop a balanced facility that is responsive to the current and long-term aviation demand for all classes of Airport users;
- To be reflective and supportive of the long-term planning efforts currently applicable to the region, including appropriate local, regional, and state transportation plans and other applicable plans;
- To provide flexibility to adjust to unforeseen changes; and
- To ensure that future development is environmentally compatible and technically, socially, and politically feasible.

The alternatives considered are compared to determine which of the alternatives will best fulfill the local aviation needs. With this information, as well as input from various Airport stakeholders, a final Airport concept can evolve into a realistic development plan.

AIRSIDE FACILITY REQUIREMENTS AND ALTERNATIVES

Components included within the Airside Facility Requirements and Alternatives section encompass runways, safety area design standards, taxiways, navigational and approach aids, lighting, marking, and signage.

Airfield Design Standards

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

It is important that the RSA, ROFA, ROFZ, and RPZ remain under direct ownership of the airport sponsor to ensure that these areas remain free of obstacles and can be readily assessed by maintenance and safety personnel. The airport should also own or maintain sufficient land use control over RPZs in an effort to ensure that the area remains obstacle free. Alternatives to owning RPZs include maintaining positive control through avigation easements or ensuring proper zoning measures are taken to maintain compatible land use. The safety areas are presented in **Exhibit N**.

Runway Safety Area (RSA)

The RSA is an established surface surrounding a runway that is designed or prepared in order to increase safety and decrease potential damage in the event that an aircraft undershoots, overshoots, or makes an excursion from the runway. The RSA is centered upon the runway centerline and its dimensions are based upon the approach speed and design group of the critical design aircraft using the runway. The FAA states within AC 150/5300-13A that the RSA must be cleared and graded and cannot contain hazardous surface variations. In addition, the RSA must be drained either by grading or storm sewers, capable of supporting snow removal, ARFF equipment, as well as the occasional passage of aircraft without damaging the aircraft. The RSA must remain free of obstacles, other than those considered fixed by function, such as runway lights.

The FAA has placed a higher significance on maintaining adequate RSA at all airports. Under Order 5200.8, effective October 1, 1999, the FAA established the *Runway Safety Area Program*. The Order states, "The objective of the Runway Safety Area Program is that all RSAs at federally-obligated airports…shall conform to the standards contained in Advisory Circular 150/5300-13, *Airport Design*, to the extent practicable." Each Regional Airports Division of the FAA is obligated to collect and maintain data on the RSA for each runway at the airport and perform airport inspections.

The RDC B-II-4000 RSA serving Runway 13-31 is 150 feet wide and extends 300 feet beyond each end of the runway. Based on a site visit and Airport records, there are no known obstructions to the RSA.

Under the ultimate RDC C-II-4000 conditions, the RSA is enlarged to 500 feet wide and extending 1,000 feet beyond the departure end of the runway and 600 feet prior to the landing threshold. The ultimate RDC C-II-4000 RSA would introduce several non-standard conditions that would need to be resolved. Under RDC C-II conditions presented on **Exhibit N**, the RSA extending to the southeast of Runway 13-31 is penetrated by vegetation beginning approximately 450 feet beyond the runway end, while the RSA

extending to the northwest is penetrated by vegetation beginning approximately 250 feet beyond the runway end. It should be noted that the vegetation incompatibility at the northwest end of Runway 13-31 is a field currently being utilized to grow corn. Any crop with a vertical component is considered an obstruction. In addition, the drainage way beyond the Runway 31 threshold creates a non-standard surface variation to the RSA.

In the event the Airport were to allow the existing non-standard conditions to remain, an alternative would be the implementation of a displaced landing threshold on Runway 31 and decreased runway length declared available for takeoff on Runway 13. The Runway 31 threshold would need to be displaced by approximately 150 feet to allow 600 feet of RSA prior to the landing threshold. Declared distances would need to be implemented on Runway 13, to decrease the amount of runway length available for takeoff by approximately 550 feet. Similarly, the Runway 13 threshold could be displaced to provide 600 feet of RSA prior to the landing threshold. In addition, the Runway 31 takeoff length declared distance could be decreased by 750 feet to allow for a full 1,000 feet of RSA beyond the runway end resulting in the removal of the vegetation penetrations to the northwest This alternative achieves FAA RSA design standards by reducing the amount of runway length available for use. Ultimately, this alternative would negatively impact the growth potential of the Airport by limiting accessibility to business jet aircraft that require longer runway lengths to safely operate.

As a result, future planning should include the removal of vegetation and rerouting or grading of the drainage way to conform to RSA standards. In doing so, the full length of Runway 13-31 can continue to be utilized for takeoffs and landings under ultimate RDC C-II.

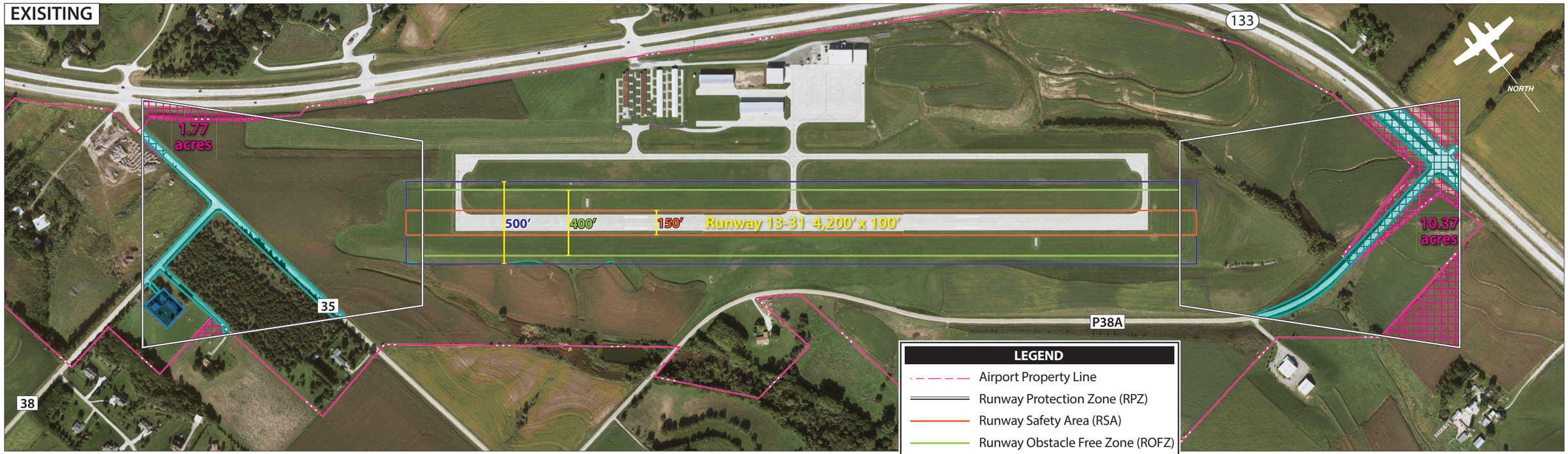
Runway Object Free Area (ROFA)

The ROFA can be described as a two-dimensional surface area that surrounds all airfield runways. This area must remain clear of obstructions aside from those that are deemed “fixed by function,” such as runway lighting systems. This safety area does not have to be level or graded as the RSA does. However, the ROFA must be clear of any penetrations of the lateral elevation of the RSA. Much like the RSA, the ROFA is centered upon the runway centerline and its size is determined based upon the critical design aircraft using the runway.

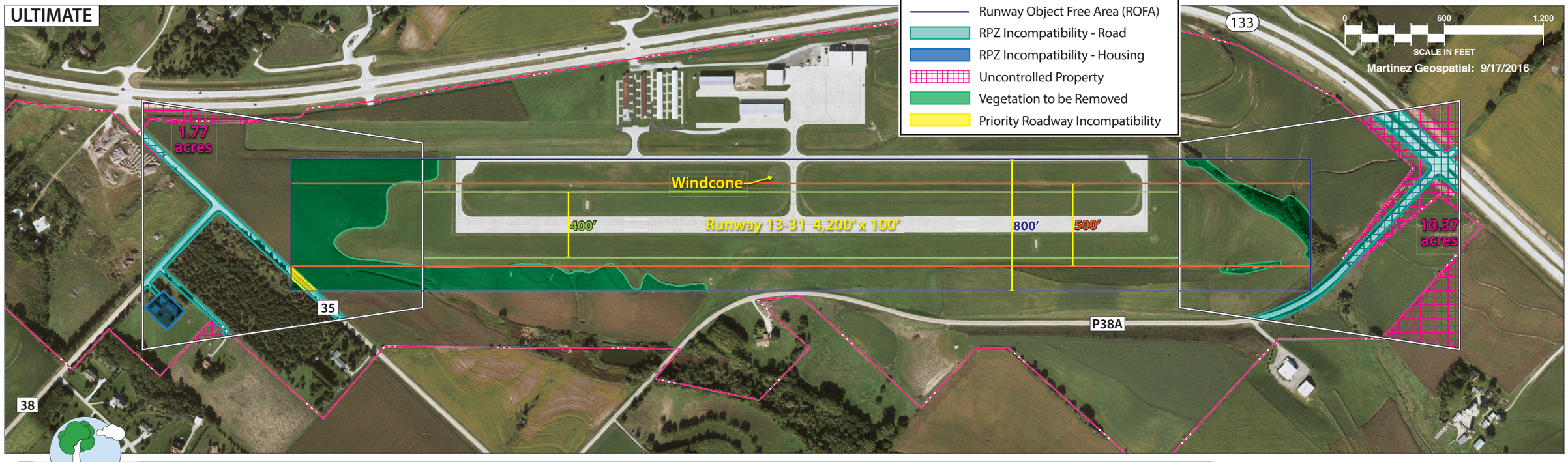
Currently, RDC B-II-4000 FAA standards call for the ROFA serving Runway 13-31 to be 500 feet wide and extend 300 feet beyond each end of the runway. The Runway 13-31 ROFA is currently obstructed by a small amount of vegetation on the westernmost side of the runway. This vegetation should be cleared and maintained to prevent future vegetation regrowth.

ROFA dimensional standards, presented on **Exhibit N**, for RDC C-II-4000 are 800 feet wide and extend 1,000 feet beyond each end of the runway. Under ultimate conditions, the ROFA would be obstructed by portions of County Road 35, vegetation, and the windcone adjacent to the midfield connector taxiway

EXISITING



ULTIMATE



LEGEND

- Airport Property Line
- Runway Protection Zone (RPZ)
- Runway Safety Area (RSA)
- Runway Obstacle Free Zone (ROFZ)
- Runway Object Free Area (ROFA)
- RPZ Incompatibility - Road
- RPZ Incompatibility - Housing
- Uncontrolled Property
- Vegetation to be Removed
- Priority Roadway Incompatibility

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providing access to Runway 13-31. These obstructions to the ultimate ROFA should be mitigated prior to upgrading to RDC C-II-4000 standards.

Similar to the RSA deficiencies, each end of Runway 13-31 and the westernmost side lacks proper ROFA to meet the future RDC C-II. The ROFA beyond each runway end includes vegetation and it is recommended that the ROFA be cleared and graded at the same time of the proposed RSA improvements. In addition, the ROFA extending beyond the northwest end of Runway 13-31 is obstructed by County Road 35, which is located on Airport property and is designated as a public use road. It is recommended that County Road 35 be re-routed and the windcone moved outside the ROFA.

Runway Obstacle Free Zone (ROFZ)

An ROFZ can be defined as a portion of airspace centered about the runway, and its elevation at any point is equal to the elevation of the closest point on the runway centerline. The ROFZ extends 200 feet past each end of the runway on the runway centerline. The width of the ROFZ is determined by the critical aircraft utilizing the runway. The ROFZ width for runways accommodating large aircraft is 400 feet. The function of the ROFZ is to ensure the safety of aircraft conducting operations by preventing object penetrations to this portion of airspace. Potential penetrations to this airspace also include taxiing and parked aircraft. Any obstructions within this portion of airspace must be mounted on frangible couplings and be fixed in its position by its function.

The established FAA dimensions for a B-II runway serving large aircraft (over 12,500 pounds) require the ROFZ to be 400 feet in width and extend 200 feet beyond each end of the runway. Runway 13-31 meets the ROFZ design standards for a B-II runway. ROFZ standards for the ultimate RDC C-II-4000 runway remain the same as the existing B-II-4000 runway; thus, no change would be required.

Runway Protection Zone (RPZ)

An RPZ can be described as a trapezoidal area centered on the extended runway centerline and generally begins 200 feet from the end of the runway. This safety area has been established to protect the end of the runway from airspace penetrations and incompatible land uses. The RPZ is divided into two different portions: the central portion and the controlled activity area. The central portion of the RPZ extends from the beginning to the end of the RPZ, is centered on the runway centerline, and is the same width as the ROFA. The RPZ dimensions are based upon the critical design aircraft using the runway and the visibility minimums serving the runway.

While the RPZ is intended to be clear of incompatible objects or land uses, some uses are permitted with conditions and other land uses are prohibited. According to AC 150/5300-13A, the following land uses are permissible within the RPZ:

- Farming that meets the minimum buffer requirements.
- Irrigation channels as long as they do not attract birds.
- Airport service roads, as long as they are not public roads and are directly controlled by the airport operator.
- Underground facilities, as long as they meet other design criteria, such as RSA requirements, as applicable.
- Unstaffed navigational aids (NAVAIDs) and facilities, such as required for airport facilities that are fixed-by-function in regard to the RPZ.

Any other land uses considered within RPZ land owned by the airport sponsor must be evaluated and approved by the FAA Office of Airports. The FAA has published *Interim Guidance on Land Uses within a Runway Protection Zone* (September 27, 2012), which identifies several potential land uses that must be evaluated and approved prior to implementation. The specific land uses requiring FAA evaluation and approval include:

- Buildings and structures (residences, schools, churches, hospitals or other medical care facilities, commercial/industrial buildings, etc.).
- Recreational land use (golf courses, sports fields, amusement parks, other places of public assembly, etc.).
- Transportation facilities (rail facilities, public roads/highways, vehicular parking facilities, etc.).
- Fuel storage facilities (above and below ground).
- Hazardous material storage (above and below ground).
- Wastewater treatment facilities.
- Above-ground utility infrastructure (i.e., electrical substations), including any type of solar panel installations.

The *Interim Guidance on Land within a Runway Protection Zone* states, “RPZ land use compatibility also is often complicated by ownership considerations. Airport owner control over the RPZ land is emphasized to achieve the desired protection of people and property on the ground. Although the FAA recognizes that in certain situations the airport sponsor may not fully control land within the RPZ, the FAA expects airport sponsors to take all possible measures to protect against and remove or mitigate incompatible land uses.”

Currently, the RPZ review standards are applicable to any new or modified RPZ. The following actions or events could alter the size of an RPZ, potentially introducing an incompatibility:

- An airfield project (e.g., runway extension, runway shift).
- A change in the critical design aircraft that increases the RPZ dimensions.
- A new or revised instrument approach procedure that increases the size of the RPZ.
- A local development proposal in the RPZ (either new or reconfigured).

Currently, the RPZs associated with Runway 13-31 begin 200 feet from the end of each runway and are 1,000 feet in width at the inner portion, 1,510 feet at the outer portion, and 1,700 feet in length encompassing 48.98 acres of property. Both approach RPZs to Runways 13 and 31 contain portions of public roads. The southeastern corner of the Runway 13 RPZ contains a portion of County Road 38, while the Runway 31 RPZ contains a portion of County Road 35, Highway 133, and extends off Airport property. Each county road traversing the RPZs provide access to rural residential parcels located west and southwest of the Airport.

The FAA recommends that an airport have ownership of the RPZ land, where feasible, that could include outright fee simple ownership or an avigation easement. If an airport cannot fully control the entirety of the RPZ, the RPZ land use standards have recommendation status for that portion of the RPZ not controlled by the airport owner. In essence, this means that the FAA can require a change to the runway environment so as to properly secure the entirety of the RPZ. Objects such as public roads have been allowed within RPZs under previous guidance unless they posed an airspace obstruction. FAA's current guidance; however, does not readily allow for public roads in the RPZ.

Since the new RPZ guidance addresses new or modified RPZs, existing incompatibilities may be grandfathered under certain conditions. For example, roads that are in the current RPZ are typically allowed to remain as grandfathered unless the runway environment changes. The Airport sponsor should take reasonable actions to meet RPZ design standards, which could include relocating portions of Highway 133 and County Roads 35 and 38 from within the Runway 13-31 RPZs; however, it could be considered acceptable since these roads have been in existence since before the RPZ standards were published. FAA funding priority for certain actions, such as relocating existing roads in the RPZ, will be determined on a case by case basis.

It should be noted that uncontrolled and/or unowned airport property containing the Right-of-Way (ROW) of Nebraska roads is not a concern for airports located in Nebraska, as the Nebraska Department of Roads (NDR) does not release their ROW.

The ultimate RPZ standards for a C-II-4000 runway would remain the same as the existing RPZ standards. Given that the ultimate RPZs would remain unchanged, any incompatibilities could still be grandfathered as long as no other changes to the runway environment or approach minimums alter the size or location of the RPZs.

Runway Protection Zone (RPZ) Alternatives

Given that the runway environment is subject to change, the Airport sponsor should take reasonable actions to meet RPZ design standards. As such, alternatives for RPZs serving each runway end have been developed.

Runway 13 RPZ Alternatives

In its current location, the RPZ serving Runway 13 contains portions of County Roads 35 and 38 as well as Highway 133 and Airport-owned residential housing. The current RPZ configuration also encompasses approximately 1.8 acres of unowned property. **Exhibit P** presents three alternatives to potentially mitigate the existing RPZ incompatibilities.

Runway 13 RPZ Alternative 1

The first alternative presents the RPZ serving Runway 13 in its existing condition and proposes the removal of portions of County Roads 35 and 38 and relocation of County Road 35. Furthermore, this alternative considers the relocation of Highway 133 at the northeastern corner of the RPZ as well as the relocation of an Airport-owned home. Total property to be acquired under this alternative amounts to approximately 1.8 acres.

Runway 13 RPZ Alternative 2

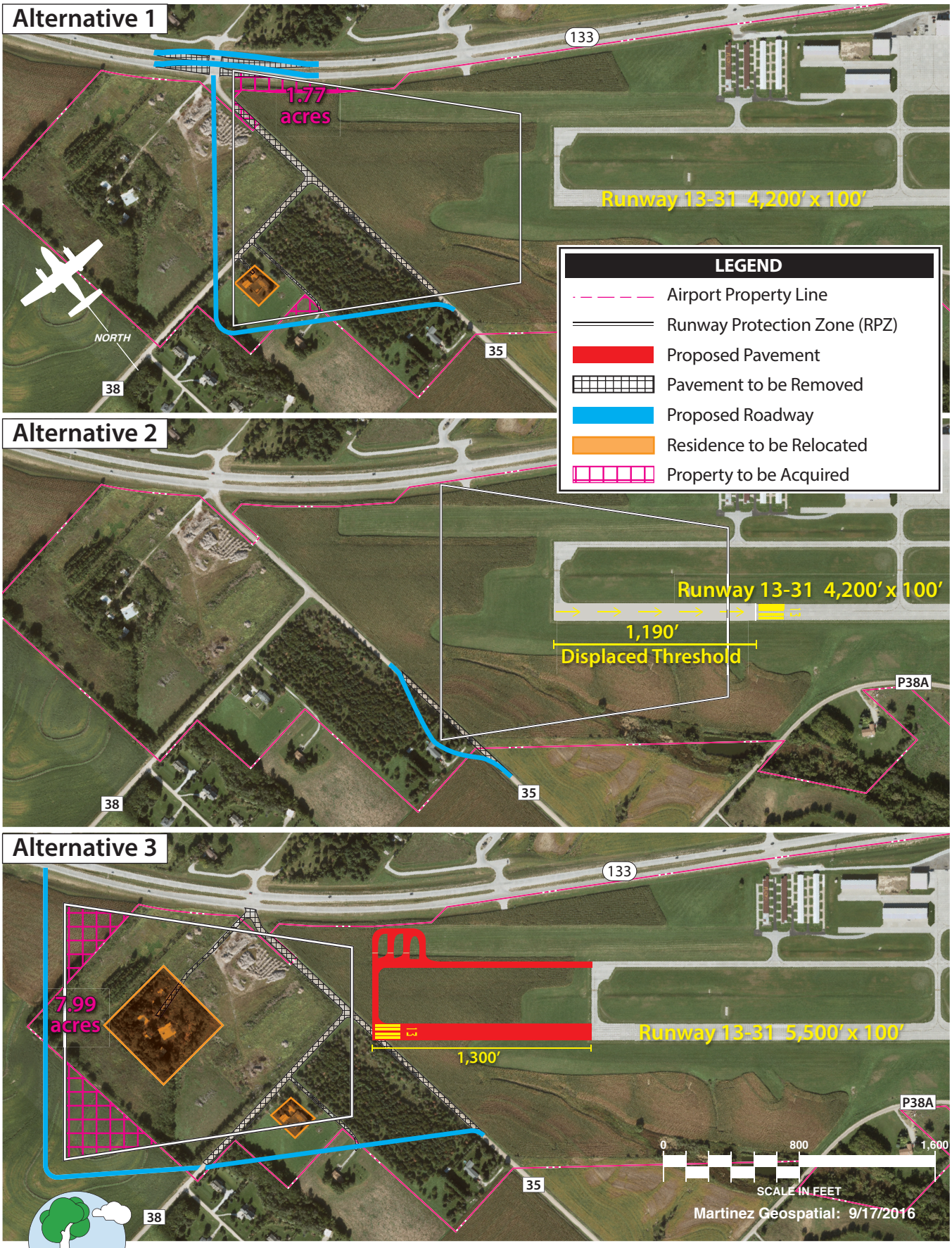
The second alternative proposes a 1,190-foot threshold displacement to Runway 13. Ultimately, this displacement would position the RPZ in a manner that limits incompatibilities and remain on Airport property. Under this circumstance, it is proposed that a portion of County Road 35 be removed and relocated out of the RPZ. It should be mentioned, however, that a threshold displacement of 1,190 feet would limit the runway's landing distance available (LDA) to 3,010 feet. Takeoff runway available (TORA) and takeoff distance available (TODA) would remain unchanged.

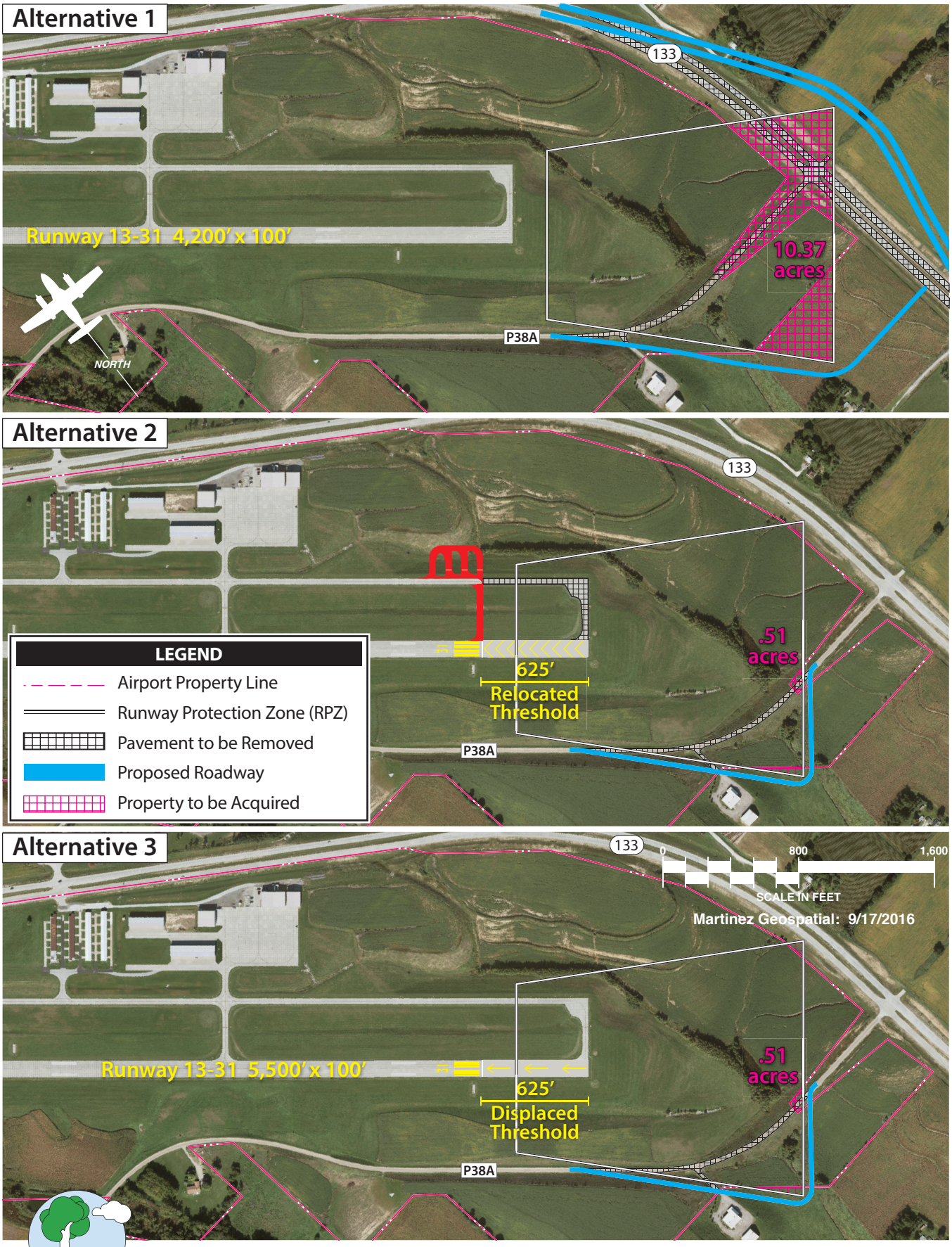
Runway 13 RPZ Alternative 3

Finally, the third alternative presents the RPZ coupled with a potential 1,300-foot extension to Runway 13. This option would include multiple incompatibilities; however, runway length would ultimately be increased and the RPZ would remain clear of Highway 133. This alternative proposes the removal and relocation of County Roads 35 and 38 as well as Airport-owned residential driveways and homes. Ultimately, this alternative would also require property acquisition of 7.99 aces.

Runway 31 RPZ Alternatives

In its current location, the RPZ serving Runway 31 extends off Airport property and encompasses 10.37 acres of unowned Airport property as well as portions of County Road 38 and Highway 133. Given the incompatibilities to the current RPZ configuration, three alternatives presented in **Exhibit Q** were developed to potentially mitigate non-standard conditions.


Alternative 1
133
1.77 acres
Runway 13-31 4,200' x 100'
NORTH
35
38
LEGEND
Airport Property Line
Runway Protection Zone (RPZ)
Proposed Pavement
Pavement to be Removed
Proposed Roadway
Residence to be Relocated
Property to be Acquired
Alternative 2
Runway 13-31 4,200' x 100'
1,190'
Displaced Threshold
P38A
35
38
Alternative 3
133
7.99 acres
Runway 13-31 5,500' x 100'
1,300'
P38A
0
800
1,600
SCALE IN FEET
35
38
Martinez Geospatial: 9/17/2016


Alternative 1
133
Runway 13-31 4,200' x 100'
10.37 acres
P38A
NORTH
Alternative 2
133
LEGEND
Airport Property Line
Runway Protection Zone (RPZ)
Pavement to be Removed
Proposed Roadway
Property to be Acquired
625'
Relocated Threshold
.51 acres
P38A
Alternative 3
133
0
800
1,600
SCALE IN FEET
Martinez Geospatial: 9/17/2016
Runway 13-31 5,500' x 100'
625'
Displaced Threshold
.51 acres
P38A

Runway 31 RPZ Alternative 1

The first alternative presents the removal and relocation of County Road 38, as well as a portion of Highway 133 in an effort to clear the RPZ of any roadway incompatibilities. In addition, this alternative proposes the acquisition of 10.37 acres of unowned Airport property.

Runway 31 RPZ Alternative 2

The second alternative proposes a 625-foot threshold displacement to Runway 31 in an effort to minimize roadway incompatibilities as well as eliminate property to be acquired. This alternative would, however, require the relocation of County Road 38, and place limitations on the effective runway length. Under the proposed conditions, the LDA, TORA, and TODA for Runway 31 would be limited to 3,575 feet.

Runway 31 RPZ Alternative 3

Finally, the third alternative presents the same 625-foot threshold displacement on Runway 31; however, under these conditions, the length of runway prior to the runway threshold could be utilized for takeoff operations. Thus, the LDA would be limited to 3,575 feet and the TORA and TODA would remain unchanged from their current lengths of 4,200 feet. In addition, this option would also require the removal and relocation of County Road 38 to remain clear of the Runway 31 RPZ.

Runway Orientation

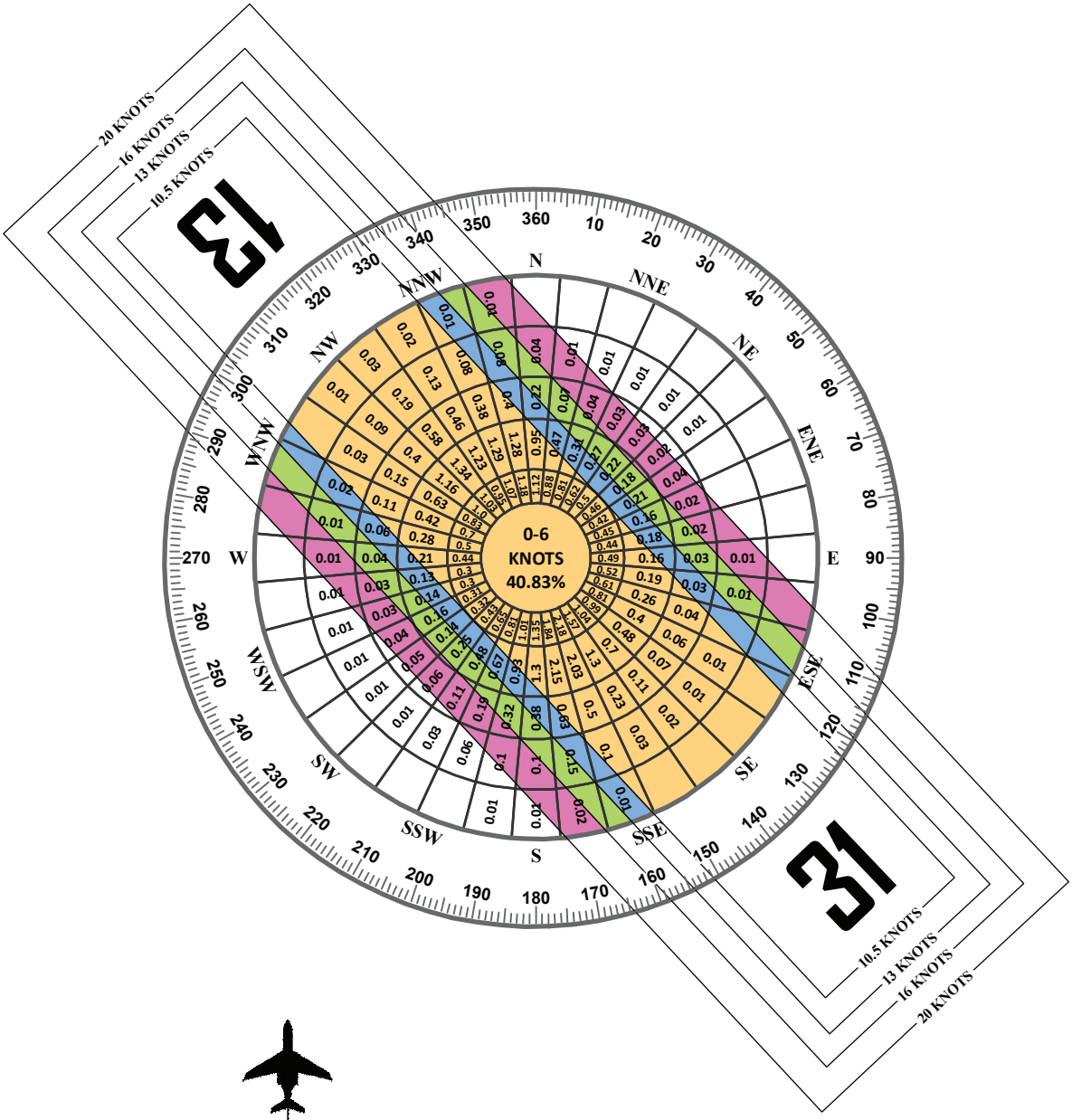
Currently, BTA is served by a single runway system (13-31) oriented in a northwest-southeast configuration. For the operational safety and efficiency of an airport, it is desirable for the runway to be oriented as close as possible to the direction of the prevailing wind. This reduces the impact of wind components perpendicular to the direction of travel of an aircraft that is landing or taking off.

FAA Advisory Circular 150/5300-13A, *Airport Design*, recommends that a crosswind runway be made available when the primary runway orientation provides for less than 95 percent wind coverage for specific crosswind components. The 95 percent wind coverage is computed on the basis of not exceeding a 10.5-knot (12 mph) component for RDC A-I and B-I, 13-knot (15 mph) component for RDC A-II and B-II, 16-knot (18 mph) component for RDC A-III, B-III, C-I through C-III, and D-I through D-III, and a 20-knot (23) component for RDC A-IV through E-VI.

Data from the AWOS located at BTA was collected from the National Oceanic Atmospheric Administration (NOAA) National Climatic Data Center over a continuous nine-year period from January 7, 2008 through December 31, 2016. A total of 231,186 observations of wind direction and other data points were made. **Exhibit R** presents Runway 13-31 and the associated wind coverage. Given that weather

ALL WEATHER WIND COVERAGE

Runways	10.5 Knots	13 Knots	16 Knots	20 Knots
Runway 13-31	92.26%	96.12%	98.74%	99.66%



NORTH

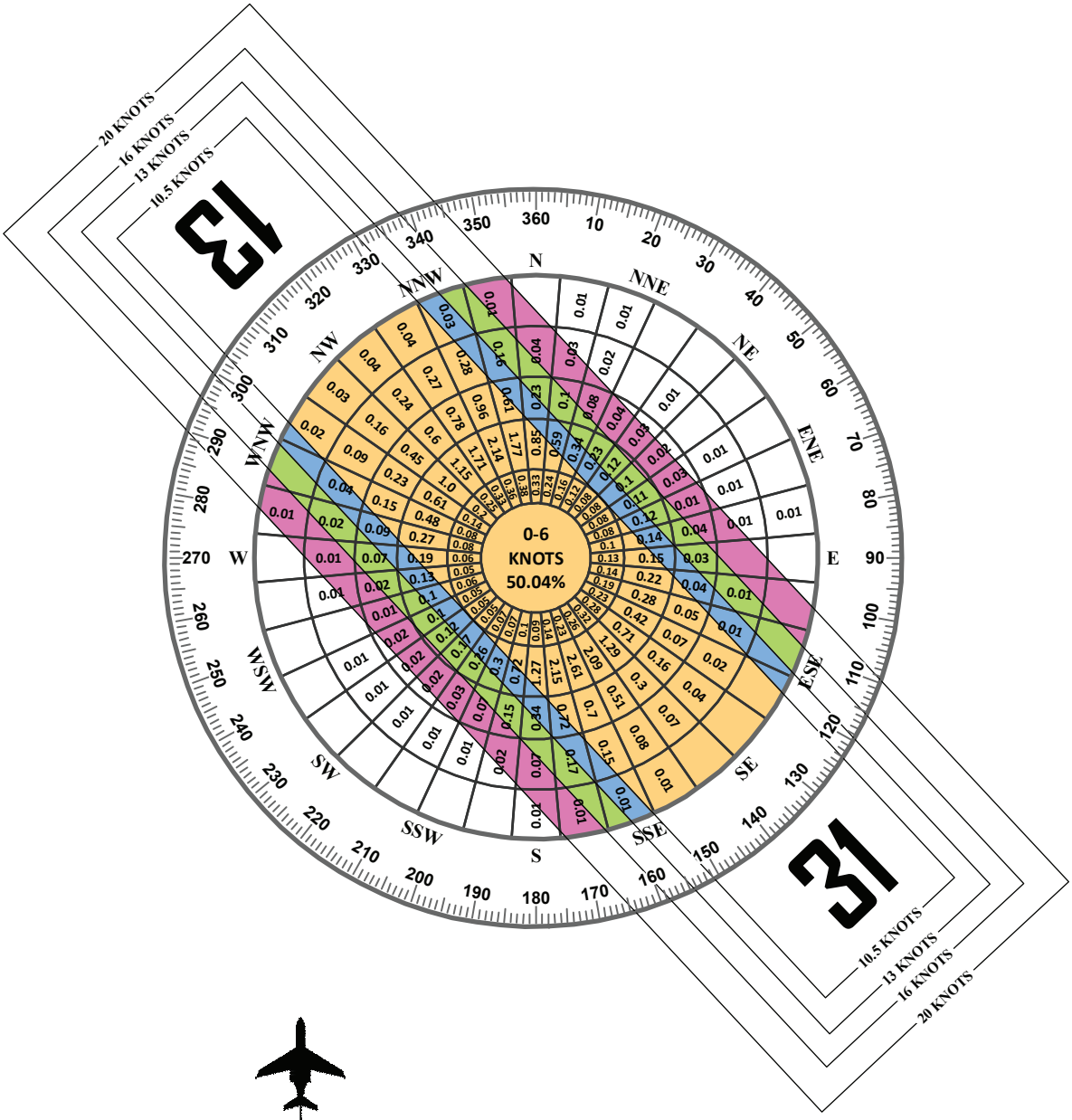
Magnetic Declination
00° 02' 47" East (January 2017)
Annual Rate of Change
00° 06' 00" West (January 2017)

SOURCE:
NOAA National Climatic Center
Asheville, North Carolina
Blair Municipal Airport
Blair, NE

OBSERVATIONS:
231,186 All Weather Observations
Jan. 1, 2008 - Dec, 31 2016

ALL WEATHER WIND COVERAGE

Runways	10.5 Knots	13 Knots	16 Knots	20 Knots
Runway 13-31	92.92%	96.84%	99.04%	99.74%



Magnetic Declination
00° 02' 47" East (January 2017)
Annual Rate of Change
00° 06' 00" West (January 2017)

SOURCE:
NOAA National Climatic Center
Asheville, North Carolina
Eppley Airfield
Omaha, NE

OBSERVATIONS:
115,595 All Weather Observations
Jan. 1, 2007 - Dec, 31 2016

data specific to the Airport was not available for the required 10-year period, historic information from the nearest weather station at Eppley Airfield (OMA) was also examined and is presented in **Exhibit R**.

In all weather conditions specific to BTA, Runway 13-31 provides 92.26 percent coverage at 10.5 knots, 96.12 percent coverage at 13 knots, 98.74 percent coverage at 16 knots, and 99.66 percent coverage at 20 knots. As evident from the analysis presented above, Runway 13-31 is not ideally oriented to support predominant winds for categories A and B-I aircraft. The runway orientation limits its use during approximately three percent of the reported observations for small aircraft. The analysis shows the ideal crosswind runway orientation for the best wind coverage at 10.5 knots would be 16-34; however, this orientation provides only 94.89 percent coverage at 10.5 knots, which does not meet the 95 percent standard. This indicates that no single runway orientation can provide 95 percent wind coverage and a crosswind runway is necessary to satisfy FAA design criteria. Analysis indicates that a crosswind runway with an orientation of 2-20 (north-northeast/south-southwest) would provide optimal wind coverage of 98.60 percent at 10.5 knots when combined with the existing runway.

The primary drawbacks with constructing a crosswind runway at BTA is the lack of property to do so and surrounding land uses. The preferred north-northeast/south-southwest runway orientation would likely interfere with existing residential housing, fertile irrigated farmland, as well as existing roadways. Barring the cost of any incompatibilities (existing housing and roadways, purchase of farmland), the cost of constructing the runway would likely range between $3 and 15 million depending on several factors including length, amenities, and incidental costs associated with terrain, environmental, and other infrastructure costs. Due to these constraints, a crosswind runway will not be further considered.

Runway Length Requirements

Runway length requirements for an airport typically are based on factors including airport elevation, mean daily maximum temperature of the hottest month, runway gradient (difference in runway elevation of each runway end), critical aircraft type expected to use the airport, and stage length of the longest non-stop trip destination. For aircraft with maximum certificated takeoff weights of less than 12,500 pounds, adjustments for runway gradient are not taken into account.

Aircraft performance declines as each of these factors increase. Warmer summertime temperatures and long stage lengths are the primary factors in determining runway length requirements, especially for turbine aircraft models. For calculating runway length requirements at BTA, the Airport's elevation is 1,317.6 feet above mean sea level (MSL) and the mean maximum temperature of the hottest month (July) is 87.3 degrees Fahrenheit (F). The Runway 13 end elevation of 1,317.6 feet MSL is 19.2 feet above the Runway 31 end, which is at 1,298.4 feet MSL.

Using the site-specific data described above, runway length requirements for the various classifications of aircraft that may operate at the airport were examined using FAA AC 150/5325-4B, *Runway Length Requirements for Airport Design*. The FAA runway analysis groups general aviation aircraft into several

categories, reflecting the percentage of the fleet within each category. The runway design should be based upon the most critical aircraft (or group of aircraft) performing at least 500 annual itinerant operations.

The first step in evaluating runway length is to determine general runway length requirements for the majority of aircraft operating at the Airport. The majority of operations at BTA are conducted using smaller single engine piston-powered aircraft weighing less than 12,500 pounds.

Table Y summarizes the FAA's generalized recommended runway lengths determined for BTA. FAA AC 150/5325-4B, *Runway Length Requirements for Airport Design*, recommends that airports be designed to at least serve 95 percent of small airplanes. The advisory circular further defines the fleet categories as follows:

- **95 Percent of Small Airplane Fleet:** Applies to airports that are primarily intended to serve medium-sized population communities with a diversity of usage and a greater potential for increased aviation activities. This category also includes airports that are primarily intended to serve low-activity locations, small population communities, and remote recreational areas.

- **100 Percent of Small Airplane Fleet:** This type of airport is primarily intended to serve communities located on the fringe of a metropolitan area or a relatively large population community remote from a metropolitan area.

TABLE Y
Runway Length Requirements
Blair Municipal Airport

AIRPORT AND RUNWAY DATA	
Airport elevation	1,317.6 feet
Mean daily maximum temperature of the hottest month	87.3° F
Maximum difference in runway elevation	19.2 feet
RUNWAY LENGTHS RECOMMENDED FOR AIRPORT DESIGN	
Small airplanes with less than 10 passenger seats	
95 percent of these small airplanes	3,500 feet
100 percent of these small airplanes	4,100 feet
Small airplanes with 10 or more passenger seats	4,400 feet

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

Based upon these calculations, Runway 13-31, at a length of 4,200 feet, currently meets runway length criteria for 95 and 100 percent of small airplanes and falls short of runway length requirements for small airplanes with 10 or more passenger seats. At the Airport's temperature and elevation, this would require a primary runway length of 4,400 feet for 100 percent of small airplanes, including those with more

than 10 passenger seats; however, the FAA recommends providing a runway capable of meeting the needs of the critical design aircraft, which is ultimately planned to be in the ARC C-II family of aircraft.

Runway length requirements for business jets weighing less than 60,000 pounds have also been calculated based on FAA AC 150/5325-4B. These calculations take into consideration the runway gradient and landing length requirements for contaminated runways (wet). Business jets tend to need greater runway length when landing on a wet surface because of their increased approach speeds.

AC 150/5325-4B stipulates that runway length determinations for large aircraft consider a grouping of airplanes with similar operating characteristics. The AC provides two separate "family groupings of airplanes," each based upon their representative percentage of aircraft in the national fleet. The first grouping is those business jets that make up 75 percent of the national fleet, and the second group is those making up 100 percent of the national fleet (75-100 percent of the national fleet). **Table Z** presents a representative list of aircraft for each aircraft grouping. A third group includes business jets weighing more than 60,000 pounds; however, runway length determination for these aircraft types must be based on the performance characteristics of the individual aircraft.

TABLE Z
Business Jet Fleet Mix Categories for Runway Length Determination

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

MTOW: Maximum Take Off Weight

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

Table AA presents the results of the runway length analysis for business jets developed following the guidance provided in AC 150/5325-4B. To accommodate 75 percent of the business jet fleet at 60 percent useful load, a runway length of 5,500 feet is recommended. This length is derived from a raw length of 4,839 feet that is adjusted, as recommended, for runway gradient, then rounded up to the nearest hundred feet (when the ten value is 30 feet or more). To accommodate 100 percent of the business jet fleet at 60 percent useful load, a runway length of 5,900 feet is recommended.

TABLE AA
Business Jet Runway Length Requirements
Blair Municipal Airport

Airport Elevation	1,317.6 feet MSL			
Average High Monthly Temp.	87.3 degrees (July)			
Runway Gradient	19.2 feet			
Fleet Mix Category	**Raw Runway Length from FAA AC**	**Runway Length With Gradient Adjustment (+192')**	**Wet Surface Landing Length for Jets (+15%)***	**Final Runway Length**
75% of fleet at 60% useful load	4,839'	5,031'	5,500'	5,500'
100% of fleet at 60% useful load	5,716'	5,908'	5,500'	5,900'

* Max 5,500' for 60% useful load in wet conditions
Source: FAA AC 150/5325-4B, *Runway Length Requirements for Airport Design.*

Business Jet Runway Length Analysis

Given that BTA is used by based and itinerant business jet aircraft (Cessna Citation family of business jets, Learjet 31/35, and Challenger 300/600), which have a greater impact upon runway length needs, a runway length analysis for specific jet and turboprop aircraft was conducted to better analyze specific runway needs at BTA.

Exhibit S provides a detailed runway length analysis for 42 of the most common business jet and turboprop aircraft in the national fleet. This data was obtained from Ultranav software which computes operational parameters for specific aircraft based on flight manual data. The analysis includes the maximum takeoff weight (MTOW) allowable and the percent useful load for the current runway length. This analysis shows that the primary runway length of 4,200 feet is capable of accommodating all these business jet/turboprop aircraft during dry runway conditions with varying limitations to their MTOW. This analysis includes the Cessna Citation Sovereign, which is considered the current critical design aircraft; however, many of the aircraft analyzed encounter greater weight penalties on hot days or cannot operate at the Airport at all under wet runway conditions due to wheel gear hydroplaning issues.

Exhibit S also presents the runway length required for landing under three operational categories: Title 14 Code of Federal Regulations (CFR) Part 25, CFR Part 135, and CFR Part 91k. CFR Part 25 operations are those conducted by individuals or companies which own their aircraft. CFR Part 135 applies to all for-hire charter operations, including most fractional ownership operations. CFR Part 91k includes operations in fractional ownership which utilize their own aircraft under direction of pilots specifically assigned to said aircraft. The landing length analysis shows an average landing length of approximately 4,900 feet for aircraft operating under CFR Part 91k during wet runway conditions and an average of 6,500 feet for aircraft operating under Part 135 during wet runway conditions. The Cessna Citation Sovereign, when operated at maximum landing weight under Part 135 during wet runway conditions, requires up to 6,000 feet for landing.

The FAA will typically only support runway length planning to the 60 percent useful load factor unless it can be demonstrated that business jets are frequently operating fully loaded (90 percent). On average, the business aircraft analyzed are capable of taking off at BTA at or above 60 percent useful load under dry runway conditions. For landing situations, the analysis showed that the Citation Sovereign, which is the critical design aircraft, requires additional runway length than what is currently available at BTA when operating under Part 91k or 135 under wet runway conditions.

Taking the ultimate AAC critical design aircraft into consideration, a Cessna Citation X would be representative of the ultimate AAC C. Based upon runway length analysis, the Cessna Citation X is able to operate at 33 percent of useful load when operating under dry runway conditions. Under wet runway conditions, the Citation X is effectively unable to takeoff as the existing runway length is too short for the aircraft to legally operate on. Furthermore, the Citation X would require additional runway length to land under dry and wet runway conditions while operating under Part 91k.

Runway 13-31 Length Summary

The majority of operations taking place at BTA are conducted by smaller, single engine, fixed-wing aircraft weighing less than 12,500 pounds. Following guidance from AC 150/5325-4B, to accommodate 100 percent of these small aircraft, a runway length of at least 4,100 feet is recommended. However, the Airport is also utilized by aircraft weighing more than 12,500 pounds, including small- to mid-sized business jet aircraft. AC 150/5325-4B stipulates that runway length determinations for business jets consider a grouping of airplanes with similar operating characteristics. As such, runway length calculations specific to BTA for business jets that make up 75 percent of the national fleet at 60 percent useful load would require a 5,500-foot runway. Therefore, specific runway length calculations for turbine aircraft operating at BTA, including the critical design aircraft, suggest that a longer runway length could be utilized.

