CHAPTER 2: FACILITY & ENVIRONMENTAL INVENTORY

Introduction

The Inventory chapter of the Airport Master Plan for the Grand Forks International Airport (GFK) provides the baseline framework to evaluate the airport facility. The facility inventory provides a review of the existing social and built environment to formulate profiles of the community and airport. The environmental inventory provides data to identify key environmental constraints and planning considerations that may affect airport development according to National Environmental Policy Act (NEPA) guidelines.

Airport Entrance Sign

This inventory data collection will be used to compare the existing conditions to the airport needs determined in future sections of the plan. This will lead to a plan developed for the future of the airport. Background information and data is gathered from various sources and compiled into this chapter. Please refer to the various appendices referenced within this narrative for more detailed information.

This chapter provides an inventory of the following elements:

Background

General

The Grand Forks International Airport: Mark Andrews Field (FAA ID: GFK), is the 22nd busiest airport in the United States in terms of operations. It is located in Grand Forks County in northwestern North Dakota. This airport is classified by FAA as a primary non-hub commercial service airport. The airport provides scheduled passenger service, air cargo, complete general aviation services and U.S. Customs and Border Protection services. The airport served 303,871 flight operations and enplaned 146,717 passengers in Fiscal Year (October 1, 2014 to September 30, 2015), and processed 58 million pounds of freight and mail in 2014.

Location

Exhibit 2-1 – Statewide Airport Location

Source: U.S. Census Bureau

The city of Grand Forks is located in northeastern North Dakota, 80 miles south of the Canadian border. Grand Forks is located approximately 80 driving miles north of Fargo, North Dakota; 146 driving miles south of Winnipeg, Manitoba, Canada; and 315 miles northwest of Minneapolis, Minnesota. The city is located along US Interstate 29 which runs from the Canadian border south to Texas. Grand Forks is located along the Red River of the North separating Grand Forks from East Grand Forks, MN.

GFK is located five miles northwest of the Grand Forks central business district in Rye Township. The airport itself is within a disconnected portion of Grand Forks city limits. U.S. Highway 2 (Gateway Drive) and Airport Drive provide access to the airport facility. U.S. Highway 2 is an east-west four-lane roadway providing direct access from the airport to downtown Grand Forks. **Figure 2-1: Airport Location Map** depicts the airport's location locally and regionally.

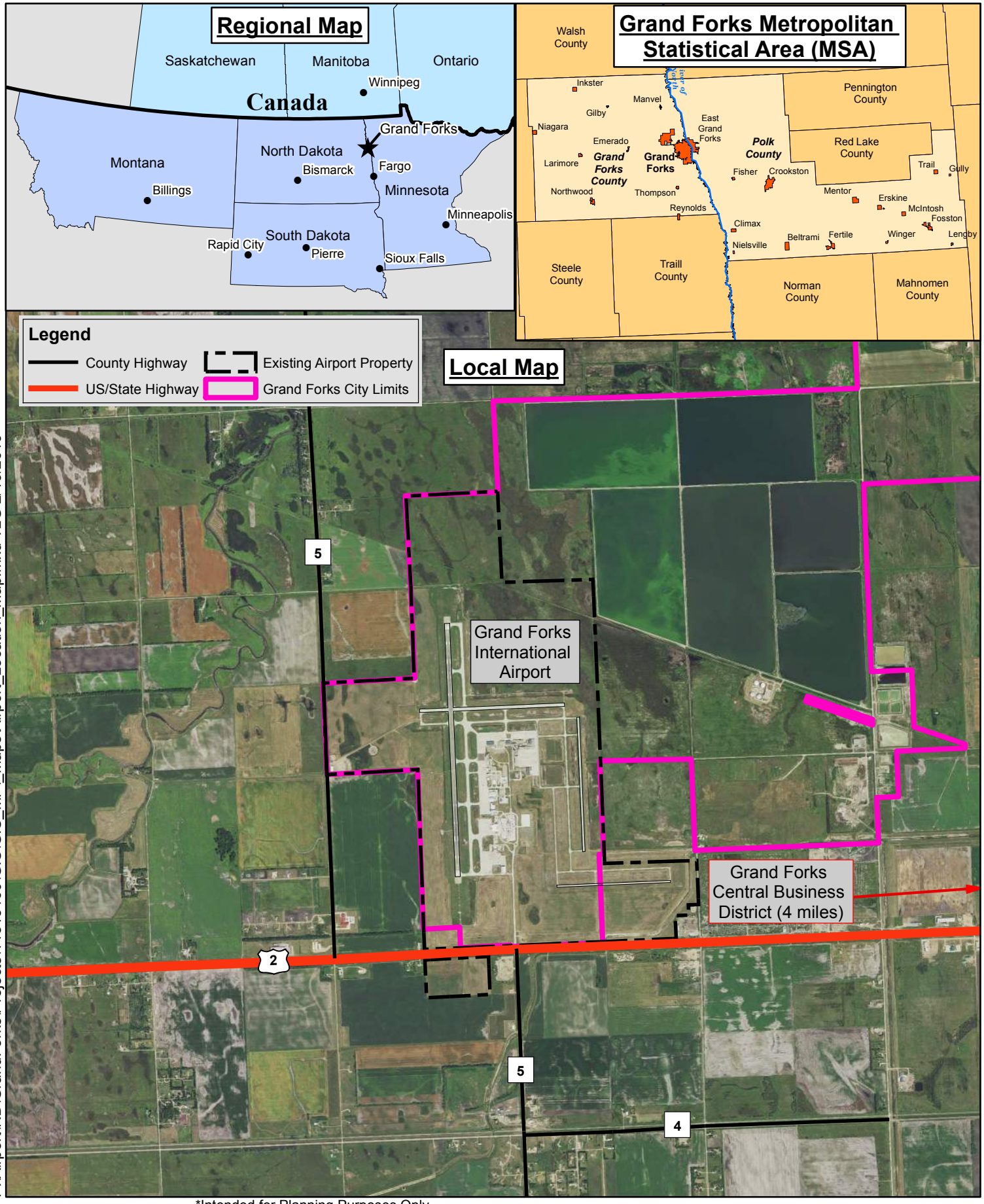
Setting

Grand Forks is located in an area of farmland and tallgrass prairie ecosystems. The community is within the heart of the Red River Valley, a formation left behind from glacial Lake Agassiz. The area is known for fertile lands. This area is prone to seasonal flooding.

The airport is sited on relatively flat land at 844 feet above Mean Sea Level (MSL). On-airport land use includes agricultural production, and some grassland. The airport is surrounded by grassland and agricultural land. Rural residential developments are scattered around the airport and a wastewater sewage lagoon located to the northeast. An auto-parts company exists directly east of the airport. Grand Forks city limits are located approximately 2 miles east of airport property along U.S. Highway 2. Terrain maintains relatively the same elevation throughout the airfield (within +/- 10 feet) with general drainage flowing to the north. **Figure 2-5: Land Use Map** depicts the airport's local setting in reference to surrounding land uses. See Environmental Inventory section for more details on specific environmental resources.

Climate

Grand Forks is located within a humid continental climate zone with mild summers and cold, harsh winters. The Grand Forks average annual temperature is 40.6 degrees Fahrenheit with annual precipitation of 20.45 inches of precipitation with 38.9 inches of snowfall. The area experiences wide temperature extremes. Snowfall on average occurs from October through April. Prevailing winds are from the north-northwest. See Meteorological Data section for more details on local weather conditions that affect the design of airport facilities.



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*Intended for Planning Purposes Only

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Grand Forks International Airport
Airport Master Plan
Airport Location Map
Figure 2-1

Socioeconomics

The city of Grand Forks has an estimated population of 56,057 in 2014. Population within the Grand Forks-East Grand Forks Metropolitan Statistical Area (MSA) which includes two counties surrounding Grand Forks is estimated to be 101,842. After years of steady population or even slightly declining population in the 1990s and 2000s, the Grand Forks MSA is growing again with a 0.67 percent annual growth rate from 2010 to 2015. It is believed the economic resurgence was caused indirectly from the oil boom in western North Dakota. Greater Grand Forks has a diverse economy including government/defense, health care, retail trade/accommodation/food service, construction and agricultural-related manufacturing industries. The region has a low unemployment rate of 2.3 percent as of September 2015. See Socioeconomic Data section for more details.

Airport Ownership & Management

In May 1987, a Joint Resolution of Grand Forks County and the city of Grand Forks authorized the creation of the Grand Forks Regional Airport Authority as the owner and operator of the Grand Forks International Airport/Mark Andrews Field. The Airport Authority Board and staff is responsible for the airport's operation and maintenance. The Airport Authority works cooperatively with staff from Grand Forks County and the city of Grand Forks. The day-to-day airport management is handled by Airport Authority staff led by the Executive Director.

GFK indirectly employs nearly 750 people making the airport the 7th largest employer in Grand Forks.

Airport History

Prior to the airport's existing location, the city's original airport was located much closer to city limits. The present airport was activated in December 1963 and became fully operational on February 1, 1964.

Original Grand Forks Airport

By the late 1950's and early 1960's, the original airport (located east of what is now Interstate 29 and south of U.S. Highway 2) was unable to accommodate larger commercial air service aircraft. Community debate was held on whether or not to expand the existing airport or if the construction of a new airport was a better option for the future of Grand Forks. It was determined to be more cost-effective for the airport to be relocated as the State Highway Department offered to purchase some of the existing land for future highway right-of-way use. In January 1961, the city of Grand Forks voted to construct a new airport five miles west of the city. Jet service was introduced to Grand Forks in 1965.

Other major milestones in the GFK history include:

- Relocated the "dome" hangar to the new airport site where the University of North Dakota's John D. Odegard school of Aerospace Sciences first began (1968)
- Main runway extended and strengthened to accommodate the Boeing 727 (1970)
- Aprons strengthened for greater air carrier traffic demand (1982)
- Third runway (17L/35R) completed to accommodate flight training operations (1983)
- Multiple terminal building expanded for greater capacity (1974, 1985, 1993)

More information on the GFK airport history can be found at http://gfkairport.com/history/.

Since the last Airport Layout Plan was completed at GFK in 2008, several airport capital improvement development projects have been completed. Major projects include:

- Construction of Runway 9R/27L (2009)
- Construction of 50,000 S.F. Byron L. Dorgan Terminal Complex (2010)
- Development of Electronic Airport Layout Plan (2012)
- University of North Dakota Helicopter Hangar Construction (2012)
- Demolition of old Air Carrier Terminal Building (2013)
- Construction of Employee Airport Terminal Parking Lot (2013)
- Construction of New Snow Removal Equipment (SRE) Building (2014)
- Construction of Overflow Automobile Parking Lot (Lot C) (2014)
- Air Cargo Building Expansion (2014)
- Reconstruct Taxiway A, B, & D Intersection (2015)
- Construction of New Aircraft Rescue and Fire Fighting (ARFF)/Operations Building (2016)

A complete list of major airport development projects from FAA and the State can be found in **Appendix X: Airport Funding & History**.

Airport Role & Design

GFK provides vital aeronautical functions for the public's best interest including commercial air service, air cargo, complete general aviation services and a U.S. Customs Port of Entry. The airport also serves to train professional pilots as it houses one of the world's premier flight schools run by the University of North Dakota (UND).

GFK serves aviation demands for the Grand Forks-East Grand Forks metropolitan and surrounding areas in North Dakota and Minnesota. GFK attracts airline passengers from northeastern North Dakota, northwestern Minnesota and southern Manitoba. Other surrounding airports providing scheduled commercial air carrier service include Fargo (80 miles), Thief River Falls (56 miles) and Devils Lake (85 miles).