Runway Length Alternative Analysis

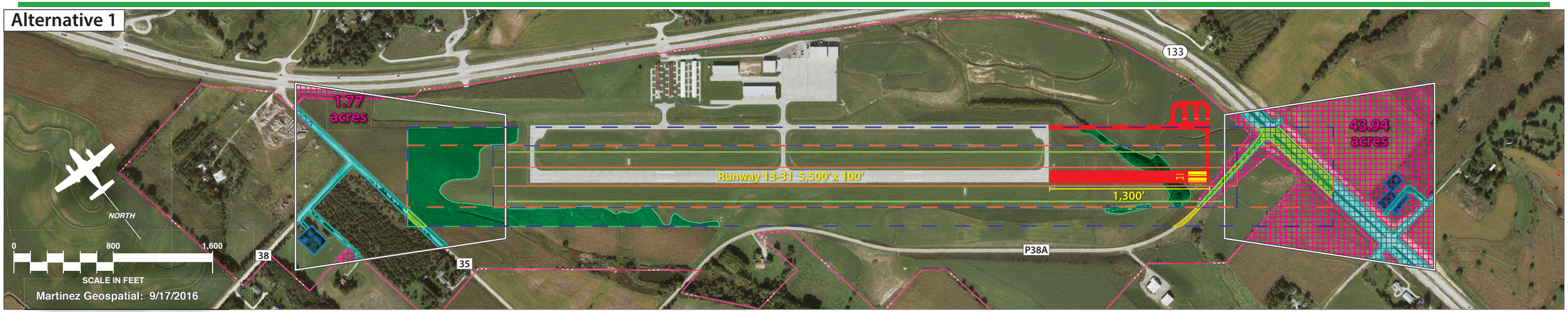
Analysis in the previous section recommended that the Airport consider a potential runway extension on Runway 13-31 to at least 5,500 feet. The business jet aircraft that utilize BTA are often weight-restricted when combining operational factors such as high temperatures and density altitudes experienced at the Airport during the summer months. Furthermore, the forecast analysis anticipates the potential increase of business jet operations at the Airport in the future.

Runway 13-31 extension alternatives include an option for extending the runway simultaneously in both directions as well as options for only extending the runway to the northwest or the southeast. These alternatives also identify the impacts an extension would have on existing features located beyond the ends of the runway. Associated changes to airfield geometry and efficiency must also be considered to include the need to extend the taxiways serving each runway end. Runway length alternatives are presented in **Exhibit T**. It should be noted that this exercise only examines impacts incurred by a runway

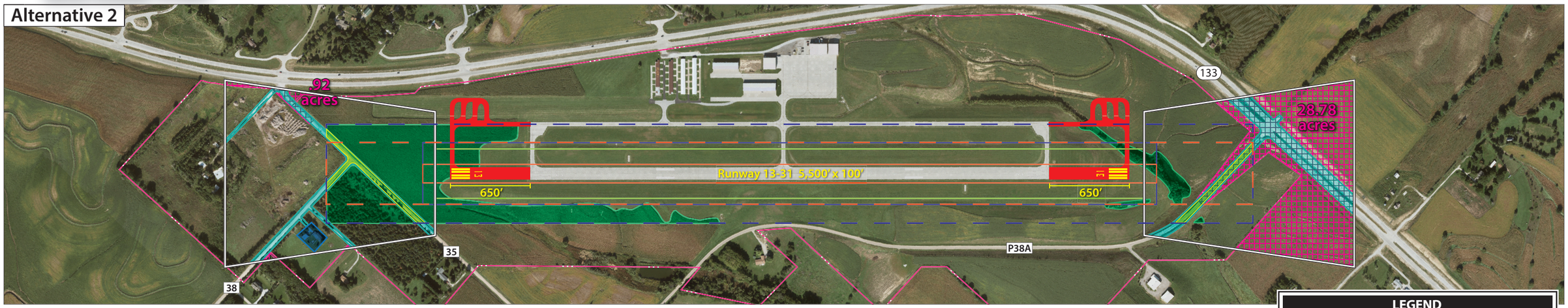
Aircraft Name	Takeoff Length for Dry Runway 4,200'			Takeoff Length for Wet Runway 4,200'			Landing Length Required for:					
							C.F.R. Part 25		C.F.R. Part 135		C.F.R. Part 91k	
	Weight Limit	Lbs. Payload Available	% Payload Available	Weight Limit	Lbs. Payload Available	% Payload Available	Dry	Wet	Dry	Wet	Dry	Wet
Beechjet 400A	14,242	3,257	61%	Out of Limits			2,245	3,266	3,742	5,443	2,806	4,083
King Air C90GTi	9,464	2,514	80%	9,464	2,514	80%	1,422	1,422	2,370	2,370	1,778	1,778
Citation 560 XL	18,419	5,719	78%	18,299	5,599	77%	3,435	5,462	5,725	9,103	4,294	6,828
Citation 560 XLS	18,789	5,989	81%	18,789	5,989	81%	3,437	5,408	5,728	9,013	4,296	6,760
Citation X	26,898	4,434	33%	Out of Limits			3,786	5,376	6,310	8,960	4,733	6,720
Citation Bravo	13,024	3,699	68%	12,798	3,473	63%	3,608	5,663	6,013	9,438	4,510	7,079
Citation Encore	15,925	5,405	88%	Out of Limits			3,024	4,570	5,040	7,617	3,780	5,713
Citation Encore Plus	16,017	5,457	87%	Out of Limits			3,027	4,599	5,045	7,665	3,784	5,749
Citation I/SP	11,850	4,447	100%	11,245	3,842	86%	2,432	2,796	4,053	4,660	3,040	3,495
Citation Mustang	8,276	2,716	88%	8,313	2,753	89%	2,578	3,617	4,297	6,028	3,223	4,521
Citation Sovereign	29,250	11,100	91%	Out of Limits			2,843	3,585	4,738	5,975	3,554	4,481
Citation Ultra	16,300	6,275	100%	Out of Limits			3,067	3,527	5,112	5,878	3,834	4,409
Citation VII	17,412	3,162	36%	Out of Limits			3,180	4,295	5,300	7,158	3,975	5,369
Citation (525) CJ1	9,375	2,505	67%	10,064	3,194	86%	2,957	3,996	4,928	6,660	3,696	4,995
Citation (525A) CJ2	11,767	3,967	87%	11,471	3,671	80%	3,194	4,642	5,323	7,737	3,993	5,803
Citation CJ3	13,870	5,110	100%	13,316	4,556	89%	3,004	4,104	5,007	6,840	3,755	5,130
Challenger 300	30,473	6,623	44%	Out of Limits			2,675	5,127	4,458	8,545	3,344	6,409
Canadair 601-3A/R	31,410	5,160	27%	Out of Limits			3,432	4,119	5,720	6,865	4,290	5,149
Challenger 604/605	34,993	7,808	37%	Out of Limits			2,877	4,445	4,795	7,408	3,596	5,556
CRJ-200	39,594	9,094	40%	38,658	8,158	36%	3,432	6,579	5,720	10,965	4,290	8,224
Falcon 7X	54,340	17,740	53%	54,340	17,740	53%	3,005	3,455	5,008	5,758	3,756	4,319

Aircraft Name	Takeoff Length for Dry Runway 4,200'			Takeoff Length for Wet Runway 4,200'			Landing Length Required for:					
							C.F.R. Part 25		C.F.R. Part 135		C.F.R. Part 91k	
	Weight Limit	Lbs. Payload Available	% Payload Available	Weight Limit	Lbs. Payload Available	% Payload Available	Dry	Wet	Dry	Wet	Dry	Wet
Falcon 10 	16,710	5,510	73%	15,700	4,500	60%	2,839	3,265	4,732	5,442	3,549	4,081
Falcon 20F 	22,320	4,707	43%	Out of Limits			2,600	2,990	4,333	4,983	3,250	3,738
Falcon 900A 	35,100	12,520	52%	35,100	12,520	52%	3,620	4,160	6,033	6,933	4,525	5,200
Hawker 400A 	17,838	6,853	54%	17,838	6,853	54%	2,370	2,370	3,950	3,950	2,963	2,963
Hawker 700 (Non-T/R) 	19,689	5,589	52%	19,689	5,589	52%	2,920	3,730	4,867	6,217	3,650	4,663
Hawker 800 (Non-T/R) 	19,854	3,854	34%	19,854	3,854	34%	3,010	3,890	5,017	6,483	3,763	4,863
Hawker 4000 	32,168	8,468	54%	31,835	8,135	51%	3,225	3,708	5,375	6,180	4,031	4,635
King Air 200 GT 	9,846	1,066	29%	9,846	1,066	29%	1,235	1,235	2,058	2,058	1,544	1,544
King Air 350 	14,517	4,632	91%	13,956	4,071	80%	2,740	3,151	4,567	5,252	3,425	3,939
King Air 1900D 	14,345	3,345	55%	14,345	3,345	55%	2,879	3,311	4,798	5,518	3,599	4,139
King Air C90B 	8,423	1,353	45%	8,423	1,353	45%	1,273	1,273	2,122	2,122	1,591	1,591
Lear 31A 	15,031	3,817	66%	11,375	161	3%	3,050	4,269	5,083	7,115	3,813	5,336
Lear 35A 	14,002	3,202	36%	Out of Limits			3,284	4,597	5,473	7,662	4,105	5,746
Lear 40 	16,296	2,696	36%	Out of Limits			2,875	3,662	4,792	6,103	3,594	4,578
Lear 40XR 	17,739	3,789	54%	Out of Limits			2,876	3,662	4,793	6,103	3,595	4,578
Lear 45 	16,723	2,723	36%	Out of Limits			2,876	3,662	4,793	6,103	3,595	4,578
Lear 45XR 	17,739	3,739	50%	Out of Limits			2,876	3,662	4,793	6,103	3,595	4,578
Lear 55 	16,378	3,485	40%	14,725	1,832	21%	3,491	5,587	5,818	9,312	4,364	6,984
Lear 60 	17,294	2,522	29%	Out of Limits			3,311	4,359	5,518	7,265	4,139	5,449
Pilatus PC-12 	9,921	3,139	100%	9,921	3,139	100%	2,823	2,823	4,705	4,705	3,529	3,529
Premier 1A 	11,033	2,433	62%	10,351	1,751	45%	3,434	4,374	5,723	7,290	4,293	5,468

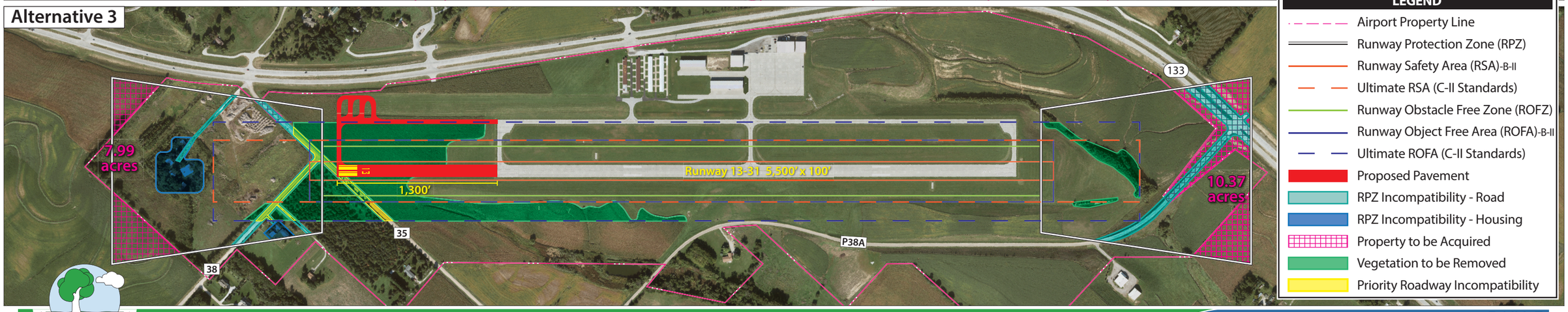
Alternative 1



Alternative 2



Alternative 3



LEGEND

- Airport Property Line
- Runway Protection Zone (RPZ)
- Runway Safety Area (RSA)-B-II
- Ultimate RSA (C-II Standards)
- Runway Obstacle Free Zone (ROFZ)
- Runway Object Free Area (ROFA)-B-II
- Ultimate ROFA (C-II Standards)
- Proposed Pavement
- RPZ Incompatibility - Road
- RPZ Incompatibility - Housing
- Property to be Acquired
- Vegetation to be Removed
- Priority Roadway Incompatibility

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extension and does not include existing conditions. Analysis pertaining to existing safety areas including the runway safety area (RSA), runway object free area (ROFA), runway obstacle free zone (ROFZ), and runway protection zones (RPZs) will be detailed later within the *Airfield Design Standards* section of this report.

Alternative 1

The first alternative examines a runway extension of 1,300 feet to the southeast. Under these conditions, the physical pavement section of the proposed runway and taxiway system would remain on Airport property. However, under existing and ultimate conditions, the RSA, ROFA, ROFZ, and RPZ serving Runway 31 would ultimately extend off Airport property. In addition, County Road 38 would traverse each associated safety area, while the Runway 31 RPZ would be traversed diagonally by Highway 133 and contain multiple houses.

Alternative 2

Alternative 2 proposes a runway extension of 650 feet on each end of the runway. Much like Alternative 1, the physical pavement sections of the proposed runway extension and taxiway system would remain on Airport property under these conditions. Under ultimate RDC C-II conditions, the RSA, ROFA, and ROFZ contain multiple incompatibilities as well as extend off Airport property. The ultimate RSA and ROFA would have incompatible vegetation and would be traversed by County Roads 35 and 38 as well as a portion of residential driveway. The RPZ serving Runway 13 would remain primarily on Airport property. However, a housing incompatibility and multiple roadway incompatibilities would be in existence posed by County Roads 35 and 38 along with residential roads. Similarly, the RPZ serving the extended Runway 31 would also extend off Airport property and contain portions of Highway 133 and County Road 38.

Alternative 3

Finally, the third alternative analyzes a 1,300-foot runway extension to the northwest. Proposed pavement sections and all existing and ultimate safety areas associated with this alternative remain on Airport property with the exception of the northeastern portion of the holding bay and the outermost corners of the RPZ serving Runways 13 and 31. Although pavement sections and safety areas remain primarily on Airport property, the runway environment and safety areas still contain housing, vegetation, and roadway incompatibilities posed by County Roads 35 and 38 as well as residential driveways.

Runway Width

The width of the existing runway was examined to ensure compliance with FAA runway design standards assigned for each RDC. Runway 13-31 is 100 feet wide, which complies with FAA runway design standards for the existing RDC B-II and ultimate RDC C-II design standards and should be maintained throughout the planning horizon.

Runway Pavement Strength

Airport pavement strength is very important as it must be able to withstand repeated operations by aircraft of significant weight. The strength rating of a runway does not preclude aircraft weighing more than the published strength rating from using the runway. All federally obligated airports must remain open to the public, and it is typically up to the pilot of the aircraft to determine if a runway can support their aircraft safely. An airport sponsor cannot restrict an aircraft from using the runway simply because its weight exceeds the published strength rating. On the other hand, the airport sponsor has an obligation to properly maintain the runway and protect the useful life of the runway, typically for 20 years. According to the FAA publication, *Airport/Facility Directory*, "Runway strength rating is not intended as a maximum allowable weight or as an operating limitation. Many airport pavements are capable of supporting limited operations with gross weights in excess of the published figures." The directory goes on to say that those aircraft exceeding the pavement strength should contact the airport sponsor for permission to operate at the airport.

The current pavement rating of Runway 13-31 is 30,000 pounds SWL and 60,000 pounds DWL. This strength rating is sufficient for the aircraft fleet mix currently operating and projected to operate at the airport. The forecast considers the potential of increased operations by mid-size business jets; however, this family of aircraft weigh less than 60,000 pounds DWG, so the current pavement strength should adequately serve the future aircraft fleet mix at BTA.

Taxiway Design Considerations

The taxiway system of an airport is primarily to facilitate aircraft movements to and from the runway system. While some taxiways are constructed to simply provide access from the apron to the runway, other taxiways are constructed to increase the allowable frequency of aircraft operations as air traffic increases.

FAA AC 150/5300-13A, Change 1, *Airport Design*, provides guidance on recommended taxiway and taxilane layouts to enhance safety by avoiding runway incursions. A runway incursion is defined as "any occurrence at an airport involving the incorrect presence of an aircraft, vehicle, or person on the protected area of a surface designated for the landing and takeoff of aircraft."

The taxiway system at BTA generally provides for the efficient movement of aircraft; however, recently published AC 150/5300-13A, Change 1, *Airport Design*, provides recommendations for taxiway design. The following is a list of the taxiway design guidelines and the basic rationale behind each recommendation:



Connecting Taxiway

1. **Taxi Method**: Taxiways are designed for "cockpit over centerline" taxiing with pavement being sufficiently wide to allow a certain amount of wander. On turns, sufficient pavement should be provided to maintain the edge safety margin from the landing gear. When constructing new taxiways, upgrading existing intersections should be undertaken to eliminate "judgmental oversteering." This is where the pilot must intentionally steer the cockpit outside the marked centerline in order to assure the aircraft remains on the taxiway pavement.

2. **Steering Angle**: Taxiways should be designed such that the nose gear steering angle is no more than 50 degrees, the generally accepted value to prevent excessive tire scrubbing.

3. **Three-Node Concept**: To maintain pilot situational awareness, taxiway intersections should provide a pilot with a maximum of three choices of travel. Ideally, these are right and left angle turns and a continuation straight ahead.

4. **Intersection Angles**: Design turns to be 90 degrees wherever possible. For acute angle intersections, standard angles of 30, 45, 60, 120, 135, and 150 degrees are preferred.

5. **Runway Incursions**: Design taxiways to reduce the probability of runway incursions.

- *Increase Pilot Situational Awareness*: A pilot who knows where he/she is on the airport is less likely to enter a runway improperly. Complexity leads to confusion. Keep taxiway systems simple using the "three node" concept.

- *Avoid Wide Expanses of Pavement*: Wide pavements require placement of signs far from a pilot's eye. This is especially critical at runway entrance points. Where a wide expanse of pavement is necessary, avoid direct access to a runway.

- *Limit Runway Crossings*: The taxiway layout can reduce the opportunity for human error. The benefits are twofold – through simple reduction in the number of occurrences, and through a reduction in air traffic controller workload.

- *Avoid "High Energy" Intersections*: These are intersections in the middle third of runways. By limiting runway crossings to the first and last thirds of the runway, the portion of the runway where a pilot can least maneuver to avoid a collision is kept clear.

- *Increase Visibility*: Right angle intersections, both between taxiways and runways, provide the best visibility. Acute angle runway exits provide greater efficiency in runway usage but should not be used as runway entrance or crossing points. A right angle turn at the end of a parallel taxiway is a clear indication of approaching a runway.

- *Avoid "Dual Purpose" Pavements*: Runways used as taxiways and taxiways used as runways can lead to confusion. A runway should always be clearly identified as a runway and only a runway.

- *Indirect Access*: Do not design taxiways to lead directly from an apron to a runway. Such configurations can lead to confusion when a pilot typically expects to encounter a parallel taxiway.

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

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

- *Acute Angle*: Acute angles should not be larger than 45 degrees from the runway centerline. A 30-degree taxiway layout should be reserved for high speed exits. The use of multiple intersecting taxiways with acute angles creates pilot confusion and improper positioning of taxiway signage.

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

7. Taxiway/Runway/Apron Incursion Prevention: Apron locations that allow direct access into a runway should be avoided. Increase pilot situational awareness by designing taxiways in such a manner that forces pilots to consciously make turns. Taxiways originating from aprons and forming a straight line across runways at mid-span should be avoided.

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

- *Direct Access from Apron to a Runway*: Avoid taxiway connectors that cross over a parallel taxiway and directly onto a runway. Consider a staggered taxiway layout that forces pilots to make a conscious decision to turn.

- *Apron to Parallel Taxiway End*: Avoid direct connection from an apron to a parallel taxiway at the end of a runway.

The existing taxiway system at BTA is found to be adequate in meeting air traffic demand. However, the current taxiway layout contains conflicts with the current FAA taxiway design standards established in AC 150/5300-13A. To maintain compliance with the current FAA taxiway design standards, the Airport should consider realigning a portion of the connecting taxiway extending from the aircraft apron, to eliminate direct access from the aircraft parking apron to Runway 13-31.

Proposed taxiway geometry changes are presented in **Exhibit U**. These taxiway design requirements are intended to reduce the probability of runway incursions by providing maximum visibility at runway intersections and increase pilot situational awareness by requiring a 90-degree turn from the parallel taxiway to access the runway.

Taxiway Geometry Alternative 1

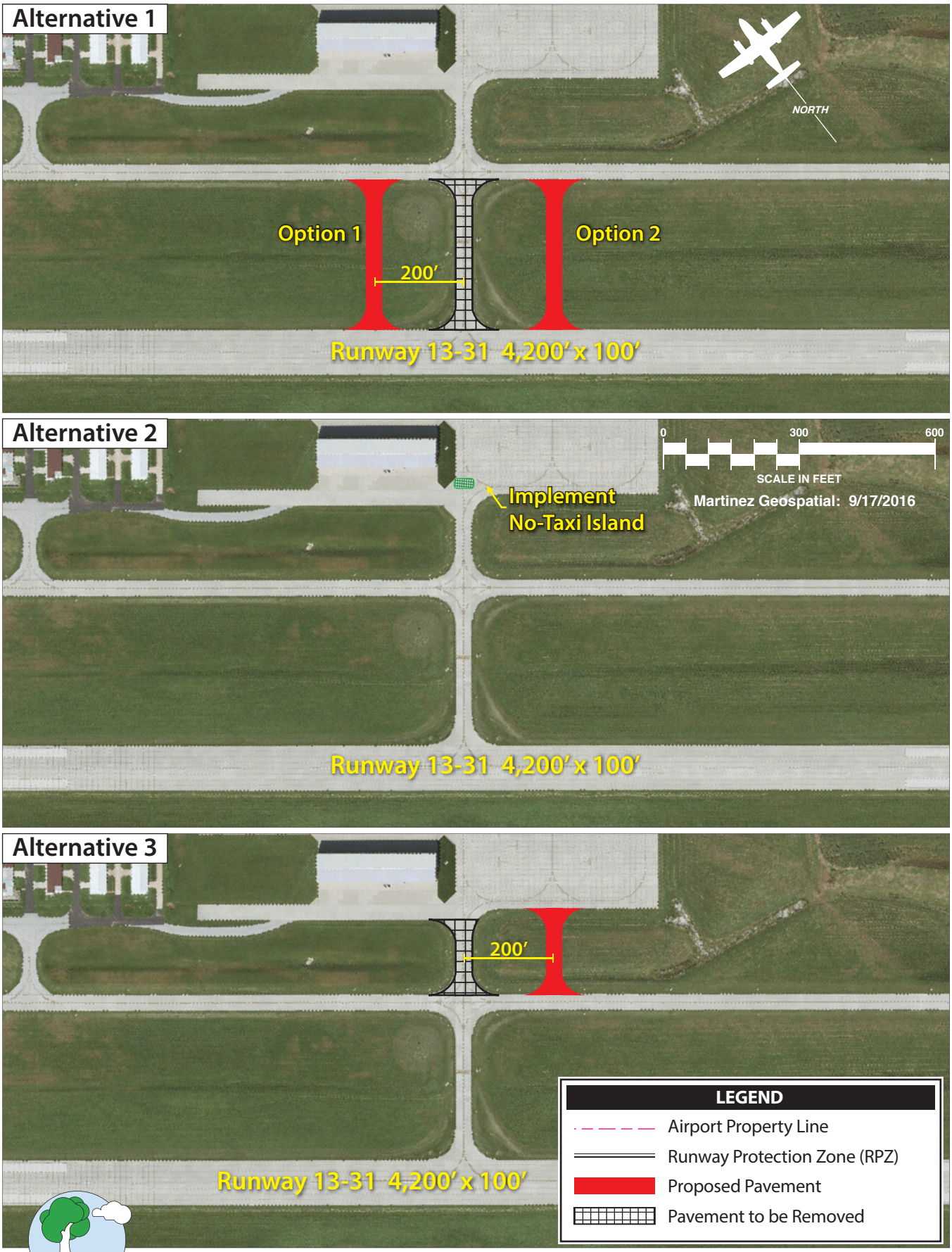
The first alternative proposes two different options that could be employed to eliminate direct access provided from the aircraft apron to Runway 13-31. The first option examines a 200-foot northern offset of the westernmost portion of the taxiway providing access to the runway environment. The second option proposes the same 200-foot offset in a southern direction. Each option would require aircraft exiting the apron to make two 90-degree turns prior to entering the runway environment. It should be noted, however, that only one option shown in this alternative would be eligible for funding, not both.

Taxiway Geometry Alternative 2

This alternative examines the inclusion of a no-taxi island. Ultimately, this will eliminate direct access from the apron area to Runway 13-31 by requiring aircraft to taxi around the island prior to entering the full length parallel taxiway and runway environment. However, this alternative option will render a portion of the apron area unusable.

Taxiway Geometry Alternative 3

A third and final alternative analyzes a 200-foot southern displacement of the easternmost portion of the taxiway providing access to the runway environment. This alternative would eliminate direct access to Runway 13-31, while providing the best access to the apron environment.


Alternative 1
NORTH
Option 1
Option 2
200′
Runway 13-31 4,200′ x 100′
Alternative 2
0
300
600
SCALE IN FEET
Martinez Geospatial: 9/17/2016
Implement
No-Taxi Island
Runway 13-31 4,200′ x 100′
Alternative 3
200′
Runway 13-31 4,200′ x 100′
LEGEND
Airport Property Line
Runway Protection Zone (RPZ)
Proposed Pavement
Pavement to be Removed

Navigational and Approach Aids

Runways 13 and 31 are accommodated by non-precision instrument approaches providing visibility minimums down to 7/8-mile. This system allows properly equipped aircraft to navigate to each runway in reduced visibility conditions. Runway 31 is equipped with REILs to guide aircraft to the approach end of each runway. Lighting systems such as this can be beneficial when the airfield environment is contaminated with lights from the surrounding area, making it difficult for pilots to distinguish the end of the runway. As such, the Airport should consider the addition of REILs to Runway 13.

In addition to the non-precision approach and REIL systems, Runways 13 and 31 are also equipped with PAPI-2 visual approach aids. This is a system consisting of two lights that are color-coded to indicate whether the approaching aircraft is on, above, or below the designated glide slope. Depending upon the aircraft's position relative to the predetermined glide slope, the lights will change colors to inform the pilot of their position.

The non-precision approach systems and REILs should be maintained throughout the planning period. The Airport should consider upgrading the PAPI-2 systems to four-light PAPIs (PAPI-4), which are recommended for runways that accommodate jet aircraft. Given that the Airport currently has approach minimums down to 7/8-mile, the Airport should also consider the installation of an approach lighting system (ALS), such as a medium intensity approach lighting system (MALS). This type of ALS is typically recommended for runways providing approach visibility minimums greater than 3/4-mile, but less than 1-mile.

Instrument Approach Considerations

Approach minimums should be as low as practical considering possible safety and financial constraints. The best approach minimums practical will ultimately allow aircraft to operate in reduced visibility conditions, while increasing the operational safety and Airport capacity.

As previously discussed, BTA currently has non-precision instrument approaches providing visibility minimums down to 7/8 of a mile. The following analysis considers the potential for the improvement or regression of visibility minimums for Runways 13 and 31. The dimensions of the RPZ will change in size if there are adjustments to the instrument approach capabilities. **Table BB** presents the dimensions of the RPZs based upon the approach visibility minimums that currently, or have the potential to, apply to each runway.

Exhibit V presents each runway extension option previously presented within the *Runway Length Alternatives Analysis* section of the report, coupled with the potential RPZ sizes associated with each instrument approach visibility minimum.

TABLE BB
Runway Protection Zones
Blair Municipal Airport

	Instrument Approach Capabilities		
Visibility Minimum	≥ 1-Mile	≥ 3/4-Mile	< 3/4-Mile
Approach Runway Protection Zone for B-II Runways			
Inner Width	500	1,000	1,000
Outer Width	700	1,510	1,750
Length	1,000	1,700	2,500
Approach Runway Protection Zone for C-II Runways			
Inner Width	1,000	1,000	1,000
Outer Width	1,510	1,510	1,750
Length	1,700	1,700	2,500

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

Instrument Approach Improvement RPZ Alternative 1

The first alternative examines the impacts of each approach minimum on required RPZ size coupled with the 1,300-foot runway extension alternative to the southeast. As can be seen, there are numerous incompatibilities associated with each RPZ serving Runway 31. The RPZ associated with each instrument approach minimum would be traversed by County Roads 35 and 38 as well as Highway 133. Furthermore, RPZs associated with instrument approach minimums of not lower than 3/4-mile and lower than 3/4-mile would contain residential housing incompatibilities. Unowned property associated with each runway end and the possible approach minimums are presented within **Table CC**.

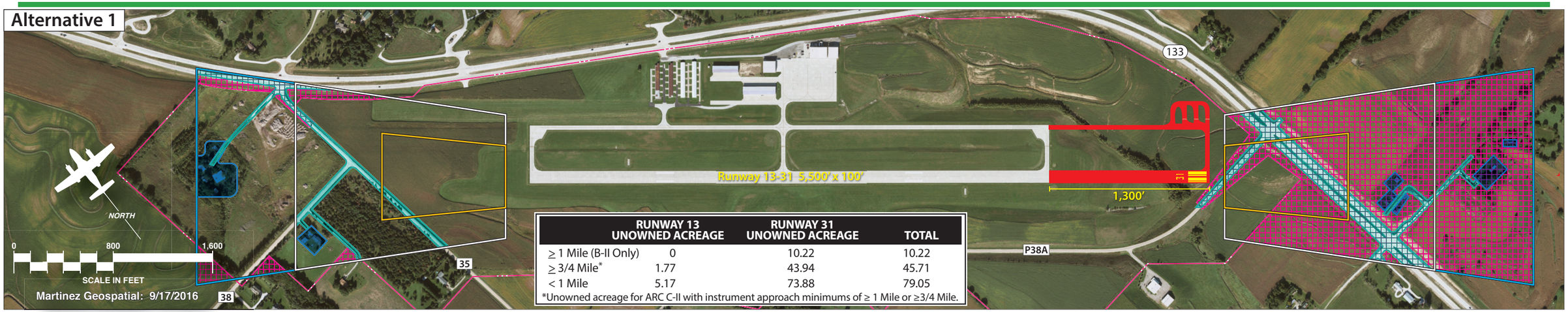
Potential impacts to the Runway 13 RPZ size required for approach minimums of less than 3/4-mile include County Roads 35 and 38 and Highway 133. In addition, Airport owned residential housing impacts would also be in existence. The RPZ required for instrument approach minimums of not lower than one mile, however, would be traversed only by County Road 35 and would remain on Airport property.

TABLE CC
Alternative 1 Unowned Acreage
Blair Municipal Airport

	Runway 13 Unowned Acreage	Runway 31 Unowned Acreage	Total
≥ 1 Mile (B-II Only)	0	10.22	10.22
≥ 3/4 Mile*	1.77	43.94	45.71
<3/4 Mile	5.17	73.88	79.05

*Unowned acreage for ARC C-II with instrument approach minimums of ≥ 1 Mile or ≥3/4 Mile.
Source: Coffman Associates analysis.

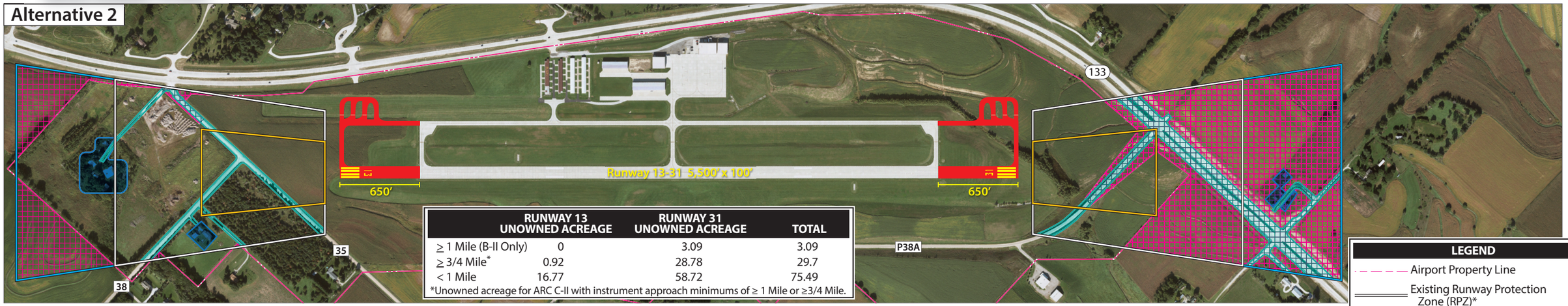
Alternative 1



	RUNWAY 13 UNOWNED ACREAGE	RUNWAY 31 UNOWNED ACREAGE	TOTAL
≥ 1 Mile (B-II Only)	0	10.22	10.22
≥ 3/4 Mile*	1.77	43.94	45.71
< 1 Mile	5.17	73.88	79.05

*Unowned acreage for ARC C-II with instrument approach minimums of ≥ 1 Mile or ≥3/4 Mile.

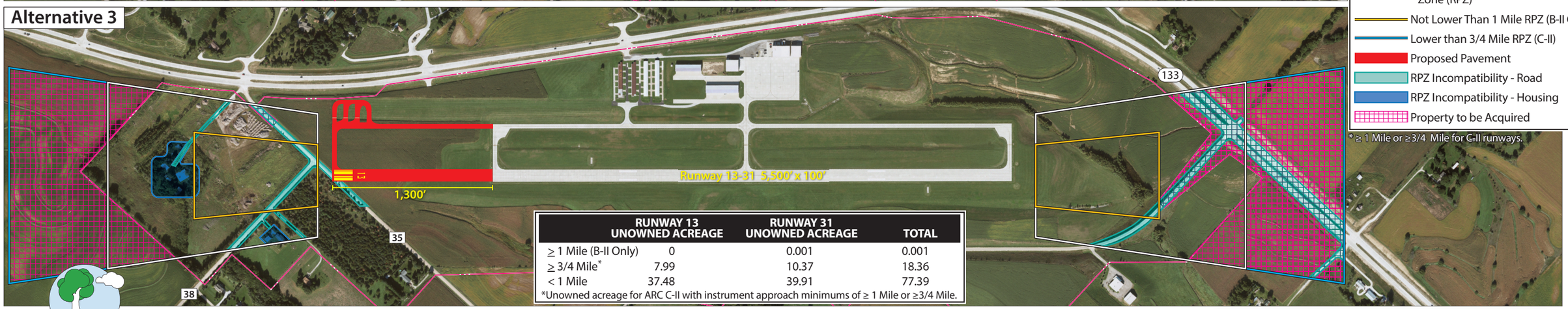
Alternative 2



	RUNWAY 13 UNOWNED ACREAGE	RUNWAY 31 UNOWNED ACREAGE	TOTAL
≥ 1 Mile (B-II Only)	0	3.09	3.09
≥ 3/4 Mile*	0.92	28.78	29.7
< 1 Mile	16.77	58.72	75.49

*Unowned acreage for ARC C-II with instrument approach minimums of ≥ 1 Mile or ≥3/4 Mile.

Alternative 3



	RUNWAY 13 UNOWNED ACREAGE	RUNWAY 31 UNOWNED ACREAGE	TOTAL
≥ 1 Mile (B-II Only)	0	0.001	0.001
≥ 3/4 Mile*	7.99	10.37	18.36
< 1 Mile	37.48	39.91	77.39

*Unowned acreage for ARC C-II with instrument approach minimums of ≥ 1 Mile or ≥3/4 Mile.

LEGEND

- Airport Property Line
- Existing Runway Protection Zone (RPZ)*
- Not Lower Than 1 Mile RPZ (B-II Only)
- Lower than 3/4 Mile RPZ (C-II)
- Proposed Pavement
- RPZ Incompatibility - Road
- RPZ Incompatibility - Housing
- Property to be Acquired

* ≥ 1 Mile or ≥3/4 Mile for C-II runways.

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Instrument Approach Improvement RPZ Alternative 2

The second alternative presents the proposed runway extension of 650 feet on each end of the runway. Under these conditions, each RPZ associated with potential approach minimums for Runway 31 would be traversed by County Road 38 and Highway 133 in varying amounts. As can be seen, the RPZ size serving approach minimums of less than 3/4-mile would contain greatest amount of roadway incompatibilities as well as residential housing incompatibilities. The amount of acreage associated with unowned property located within each potential RPZ size is shown in **Table DD**.

RPZ sizes associated with potential instrument approach minimums serving Runway 13 would each be impacted by County Roads 35 and 38 as well as residential driveways. RPZs associated with instrument approach minimums of not less than 3/4-mile and less than 3/4-mile would also contain Airport owned residential housing incompatibilities as well as portions of unowned property.

TABLE DD
Alternative 2 Unowned Acreage
Blair Municipal Airport

	Runway 13 Unowned Acreage	Runway 31 Unowned Acreage	Total
≥ 1 Mile (B-II Only)	0	3.09	3.09
≥ 3/4 Mile*	0.92	28.78	29.7
<3/4 Mile	16.77	58.72	75.49

*Unowned acreage for ARC C-II with instrument approach minimums of ≥ 1 Mile or ≥3/4 Mile.
Source: Coffman Associates analysis.

Instrument Approach Improvement RPZ Alternative 3

The third and final alternative examines the RPZ sizes associated with varying instrument approach minimums and a 1,300-foot runway extension to the northwest. As can be seen, RPZ sizes associated with each potential instrument approach minimum to Runway 31 would contain roadway incompatibilities in varying amounts. In addition, RPZs associated with each potential instrument approach minimum would also contain portions of unowned property, which are presented in **Table EE**.

RPZs accompanying potential instrument approach minimums serving the extended Runway 13 would all have roadway and housing incompatibilities to varying degrees. Each potential RPZ would be traversed by County Roads 35 and 38 as well as residential driveways and would contain Airport owned residential housing. RPZs associated with instrument approach minimums of not lower than 3/4-mile and less than 3/4-mile would also extend off Airport property.

TABLE EE
Alternative 3 Unowned Acreage
Blair Municipal Airport

	Runway 13 Unowned Acreage	Runway 31 Unowned Acreage	Total
≥ 1 Mile (B-II Only)	0	0.001	0.001
≥ 3/4 Mile*	7.99	10.37	18.36
<3/4 Mile	37.48	39.91	77.39

*Unowned acreage for ARC C-II with instrument approach minimums of ≥ 1 Mile or ≥3/4 Mile.
Source: Coffman Associates analysis.

Instrument Approach Improvement Summary

In addition to the RPZs, the determination of airspace obstructions that may be associated with these improved approach procedures would need to be further evaluated. The two primary resources for determining airspace obstructions are Title 14 Code of Federal Regulations (CFR) Part 77, *Objects Affecting Navigable Airspace*, and *Terminal Instrument Procedures* (TERPS). Part 77 is a filter which identifies potential obstructions, whereas TERPS is the critical tool in determining actual flight obstructions, as its analysis is used to evaluate and develop instrument approach procedures, including visibility minimums and cloud heights associated with approved approaches. Further determination by the FAA would be needed to determine the extent of removing or lowering potential obstructions that may exist in order to support an instrument approach procedure that could serve ultimate conditions.

As previously detailed, any change to the runway environment that includes a new or revised instrument approach procedure that increases the RPZ dimensions is subject to a further evaluation of the RPZs meeting updated guidance from the FAA. If an airport cannot fully control the entirety of the RPZ from being free of incompatible land uses, the FAA can require a change to the runway environment to properly secure the RPZs. As such, consideration of instrument approach minimums lower than 3/4-mile will not be further explored in this planning effort.

Due to advancements in technology associated with GPS-based instrument approach procedures, the instrument approach options discussed would require minimal enhancements to ground-based navigational aids, as each end of Runway 13-31 is currently served by GPS technologies. Thus, it is recommended that the ultimate Runway 13-31 continue to be served by GPS-based instrument approach procedures as opposed to a costly ground-based system, such as an instrument landing system (ILS).

Airfield Marking, Lighting, and Signage

Runway 13-31 is marked with non-precision runway markings, which is consistent with the available instrument approach capabilities of each runway. These markings should be maintained through the planning horizon.

Given that Runway 13-31 is designated as a B-II runway accommodating large aircraft, FAA separation standards, stated in AC 150/5300-13A, maintain that runways of this designation must have at least 200 feet of separation between runway centerline and any holding position. Holding positions are markings on taxiways leading to runways, which provide for adequate runway clearance for holding aircraft. Currently, all taxiways contain hold position markings at runway intersections located 250 feet from the runway centerline which exceeds the RDC B-II standard. In the future, it is recommended that any additional holding positions be placed at a minimum of 250 feet from the runway centerline to conform to future RDC C-II standards.



Medium Intensity Taxiway Lighting

Runway and taxiway lighting systems serve as a primary means of navigation in reduced visibility and night-time operations. Currently, Runway 13-31 is equipped with MIRL, a common runway lighting system, that can be controlled by pilots via the CTAF.

All taxiways are accommodated by medium intensity taxiway lighting (MITL), except for the connecting taxiways linking the nested T-hangars on the north-eastern side of the field with the aircraft parking apron and full length parallel taxiway serving Runway 13-31. This taxiway is intended to be temporary and the Airport will consider replacing all blue reflectors with MITL on the connecting taxiways when upgraded.

Airfield signage serves as another means of navigation for pilots. Airfield signage informs pilots of their location on the airport, as well as directs them to major airport facilities, such as runways, certain taxiways, and aprons. Currently, the Airport has appropriate signage to facilitate safe navigation; however, the Airport signage system should be updated and or expanded should the runway/taxiway system be expanded.

LANDSIDE FACILITY REQUIREMENTS AND ALTERNATIVES

Components included within the Landside Facility Requirements and Alternatives section will encompass terminal facilities, aircraft hangars and tiedowns, aircraft parking aprons, automobile parking, and airport support facilities. Given the nature of landside facilities, each development area interrelates and affects the development potential of the others. As a result, each alternative will be presented to the planning advisory committee, City of Blair, Blair Airport Authority, NDA, FAA, and the public. Following their input, the selected alternative, combination thereof, or product of the alternative analysis will be coordinated to ensure the functionality of the ultimate landside development area depicted on the recommended development concept to be presented.

Terminal Building and Parking Requirements

The terminal facilities typically located on GA airports provide space for a variety of activities, as well as pilot services. The GA terminal facility can potentially function as a flight planning area, pilot's lounge, airport management building, storage space, house fixed base operators (FBOs), serve as a passenger waiting area, as well as provide concessions. In addition, if there is a flight instruction program based at the airfield, the terminal building can also function as a classroom. Currently, BTA is served by a two-level terminal facility with an estimated aggregate square footage of 5,000 sf and a 2,600-sf footprint.

To estimate GA terminal facility needs, the number of itinerant passengers expected to use terminal facilities during the design hour are taken into consideration. The terminal area space requirements are based upon the allocation of a range of designated square footage per design hour itinerant passenger. Identifying the number of design hour passengers is achieved by simply multiplying the number of itinerant design hour operations by the number or passengers expected on the aircraft. The applied square footage requirements can range between 90 and 120 square feet per design hour itinerant passenger. For the purpose of this study, industry standards of 120 square feet per design hour itinerant passenger were applied. Current and projected terminal building requirements can be viewed in **Table FF**.

TABLE FF
Terminal Facility/Office Requirements
Blair Municipal Airport

	Currently Available	Short Term	Intermediate	Long Term
Design Hour Itinerant Operations	2	2	2	3
Multiplier	2	2.2	2.3	2.5
Total Design Hour Itinerant Passengers	4	4	5	8
Total Building Space (sf)	5,000	500	600	1,000

Source: Coffman Associates analysis.

To calculate the demand for the terminal facility, design hour itinerant operations are estimated at 15 percent of the busy day itinerant operations occurring at BTA. This calculation yields a total of two design hour itinerant operations for current demand. Given that most aircraft operating at BTA are capable of accommodating multiple passengers, a multiplier of two was utilized for the calculation. This is a reasonable multiplier as most general aviation aircraft do not operate at full capacity on a regular basis. Over the planning horizon, a modest increase was applied to the itinerant passenger multiplier to reflect greater terminal facility space required when both itinerant passengers and operations potentially increase.

When considering the square footage provided by the terminal facility, there is enough space provided to support current and future itinerant demand as the current terminal building space totals approximately 5,000 square feet. It should be mentioned, however, that owners of based aircraft may also use

the terminal facilities provided. In addition, current and future facilities available at the Airport may generate an increased amount of itinerant traffic and thus more terminal area may be desired. As such, additional space should be planned on an as-needed basis.

Currently, the terminal facilities provided are owned and operated by Skywerx FBO and the facilities are beyond the control of the Airport. BTA should give future consideration to owning and operating a terminal building.

Aircraft Storage Hangars, Apron, and Maintenance Requirements

Utilization of hangar space varies as a function of local climate, security, and owner preferences. The trend in general aviation aircraft, whether single or multi-engine, is toward more sophisticated (and consequently, more expensive) aircraft. Therefore, many aircraft owners prefer enclosed hangar space to outside tiedowns.

There are a variety of aircraft storage options typically available at an airport including shade hangars, T-hangars, linear box hangars, executive/box hangars, and bulk storage conventional hangars. Shade hangars are the most basic form of aircraft protection and are common in warmer climates. These structures provide a roof covering, but no walls or doors. There are no shade hangars at BTA, and for purposes of planning, any future shade hangars are included in the T-hangar need forecast.

T-hangars are intended to accommodate one small single engine piston aircraft or, in some cases, one multi-engine piston aircraft. T-hangars are so named because they are in the shape of a "T," providing a space for the aircraft nose and wings, but no space for turning the aircraft within the hangar. Similar to the T-hangar style is the linear box hangar. Linear box hangars typically provide storage for a single aircraft and can be nested with multiple individual linear box hangars. Unlike the T-hangar, linear box hangars enable to user to store aircraft in more ways than one.

The next type of aircraft hangar common for storage of general aviation aircraft is the executive/box hangar. Executive/box hangars typically provide a larger space, generally with an area between 2,500 and 6,000 square feet. This type of hangar can provide for maneuverability within the hangar, can accommodate more than one aircraft, and may have a small office and utilities. Conventional hangars are the large, clear span hangars typically located facing the main aircraft apron at airports. These hangars provide for bulk aircraft storage and are often utilized by airport businesses, such as a fixed base operator (FBO) and/or aircraft maintenance business. Conventional hangars are generally larger than executive/box hangars and can range in size from 6,000 square feet to more than 20,000 square feet.

Planning for future aircraft storage needs is based on typical owner preferences and standard sizes for hangar space. For determining future aircraft storage needs, a planning standard of 1,200 square feet per based aircraft is utilized for T-hangars. For conventional hangars, a planning standard of 3,000 square feet is utilized for turboprop aircraft, 6,000 square feet is utilized for business jet aircraft, and 1,500 square feet is utilized for helicopter storage needs.

The demand for aircraft storage hangars is dependent upon the number and type of aircraft expected to be based at the Airport in the future. For planning purposes, it is necessary to estimate hangar requirements based upon forecast operational activity. As an industry standard, approximately 250 square feet per based aircraft should be allotted for maintenance purposes. Future hangar requirements are presented in **Table GG**.

TABLE GG
Aircraft Storage Requirements
Blair Municipal Airport

		Future Requirements		
	Current Estimate	Short Term Need	Intermediate Need	Long Term Need
Aircraft to be Hangared	60	67	75	90
Hangar Area Requirements (sf)				
T-hangar /Linear Box Hangar Area	54,600	58,200	63,000	74,700
Executive Box Hangar Area	11,100	14,100	20,100	23,100
Conventional Hangar Area	29,900	47,900	55,400	74,900
Office/Maintenance Area (sf)	-	16,750	18,800	22,500
Total Area	**95,600**	**136,950**	**157,300**	**195,200**

As can be seen in the table, it is estimated that there is approximately 95,600 square feet of hangar storage space currently available at the Airport. In the short term, an additional 41,350 square feet is needed, and by the long term, an additional aggregate 99,600 square feet could be needed.

Construction of aircraft storage space should be determined and phased to maximize existing demand. Construction can be undertaken by the Airport or by a private developer, either of which will contribute to fulfilling the overall need at the Airport.

A parking apron should provide for the number of locally based aircraft that are not stored in hangars, as well as those aircraft used for air taxi and training activities. Parking should be provided for itinerant aircraft as well.

For planning purposes, five percent of the forecast based aircraft will be used to determine the parking apron requirements of local aircraft to accommodate temporary storage for hangar waiting or maintenance operations.

Currently, the primary aircraft parking apron at BTA totals approximately 6,600 square yards (sy) and has seven marked aircraft tiedown positions including one large aircraft tiedown position. In order to determine required aircraft apron space, an industry planning standard of 650 sy per local aircraft, 800 sy per itinerant aircraft, and 1,600 sy for large turboprop and jet aircraft was applied. Future aircraft parking apron requirements are presented in **Table HH**. According to these recommendations, an additional 2,250 sy of aircraft parking space could be required throughout the planning period.

TABLE HH
Aircraft Apron Parking Requirements
Blair Municipal Airport

		Future Requirements		
	Available	Short Term Need	Intermediate Need	Long Term Need
Locally Based Aircraft Positions	-	3	4	5
Single/Multi-Engine Transient	6	2	2	3
Large Turboprop and Jet Positions	1	1	2	2
Total Positions	7	6	8	10
Total Apron Area (sy)	**6,600**	**4,350**	**7,400**	**8,850**

Total parking area consists of approximately 14,700 sf of parking area and contains unmarked as well as 21 marked parking spaces. Unmarked parking area is estimated to accommodate approximately 22 vehicles. Parking space requirements were based upon industry standards of 350 square feet per vehicle. Future parking demands have been determined based on an evaluation of the estimated existing and future itinerant traffic, as well as industry standards, which consider one-half of based aircraft at the Airport will require a parking space. As shown in **Table JJ**, vehicular parking area currently available is sufficient; however, additional parking capacity will be considered throughout the planning period as new facilities are constructed.

TABLE JJ
Vehicle Parking Requirements
Blair Municipal Airport

		Facility Requirements		
	Available	Short Term Need	Intermediate Need	Long Term Need
Terminal Vehicle Spaces	-	4	5	8
General Aviation Spaces	-	34	38	45
Total Parking Spaces	43	38	43	53
Total Parking Area (sf)	**14,700**	**13,300**	**22,800**	**28,100**

SUPPORT REQUIREMENTS

Various facilities that do not logically fall within classifications of airfield, terminal building, or general aviation areas have also been identified. These other areas provide certain functions related to the overall operation of the airport and include ARFF, fuel storage, and airport maintenance facilities.

Aircraft Rescue and Firefighting (ARFF)

BTA does not have an aircraft rescue and firefighting (ARFF) building or equipment located on the airfield. As a GA airport, the FAA does not mandate that ARFF services be provided. Structural firefighting

services are provided by facilities off airport property by Fort Calhoun Fire Department, which is located 7.5 miles to the southeast by road. BTA is anticipated to remain a GA airport through the planning period so no on-site ARFF facilities are planned.

Aviation Fuel Storage

The Airport has one fuel farm, built in 2009, which stores 100LL and Jet-A aviation fuel. The fuel farm has a capacity of 12,000 gallons for 100LL and Jet-A comprising a total of 24,000 gallons and is located to the northwest of the terminal building. 100LL and Jet-A fuels are dispensed through a 24-hour self-serve system, while Skywerx FBO offers quick-turn Jet-A fueling services utilizing a fuel truck.



Fuel Farm

Additional fuel storage capacity should be planned when the Airport is unable to maintain an adequate supply and reserve. While each airport determines their own desired reserve, a 14-day reserve is common for GA airports. When additional capacity is needed, it should be planned in 10,000- to 12,000-gallon increments, which allows for the capacity of common fuel tanker trucks. Given the existing and future operational level estimates, fuel storage capacity should be adequate though the planning horizon. Should the Airport expand fueling facilities, it is recommended that above ground fuel storage tanks are installed as underground fuel storage tanks are more prone to leaks.

Based on average usage assumptions, fuel storage has been estimated and is presented in **Table KK**.

TABLE KK
Fuel Storage Requirements
Blair Municipal Airport

			Planning Horizon		
	Available	Current	Short Term	Intermediate Term	Long Term
Jet-A					
Daily Usage (gal.)		195	260	290	340
14-Day Supply (gal.)	12,000	3,200	3,600	4,000	4,800
Annual Usage (gal.)		71,252	94,900	105,900	124,100
AvGas					
Daily Usage (gal.)		58	70	90	100
14-Day Supply (gal.)	12,000	900	1,000	1,200	1,400
Annual Usage (gal.)		21,014	25,600	32,900	36,500

Source: Coffman Associates analysis

Aircraft Wash Facility

Currently, there is not a designated aircraft wash facility at BTA. Consideration should be given to establishing such a facility at the Airport. Wash facilities are common amenities at many GA airports that provide for the collection of used aircraft oil and other hazardous materials, as well as provide a covered area for aircraft washing and light maintenance.

Maintenance/Storage Facilities and Security Fencing

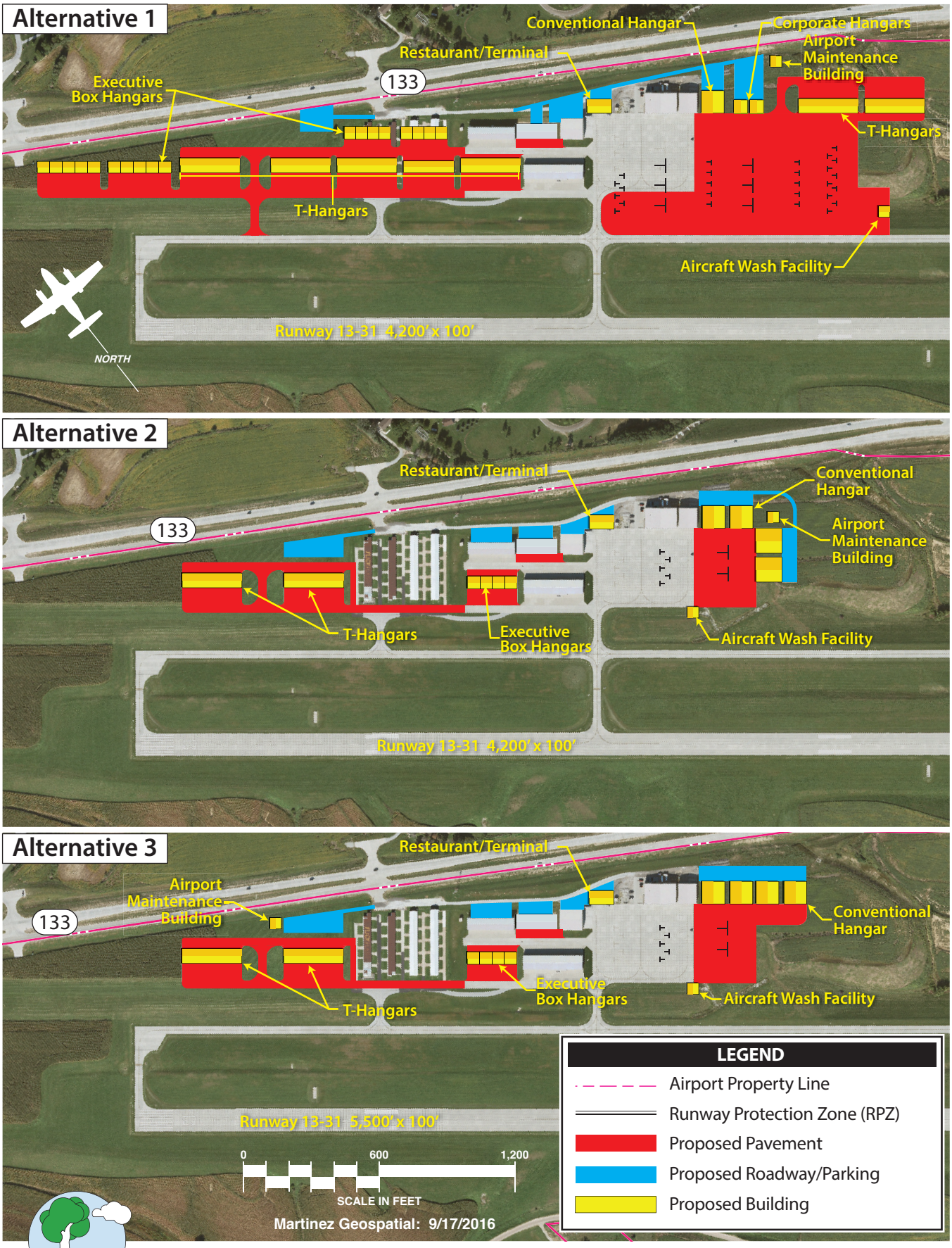
The Airport does not currently have a building dedicated to maintenance or storage. At present, the Airport's snow removal equipment (SRE) is stored in a large, metal building that was included in a 2015 property acquisition located on the north end of the airfield. The Airport should consider the allotment of an additional building specifically dedicated to the storage of airport maintenance equipment. Furthermore, the fencing system currently serving the Airport does not fully encompass the airfield. It is recommended that additional fencing be provided to completely enclose the airfield, which would deter casual intruders from penetrating a secured area by presenting a barrier that requires an overt action to enter.

Landside Development Alternatives

Analysis in this section of the report indicated that the Airport should plan for the construction of addition aircraft hangars and facilities over the next 20 years. Hangar and facility development takes on a variety of sizes corresponding with several different intended uses. Commercial GA activities are essential to providing the necessary services on an airport. This includes privately owned businesses involved with, but not limited to, aircraft rental and flight training, aircraft charters, aircraft maintenance, line service, and aircraft fueling. In addition, forecasted needs for Airport parking, terminal facilities, and support facilities were also discussed. Given the need for additional facilities over the planning horizon, three landside alternatives presented in **Exhibit W** were developed in an effort to best determine the direction of development.

Landside Development Alternative 1

The first alternative is largely based on the *Landside Facilities Master Plan* completed in June 2006 for BTA. This plan proposes the removal of four existing 10-place T-hangars and includes significant hangar and pavement construction along with the addition of an on-airport restaurant and terminal building. In addition to the proposed hangar, airport parking, and pavement sections detailed in the Landside Facilities Master Plan, an Airport maintenance building and aircraft wash facility have been included.


Alternative 1
Conventional Hangar
Corporate Hangars
Airport Maintenance Building
Restaurant/Terminal
133
Executive Box Hangars
T-Hangars
T-Hangars
Aircraft Wash Facility
Runway 13-31 4,200' x 100'
NORTH
Alternative 2
Restaurant/Terminal
Conventional Hangar
133
Airport Maintenance Building
T-Hangars
Executive Box Hangars
Aircraft Wash Facility
Runway 13-31 4,200' x 100'
Alternative 3
Restaurant/Terminal
Airport Maintenance Building
133
Conventional Hangar
Executive Box Hangars
T-Hangars
Aircraft Wash Facility
Runway 13-31 5,500' x 100'
0
600
1,200
SCALE IN FEET
Martinez Geospatial: 9/17/2016
LEGEND
Airport Property Line
Runway Protection Zone (RPZ)
Proposed Pavement
Proposed Roadway/Parking
Proposed Building

Landside Development Alternative 2

The second alternative suggests that the four existing 10-place T-hangars be maintained or upgraded in their current location in an effort to reduce the cost of new hangar construction. This alternative proposes two additional T-hangar facilities on the northernmost side of the existing T-hangars and a 4-place executive box hangar on the southernmost side. It should be noted that the taxilane serving the four existing T-hangars would need to be removed and regraded to meet FAA taxilane gradient standards upon construction of this alternative.

Four conventional hangars are also proposed on the southeastern side of the apron area. Ultimately, this option limits the amount of apron area required by placing two of the conventional hangars on the southernmost side of the apron. However, conventional hangars in this configuration could preclude future landside development to the south-southwest. This alternative includes the on-airport restaurant and terminal building detailed in the Landside Facilities Master Plan as well as an airport maintenance facility, aircraft wash facility, and additional aircraft tiedowns and automobile parking.

Landside Development Alternative 3

The third and final alternative examines a landside configuration similar to the second alternative. As such, taxilane gradient issues surrounding the existing T-hangars will need to be addressed prior to construction of this alternative. Unlike the previous alternative, the proposed conventional hangars are positioned in a manner that would not preclude future landside development to the south-southwest. This option also presents the on-airport restaurant and terminal building detailed in the Landside Facilities Master Plan with the addition of an airport maintenance building and aircraft wash facility. Additional apron area, aircraft tiedown positions, and automobile parking areas are also proposed.

SUMMARY

The intent of this document has been to outline the facilities required to meet potential aviation demands projected for BTA for the planning horizon as well as determine a direction of development which best meets projected needs through a series of Airport development alternatives. A summary of the airside and landside requirements is presented on **Exhibit X**.

RECOMMENDED DEVELOPMENT CONCEPT

Exhibit Y depicts the overall Development Concept for BTA. The aviation demand forecasts and facility requirements assessment in the previous sections identified airside, landside, and support needs as well as facility deficiencies. The purpose of this section is to consider the actual physical facilities which are



	EXISTING	LONG TERM
RUNWAYS	**13-31**	**13-31**
Runway Design Code (RDC)	B-II-4,000	C-II-4,000
Dimensions	4,200 x 100	Runway Length: Consider 5,500 x 100
Pavement Strength	30,000 lbs SWL, 60,000 lbs DWL	Same
TAXIWAYS	**13-31**	**13-31**
Parallel Taxiway	Yes	Maintain Full Length Parallel Taxiway
Parallel Taxiway Separation from Runway	400'	Same
Widths	35'	Same
Holding Position Locations from Runway	250'	Same



NAVIGATIONAL AND WEATHER AIDS	**13-31**	**13-31**
Instrument Approaches	Not Lower than 3/4- Mile	Same
	AWOS, Lighted Wind Cone, and Beacon	Same
LIGHTING AND MARKING	**13-31**	**13-31**
Runway Lighting	MIRL	Same
Runway Marking	Non-Precision	Same
Taxiway Lighting	MITL	Same
Approach Aids	PAPI-2, REILs (31)	PAPI-4, REILs (13), MALS (31)

KEY:

AWOS - Automated Weather Observation System
DWL - Dual Wheel Loading
SWL - Single Wheel Loading
MALS - Medium Intensity Approach Lighting System
MIRL - Medium Intensity Runway Lighting
MITL - Medium Intensity Taxiway Lighting
REILs - Runway End Identification Lights
PAPI - Precision Approach Path Indicator



AIRCRAFT STORAGE REQUIREMENTS



	Current Estimate	FUTURE REQUIREMENTS Short Term Need	Intermediate Term Need	Long Term Need
Aircraft to be Hangared	60	67	75	90
HANGAR AREA REQUIREMENTS (S.F.)				
T-hangar /Linear Box Hangar Area	54,600	58,200	63,000	74,700
Executive Box Hangar Area	11,100	14,100	20,100	23,100
Conventional Hangar Area	29,900	47,900	55,400	74,900
Office/Maintenance Area (s.f)	-	16,750	18,800	22,500
Total Area	**95,600**	**136,950**	**157,300**	**195,200**

AIRCRAFT APRON PARKING REQUIREMENTS

Locally Based Aircraft Positions	-	3	4	5
Single/Multi-Engine Transient	6	2	2	3
Large Turboprop and Jet Positions	1	1	2	2
Total Positions	7	6	8	10
Total Apron Area (s.y.)	**6,600**	**4,350**	**7,400**	**8,850**

TERMINAL FACILITY AND PARKING REQUIREMENTS



Total Building Space (s.f.)	**5,000**	**2,800**	**3,200**	**4,200**
GA Terminal Spaces	-	23	27	35
GA Based Owner Spaces	-	34	38	45
Total GA Parking Spaces	**43**	**57**	**65**	**80**

SUPPORT FACILITY REQUIREMENTS

Jet-A 14-Day Supply (gal.)	12,000	3,600	4,000	4,800
100LL 14-Day Supply (gal.)	12,000	1,000	1,200	1,400



Security Fencing / Gates	Consider Fencing Enhancements		Maintain
Airport Maintenance Facilities	Consider Mantenance Facility		Maintain

needed to accommodate projected demand and meet safety and design requirements at the Airport through the long range planning horizon.

AIRSIDE FACILITIES

The principal airfield recommendations focus first upon safety and security with some capacity improvements proposed as well. Of key importance is to ensure that proposed airfield improvements will be designed to meet all appropriate FAA airport design standards. Recommendations are then designed to improve the operational efficiency, circulation, and capability of the airfield. **Exhibit Y** depicts the principal airfield recommendations. The following subsections summarize the elements of the airfield recommendations.

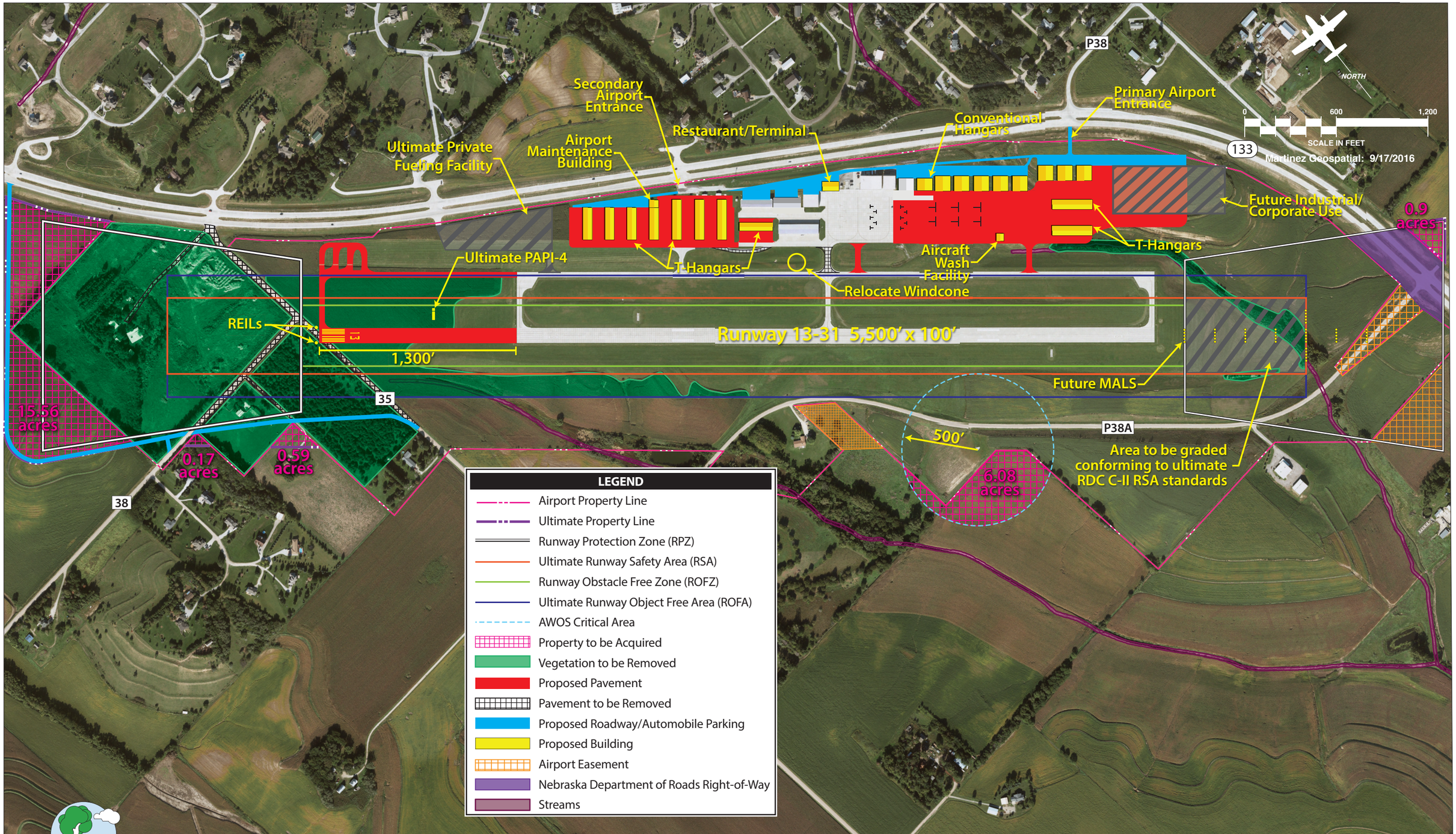
Alternatives presented in the previous section propose several airfield alternative development considerations including:

- Potential upgrade of Runway 13-31 to an airport reference code (ARC) and RDC C-II;
- Runway 13-31 extension – 1,300 feet northwest;
- Runway protection zone (RPZ) challenges due to proposed runway extension;
- Property acquisition issues;
- Taxiway enhancements; and
- Corrections to airfield geometrical design flaws

All alternatives presented would require an investment, and in several cases a substantial investment, from federal, state, and local agencies. It is important to note that any capital expenditures required to meet the needs of a larger ARC C-II critical aircraft would require specific justification. Airside facility upgrades to meet ARC C-II design criteria would include longer runway length and greatly expanded safety areas as outlined in the previous section. The FAA typically stipulates that if any major runway reconstruction or extension is planned, documentation of 500 annual itinerant operations of the design aircraft will be required. Based on historical aircraft operations and projections of future use presented in the Forecasting section, a transition of the critical design aircraft to ARC C-II could be likely.

Runway Length

Facility requirements completed in the previous section outlined a need for a runway length of up to 5,500 feet to meet a wider range of aircraft in ARC B-II and ultimate ARC C-II. The existing runway length of 4,200 feet is adequate for most aircraft using the Airport but will fall short of the needs of corporate aircraft in B and C-II, especially on hot days and during wet runway conditions. The recommended plan includes a 1,300-foot extension to the northwest end of Runway 13-31, as depicted on **Exhibit Y**. The ultimate runway extension and associated safety areas (to be discussed) would extend into County Roads



LEGEND

- Airport Property Line
- Ultimate Property Line
- Runway Protection Zone (RPZ)
- Ultimate Runway Safety Area (RSA)
- Runway Obstacle Free Zone (ROFZ)
- Ultimate Runway Object Free Area (ROFA)
- AWOS Critical Area
- Property to be Acquired
- Vegetation to be Removed
- Proposed Pavement
- Pavement to be Removed
- Proposed Roadway/Automobile Parking
- Proposed Building
- Airport Easement
- Nebraska Department of Roads Right-of-Way
- Streams

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35 and 38. As such, the relocation of County Road 35 and the intersection of County Roads 35 and 38 is also depicted on the Development Concept.

Runway Width

As depicted on **Exhibit Y**, Runway 13-31 is 100 feet wide. FAA design criteria calls for a runway width of 75 feet to meet RDC B-II design and 100 feet to meet RDC C-II design. The current runway width meets the existing and ultimate planning design standards and should be maintained accordingly.

Runway Strength

Runway 13-31 is constructed of concrete without a surface treatment. It is strength-rated at 30,000 pounds SWL and 60,000 pounds DWL. Based on existing and projected fleet mix of aircraft, this strength should be maintained through the long term planning horizon.

Runway Safety Area

FAA design guidance includes several dimensional standards to protect aircraft in the event an aircraft departs the runway surface. The most critical of these standards is the RSA. The RSA is a rectangular area surrounding the runway and is established based on the critical aircraft design for the runway and must be cleared and graded to support the weight of an aircraft. Runway 13-31 currently falls within RDC B-II design criteria, requiring an RSA measuring 150 feet wide and extending 300 feet beyond each runway end. The existing RSA meets FAA standards. The ultimate RDC C-II RSA is required to be 500 feet wide and extend 1,000 feet beyond each runway end. The ultimate RSA will remain on existing Airport property; however, several RSA incompatibilities would be introduced. The RSA extending to the southeast of Runway 13-31 is penetrated by a drainage way and vegetation beginning approximately 450 feet beyond the runway end, while the RSA extending to the northwest is penetrated by vegetation beginning approximately 250 feet beyond the runway end. Vegetation at the northwest end of the RSA is a field currently being utilized to grow corn. Any crop with a vertical component is considered an obstruction. Furthermore, with the ultimate runway being extended to 5,500 feet, the ultimate RSA would also include portions of County Road 35 and 38.

As a result, the Development Concept includes the relocation of County Roads 35 and 38, rerouting and grading of the drainage way, and the removal of vegetation to conform to ultimate C-II RSA standards.

Runway Object Free Area

The ROFA is an area surrounding the RSA which allows for aircraft operating in the RSA to remain free of objects that may impact the aircraft. The B-II ROFA dimensional standard is a width of 500 feet that extends 300 feet beyond the runway end. Ultimate C-II ROFA design standards are 800 feet wide and extend 1,000 feet beyond each runway end. Under these conditions, the ROFA would be obstructed by portions of County Roads 35 and 38, vegetation, and the windcone located midfield approximately 295 feet from the runway centerline. As such, the Development Concept shows the relocation of County Roads 35, 38, and the existing windcone, as well as the removal of obstructing vegetation.

Runway Obstacle Free Zone

Under existing B-II and ultimate C-II conditions, the ROFZ is 400 feet wide and extends 200 feet beyond each runway end. With the existing Runway length of 4,200 feet, no changes to the ROFZ would be required. However, given the proposed runway extension to 5,500 feet, the ROFZ would be obstructed by County Roads 35 and 38, and vegetation. As such, the Development Concept shows the removal of obstructing vegetation and relocation of County Roads 35 and 38.

Runway Protection Zone and Instrument Approaches

The RPZ's function is to enhance the protection of people and property on the ground. This is achieved through airport owner control over the RPZs. Such control includes clearing RPZ areas (and maintaining them clear) of incompatible objects and activities. Control is preferably exercised through the acquisition of sufficient property interest in the RPZ. Specific land uses prohibited in the RPZ include residences and places of public assembly. Roads are discouraged from being located in the RPZ, especially the central portion of the RPZ (defined as the width of the OFA extended to the end of the RPZ). Existing roads are generally grandfathered, but an effort should be made to relocate them if possible.

It should be noted that recent changes in FAA guidelines do not allow for newly constructed incompatible uses to be located in the RPZ without first obtaining approval from the FAA. Incompatible land uses have generally included anything that will attract congregations of people, but now include public roadways. As such, if the existing roads are modified or new roads in the RPZ are proposed, the FAA will require further study and will make a determination if they can be allowed. Moreover, any changes to the existing runway ends will effectively remove the "grandfathering" allowance for any existing roads.

Exhibit Y presents the proposed 1,300-foot northwesterly runway extension and the RPZs associated with each end of the runway. The long term plan for Runway 13-31 is to maintain the non-precision approach to each runway end providing not lower than ¾-mile visibility minimums. Approximately 10.37 acres of the RPZ serving Runway 31 would extend beyond existing Airport property. However, the ma-

jority of the unowned property is contained within an existing easement owned by the Airport or includes the Right of Way (ROW) associated with Highway 133. It is understood that the Nebraska Department of Roads (NDR) does not release the ROW in the State of Nebraska. As such, it is not essential for airports located in the State of Nebraska to purchase the ROW. As a result, property to be acquired totals approximately 0.9 acres. The easement in existence is sufficient to control airspace obstructions but may not be adequate to ensure that on-the-ground improvements are not made. The RPZ cannot contain any improvements that will attract people, including residences, commercial/industrial uses, roads, etc. As long as the area remains free of these types of incompatible uses, the easement should be sufficient and the land would not need to be acquired fee simple.

The RPZ serving Runway 13 would extend beyond Airport property upon the extension of the runway. As such, the northeast and northwest portions of the RPZ would encompass approximately 6.38 acres. In addition, the RPZ is traversed by two County Roads—35 and 38. Given that the ultimate Runway 13 RPZ placement is the result of a runway extension, the roads within the RPZ are not grandfathered and must be relocated. As a result of the relocation of County Roads 35 and 38, it is recommended that the Airport acquire the property extending from the northwestern edge of the existing Airport property boundary to the ROW of the proposed County Road 35, encompassing a total of 15.56 acres. It should be noted that residences identified in the previous section as being RPZ incompatibilities have since been removed and are no longer a barrier to the Runway 13-31 extension.

Taxiways

As previously mentioned in the Facility Requirements and Alternatives sections, the northernmost portion of the midfield taxiway connecting the apron area to Runway 13-31 should be relocated approximately 200 feet to the southeast of its existing position. Ultimately, this will bring the connecting taxiway into compliance with FAA taxiway geometry standards by not allowing direct access from an aircraft parking apron to the runway as it currently does. An additional connecting taxiway providing access from the ultimate southeastern apron area to the parallel taxiway serving Runway 13-31 is also included on the Development Concept.

Future planning should also include the extension of the parallel taxiway to the northwest on the northern side of Runway 13-31. The proposed taxiway also includes the addition of a holding bay serving Runway 13.

Approach and Navigational Aids

Currently, Runways 13 and 31 are equipped with PAPI-2 visual approach aids and Runway 31 is equipped with REILs to guide aircraft to the approach end of the Runway. It is recommended that REILs be added to Runway 13, and PAPI-2 approach aids be upgraded to PAPI-4 approach aids to further enhance the use of this runway and overall airfield safety. In addition, consideration is given to the installation of a

MALS as this type of ALS is typically recommended for runways providing approach visibility minimums equal to or greater than 3/4-mile, but less than 1-mile.

Airfield Signage, Marking, and Lighting

Presently, all airfield signage and markings are suitable to serve the Airport. However, as Airport expansion and taxiway configuration projects are completed, airfield signage and marking should be updated accordingly. All taxiways are currently served by MITL, with the exception of the connecting taxiways linking the nested T-hangars on the northeastern side of the field with the parallel taxiway and apron area. These areas are currently served by blue reflectors. In the future, areas currently served by blue reflectors should be upgraded to MITL. MITL should also be implemented on the relocated and future southeastern connecting taxiway, providing access from the apron area to the parallel taxiway. In addition, existing MITL serving Runway 13-31 and the parallel taxiway should be extended as the runway and parallel taxiway extension take place.

LANDSIDE FACILITIES

The primary goal of landside facility planning is to provide adequate space to meet reasonably anticipated general aviation needs, while also optimizing operational efficiency and land use. Achieving these goals yields a development scheme which segregates functional uses, while maximizing the Airport's revenue potential. The facility requirements analysis identified several opportunities to improve the existing landside facilities in order to better accommodate future aviation demand. This section will specify the recommended improvements pertaining to landside facilities.

As a GA airport, the clear majority of landside development proposed within this study will accommodate the GA operators and service providers at BTA. The existing GA landside facilities are located on the northwest and southeast sides of the airfield and include 60 separate hangar facilities, providing 103,400 sf of hangar capacity, as well as apron and aircraft movement space totaling approximately 16,900 sy.

The Development Concept proposes the addition of new hangar and apron facilities on both the northwest and southeast sides of the airfield. Recommended GA developments include a variety of hangar types from T-hangars, mid-sized executive box hangars, and large clearspan conventional hangars to satisfy the full range of GA user needs. However, all hangar-related development should occur only as dictated by demand. The locations and sizes of hangars proposed in this document are conceptual and may not reflect the needs of future developers and their customers. The Development Concept is intended to be used strictly as a guide for Airport staff when considering new hangar developments.

Aircraft Storage Hangars and Future Aviation Development

The facility requirements analysis indicated that an additional 99,600 square feet of aircraft storage hangar area may be needed through the long term planning period in order to meet potential aviation demand. Recommended hangar development is proposed in the form of T-hangars, executive box hangars, and large conventional hangars. Again, future demand will dictate the size and type of hangar facilities that could be built.

As presented on **Exhibit Y**, the Development Concept shows four additional eight-unit T-hangar facilities on the northernmost side of the existing Airport entrance road. The Development Concept also calls for the four existing 10-unit T-hangars directly across from the Airport entrance road to be removed and replaced with three 10-unit T-hangars. This project will ultimately bring the taxilane serving the northwest GA development area into compliance with FAA gradient standards and allow for the removal of the temporary taxilane. Furthermore, a 10-unit T-hangar will also be placed directly across from the existing executive box hangars.

On the southeastern side of the airfield, an additional 37,500 sy of apron area are proposed. It should be mentioned that this area includes small and large transient aircraft parking and an aircraft wash facility located on the westernmost side of the apron area. In conjunction with the apron expansion, one 90 x 100-, one 80 x 100- and eight 100 x 100-foot conventional hangars are located on the easternmost side of the proposed apron. It should be mentioned that construction has begun on the 90 x 100-foot conventional hangar during the course of this study and has been depicted as an existing facility on the Development Concept. Finally, two 10-place T-hangars are planned on the southwest side of the apron area, adjacent to the aircraft wash facility, and up to an additional 27,600 sy of apron area could be reserved for industrial or corporate use on the southernmost side of the landside development area.

Terminal Facility

As determined in the Facility Requirements and Alternatives section of this report, the current terminal facility is sized adequately to handle projected demand through the long term planning horizon. However, the existing terminal facility is not Airport-owned and is beyond the control of the Airport. Therefore, an additional 70 x 100-foot terminal facility and restaurant is proposed adjacent to the existing self-service fueling system.

Future Industrial or Corporate Development

The Development Concept reserves a portion of the southeastern apron area for potential industrial or corporate use. The proposed apron area supporting the industrial/corporate reserve totals approximately 27,600 sy, while the industrial/corporate reserve itself encompasses approximately 24,300 sy and provides both air and landside access.

SUPPORT FACILITIES

As previously mentioned within the Facility Requirements and Alternatives section of this report, support facilities are integral to the operation of the airport; however, the facilities are not categorized as airside or landside facilities. The facility needs analysis identified several improvements that will ultimately contribute to the Airport's ability to accommodate the forecast aviation activity levels.

Aircraft Wash Facility

The addition of an aircraft wash facility will provide for the collection of used aircraft oil and other hazardous materials, as well as provide a covered area for aircraft washing and light maintenance. The recommended location of the aircraft wash facility is on the southwestern side of the proposed apron area.

Airport Maintenance Building

The facility requirements analysis identified a need for a designated airport maintenance area. This area should consist of a large building used specifically for the storage of airport maintenance equipment. A recommended location is identified immediately northwest of the existing Airport entrance, affixed to the southernmost eight-unit T-hangar.

Private Fueling Facility

Although a need for additional fuel storage capacity is not anticipated during the planning period, there has been recent interest from a private entity located on the airfield to operate a fueling facility for private use only. The footprint of the private fueling facility is located north of the proposed landside development area, on the east side of Runway 13-31. Given that the fueling facility will be privately funded, operated, and will not be open to the public, the proposed development area is presented on the development concept for conceptual layout purposes only.

Airport Utilities

At the present time, significant Airport development could be limited by existing utilities. The 2006 Landside Facilities Master Plan indicates that any substantial hangar development would require enhanced water storage capability (for firefighting purposes), sanitary sewer, natural gas, as well as increased electrical output (for heavy electricity users). The study identifies an existing water well on Airport property located west of the rotating beacon; however, it is determined not to be suited for future water supply purposes. The Airport must incorporate additional water storage and pumping capabilities in order to meet minimum flow requirements, which can be dependent upon the type of hangars and facilities built.

Future Airport development should consider enhancements to utility infrastructure that could include increased water storage and pumping capacity, sanitary sewer, and improved electrical and natural gas capabilities.

Airport Entrance Road and Automobile Parking

In addition to the existing Airport entrance, the Development Concept considers a second entrance road serving the southeastern side of the Airport. This proposed second entry location would be located directly across from County Road 38 as it intersects with the easternmost side of Highway 133. The secondary entrance road would continue northwest and adjacent to the eastern portion of Airport property, providing vehicle access and parking for existing and proposed landside development areas. The road eventually connects with the existing Airport entrance and continues northwest to provide vehicle access and parking to the landside development and Airport maintenance building proposed on the northwestern side of the airfield.

ENVIRONMENTAL OVERVIEW

A review of the potential environmental impacts associated with proposed airport projects is an essential consideration in the airport planning process. The primary purpose of this discussion is to review the proposed capital improvements at Blair Municipal Airport (Airport) to determine whether the projects could, individually or collectively, significantly affect existing environmental resources. The information contained in this section was obtained from previous studies, official internet websites, and analysis by the consultant.

Construction of all improvements depicted on the Airport Layout Plan (ALP) will require compliance with the *National Environmental Policy Act* (NEPA) *of 1969*, as amended. This includes privately funded projects, in addition to those receiving federal funding. For projects not categorically excluded under FAA Order 1050.1.F, *Environmental Impact: Policies and Procedures*, compliance with NEPA is generally satisfied through the preparation of an Environmental Assessment (EA). In instances where significant environmental impacts are expected, an Environmental Impact Statement (EIS) may be required.

Note that this portion of the ALP Narrative Report is *not* designed to satisfy NEPA requirements, but rather it is intended to provide a preliminary review of environmental issues that may require further consideration within the environmental review processes. This evaluation considers the 14 environmental categories required in FAA Order 1050.1F and FAA Order 5050.4B, *National Environmental Policy Act Implementation Instructions for Airport Actions.*

The following sections describe environmental resources which could be impacted by the proposed Airport development depicted on **Exhibit Y**.

AIR QUALITY

The FAA has identified a significance threshold for Air Quality. The proposed action is significant if it will cause pollutant concentrations to exceed one or more of the National Ambient Air Quality Standards (NAAQS), as established by the Environmental Protection Agency (EPA) under the Clean Air Act, for any of the time periods analyzed, or increase the frequency or severity of any such existing violations.

The NAAQS specifies the maximum allowable short term and long term concentration of six criteria pollutants, including ozone (O_3), carbon monoxide (CO), sulfur dioxide (SO_2), nitrogen oxides (NO_x), particulate matter (PM_{10} and $PM_{2.5}$), and lead (Pb). Based on both federal and state air quality standards, a geographic area can be classified as either an "attainment," "maintenance," or "non-attainment" area for each of the pollutants. The threshold for non-attainment designation varies by pollutant, as seen on **Exhibit Z**.

The Airport is in Washington County, which is in attainment for all federal criteria pollutants. Thus, general conformity review per the *Clean Air Act* is not required. Planned projects at the Airport could result in temporary impacts to air quality. This includes exhaust emissions from the operation of construction vehicles and fugitive dust from earthmoving and pavement removal. Temporary impacts would result during the construction of improvements, such as the new hangars, runway extension, apron expansion, terminal building expansion, and road removal and rerouting. According to the most recent FAA *Aviation Emissions and Air Quality Handbook* (2015), an emissions inventory under NEPA may be necessary for any proposed action that would result in a foreseeable increase in emissions due to its implementation.

BIOLOGICAL RESOURCES (INCLUDING FISH, WILDLIFE, AND PLANTS)

A proposed action is significant if the U.S. Fish and Wildlife Service (USFWS) or National Marine Fisheries Service determines that the action would be likely to jeopardize the continued existence of a federally listed threatened or endangered species or would result in the destruction or adverse modification of federally designated critical habitat. Further, a proposed action is significant should there be potential for:

- A long term or permanent loss of unlisted plant or wildlife species;
- Adverse impacts to special status species or their habitats;
- Substantial loss, reduction, degradation, disturbance, or fragmentation of native species' habitats or their populations; or,
- Adverse impacts on a species' reproductive success rates, non-natural mortality, or ability to sustain the minimum population levels required for population maintenance.

The USFWS oversees the requirements of the *Endangered Species Act* (ESA), specifically Section 7, which sets forth requirements for consultation to determine if a proposed action "may affect" a federally en-

POLLUTANT		PRIMARY/ SECONDARY	AVERAGING TIME	LEVEL	FORM
Carbon Monoxide (CO)		primary	8 hours	9 ppm	Not to be exceeded more than once per year
			1 hour	35 ppm	
Lead (Pb)		primary and secondary	Rolling 3 month average	0.15 µg/m^3 (1)	Not to be exceeded
Nitrogen Dioxide (NO_2)		primary	1 hour	100 ppb	98th percentile of 1-hour daily maximum concentrations, averaged over 3 years
		primary and secondary	1 year	53 ppb (2)	Annual Mean
Ozone (O_3)		primary and secondary	8 hours	0.070 ppm (3)	Annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years
Particle Pollution (PM)	$PM_{2.5}$	primary	1 year	12.0 µg/m^3	annual mean, averaged over 3 years
		secondary	1 year	15.0 µg/m^3	annual mean, averaged over 3 years
		primary and secondary	24 hours	35 µg/m^3	98th percentile, averaged over 3 years
	PM_{10}	primary and secondary	24 hours	150 µg/m^3	Not to be exceeded more than once per year on average over 3 years
Sulfur Dioxide (SO_2)		primary	1 hour	75 ppb (4)	99th percentile of 1-hour daily maximum concentrations, averaged over 3 years
		secondary	3 hours	0.5 ppm	Not to be exceeded more than once per year

UNITS OF MEASURE: **ppm** - parts per million by volume **ppb** - parts per billion by volume **µg/m^3** - micrograms per cubic meter of air

1) In areas designated nonattainment for the Pb standards prior to the promulgation of the current (2008) standards, and for which implementation plans to attain or maintain the current (2008) standards have not been submitted and approved, the previous standards (1.5 µg/m^3 as a calendar quarter average) also remain in effect.

(2) The level of the annual NO_2 standard is 0.053 ppm. It is shown here in terms of ppb for the purposes of clearer comparison to the 1-hour standard level.

(3) Final rule signed October 1, 2015, and effective December 28, 2015. The previous (2008) O_3 standards additionally remain in effect in some areas. Revocation of the previous (2008) O_3 standards and transitioning to the current (2015) standards will be addressed in the implementation rule for the current standards.

(4) The previous SO_2 standards (0.14 ppm 24-hour and 0.03 ppm annual) will additionally remain in effect in certain areas: (1) any area for which it is not yet 1 year since the effective date of designation under the current (2010) standards, and (2) any area for which an implementation plan providing for attainment of the current (2010) standard has not been submitted and approved and which is designated nonattainment under the previous SO_2 standards or is not meeting the requirements of a SIP call under the previous SO_2 standards (40 CFR 50.4(3)). A SIP call is an Environmental Protection Agency (EPA) action requiring a state to resubmit all or part of its State Implementation Plan to demonstrate attainment of the required National Ambient Air Quality Standards (NAAQS).



Source: https://www.epa.gov/criteria-air-pollutants/naaqs-table.

dangered or threatened species. If an agency determines that an action "may affect" a federally protected species, then Section 7(a)(2) requires the agency to consult with USFWS to ensure that any action the agency authorizes, funds, or carries out is not likely to jeopardize the continued existence of any federally listed endangered or threatened species, or result in the destruction or adverse modification of critical habitat. If a species has been listed as a candidate species, Section 7(a)(4) states that each agency must confer with USFWS.

Additional federal laws protecting fish, wildlife, and plants include the *Migratory Bird Treaty Act* (MBTA), which prohibits activities that would harm migratory birds, their eggs, or nests, and the *Bald and Golden Eagle Protection Act* (BaGEPA), which prohibits the take (defined as "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb") of bald and golden eagles, including their parts, nests, or eggs, without a permit. Executive Order (E.O.) 13751, *Safeguarding the Nation from the Impacts of Invasive Species* aims to prevent the introduction of invasive species because of a proposed action. E.O. 11990, *Protection of Wetlands,* is discussed under the Water Resources section of this report.

A USFWS Information for Planning and Consultation (IPaC) report indicates that there are five protected species potentially occurring at the Airport. The Nebraska Rare Species organization also maintains a list of federally and state-protected species in Nebraska. **Table LL** lists all federally listed and State of Nebraska listed protected species along with their habitat. There are no critical habitats at this location.

TABLE LL
Federal and State Protected Species
Blair Municipal Airport

Species Name	Scientific Name	Federal Status	State Status	Habitat
Birds				
Least tern[1]	*Sterna antillarum*	Endangered	Endangered	Nests on barren and sparsely vegetated sandbars near rivers, sand, and gravel pits, and lake and reservoir shorelines.
Piping plover	*Charadrius melodus*	Threatened	Threatened	Found in wide, flat, open, sandy beaches with very little grass or other vegetation.
Fishes				
Pallid sturgeon	*Scaphirhynchus albus*	Endangered	Endangered	Require aquatic habitat found in large rivers at a variety of depths.
Flowering Plants				
Western prairie fringed orchid	*Platanthera praeclara*	Threatened	Threatened	Unplowed tallgrass prairies and meadows, as well as old fields and roadside ditches.
Mammals				
Northern long-eared bat	*Myotis septentrionalis*	Threatened	Not Listed	Roosts in crevices and cavities of live and dead trees (in summer).

[1] Listed federally as "Least Stern (*Sterna antillarum*); Listed state as Interior Least Tern (*Sterna antillarum athalassos*) – these represent the same species of bird.
Sources: U.S. Fish and Wildlife Service Information for Planning and Consultation (accessed July 2017); Nebraska Rare Species (accessed via rarespecies.nebraska.gov, July 2017)

Based on preliminary review, habitat to support these species is not present at the Airport; however, field surveys may be required prior to project implementation to determine the presence of protected species. Projects outlined in the ALP development concept, such as property acquisition, vegetation removal, runway extension, T-hangar construction, and roadway relocation, may require field surveys to determine the potential presence of protected species. Coordination with the USFWS and/or Nebraska Game and Parks Commission may be necessary to determine the extent, if any, of field investigations necessary prior to undertaking these planned improvements.

In addition to the ESA, the MBTA is also applicable at the Airport, as much of the study area constitutes habitat for birds protected under this Act. Birds protected under the MBTA may nest, winter, or migrate throughout the area, including those protected by the ESA. Under the requirements of the MBTA, all project proponents are responsible for complying with the appropriate regulations, protecting birds when planning and developing a project. The 26 protected migratory birds with potential to occur in the study area are listed in **Table MM**.

TABLE MM
Birds Protected Under the *Migratory Bird Treaty Act* and Bald and *Golden Eagle Protection Act*
Blair Municipal Airport

Protected Species	Scientific Name	Season(s) Present
Acadian flycatcher	*Empidonax virescens*	Breeding
Bald eagle	*Haliaeetus leucocephalus*	Year-Round
Bell's vireo	*Vireo bellii*	Breeding
Black-billed cuckoo	*Coccyzus erythropthalmus*	Breeding
Black-crowned night-heron	*Nycticorax nycticorax*	Breeding
Cerulean warbler	*Dendroica cerulean*	Breeding
Dickcissel	*Spiza americana*	Breeding
Field sparrow	*Spizella pusilla*	Breeding
Golden eagle	*Aquila chrysaetos*	Wintering
Grasshopper sparrow	*Ammodramus savannarum*	Breeding
Harris's sparrow	*Zonotrichia querula*	Wintering
Henslow's sparrow	*Ammodramus henslowii*	Breeding
Hudsonian godwit	*Limosa haemastica*	Migrating
Kentucky warbler	*Oporornis formosus*	Breeding
Least bittern	*Lxobrychus exilis*	Breeding
Loggerhead shrike	*Lanius lubovicianus*	Wintering
Northern flicker	*Colaptes auratus*	Year-Round
Peregrine falcon	*Falco peregrinus*	Breeding
Red-billed woodpecker	*Melanerpes erthrocephalus*	Breeding
Rusty blackbird	*Euphagus carolinus*	Wintering
Short-eared owl	*Asio flammeus*	Wintering
Swainson's hawk	*Buteo swainsoni*	Breeding
Upland sandpiper	*Bartramia longicauda*	Breeding
Western grebe	*Aechmorphorous occidentalis*	Breeding
Willow flycatcher	*Empidonax traillii*	Breeding
Wood thrush	*Hylocichla mustelina*	Breeding

Source: U.S. Fish and Wildlife Service Information for Planning and Consultation (accessed July 2017)

CLIMATE

The FAA has not established a significance threshold for Climate.

Carbon dioxide equivalent, or CO_2e, is used to describe different greenhouse gases (GHG) in a common unit. For any quantity and type of GHG, CO_2e represents the amount of CO_2 that would have the equivalent global warming potential.

The EPA's *Inventory of U.S. Greenhouse Gas Emissions and Sinks 1990-2015*, found that the transportation sector, which includes aviation, accounted for 27 percent of U.S. greenhouse gas (GHG) emissions in 2015. Of this, aviation contributed 160.7 million metric tons (MMT) of carbon dioxide equivalent (CO_2e), or nearly nine percent of all transportation emissions.[1, 2] Transportation sources include cars, trucks, ships, trains, and planes. Most of the GHG emissions from transportation are CO_2 emissions resulting from the combustion of petroleum-based products in internal combustion engines. Relatively small amounts of methane (CH_4), hydrofluorocarbon (HFC), and nitrous oxide (N_2O) are emitted during fuel combustion.

From 1990 to 2015, total transportation emissions increased. The upward trend is largely due to increased demand for travel; however, much of this travel was done in passenger cars and light-duty trucks. In addition to transportation-related emissions, **Figure 1** shows all GHG emissions sources in the U.S. in 2015.

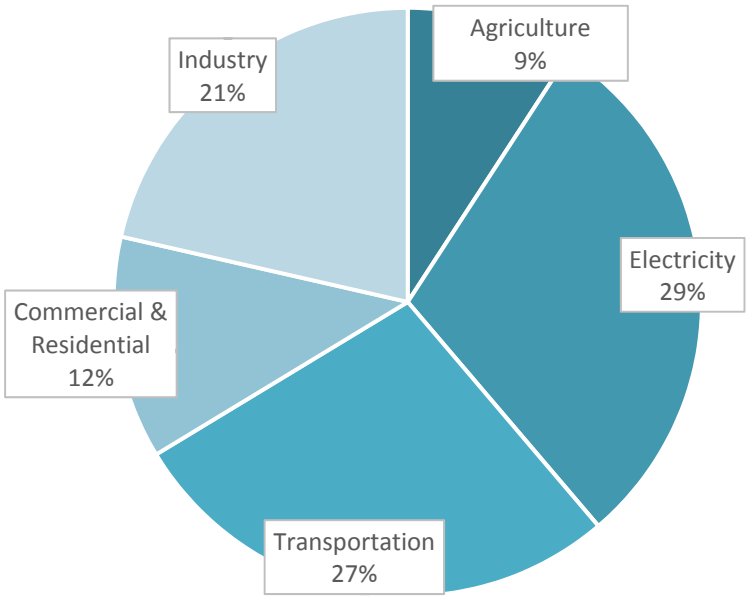


Figure 1 2015 Sources of Greenhouse Gas Emissions in the U.S.
Source: U.S. EPA (2017)

[1] Aviation activity consists of emissions from jet fuel and aviation gasoline consumed by commercial aircraft, general aviation, and military aircraft.
[2] Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2015, Table 2-13 (available: https://www.epa.gov/ghgemissions/inventory-us-greenhouse-gas-emissions-and-sinks-1990-2015)

Increasing concentrations of GHGs can affect global climate by trapping heat in the Earth's atmosphere. Scientific measurements have shown that Earth's climate is warming, with concurrent impacts, including warmer air temperatures, rising sea levels, increased storm activity, and greater intensity in precipitation events. This climate change is a global phenomenon that can also have local impacts (IPCC 2014). GHGs, such as water vapor (H_2O), carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), and ozone (O_3), are both naturally occurring and anthropogenic (man-made).