Table 2-2 – Area Commercial Service Airports

Airport Name / City	FAA ID	Location from GFK	2013 Enplanements	FAA Classification
Grand Forks Int'l	***GFK***	**-**	***146,435***	Primary Non-Hub
Thief River Falls Regional	TVF	56 miles	2,152	Non-Primary
Fargo – Hector Int'l	FAR	80 miles	403,919	Primary Small-Hub
Devils Lake Regional	DVL	85 miles	2,679	Commercial Service
Bemidji Regional	BJI	118 miles	22,819	Primary Non-Hub
Winnipeg Int'l	YWG	151 miles	1,678,899	N/A
Minneapolis-St. Paul Int'l	MSP	328 miles	16,280,835	Primary Large Hub

Source: Airnav.com, FAA Airport Master Record, FAA CY 2013 ACAIS

The airport is part of the National Plan of Integrated Airport Systems (NPIAS) as classified by the Federal Aviation Administration (FAA). NPIAS airports are vital to the national air transportation system. According to FAA standards, the airport is classified as a non-hub primary commercial airport enplaning more than 10,000 passengers but less than 0.05 percent of national total. **Appendix X: Airport Classification** contains more information on this topic with **Chapter 6: Implementation** providing additional information about the Federal funding programs available to the Grand Forks Regional Airport. The airport is certificated under FAR Part 139 guidelines as a Class I airport certificated to serve scheduled operations of large air carrier aircraft.

The North Dakota State Aviation System Plan (NDSASP), completed by the North Dakota Aeronautics Commission (NDAC) in 2015, also categorized GFK as a primary commercial service airport. GFK supports the national and state aviation system by providing communities with access and international markets in multiple states and throughout the United States.

The FAA's Airport Reference Code (ARC) identifies a design category based on aircraft wingspan, tail height and approach speed for aircraft types that regularly use the airport. The last FAA-approved GFK Airport Layout Plan prepared in 2008 identifies the ARC classification of C-IV. An example aircraft in the ARC C-IV category would be an Airbus A300/A310. These aircraft types are currently operated at GFK by FedEx. Although not identified on the ALP, the existing taxiway design group (TDG) width is TDG-5 for the design aircraft. See **Chapter 4: Facility Requirements** for more details on FAA design classifications.

Table 2-3 – Airport Role & Design

Airport ID	State Classification	FAA Classification	ARC	TDG
GFK	Primary Commercial Service	Primary Non-Hub Commercial Service	C-IV	5

Source: Federal Aviation Administration, ND State Aviation System Plan (2015), GFK Airport Layout Plan
ARC = Airport Reference Code, TDG = Taxiway Design Group

It should be noted however the current aircraft types that regularly use the airport have an ARC classification of D-IV and TDG-5. More information on the design aircraft can be found in **Chapter 3: Aviation Activity Forecasts.**

Airport Activity

PASSENGER AIRLINES

The Grand Forks International Airport provides scheduled airline service through Delta Air Lines (operated by regional subsidiaries Skywest/Endeavor Air) and through Allegiant Airlines. Delta/Northwest has been operating to Grand Forks since the 1930s and Allegiant began operations in 2008. Scheduled airline departures for the peak month in March 2014 is shown below where there were 228 scheduled departures. Actual flight schedules vary based on seasonal demand and airline requirements. Large air carrier charter flights are flown on-demand to leisure destinations or for UND Athletics.

Table 2-4 – Passenger Airline Service (March 2014)

Airline	Destination	Frequency	Aircraft Types (Seats)
Allegiant (G4)	Las Vegas-McCarran (LAS)	4/week	MD-83 (166) Boeing 757-200 (215)
Allegiant (G4)	Orlando-Sanford (SFB)	4/week	Airbus A-320 (177)
Allegiant (G4)	Phoenix-Mesa (AZA)	5/week	MD-83 (166) Airbus A-319 (156)
Delta (DL)	Minneapolis-St. Paul (MSP)	5-6/day	CRJ-200 (50)*
Sun Country (SY)	Laughlin, AZ (IFP)	Scheduled Charter (1)	Boeing 737-800 (162)

Source: Bureau of Transportation Statistics T-100
**DL has transitioned to 76-seat CRJ-900 aircraft two times daily on average*

Enplanements, or each passenger boarding an aircraft for a specific destination, are recorded and tracked throughout the year. On an annual basis, GFK has experienced a growth in annual enplanements since the last Airport Master Plan in 2008. Between the years of 2008 and 2013, annual enplanements at GFK rose from 85,044 to 146,435. This increase of over 70 percent was a result of new service from Allegiant Airlines and a strengthening regional economy.

New service on United Airlines to Denver began in October 2012 but ended in December 2013. Since 2014, Delta has upgraded flights from 50-seat CRJ-200 to 76-seat CRJ-900 aircraft twice-daily on average.

REGULAR CARGO SERVICE

Grand Forks International Airport is currently home to regular air cargo service featuring a regional hub for FedEx freight and mail. Mainline air cargo is served by FedEx with feeder service provided by Corporate Air. Other air cargo operators include IFL, Integrated Air Service (IAS) and others providing contract feeder service for others carriers.

FedEx is the largest air cargo operator at the airport and conducts ground operations in the south cargo complex. Daily operations occur with Boeing 757, Airbus A300, or Airbus A310 aircraft. Typically, FedEx will operate two staggered daily flights. During peak holiday seasons, this can increase to two aircraft staged on the apron area at any given time. From these operations, Cessna 208 feeder aircraft (Corporate Air) leave GFK with cargo to smaller outlying cities in North Dakota and northwest Minnesota. Roughly 8-9 feeder aircraft depart in the morning hours and return in the evening hours in line with FedEx's mainline operations conducted in the evenings.

As a part of the FedEx operations, air mail is also sent through mainline aircraft. This mail is then processed in a separate facility. IAS processes between 50 and 80 thousand pounds of air mail on any given flight. It has been noted by IAS staff their location on the airfield has sometimes caused issues with processing their mail and getting it to FedEx in a timely manner.