Research has also shown a direct correlation between fuel combustion and GHG emissions. GHGs from anthropogenic sources include CO_2, CH_4, N_2O, hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6). CO_2 is the most important anthropogenic GHG because it is a long-lived gas that remains in the atmosphere for up to 100 years.

Similar to Air Quality, temporary construction activity would result in increased pollutant emissions.

COASTAL RESOURCES

The FAA has not established a significance threshold for Coastal Resources. Factors to consider include if the proposed action would have the potential to:

- Be inconsistent with the relevant state coastal zone management plan(s);
- Impact a coastal barrier resources system unit;
- Pose an impact to coral reef ecosystems;
- Cause an unacceptable risk to human safety or property; or,
- Cause adverse impacts to the coastal environment that cannot be satisfactorily mitigated.

The Airport is over 800 miles away from the nearest costal resource.

DEPARTMENT OF TRANSPORTATION ACT, SECTION 4(f)

The FAA has established a significance threshold for this resource category, which states that if the action involves more than a minimal physical use of a Section 4(f) resource or constitutes a "constructive use" based on an FAA determination that the aviation project would substantially impair the Section 4(f) resource. Resources that are protected by Section 4(f) include:

- Publicly owned land from a public park;
- Recreation area;
- Wildlife and waterfowl refuge of national, state, or local significance; and/or,
- Privately owned land from an historic site of national, state, or local significance.

Substantial impairment occurs when the activities, features, or attributes of the resource that contribute to its significance or enjoyment are substantially diminished.

Section 303(c) of Title 49 United States Code (USC), states that the Secretary of Transportation shall not approve any program or project that requires the use of any of the protected uses unless there is no feasible and prudent alternative to the use of such land, and the project includes all possible planning to minimize harm resulting from the use.

As seen on **Table NN**, the nearest Section 4(f) resource is over two miles away. The closest Wilderness Area and Recreation Area are over 200 miles away from the Airport. Proposed actions at the Airport should not interfere with these protected resources; however, certain changes, like the proposed runway extension, would change flight paths, and should be evaluated for potential impacts to properties protected under Section 4(f).

TABLE NN
Section 4(f) Protected Resources

Name	Distance from Airport	Direction from Airport
National Register of Historic Places		
Carl Penke Farm	5.0 miles	Southwest
Long Creek School	2.3 miles	North
Public Parks		
Cunningham Lake Park	3.6 miles	Southwest
Wildlife Refuge		
Rio Grande Valley National Wildlife Refuge	6.13 miles	East

Source: U.S. Geological Survey (accessed July 2017)

FARMLANDS

The FAA significance threshold for Farmlands is if the total combined score on Form AD-1006, "Farmland Conversion Impact Rating," ranges between 200 and 260 points. An important consideration is if this action would have the potential to convert important farmlands to non-agricultural uses. Important farmlands include:

- Pastureland;
- Cropland; and,
- Forest considered to be prime, unique, or statewide or locally important land.

The *Farmland Protection Policy Act* (FPPA) was enacted to preserve farmland. FPPA guidelines apply to farmland classified as prime or unique, or of state or local importance, as determined by the appropriate government agency, with concurrence by the Secretary of Agriculture.

The Natural Resource Conservation Service's (NRCS) Web Soil Survey indicates that much of the Airport is classified as prime farmland or farmland of statewide importance, as seen on **Exhibit AA**. Development on existing Airport property will likely be exempt from the requirements of FPPA as NRCS may consider these to be previously committed to urban use. For the land affected by property acquisition and road relocation, further coordination with NRCS may be required. Through coordination with NRCS during the NEPA documentation process, preparation of Form AD-1006 may be required. This form is a land evaluation and site assessment system used to determine a rating score to identify impacts to farmlands.

HAZARDOUS MATERIALS, SOLID WASTE, AND POLLUTION PREVENTION

The FAA has not established a significance threshold for this resource category; however, the following should be considered should the action have potential to:

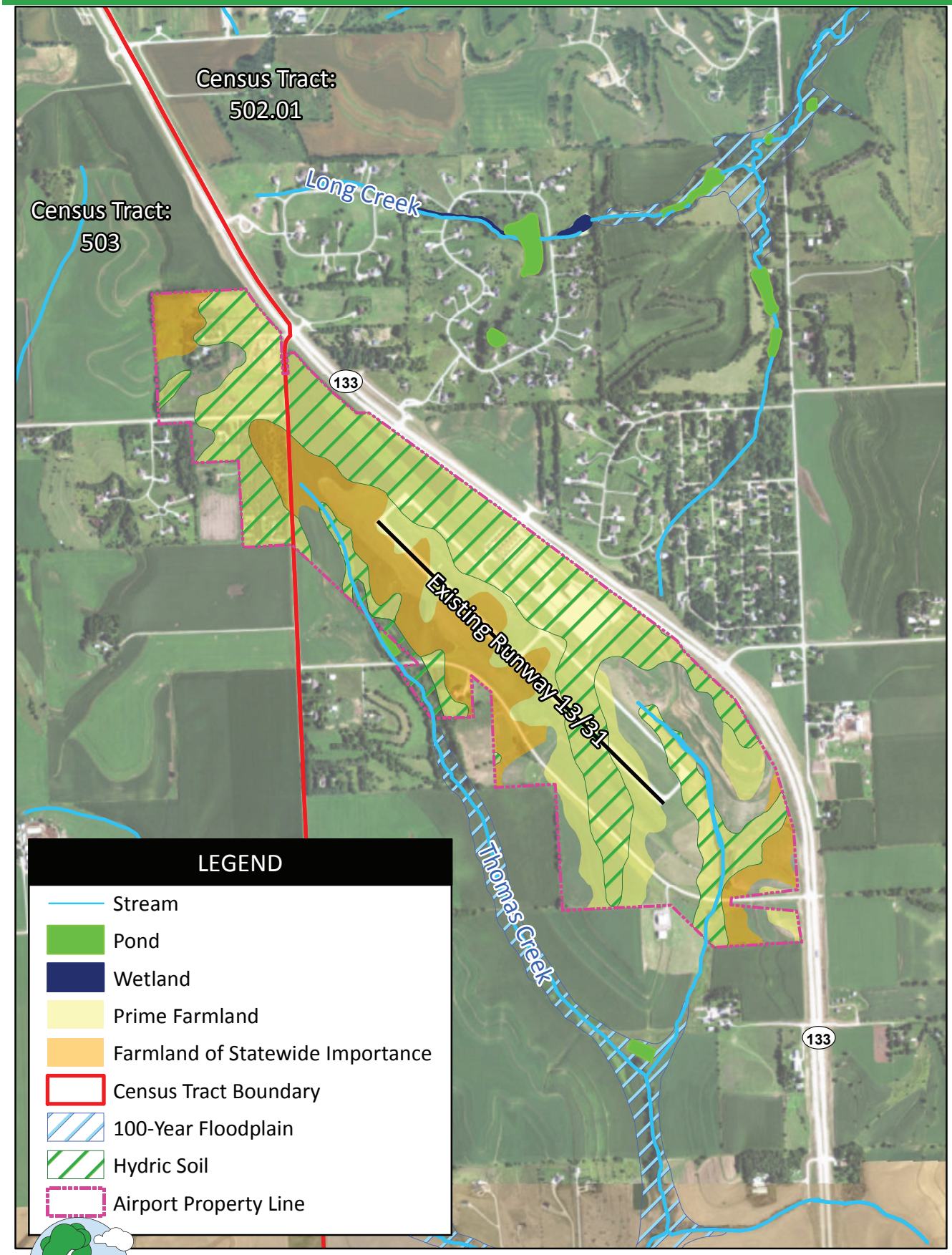
- Violate applicable Federal, state, tribal, or local laws or regulations regarding hazardous materials and/or solid waste management;
- Involve a contaminated site;
- Produce an appreciably different quantity or type of hazardous waste;
- Generate an appreciably different quantity or type of solid waste or use a different method of collection or disposal and/or would exceed local capacity; or,
- Adversely affect human health and the environment.

Federal, state, and local laws regulate hazardous materials use, storage, transport, and disposal. These laws may extend to past and future landowners of properties containing these materials. Additionally, disrupting sites containing hazardous materials or contaminates may cause impacts to soil, surface water, groundwater, air quality, and the organisms using these resources.

According to the EPA's *EJSCREEN*, there are no Brownfields[3] or Superfund[4] sites located near the Airport. The City of Blair's solid waste is hauled to the Douglas County Landfill near Elk City, Nebraska, approximately eight miles west of the Airport.[5]

The ALP does not anticipate land uses that would produce an appreciably different quantity or type of waste; however, should this type of land use be proposed, further NEPA review and/or permitting would be required.

[3] A brownfield is a property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutants, or contaminant (U.S. EPA).
[4] A Superfund site is any land in the U.S. that has been contaminated by hazardous waste and identified by the EPA as a candidate for cleanup as it poses a human health risk and/or a risk to the environment (U.S. Department of Health and Human Services).
[5] http://www.blairnebraska.org/2228/Utility-Public-Works-Services



Sources: ESRI Basemap Imagery (2016), NRCS, FEMA, USFWS, US Census.

HISTORICAL, ARCHITECTURAL, ARCHEOLOGICAL, AND CULTURAL RESOURCES

The FAA has not established a significance threshold for this resource category; however, a factor to consider is if the action would result in a finding of Adverse Effect through the Section 106 process. Note that an adverse effect does not automatically trigger preparation of an EIS.

Determination of a project's impact to historical and cultural resources is made in compliance with the *National Historic Preservation Act* (NHPA) *of 1966*. The ALP can conflict with NHPA if the proposed project causes an adverse effect on a property which has been identified (or unearthed during construction) as having historical, architectural, archeological, or cultural significance.

The closest property listed on the National Register of Historic Places, Long Creek School, is over two miles north of the Airport. Any areas of the Airport that would be subject to ground disturbance should be surveyed for cultural resources prior to construction unless previously disturbed to the point that artifacts could no longer be intact. Should unanticipated cultural resources be uncovered during construction activities, all activities near the find will cease and the FAA will be notified immediately. As outlined in Section 8.8 of the FAA 1050.1F, *Desk Reference* (July 2015), the FAA will then notify the State Historic Preservation Officer, Tribal Historic Preservation Officer, any tribe that might attach religious and cultural significance to the affected property, and the Advisory Council on Historic Preservation to resolve any adverse effects.

LAND USE

The FAA has not established a significance threshold for Land Use, nor are there specific independent factors to consider. The determination that significant impacts exist in the Land Use category is normally dependent on the significance of other impacts.

The ALP proposes several areas of land acquisition to help prevent land use compatibility issues with the Airport. A total of approximately 17 acres of land is proposed for acquisition, broken into the following parcels:

- 15.56 acres near the Runway 13 RPZ;
- 0.17 acres just outside of the Runway 13 RPZ, adjacent to the proposed County Road 35 re-route;
- 0.59 acres directly east of the above 0.17-acre acquisition; and,
- 0.09 acres in the Runway 31 RPZ (two parcels: 2.16 acres and 4.22 acres).

The above land acquisitions contain primarily vacant and open space. Given that there are no residences or businesses that must be removed, the acquisition of these should not pose an issue for the Airport.

NATURAL RESOURCES AND ENERGY SUPPLY

The FAA has not established a significance threshold for this category. A factor to consider is if the action would have the potential to cause demand to exceed available or future supplies of these resources.

Planned development projects at the Airport are not anticipated to result in a demand for natural resources or energy consumption beyond what is available by service providers.

NOISE AND NOISE-COMPATIBLE LAND USE

The FAA has developed a significance threshold for the Noise and Compatible Land Use Category. Should the proposed action increase noise by DNL[6]1.5 dB or more for a noise-sensitive area that is exposed to noise at or above the DNL 65 dB noise exposure level, or that will be exposed at or above the DNL 65 dB level due to a DNL 1.5 dB or greater increase when compared to the no action alternative for the same timeframe. Special consideration should be given to the evaluation of the significance of noise impacts on noise-sensitive areas within Section 4(f) properties.

As seen on **Exhibit BB**, the current noise contours are entirely within the Airport property limits, thus causing no significant impacts to surrounding noise-sensitive uses. **Exhibit BB** also shows future noise contours. The 65 DNL contour extends just beyond Airport property limits on the southwestern side of Runway 13-31. The parcel of land the noise contour extends onto is vacant and undeveloped, thus posing no impact to a noise-sensitive receptor.

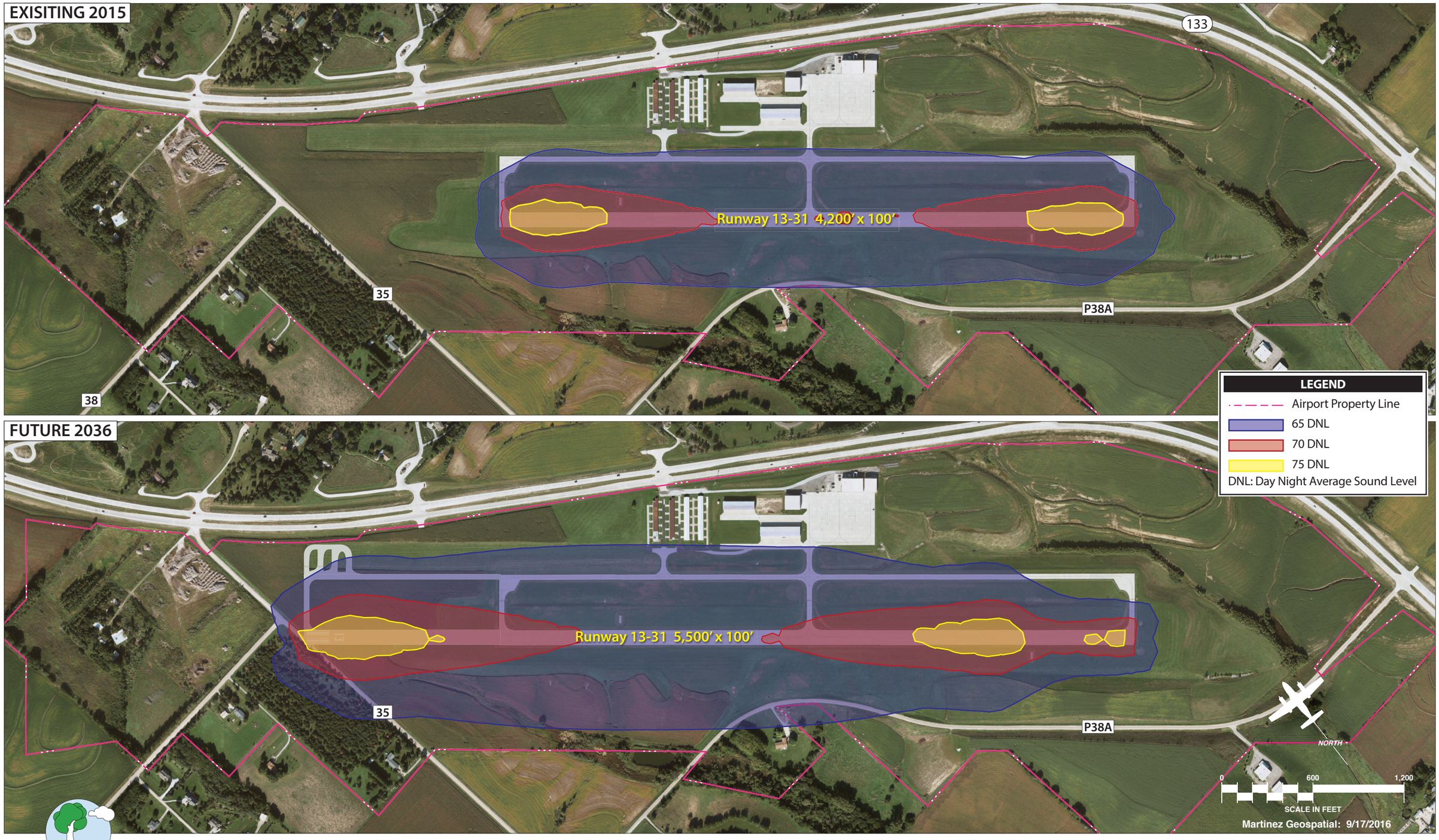
SOCIOECONOMICS, ENVIRONMENTAL JUSTICE, AND CHILDREN'S ENVIRONMENTAL HEALTH AND SAFETY RISKS

Socioeconomics

The FAA has not established a significance threshold for Socioeconomics; however, factors to consider are if an action would have the potential to:

- Induce substantial economic growth in an area, either directly or indirectly (e.g., through establishing projects in an undeveloped area);
- Disrupt or divide the physical arrangement of an established community;
- Cause extensive relocation when sufficient replacement housing is unavailable;

[6] Day-Night Average Sound Level (DNL). The 24-hour average sound level, in decibels, for the period from midnight to midnight, obtained after the addition of ten decibels to sound levels for the periods between midnight and 7 a.m., and between 10 p.m., and midnight, local time. The symbol for DNL is Ldn (See 14 CFR § 150.7).


EXISITING 2015
133
Runway 13-31 4,200' x 100'
35
P38A
38
FUTURE 2036
Runway 13-31 5,500' x 100'
35
P38A
LEGEND
Airport Property Line
65 DNL
70 DNL
75 DNL
DNL: Day Night Average Sound Level
NORTH
0
600
1,200
SCALE IN FEET
Martinez Geospatial: 9/17/2016

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- Cause extensive relocation of community businesses that would cause severe economic hardship for affected communities;
- Disrupt local traffic patterns and substantially reduce the levels of service of roads serving the airport and its surrounding communities; or
- Produce a substantial change in the community tax base.

There are two sections of roadways around the Airport that are slated for removal that could disrupt local traffic patterns. Within the Runway 13 RPZ, portions of County Roads 35 and 38 could be removed, rerouting traffic around the perimeter of the Runway 13 RPZ instead of the current pattern that crosses diagonally through the RPZ.

The development concept does not recommend any improvements to the Airport that would create substantial economic growth in the area, or substantially change the community's tax base.

Environmental Justice

The FAA has not established a significance threshold for Environmental Justice; however, factors to consider are if an action would have the potential to lead to a disproportionately high and adverse impact to an environmental justice population (i.e., a low-income or minority population), due to:

- Significant impacts in other environmental categories; or,
- Impacts on the physical or natural environment that affect an Environmental Justice population in a way that FAA determines is unique to the Environmental Justice population and significant to that population.

The Airport is in two Census Tracts (CT), 503 and 502.01, as seen on **Exhibit AA**. **Table PP** provides various population metrics of these two tracts.

TABLE PP
Census Tract Demographics

Demographic Metric	Census Tract 502.01	Census Tract 503
Poverty Status		
Income in Past 12 Months Below Poverty Level	170 (4.2%)	424 (9.6%)
Total	**4,048**	**4,403**
Race		
White	4,037	4,301
Black or African American	0	22
American Indian and Alaska Native	6	5
Asian	0	3
Native Hawaiian and Other Pacific Islander	0	0
Some Other Race	0	18
Two or More Races	5	54
Total	**4,048**	**4,403**

Source: U.S. Census Bureau, 2011-2015 American Community Survey 5-Year Estimates (Tables B17001 and B02001)

No disproportionately high and adverse impacts will occur to surrounding disadvantaged populations near the Airport.

Children's Environmental Health and Safety Risks

The FAA has not established a significance threshold for Children's Environmental Health and Safety Risks. However, factors to consider are if an action would have the potential to lead to a disproportionate health or safety risk to children.

Except for the County Road 35 realignment, all proposed development will occur on existing Airport property. Further, there are no institutions housing children near the Airport that would be impacted by construction.

VISUAL EFFECTS

Light Emissions

The FAA has not established a significance threshold for Light Emissions. Factors to consider include the degree to which the action would have the potential to:

- Create annoyance or interfere with normal activities from Light Emissions; and,
- Affect the visual character of the area due to the Light Emissions, including the importance, uniqueness, and aesthetic value of the affected visual resource.

The following lighting improvements are proposed on the ALP:

- Parking lot lights;
- Medium intensity runway lights added to extension of Runway 13;
- Medium intensity taxiway lighting on full parallel and connector taxiways;
- Replace 2-light precision approach path indicators with 4-light precision approach path indicators on both runway ends;
- Addition of runway end identifier lights to Runway 13; and,
- Medium intensity approach lighting system added to Runway 31.

All proposed lighting upgrades are on Airport property and will not impact surrounding land uses given the distance between the lights and any sensitive receptors.

Visual Resources / Visual Character

The FAA has not established a significance threshold for Visual Resources / Visual Character; however, the extent to which the action would have the potential to do the following should be considered:

- Affect the nature of the visual character of the area, including the importance, uniqueness, and aesthetic value of the affected visual resources;
- Contrast with the visual resources and/or visual character in the study area; and,
- Block or obstruct the views of visual resources, including whether these resources would still be viewable from other locations.

Most proposed development is on existing Airport property. There is no development proposed in areas slated for acquisition, though there will be perimeter fencing added around the future Airport property line. These proposed changes should not cause notable change in the Airport's visual character as it is today.

WATER RESOURCES

Wetlands

The FAA has established significance thresholds for wetlands based upon the potential that an action would:

- Adversely affect a wetland's function to protect the quality or quantity of municipal water supplies, including surface waters and sole source and other aquifers;
- Substantially alter the hydrology needed to sustain the affected wetland system's values and functions or those of a wetland to which it is connected;
- Substantially reduce the affected wetland's ability to retain floodwaters or storm runoff, thereby threatening public health, safety or welfare (the term welfare includes cultural, recreational, and scientific resources or property important to the public);
- Adversely affect the maintenance of natural systems supporting wildlife and fish habitat or economically important timber, food, or fiber resources of the affected or surrounding wetlands;
- Promote development of secondary activities or services that would cause the circumstances listed above to occur; or,
- Be inconsistent with applicable state wetland strategies.

According to the U.S. Fish and Wildlife Service's National Wetlands Inventory, there are no wetlands on Airport property.

Approximately 47 percent of Airport property is covered in hydric containing soils, meaning soils have the potential for water retention annually and/or seasonally. Much of the area slated for construction,

specifically for landside development, are hydric containing soils, as seen on **Exhibit Z**. Construction design should address the potential for saturated soils during Airport development. In addition, wetland surveys may be required prior to construction.

Floodplains

The action is significant if it would cause notable adverse impacts on natural and beneficial floodplain values. Natural and beneficial floodplain values are defined in Paragraph 4.k of Department of Transportation (DOT) Order 5650.2, Floodplain Management and Protection:

"Natural and Beneficial Floodplain Values – include but are not limited to: natural moderation of floods, water quality maintenance, groundwater recharge, fish, wildlife, plants, open space, natural beauty, scientific study, outdoor recreation, agriculture, aquaculture, and forestry."

Further, the FAA must determine if there would be significant floodplain encroachment based on the intensity of the encroachments and its impacts on the floodplain's natural and beneficial values. A significant floodplain encroachment under DOT Order 5650.2 is defined as an encroachment resulting in one or more of the following construction- or flood-related impacts:

- Considerable probability of loss of human life;
- Likely future damage associated with the encroachment that could be substantial in cost or extent, including interruption of service on or loss of a vital transportation facility; and
- A notable adverse impact on "natural and beneficial floodplain values."

According to the Federal Emergency Management Agency's Federal Insurance Rate Map number 31177C0315D, dated January 6, 2012, there are two floodplains near the Airport. Neither of them are on Airport property and, thus, would not be impacted by proposed construction. Both floodplains can be seen on **Exhibit AA**.

Surface Waters

The FAA has established the following significance thresholds for Surface Waters based upon a project's potential to:

- Exceed water quality standards established by federal, state, local, and tribal regulatory agencies; or,
- Contaminate public drinking water supply such that public health may be adversely affected.

Additional factors to consider are when a project would have the potential to:

- Adversely affect natural and beneficial water resource values to a degree that substantially diminishes or destroys such values;
- Adversely affect surface water such that the beneficial uses and values of such waters are appreciably diminished or can no longer be maintained and such impairment cannot be avoided or satisfactorily mitigated; or,
- Present difficulties based on water quality impacts when obtaining a permit or authorization.

There are two streams on Airport property, Thomas Creek and a tributary of Thomas Creek, shown on **Exhibit AA**. Thomas Creek flows near Runway 13 close to where the runway extension is proposed. The tributary of Thomas Creek flows onto Airport property south of Runway 31 and it just slightly crosses the parallel taxiway. The tributary of Thomas Creek flows near where there are proposed T-hangars, future pavement, and the aircraft wash facility. During construction, best management practices (BMPs) should be used to ensure there is minimal contamination to these surface waters.

For pollution prevention, the Airport operates under the National Pollutant Discharge Elimination System (NPDES) per Nebraska Title 119[7] and has a valid Stormwater Pollution Prevention Plan (SWPPP). Airport projects that increase the amount of impervious surfaces, like the proposed runway extension, parking, roads, and buildings, could increase the amount of stormwater runoff from the Airport. The Airport's stormwater drainage system may need to be upgraded, as necessary, to handle additional runoff quantities.

Groundwater

The FAA has established the following significance thresholds for Groundwater based upon a project's potential to:

- Exceed groundwater quality standards established by federal, state, local, and tribal regulatory agencies; or
- Contaminate an aquifer used for public water supply such that public health may be adversely affected.

Additional factors to consider are when a project would have the potential to:

- Adversely affect natural and beneficial groundwater values to a degree that substantially diminishes or destroys such values;

[7] Nebraska Title 19 - Rules and Regulations Pertaining to the Issuance of Permits under the National Pollutant Discharge Elimination System.

- Adversely affect groundwater quantities such that the beneficial uses and values of such groundwater are appreciably diminished or can no longer be maintained and such impairment cannot be avoided or satisfactorily mitigated; or
- Present difficulties based on water quality impacts when obtaining a permit or authorization.

The City of Blair owns and operates the public water system, which receives its water from the Missouri River. The water supply system for the city is currently capable of adequately supplying water to its consumers and has available capacity for growth. Future development at the Airport is not anticipated to substantially change the amount of water used at the Airport, thus not significantly impacting the City's water system.

Wild and Scenic Rivers

The FAA has not established a significance threshold for Wild and Scenic Rivers. Factors to consider are when an action would have an adverse impact on the values for which a river was designated (or considered for designation) through:

- Destroying or altering a river's free-flowing nature;
- A direct and adverse effect on the values for which a river was designated (or under study for designation);
- Introducing a visual, audible, or other type of intrusion that is out of character with the river or would alter outstanding features of the river's setting;
- Causing the river's water quality to deteriorate;
- Allowing the transfer or sale of property interests without restrictions needed to protect the river or the river corridor; or
- Any of the above impacts preventing a river on the Nationwide Rivers Inventory (NRI) or a Section 5(d) river that is not included in the NRI from being included in the Wild and Scenic River System or causing a downgrade in its classification (e.g., from wild to recreational).

The closest Wild and Scenic River is over 100 miles away from the Airport. The ALP projects would, therefore, not have adverse effects on a National and Wild Scenic River's outstanding remarkable values under consideration in the National River Inventory (i.e., scenery, recreation, geology, fish, wildlife, and history).

AIRPORT RECYCLING, REUSE & WASTE REDUCTION

The *FAA Modernization and Reform Act of 2012* (FMRA), which amended Title 49, United States Code (USC), included several changes to the Airport Improvement Program (AIP). Two of these changes are related to recycling, reuse, and waste reduction at airports.

- Section 132 (b) of the FMRA expanded the definition of airport planning to include "developing a plan for recycling and minimizing the generation of airport solid waste, consistent with applicable state and local recycling laws, including the cost of a waste audit."

- Section 133 of the FMRA added a provision requiring airports that have or plan to prepare a master plan, and that receive AIP funding for an eligible project, to ensure that the new or updated master plan addresses issues relating to solid waste recycling at the airport, including:

  - The feasibility of solid waste recycling at the airport;
  - Minimizing the generation of solid waste at the airport;
  - Operation and maintenance requirements;
  - A review of waste management contracts; and,
  - The potential for cost savings or the generation of revenue.

The T-hangar facilities and existing four-place executive box hangar facilities are the only buildings the Airport has purview over for waste and recycling practices. Waste and recycling for all other Airport facilities is handled independently by the entities/tenants who lease those spaces from the Airport. While the focus of this plan is on Airport-operated facilities, the Airport should work to incorporate facility-wide strategies that create consistency in waste disposal mechanisms. This would ultimately result in the reduction of materials sent to the landfill.

Understanding the Airport's waste stream requires an understanding of the types of waste typically generated at airports. Generally, waste from airports can be divided into eight categories, with additional types of municipal solid waste (MSW).[8]

- **Municipal Solid Waste** – more commonly known as trash or garbage – consists of everyday items that are used and then discarded, like product packaging. The following subcategories are either combined with MSW or sorted separately, depending on an airport's solid waste practices.
  - **Construction and Demolition Waste** (C&D) is considered non-hazardous trash resulting from land clearing, excavation, demolition, renovation or repair of structures, roads and utilities, including concrete, wood, metals, drywall, carpet, plastic, pipe, cardboard, and salvaged building components.
  - **Green Waste** is yard waste consisting of tree, shrub and grass clippings, leaves, weeds, small branches, seeds, and pods.
  - **Food Waste** includes unconsumed food products or waste generated and discarded during food preparation.
  - **Deplaned Waste** is waste removed from passenger aircraft. Deplaned waste includes bottles, cans, newspaper, mixed paper (newspaper, napkins, paper towels), plastic cups, service ware, food waste, and food-soiled paper/packaging.

[8] Recycling, Reuse and Waste Reduction at Airports, FAA (April 24, 2013)

- **Lavatory Waste** is a special waste that is emptied through a hose and pumped into a lavatory service vehicle. The waste is then transported to a triturator[9] facility for pretreatment prior to discharge in the sanitary sewage system. Due to the chemical in lavatory waste, it can present environmental and human health risks if mishandled. Caution must be taken to ensure lavatory waste is not released to the public sanitary sewerage system prior to pretreatment.
- **Spill Clean and Remediation Wastes** are also special wastes and are generated during cleanup of spills and/or the remediation of contamination from several types of sites on an airport.
- **Hazardous Wastes** are governed by the *Resource Conservation and Recovery Act* (RCRA), as well as the regulations in 40 Code of Federal Regulations (CFR) Subtitle C, Parts 260 to 270. The Environmental Protection Agency (EPA) developed less stringent regulations for certain hazardous waste, known as universal waste, described in 40 CFR Part 237 – The Universal Waste Rule. Common sources of aviation hazardous waste include:

  - Solvents
  - Caustic parts washes
  - Heavy metal paint waste and paint chips
  - Wastewater sludges
  - Unused epoxies and monomers
  - Waste fuels and other ignitable products
  - Unusable water conditioning chemicals
  - Contaminated sludge
  - Nickel Cadmium batteries
  - Waste pesticides

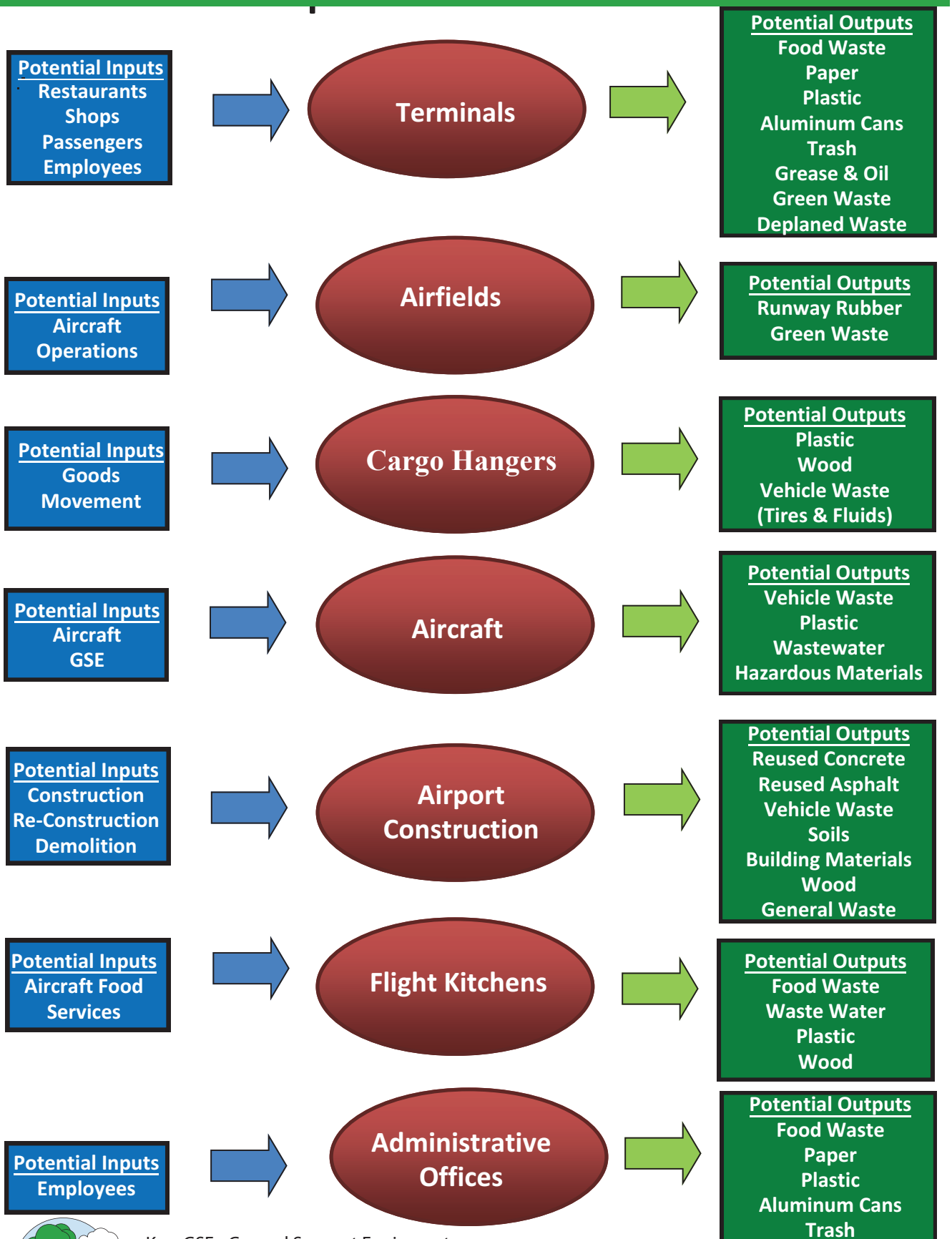
The FAA's Airport Cooperative Research Program (ACRP) identified five key best practices in its report, *Recycling Best Practices – A Guidebook for Advancing Recycling from Aircraft Cabins* (2014), that are most effective at advancing aviation recycling.

1. Secure top-down and bottom-up commitment within the airport for recycling efforts
2. Develop consistent recycling procedures and infrastructure
3. Increase the efficiency of existing systems
4. Track, evaluate, and share data on program performance
5. Make recycling a part of everyday business

As seen on **Exhibit CC**, there are seven potential areas of an airport contributing to the waste stream, including terminals, airfields, aircraft maintenance hangars, cargo hangars, flight kitchens, offices, and airport construction projects. To create a comprehensive waste reduction and recycling plan for BTA, all potential inputs must be considered.

There are often few key staff members that are directly involved in the waste management system, making their support and participation critical. It is also crucial to gain the participation of tenants to ensure buy-in of the Airport's recycling efforts. The Airport must establish consistent internal procedures to ensure there are no unacceptable items contaminating recycling containers, or recyclables thrown in the trash. Clearly marked signage of what is and is not accepted placed near the solid waste and recycling containers is another significant part of a

[9] A triturator facility turns lavatory waste into fine particulates for further processing.



Key: GSE - Ground Support Equipment

Source: Recycling, Reuse and Waste Reduction at Airports, FAA (April 2013)

consistent, effective recycling system. Currently at BTA, there are no signs at the Airport as there are no recycling bins in Airport-managed buildings. The graphic provides an example of signage that the Airport could use in the future to explain what can and cannot be recycled.

When recycling is implemented, the Airport should track tenant-specific recycling rates and waste quantities to identify cost-saving measures that are currently unidentified simply based on the lack of quantitative data. The Airport should also incorporate recycling into everyday business by providing training, education, and support to Airport personnel, tenants, and others who conduct business at the Airport. In-person meetings with Airport tenants should be held to create mutual understanding of the Airport's solid waste and recycling goals and how tenants play a vital role in the Airport's overall success.

The implementation of an effective program requires accurate data of current waste and recycling rates. There are several ways an airport can gain insight into their waste stream. The waste audit is the most comprehensive and intensive way to assess waste stream composition, opportunities for waste reduction, and capture of recyclables. This Recycling Plan is based on information provided by the Airport using an examination of records.



Figure 2: Recycling Do's and Don'ts

- **Examination of Records**
  - Waste hauling and disposal records and contracts
  - Supply and equipment invoices
  - Other waste management costs (commodity rebates, container costs, etc.)

- **Facility Walk-Through**
  - Qualitative waste information
  - Understanding waste pickup and hauling practices

- **Waste Audit**
  - Collection and analysis of the types of waste produced

SOLID WASTE

The Airport is currently doing an excellent job of right-sizing their trash containers and service pickups to the amount of solid waste generated. Waste services are provided on an as-needed basis by Abe's Trash Service. Typically, solid waste is picked up only a couple times a year, which costs the Airport a few hundred dollars annually. Other than the Airport-managed buildings, the FBO is the prime waste disposer. Solid waste is hauled to the Douglas County Landfill near Elk City, Nebraska.[10]

The City of Blair has entered into an agreement with Douglas County that authorizes the City to dispose of solid waste in the Douglas County Landfill near Elk City, Nebraska. By City Ordinance, all solid waste providers removing waste within Blair city limits are required to dispose of waste in the Douglas County Landfill.

RECYCLING

The Airport currently does not recycle; however, the Airport's current solid waste provider also offers commercial recycling opportunities. Should the Airport decide to add recycling services, the Airport could explore a contract with Abe's Trash Service, which offers two dumpster sizes, as well as the convenience of single-stream recycling.

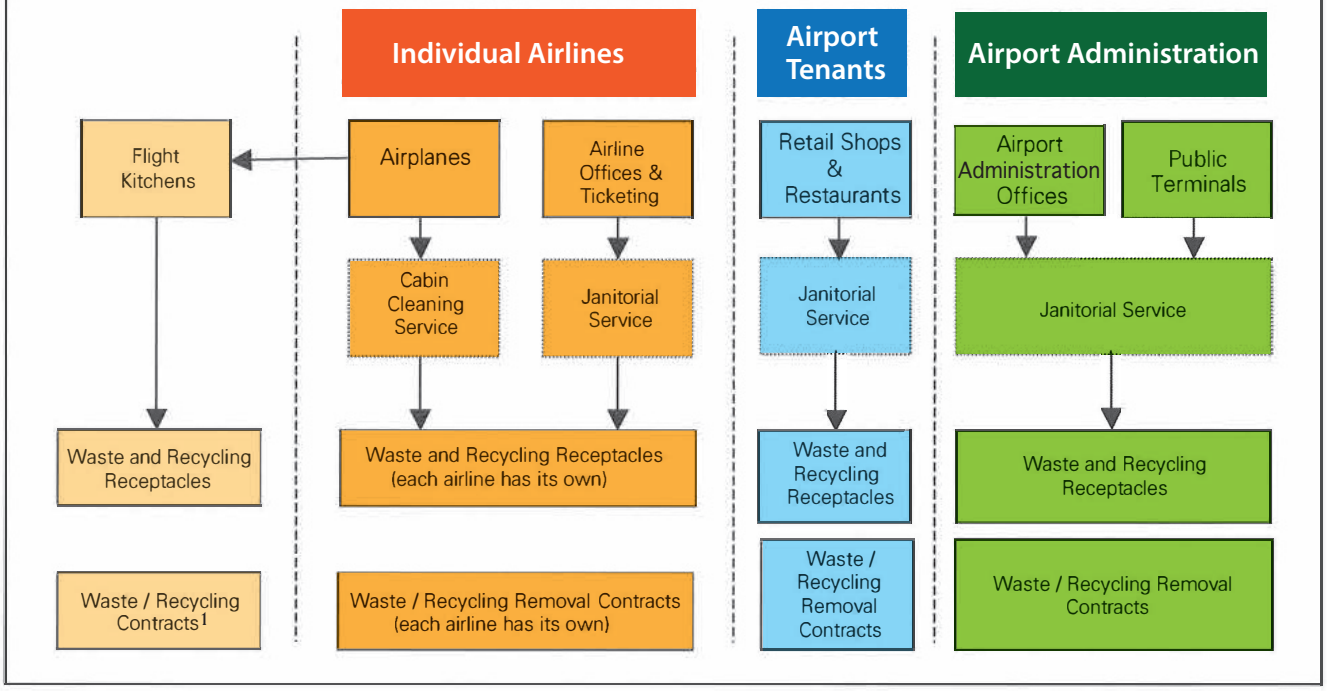
SOLID WASTE MANAGEMENT SYSTEM

Waste management services at BTA are presently managed independently by various tenants and entities in what is known as a **decentralized** waste management system. To maximize recycling efforts, the Airport should more actively engage tenants by transitioning to a **centralized** waste management system. **Exhibit DD** summarizes the differences between these two styles.

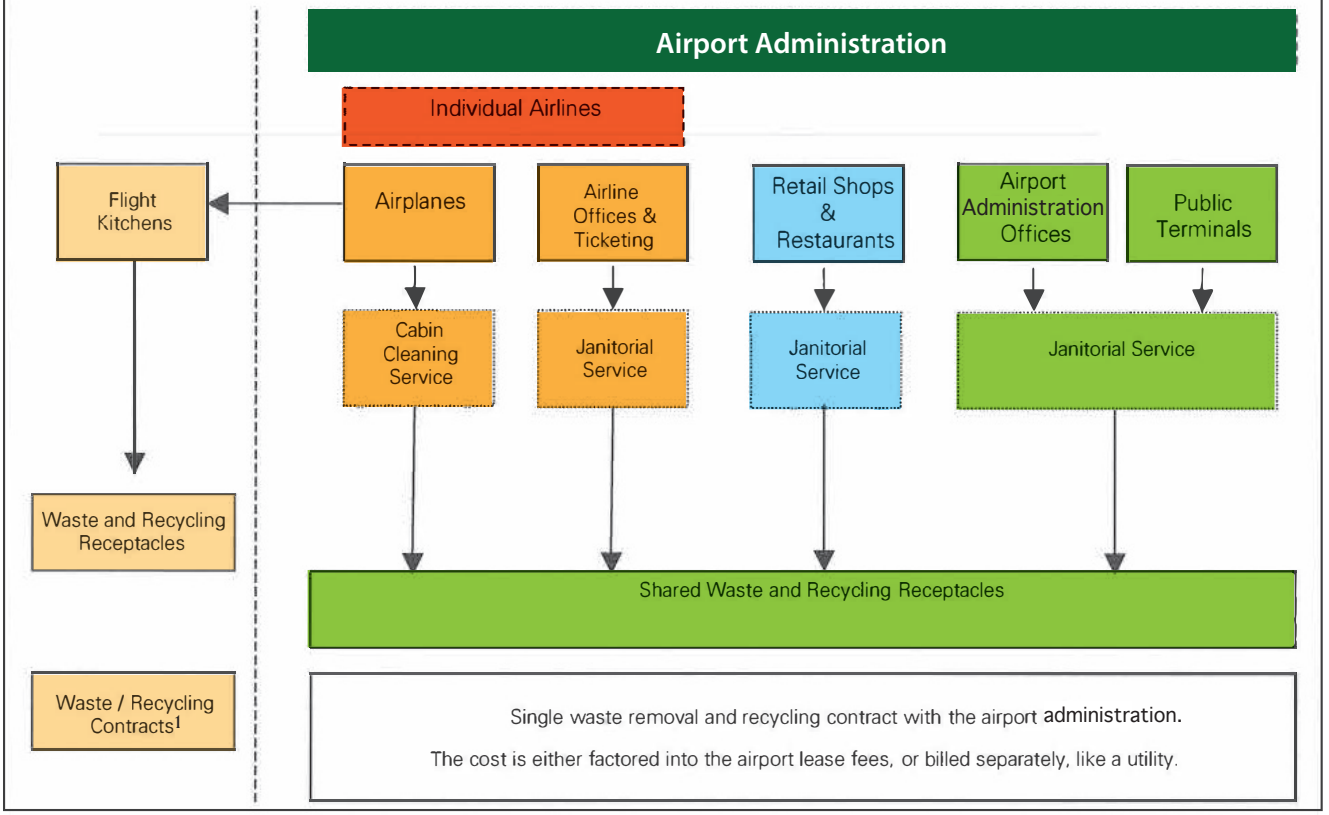
Centralized waste management systems provide greater opportunity for participation from Airport tenants who may not be incentivized to recycle on their own. The centralized system is advantageous in that is has less players involved in the overall management of the solid waste and recycling efforts. This management style allows greater control by the Airport over the type, placement, and maintenance of compactors and dumpsters, saving space and eliminating the need for each tenant to have their own containers. A centralized strategy can be inefficient for some airports as it requires more effort and oversight on the part of airport management. Ultimately, a centralized waste management system will streamline waste and recycling collection, maximizing the opportunity to reduce waste generation and increase diversion of recyclables.

[10] City of Blair Website (accessed August 2017 via http://www.blairnebraska.org/2228/Utility-Public-Works-Services)

Components of a Decentralized Airport Waste Management System



Components of a Centralized Airport Waste Management System



[1] Flight kitchens usually manage their own waste even if an airport relies on a centralized system

Source: Natural Resources Defense Council, Trash Landings: How Airlines and Airports Can Clean Up Their Recycling Programs, December 2006.

SOLID WASTE AND RECYCLING GOALS

While the Airport may or may not pursue the implementation of a centralized waste management system, there are other opportunities for improvement. **Table QQ** outlines objectives that could help reduce waste generation and increase recycling efforts at BTA. To increase the effectiveness of tracking progress at the Airport, a baseline state of all suggested metrics should be established to provide a comparison over time.

TABLE QQ
Waste Management and Recycling Goals
Blair Municipal Airport

Goals	Objectives to Meet Goals	Metrics
Reduce amount of solid waste generated	Switch to online bill pay to eliminate monthly paper bills	No longer receiving monthly paper bills
	Conduct a waste audit to identify most common types of waste	Identification of most common solid waste
	Eliminate purchase of items that are not recyclable (i.e., Styrofoam, plastic bags)	Number of items purchased that are not recyclable
Increase amount of material recycled	Begin a recycling program; or, collect recyclables to bring to Washington County Recycling Center[1] (as needed)	Hire a recycling contractor; or, track number of annual trips to Washington County Recycling Center[1]
	Increase the number of recycling bins in public areas	Number of recycling bins available to the public
	Incorporate recycling requirements and/or recommendations into tenant lease agreements	Number of tenant contracts with recycling requirements and/or recommendations
	Expand recycling marketing & promotion efforts throughout public areas	Number of marketing & promotional materials
	Require contractors to implement strategies to reduce, reuse & recycle construction & demolition waste	Incorporation of waste reduction, reuse & recycling language into construction contracts

[1] The Washington County Recycling Center is located at 440 S. 3rd Street in Blair. The facility is operated by the Washington County Recycling Association (WCRA), a non-profit organization (source: City of Blair website, August 2017).
MSW: Municipal Solid Waste

CAPITAL IMPROVEMENT PROGRAM

The analyses completed in the preceding section outline airside and landside development needs to meet projected aviation demand based on forecast activity, facility requirements, safety standards, and operational efficiency. This section will provide a description and overall cost of each project identified in the capital improvement program (CIP) and development schedule. The program outlined has been

evaluated from a variety of perspectives and represents a comparative analysis of basic budget factors, demand, and priority assignments.

The CIP is developed following FAA and NDA guidelines for airport planning and primarily identifies those projects that are likely eligible for FAA and/or NDA funding assistance. Other aviation projects that are not programmed to receive federal and/or state funding participation are also presented.

The presentation of the CIP has been organized into two sections. First, the Airport's capital program needs are recognized by various categories, ranging from enhancing safety to satisfying demand. Second, the Airport development schedule and project cost estimates are presented in narrative and graphic form.

AIRPORT DEVELOPMENT NEEDS

In an effort to identify capital needs at the Airport, this section provides an analysis regarding the associated development needs of projects included in the CIP. While some projects may be demand-based, others will be dictated by safety or rehabilitation needs.

Each development need is categorized according to this schedule. The applicable category (or categories) included are presented on **Exhibit EE**. The proposed projects can be categorized as follows:

- **Safety/Security (SS)** – These are capital needs considered necessary for operational safety and protection of aircraft and/or people and property on the ground near the Airport.
- **Environmental (EN)** – These are capital needs that are identified to enable the Airport to operate in an environmentally acceptable manner.
- **Maintenance (MN)** – These are capital needs required to maintain the existing infrastructure at the Airport.
- **Efficiency (EF)** – These are capital needs intended to optimize aircraft ground operations or passengers' use of the terminal building.
- **Demand (DM)** – These are capital needs required to accommodate levels of aviation demand. The implementation of these projects should only occur when demand for these needs is verified.
- **Opportunities (OP)** – These are capital needs intended to take advantage of opportunities afforded by the Airport setting. Typically, this will involve improvements to property intended for lease to aviation or non-aviation related development.

Project #		Project Category	Federal Funding	Airport/Local Share	Total Project Cost Estimate
Short Term Project Description					
Planning Year 2020					
1	Construct automobile parking and access road southeast of the existing entrance	DM/OP	$ 738,000.00	$ 82,000.00	$ 820,000.00
2019 Total			**$ 738,000.00**	**$ 82,000.00**	**$ 820,000.00**
Planning Year 2021					
2	Design/Construct one 80 x 100-foot conventional hangar and supporting pavement	DM	$ -	$ 854,000.00	$ 854,000.00
2020 Total			**$ -**	**$ 854,000.00**	**$ 854,000.00**
Planning Year 2023					
3	Clear and grub property for the 1,300-foot northwest runway extension	SS	$ 602,100.00	$ 66,900.00	$ 669,000.00
2022 Total			**$ 602,100.00**	**$ 66,900.00**	**$ 669,000.00**
Planning Year 2024					
4	Acquire property (total of 23.30 acres)	SS/OP	$ 166,500.00	$ 18,500.00	$ 185,000.00
2023 Total			**$ 166,500.00**	**$ 18,500.00**	**$ 185,000.00**
Total Short Term Program			***$ 1,506,600.00***	***$ 1,021,400.00***	***$ 2,528,000.00***
Intermediate Term Project Description					
5	Environmental documentation for ultimate Runway 13-31 and parallel taxiway extension	EN	$ 225,000.00	$ 25,000.00	$ 250,000.00
6	Construct Airport maintenance building	MN/EF	$ -	$ 176,000.00	$ 176,000.00
7	Remove portions of County Roads 35 and 38 and relocate County Road 35	SS	$ 241,200.00	$ 26,800.00	$ 268,000.00
8	Construct northwest runway and parallel taxiway extension and conform to ultimate C-II standards	SS/EF	$ 5,404,500.00	$ 600,500.00	$ 6,005,000.00
9	Relocate windcone from ultimate ROFA	SS	$ 16,200.00	$ 1,800.00	$ 18,000.00
10	Joint seal and marking	SS/MN	$ 477,000.00	$ 53,000.00	$ 530,000.00
11	Install REILs on Runway 13 / upgrade PAPI-2s to PAPI-4s and relocate the PAPI-4 serving ultimate Runway 13	SS	$ 184,500.00	$ 20,500.00	$ 205,000.00
12	Construct 10-place T-Hangar and supporting pavement	DM	$ -	$ 345,000.00	$ 345,000.00
13	Pave the existing Airport entrance road and construct automobile parking	DM/OP	$ -	$ 675,000.00	$ 675,000.00
14	Replace all existing blue reflectors with MITL	SS	$ 28,800.00	$ 3,200.00	$ 32,000.00
15	Relocate connecting taxiway providing direct access to Runway 13-31 200 feet	SS	$ 144,000.00	$ 16,000.00	$ 160,000.00
16	Construct two 100 x 100-foot conventional hangars (including supporting apron area and automobile parking and access)	DM	$ -	$ 2,799,000.00	$ 2,799,000.00
Total Intermediate Term Program			***$ 6,721,200.00***	***$ 4,741,800.00***	***$ 11,463,000.00***
Long Term Project Description					
17	Construct automobile parking and access road to serve the existing and ultimate northwest aviation development	DM/OP	$ -	$ 174,000.00	$ 174,000.00
18	Construct northwest T-Hangar buildout (four 8-place hangars) and supporting pavement	DM	$ -	$ 1,638,000.00	$ 1,638,000.00
19	Construct restaurant/terminal building	DM/OP	$ -	$ 1,472,000.00	$ 1,472,000.00
20	Construct southeast apron expansion	DM/EF	$ 2,399,400.00	$ 266,600.00	$ 2,666,000.00
21	Construct aircraft wash facility	EN	$ 252,000.00	$ 28,000.00	$ 280,000.00
22	Construct southeast connecting taxiway providing access to the parallel taxiway	EF/DM	$ 111,600.00	$ 12,400.00	$ 124,000.00
23	Construct three 100 x 100-foot conventional hangars (including automobile parking and access)	DM	$ -	$ 3,269,000.00	$ 3,269,000.00
24	Construct three 100 x 100-foot conventional hangars (including automobile parking and access)	DM/EF	$ -	$ 3,441,000.00	$ 3,441,000.00
25	Construct southeast T-hangar buildout and supporting pavement	DM/EF	$ -	$ 681,000.00	$ 681,000.00
26	Construct MALS	SS	$ 225,000.00	$ 25,000.00	$ 250,000.00
27	Complete Area Navigation Approach Survey (PACS/SACS)	DM/OP	$ -	$ 50,000.00	$ 50,000.00
28	Remove existing northwest T-Hangars and temporary taxilane. Construct taxilane and three 10-place T-Hangars	DM/OP	$ -	$ 1,729,000.00	$ 1,729,000.00
29	Construct 27,600 sy southeast apron expansion (reserved for future corporate/industrial use)	DM/OP	$ 2,488,500.00	$ 276,500.00	$ 2,765,000.00
Total Long Term Program			***$ 5,476,500.00***	***$ 13,062,500.00***	***$ 18,539,000.00***
Capital Improvement Program Total			***$ 13,704,300.00***	***$ 18,825,700.00***	***$ 32,530,000.00***



Category Legend:

SS - Safety/Security
MN - Maintenance
DM - Demand
EN - Environmental
EF - Efficiency
OP - Opportunity

AIRPORT DEVELOPMENT SCHEDULE AND COST SUMMARIES

With the recommended Development Concept and specific needs and improvements for the Airport having been established, the next step is to determine a realistic implementation timeline and associated costs for the plan. The recommended improvements are grouped by planning horizon: short term (current – 5 years), intermediate term (6 – 10 years), and long term (11 – 20 years). **Table RR** summarizes key activity milestones for the three planning horizons.

TABLE RR
Activity Planning Milestones
Blair Municipal Airport

	2015	Short Term	Intermediate Term	Long Term
TOTAL BASED AIRCRAFT	**60**	**67**	**75**	**90**
ANNUAL OPERATIONS				
Itinerant				
Air Taxi	100	300	350	500
General Aviation	2,832	3,350	3,750	4,500
Military	0	0	0	0
Total Itinerant Operations	2,932	3,650	4,100	5,000
Local				
General Aviation	24,605	26,800	30,000	36,000
Military	0	0	0	0
Total Local Operations	24,605	26,800	30,000	36,000
TOTAL ANNUAL OPERATIONS	***27,537***	***30,450***	***34,100***	***41,000***

A key aspect of this document is the use of demand-based planning milestones. Many projects should be considered based on actual demand levels. As short term horizon activity levels are reached, it will then be time to program for the intermediate term based upon the next activity milestones. Similarly, when the intermediate term milestones are reached, it will be time to program for the long term activity milestones.

Many development items included in the recommended concept will need to follow these demand indicators. For example, the plan includes new hangar development. Based aircraft necessitating the need for additional hangar development and the need to accommodate growth in overall Airport activity will be the primary indicator for these projects. If based aircraft growth occurs as projected, additional hangars should be constructed to meet the demand. If growth slows or does not occur as forecast, some projects may be delayed. As a result, capital expenditures are planned to be made on an as-needed basis, which leads to a more responsible use of capital assets.

At BTA, some hangars are owned and managed privately on land leased from the Airport. Because of economic realities, many airports are relying on private developers to construct new hangars. In some

cases, private developers can keep construction costs lower, which in turn lowers the monthly fee necessary to amortize the cost of development.

The CIP for the Airport assumes future hangar construction will be funded largely by private entities. This assumption does not preclude the possibility of the Airport constructing new hangars. Ultimately, the Airport will determine, based upon demand and the specific needs of a potential developer, whether to self-fund hangar construction or to rely on private developers. The capital plan does provide for the Airport to construct apron, taxiway, and taxilane improvements leading to proposed hangar development, which is eligible for FAA and NDA (under the hangar loan program) grant funding.

Not all projects identified are necessary to meet projected demand. Other projects are necessary to enhance the safety and efficiency of the Airport, maintain existing pavement infrastructure, or to address FAA design standards.

Since this study is a conceptual document, implementation of the capital projects should only be undertaken after further refinement of their design and costs through architectural and engineering analyses. Moreover, some projects may require additional unforeseen infrastructure improvements (i.e., drainage improvements, extension of utilities, etc.) that may increase the estimated cost of the project or increase the timeline for completion.

Once a list of necessary projects was identified and refined, project-specific cost estimates were developed. The cost estimates include design, engineering, construction administration, and contingencies that may arise on the project. Capital costs presented here should be viewed only as estimates subject to further refinement during design. Nevertheless, they are considered sufficient for planning purposes. Cost estimates for each of the development projects in the CIP are based on present-day construction, design, and administration costs. Adjustments will need to be applied over time as construction costs or capital equipment costs change.

Exhibit EE presents the proposed 20-year CIP for BTA. An estimate of federal/state funding eligibility has been included, although actual funding is not guaranteed. For projects that are eligible for federal/state funding, AIP/NDA grants provide up to 90 percent of the total project cost. The remaining 10 percent, or more, of project costs are funded locally by the City of Blair. Other projects, such as the construction of new access roads, are not eligible for AIP grants because they serve private hangar facilities. As a result, these projects must be funded locally. **Exhibit FF** graphically depicts the CIP overlaid onto the airport aerial photograph and broken out into planning horizons.

The FAA and NDA each utilize a priority ranking system to help objectively evaluate potential Airport projects. Projects are weighted toward safety, infrastructure preservation, meeting design standards, and capacity enhancement. These entities will participate in the highest priority projects before considering lower priority projects, even if a lower priority project is considered a more urgent need by the local sponsor. Nonetheless, the project should remain a priority for the Airport and funding support should continue to be requested in subsequent years.

Some projects identified in the CIP will require environmental documentation. The level of documentation necessary for each project must be determined in consultation with the FAA and NDA. There are three major levels of environmental review to be considered under the *National Environmental Policy Act* (NEPA) that include categorical exclusions (CatEx), Environmental Assessments (EA), and Environmental Impact Statements (EIS). Each level requires more time to complete and more detailed information. Guidance on what level of documentation is required for a specific project is provided in FAA Order 1050.1F, *Environmental Impacts: Policies and Procedures*. The Environmental Overview presented in the previous section addresses NEPA and provides an evaluation of potential environmental impacts for BTA.

The following sections will describe in greater detail the projects identified for the Airport over the next 20 years. The projects are grouped based upon a detailed evaluation of existing and projected demand, safety, rehabilitation needs, and local priority. While the CIP shows the priority ranking of the projects, the list should be evaluated and revised on a regular basis. It is also important to note that certain projects, while listed separately for purposes of evaluation in this study, could be combined with other projects during time of construction/implementation.

SHORT TERM PLANNING PROGRAM

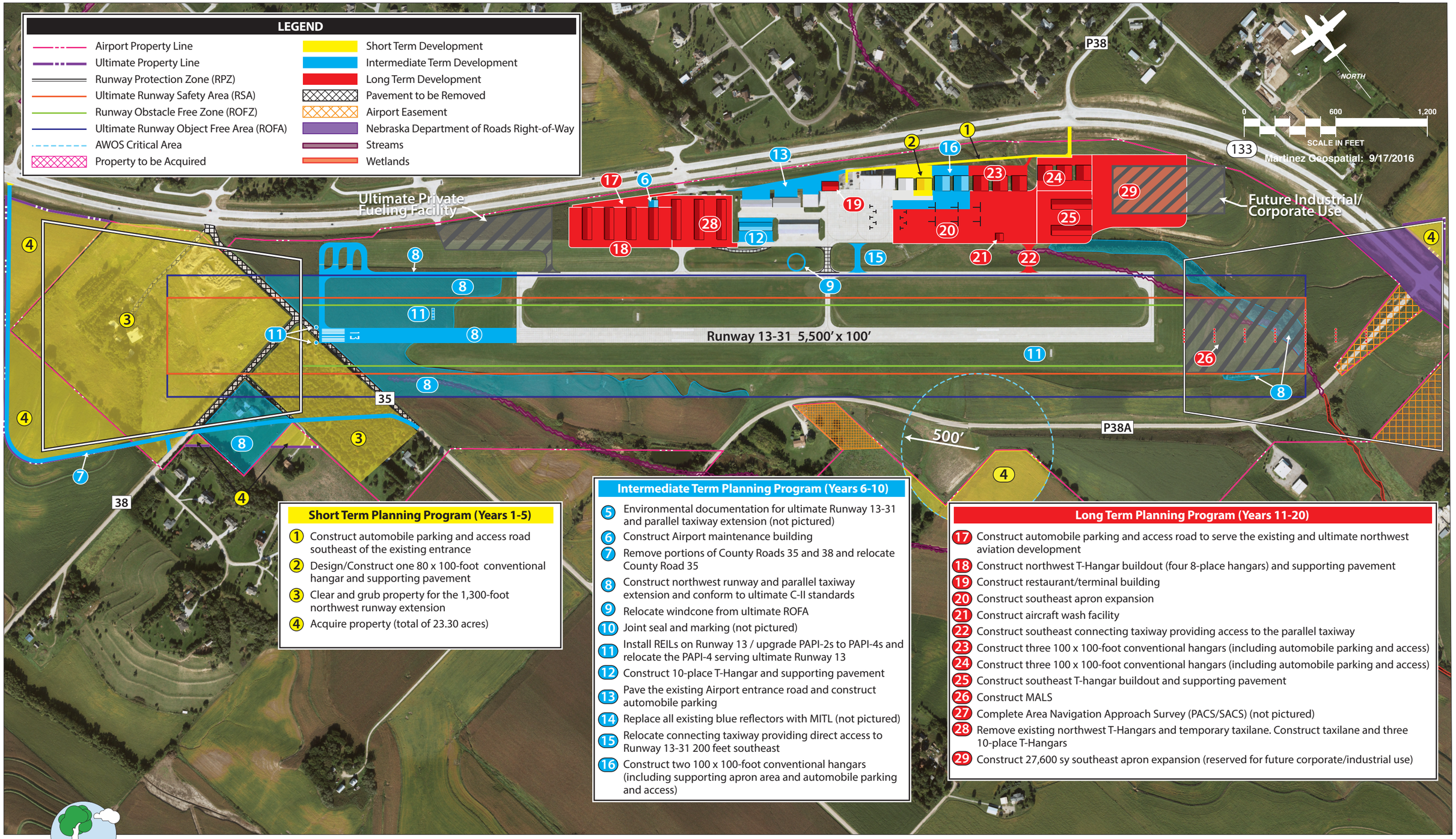
The short term planning period is the only planning horizon separated into single years. This is to allow the CIP to be coordinated with the planning cycle of NDA and the FAA. If any of these projects cannot be funded in the timeframe indicated, the Airport should consider the project for the following year.

Projects called out during this timeframe are very specific in terms of actual design and construction. As such, some projects are initially put through a design phase and then followed up with actual construction.

The short term program considers four projects for the planning period as presented on **Exhibit EE** and depicted on **Exhibit FF**. The following provides a detailed breakdown of each project.

FY 2020 Projects

Project #1: Construct Southeast Airport Entrance
Description: The addition of a secondary Airport entrance on the southeast side of the airfield would create improved Airport access, if demand warrants.
Cost Estimate: $820,000
Funding/Eligibility: State or Federal - 90 percent / Local – 10 percent



Short Term Planning Program (Years 1-5)

1. Construct automobile parking and access road southeast of the existing entrance
2. Design/Construct one 80 x 100-foot conventional hangar and supporting pavement
3. Clear and grub property for the 1,300-foot northwest runway extension
4. Acquire property (total of 23.30 acres)

Intermediate Term Planning Program (Years 6-10)

5. Environmental documentation for ultimate Runway 13-31 and parallel taxiway extension (not pictured)
6. Construct Airport maintenance building
7. Remove portions of County Roads 35 and 38 and relocate County Road 35
8. Construct northwest runway and parallel taxiway extension and conform to ultimate C-II standards
9. Relocate windcone from ultimate ROFA
10. Joint seal and marking (not pictured)
11. Install REILs on Runway 13 / upgrade PAPI-2s to PAPI-4s and relocate the PAPI-4 serving ultimate Runway 13
12. Construct 10-place T-Hangar and supporting pavement
13. Pave the existing Airport entrance road and construct automobile parking
14. Replace all existing blue reflectors with MITL (not pictured)
15. Relocate connecting taxiway providing direct access to Runway 13-31 200 feet southeast
16. Construct two 100 x 100-foot conventional hangars (including supporting apron area and automobile parking and access)

Long Term Planning Program (Years 11-20)

17. Construct automobile parking and access road to serve the existing and ultimate northwest aviation development
18. Construct northwest T-Hangar buildout (four 8-place hangars) and supporting pavement
19. Construct restaurant/terminal building
20. Construct southeast apron expansion
21. Construct aircraft wash facility
22. Construct southeast connecting taxiway providing access to the parallel taxiway
23. Construct three 100 x 100-foot conventional hangars (including automobile parking and access)
24. Construct three 100 x 100-foot conventional hangars (including automobile parking and access)
25. Construct southeast T-hangar buildout and supporting pavement
26. Construct MALS
27. Complete Area Navigation Approach Survey (PACS/SACS) (not pictured)
28. Remove existing northwest T-Hangars and temporary taxilane. Construct taxilane and three 10-place T-Hangars
29. Construct 27,600 sy southeast apron expansion (reserved for future corporate/industrial use)

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FY 2021 Projects

Project #2: Design/Construct One 80 x 100-foot Conventional Hangar on the Southeastern Side of the Existing Apron Area
Description: This project is the engineering/design and construction of one 80 x 100-foot conventional-style hangar, including supporting pavement (within 25 feet of the structure) and automobile parking located on the southeastern side of the existing apron.
Cost Estimate: $854,000
Funding/Eligibility: State or Federal - 0 percent / Local – 100 percent

FY 2023 Projects

Project #3: Clear and Grub Property for the 1,300-foot Northwest Runway Extension
Description: Currently, Airport property on the northwestern side of the airfield contains farmland utilized to grow crops, as well as trees and other vegetation once associated with residential property. This project is to clear any existing incompatible vegetation in preparation for the 1,300-foot runway extension to the northwest.
Cost Estimate: $669,000
Funding/Eligibility: State or Federal - 90 percent / Local – 10 percent

FY 2024 Projects

Project #4: Acquire Property (23.30 acres)
Description: It is recommended that the Airport own in-fee or at least have an easement over unowned property located within the RPZs serving the runway system. Currently, a total of 7.28 acres of property would be uncontrolled under the ultimate runway configuration at the Airport. However, it is recommended that the Airport also acquire the property extending beyond the ultimate RPZ serving Runway 13 up to the ROW of the proposed County Road 35. Additionally, 6.08 acres of property within the AWOS critical area should be acquired. In total, the property to be acquired amounts to 23.30 acres.
Cost Estimate: $185,000
Funding/Eligibility: State or Federal - 90 percent / Local – 10 percent

Short Term CIP Summary

The short term CIP includes projects that enhance the overall safety, efficiency, and maintenance of the airfield, while also implementing landside improvements. The total investment necessary for the short term CIP is approximately $2.5 million. Approximately $1.5 million is programmed for federal funding assistance. The remaining $1.0 million is to be provided through local funding outlets.

INTERMEDIATE TERM PLANNING HORIZON

The intermediate term covers the period 6 through 10 years and includes 12 projects. These projects are listed on **Exhibit EE** and depicted on **Exhibit FF**. Planning new projects beyond the short term timeframe can be challenging. Due to the fluid nature of funding availability and the possibility of changing priorities, these projects have been grouped together to a single project list and not prioritized by year. Further evaluation of these projects should occur during this planning horizon to determine their order of importance based on airport safety, demand, and efficiency.

Project #5: Environmental Documentation for Ultimate Runway 13-31 and Parallel Taxiway Extension
Description: Given the potential environmental impacts associated with the extension of ultimate Runway 13-31, this project provides the environmental documentation required prior to construction of the runway extension.
Cost Estimate: $250,000
Funding/Eligibility: State or Federal - 90 percent / Local – 10 percent

Project #6: Construct Airport Maintenance Building
Description: This project is for the construction of a dedicated Airport maintenance building located near the ultimate hangar development on the northwestern side of the airfield.
Cost Estimate: $176,000
Funding/Eligibility: State or Federal - 0 percent / Local – 100 percent

Project #7: Remove Portions of County Roads 35 and 38 and Relocate County Road 35
Description: This project considers the removal of portions of County Roads 35 and 38 and the relocation of a portion of County Road 35. Ultimately, County Roads 35 and 38 will obstruct the safety areas and RPZ serving the proposed Runway 13 extension. As such, County Road 35 should be relocated around the ultimate Runway 13 RPZ.
Cost Estimate: $268,000
Funding/Eligibility: State or Federal - 90 percent / Local – 10 percent

Project #8: Construct Northwest Runway and Parallel Taxiway Extension and Conform to Ultimate C-II Standards
Description: This project extends Runway 13-31 and the parallel taxiway by 1,300 feet to the northwest in order to better accommodate operations by larger business jet aircraft. Prior to upgrading the airfield to ultimate C-II standards, the Airport must ensure that all standards and gradients associated with the RSA, ROFA, and ROFZ are met. As such, this project includes the removal of any obstructing vegetation and correcting RSA gradient issues in order to conform to FAA standards for RDC C-II standards.
Cost Estimate: $6,005,000
Funding/Eligibility: State or Federal - 90 percent / Local – 10 percent

Project #9: Relocate Windcone From Ultimate ROFA
Description: When the Airport transitions to RDC C-II standards, the existing windcone will become an obstruction based upon its current location. It is recommended that the Airport relocate the windcone approximately 200 feet to the north out of the ultimate ROFA.
Cost Estimate: $18,000
Funding/Eligibility: State or Federal - 90 percent / Local – 10 percent

Project #10: Joint Seal and Marking
Description: Joint seal and marking projects have been included in this CIP as programmed in the 2017 NDA ACIP. Ultimately, this project is aimed at prolonging the life of existing pavement and increasing pilot situational awareness through improved airfield marking.
Cost Estimate: $530,000
Funding/Eligibility: State or Federal - 90 percent / Local – 10 percent

Project #11: Install REILs on Runway 13 / Upgrade the Existing PAPI-2s to PAPI-4s and relocate the PAPI-4 serving ultimate Runway 13
Description: Upon the extension of Runway 13-31, it is recommended that the Airport install REILs serving Runway 13, which will increase pilot situational awareness. The existing PAPI-2 approach aids should be upgraded to PAPI-4s as PAPI-4 approach aids typically serve and are recommended for runways that experience jet traffic. As a result of Project #8, the upgraded PAPI-4 serving Runway 13 will need to be located appropriately in relation to the Runway 13 threshold.
Cost Estimate: $205,000
Funding/Eligibility: State or Federal - 90 percent / Local – 10 percent

Project #12: Construct 10-Place T-Hangar and Supporting Pavement
Description: This project calls for the construction of a 10-place T-hangar and supporting pavement located directly across from the existing four-place executive box hangar.
Cost Estimate: $345,000
Funding/Eligibility: State or Federal - 0 percent / Local – 100 percent

Project #13: Pave the Existing Airport Entrance Road and Construct Automobile Parking
Description: This project includes the relocation and paving of the automobile parking and access road serving the southeastern side of the existing Airport entrance road.
Cost Estimate: $675,000
Funding/Eligibility: State or Federal - 0 percent / Local – 100 percent

Project #14: Replace All Existing Blue Reflectors with MITL
Description: Currently, the connecting taxiway located near the existing nested T-hangars on the northwest end of the airfield providing access to the parallel taxiway is served by blue reflectors. Upgrading this portion of the taxiway system to be served by MITL will ultimately increase pilot situational awareness, as well as airfield operational safety.
Cost Estimate: $32,000
Funding/Eligibility: State or Federal - 90 percent / Local – 10 percent

Project #15: Relocate Easternmost Portion of the Connecting Taxiway Providing Direct Access to Runway 13-31 to Improve Airfield Safety/Geometry
Description: Relocation of the easternmost portion of the connecting taxiway approximately 200 feet to the southeast will bring the taxiway into compliance with current FAA airfield geometry standards. Ultimately, the taxiway relocation will enhance the overall safety of the airport by eliminating direct access from the apron to Runway 13-31.
Cost Estimate: $160,000
Funding/Eligibility: State or Federal - 90 percent / Local – 10 percent

Project #16: Construct two 100 x 100-ft. Conventional Hangars and Supporting Pavement
Description: This project considers the construction of two 100 x 100-foot conventional aircraft storage hangars, supporting apron, and automobile parking, located south of the two proposed 80 x 100-foot conventional storage hangars.
Cost Estimate: $2,799,000
Funding/Eligibility: State or Federal - 0 percent / Local – 100 percent

Intermediate Term CIP Summary

Projects included in the intermediate term continue to improve the overall safety and efficiency of the airfield as well as expand landside facility capacities. The total investment necessary for the intermediate term CIP is approximately $11.5 million. Approximately $6.7 million is programmed for federal funding assistance. The remaining $4.8 million is to be provided through local funding sources.

LONG TERM PLANNING PROGRAM

This long term planning horizon includes 13 projects for the 10-year timeframe as listed on **Exhibit EE** and depicted on **Exhibit FF**. The following section includes a description of each project.

Project #17: Construct Automobile Parking and Access Road to Serve the Existing and Ultimate Northwest Aviation Development Area
Description: Construct paved automobile parking and access road serving the existing and proposed ultimate aviation development on the northwestern side of the existing Airport access road.
Cost Estimate: $174,000
Funding/Eligibility: State or Federal - 0 percent / Local – 100 percent

Project #18: Construct Northwest T-Hangar Buildout (Four 8-Place T-Hangars) and Supporting Pavement
Description: This project considers the construction of four 8-place T-hangars, supporting apron, and taxilanes located northwest of the existing nested T-hangar facilities near the current Airport entrance road.
Cost Estimate: $1,638,000
Funding/Eligibility: State or Federal - 0 percent / Local – 100 percent

Project #19: Construct Airport Restaurant/Terminal Building
Description: At this time, the terminal facilities provided at BTA are owned and operated by a privately owned FBO. As such, this project allows the Airport an opportunity to control their own terminal facility.
Cost Estimate: $1,472,000
Funding/Eligibility: State or Federal - 0 percent / Local – 100 percent

Project #20: Construct Southeast Apron Expansion
Description: This project considers an apron expansion to the southeast of the existing apron area encompassing approximately 29,300 sy.
Cost Estimate: $2,666,000
Funding/Eligibility: State or Federal - 90 percent / Local – 10 percent

Project #21: Construct Aircraft Wash Facility
Description: The addition of an aircraft wash facility would provide for the collection of used aircraft oil and other hazardous materials, as well as provide a covered area for aircraft washing and light maintenance.
Cost Estimate: $280,000
Funding/Eligibility: State or Federal - 90 percent / Local – 10 percent

Project #22: Construct Southeast Connecting Taxiway Providing Access to the Parallel Taxiway
Description: As a result of Project #20, additional access from the extended apron area to the parallel taxiway serving Runway 13-31 could be needed. This project is the construction of a connecting taxiway providing access from the extended apron area to the parallel taxiway.
Cost Estimate: $124,000
Funding/Eligibility: State or Federal - 90 percent / Local – 10 percent

Project #23: Construct Three 100 x 100-foot Conventional Hangars
Description: This project includes the construction of three 100 x 100-foot conventional hangars if demand warrants. Automobile parking and access serving the proposed facilities are also considered in this project.
Cost Estimate: $3,269,000
Funding/Eligibility: State or Federal - 0 percent / Local – 100 percent

Project #24: Construct Three 100 x 100-foot Conventional Hangars
Description: This project involves the construction of three additional 100 x 100-foot conventional hangars if demand warrants. Automobile parking and access serving the proposed facilities are also considered in this project.
Cost Estimate: $3,441,000
Funding/Eligibility: State or Federal - 0 percent / Local – 100 percent

Project #25: Construct Southeast T-Hangar Buildout and Supporting Pavement
Description: This project includes the construction of two 10-place T-hangars, supporting apron, and taxilanes located southwest of the proposed secondary Airport entrance road.
Cost Estimate: $681,000
Funding/Eligibility: State or Federal - 0 percent / Local – 100 percent

Project #26: Construct MALS Serving Runway 31
Description: This project includes the installation of a MALS, as this type of ALS is typically recommended for runways providing approach visibility minimums equal to or greater than 3/4-mile, but less than 1-mile.
Cost Estimate: $250,000
Funding/Eligibility: State or Federal - 90 percent / Local – 10 percent

Project #27: Complete Area Navigation Approach Survey
Description: This project is the completion of an area navigation survey to establish a Primary Airport Control Station (PACS) and Secondary Airport Control Station (SACS). These control stations are established in the vicinity of, and usually on, an airport and are tied directly to the National Spatial Reference System.
Cost Estimate: $50,000
Funding/Eligibility: State or Federal - 0 percent / Local – 100 percent

Project #28: Remove Existing Northwest T-Hangars and Temporary Taxilane and Construct Three 10-Place T-Hangars
Description: This calls for the four existing 10-unit T-hangars directly across from the Airport entrance road to be removed and replaced with three 10-unit T-hangars. This project will ultimately allow for better separation between T-hangars, bring the taxilane serving the northwest GA development area into compliance with FAA gradient standards, and allow for the removal of the temporary taxilane.
Cost Estimate: $1,729,000
Funding/Eligibility: State or Federal - 0 percent / Local – 100 percent

Project #29: Construct Southeast Apron Expansion (reserved for future corporate/industrial use)
Description: This project is the construction of a 27,600 sy apron expansion on the southeastern portion of the airfield that will be reserved for corporate or commercial use.
Cost Estimate: $2,765,000
Funding/Eligibility: State or Federal - 90 percent / Local – 10 percent

Long Term CIP Summary

The total costs associated with the long term program are estimated at $18.5 million. Of this total, approximately $5.5 million could be eligible for federal funding, and the local share is projected at $13.0 million.

CAPITAL IMPROVEMENT SUMMARY

The CIP is intended as a road map of airport improvements to help guide Blair Airport Authority, the NDA, and FAA. The plan as presented will help accommodate increases in forecast demand at BTA over the next 20 years and beyond. The first five years of the CIP are separated into yearly installments, and the intermediate and long term projects are grouped together, respectively. The sequence of projects may change due to availability of funds or changing priorities. Nonetheless, this is a comprehensive list of capital projects the Airport should consider in the next 20 years.

The total CIP proposes approximately $32.5 million in Airport development needs. Of this total, approximately $13.7 million could be eligible for federal funding assistance. The local funding estimate for the proposed CIP is $18.8 million, which is driven primarily by construction costs associated with large conventional type hangars.

CAPITAL IMPROVEMENT FUNDING SOURCES

There are generally four sources of funds used to finance airport development, which include:

- Airport cash flow
- Revenue and general obligation bonds
- Federal/state/local grants
- Passenger facility charges (PFCs), which are reserved for commercial service airports

Access to these sources of financing varies widely among airports, with some large airports maintaining substantial cash reserves and the smaller commercial service and general aviation airports often requiring subsidies from local governments to fund operating expenses and finance modest improvements.

Financing capital improvements at the Airport will not rely solely on local financial resources. Capital improvement funding is available through various grant-in-aid programs on both the federal and state levels. Historically, BTA has received federal and state grants. While more funds could be available some years, the CIP was developed with project phasing in order to remain realistic and within the range of anticipated grant assistance. The following discussion outlines key sources of funding potentially available for capital improvements at the Airport.

FEDERAL GRANTS

Through federal legislation over the years, various grant-in-aid programs have been established to develop and maintain a system of public use airports across the United States. The purpose of this system and its federally based funding is to maintain national defense and to promote interstate commerce. Recent legislation affecting federal funding was enacted on February 17, 2012 and is titled, *The FAA Modernization and Reform Act* of 2012. The law authorized FAA appropriations (AIP) at $3.35 billion for fiscal years 2012 through 2015. In 2016, Congress passed legislation (H.R. 636, *FAA Extension, Safety, and Security Act of 2016*) amending the law to expire on September 30, 2017. Subsequently, Congress passed a bill (H.R. 3823, *Disaster Tax Relief and Airport and Airway Extension Act of 2017*) authorizing appropriations to the FAA through March 31, 2018, and the *Consolidated Appropriations Act, 2018*, extended FAA's funding and authority through September 30, 2018. In October 2018, Congress passed legislation entitled, *FAA Reauthorization Act of 2018*, which will fund the FAA's AIP at $3.35 billion annually until 2023.

Several projects identified in the CIP are eligible for FAA funding through the AIP, which provides entitlement funds to airports based, in part, on their annual enplaned passengers and pounds of landed cargo weight. Additional AIP funds, designated as discretionary, may also be used for eligible projects, based on the FAA's national priority system. Although the AIP has been reauthorized several times and the funding formulas have been periodically revised to reflect changing national priorities, the program has remained essentially the same. Public use airports that serve civil aviation, like BTA, may receive AIP funding for eligible projects, as described in FAA's *Airport Improvement Program Handbook*. The Airport must fund the remaining project costs using a combination of other funding sources, as discussed further below.

Eligible airports, which include those in the NPIAS, such as BTA, can apply for airport improvement grants. **Table SS** presents the approximate distribution of the AIP funds. Currently, the Airport is eligible to apply for grants which may be funded through several categories.

Funding for AIP-eligible projects is undertaken through a cost-sharing arrangement in which the FAA share varies by airport size and is generally 75 percent for large and medium hub airports and 90 percent for all other airports. In exchange for this level of funding, the airport sponsor is required to meet various grant assurances, including maintaining the improvement for its useful life, usually 20 years.

The source for AIP funds is the Aviation Trust Fund. The Aviation Trust Fund was established in 1970 to provide funding for aviation capital investment programs (aviation development, facilities and equipment, and research and development). The Aviation Trust Fund also finances the operation of the FAA. It is funded by user fees, including taxes on airline tickets, aviation fuel, and various aircraft parts.

TABLE SS
Federal AIP Funding Distribution

Funding Category	Percent of Total	Funds*
Apportionment/Entitlement		
Passenger Entitlements	26.6%	$891,100,000
Cargo Entitlements	3.5%	$117,250,000
Alaska Supplemental	0.7%	$23,450,000
State Apportionment for Nonprimary Entitlements	12.5%	$418,750,000
State Apportionment Based on Area and Population	7.4%	$247,900,000
Carryover	22.1%	$740,350,000
Small Airport Fund		
Small Hubs	2.2%	$73,700,000
Nonhubs	8.7%	$291,450,000
Nonprimary (GA and Reliever)	4.3%	$144,050,000
Discretionary		
Capacity/Safety/Security/Noise	5.4%	$180,900,000
Pure Discretionary	1.8%	$60,300,000
Set Asides		
Noise	4.2%	$140,700,000
Military Airports Program	0.5%	$16,750,000
Reliever	0.1%	$3,350,000
Totals	100.00%	$3,350,000,000

* FAA *Modernization and Reform Act of 2012 – expired September 30, 2015*
AIP: Airport Improvement Program
Source: FAA Order 5100.38D, Airport Improvement Program Handbook

Apportionment (Entitlement) Funds

AIP provides funding for eligible projects at airports through an apportionment (entitlement) program. Non-primary airports, such as BTA, are eligible to receive federal assistance each year in the amount of $150,000. These non-primary entitlement (NPE) funds are available to use in the fiscal year it becomes available and the following three fiscal years. Unused funds expire after four years unless the sponsor obligates the funds under a grant or transfers the funds to another NPIAS airport.

States also receive a direct apportionment based on a federal formula that takes into account area and population. Each state has the ability to distribute these funds for projects at various airports throughout the state.

Small Airport Fund

If a large or medium hub commercial service airport chooses to institute a PFC, which is a fee of up to $4.50 on each airline ticket for funding of capital improvement projects, then their apportionment is reduced. A portion of the reduced apportionment goes to the small airport fund. The small airport fund is reserved for small-hub primary commercial service airports, non-hub commercial service airports, and general aviation airports. BTA is a general aviation airport; therefore, it is eligible for small airport funds.

Discretionary Funds

In a number of cases, airports face major projects that will require funds in excess of the airport's annual entitlements. Thus, additional funds from discretionary apportionments under AIP become desirable. The primary feature about discretionary funds is that they are distributed on a priority basis. These priorities are established by the FAA, utilizing a priority code system. Under this system, projects are ranked by their purpose. Projects ensuring airport safety and security are ranked as the most important priorities, followed by maintaining current infrastructure development, mitigating noise and other environmental impacts, meeting standards, and increasing system capacity. Additional buildings and structures may be eligible if the function of the structure is to serve airport operations in a non-revenue generating capacity, such as maintenance facilities.

It is important to note that competition for discretionary funding is not limited to airports in the State of Nebraska or even those within the FAA Central Region. The funds are distributed to all airports in the country and, as such, are more difficult to obtain. High priority projects will often fare favorably, while lower priority projects many times will not receive discretionary grants.

Set-Aside Funds

Portions of AIP funds are set-asides designed to achieve specific funding minimums for noise compatibility planning and implementation, select former military airfields (Military Airport Program), and select reliever airports. BTA does not qualify for set-aside funds as it is not a former military airfield or a reliever airport.

FAA Facilities and Equipment (F&E) Program

The Airway Facilities Division of the FAA administers the Facilities and Equipment (F&E) Program. This program provides funding for the installation and maintenance of various navigational aids and equipment of the national airspace system. Under the F&E program, funding is provided for FAA airport traffic control towers (ATCTs), enroute navigational aids, on-airport navigational aids, and approach lighting systems.

While F&E still installs and maintains some navigational aids, on-airport facilities at general aviation airports have not been a priority. Therefore, airports often request funding assistance for navigational aids through AIP and then maintain the equipment on their own[11].

STATE AID TO AIRPORTS

In support of the state aviation system, the NDA also participates in airport improvement projects. The source for state airport improvement funds is the *State Aid Program* which was established in 1945 and amended in 2003. This program is administered by the Nebraska Division of Aeronautics. Project approval and funding limits are determined by the Nebraska Aeronautics Commission, which also has the right to fund projects outside the scope of the program at their discretion.

Under the program, all Nebraska public use airports that are included in the *Nebraska State Aviation System Plan* are eligible. The funding limits are as follows:

- State projects: up to 90 percent state funds.
- State projects acquiring land or terminal buildings: 50 percent state funds.
- Federal projects: two (2) percent state funds on federally funded projects with total costs greater than $500,000.

State funds are limited to $100,000 per airport per fiscal year, except that runway construction for state-aid projects is limited to $200,000. State funds allocated for a federal project are limited to a total of $100,000. A federal project includes the entire scope of the federal grant. Multiple grants which are used to finance the same scope of work are considered to be one project.

The following is a partial list of airport projects that are generally eligible for funding from the state:

1. <u>Grading, paving, pavement rehabilitation and federally funded seal coating</u>:

    a. Runways and turnarounds.
    b. Taxiways, including hold aprons and taxiways between hangars. Individual hangar ramps up to the hangar doors are eligible only under the Hangar Loan Program.
    c. Aprons - except pavement within 25 feet of a building since aircraft cannot park in this area. This 25-foot area is partially eligible for new hangars under the Hangar Loan Program.

[11] Guidance on the eligibility of a project for federal AIP grant funding can be found in FAA Order 5100.38D, *Airport Improvement Program Handbook*, which can be accessed at: http://www.faa.gov/airports/aip/aip_handbook/media/AIP-Handbook-Order-5100-38D

2. Lighting of eligible paved or graded items, including a vault, electrical equipment, beacon, standby generator, reflective markers, flood lights, etc.

3. Visual Navaids - PAPI, REIL, ALS, and AWOS. Emphasis will be placed on navaids for instrument runways and on those needed for obstacle clearance.

4. Airport Layout Plans (ALPs), Environment Assessment Reports (EAs), and other planning studies.

5. Obstruction removal of objects in the runway protection zones and objects violating Part 77 obstruction standards. Includes the relocation of roads to allow necessary airport development.

6. Land and easement acquisition for all airport developments, including fencing and relocation.

7. Administration and terminal buildings - public use areas only. Areas rented or reserved for private use are not eligible. Airport offices such as the manager's office or the authority's meeting room are eligible. The eligible amount will be determined by prorating the actual square footage of each area.

8. Related Items (listed below) are eligible at the same rate of participation as the item to which they are related.

    a. Consulting and other fees, such as engineering, testing, advertising, administrative and legal fees. These fees are only eligible when the project they are related to is completed within a reasonable time. Typically, the fees are not reimbursed until after the construction/ acquisition contracts are executed.
    b. Related construction items like pavement repairs, utility relocation, incidental fencing, marking, seeding, drainage structures, ducts, etc.

The following is a partial list of projects not eligible under the *State Aid Program*:

1. Not eligible under any state program:
    a. Security (FAR Part 107) and guidance signs (FAR Part 139).
    b. Vehicles (SRE and ARFF) and associated buildings.
    c. Passenger lifts for commuter aircraft.
    d. Other regular maintenance items.
    e. Paving access roads and parking lots.
    f. Runway development not shown on an approved ALP.

2. Not eligible under this program but eligible under other NDA programs:
   a. Crack/joint sealing not related to construction.
   b. Seal coats, slurry seals and rejuvenators
   c. Marking not related to construction.
   d. Hangars.
   e. Fuel storage.
   f. NDB, VOR and ILS.

Additional NDA Funding Programs

The NDA offers several other funding programs. The *Revolving Hangar Program* was established in 1954. This program provides no interest loans to public use airports for hangar construction (typically T-hangar construction). NDA will loan up to 70 percent of the cost of new construction and 50 percent of eligible costs for existing hangar rehabilitation and/or door replacement, up to the amount approved by the Nebraska Aeronautics Commission (NAC). The maximum loan amount is a total of $600,000, inclusive of all loans made under the program. New construction must be repaid in 10 years and rehabilitation or door replacement must be repaid in five years.

NDA and the NAC also offer the *Fuel Storage Loan Program* of 2004. This is a no interest loan for the expansion of static fuel storage facilities. Mobile tanks are not eligible for this program. Additional fuel storage capacity must first be justified through fuel sales records. This program will provide up to 70 percent funding with a $50,000 cap. The balance must be repaid within 10 years.

NDA and NAC also offer a pavement marking program, a crack and joint sealing program, and a pavement preservation program. These programs are cost sharing programs, in which a portion of the cost is subsidized by NDA.

LOCAL FUNDING

The balance of project costs, after consideration has been given to grants, must be funded through local resources. The goal for the operation of the Airport is to generate ample revenues to cover all operating and maintenance costs, as well as the local matching share of capital expenditures. As with many airports, this is not always possible and other financial methods will be needed.

According to **Exhibit EE**, local funding will be needed in each planning horizon. This includes a total of $3.0 million in the short term, $5.2 million in the intermediate term, and $11.5 million in the long term.

There are several local financing options to consider when funding future development at airports, including airport revenues, issuance of a variety of bond types, and leasehold financing. These strategies could be

used to fund the local matching share, or complete a project if grant funding cannot be arranged. Below is a brief description of the most common local funding options:

Leasehold/Third-Party Financing: Leasehold or third-party financing refers to a developer or tenant financing improvements under a long term ground lease. The obvious advantage of such an arrangement is that it relieves the airport of all responsibility for raising the capital funds for improvements. However, the private development of facilities on a ground lease, particularly on property owned by the airport, produces a unique set of concerns. In particular, it may be more difficult to obtain private financing as only the improvements and the right to continue the lease can be claimed in the event of a default. Ground leases normally provide for the reversion of improvements to the airport at the end of the lease term, which reduces their potential value to a lender taking possession. Also, companies that want to own their property as a matter of financial policy may not locate where land is only available for lease.

Bonding: Bonding is a common method to finance large capital projects at airports. A bond is an instrument of indebtedness of the bond issuer to the bond holders; thus, a bond is a form of loan or IOU. While bond terms are negotiable, typically the bond issuer is obligated to pay the bond holder interest at regular intervals and/or repay the principal at a later date.

General Revenue: The operations of the airport generate revenues, which are secured by federal grant assurances to be utilized at the airport. All receipts, excluding bond proceeds or related grants and interest, are irrevocably pledged to the punctual payment of operating and maintenance expenses, payment of debt service for as long as bonds remain outstanding, or for additions or improvements to airport facilities.

All public use airports should establish standard basis rates for various leases. All lease rates should be set to adjust to a standard index such as the Consumer Price Index to assure that fair and equitable rates continue to be charged into the future. The condition and location of hangar space should also be considered when establishing the lease rates. Standard basis rates should be established for sponsor-owned hangars, terminal building office space, and ground leases. Fuel flowage fees and aircraft tie-down fees should also be uniform.

PLAN IMPLEMENTATION

The best means to begin implementation of the recommendations in this study is to first recognize that planning is a continuous process that does not end with completion and approval of this document. The issues upon which this study is based will remain valid for a number of years. The primary goal is for the Airport to best serve the air transportation needs of the region, while striving toward economic self-sufficiency.

The CIP and the phasing program presented will change over time. An effort has been made to identify and prioritize all major capital projects that would require FAA grant funding. Nonetheless, the Airport and NDA review the five-year CIP on an annual basis.

The real value of a usable planning document is in keeping the issues and objectives in the minds of the managers and decision-makers so that they are better able to recognize change and its effect. In addition to adjustments in aviation demand, decisions made as to when to undertake the improvements recommended in this study will impact the timeframe that the plan remains valid. The format used in this plan is intended to reduce the need for formal and costly updates by simply adjusting the timing. Updating can be done by the manager, thereby improving the plan's effectiveness. Nonetheless, the FAA and NDA typically encourage airports to update their planning documents every seven to ten years, or sooner if significant changes occur in the interim.

In summary, the planning process requires Airport management to monitor the progress of the Airport. The information obtained from continually monitoring Airport activity, as well as changes to FAA design standards, will provide the information necessary to determine if the development schedule should be accelerated or decelerated.

BLAIR
MUNICIPAL AIRPORT

APPENDIX A
GLOSSARY



Blair . . . A promise of quality

Glossary of Terms

A

ABOVE GROUND LEVEL: The elevation of a point or surface above the ground.

ACCELERATE-STOP DISTANCE AVAILABLE (ASDA): See declared distances.

ADVISORY CIRCULAR: External publications issued by the FAA consisting of nonregulatory material providing for the recommendations relative to a policy, guidance and information relative to a specific aviation subject.

AIR CARRIER: An operator which: (1) performs at least five round trips per week between two or more points and publishes flight schedules which specify the times, days of the week, and places between which such flights are performed; or (2) transports mail by air pursuant to a current contract with the U.S. Postal Service. Certified in accordance with Federal Aviation Regulation (FAR) Parts 121 and 127.

AIRCRAFT: A transportation vehicle that is used or intended for use for flight.

AIRCRAFT APPROACH CATEGORY: A grouping of aircraft based on 1.3 times the stall speed in their landing configuration at their maximum certificated landing weight. The categories are as follows:

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

AIRCRAFT OPERATION: The landing, takeoff, or touch-and-go procedure by an aircraft on a runway at an airport.

AIRCRAFT OPERATIONS AREA (AOA): A restricted and secure area on the airport property designed to protect all aspects related to aircraft operations.

AIRCRAFT OWNERS AND PILOTS ASSOCIATION: A private organization serving the interests and needs of general aviation pilots and aircraft owners.

AIRCRAFT RESCUE AND FIRE FIGHTING: A facility located at an airport that provides emergency vehicles, extinguishing agents, and personnel responsible for minimizing the impacts of an aircraft accident or incident.

AIRFIELD: The portion of an airport which contains the facilities necessary for the operation of aircraft.

AIRLINE HUB: An airport at which an airline concentrates a significant portion of its activity and which often has a significant amount of connecting traffic.

AIRPLANE DESIGN GROUP (ADG): A grouping of aircraft based upon wingspan. The groups are as follows:

- Group I: Up to but not including 49 feet.
- Group II: 49 feet up to but not including 79 feet.
- Group III: 79 feet up to but not including 118 feet.
- Group IV: 118 feet up to but not including 171 feet.
- Group V: 171 feet up to but not including 214 feet.
- Group VI: 214 feet or greater.

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

AIRPORT BEACON: A navigational aid located at an airport which displays a rotating light beam to identify whether an airport is lighted.

AIRPORT CAPITAL IMPROVEMENT PLAN: The planning program used by the Federal Aviation Administration to identify, prioritize, and distribute funds for airport development and the needs of the National Airspace System to meet specified national goals and objectives.

AIRPORT ELEVATION: The highest point on the runway system at an airport expressed in feet above mean sea level (MSL).

AIRPORT IMPROVEMENT PROGRAM: A program authorized by the Airport and Airway Improvement Act of 1982 that provides funding for airport planning and development.

AIRPORT LAYOUT DRAWING (ALD): The drawing of the airport showing the layout of existing and proposed airport facilities.

AIRPORT LAYOUT PLAN (ALP): A scaled drawing of the existing and planned land and facilities necessary for the operation and development of the airport.