The airport processed over 58 million pounds of cargo in 2014, an increase of 31 percent from 2007. In February 2016 FedEx announced it will move its air operations from GFK to Fargo's Hector International Airport as soon as October 2016. Air cargo operations are expected to reduce significantly.

GENERAL AVIATION & FIXED BASE OPERATORS

General aviation and small commercial operators makes up a significant portion of the airport activity at GFK. Flights are for various purposes including air ambulance/medical transport, business/corporate travel, personal travel, flight training, recreation and tourism.

Valley Med Flight Pilatus PC-12

AvFlight (formerly GFK Flight Support) is the airport's sole Fixed Base Operator (FBO), and provides aviation services to the public including mobile fueling, ground handling, transient aircraft storage, hangar leases, pilot lounge, and on-call aircraft maintenance. The FBO complex was constructed in 2008. AvFlight also handles charter flights and handles ground services for Allegiant's regularly scheduled commercial flights.

There are several regular operators that utilize GFK as their home base. One primary operator is Valley Med Flight. Valley Med Flight operates multiple Pilatus PC-12 turboprop aircraft, as well as helicopters for critical care air medical transport flights. They are based out of GFK, and have multiple airports that serve as satellite bases to conduct operations.

UNIVERSITY OF NORTH DAKOTA

The University of North Dakota John D. Odegard School for Aerospace Sciences flight training program is based at GFK. UND operates one of the world's largest pilot training programs with a fleet of flight training aircraft such as single-engine Cessna 172, multi-engine Piper Seminole and helicopters. UND provides pilot training for both traditional students and overseas contract students. A FAR Part 141 pilot school, students can obtain numerous pilot certificates and ratings. UND's airport operations account for approximately 90 percent of the total takeoffs and landings at GFK.

UND Aerospace Fleet
Source: University of North Dakota

OTHER ACTIVITY METRICS

As of December 2015, the FAA Airport Master Record shows a total of 147 based aircraft at GFK. The majority of these based aircraft are noted as single-engine (95), with 21 multi-engine, 19 jets, and 12 helicopters. UND alone bases 99 aircraft at GFK.

The FAA Terminal Area Forecast (TAF) published in January 2016 indicates there were 303,871 annual flight operations (takeoff and landings) at GFK in 2015. Approximately 63 percent of these flights were conducted with the GFK local area, presumably for UND flight training operations. The FAA estimates a projected annual growth rate of 0.92 percent annually through year 2034.

See **Chapter 3: Aviation Activity Forecasts** for more information on existing and projected GFK airport activity.

Facility Inventory

An inventory of Grand Forks International Airport facilities was performed to establish a baseline for determining required future improvements. As discussed in the following sections, GFK airport facilities are grouped into several categories: land, airfield, navigational aids (NAVAIDS)/airspace, general aviation, support, access/parking and other facilities.

Land

The Grand Forks Regional Airport Authority owns approximately 1,770 acres of property fee simple and additional air easements over non-owned properties. Records show airport land interests were acquired between 1962 and 2005. The majority of fee ownership was acquired in 1962 when the airport was relocated outside of city limits and to its present location as it exists today. In June 1988, airport property transferred ownership from the city of Grand Forks to the Grand Forks Regional Airport Authority.

Airport land is leased to private parties for approved aeronautical and agricultural (non-aeronautical) production uses. Examples of lease agreements include land to farmers to maintain large areas of grassland, lease agreement for aeronautical operators or to individuals construct hangars.

As part of this Master Plan, an update to the Exhibit "A"/Airport Property Map will occur to identify property ownership, easements and encumbrances. Please see the current Exhibit "A"/Airport Property Map located in **Appendix X: Airport Layout Plan** for further details.

Airfield Facilities

Airside facilities are those that are necessary for aircraft surface movement, such as runways, taxiways, aprons and associated lighting, marking and signage systems. A map depicting existing airport airside components is included in **Figure 2-2: Airfield Facilities Map**. Information on design codes is contained in **Appendix X: Airport Classification**.

RUNWAY 17R/35L

Runway 17R/35L, the primary runway at GFK, has an existing runway length of 7,351 feet and is 150 feet wide. The runway is designated as an air carrier runway maintained to Part 139 standards. The runway is currently designed to meet FAA Runway Design Code (RDC) D-IV-5000 (17R) and D-IV-2400 (35L) standards providing operational capability to accommodate larger and faster aircraft and approach visibility minimums as low as ½ mile. Runway 35L is designed to accommodate a precision instrument approach while Runway 17R is designed for a non-precision instrument approach with vertical guidance.

The runway pavement surface is polymer-modified grooved asphalt to help increase surface friction during wet runway conditions. The pavement is designed to accommodate regular use of up to 75,000 pound aircraft in a single wheel main landing gear configuration, 160,000 pound aircraft in a double-wheel main landing gear configuration and 270,000 pound aircraft in a double tandem main landing gear wheel and strut configuration. The runway's Pavement Classification Number (PCN) is published as 35/R/C/W/T. A 200-foot long and 200-foot wide blast pad is located beyond each runway end for jet blast soil erosion protection.