AIRPORT LAYOUT PLAN DRAWING SET: A set of technical drawings depicting the current and future airport conditions. The individual sheets comprising the set can vary with the complexities of the airport, but the FAA-required drawings include the Airport Layout Plan (sometimes referred to as the Airport Layout Drawing (ALD), the Airport Airspace Drawing, and the Inner Portion of the Approach Surface Drawing, On-Airport Land Use Drawing, and Property Map.

AIRPORT MASTER PLAN: The planner's concept of the long-term development of an airport.

AIRPORT MOVEMENT AREA SAFETY SYSTEM: A system that provides automated alerts and warnings of potential runway incursions or other hazardous aircraft movement events.

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

AIRPORT REFERENCE CODE (ARC): A coding system used to relate airport design criteria to the operational (Aircraft Approach Category) to the physical characteristics (Airplane Design Group) of the airplanes intended to operate at the airport.

AIRPORT REFERENCE POINT (ARP): The latitude and longitude of the approximate center of the airport.

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

AIRPORT SURFACE DETECTION EQUIPMENT: A radar system that provides air traffic controllers with a visual representation of the movement of aircraft and other vehicles on the ground on the airfield at an airport.

AIRPORT SURVEILLANCE RADAR: The primary radar located at an airport or in an air traffic control terminal area that receives a signal at an antenna and transmits the signal to air traffic control display equipment defining the location of aircraft in the air. The signal provides only the azimuth and range of aircraft from the location of the antenna.

AIRPORT TRAFFIC CONTROL TOWER (ATCT): A central operations facility in the terminal air traffic control system, consisting of a tower, including an associated instrument flight rule (IFR) room if radar equipped, using air/ground communications and/or radar, visual signaling and other devices to provide safe and expeditious movement of terminal air traffic.

AIR ROUTE TRAFFIC CONTROL CENTER: A facility which provides en route air traffic control service to aircraft operating on an IFR flight plan within controlled airspace over a large, multi-state region.

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

AIRSPACE: The volume of space above the surface of the ground that is provided for the operation of aircraft.

AIR TAXI: An air carrier certificated in accordance with FAR Part 121 and FAR Part 135 and authorized to provide, on demand, public transportation of persons and property by aircraft. Generally operates small aircraft "for hire" for specific trips.

AIR TRAFFIC CONTROL: A service operated by an appropriate organization for the purpose of providing for the safe, orderly, and expeditious flow of air traffic.

AIR ROUTE TRAFFIC CONTROL CENTER (ARTCC): A facility established to provide air traffic control service to aircraft operating on an IFR flight plan within controlled airspace and principally during the en route phase of flight.

AIR TRAFFIC CONTROL SYSTEM COMMAND CENTER: A facility operated by the FAA which is responsible for the central flow control, the central altitude reservation system, the airport reservation position system, and the air traffic service contingency command for the air traffic control system.

AIR TRAFFIC HUB: A categorization of commercial service airports or group of commercial service airports in a metropolitan or urban area based upon the proportion of annual national enplanements existing at the airport or airports. The categories are large hub, medium hub, small hub, or non-hub. It forms the basis for the apportionment of entitlement funds.

AIR TRANSPORT ASSOCIATION OF AMERICA: An organization consisting of the principal U.S. airlines that represents the interests of the airline industry on major aviation issues before federal, state, and local government bodies. It promotes air transportation safety by coordinating industry and governmental safety programs and it serves as a focal point for industry efforts to standardize practices and enhance the efficiency of the air transportation system.

ALERT AREA: See special-use airspace.

ALTITUDE: The vertical distance measured in feet above mean sea level.

ANNUAL INSTRUMENT APPROACH (AIA): An approach to an airport with the intent to land by an aircraft in accordance with an IFR flight plan when visibility is less than three miles and/or when the ceiling is at or below the minimum initial approach altitude.

APPROACH LIGHTING SYSTEM (ALS): An airport lighting facility which provides visual guidance to landing aircraft by radiating light beams by which the pilot aligns the aircraft with the extended centerline of the runway on his final approach and landing.

APPROACH MINIMUMS: The altitude below which an aircraft may not descend while on an IFR approach unless the pilot has the runway in sight.

APPROACH SURFACE: An imaginary obstruction limiting surface defined in FAR Part 77 which is longitudinally centered on an extended runway centerline and extends outward and upward from the primary surface at each end of a runway at a designated slope and distance based upon the type of available or planned approach by aircraft to a runway.

APRON: A specified portion of the airfield used for passenger, cargo or freight loading and unloading, aircraft parking, and the refueling, maintenance and servicing of aircraft.

AREA NAVIGATION: The air navigation procedure that provides the capability to establish and maintain a flight path on an arbitrary course that remains within the coverage area of navigational sources being used.

AUTOMATED TERMINAL INFORMATION SERVICE (ATIS): The continuous broadcast of recorded non-control information at towered airports. Information typically includes wind speed, direction, and runway in use.

AUTOMATED SURFACE OBSERVATION SYSTEM (ASOS): A reporting system that provides frequent airport ground surface weather observation data through digitized voice broadcasts and printed reports.

AUTOMATIC WEATHER OBSERVATION STATION (AWOS): Equipment used to automatically record weather conditions (i.e. cloud height, visibility, wind speed and direction, temperature, dew point, etc.)

AUTOMATIC DIRECTION FINDER (ADF): An aircraft radio navigation system which senses and indicates the direction to a non-directional radio beacon (NDB) ground transmitter.

AVIGATION EASEMENT: A contractual right or a property interest in land over which a right of unobstructed flight in the airspace is established.

AZIMUTH: Horizontal direction expressed as the angular distance between true north and the direction of a fixed point (as the observer's heading).

B

BASE LEG: A flight path at right angles to the landing runway off its approach end. The base leg normally extends from the downwind leg to the intersection of the extended runway centerline. See "traffic pattern."

BASED AIRCRAFT: The general aviation aircraft that use a specific airport as a home base.

BEARING: The horizontal direction to or from any point, usually measured clockwise from true north or magnetic north.

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

BLAST PAD: A prepared surface adjacent to the end of a runway for the purpose of eliminating the erosion of the ground surface by the wind forces produced by airplanes at the initiation of takeoff operations.

BUILDING RESTRICTION LINE (BRL): A line which identifies suitable building area locations on the airport.

C

CAPITAL IMPROVEMENT PLAN: The planning program used by the Federal Aviation Administration to identify, prioritize, and distribute Airport Improvement Program funds for airport development and the needs of the National Airspace System to meet specified national goals and objectives.

CARGO SERVICE AIRPORT: An airport served by aircraft providing air transportation of property only, including mail, with an annual aggregate landed weight of at least 100,000,000 pounds.

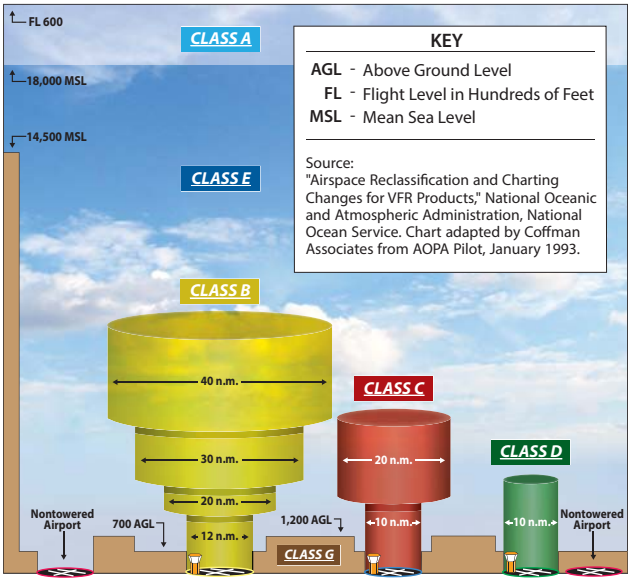
CATEGORY I: An Instrument Landing System (ILS) that provides acceptable guidance information to an aircraft from the coverage limits of the ILS to the point at which the localizer course line intersects the glide path at a decision height of 200 feet above the horizontal plane containing the runway threshold.

CATEGORY II: An ILS that provides acceptable guidance information to an aircraft from the coverage limits of the ILS to the point at which the localizer course line intersects the glide path at a decision height of 100 feet above the horizontal plane containing the runway threshold.

CATEGORY III: An ILS that provides acceptable guidance information to a pilot from the coverage limits of the ILS with no decision height specified above the horizontal plane containing the runway threshold.

CEILING: The height above the ground surface to the location of the lowest layer of clouds which is reported as either broken or overcast.

CIRCLING APPROACH: A maneuver initiated by the pilot to align the aircraft with the runway for landing when flying a predetermined circling instrument approach under IFR.



CLASS A AIRSPACE: See Controlled Airspace.

CLASS B AIRSPACE: See Controlled Airspace.

CLASS C AIRSPACE: See Controlled Airspace.

CLASS D AIRSPACE: See Controlled Airspace.

CLASS E AIRSPACE: See Controlled Airspace.

CLASS G AIRSPACE: See Controlled Airspace.

CLEAR ZONE: See Runway Protection Zone.

COMMERCIAL SERVICE AIRPORT: A public airport providing scheduled passenger service that enplanes at least 2,500 annual passengers.

COMMON TRAFFIC ADVISORY FREQUENCY: A radio frequency identified in the appropriate aeronautical chart which is designated for the purpose of transmitting airport advisory information and procedures while operating to or from an uncontrolled airport.

COMPASS LOCATOR (LOM): A low power, low/medium frequency radio-beacon installed in conjunction with the instrument landing system at one or two of the marker sites.

CONICAL SURFACE: An imaginary obstruction-limiting surface defined in FAR Part 77 that extends

from the edge of the horizontal surface outward and upward at a slope of 20 to 1 for a horizontal distance of 4,000 feet.

CONTROLLED AIRPORT: An airport that has an operating airport traffic control tower.

CONTROLLED AIRSPACE: Airspace of defined dimensions within which air traffic control services are provided to instrument flight rules (IFR) and visual flight rules (VFR) flights in accordance with the airspace classification. Controlled airspace in the United States is designated as follows:

- **CLASS A**: Generally, the airspace from 18,000 feet mean sea level (MSL) up to but not including flight level FL600. All persons must operate their aircraft under IFR.

- **CLASS B**:
  Generally, the airspace from the surface to 10,000 feet MSL surrounding the nation's busiest airports. The configuration of Class B airspace is unique to each airport, but typically consists of two or more layers of air space and is designed to contain all published instrument approach procedures to the airport. An air traffic control clearance is required for all aircraft to operate in the area.

- **CLASS C**: Generally, the airspace from the surface to 4,000 feet above the airport elevation (charted as MSL) surrounding those airports that have an operational control tower and radar approach control and are served by a qualifying number of IFR operations or passenger enplanements. Although individually tailored for each airport, Class C airspace typically consists of a surface area with a five nautical mile (nm) radius and an outer area with a 10 nautical mile radius that extends from 1,200 feet to 4,000 feet above the airport elevation. Two-way radio communication is required for all aircraft.

- **CLASS D**: Generally, that airspace from the surface to 2,500 feet above the air port elevation (charted as MSL) surrounding those airports that have an operational control tower. Class D airspace is individually tailored and configured to encompass published instrument approach procedure. Unless otherwise authorized, all persons must establish two-way radio communication.

- **CLASS E**: Generally, controlled airspace that is not classified as Class A, B, C, or D. Class E airspace extends upward from either the surface or a designated altitude to the overlying or adjacent controlled airspace. When designated as a surface area, the airspace will be configured to contain all instrument procedures. Class E airspace encompasses all Victor Airways. Only aircraft following instrument flight rules are required to establish two-way radio communication with air traffic control.

- **CLASS G**: Generally, that airspace not classified as Class A, B, C, D, or E. Class G airspace is uncontrolled for all aircraft. Class G airspace extends from the surface to the overlying Class E airspace.

CONTROLLED FIRING AREA: See special-use airspace.

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

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

CROSSWIND LEG: A flight path at right angles to the landing runway off its upwind end. See "traffic pattern."

D

DECIBEL: A unit of noise representing a level relative to a reference of a sound pressure 20 micro newtons per square meter.

DECISION HEIGHT/ DECISION ALTITUDE: The height above the end of the runway surface at which a decision must be made by a pilot during the ILS or Precision Approach Radar approach to either continue the approach or to execute a missed approach.

DECLARED DISTANCES: The distances declared available for the airplane's takeoff runway, takeoff distance, accelerate-stop distance, and landing distance requirements. The distances are:

- **TAKEOFF RUNWAY AVAILABLE (TORA):** The runway length declared available and suitable for the ground run of an airplane taking off.

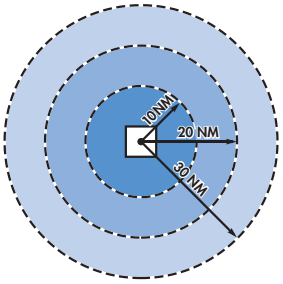
- **TAKEOFF DISTANCE AVAILABLE (TODA):** The TORA plus the length of any remaining runway and/or clear way beyond the far end of the TORA.
- **ACCELERATE-STOP DISTANCE AVAILABLE (ASDA):** The runway plus stopway length declared available for the acceleration and deceleration of an aircraft aborting a takeoff.
- **LANDING DISTANCE AVAILABLE (LDA):** The runway length declared available and suitable for landing.

DEPARTMENT OF TRANSPORTATION: The cabinet level federal government organization consisting of modal operating agencies, such as the Federal Aviation Administration, which was established to promote the coordination of federal transportation programs and to act as a focal point for research and development efforts in transportation.

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

DISPLACED THRESHOLD: A threshold that is located at a point on the runway other than the designated beginning of the runway.

DISTANCE MEASURING EQUIPMENT (DME): Equipment (airborne and ground) used to measure, in nautical miles, the slant range distance of an aircraft from the DME navigational aid.



DNL: The 24-hour average sound level, in Aweighted decibels, obtained after the addition of ten decibels to sound levels for the periods between 10 p.m. and 7 a.m. as averaged over a span of one year. It is the FAA standard metric for determining the cumulative exposure of individuals to noise.

DOWNWIND LEG: A flight path parallel to the landing runway in the direction opposite to landing. The downwind leg normally extends between the crosswind leg and the base leg. Also see "traffic pattern."

E

EASEMENT: The legal right of one party to use a portion of the total rights in real estate owned by another party. This may include the right of passage over, on, or below the property; certain air rights above the property, including view rights; and the rights to any specified form of development or activity, as well as any other legal rights in the property that may be specified in the easement document.

ELEVATION: The vertical distance measured in feet above mean sea level.

ENPLANED PASSENGERS: The total number of revenue passengers boarding aircraft, including originating, stop-over, and transfer passengers, in scheduled and nonscheduled services.

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

ENTITLEMENT: Federal funds for which a commercial service airport may be eligible based upon its annual passenger enplanements.

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

ENVIRONMENTAL AUDIT: An assessment of the current status of a party's compliance with applicable environmental requirements of a party's environmental compliance policies, practices, and controls.

ENVIRONMENTAL IMPACT STATEMENT (EIS): A document required of federal agencies by the National Environmental Policy Act for major projects are legislative proposals affecting the environment. It is a tool for decision-making describing the positive and negative effects of a proposed action and citing alternative actions.

ESSENTIAL AIR SERVICE: A federal program which guarantees air carrier service to selected small cities by providing subsidies as needed to prevent these cities from such service.

F

FEDERAL AVIATION REGULATIONS: The general and permanent rules established by the executive departments and agencies of the Federal Government for aviation, which are published in the Federal Register. These are the aviation subset of the Code of Federal Regulations.

FEDERAL INSPECTION SERVICES: The provision of customs and immigration services including passport inspection, inspection of baggage, the collection of duties on certain imported items, and the inspections for agricultural products, illegal drugs, or other restricted items.

FINAL APPROACH: A flight path in the direction of landing along the extended runway centerline. The final approach normally extends from the base leg to the runway. See "traffic pattern."

FINAL APPROACH AND TAKEOFF AREA (FATO). A defined area over which the final phase of the helicopter approach to a hover, or a landing is completed and from which the takeoff is initiated.

FINAL APPROACH FIX: The designated point at which the final approach segment for an aircraft landing on a runway begins for a non-precision approach.

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

FIXED BASE OPERATOR (FBO): A provider of services to users of an airport. Such services include, but are not limited to, hangaring, fueling, flight training, repair, and maintenance.

FLIGHT LEVEL: A measure of altitude used by aircraft flying above 18,000 feet. Flight levels are indicated by three digits representing the pressure altitude in hundreds of feet. An airplane flying at flight level 360 is flying at a pressure altitude of 36,000 feet. This is expressed as FL 360.

FLIGHT SERVICE STATION: An operations facility in the national flight advisory system which utilizes data interchange facilities for the collection and dissemination of Notices to Airmen, weather, and administrative data and which provides pre-flight and in-flight advisory services to pilots through air and ground based communication facilities.

FRANGIBLE NAVAID: A navigational aid which retains its structural integrity and stiffness up to a designated maximum load, but on impact from a greater load, breaks, distorts, or yields in such a manner as to present the minimum hazard to aircraft.

G

GENERAL AVIATION: That portion of civil aviation which encompasses all facets of aviation except air carriers holding a certificate of convenience and necessity, and large aircraft commercial operators.

GENERAL AVIATION AIRPORT: An airport that provides air service to only general aviation.

GLIDESLOPE (GS): Provides vertical guidance for aircraft during approach and landing. The glideslope consists of the following:

1. Electronic components emitting signals which provide vertical guidance by reference to airborne instruments during instrument approaches such as ILS; or

2. Visual ground aids, such as VASI, which provide vertical guidance for VFR approach or for the visual portion of an instrument approach and landing.

GLOBAL POSITIONING SYSTEM (GPS): A system of 48 satellites used as reference points to enable navigators equipped with GPS receivers to determine their latitude, longitude, and altitude.

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

H

HELIPAD: A designated area for the takeoff, landing, and parking of helicopters.

HIGH INTENSITY RUNWAY LIGHTS: The highest classification in terms of intensity or brightness for lights designated for use in delineating the sides of a runway.

HIGH-SPEED EXIT TAXIWAY: A long radius taxiway designed to expedite aircraft turning off the runway after landing (at speeds to 60 knots), thus reducing runway occupancy time.

HORIZONTAL SURFACE: An imaginary obstruction-limiting surface defined in FAR Part 77 that is specified as a portion of a horizontal plane surrounding a runway located 150 feet above the established airport elevation. The specific horizontal dimensions of this surface are a function of the types of approaches existing or planned for the runway.

I

INITIAL APPROACH FIX: The designated point at which the initial approach segment begins for an instrument approach to a runway.

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

INSTRUMENT FLIGHT RULES (IFR): Procedures for the conduct of flight in weather conditions below Visual Flight Rules weather minimums. The term IFR is often also used to define weather conditions and the type of flight plan under which an aircraft is operating.

INSTRUMENT LANDING SYSTEM (ILS): A precision instrument approach system which normally consists of the following electronic components and visual aids:

1. Localizer.
2. Glide Slope.
3. Outer Marker.
4. Middle Marker.
5. Approach Lights.

INSTRUMENT METEOROLOGICAL CONDITIONS: Meteorological conditions expressed in terms of specific visibility and ceiling conditions that are less than the minimums specified for visual meteorological conditions.

ITINERANT OPERATIONS: Operations by aircraft that are not based at a specified airport.

K

KNOTS: A unit of speed length used in navigation that is equivalent to the number of nautical miles traveled in one hour.

L

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

LANDING DISTANCE AVAILABLE (LDA): See declared distances.

LARGE AIRPLANE: An airplane that has a maximum certified takeoff weight in excess of 12,500 pounds.

LOCAL AREA AUGMENTATION SYSTEM: A differential GPS system that provides localized measurement correction signals to the basic GPS signals to improve navigational accuracy integrity, continuity, and availability.

LOCAL OPERATIONS: Aircraft operations performed by aircraft that are based at the airport and that operate in the local traffic pattern or within sight of the airport, that are known to be departing for or arriving from flights in local practice areas within a prescribed distance from the airport, or that execute simulated instrument approaches at the airport.

LOCAL TRAFFIC: Aircraft operating in the traffic pattern or within sight of the tower, or aircraft known to be departing or arriving from the local practice areas, or aircraft executing practice instrument approach procedures. Typically, this includes touch and-go training operations.

LOCALIZER: The component of an ILS which provides course guidance to the runway.

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

LONG RANGE NAVIGATION SYSTEM (LORAN): Long range navigation is an electronic navigational aid which determines aircraft position and speed by measuring the difference in the time of reception of synchronized pulse signals from two fixed transmitters. Loran is used for en route navigation.

LOW INTENSITY RUNWAY LIGHTS: The lowest classification in terms of intensity or brightness for lights designated for use in delineating the sides of a runway.

M

MEDIUM INTENSITY RUNWAY LIGHTS: The middle classification in terms of intensity or brightness for lights designated for use in delineating the sides of a runway.

MICROWAVE LANDING SYSTEM (MLS): An instrument approach and landing system that provides precision guidance in azimuth, elevation, and distance measurement.

MILITARY OPERATIONS: Aircraft operations that are performed in military aircraft.

MILITARY OPERATIONS AREA (MOA): See special-use airspace

MILITARY TRAINING ROUTE: An air route depicted on aeronautical charts for the conduct of military flight training at speeds above 250 knots.

MISSED APPROACH COURSE (MAC): The flight route to be followed if, after an instrument approach, a landing is not affected, and occurring normally:

1. When the aircraft has descended to the decision height and has not established visual contact; or

2. When directed by air traffic control to pull up or to go around again.

MOVEMENT AREA: The runways, taxiways, and other areas of an airport which are utilized for taxiing/hover taxiing, air taxiing, takeoff, and landing of aircraft, exclusive of loading ramps and parking areas. At those airports with a tower, air traffic control clearance is required for entry onto the movement area.

N

NATIONAL AIRSPACE SYSTEM: The network of air traffic control facilities, air traffic control areas, and navigational facilities through the U.S.

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

NATIONAL TRANSPORTATION SAFETY BOARD: A federal government organization established to investigate and determine the probable cause of transportation accidents, to recommend equipment and procedures to enhance transportation safety, and to review on appeal the suspension or revocation of any certificates or licenses issued by the Secretary of Transportation.

NAUTICAL MILE: A unit of length used in navigation which is equivalent to the distance spanned by one minute of arc in latitude, that is, 1,852 meters or 6,076 feet. It is equivalent to approximately 1.15 statute mile.

NAVAID: A term used to describe any electrical or visual air navigational aids, lights, signs, and associated supporting equipment (i.e. PAPI, VASI, ILS, etc.)

NAVIGATIONAL AID: A facility used as, available for use as, or designed for use as an aid to air navigation.

NOISE CONTOUR: A continuous line on a map of the airport vicinity connecting all points of the same noise exposure level.

NON-DIRECTIONAL BEACON (NDB): A beacon transmitting nondirectional signals whereby the pilot of an aircraft equipped with direction finding equipment can determine his or her bearing to and from the radio beacon and home on, or track to, the station. When the radio beacon is installed in conjunction with the Instrument Landing System marker, it is normally called a Compass Locator.

NON-PRECISION APPROACH PROCEDURE: A standard instrument approach procedure in which no electronic glide slope is provided, such as VOR, TACAN, NDB, or LOC.

NOTICE TO AIRMEN: A notice containing information concerning the establishment, condition, or change in any component of or hazard in the National Airspace System, the timely knowledge of which is considered essential to personnel concerned with flight operations.

O

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

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

ONE-ENGINE INOPERABLE SURFACE: A surface emanating from the runway end at a slope ratio of 62.5:1. Air carrier airports are required to maintain a technical drawing of this surface depicting any object penetrations by January 1, 2010.

OPERATION: The take-off, landing, or touch-and-go procedure by an aircraft on a runway at an airport.

OUTER MARKER (OM): An ILS navigation facility in the terminal area navigation system located four to seven miles from the runway edge on the extended centerline, indicating to the pilot that he/she is passing over the facility and can begin final approach.

P

PILOT CONTROLLED LIGHTING: Runway lighting systems at an airport that are controlled by activating the microphone of a pilot on a specified radio frequency.

PRECISION APPROACH: A standard instrument approach procedure which provides runway alignment and glide slope (descent) information. It is categorized as follows:

- **CATEGORY I (CAT I)**: A precision approach which provides for approaches with a decision height of not less than 200 feet and visibility not less than 1/2 mile or Runway Visual Range (RVR) 2400 (RVR 1800) with operative touchdown zone and runway centerline lights.
- **CATEGORY II (CAT II)**: A precision approach which provides for approaches with a decision height of not less than 100 feet and visibility not less than 1200 feet RVR.
- **CATEGORY III (CAT III)**: A precision approach which provides for approaches with minima less than Category II.

PRECISION APPROACH PATH INDICATOR (PAPI): A lighting system providing visual approach slope guidance to aircraft during a landing approach. It is similar to a VASI but provides a sharper transition between the colored indicator lights.

PRECISION APPROACH RADAR: A radar facility in the terminal air traffic control system used to detect and display with a high degree of accuracy the direction, range, and elevation of an aircraft on the final approach to a runway.

PRECISION OBJECT FREE AREA (POFA): An area centered on the extended runway centerline, beginning at the runway threshold and extending behind the runway threshold that is 200 feet long by 800 feet wide. The POFA is a clearing standard which requires the POFA to be kept clear of above ground objects protruding above the runway safety area edge elevation (except for frangible NAVAIDS). The POFA applies to all new authorized instrument approach procedures with less than 3/4 mile visibility.

PRIMARY AIRPORT: A commercial service airport that enplanes at least 10,000 annual passengers.

PRIMARY SURFACE: An imaginary obstruction limiting surface defined in FAR Part 77 that is specified as a rectangular surface longitudinally centered about a runway. The specific dimensions of this surface are a function of the types of approaches existing or planned for the runway.

PROHIBITED AREA: See special-use airspace.

PVC: Poor visibility and ceiling. Used in determining Annual Service Volume. PVC conditions exist when the cloud ceiling is less than 500 feet and visibility is less than one mile.

R

RADIAL: A navigational signal generated by a Very High Frequency Omni-directional Range or VORTAC station that is measured as an azimuth from the station.

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

REMOTE COMMUNICATIONS OUTLET (RCO): An unstaffed transmitter receiver/facility remotely controlled by air traffic personnel. RCOs serve flight service stations (FSSs). RCOs were established to provide ground-to-ground communications between air traffic control specialists and pilots at satellite airports for delivering en route clearances, issuing departure authorizations, and acknowledging instrument flight rules cancellations or departure/ landing times.

REMOTE TRANSMITTER/RECEIVER (RTR): See remote communications outlet. RTRs serve ARTCCs.

RELIEVER AIRPORT: An airport to serve general aviation aircraft which might otherwise use a congested air-carrier served airport.

RESTRICTED AREA: See special-use airspace.

RNAV: Area navigation - airborne equipment which permits flights over determined tracks within prescribed accuracy tolerances without the need to overfly ground-based navigation facilities. Used en route and for approaches to an airport.

RUNWAY: A defined rectangular area on an airport prepared for aircraft landing and takeoff. Runways are normally numbered in relation to their magnetic direction, rounded off to the nearest 10 degrees. For example, a runway with a magnetic heading of 180 would be designated Runway 18. The runway heading on the opposite end of the runway is 180 degrees from that runway end. For example, the opposite runway heading for Runway 18 would be Runway 36 (magnetic heading of 360). Aircraft can takeoff or land from either end of a runway, depending upon wind direction.

RUNWAY ALIGNMENT INDICATOR LIGHT: A series of high intensity sequentially flashing lights installed on the extended centerline of the runway usually in conjunction with an approach lighting system.

RUNWAY DESIGN CODE: A code signifiying the design standards to which the runway is to be built.

RUNWAY END IDENTIFICATION LIGHTING (REIL): Two synchronized flashing lights, one on each side of the runway threshold, which provide rapid and positive identification of the approach end of a particular runway.

RUNWAY GRADIENT: The average slope, measured in percent, between the two ends of a runway.

RUNWAY PROTECTION ZONE (RPZ): An area off the runway end to enhance the protection of people and property on the ground. The RPZ is trapezoidal in shape. Its dimensions are determined by the aircraft approach speed and runway approach type and minima.

RUNWAY REFERENCE CODE: A code signifying the current operational capabilities of a runway and associated taxiway.

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

RUNWAY VISIBILITY ZONE (RVZ): An area on the airport to be kept clear of permanent objects so that there is an unobstructed line of- site from any point five feet above the runway centerline to any point five feet above an intersecting runway centerline.

RUNWAY VISUAL RANGE (RVR): An instrumentally derived value, in feet, representing the horizontal distance a pilot can see down the runway from the runway end.

S

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

SEGMENTED CIRCLE: A system of visual indicators designed to provide traffic pattern information at airports without operating control towers.

SHOULDER: An area adjacent to the edge of paved runways, taxiways, or aprons providing a transition between the pavement and the adjacent surface; support for aircraft running off the pavement; enhanced drainage; and blast protection. The shoulder does not necessarily need to be paved.

SLANT-RANGE DISTANCE: The straight line distance between an aircraft and a point on the ground.

SMALL AIRCRAFT: An aircraft that has a maximum certified takeoff weight of up to 12,500 pounds.

SPECIAL-USE AIRSPACE: Airspace of defined dimensions identified by a surface area wherein activities must be confined because of their nature and/or wherein limitations may be imposed upon aircraft operations that are not a part of those activities. Special-use airspace classifications include:

- **ALERT AREA**: Airspace which may contain a high volume of pilot training activities or an unusual type of aerial activity, neither of which is hazardous to aircraft.
- **CONTROLLED FIRING AREA**: Airspace wherein activities are conducted under conditions so controlled as to eliminate hazards to nonparticipating aircraft and to ensure the safety of persons or property on the ground.
- **MILITARY OPERATIONS AREA (MOA)**: Designated airspace with defined vertical and lateral dimensions established outside Class A airspace to separate/segregate certain military activities from instrument flight rule (IFR) traffic and to identify for visual flight rule (VFR) traffic where these activities are conducted.
- **PROHIBITED AREA**: Designated airspace within which the flight of aircraft is prohibited.
- **RESTRICTED AREA**: Airspace designated under Federal Aviation Regulation (FAR) 73, within which the flight of aircraft, while not wholly prohibited, is subject to restriction. Most restricted areas are designated joint use. When not in use by the using agency, IFR/VFR operations can be authorized by the controlling air traffic control facility.
- **WARNING AREA:** Airspace which may contain hazards to nonparticipating aircraft.

STANDARD INSTRUMENT DEPARTURE (SID): A preplanned coded air traffic control IFR departure routing, preprinted for pilot use in graphic and textual form only.

STANDARD INSTRUMENT DEPARTURE PROCEDURES: A published standard flight procedure to be utilized following takeoff to provide a transition between the airport and the terminal area or en route airspace.

STANDARD TERMINAL ARRIVAL ROUTE (STAR): A preplanned coded air traffic control IFR arrival routing, preprinted for pilot use in graphic and textual or textual form only.

STOP-AND-GO: A procedure wherein an aircraft will land, make a complete stop on the runway, and then commence a takeoff from that point. A stop-and-go is recorded as two operations: one operation for the landing and one operation for the takeoff.

STOPWAY: An area beyond the end of a takeoff runway that is designed to support an aircraft during an aborted takeoff without causing structural damage to the aircraft. It is not to be used for takeoff, landing, or taxiing by aircraft.

STRAIGHT-IN LANDING/APPROACH: A landing made on a runway aligned within 30 degrees of the final approach course following completion of an instrument approach.

T

TACTICAL AIR NAVIGATION (TACAN): An ultrahigh frequency electronic air navigation system which provides suitably-equipped aircraft a continuous indication of bearing and distance to the TACAN station.

TAKEOFF RUNWAY AVAILABLE (TORA):
See declared distances.

TAKEOFF DISTANCE AVAILABLE (TODA):
See declared distances.

TAXILANE: The portion of the aircraft parking area used for access between taxiways and aircraft parking positions.

TAXIWAY: A defined path established for the taxiing of aircraft from one part of an airport to another.

TAXIWAY DESIGN GROUP: A classification of airplanes based on outer to outer Main Gear Width (MGW) and Cockpit to Main Gear (CMG) distance.

TAXIWAY SAFETY AREA (TSA): A defined surface alongside the taxiway prepared or suitable for reducing the risk of damage to an airplane unintentionally departing the taxiway.

TERMINAL INSTRUMENT PROCEDURES: Published flight procedures for conducting instrument approaches to runways under instrument meteorological conditions.

TERMINAL RADAR APPROACH CONTROL: An element of the air traffic control system responsible for monitoring the en-route and terminal segment of air traffic in the airspace surrounding airports with moderate to high levels of air traffic.

TETRAHEDRON: A device used as a landing direction indicator. The small end of the tetrahedron points in the direction of landing.

THRESHOLD: The beginning of that portion of the runway available for landing. In some instances the landing threshold may be displaced.

TOUCH-AND-GO: An operation by an aircraft that lands and departs on a runway without stopping or exiting the runway. A touch-and go is recorded as two operations: one operation for the landing and one operation for the takeoff.

TOUCHDOWN: The point at which a landing aircraft makes contact with the runway surface.

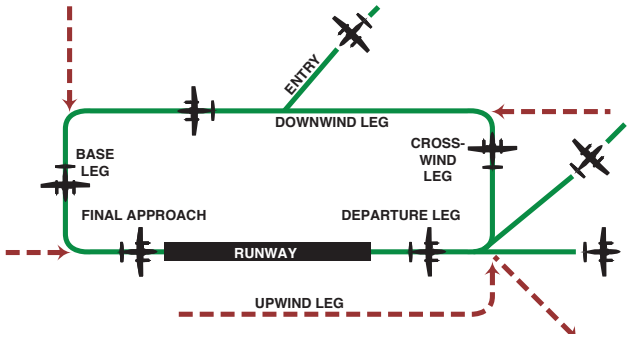
TOUCHDOWN AND LIFT-OFF AREA (TLOF): A load bearing, generally paved area, normally centered in the FATO, on which the helicopter lands or takes off.

TOUCHDOWN ZONE (TDZ): The first 3,000 feet of the runway beginning at the threshold.

TOUCHDOWN ZONE ELEVATION (TDZE): The highest elevation in the touchdown zone.

TOUCHDOWN ZONE (TDZ) LIGHTING: Two rows of transverse light bars located symmetrically about the runway centerline normally at 100- foot intervals. The basic system extends 3,000 feet along the runway.

TRAFFIC PATTERN: The traffic flow that is prescribed for aircraft landing at or taking off from an airport. The components of a typical traffic pattern are the upwind leg, crosswind leg, downwind leg, base leg, and final approach.



U

UNCONTROLLED AIRPORT: An airport without an air traffic control tower at which the control of Visual Flight Rules traffic is not exercised.

UNCONTROLLED AIRSPACE: Airspace within which aircraft are not subject to air traffic control.

UNIVERSAL COMMUNICATION (UNICOM):
A nongovernment communication facility which may provide airport information at certain airports. Locations and frequencies of UNICOM's are shown on aeronautical charts and publications.

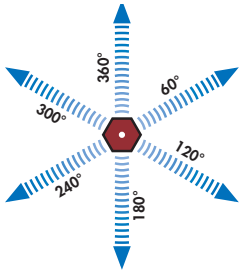
UPWIND LEG: A flight path parallel to the landing runway in the direction of landing. See "traffic pattern."

V

VECTOR: A heading issued to an aircraft to provide navigational guidance by radar.

VERY HIGH FREQUENCY/ OMNIDIRECTIONAL RANGE (VOR): A ground-based electronic navigation aid transmitting very high frequency navigation signals, 360 degrees in azimuth, oriented from magnetic north. Used as the basis for navigation in the national airspace system. The VOR periodically identifies itself by Morse Code and may have an additional voice identification feature.

VERY HIGH FREQUENCY OMNI-DIRECTIONAL RANGE/ TACTICAL AIR NAVIGATION (VORTAC): A navigation aid providing VOR azimuth, TACAN azimuth, and TACAN distance-measuring equipment (DME) at one site.



VICTOR AIRWAY: A control area or portion thereof established in the form of a corridor, the centerline of which is defined by radio navigational aids.

VISUAL APPROACH: An approach wherein an aircraft on an IFR flight plan, operating in VFR conditions under the control of an air traffic control facility and having an air traffic control authorization, may proceed to the airport of destination in VFR conditions.

VISUAL APPROACH SLOPE INDICATOR (VASI): An airport lighting facility providing vertical visual approach slope guidance to aircraft during approach to landing by radiating a directional pattern of high intensity red and white focused light beams which indicate to the pilot that he is on path if he sees red/ white, above path if white/white, and below path if red/red. Some airports serving large aircraft have three-bar VASI's which provide two visual guide paths to the same runway.

VISUAL FLIGHT RULES (VFR): Rules that govern the procedures for conducting flight under visual conditions. The term VFR is also used in the United States to indicate weather conditions that are equal to or greater than minimum VFR requirements. In addition, it is used by pilots and controllers to indicate type of flight plan.

VISUAL METEOROLOGICAL CONDITIONS: Meteorological conditions expressed in terms of specific visibility and ceiling conditions which are equal to or greater than the threshold values for instrument meteorological conditions.

VOR: See "Very High Frequency Omnidirectional Range Station."

VORTAC: See "Very High Frequency Omnidirectional Range Station/Tactical Air Navigation."

W

WARNING AREA: See special-use airspace.

WIDE AREA AUGMENTATION SYSTEM: An enhancement of the Global Positioning System that includes integrity broadcasts, differential corrections, and additional ranging signals for the purpose of providing the accuracy, integrity, availability, and continuity required to support all phases of flight.

Abbreviations

AC: advisory circular

ADF: automatic direction finder

ADG: airplane design group

AFSS: automated flight service station

AGL: above ground level

AIA: annual instrument approach

AIP: Airport Improvement Program

AIR-21: Wendell H. Ford Aviation Investment and Reform Act for the 21st Century

ALS: approach lighting system

ALSF-1: standard 2,400-foot high intensity approach lighting system with sequenced flashers (CAT I configuration)

ALSF-2: standard 2,400-foot high intensity approach lighting system with sequenced flashers (CAT II configuration)

AOA: Aircraft Operation Area

APV: instrument approach procedure with vertical guidance

ARC: airport reference code

ARFF: aircraft rescue and fire fighting

ARP: airport reference point

ARTCC: air route traffic control center

ASDA: accelerate-stop distance available

ASR: airport surveillance radar

ASOS: automated surface observation station

ATCT: airport traffic control tower

ATIS: automated terminal information service

AVGAS: aviation gasoline - typically 100 low lead (100LL)

AWOS: automatic weather observation station

BRL: building restriction line

CFR: Code of Federal Regulation

CIP: capital improvement program

DME: distance measuring equipment

DNL: day-night noise level

DWL: runway weight bearing capacity of aircraft with dual-wheel type landing gear

DTWL: runway weight bearing capacity of aircraft with dual-tandem type landing gear

FAA: Federal Aviation Administration

FAR: Federal Aviation Regulation

FBO: fixed base operator

FY: fiscal year

GPS: global positioning system

GS: glide slope

HIRL: high intensity runway edge lighting

IFR: instrument flight rules (FAR Part 91)

ILS: instrument landing system

IM: inner marker

LDA: localizer type directional aid

LDA: landing distance available

LIRL: low intensity runway edge lighting

LMM: compass locator at middle marker

LOM: compass locator at outer marker

LORAN: long range navigation

MALS: medium intensity approach lighting system with indicator lights

MIRL: medium intensity runway edge lighting

MITL: medium intensity taxiway edge lighting

MLS: microwave landing system

MM: middle marker

MOA: military operations area

MSL: mean sea level

NAVAID: navigational aid

NDB: nondirectional radio beacon

NM: nautical mile (6,076.1 feet)

NPES: National Pollutant Discharge Elimination System

NPIAS: National Plan of Integrated Airport Systems

NPRM: notice of proposed rule making

ODALS: omnidirectional approach lighting system

OFA: object free area

OFZ: obstacle free zone

OM: outer marker

PAC: planning advisory committee

PAPI: precision approach path indicator

PFC: porous friction course

PFC: passenger facility charge

PCL: pilot-controlled lighting

PIW public information workshop

PLASI: pulsating visual approach slope indicator

POFA: precision object free area

PVASI: pulsating/steady visual approach slope indicator

PVC: poor visibility and ceiling

RCO: remote communications outlet

RRC: Runway Reference Code

RDC: Runway Design Code

REIL: runway end identification lighting

RNAV: area navigation

RPZ: runway protection zone

RSA: runway safety area

RTR: remote transmitter/receiver

RVR: runway visibility range

RVZ: runway visibility zone

SALS: short approach lighting system

SASP: state aviation system plan

SEL: sound exposure level

SID: standard instrument departure

SM: statute mile (5,280 feet)

SRE: snow removal equipment

SSALF: simplified short approach lighting system with runway alignment indicator lights

STAR: standard terminal arrival route

SWL: runway weight bearing capacity for aircraft with single-wheel tandem type landing gear

TACAN: tactical air navigational aid

TAF: Federal Aviation Administration (FAA) Terminal Area Forecast

TDG: Taxiway Design Group

TLOF: Touchdown and lift-off

TDZ: touchdown zone

TDZE: touchdown zone elevation

TODA: takeoff distance available

TORA: takeoff runway available

TRACON: terminal radar approach control

VASI: visual approach slope indicator

VFR: visual flight rules (FAR Part 91)

VHF: very high frequency

VOR: very high frequency omni-directional range

VORTAC: VOR and TACAN collocated

BLAIR
MUNICIPAL AIRPORT

APPENDIX B
FAA FORECAST APPROVAL LETTER



Blair . . . A promise of quality

U.S. Department
of Transportation

Federal Aviation Administration

Central Region
Iowa, Kansas
Missouri, Nebraska

901 Locust
Kansas City, Missouri 64106
(816) 329-2600

April 03, 2017

Mr. Rodney Storm
Airport Manager
Blair Municipal Airport
218 South 16Th St
Blair, NE 68008

Dear Mr. Storm:

Forecast/Critical Design Aircraft Approval
Blair Municipal (BTA), Blair, NE
AIP No. 3-31-0109-015-2016

The submitted Aviation Demand Forecast is Approved.

The proposed existing Critical Design Aircraft, **Cessna Citation Sovereign**, is **Approved**. The proposed ultimate Critical Design Aircraft, **C-II Family**, is **Approved**. However, if any major runway or taxiway construction, reconstruction or extension is planned, documentation of 500 annual operations of the design aircraft will be required.

Anna Lannin, NDA, has reviewed and offered comments that I have attached to this letter. I concur with her commnets and offer the following additional comments:

- Page 9, Table D – Please include the approximate number of aircraft that the hangars can hold.
- Page 34, Table N – Basedaircraft.com should be the source for this table. Please provide the N-number and aircraft type in a table using the information from basedaircraft.com.
- Page 47, Critical Design Aircraft – Third paragraph, please remove the word itinerant from the first sentence.
- Page 50, Future Runway Design – The future ARC of C-II is not adequately justified. From basedaircraft.com none of the three added jets were C-II. Please provide more justification. The Cessna Citation Sovereign 680 appears to have an ARC of B-III.
- Page 61, Runway 31 RPZ Alternative 3 – Write up uses a 4200' runway length but Exhibit Q shows 5500'. Please clarify.
- Page 71, Runway Length Analysis – None of the three alternatives included the Runway 31 RPZ discussion earlier in the report. How do these alternatives match up with those? Should a fourth alternative be considered with a 625' displacement of the Runway 31 threshold? Please consider.
- Page 81, See comment above. Once again no discussion is given to displacing/relocating the Runway 31 threshold. What impacts to State Highway 133 could be minimized?

Please have the operations numbers updated on your 5010 Master Record to match the current year information from the forecast.

You may proceed with developing the remainder of the report and the Airport Layout Plan drawings. If you have any questions regarding this project, please call me at (816) 329-2624 or via email at doug.anderson@faa.gov.

Sincerely,

Original Signed By
Douglas R. Anderson

Douglas R. Anderson, P.E.
Nebraska State Planner

CC: Mike Dmyterko, Coffman Associates, Inc.
Anna Lannin, Nebraska Department of Aeronautics

Encl

BLAIR
MUNICIPAL AIRPORT

APPENDIX C
AIRPORT LAYOUT PLAN



Blair . . . A promise of quality

U.S. Department
of Transportation

**Federal Aviation
Administration**

Central Region
Iowa, Kansas
Missouri, Nebraska

901 Locust
Kansas City, Missouri 64106
(816) 329-2600

March 21, 2019

Mr. Geary Combs
Chairman
Blair Airport Authority
527 So. 23rd St
Blair, NE 68008

Dear Mr. Combs:

ALP Conditional Approval
Blair Municipal (BTA), Blair, NE
AIP No. 3-31-0109-015-2016

The Blair Municipal Airport Layout Plan (ALP), prepared by Coffman Associates, Inc., and bearing your signature, is approved. A signed copy of the approved ALP is enclosed.

Although future structures on or near the airport may be in conformance with the ALP, all future alterations or new structures will be subject to the notice provisions of Federal Aviation Regulations (FAR) Part 77. An aeronautical study (no.2018-ACE-4270-NRA) was conducted on the proposed development. This determination does not constitute FAA approval or disapproval of the physical development involved in the proposal.

In making this determination, the FAA has considered matters such as the effects the proposal would have on existing or planned traffic patterns of neighboring airports, the effects it would have on the existing airspace structure and projected programs of the FAA, the effects it would have on the safety of persons and property on the ground, and the effects that existing or proposed manmade objects (on file with the FAA), and known natural objects within the affected area would have on the airport proposal.

The FAA has only limited means to prevent the construction of structures near an airport. The airport sponsor has the primary responsibility to protect the airport environs through such means as local zoning ordinances, property acquisition, avigation easements, letters of agreement or other means.

The approval, indicated by my signature, is given subject to the condition that the following may not be undertaken without environmental approval by the Federal Aviation Administration:

- **Extension of Runway 13/31**
- **Extension of Parallel Taxiway for Runway 13/31**
- **Any land acquisition**
- **Any terminal area development including: construction of aprons, buildings, parking lots and access roads**

All items of development shall comply with the requirements of the National Environmental Policies Act of 1969 (P.L. 91-190). Approval of the plan does not indicate that the United States will participate in the cost of any development proposed. AIP funding requires evidence of eligibility and justification at the time a funding request is ripe for consideration.

When construction of any proposed structure or development indicated on the plan is undertaken, such construction requires normal 45-day advance notification to FAA for review in accordance with applicable Federal Aviation Regulations (i.e., Parts 77, 157, 152, etc.). More notice is generally beneficial to ensure that all statutory, regulatory, technical and operational issues can be addressed in a timely manner.

One set of the of conditionally approved ALP drawings is enclosed. We are keeping one set of the conditionally approved ALP drawing sets for the official FAA files. Copies of this letter with sets of conditionally approved ALP drawings are being furnished to the Nebraska Department of Transportation and your consultant.

If you have any questions, you may contact me by telephone at (816) 329-2624 or via email at doug.anderson@faa.gov.