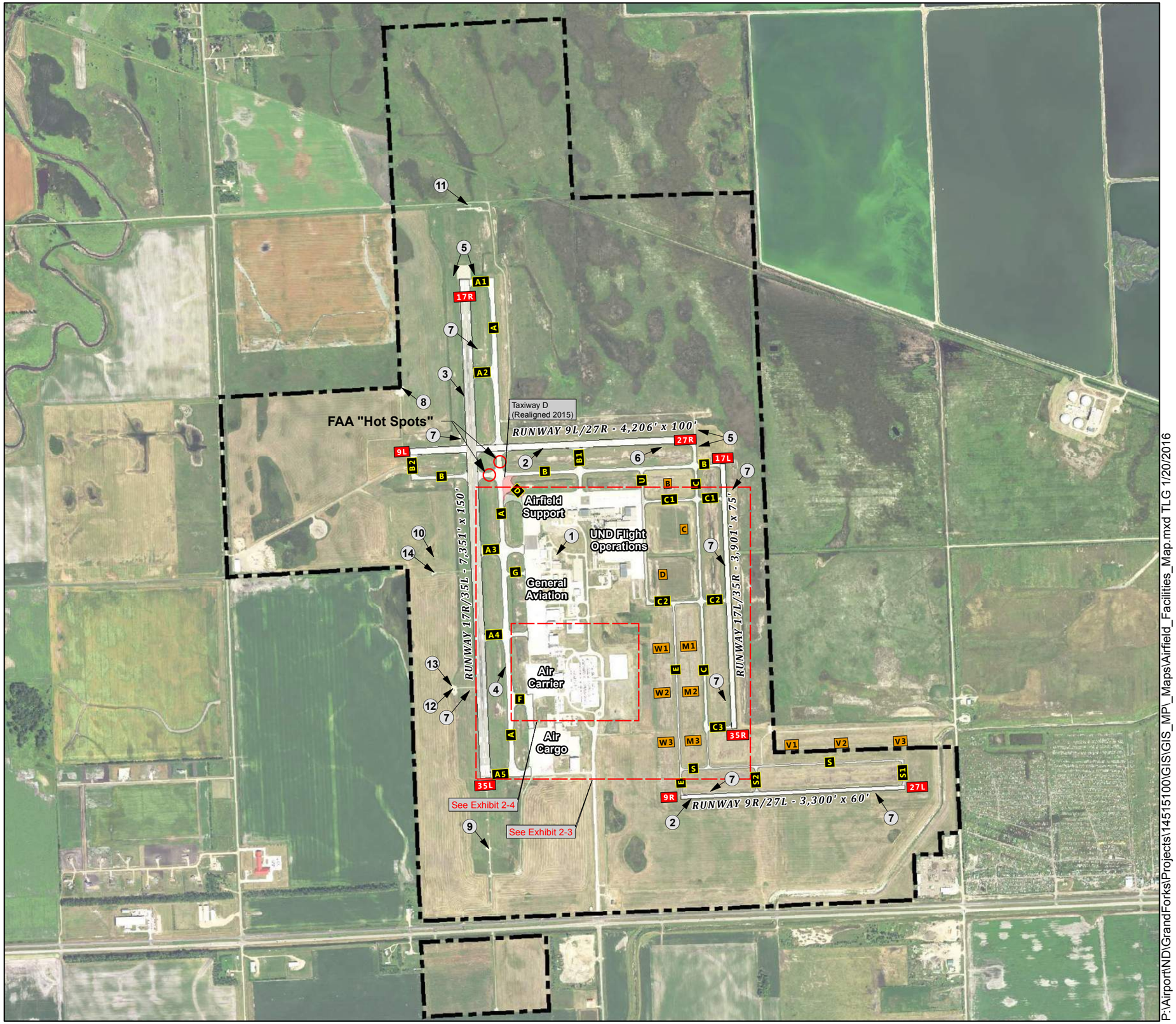
RUNWAY 17L/35R

Runway 17L/35R, a parallel runway to the primary runway at GFK and constructed of concrete pavement, has an existing runway length of 3,901 feet and is 75 feet wide. This runway is used for general aviation traffic. Runway 17L/35R is currently designed to accommodate FAA RDC B-II-VIS, Small Aircraft standards providing operational capability to accommodate aircraft up to a Beechcraft King Air 200 or similar aircraft with maximum gross weights of 12,500 pounds or less. Both Runway ends operate under Visual Flight Rules (VFR) and do not have instrument approaches.

The runway pavement surface is concrete designed to accommodate regular use of up to 12,500 pound small aircraft in a single wheel main landing gear configuration. The runway's PCN is published as 9/R/C/W/T.

RUNWAY 9L/27R

Runway 9L/27R is a "crosswind" having an existing runway length of 4,206 feet and is 100 feet wide. This runway is a secondary air carrier runway maintained by the airport to FAR Part 139 standards. Runway 9L/27R is currently designed to accommodate FAA RDC B-II-5000 standards providing operational capability to accommodate aircraft up to a Beechcraft King Air 350 or similar aircraft. The runway has non-precision instrument approaches with vertical guidance to both runway ends with approach visibilities as low as 1 mile. This runway is heavily used by the University of North Dakota flight training aircraft when a heavy crosswind is present at GFK.



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Legend

- XX Helipad ID
- XX Taxiway ID
- XX Runway End ID
- Existing Airport Property

NAVIGATIONAL AIDS

1. Airport Beacon
2. Medium Intensity Runway Edge Lighting (MIRL)
3. High Intensity Runway Edge Lighting (HIRL)
4. Medium Intensity Taxiway Edge Lights (MITL)*
5. Runway End Identifier Lights (REILS)
6. Visual Approach Slope Indicator (VASI)
7. Precision Approach Path Indicator (PAPI)
8. Very High Frequency Omni-Directional Range (VOR)
9. Approach Lighting System (MALSR)
10. Primary Lighted Wind Cone
11. Localizer Antenna
12. Glideslope Antenna
13. Automated Surface Observation System (ASOS)
14. Runway Visual Range (RVR)

*Applies to all taxiways on airfield

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0 1,000 2,000 4,000 Feet

*Intended for Planning Purposes Only

KLJ

Grand Forks International Airport
Airport Master Plan
Airfield Facility Map
Figure 2-2

The pavement is concrete designed to accommodate regular use of up to 43,000 pound aircraft in a single wheel main landing gear configuration, 55,000 pound aircraft in a double-wheel main landing gear configuration and 115,000 pound aircraft in a double tandem main landing gear wheel and strut configuration. The runway's PCN is published as 24/R/B/W/T.