Sincerely,



Douglas R. Anderson, P.E.
Nebraska State Planner

Enclosure: ALP Drawing Set

CC: Mike Dmyterko, Coffman Associates, Inc.
Anna Lannin, Nebraska Department of Transportation

AIRPORT LAYOUT PLAN

FOR

BLAIR MUNICIPAL AIRPORT

Blair, Nebraska

Prepared for

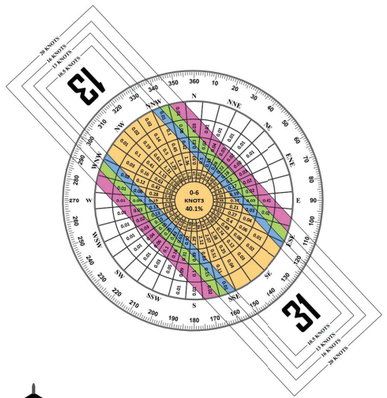
Blair Airport Authority

INDEX OF DRAWINGS

1. TITLE SHEET
2. AIRPORT LAYOUT PLAN DRAWING
3. AIRPORT AIRSPACE DRAWING
4. RUNWAY 13-31 APPROACH SURFACE PROFILES
5. INNER PORTION OF RUNWAY 13 APPROACH SURFACE DRAWING
6. INNER PORTION OF RUNWAY 31 APPROACH SURFACE DRAWING
7. RUNWAY 13-31 DEPARTURE SURFACE DRAWING
8. TERMINAL AREA DRAWING
9. AIRPORT LAND USE DRAWING
10. EXHIBIT "A" AIRPORT PROPERTY

ALL WEATHER WIND COVERAGE

Runways	10.5 Knots	13 Knots	16 Knots	20 Knots
Runway 13-31	92.10%	96.10%	98.75%	99.67%



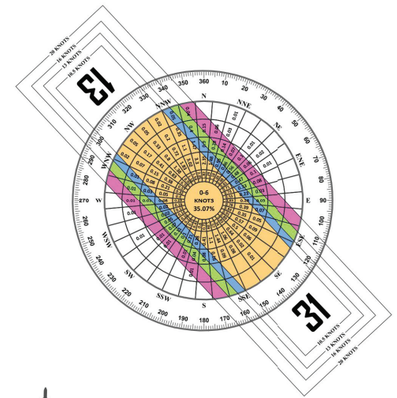
SOURCE:
NOAA National Climatic Center
Asheville, North Carolina
Blair Municipal Airport
Blair, NE
Eppley Airfield
Omaha, NE

OBSERVATIONS:
228,713 All Weather Observations
Jan. 1, 2006 - Dec. 31 2015

Magnetic Declination
02° 49' 00" East (Sept. 2016)
Annual Rate of Change
00° 06' 00" West (Sept. 2016)

IFR WIND COVERAGE

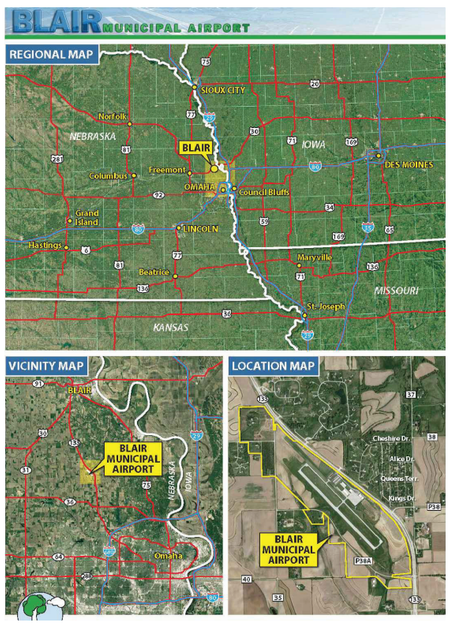
Runways	10.5 Knots	13 Knots	16 Knots	20 Knots
Runway 13-31	90.60%	95.32%	98.82%	99.74%



SOURCE:
NOAA National Climatic Center
Asheville, North Carolina
Blair Municipal Airport
Blair, NE
Eppley Airfield
Omaha, NE

OBSERVATIONS:
21,244 IFR Observations
Jan. 1, 2006 - Dec. 31 2015

Magnetic Declination
02° 49' 00" East (Sept. 2016)
Annual Rate of Change
00° 06' 00" West (Sept. 2016)



FOR APPROVAL BY

By [signature] Chairman 3/19/2019
Blair Airport Authority DATE:

FAA APPROVAL STAMP

SEE SHEET 2 OF 10

0 100 200
SCALE IN FEET

NO.	REVISIONS	DATE	BY	APP'D.
	-	—	—	—

"THE PREPARATION OF THESE DOCUMENTS WAS FINANCED IN PART THROUGH A GRANT FROM THE FEDERAL AVIATION ADMINISTRATION AS PROVIDED UNDER SECTION 505 OF THE AIRPORT AND AIRWAY IMPROVEMENT ACT OF 1982, AS AMENDED. THE CONTENTS DO NOT NECESSARILY REFLECT THE OFFICIAL VIEWS OR POLICY OF THE FAA. ACCEPTANCE OF THESE DOCUMENTS BY THE FAA DOES NOT IN ANY WAY CONSTITUTE A COMMITMENT ON THE PART OF THE UNITED STATES TO PARTICIPATE IN ANY DEVELOPMENT DEPICTED HEREIN NOR DOES IT INDICATE THAT THE PROPOSED DEVELOPMENT IS ENVIRONMENTALLY ACCEPTABLE IN ACCORDANCE WITH APPROPRIATE PUBLIC LAWS."

BLAIR MUNICIPAL AIRPORT
TITLE SHEET
Blair, Nebraska

PLANNED BY: Tyler Huber
DETAILED BY: Larry D. Johnson
APPROVED BY: Mike W. Dmytenko
March 13, 2019 SHEET 1 OF 10

Coffman Associates
Airport Consultants
www.coffmanassociates.com

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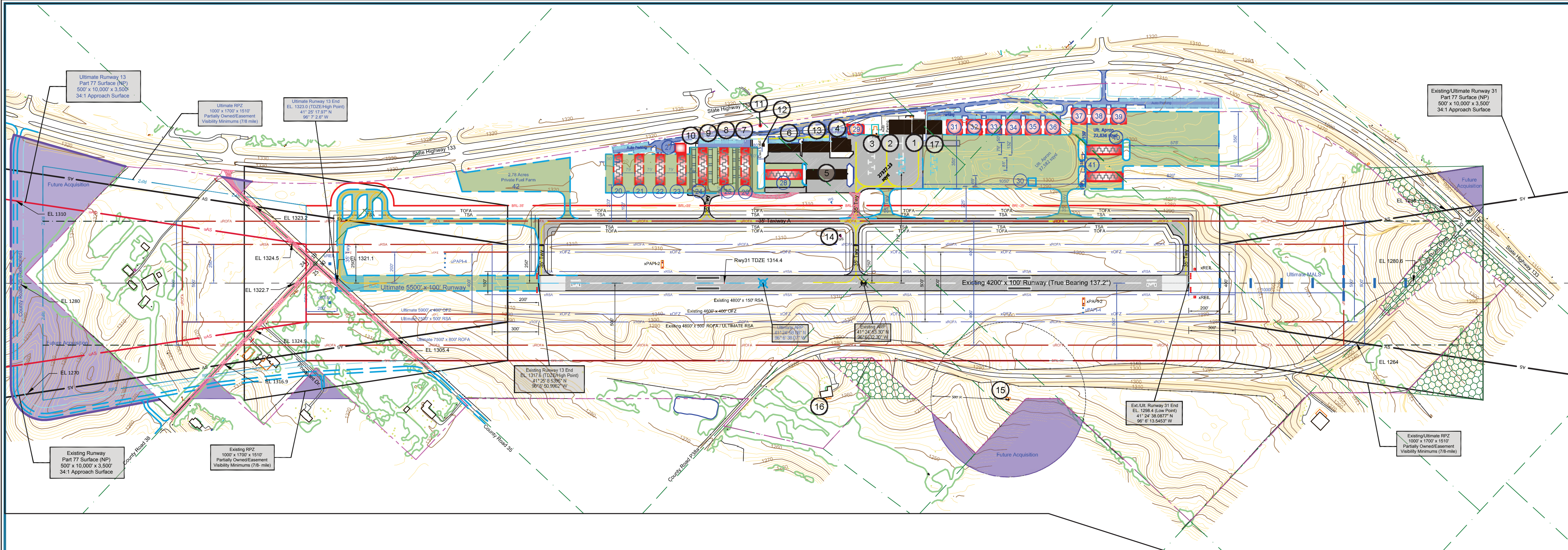


RUNWAY DATA	RUNWAY 13-31			
	EXISTING		ULTIMATE	
RUNWAY IDENTIFICATION	Primary		Primary	
APPROACH REFERENCE CODE (APRC)	D/IV/4000, D/V/4000		D/IV/4000, D/V/4000	
DEPARTURE REFERENCE CODE (DPRC)	D/IV, D/V		D/IV, D/V	
RUNWAY DESIGN CODE (RDC)	B-II-4000		C-II-4000	
CRITICAL DESIGN AIRCRAFT TYPE	Cessna Citation Sovereign		Cessna Citation X+	
WINGSPAN OF DESIGN AIRCRAFT	72.33'		69.17'	
MAX. CERTIFIED TAKEOFF WEIGHT OF DESIGN A/C	30,775 lbs		36,600 lbs	
RUNWAY DIMENSIONS (L X W)	4200' x 100'		5500' x 100'	
RUNWAY TRUE BEARING (NGS SURVEY)	137.20° / 317.21°		137.20° / 317.21°	
RUNWAY WIND COVERAGE (16 KNOTS/18 MPH)	98.75%		98.75%	
RUNWAY SHOULDERS	None		None	
RUNWAY MAXIMUM ELEVATION/HIGH POINT OF RUNWAY	1317.6' MSL		1323.0' MSL	
RUNWAY LOW POINT ELEVATION (NAVD-88)	1298.4' MSL		1298.4' MSL	
RUNWAY LIGHTING	MIRL		MIRL	
RUNWAY EFFECTIVE GRADIENT/MAXIMUM GRADIENT	0.46%		0.35%	
RUNWAY SURFACE MATERIAL	Concrete		Concrete	
RUNWAY PAVEMENT SURFACE TREATMENT	None		None	
RUNWAY PAVEMENT STRENGTH (IN THOUSAND LBS. #1)	30(S), 60(D)		30(S), 60(D)	
RUNWAY PAVEMENT STRENGTH (PCN)	-		-	
RUNWAY CENTERLINE TO PARALLEL TAXIWAY CENTERLINE	400'		400'	
LINE OF SIGHT REQUIREMENT MET	Yes		Yes	
TAXIWAY LIGHTING	MITL, Reflectors		MITL	
TAXIWAY MARKING	Centerline		Centerline	
TAXIWAY SURFACE MATERIAL	Concrete		Concrete	
TAXIWAY CENTERLINE TO FIXED OR MOVABLE OBJECT	65.5'		65.5'	
TAXIWAY WINGTIP CLEARANCE	26'		26'	
TAXIWAY WIDTH (TDG)	35' / TDG 2		35' / TDG 2	
TAXILANE WIDTH and TAXILANE OBJECT FREE AREA WIDTH	25' (115')		25' (115')	
TAXIWAY SHOULDER WIDTH	None		None	
TAXIWAY & TAXILANE SAFETY AREA WIDTH	79'		79'	
TAXIWAY OBJECT FREE AREA WIDTH	131' TOFA		131' TOFA	
TAXIWAY HOLDING POSITION MARKING/HOLDSIGN	250'		250'	
TAXIWAY EDGE SAFETY MARGIN (TESM)	7.5'		7.5'	
	RUNWAY 13	RUNWAY 31	RUNWAY 13	RUNWAY 31
14 CFR PART 77 APPROACH CATEGORY	NP-C	NP-C	NP-C	NP-C
14 CFR PART 77 APPROACH SURFACE	500' x 10,000' x 3500'	500' x 10,000' x 3500'	500' x 10,000' x 3500'	500' x 10,000' x 3500'
14 CFR PART 77 APPROACH SLOPE	34:1 Nonprecision	34:1 Nonprecision	34:1 Nonprecision	34:1 Nonprecision
RUNWAY PROTECTION ZONES	1000' x 1700' x 1510'	1000' x 1700' x 1510'	1000' x 1700' x 1510'	1000' x 1700' x 1510'
RUNWAY APPROACH VISIBILITY MINIMUMS (LOWEST)	7/8 mile	7/8 mile	7/8 mile	7/8 mile
RUNWAY MARKING	Nonprecision	Nonprecision	Nonprecision	Nonprecision
RUNWAY BLAST PAD	None	None	None	None
RUNWAY DISPLACED THRESHOLD	None	None	None	None
RUNWAY DISPLACED THRESHOLD ELEVATION	None	None	None	None
OBSTACLE CLEARANCE SURFACES (EB #99 Table 3-2)	20:1 (Rwy Type 4)	20:1 (Rwy Type 4)	20:1 (Rwy Type 4)	20:1 (Rwy Type 4)
RUNWAY END ELEVATION (NAVD88)	EL. 1317.6	EL. 1298.4	EL. 1323.0	EL. 1298.4
RUNWAY TOUCHDOWN ZONE ELEVATION (TDZE / NAVD 88)	EL. 1317.6	EL. 1314.4	EL. 1323.0	EL. 1314.4
RUNWAY SAFETY AREA (STANDARD RSA BEYOND STOP END)	Yes	Yes	Yes	Yes
RUNWAY SAFETY AREA (RSA Actual L x W)	4800' x 150'		7500' x 500'	
OBJECT FREE AREA (STANDARD OFA BEYOND STOP END)	300' x 150'	300' x 150'	1000' x 500'	1000' x 500'
OBJECT FREE AREA (OFA Actual L x W)	4800' x 500'		7500' x 800'	
OBSTACLE FREE ZONE (STANDARD OFZ BEYOND STOP END)	300' x 500'	300' x 500'	1000' x 800'	1000' x 800'
OBSTACLE FREE ZONE (OFZ Actual L x W)	4600' x 400'		5900' x 400'	
TYPE OF AERONAUTICAL SURVEY REQUIRED FOR APPROACH	VG (2009)	VG (2009)	VG	VG
RUNWAY DEPARTURE SURFACE (EB #99 Table 3-2 OCS 40:1)	Yes	Yes	Yes	Yes
AIRPORT INSTRUMENT APPROACH PROCEDURES	RNAV (GPS) LPV	RNAV (GPS) LPV	RNAV (GPS) LPV	RNAV (GPS) LPV
RUNWAY VISUAL AIDS (Lights)	PAPI-2	PAPI-2, REIL	PAPI-4, REIL	PAPI-4, MALS

1 PAVEMENT STRENGTHS ARE EXPRESSED IN SINGLE (S).

AIRPORT DATA			
OWNER: Blair Airport Authority	CITY: Blair, NE	COUNTY: Washington, NE	
BLAIR MUNICIPAL AIRPORT (BTA)		EXISTING	ULTIMATE
AIRPORT REFERENCE CODE		B-II	C-II
CRITICAL DESIGN AIRCRAFT		Cessna Citation Sovereign	Cessna Citation X+
WINGSPAN / UNDERCARRIAGE / APPROACH SPEED		72.33' / 27.83' / 108 Knots	69.17' / 29.92' / 132 Knots
AIRPORT ELEVATION (NAVD 88)		1317.6' MSL	1323.0 MSL
MEAN MAXIMUM TEMPERATURE OF HOTTEST MONTH		87.3° F (July)	Same
AIRPORT REFERENCE POINT (ARP) COORDINATES (NAD 83)	Latitude	41° 24' 53.30" N	41° 24' 58.08" N
	Longitude	96° 6' 32.30" W	96° 6' 38.07" W
AIRPORT INSTRUMENT APPROACH PROCEDURES / RNAV (GPS) APPROACH		RNAV GPS	RNAV GPS
AIRPORT and TERMINAL NAVIGATIONAL AIDS		None	None
MISCELLANEOUS FACILITIES		Airport Beacon Lighted Wind Cone AWOS-3	Airport Beacon Lighted Wind Cone AWOS-3
NPIAS SERVICE LEVEL		General Aviation (GA)	Same
STATE SERVICE ROLE		Regional	Same

RUNWAY COORDINATES (NAD 83)			
BLAIR MUNICIPAL AIRPORT (BTA)		EXISTING	ULTIMATE
Runway 13 End-EL. 1317.6 (NAVD 88) Ultimate 13 End-EL. 1323.0	Latitude	41° 25' 8.5395" N	41° 25' 17.97" N
	Longitude	96° 6' 50.9962" W	96° 7' 2.6" W
Runway 31 End EL. 1298.4 (NAVD 88)	Latitude	41° 24' 38.0877" N	Same
	Longitude	96° 6' 13.5453" W	Same

MODIFICATIONS TO FAA AIRPORT DESIGN STANDARDS			
STANDARD MODIFIED	DESCRIPTION	AIRSPACE CASE NUMBER	APPROVAL DATE
None	-	-	-

Airport Facilities (FAA Owned)
MALS (Ultimate)

GENERAL NOTES:

1. Depiction of features and objects, including related elevations and clearances, within the Inner Approach of the 14 CFR Part 77 are depicted on the INNER PORTION OF THE APPROACH SURFACE DRAWINGS.
2. Details concerning terminal improvements depicted on the TERMINAL AREA DRAWING.
3. Recommended land uses within the airport environs are depicted on the AIRPORT LAND USE DRAWING.
4. NAVD 88 Datum was used for all vertical elevations and NAD 83 for all horizontal elevations.
5. There are no Existing Runway Shoulders or Taxiway Shoulders, tables show standard requirements.
6. See Inner Portion of Runway 13-31 Approach Surface Drawing, Approach Surface Profiles, Departure Surface Drawing for Obstacle Clearance Surfaces (OCS).
7. No PACS or SACS found. See https://www.ngs.noaa.gov/cgi-bin/airports.prl?TYPE=PACSAC
8. Engineering Brief (EB #99) provides the latest versions of Table 3-2 (Approach and Departure Standards) and Table 3-4 (Standards for Instrument Approach Procedures). Please reference the tables in this EB until a new version of Advisory Circular (AC) 150/5300-13A, Airport Design, is published.

DECLARED DISTANCE	Existing		Ultimate	
	Rwy 13	Rwy 31	Rwy 13	Rwy 31
TAKEOFF RUN AVAILABLE (TORA)	4200'	4200'	5500'	5500'
TAKEOFF DISTANCE AVAILABLE (TODA)	4200'	4200'	5500'	5500'
ACCELERATE-STOP DISTANCE AVAILABLE (ASDA)	4200'	4200'	5500'	5500'
LANDING DISTANCE AVAILABLE (LDA)	4200'	4200'	5500'	5500'

LEGEND

EXISTING	ULTIMATE	DESCRIPTION
	SAME	ABANDONED PAVEMENT (To Be Removed)
		AIRPORT PROPERTY LINE/FENCE
		AIRPORT REFERENCE POINT (ARP)
	SAME	AIRPORT ROTATING BEACON
	SAME	BUILDING ABANDONMENT (To Be Removed)
		BUILDING
	SAME	DRAINAGE
		PAVEMENT
		FENCING (3'-6' AGL)
xPAPI-2	uPAPI-4	NAVIGATIONAL AID INSTALLATION (PAPI)
		RUNWAY THRESHOLD LIGHTS and REIL
	SAME	SECTION CORNER
		WIND INDICATOR/WINDSOCK (WS)
1200	SAME	TOPOGRAPHY (NAVD 88)
		HOLDING POSITION MARKING
	SAME	PARCELS
TSA	SAME	TAXIWAY SAFETY AREA (79')
TOFA	SAME	TAXIWAY OBJECT FREE AREA (131')
Extd OFA	SAME	EXTENDED OBJECT FREE AREA
xOFZ	uOFZ	OBSTACLE FREE ZONE (OFZ)
xRSA	uRSA	RUNWAY SAFETY AREA (RSA)
xROFA	uROFA	RUNWAY OBJECT FREE AREA (ROFA)
AS	uAS	PART 77 APPROACH SURFACE
		RUNWAY PROTECTION ZONE (RPZ)
BRL-35	SAME	BUILDING RESTRICTION LINE (BRL-35' Minimum)
	SAME	AWOS
NONE		APPROACH LIGHT SYSTEM (MALS)
	SAME	EASEMENT
		TIE-DOWNS
		ROAD and PARKING
NONE		PROPERTY (Future Airport Acquisition)
	SAME	TREES
	SAME	PONDS
NONE		FUTURE APRON / TAXIWAY PAVEMENT

FOR APPROVAL BY

by Gary Clarke, Chairman 3/19/2019
Blair Airport Authority DATE:

BUILDINGS/FACILITIES		
	DESCRIPTION	Elevation
1	HANGAR (Blair Airport Authority)	1339.2 MSL
2	FBO HANGAR (SkyWerx)	1341.3 MSL
3	SELF-SERVICE FUEL	1324.7 MSL
4	HANGAR (SkyWerx)	1344.7 MSL
5	T-HANGAR (Blair Airport Authority)	1334.7 MSL
6	BOX HANGAR	1338.9 MSL
7	T-HANGAR (Blair Airport Authority)	1342.9 MSL
8	T-HANGAR (Blair Airport Authority)	1342.9 MSL
9	T-HANGAR (Blair Airport Authority)	1343.0 MSL
10	T-HANGAR (Blair Airport Authority)	1343.5 MSL
11	OL AIRPORT BEACON	1376.2 MSL
12	ELECTRICAL VAULT	1327.2 MSL
13	BUILDING (SkyWerx)	1336.0 MSL
14	OL WINDSOCK	1322.4 MSL
15	AWOS	1332.7 MSL
16	BUILDING	1292.2 MSL
17	HANGAR (Gottsch Brothers LLC)	1343' MSL

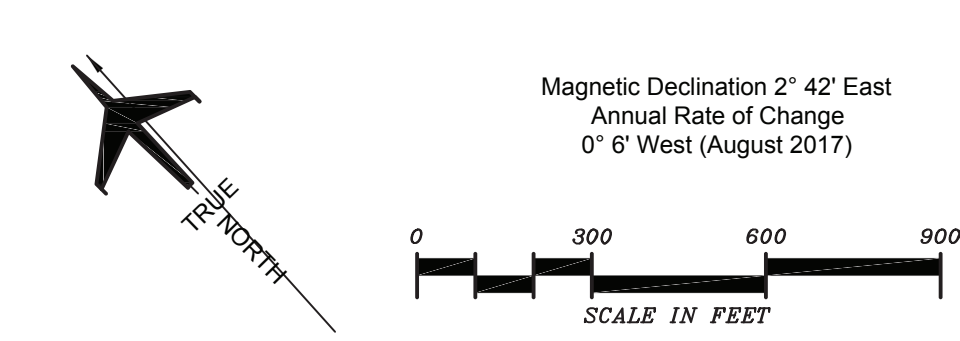
FAA APPROVAL STAMP

CONDITIONAL APPROVAL

The approval indicated by my signature is given subject to the condition that the items identified in our approval letter dated March 21, 2019 may not be undertaken without prior written environmental approval by the Federal Aviation Administration. This approval action does not imply any commitment for Federal funding, or approval of future structures requiring notice under FAR Part 77.

Airport Planning Engineer 3/21/2019
FAA Central Region Date

ULTIMATE BUILDINGS/FACILITIES		
	DESCRIPTION	Elevation
20	T-HANGAR (8-units)	20' AGL
21	T-HANGAR (8-units)	20' AGL
22	T-HANGAR (8-units)	20' AGL
23	T-HANGAR (8-units)	20' AGL
24	T-HANGAR (10-units)	20' AGL
25	T-HANGAR (10-units)	20' AGL
26	T-HANGAR (10-units)	20' AGL
27	AIRPORT MAINTENANCE BUILDING	35' AGL
28	T-HANGAR (10-units)	20' AGL
29	TERMINAL BUILDING/RESTAURANT	35' AGL
30	WASH RACK	25' AGL
31	CONVENTIONAL HANGAR	25' AGL
32	CONVENTIONAL HANGAR	35' AGL
33	CONVENTIONAL HANGAR	35' AGL
34	CONVENTIONAL HANGAR	35' AGL
35	CONVENTIONAL HANGAR	35' AGL
36	CONVENTIONAL HANGAR	35' AGL
37	CONVENTIONAL HANGAR	35' AGL
38	CONVENTIONAL HANGAR	35' AGL
39	CONVENTIONAL HANGAR	35' AGL
40	T-HANGAR (10-units)	20' AGL
41	T-HANGAR (10-units)	20' AGL
42	PRIVATE FUEL FARM	15' AGL



Magnetic Declination 2° 42' East
Annual Rate of Change
0° 6' West (August 2017)

NO.	REVISIONS	DATE	BY	APP'D.
1	-	—	—	—

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BLAIR MUNICIPAL AIRPORT

AIRPORT LAYOUT PLAN DRAWING

Blair, Nebraska

PLANNED BY: Tyler Stuber
DETAILED BY: Larry D. Johnson
APPROVED BY: Mike W. Dmyterko

March 13, 2019 SHEET 2 OF 10

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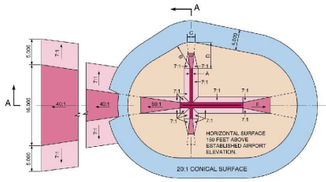
OBSTRUCTION TABLE

No.	Description	Object MSL	TOP AGL	Part 77 Surface	Object Penetration	Remediation
1	ROAD	1340.1' MSL	15' MSL	Transitional	2' MSL	Road To Be Relocated
2	ROAD	1339.2' MSL	15' MSL	Primary	16.2' MLS	Road To Be Relocated
3	UTILITY POLES	1349.6' MSL	26.6' MSL	Primary	26.6' MSL	Bury Lines / Remove All Poles
4	ROAD	1330.1' MSL	15' MSL	Primary	7' MSL	Road To Be Relocated
5	TREES (Group)	1357.1' MSL	39.9' MSL	Primary & Transitional	39.9' MSL	Remove Group of Trees
6	UTILITY POLES	1330.1' MSL	22.5' MSL	Primary	7.1' MSL	Bury Lines / Remove All Poles
7	WIND SOCK	1320' MSL	11' AGL	Transitional	1' MSL	To Be Relocated



OBSTRUCTION LEGEND

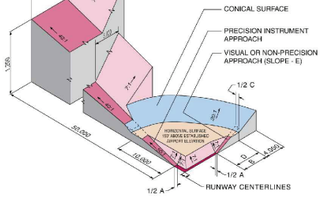
- 1 OBSTRUCTION
- GROUP TREES OBSTRUCTION
- OBSTRUCTION SURVEY (9-17-2016 from MTZ geospatial)

DIM	ITEM	DIMENSIONAL STANDARDS (FEET)					
		VISUAL RUNWAY		NON-PRECISION INSTRUMENT RUNWAY			PRECISION INSTRUMENT RUNWAY
		A	B	A	B C	B D	
A	WIDTH OF PRIMARY SURFACE AND APPROACH SURFACE WIDTH AT INNER END	250	500	500	500	1,000	1,000
B	RADIUS OF HORIZONTAL SURFACE	5,000	5,000	5,000	10,000	10,000	10,000
		VISUAL APPROACH		NON-PRECISION INSTRUMENT APPROACH			PRECISION INSTRUMENT APPROACH
		A	B	A	B C	B D	
C	APPROACH SURFACE WIDTH AT END	1,250	1,500	2,000	3,500	4,000	16,000
D	APPROACH SURFACE LENGTH	5,000	5,000	5,000	10,000	10,000	*
E	APPROACH SLOPE	20:1	20:1	20:1	34:1	34:1	*

A - UTILITY RUNWAYS
B - RUNWAYS LARGER THAN UTILITY
C - VISIBILITY MINIMUMS GREATER THAN 3/4 MILE
D - VISIBILITY MINIMUMS AS LOW AS 3/4 MILE
* - PRECISION INSTRUMENT APPROACH SLOPE IS 50:1 FOR INNER 10,000 FEET AND 40:1 FOR AN ADDITIONAL 40,000 FEET

GENERAL NOTES:

1. Obstructions, clearances, and locations are calculated from ultimate runway end elevations and ultimate approach surfaces, unless otherwise noted.
2. Depiction of features and objects within the primary, transitional, horizontal, and conical surfaces, are illustrated on the AIRPORT AIRSPACE DRAWINGS.
3. Depiction of features and objects within the inner portion of the approach surfaces, are illustrated on the INNER PORTION OF RUNWAY APPROACH SURFACE DRAWINGS.
4. Existing and future height and hazard ordinances are to be amended and/or referenced upon approval of the PART 77 AIRSPACE PLAN.
5. Obstruction survey accuracy conforms to requirements listed in AC 150/5300-18b for the Obstacle feature class.
6. Per Blair Municipal Airport Zoning Regulations adopted June 12, 2006, height restriction zoning exists within three miles of the existing or planned airport property line. The boundaries, operation zones, approach zones, transition zones, and turning zones of the airport are indicated on the Zoning Map that accompanies these regulations. A copy of the zoning is on file in the office of the City Clerk, Blair, Nebraska.



ISOMETRIC VIEW OF SECTION A-A

SOURCE: 14 CFR Part 77, Section 77.25, Civil Airport Imaginary Surfaces.

TRUE NORTH

Magnetic Declination
2°42' East (August 2017)
Annual Rate of Change 6' W Per Year

0 2000 4000 6000
SCALE IN FEET

NO.	REVISIONS	DATE	BY	APP'D.
1	-	—	—	—

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BLAIR MUNICIPAL AIRPORT

AIRPORT AIRSPACE DRAWING

Blair, Nebraska

PLANNED BY: Tyler Huber
DETAILED BY: Larry D. Johnson
APPROVED BY: Mike W. Dmytenko
March 13, 2019
SHEET 3 OF 10

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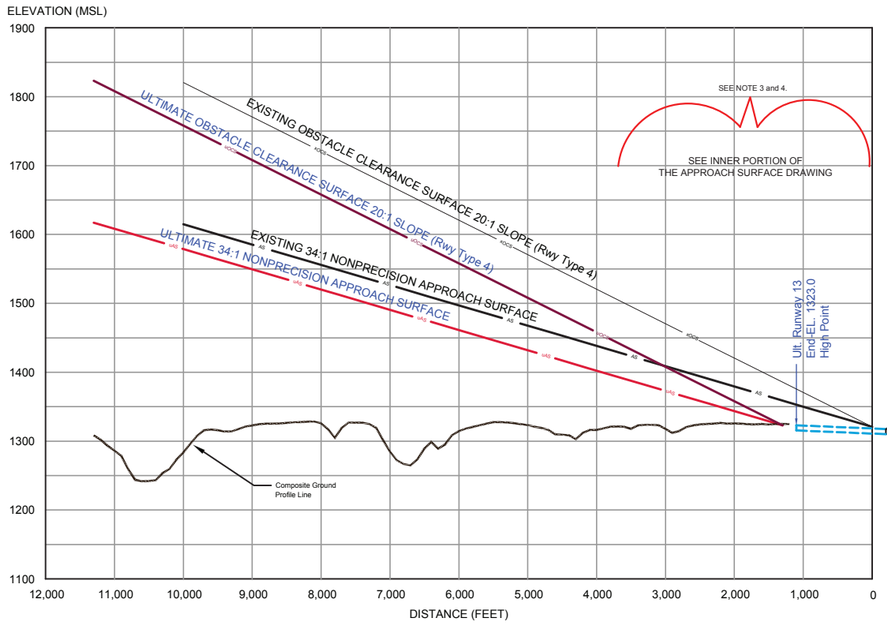
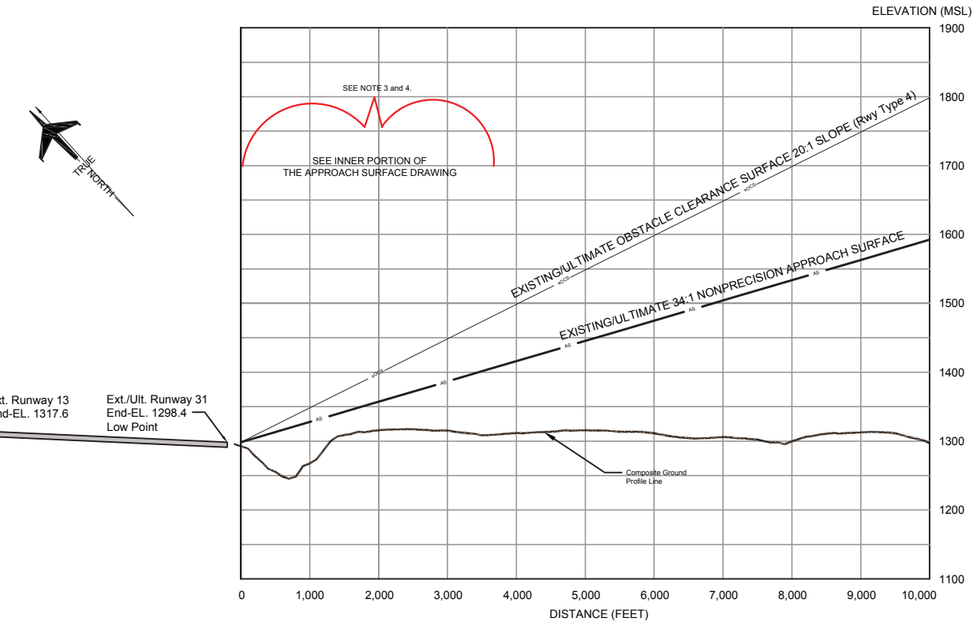
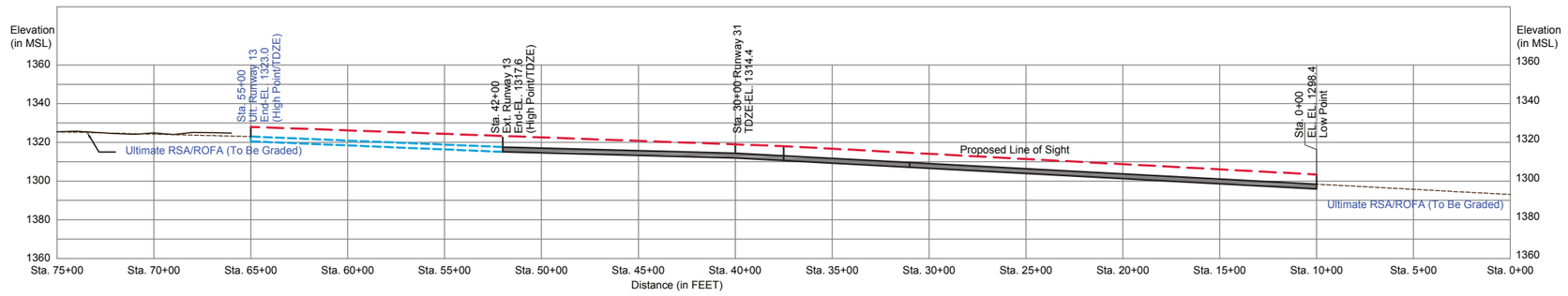


RUNWAY 13 APPROACH SURFACES PROFILE



RUNWAY 31 APPROACH SURFACES PROFILE



RUNWAY 13-31 CENTERLINE PROFILE

Existing 4,200' x 100' Runway
Ultimate 5,500' x 100' Runway

GENERAL NOTES:

1. Obstructions, clearances, and locations are calculated from ultimate runway end elevations and ultimate approach surfaces, unless otherwise noted.
2. Depiction of features and objects within the primary, transitional, horizontal, and conical surfaces, are illustrated on the AIRPORT AIRSPACE DRAWINGS.
3. Depiction of features and objects within the inner portion of the approach surfaces, are illustrated on the INNER PORTION OF RUNWAY APPROACH SURFACE DRAWINGS.
4. Existing and future height and hazard ordinances are to be amended and/or referenced upon approval of the PART 77 AIRSPACE PLAN.
5. Obstruction survey accuracy conforms to requirements listed in AC 150/5300-18b for the Obstacle feature class.
6. Per Blair Municipal Airport Zoning Regulations adopted June 12, 2006, height restriction zoning exists within three miles of the existing or planned airport property line. The boundaries, operation zones, approach zones, transition zones, and turning zones of the airport are indicated on the Zoning Map that accompanies these regulations. A copy of the zoning is on file in the office of the City Clerk, Blair, Nebraska.

RUNWAY 13 OUTER APPROACH OBSTRUCTION TABLE

No.	Object Name	Elevation	Existing 34:1 Approach	Existing 20:1 OCS	Ultimate 34:1 Approach	Ultimate 20:1 OCS	Proposed Disposition
None							

No Obstructions In the Outer Portion of Runway 13 Approach Surface

RUNWAY 31 OUTER APPROACH OBSTRUCTION TABLE

No.	Object Name	Elevation	Existing 34:1 Approach	Existing 20:1 OCS	Ultimate 34:1 Approach	Ultimate 20:1 OCS	Proposed Disposition
None							

No Obstructions In the Outer Portion of Runway 13 Approach Surface

Magnetic Declination 2° 42' East
Annual Rate of Change
0° 6' West (August 2017)

0 1000 2000 3000
HORIZONTAL SCALE IN FEET

0 100 200 300
VERTICAL SCALE IN FEET

NO.	REVISIONS	DATE	BY	APP'D.
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BLAIR MUNICIPAL AIRPORT
RUNWAY 13-31
APPROACH SURFACE PROFILES
Blair, Nebraska

PLANNED BY: Tyler Huber
DETAILED BY: Larry D. Johnson
APPROVED BY: Mike W. Dmytenko

March 13, 2019 SHEET 4 OF 10

Coffman Associates
Airport Consultants
www.coffmanassociates.com

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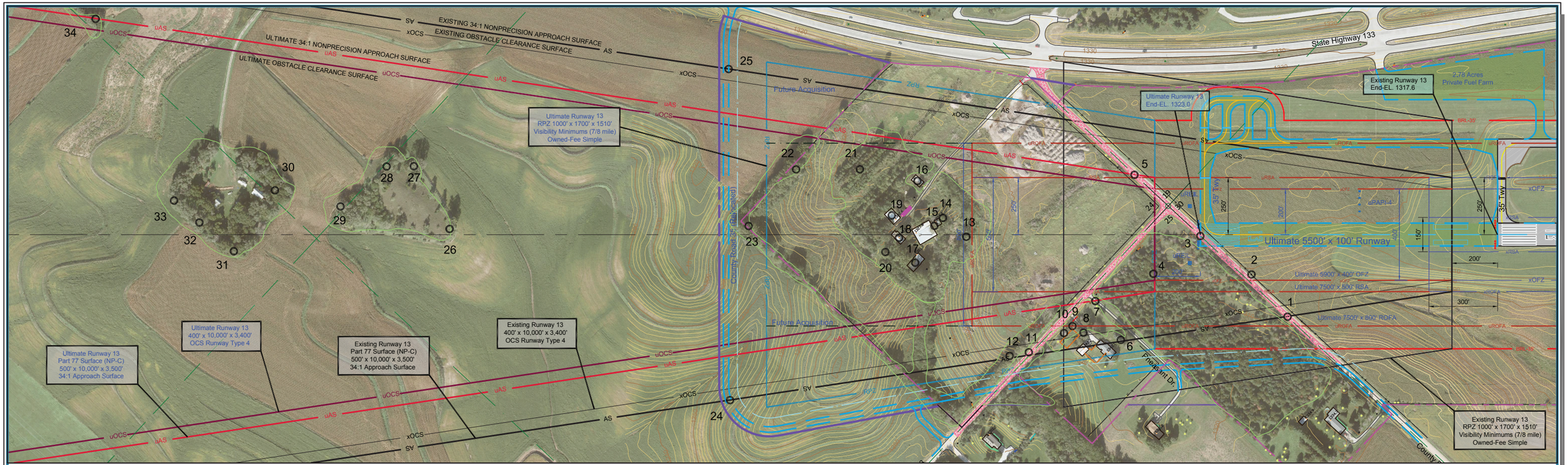

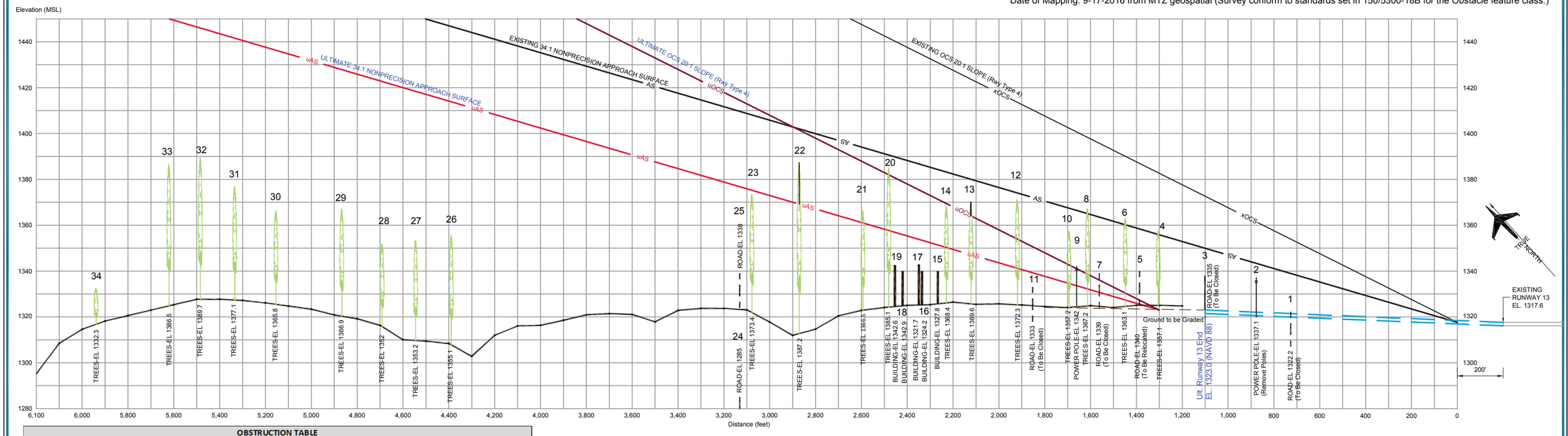

OBSTRUCTION TABLE							
No.	Object Name	Elevation MSL	Existing 34:1 Approach	Existing 20:1 OCS	Ultimate 34:1 Approach	Ultimate 20:1 OCS	Proposed Disposition
4	TREES	1357.1	2'	CLEAR	34.5'	34.5'	REMOVE ALL TREES
5	ROAD	1340	CLEAR	CLEAR	15'	15'	RELOCATE ROAD
6	TREES	1363.1	3'	CLEAR	N/A	N/A	REMOVE ALL TREES IN RPZ
7	ROAD	1339	N/A	N/A	8.5'	3.2'	CLOSED ROAD
8	TREES	1367.2	2.3'	CLEAR	N/A	N/A	REMOVE ALL TREES
13	TREES	1369.6	CLEAR	CLEAR	22.8'	5.8'	REMOVE ALL TREES
14	TREES	1368.4	CLEAR	CLEAR	18'	CLEAR	REMOVE ALL TREES
20	TREES	1385.1	CLEAR	CLEAR	27.7'	3.5'	REMOVE ALL TREES
21	TREES	1366.5	CLEAR	CLEAR	5.5'	CLEAR	REMOVE ALL TREES
22	TREES	1387.2	CLEAR	CLEAR	18'	CLEAR	REMOVE ALL TREES IN RPZ

GENERAL NOTES:

1. Obstructions, clearances, and locations are calculated from ultimate runway end elevations and ultimate approach surfaces, unless otherwise noted. Road obstructions reflect a safety clearance of 10' for dirt Roads or private Roads, 15' for noninterstate Roads, 17' for interstate Roads, and 23' for railroad.
2. Engineering Brief (EB #99) provides the latest versions of Table 3-2 (Approach and Departure Standards) and Table 3-4 (Standards for Instrument Approach Procedures). Please reference the tables in this EB until a new version of Advisory Circular (AC) 150/5300-13A, Airport Design, is published.

Magnetic Declination 2° 42' East
Annual Rate of Change
0° 6' West (August 2017)

HORIZONTAL SCALE IN FEET
0 200 400 600

VERTICAL SCALE IN FEET
0 20 40 60

NO.	REVISIONS	DATE	BY	APP'D.
	-	—	—	—

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BLAIR MUNICIPAL AIRPORT
INNER PORTION OF RUNWAY 13 APPROACH SURFACE DRAWING
Blair, Nebraska

PLANNED BY: Tyler Huber
DETAILED BY: Larry D. Johnson
APPROVED BY: Mike W. Dmytenko
March 13, 2019
SHEET 5 OF 10

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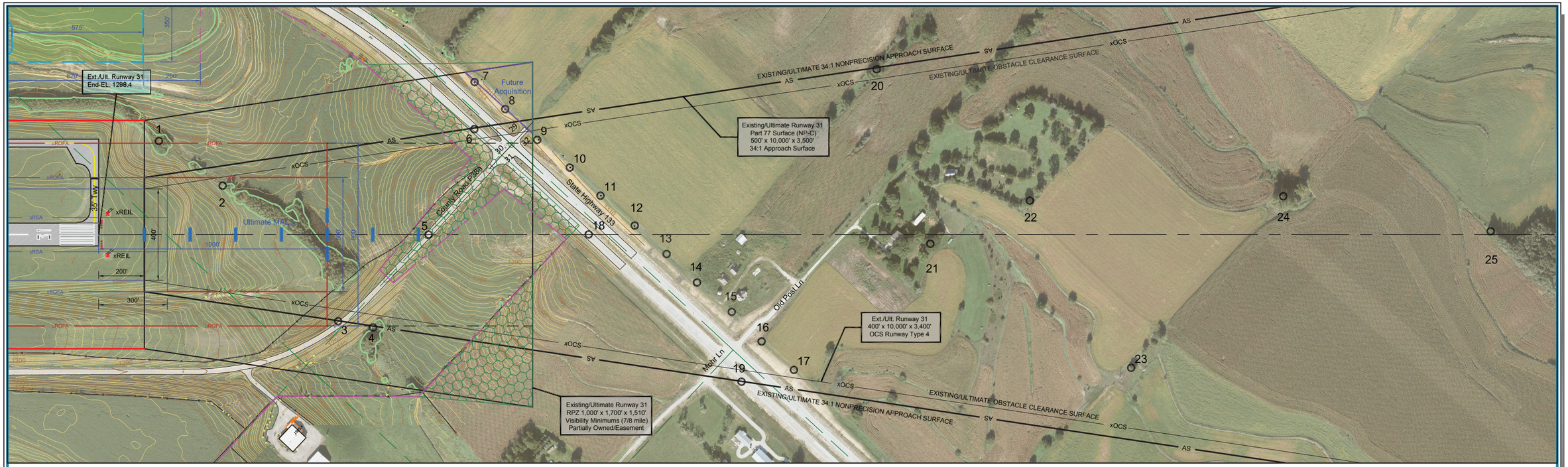
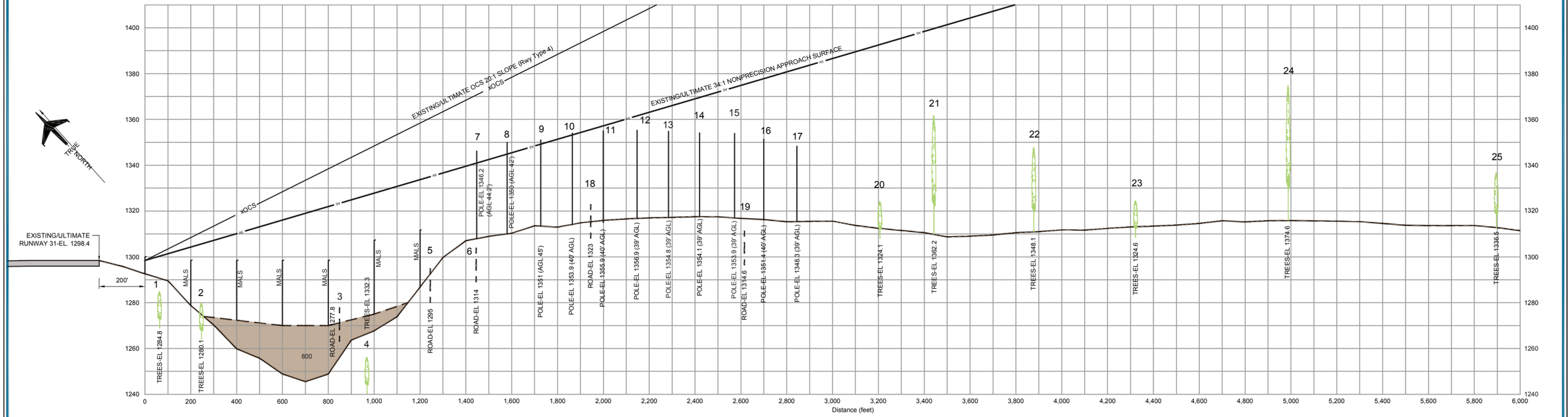


Date of Mapping: 9-17-2016 from MTZ geospatial (Survey conform to standards set in 150/5300-18B for the Obstacle feature class.)



OBSTRUCTION TABLE							
No.	Object Name	Elevation TOP MSL	Existing 34:1 Approach	Existing 20:1 OCS	Ultimate 34:1 Approach	Ultimate 20:1 OCS	Proposed Disposition
9	UTILITY_POLE	1351	1.8'	Clear	1.8'	Clear	BURY LINES/REMOVE POLES No. 9 thru 17
10	UTILITY_POLE	1353.9	1'	Clear	1'	Clear	BURY LINES/REMOVE POLES No. 9 thru 17

GENERAL NOTES:

1. Obstructions, clearances, and locations are calculated from ultimate runway end elevations and ultimate approach surfaces, unless otherwise noted. Road obstructions reflect a safety clearance of 10' for dirt Roads or private Roads, 15' for noninterstate Roads, 17' for interstate Roads, and 23' for railroad.
2. Engineering Brief (EB #99) provides the latest versions of Table 3-2 (Approach and Departure Standards) and Table 3-4 (Standards for Instrument Approach Procedures). Please reference the tables in this EB until a new version of Advisory Circular (AC) 150/5300-13A, Airport Design, is published.