When smaller scheduled service aircraft operated in and out of GFK (Saab 340 or Avro RJ85), this runway was occassionally used during strong crosswind condition . Currently, the larger size of air carrier and regional aircaft using GFK prevents this runway from being used. The runway is used almost exclusively by general aviation aircraft and some smaller corporate operators.

RUNWAY 9R/27L

Runway 9R/27L, a secondary "crosswind" runway parallel to Runway 9L/27R having an existing runway length of 3,300 feet and is 60 feet wide. This runway is used for general aviation traffic. Runway 9L/27R is currently designed to accommodate FAA RDC B-I-VIS, Small Aircraft standards providing operational capability to accommodate aircraft up to a Beechcraft King Air 200 or similar aircraft. The runway has visual approaches. This runway is heavily used by the University of North Dakota when a heavy crosswind component is present at GFK *and* when Runway 9R/27L is congested. Both Runway ends operate under VFR and do not have instrument approaches.

The pavement is grooved concrete designed to accommodate regular use of up to 12,500 pound small aircraft in a single wheel main landing gear configuration. The runway's PCN is published as 10/R/C/W/T.

Table 2-5 – Runway Facility Summary

Component	Runway 17R/35L	Runway 17L/35R	Runway 9L/27R	Runway 9R/27L
Runway Length (feet)	7,351'	3,901'	4,206'	3,300'
Runway Width (feet)	150'	75'	100'	60'
Runway Surface Material	Asphalt[1]	Concrete	Concrete	Concrete
Runway Surface Treatment	Grooved	N/A	Grooved	N/A
Single Wheel Pavement Strength	75,000 lbs.	12,500 lbs.	43,000 lbs.	12,500 lbs.
Double Wheel Pavement Strength	160,000 lbs.	N/A	55,000 lbs.	N/A
Dual Tandem Pavement Strength	270,000 lbs.	N/A	115,000 lbs.	N/A
Pavement Classification Number	35/R/C/W/T	9/R/C/W/T	24/R/B/W/T	10/R/C/W/T
Runway Design Code	D-IV-2400	B-II-VIS, Small Acft.	B-II-5000	B-I-VIS, Small Acft.

Source: Airnav.com, FAA Airport Master Record *[1]Runway 17R-35L has a concrete base with an asphalt overlay R = Rigid Concrete Pavement, B = Subgrade Category (Medium Strength), C = Subgrade Category (Poor Strength), W = Unrestricted Tire Pressure, T = Technical Analysis*

HELIPADS

Set to be published in the FAA Airport Master Record in 2016, airport management submitted 12 helipads to the FAA in 2014 for official landing area approval. Intended for daytime-only use, the helipads are identified by a series of letters and numbers (B, C, D, M1, M2, M3, W1, W2, W3, V1, V2, V3) located in between runways and taxiways on the east side of the airport. All helipads are utilized in a north-south or east-west configuration for UND flight training operations. Each helipad has a turf surface and the Touchdown and Lift-Off Area is 35-foot by 35-feet feet in size. Basic visual markings are installed. Approach and departure paths are oriented north/south or east/west. Helipad locations are depicted on **Figure 2-2**.

TAXIWAYS

GFK is served by a system of taxiways to facilitate the movement of aircraft from the runway environment to other airport facilities including hangars and parking aprons. Locations and identifiers are depicted in **Figure 2-2**. Parallel taxiways serving runways are identified A, B, C and S. Parallel taxiways have entrance taxiways labeled numerically in sequence along each respective runway. All taxiways have a concrete surface unless otherwise identified.

- **Parallel Taxiway A** is a 75-foot wide full length parallel taxiway serving the primary Runway 17R/35L. The taxiway is offset from runway centerline by 400 feet. Taxiway A provides aircraft access to the FBO, passenger terminal, U.S. Customs and air cargo facilities. Associated 75-foot wide entrance taxiways range from A1 through A5. These entrance taxiways provide aircraft access to the runway, and help facilitate fluid movement of aircraft. This taxiway network is designed to TDG-5 width[1] standards.
- **Parallel Taxiway B** is a 50-foot wide full length parallel taxiway serving the crosswind Runway 9L/27R. The taxiway is offset from runway centerline by 400 feet. This taxiway also extends to the Runway 17L threshold where it becomes 40-feet wide. Taxiway B provides aircraft access to the Bravo Apron (exclusively used by UND). Associated 50-foot wide entrance taxiways include B1 and B2 and provide aircraft access to the runway. This taxiway network is designed to TDG-4 width standards, except for the portion connecting Parallel Taxiway A with 17L which is TDG-5 width standards.
- **Parallel Taxiway C** is a 40-foot wide full length parallel taxiway serving the parallel Runway 17L/35R on the east side of the airport. The taxiway is offset from runway centerline by 400 feet, and also extends to the end of Runway 27R's threshold. Taxiway C provides access to the Charlie Apron. Associated 40-wide entrance taxiways range from C1 through C3 and provide aircraft access to the runway. Taxiways C1 and C2 (bituminous asphalt surface) extend to the aprons. This taxiway network is designed to TDG-2 width standards. Taxiway C extending from Taxiway C2 to Taxiway S is 25 feet (TDG 1B width) wide.
- **Parallel Taxiway S** is a 25-foot wide full length parallel taxiway serving the parallel Runway 9R/27L. The taxiway is offset from runway centerline by 400 feet. Taxiway S provides access to the C and E taxiways, which thereby provides access to Runway 17R/35L and Charlie Apron. Associated entrance taxiways range from S1, S2, and E and allow aircraft access to Runway 9R/27L. This taxiway network is designed to TDG-1B width standards.
- **Taxiway E** is a 25-foot wide taxiway that parallels Taxiway C in a north-south configuration. This taxiway is offset from Taxiway C by 415 feet, and provides direct access between the Charlie Apron/Taxiway C2 and Runway 9R/27L. This taxiway network is designed to TDG-1B width standards for aircraft up to 12,500 pounds.
- **Taxiway F** is a 125-foot wide "throat" taxiway that provides access from Parallel Taxiway A to both the air carrier and air cargo apron areas. This taxiway is designed to TDG-5 width standards for the overall design aircraft.
- **Taxiway G** is a 40-foot wide taxiway that provides access from Parallel Taxiway A to west-side general aviation facilities that include apron frontage and private hangar areas. This taxiway is designed to TDG-2 width standards for up to aircraft 12,500 pounds.
- **Taxiway D** is a 75-foot wide taxiway that provides access from Parallel Taxiway A to the old passenger terminal apron area. This Taxiway D was rebuilt and realigned in 2015 to correct a