Magnetic Declination 2° 42' East
Annual Rate of Change
0° 6' West (August 2017)

0 200 400 600
HORIZONTAL SCALE IN FEET

0 20 40 60
VERTICAL SCALE IN FEET

NO.	REVISIONS	DATE	BY	APP'D.
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BLAIR MUNICIPAL AIRPORT
INNER PORTION OF RUNWAY 31 APPROACH SURFACE DRAWING
Blair, Nebraska

PLANNED BY: Tyler Stuber
DETAILED BY: Larry D. Johnson
APPROVED BY: Mike W. Dmytenko

March 13, 2019 SHEET 6 OF 10

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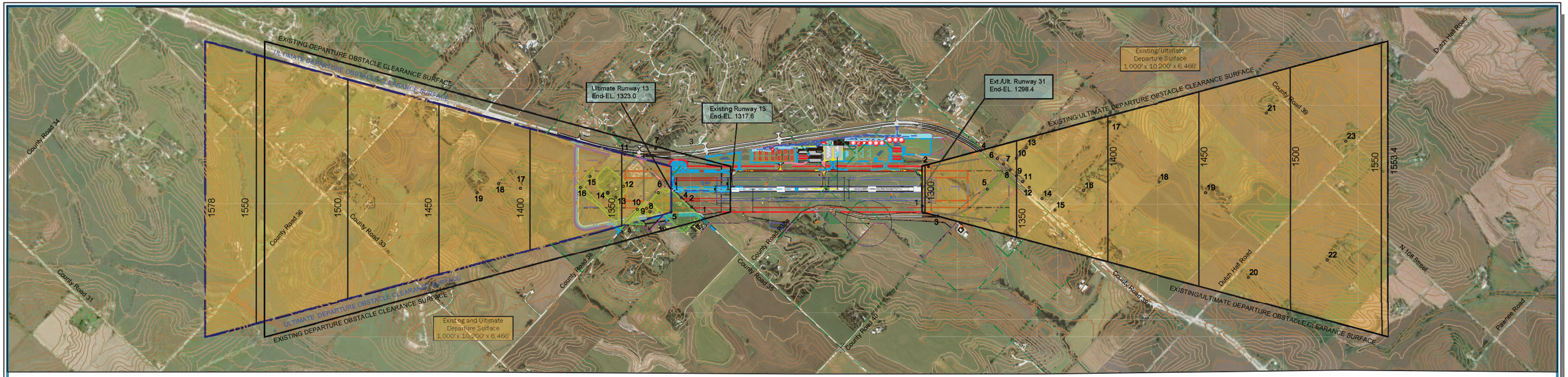
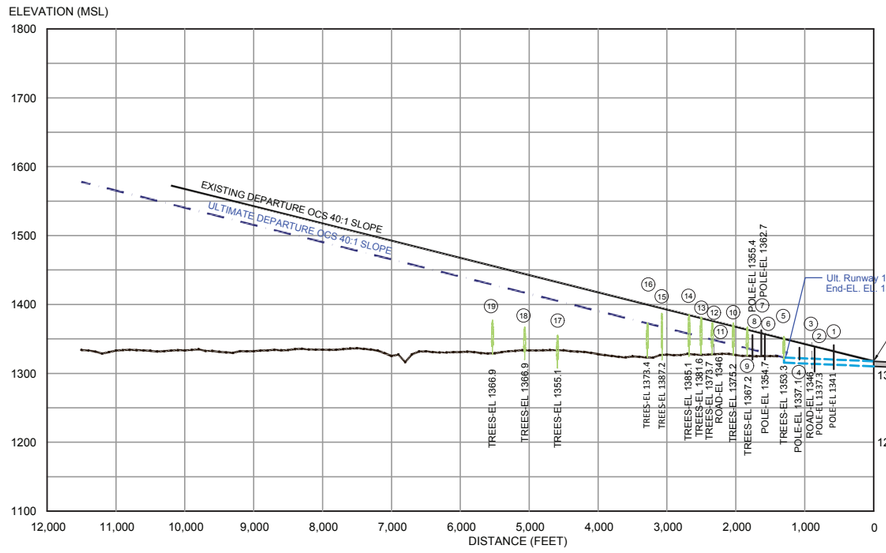
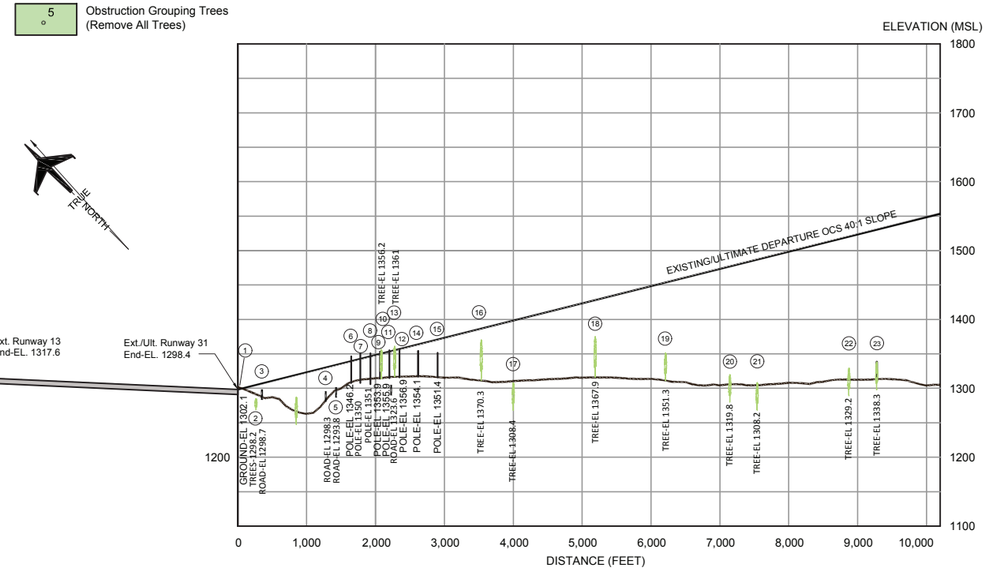


Date of Mapping: 9-17-2016 from MTZ geospatial (Survey conform to standards set in 150/5300-18B for the Obstacle feature class.)



RUNWAY DEPARTURE SURFACE

5 Obstruction Grouping Trees (Remove All Trees)



RUNWAY DEPARTURE SURFACE

RUNWAY 13 OBSTRUCTION TABLE

No.	Object Name	Elevation MSL	Penetration	Proposed Disposition
1	Utility Pole	1340.1'	9'	Bury Lines/Remove Poles
2	Utility Pole	1337.3'	0'	Bury Lines/Remove Poles
3	Road	1346'	5'	Relocate Runway End
4	Utility Pole	1337.1'	0'	Bury Lines/Remove Poles
5	Trees	1353.3'	30.3'	Trim/Remove All Trees
6	Utility Pole	1354.7'	24.8'	Bury Lines/Remove Poles
7	Utility Pole	1362.7'	31.5'	Bury Lines/Remove Poles
8	Utility Pole	1355.4'	21'	Bury Lines/Remove Poles
9	Trees	1367.2'	31'	Trim/Remove All Trees
10	Trees	1375.2'	31.4'	Trim/Remove All Trees
12	Trees	1373.7'	24.8'	Trim/Remove All Trees
13	Trees	1381.6'	28.5'	Trim/Remove All Trees
14	Trees	1385.1'	27.8'	Trim/Remove All Trees
15	Trees	1387.2'	20'	Trim/Remove All Trees
16	Trees	1373.4'	1'	Trim/Remove All Trees

RUNWAY 31 OBSTRUCTION TABLE

No.	Object Name	Elevation MSL	Penetration	Proposed Disposition
1	Terrain	1302.6'	3.5'	Re-Grade
6	Utility Pole	1346.2'	6.6'	Bury Lines/Remove Poles
7	Utility Pole	1350'	7.1'	Bury Lines/Remove Poles
8	Utility Pole	1351'	4.3'	Bury Lines/Remove Poles
9	Utility Pole	1353.9'	3.3'	Bury Lines/Remove Poles
10	Treetop	1356.2	7'	Trim/Remove All Trees
11	Utility Pole	1355.9'	1.6'	Bury Lines/Remove Poles
13	Treetop	1361.0'	4.8'	Trim/Remove All Trees

GENERAL NOTES:

1. Obstructions, clearances, and locations are calculated from ultimate runway end elevations and ultimate approach surfaces, unless otherwise noted.
2. Depiction of features and objects within the primary, transitional, horizontal, and conical surfaces, are illustrated on the AIRPORT AIRSPACE DRAWINGS.
3. Depiction of features and objects within the outer portion of the approach surfaces, are illustrated on the RUNWAY APPROACH SURFACE PROFILES.
4. Depiction of features and objects within the inner portion of the approach surfaces, are illustrated on the INNER PORTION OF RUNWAY APPROACH SURFACE DRAWINGS.
5. Obstructions within groupings represent tallest object in that specified area.
6. Engineering Brief (EB #99) provides the latest versions of Table 3-2 (Approach and Departure Standards) and Table 3-4 (Standards for Instrument Approach Procedures). Please reference the tables in this EB until a new version of Advisory Circular (AC) 150/5300-13A, Airport Design, is published.

Magnetic Declination 2° 42' East
Annual Rate of Change
0° 6' West (August 2017)

0 1000 2000 3000
HORIZONTAL SCALE IN FEET

0 100 200 300
VERTICAL SCALE IN FEET

NO.	REVISIONS	DATE	BY	APP'D.
1	-	—	—	—

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BLAIR MUNICIPAL AIRPORT
RUNWAY 13-31
DEPARTURE SURFACE DRAWING
Blair, Nebraska

PLANNED BY: Tyler Huber
DETAILED BY: Larry D. Johnson
APPROVED BY: Mike W. Dmytenko
March 13, 2019

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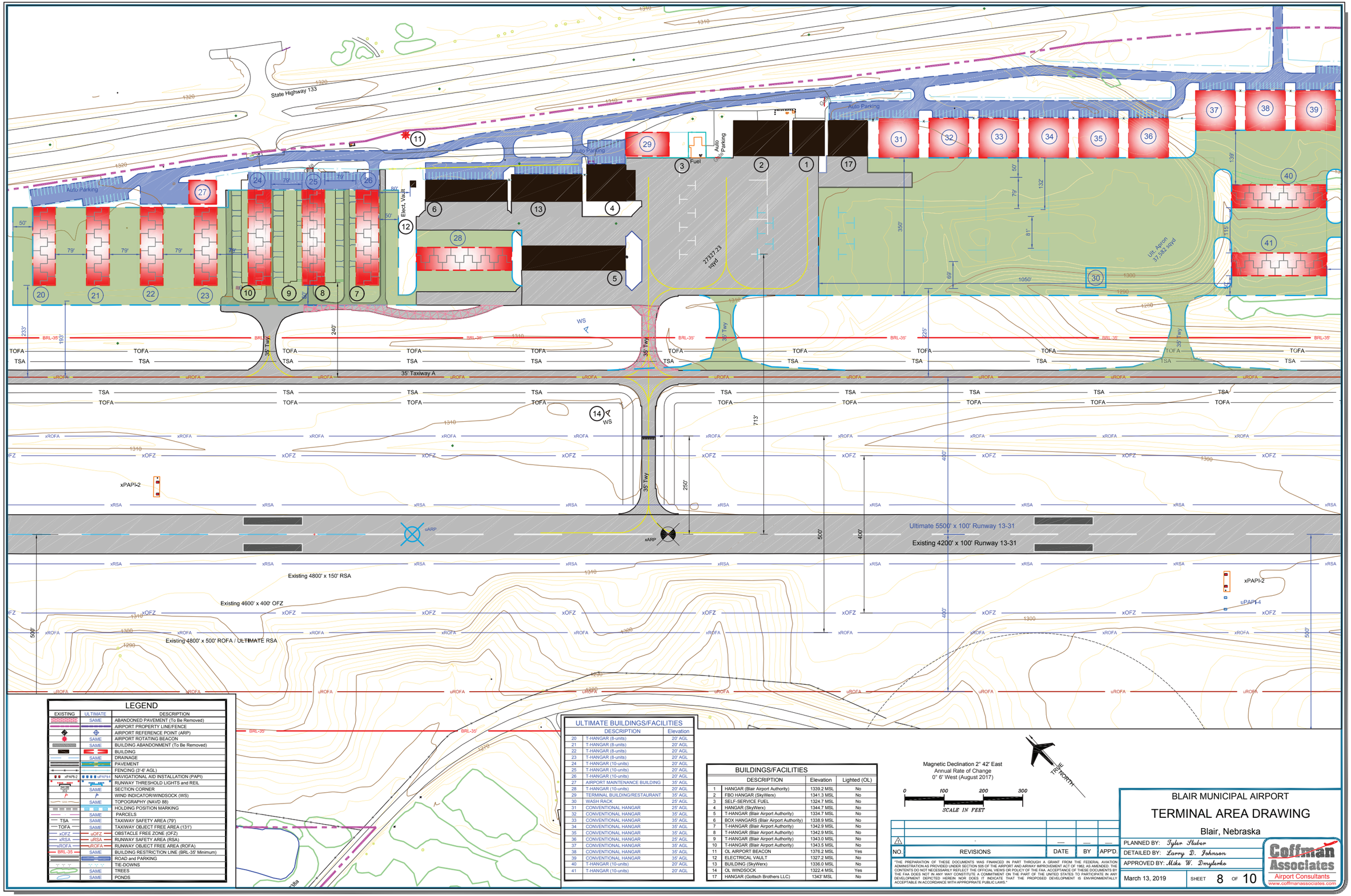

LEGEND

EXISTING	ULTIMATE	DESCRIPTION
	SAME	ABANDONED PAVEMENT (To Be Removed)
		AIRPORT PROPERTY LINE/FENCE
	SAME	AIRPORT REFERENCE POINT (ARP)
	SAME	AIRPORT ROTATING BEACON
	SAME	BUILDING ABANDONMENT (To Be Removed)
		BUILDING
	SAME	DRAINAGE
		PAVEMENT
		FENCING (3'-6" AGL)
xPAPI-2	uPAPI-4	NAVIGATIONAL AID INSTALLATION (PAPI)
		RUNWAY THRESHOLD LIGHTS and REIL
25/36 / 7/18	SAME	SECTION CORNER
	SAME	WIND INDICATOR/WINDSOCK (WS)
1320	SAME	TOPOGRAPHY (NAVD 88)
		HOLDING POSITION MARKING
	SAME	PARCELS
TSA	SAME	TAXIWAY SAFETY AREA (79')
TOFA	SAME	TAXIWAY OBJECT FREE AREA (131')
xOFZ	uOFZ	OBSTACLE FREE ZONE (OFZ)
xRSA	uRSA	RUNWAY SAFETY AREA (RSA)
xROFA	uROFA	RUNWAY OBJECT FREE AREA (ROFA)
BRL-35	SAME	BUILDING RESTRICTION LINE (BRL-35' Minimum)
		ROAD and PARKING
	SAME	TIE-DOWNS
	SAME	TREES
	SAME	PONDS

ULTIMATE BUILDINGS/FACILITIES

	DESCRIPTION	Elevation
20	T-HANGAR (8-units)	20' AGL
21	T-HANGAR (8-units)	20' AGL
22	T-HANGAR (8-units)	20' AGL
23	T-HANGAR (8-units)	20' AGL
24	T-HANGAR (10-units)	20' AGL
25	T-HANGAR (10-units)	20' AGL
26	T-HANGAR (10-units)	20' AGL
27	AIRPORT MAINTENANCE BUILDING	35' AGL
28	T-HANGAR (10-units)	20' AGL
29	TERMINAL BUILDING/RESTAURANT	35' AGL
30	WASH RACK	25' AGL
31	CONVENTIONAL HANGAR	25' AGL
32	CONVENTIONAL HANGAR	35' AGL
33	CONVENTIONAL HANGAR	35' AGL
34	CONVENTIONAL HANGAR	35' AGL
35	CONVENTIONAL HANGAR	35' AGL
36	CONVENTIONAL HANGAR	25' AGL
37	CONVENTIONAL HANGAR	35' AGL
38	CONVENTIONAL HANGAR	35' AGL
39	CONVENTIONAL HANGAR	35' AGL
40	T-HANGAR (10-units)	20' AGL
41	T-HANGAR (10-units)	20' AGL

BUILDINGS/FACILITIES

	DESCRIPTION	Elevation	Lighted (OL)
1	HANGAR (Blair Airport Authority)	1339.2 MSL	No
2	FBO HANGAR (SkyWerx)	1341.3 MSL	No
3	SELF-SERVICE FUEL	1324.7 MSL	No
4	HANGAR (SkyWerx)	1344.7 MSL	No
5	T-HANGAR (Blair Airport Authority)	1334.7 MSL	No
6	BOX HANGARS (Blair Airport Authority)	1338.9 MSL	No
7	T-HANGAR (Blair Airport Authority)	1342.9 MSL	No
8	T-HANGAR (Blair Airport Authority)	1342.9 MSL	No
9	T-HANGAR (Blair Airport Authority)	1343.0 MSL	No
10	T-HANGAR (Blair Airport Authority)	1343.5 MSL	No
11	OL AIRPORT BEACON	1376.2 MSL	Yes
12	ELECTRICAL VAULT	1327.2 MSL	No
13	BUILDING (SkyWerx)	1336.0 MSL	No
14	OL WINDSOCK	1322.4 MSL	Yes
17	HANGAR (Gottsch Brothers LLC)	1343' MSL	No

Magnetic Declination 2° 42' East
Annual Rate of Change
0° 6' West (August 2017)

0 100 200 300
SCALE IN FEET

TRUE NORTH

NO.	REVISIONS	DATE	BY	APP'D.
1	-	—	—	—

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BLAIR MUNICIPAL AIRPORT

TERMINAL AREA DRAWING

Blair, Nebraska

PLANNED BY: Tyler Huber
DETAILED BY: Larry D. Johnson
APPROVED BY: Mike W. Dmytenko

March 13, 2019 | SHEET 8 OF 10

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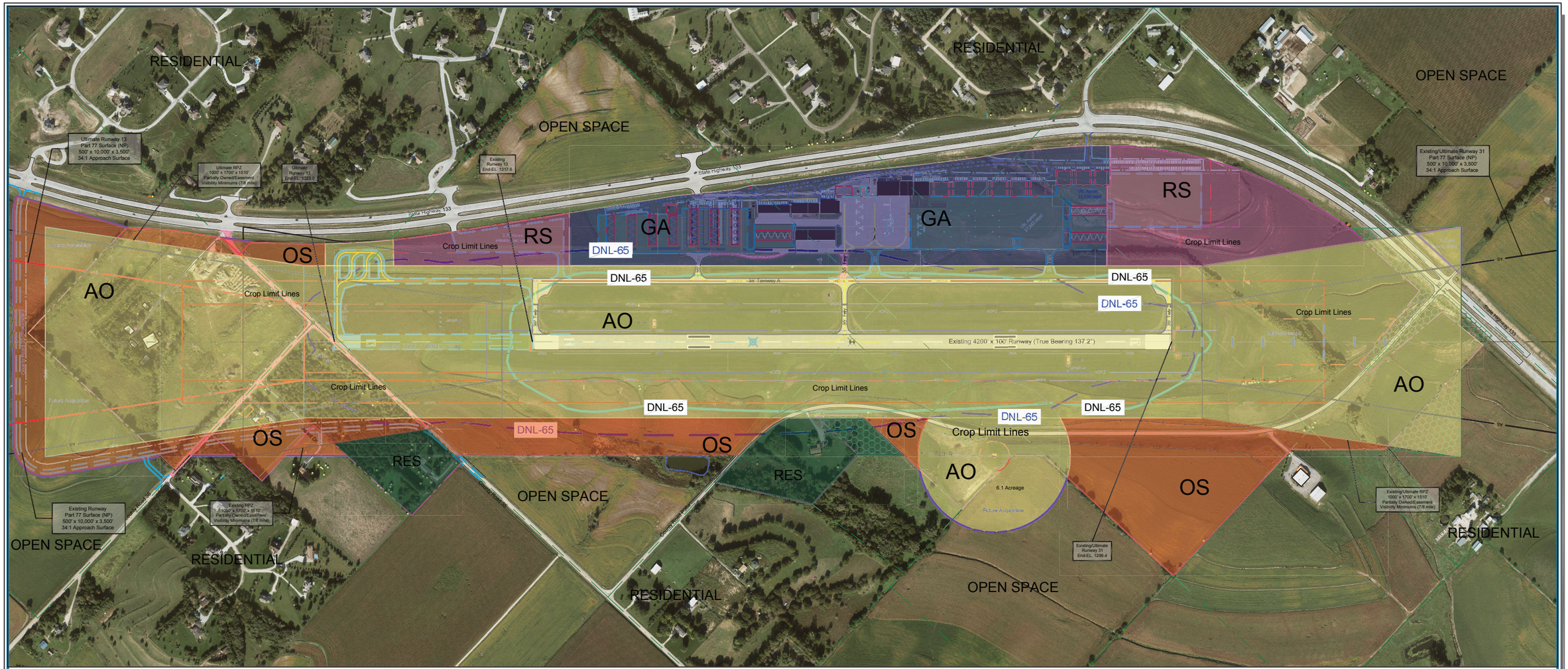

Date of Mapping: 9-17-2016 from MTZ geospatial

On-Airport Land Use Legend

- AIRPORT OPERATION (AO)
- GENERAL AVIATION (GA)
- REVENUE SUPPORT (RS) (Non-Aviation Related)
- RESIDENTIAL (RES)
- OPEN SPACE (OS)
- EXISTING 2016 DNL-65
- ULTIMATE 2036 DNL-65
- CROP LIMIT LINES

GENERAL NOTES:

1. Depiction of features and objects, including related elevations and clearances, within the Inner Approach of the CFR 14 Part 77 are depicted on the INNER PORTION OF THE APPROACH SURFACE DRAWINGS.
2. Details concerning terminal improvements depicted on the TERMINAL AREA DRAWING.
3. Recommended land uses within the airport environs are depicted on the LAND USE DRAWING.
4. NAVD 88 Datum was used for all vertical elevations and NAD 83 for all horizontal elevations.
5. Existing and future height and hazard ordinances are to be amended and/or referenced upon approval of updated AIRPORT AIRSPACE DRAWING (14 CFR Part 77).
6. No Public use facilities (schools, hospitals, churches, or parks) within the plan view of this drawing.
7. Existing or future Crop Limit Lines begin at 610' x 510' beyond each runway end, 70' from Taxiway Centerline, 60' off of apron edge and 300' center on MALS.

LEGEND

EXISTING	ULTIMATE	DESCRIPTION
	SAME	ABANDONED PAVEMENT (To Be Removed)
		AIRPORT PROPERTY LINE/FENCE
		AIRPORT REFERENCE POINT (ARP)
	SAME	AIRPORT ROTATING BEACON
	SAME	BUILDING ABANDONMENT (To Be Removed)
		BUILDING
	SAME	DRAINAGE
		PAVEMENT
		FENCING (3'-6' AGL)
xPAPI-2	uPAPI-4	NAVIGATIONAL AID INSTALLATION (PAPI)
		RUNWAY THRESHOLD LIGHTS and REIL
	SAME	SECTION CORNER
		WIND INDICATOR/WINDSOCK (WS)
1200	SAME	TOPOGRAPHY (NAVD 88)
		HOLDING POSITION MARKING
	SAME	PARCELS
TSA	SAME	TAXIWAY SAFETY AREA (79')
TOFA	SAME	TAXIWAY OBJECT FREE AREA (131')
Extd OFA	SAME	EXTENDED OBJECT FREE AREA
xOFZ	uOFZ	OBSTACLE FREE ZONE (OFZ)
xRSA	uRSA	RUNWAY SAFETY AREA (RSA)
xROFA	uROFA	RUNWAY OBJECT FREE AREA (ROFA)
AS	uAS	PART 77 APPROACH SURFACE
		RUNWAY PROTECTION ZONE (RPZ)
BRL-35	SAME	BUILDING RESTRICTION LINE (BRL-35' Minimum)
	SAME	AWOS
NONE		APPROACH LIGHT SYSTEM (MALS)
	SAME	EASEMENT
		TIE-DOWNS
		ROAD and PARKING
NONE		PROPERTY (Future Airport Acquisition)
	SAME	TREES
	SAME	PONDS
NONE		FUTURE APRON / TAXIWAY PAVEMENT

Magnetic Declination 2° 42' East
Annual Rate of Change
0° 6' West (August 2017)

0 300 600 900
SCALE IN FEET

NO.	REVISIONS	DATE	BY	APP'D.
1	-	—	—	—

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BLAIR MUNICIPAL AIRPORT

AIRPORT LAND USE DRAWING

Blair, Nebraska

PLANNED BY: Tyler Fluber
DETAILED BY: Larry D. Johnson
APPROVED BY: Mike W. Dmytenko
March 13, 2019
SHEET 9 OF 10

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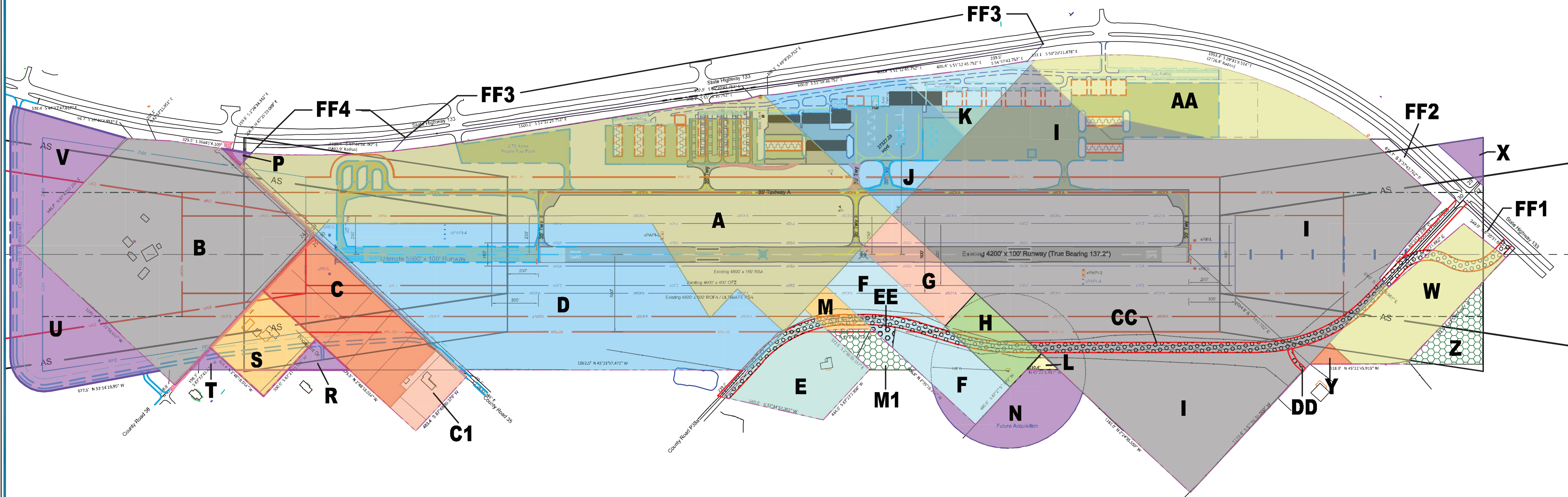

EASEMENTS / RELEASES

Tract	Grantor	Grantee	Instrument	Date Aquired/Released	Recorded Acreage	Federal Proj. #	Book_Page	Legal Description
CC	Airport Authority	Washington County	ROW Easement	12/12/2004	0	3-31-0109-4	451_226-231	66' Washing Co. Rd P-38 Thru Tax Lots 41, 40, 35, 36, 32, 23, 42 Section 30-17-13 and Tax Lot 7 Section 31-17-12
DD	Airport Authority	Black Veterinary Clinc	Permanent Easement	9/24/2004	0.11	none	449_259-261	Part of Tax Lot 42 Section 30-17-12
EE	Airport Authority	Martin Hoer & Elizabeth P. Hoer	Warranty Deed	9/10/2004	0.28	3-31-0109-4	447_201-206	Part of Tax Lot 32 Section 30-17-12
FF1	Airport Authority	NDOR	ROW Release To Other	12/5/2006	2.66	NDOR Highway 133	501_75-82	Hwy 133 ROW Thru Tax Lot 7
FF2	Airport Authority	NDOR	ROW Release To Other	12/5/2006	3.41	NDOR Highway 133	501_75-82	Hwy 133 ROW Thru Tax Lot 42
FF3	Airport Authority	NDOR	ROW Release To Other	12/5/2006	6.54	NDOR Highway 133	501_75-82	Hwy 133 ROW Thru Tax Lots 37, 38, 39
FF4	Airport Authority	NDOR	ROW Release To Other	12/5/2006	1.36	NDOR Highway 133	501_75-82	Hwy 133 ROW Thru Tax Lot 15
M1	Martin Hoer	Airport Authority	Airspace easement	9/10/2004	1.8	3-31-0109-04	Unavailable	Part of Tax Lot 36 30-17-12
Z	Gladys Mohr	Airport Authority	Existing Easement	10/22/2004	3.04	3-31-0109-04	Unavailable	Part of Tax Lot 7 31-17-12

PROPERTY TO BE ACQUIRED

Tract	Acreage
N	6.08
P	0.2
R	0.91
T	0.49
U	11.4
V	8.45
X	1.05

GENERAL NOTES:

1. Metes and Bounds descriptions are derived from internal process using the assessor parcel and 2012 Exhibit A of the Airport Property as the base line work. They are not drawn from deeds.
2. NAVD88 Datum was used for all vertical elevations and NAD83 for all horizontal elevations.
3. Property table provided by airport after attorneys review of table with the county recorder. Parcels A and C show the split by Assessor's Parcel Number as provided by Airport and referenced in ARP SOP 3.0 Item 6g. Parcel B shows calculated acreage of parcel.

Date of Mapping: 9-17-2016 from MTZ geospatial

AIRPORT PROPERTY

Tract	Owner	Grantor	Grantee	Transaction Type	Interest	Instrument	Date Acquired/Released	Recorded Acreage	Federal Project	Book / Page	Legal Description
A	City of Blair	Eagle Institute	City of Blair Thru Airport Authority	Acquisition	FEE	Corp Warranty Deed	10/10/1996	5.17	3-31-0109-02	258 734	TL 24 19-17-12 11C PC 5 5.17AC
A	City of Blair	Eagle Institute	City of Blair Thru Airport Authority	Acquisition	FEE	Corp Warranty Deed	9/24/1996	72.05	3-31-0109-02	258 734	TL 49 30-17-12 11C PC 8 78.06 AC
AA	City of Blair	Kenneth C. Schatz	City of Blair Thru Airport Authority	Acquisition	FEE	Warranty Deed	1/22/2010	16.01	3-31-0109-10	550_435	TL 52 30-17-12 11C PC 4 16.01 AC
B	City of Blair	Gary & Cheryl Petersen	City of Blair Thru Airport Authority	Acquisition	FEE	Eminent Domain	2013	38.78	3-31-0109-013	Unavailable	TL 29 SECTION 24-17-11
C	City of Blair	Gloria A. Nordstrom & Robert A Nordstrom	City of Blair Thru Airport Authority	Acquisition	FEE	Warranty Deed	5/11/2004	2.01	3-31-0109-04	437_86	NORDSTROM'S 2ND SUB LOT 8 17BN PC 2 2.01 AC
C	City of Blair	Gloria A. Nordstrom & Robert A Nordstrom	City of Blair Thru Airport Authority	Acquisition	FEE	Warranty Deed	5/11/2004	2.01	3-31-0109-04	437_86	NORDSTROM'S 2ND SUB LOT 3 17BN PC 3 2.01 AC
C	City of Blair	Gloria A. Nordstrom & Robert A Nordstrom	City of Blair Thru Airport Authority	Acquisition	FEE	Warranty Deed	5/11/2004	2.01	3-31-0109-04	437_86	NORDSTROM'S 2ND SUB LOT 4 17BN PC 4 2.01 AC
C	City of Blair	Gloria A. Nordstrom & Robert A Nordstrom	City of Blair Thru Airport Authority	Acquisition	FEE	Warranty Deed	5/11/2004	2.5	3-31-0109-04	437_86	NORDSTROM'S 2ND SUB LOT 5 17BN PC 5 2.50 AC
C	City of Blair	Gloria A. Nordstrom & Robert A Nordstrom	City of Blair Thru Airport Authority	Acquisition	FEE	Warranty Deed	5/11/2004	2.89	3-31-0109-04	437_86	NORDSTROM'S 2ND SUB LOT 6 17BN PC 6 2.89 AC
C1	City of Blair	Folkers, Paul A & Paula R Co Trustee	City of Blair Thru Airport Authority	Acquisition	FEE	Warranty Deed	11/30/2006	2.79	3-31-0109-04	500_736	NORDSTROM'S 2ND SUB LOT 7 17BN PC 7 2.79 AC
D	City of Blair	Janna Simmons	City of Blair Thru Airport Authority	Acquisition	FEE	Eminent Domain	8/12/2003	46.07	3-31-0109-04	Unavailable	TL 40 30-17-12 11C PC 22 46.07 AC
E	City of Blair	Dennis C. and Nancy J. Goldapp	City of Blair Thru Airport Authority	Acquisition	FEE	Warranty Deed	5/9/2004	8	3-31-0109-04	437_825	TL 35 30-17-12 11C PC 19 8 AC
F	City of Blair	Pycha, Frank, III & Norma Jean	City of Blair Thru Airport Authority	Acquisition	FEE	Warranty Deed	10/1/2003	10.01	3-31-0109-04	420_697	TL 32 30-17-12 11C PC 13 10.01 AC
G	City of Blair	Pycha, Frank, III & Norma Jean	City of Blair Thru Airport Authority	Acquisition	FEE	Warranty Deed	10/1/2003	5	3-31-0109-04	420_697	TL 21 30-17-12 11C PC 14 5 AC
H	City of Blair	Pycha, Frank, III & Norma Jean	City of Blair Thru Airport Authority	Acquisition	FEE	Warranty Deed	10/1/2003	3.9	3-31-0109-04	420_697	TL 23 30-17-12 11C PC 15 3.90 AC
I	City of Blair	Gerald & Roberta Kruse	City of Blair Thru Airport Authority	Acquisition	FEE	Eminent Domain	8/12/2003	115.82	3-31-0109-03	Unavailable	TL 51 30-17-12 11C PC 23 115.82 AC
J	City of Blair	Marvin Rohwer & Delores Fifer	City of Blair Thru Airport Authority	Acquisition	FEE	Eminent Domain	8/12/2003	14.68	3-31-0109-04	Unavailable	TL 38 30-17-12
K	City of Blair	Kilgore Land Company	City of Blair Thru Airport Authority	Acquisition	FEE	Eminent Domain	8/9/2004	5.4	3-31-0109-04	438, 102-108	TL 37 30-17-12
L	City of Blair	Elizabeth Rybin	City of Blair Thru Airport Authority	Acquisition	FEE	Warranty Deed	11/10/2003	0.25	3-31-0109-04	424_110-111	TL 44 30-17-12 11C PC 24 .25 AC
M	City of Blair	Martin Hoer	City of Blair Thru Airport Authority	Acquisition	FEE	Eminent Domain	8/12/2003	1.39	3-31-0109-04	Unavailable	TL 46 30-17-12 11C PC 25 1.39 AC
S	City of Blair	Schweers Revocable Trust	City of Blair Thru Airport Authority	Acquisition	FEE	Trustee's Deed	4/2/2012	4.86	3-31-0109-11	583_629	TL 7 25-17-11 17BN PC 8 4.86 AC
W	City of Blair	Gladys Mohr Trust of 2000	City of Blair Thru Airport Authority	Acquisition	FEE	Warranty Deed	10/18/2005	10.98	3-31-0109-04	474_621-622	TL 34 31-17-12 11C PC 23 10.98 AC
Y	City of Blair	Gladys Mohr Trust of 2000	City of Blair Thru Airport Authority	Acquisition	FEE	Warranty Deed	10/18/2005	0.43	3-31-0109-04	474_621-622	TL 32 31-17-12 11C PC 24 0.43 AC

EXHIBIT "A" LEGEND

EXISTING	ULTIMATE	DESCRIPTION
	SAME	EXISTING PROPERTY
N/A		TO BE ACQUIRED
	SAME	EASEMENT
	SAME	ROW EASEMENT 12/12/2004

LEGEND

EXISTING	ULTIMATE	DESCRIPTION
	SAME	ABANDONED PAVEMENT (To Be Removed)
		AIRPORT PROPERTY LINE/FENCE
		AIRPORT REFERENCE POINT (ARP)
	SAME	AIRPORT ROTATING BEACON
	SAME	BUILDING ABANDONMENT (To Be Removed)
		BUILDING
	SAME	DRAINAGE
		PAVEMENT
		FENCING (3'-6' AGL)
xPAPI-2	uPAPI-4	NAVIGATIONAL AID INSTALLATION (PAPI)
		RUNWAY THRESHOLD LIGHTS and REIL
34 35 / 3 2	SAME	SECTION CORNER
		WIND INDICATOR/WINDSOCK (WS)
1200	SAME	TOPOGRAPHY (NAVD 88)
		HOLDING POSITION MARKING
	SAME	PARCELS
TSA	SAME	TAXIWAY SAFETY AREA (79')
TOFA	SAME	TAXIWAY OBJECT FREE AREA (131')
Extd OFA	SAME	EXTENDED OBJECT FREE AREA
xOFZ	uOFZ	OBSTACLE FREE ZONE (OFZ)
xRSA	uRSA	RUNWAY SAFETY AREA (RSA)
xROFA	uROFA	RUNWAY OBJECT FREE AREA (ROFA)
AS	uAS	PART 77 APPROACH SURFACE
		RUNWAY PROTECTION ZONE (RPZ)
BRL-35	SAME	BUILDING RESTRICTION LINE (BRL-35' Minimum)
	SAME	AWOS
NONE		APPROACH LIGHT SYSTEM (MALS)
	SAME	EASEMENT
		TIE-DOWNS
		ROAD and PARKING
NONE		PROPERTY (Future Airport Acquisition)

FOR APPROVAL BY

by [signature], Chairman 3/19/2019
Blair Airport Authority DATE:

TRUE NORTH

Magnetic Declination 2° 42' East
Annual Rate of Change
0° 6' West (August 2017)

0 300 600 900
SCALE IN FEET

NO.	REVISIONS	DATE	BY	APP'D.
	-	—	—	—

"THE PREPARATION OF THESE DOCUMENTS WAS FINANCED IN PART THROUGH A GRANT FROM THE FEDERAL AVIATION ADMINISTRATION AS PROVIDED UNDER SECTION 505 OF THE AIRPORT AND AIRWAY IMPROVEMENT ACT OF 1982, AS AMENDED. THE CONTENTS DO NOT NECESSARILY REFLECT THE OFFICIAL VIEWS OR POLICY OF THE FAA. ACCEPTANCE OF THESE DOCUMENTS BY THE FAA DOES NOT IN ANY WAY CONSTITUTE A COMMITMENT ON THE PART OF THE UNITED STATES TO PARTICIPATE IN ANY DEVELOPMENT DEPICTED HEREIN NOR DOES IT INDICATE THAT THE PROPOSED DEVELOPMENT IS ENVIRONMENTALLY ACCEPTABLE IN ACCORDANCE WITH APPROPRIATE PUBLIC LAWS."

BLAIR MUNICIPAL AIRPORT

EXHIBIT "A" AIRPORT PROPERTY

Blair, Nebraska

PLANNED BY: Tyler Stuber
DETAILED BY: Larry D. Johnson
APPROVED BY: Mike W. Dmyterko

March 13, 2019 SHEET 10 OF 10

Coffman Associates
Airport Consultants
www.coffmanassociates.com

Coffman Associates R:\CAD\JohnsonL\Project\BTA_Blair\ALP\ALPSET\BTA_sht10_prop2018.dwg Printed Date: 3-15-19 09:47:59 AM ljohnson

BLAIR
MUNICIPAL AIRPORT

APPENDIX D
UNITED STATES DEPARTMENT OF AGRICULTURE
WILDLIFE HAZARD OVERVIEW



Blair . . . A promise of quality

United States Department of Agriculture

Animal and Plant Health Inspection Service

Wildlife Services

5940 South 58th
Lincoln, NE
68516
(402) 434-2340
(402) 434-2339 FAX

Rodney Storm
Airport Manager
Blair Municipal Airport
218 South 16th St.
Blair, NE 68008

June 6, 2016

Re: Site Visit

Greetings Mr. Storm,

Thank you and your staff for the time and assistance provided on May 2, 2017 to conduct an overview of wildlife hazards and wildlife hazard management activities at Blair Municipal Airport (BTA). An overview of the airport, current wildlife management practices, and general wildlife concerns were discussed. A brief survey of the airfield was conducted with Mark Hodson to look for signs of wildlife activity, survey for bird activity, inspect the perimeter fence, and identify wildlife attractants. WS also surveyed a 5-mile radius area around the airport for the presence of hazardous wildlife and attractants.

Based on the analysis of the data gathered, no known history of a Wildlife Hazard Assessment, and lack of a Wildlife Hazard Management Plan, I recommend a WHA be conducted at BTA by a FAA-qualified Airport Wildlife Biologist. What follows is a summary of observations and recommendations from the site visit. These recommendations are intended to enhance the current wildlife hazard management practices to improve aviation safety.

Observations

Blair Municipal Airport is a 306-acre, non-towered, NE airport located 7 miles south of Blair Nebraska with land cover consisting of a grass/forb mixture with an area of woody vegetation predominantly on the north end of the airfield. The airport is bounded to the south and east by highway 133, and bounded by an incomplete perimeter fence to the north and west. Neighboring properties consist mainly of agricultural fields, small wooded areas, acreages, and several small ponds and wetlands.

Habitat/ On-site Attractant Observations

The large block of both deciduous and coniferous trees on the north end of the airfield provides cover and nesting areas for a plethora of various passerines, white-tailed deer, coyotes, foxes and other predators.

The perimeter fence does not completely surround the airport and consists of simple barbed wire fence. Most of the fence is approximately 4 feet in height with areas broken down. This style of fencing is not adequate to exclude hazardous wildlife, especially deer which are one of the most damaging species to aircraft.

There were 9 different locations on airport property where striped skunks, coyotes and badgers were excavating burrows or foraging for food. One abandoned coyote den was found between the runway and the taxiway. Several fresh gopher mounds were opened by a badger foraging for food.

On the west side of the airfield an area of grass several acres in size has been allowed to grow well above 2 feet tall. This area provides habitat for small mammals (evidenced by the numerous burrows surrounding the area) and in turn their predators. It may also provide cover for deer, which could remain undetected here during the day.

Hangars and other buildings can provide roosting or nesting habitat for birds. I observed birds actively nesting and roosting in several buildings around BTA including the hangars.

Bird Observations

The following table summarizes bird species and numbers observed during the site visit. It is not a comprehensive inventory of bird species at BTA. As the seasons change, the species and frequency will fluctuate.

Species	*Number*	*Behavior*	*Approximate Location*
Great Blue Heron	1	Loafing in pond	Pond on west edge of property
Canada Geese	6	Flying across runway	Flew east to west across the runway
Barn Swallow	15	Aerial foraging	West and south of airfield
Tree Swallow	7	Aerial Foraging	Northwest of airfield
Bobolinks	9	Flying over observation area, perched on vegetation	Grassy areas mainly west of the airfield
House Sparrow	~25	Flying over observation area, perched on structure	hangars, probably nesting inside
Red-winged Blackbird	~20	Flying over observation area, perched on vegetation	South drainage ditch and various other areas throughout the airfield
Common Grackle	25+	Flying over observation area, perched, nesting	Timbered area north of airfield
American Robin	3	Flying over observation area	North of airfield
Western Meadowlark	10	Flying over observation area, perched	Grassy areas
American Wigeon	2	Roosting	Pond on west perimeter fence
Mallard	2	Roosting/feeding	Pond

American Crow	2	Loafing on the ground	South end of airfield
Killdeer	3	Flying over observation area	Taxiway
Brown-Headed Cowbird	8	Perched on structure	Perimeter fence
European Starling	15	Perched on structure, flying over airfield	Perimeter fence, hangars
Pigeon	12	Flying over airfield	South end
Mourning Dove	2	Perched on structure	Perimeter fence
Franklins Gull	10	Flying over property	East side
Wild Turkey	1	Feeding in conifers	North end of property in woody vegetation

Mammal Observations

During the site visit 2 feral cats and an opossum were observed on the north end of the property across the gravel drive in the timbered area. Tracks of deer, coyote, raccoon, badger, and skunk were noted mainly on the northern end of the airfield. Many of these animals are nocturnal and become more active in low light conditions and at night. Several thirteen-lined ground squirrels were observed near the hangars and gopher mounds were spread throughout the field. Several abandoned dens and 1 active plugged badger den were observed on the airport property This den was located south of the pond on the fence line.

Since this airfield is not protected by high fence, white-tailed deer, coyotes, foxes, and a multitude of other wildlife species could easily access the AOA. Airport personnel (the mower man) reported that he had observed deer, coyotes, and skunks on the airfield.

Off-site Attractant Observations

The Missouri River and Desoto NWR is a large permanent wildlife attractant located several miles east of the airport. This provides ample food, water, cover, roosting and nesting habitat for a large diversity of hazardous wildlife including but not limited to Canada Geese and other waterfowl, raptors, gulls, and wading shorebirds. Twice a year, millions of migratory birds pass thru this area being in the heart of the flyway. The airport is surrounded by mostly agricultural fields, acreages, small timbered areas, and housing developments. One of the developments east of the airfield has a small lake that was observed harboring a large flock of Canada Geese. Hazardous species such as white-tailed deer, Canada Geese, and other hazardous wildlife tend to reside in these areas and could move onto the airfield, or fly into critical airspace.

Adjacent Farms
The farms directly adjacent to the airport contain corn and bean fields, which attract white-tailed deer, Canada Geese, Wild Turkeys, and large flocks of European Starlings and blackbirds. Livestock are housed on the farm as well. A small pond is located on the west boundary fence provides attractive habitat for waterfowl such as Canada Geese and ducks.

Recommendations to reduce wildlife attractants on site

Grass Management
Maintain grass at a height between 7-14 inches. Mowing frequently will prevent seed development to reduce the attraction of hazardous wildlife. Mow marginal areas at least twice during the growing season with a final mow just after the growing season to maintain grass within the recommended height range throughout the fall and winter. When construction projects require re-seeding of land cover avoid clover-grass mixtures which provide a high-nutrient food source for wildlife. Instead plant a tall, high-endophyte fescue grass variety. This type of grass does not provide a quality food source, and is therefore less attractive to hazardous wildlife.

Habitat Modification
Remove or thin out brushy and woody areas on the AOA especially at the north end. Discontinue the practice of planting row crops such as corn and beans. Instead maintain this area the same as other grass fields on the AOA.

Perimeter Fence Modification
Replace the existing perimeter fence with a design better suited to prevent hazardous wildlife intrusion. The recommended fence design to properly exclude wildlife is chain link at least 8 feet in height with 3 strands of barbed wire outriggers on top, and 3 feet of chain link skirting attached at the bottom and buried at an outward angle (see FAA Cert Alert 04-16 "Deer Hazards to Aircraft and Deer Fencing"). Alternatively a 10 foot fence buried 2 feet deep with barbed wire outriggers on top would provide similar protection. These designs will greatly reduce the likelihood of wildlife entering the airfield, and increases general security at the airport.

Administrative Recommendations & Recommendations for Direct Management

Attend Airport Wildlife Hazard Management Training
Send appropriate airport personnel to annual airport Wildlife Hazard Management Training administered by a FAA-certified Airport biologist as outlined in FAA AC 150/5200-36. This training should help BTA develop techniques and protocols, and establish priorities for managing hazardous wildlife.

Report Wildlife Strikes
Report all wildlife strikes to the National Wildlife Strike Database online at http://wildlife-mitigation.tc.faa.gov, or using the paper FAA Form 5200-7 Bird/Other Wildlife Strike Report, and encourage pilots to do the same. FAA AC 150/5200-32A

provides the steps for proper strike reporting. Proper identification of wildlife involved in strikes is critical. If the airport cannot identify the species being reported then the carcass, feathers, or tissue can be sent to the Smithsonian Feather Identification Lab. In addition, maintain an internal Wildlife Strike Log at BTA for your own record.

Establish Zero-tolerance Policy for Hazardous Wildlife

Maintain a zero-tolerance policy for white-tailed deer, Canada Geese, and gulls anywhere on the airfield as these are some of the most damaging species prevalent in and around BTA. Haze or lethally remove these species as soon as they are observed. Non-lethal harassment techniques such as using pyrotechnics should be attempted before lethal removal. Large flocks of American Crows, European Starlings and blackbirds, or any other wildlife creating a hazardous situation should also be dispersed or removed.

Maintain a Wildlife Control & Observation Log

Maintain a Wildlife Control and Observation Log. Keeping good records of wildlife observations and management activities helps prioritize species and particular areas of concern to focus future management efforts. I recommend using an electronic database to allow for easy analysis of large amounts of data.

Obtain Depredation Permits & Implement Lethal Control

Contact the U.S. Fish and Wildlife Service, and the Nebraska Game Fish and Parks to obtain proper depredation permits for the management of hazardous species at BTA. Properly trained airport personnel, USDA Wildlife Services or another FAA-certified Airport Biologist, or local law enforcement can be used to remove hazardous species from the airfield. Consult local laws and ordinances, and if necessary coordinate with law enforcement to ensure that airport personnel or other persons designated under permits can legally use firearms at BTA.

Establish a Bird Hazard Working Group

Conduct community outreach to neighboring farms, parks, and municipalities where hazardous wildlife could affect BTA. Meet with these groups periodically to discuss ways to mitigate hazardous wildlife attractants in the vicinity of the airport, and if necessary coordinate population management of certain hazardous species.

USDA Wildlife Services is available to assist in the implementation of any of these recommendations, which are offered to help establish an effective wildlife hazard management program at BTA and to improve aviation safety.

Based on the above observations and the current lack of a formal wildlife hazard management program at BTA, I recommend that a Wildlife Hazard Assessment be conducted. A WHA will obtain a more detailed assessment of wildlife activity and hazards, assess seasonal wildlife activity in the vicinity of the airport, and prioritize wildlife hazards and associated management actions. This type of study can be conducted by USDA Wildlife Services or by another FAA-certified Airport Biologist.

Thank you for the opportunity to contribute to safe air operations at your airport.

Sincerely,

Jed Vonnahme
Wildlife Biologist
APHIS/USDA/Wildlife Services
5940 S. 58th St.
Lincoln, NE 68516
Office/cell: (402) 853-2966
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