[1] TDG standards were developed in FAA Advisory Circular 150/5300-13A. Taxiway/taxilane pavement at GFK was constructed prior to this AC revision except for Taxiway D in 2015.

complex intersection and allow UND traffic a less-congested way to access the west-side of the airfield. It also provides access to the apron area for extra aircraft parking during irregular airport operations. This taxiway is designed to TDG-5 width standards for the overall design aircraft.

- **Taxiway U** is a 40-foot wide bituminous asphalt surface taxiway that provides access from Parallel Taxiway B to the Bravo and Charlie Apron areas. This taxiway is designed to TDG-2 width standards for aircraft up to 12,500 pounds.

As defined by FAA, "Hot Spots" are locations on an airport with a history of potential risk of collision or runway incursion where heightened attention by pilots and drivers is necessary. The connection between Taxiway A and Runway 9L/27R (HS 1) and as well as Taxiway B and Runway 35L/17R (HS 2) are two identified "hot spots" at GFK where taxiways cross runways at high energy locations.

HOLDING BAYS

The Runway 35R departure end is served by an additional 100-foot long and 25-foot wide pavement that provides small aircraft the ability to hold for air traffic control clearances away from the Taxiway C traffic flow.

TAXILANES

GFK is served by various low-speed taxilanes that provide access from the aprons to individual general aviation hangar areas. Locations are generally depicted in **Figure 2-3**.

- **West General Aviation** concrete taxilanes (Taxilane H) allow for dual access from the Alpha Apron to aircraft storage hangars. The primary access taxilane on the south side is 35 feet wide while taxilanes in between buildings range from 25 to 35 feet wide. These areas are designed for FAA Airplane Design Group I and II aircraft.

- **Apron Areas** have designed public pavement areas that are striped for aircraft maneuvering in between aircraft parking and structures. Each has varying design standards based on the apron.

APRONS

There are six (6) distinct aircraft apron areas at GFK. Locations are identified in **Figure 2-3: Terminal Area Facilities Map**. Apron areas serve the loading, unloading, parking and maneuvering needs for commercial airlines, air cargo, general aviation and UND operations.

- **Alpha Apron** is a concrete surface 55,285 square yards and serves multiple public uses in the west terminal area. The apron provides access to numerous facilities including U.S. Customs and Border Protection, the airport's FBO providing aeronautical services to the public, transient/overnight aircraft parking and based aircraft hangars. Aircraft Rescue and Fire Fighting (ARFF) operations and some air cargo sorting/loading are located here as well. In total there are 62 striped parking positions for FAA Design Group I small aircraft.

- **Bravo Apron** is a concrete surface 35,827 square yards in size, located in the north airfield area exclusively used for larger University of North Dakota flight training program aircraft parking. There are 55 striped parking positions for single-engine and multi-engine aircraft. This is considered to be an exclusive-use apron. Facilities along the apron include UND aircraft storage hangars, operations dispatch, and flight instructor offices and aircraft maintenance.

- **Charlie Apron** is a concrete surface 37,309 square yards in size, located in the east airfield area exclusively used for helicopters and smaller University of North Dakota flight training program aircraft parking. There are 89 striped parking positions for small single-engine and helicopter aircraft types. Helicopters are concentrated to the southern portion of the apron.

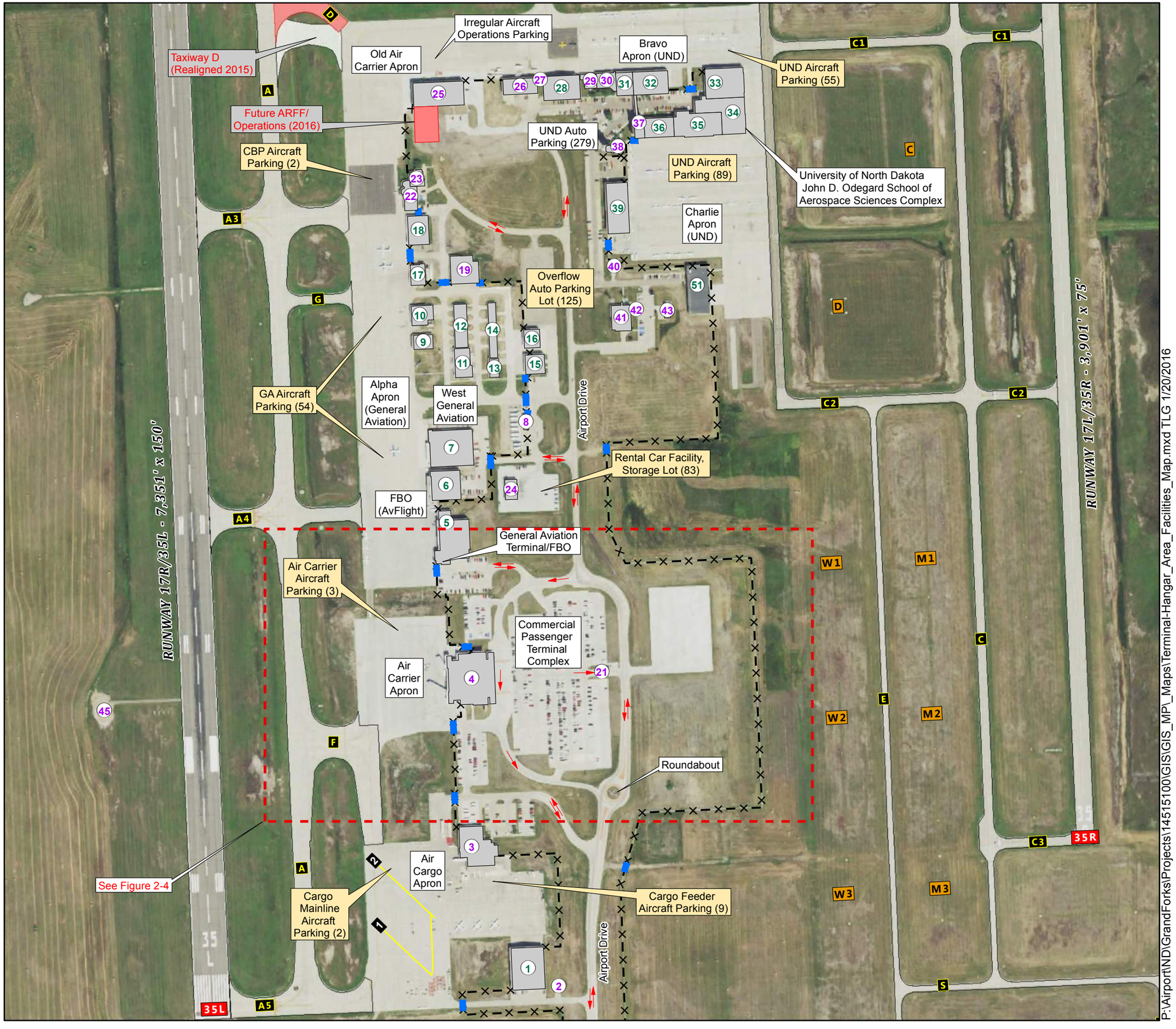
This is considered to be an exclusive-use apron. Facilities along the apron include UND aircraft/helicopter storage hangars, faculty offices and line services.

- **Air Carrier Apron** in the west airfield area is a concrete surface 20,488 square yards in size used for scheduled and occasional unscheduled passenger airlines requiring access to the passenger terminal. There are three designated commercial aircraft parking positions. De-icing operations also occur on this apron.
- **Air Cargo Apron** in the west airfield area is a concrete surface 36,794 square yards in size used for mainline and feeder air cargo ground operations. There are two for mainline aircraft and nine parking positions for feeder aircraft. At this time this public areas is used by FedEx and Corporate Air. Facilities located along this apron include a cargo processing building and aircraft storage hangar.
- **Old Air Carrier Apron** is located directly north of the Alpha Apron, and west of the Bravo Apron. This apron space is no longer used by regularly scheduled air carrier service, as the commercial service terminal building was demolished and a new facility was constructed to the south of the Alpha Apron (2010). The apron is a concrete surface and 20,237 square yards in size, and used for irregular airport operations (i.e. commercial aircraft diversion parking) and access to the new SRE building.

Table 2-6 – Apron Area Summary

Identifier	Primary Purpose	Area (Square Yards)
Alpha	General Aviation, Air Cargo (Public)	55,285
Bravo	UND Aircraft Parking (Exclusive Use)	35,827
Charlie	UND Aircraft Parking (Exclusive Use)	37,309
Air Carrier	Scheduled Airlines (Public)	20,488
Air Cargo	Regular Air Cargo (Public)	36,794
Old Air Carrier	Irregular Operations (Public)	20,237
	TOTAL	**205,940**

Source: GFK Pavement Condition Report (2015), KLJ Analysis



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Legend

- Gate
- Fence

EXISTING AIRCRAFT STORAGE HANGARS

1. Corporate Air Hangar (FedEx)
5. AvFlight FBO
6. Customs and Border Protection Air and Marine
7. Customs and Border Protection Air and Marine
9. Hangar Mass 4
10. Hangar Mass 3
11. Valley Med Flight
12. T-Hangars A/B
13. Leigh Hangar
14. T-Hangars C/D
15. Rydell Hangar
16. Minnkota Power Hangar
17. Integrated Airport Systems Mail Sort Facility
18. Hangar Mass 2
28. Hangar Mass 1
31. UND Aircraft Dispatch
32. UND Hangar
33. UND Hangar Complex
34. UND Hangar
35. UND Hangar
36. UND Hangar
39. UND Hangar
51. UND Hangar

SUPPORT FACILITIES

2. Lift Station
3. FedEx Sorting Facilities
4. Air Carrier Terminal Building
8. Fuel Farm
19. Snow Removal Equipment Building
20. Ticket Booth
21. Ticket Canopy
22. Aircraft Rescue Fire Fighting / Airport Operations / Customs & Border Protection
23. Maintenance Office
25. Snow Removal Equipment Building
26. Original FedEx Building
27. Old ATC Tower Cab
29. UND Offices
30. UND Dispatch
37. UND Offices
38. Airport Traffic Control Tower Complex
40. Lift Station
41. FAA Airway Facilities/UND Unmaned Aerial Systems
42. Generator
43. FAA Airway Facilities Garage
***44.** MALSR Electrical Shelter
45. Glideslope Shelter
***46.** Storage Building
***47.** Localizer Shelter
***48.** East Electrical Building
***49.** Water Utility Building
***50.** MALSR Electrical Shelter

* Building associated with airport but not appearing on this sheet.

N

0 250 500 1,000 Feet

*Intended for Planning Purposes Only

Grand Forks International Airport
Airport Master Plan
Terminal Area Facilities Map
Figure 2-3

PAVEMENT CONDITION

Airport pavements are basic infrastructure components at airports. Airfield pavements need to be maintained in a safe and operable condition for aircraft operations. Pavement condition is comprehensively evaluated by the State every three years and measured on a 0 to 100 scale known as the Pavement Condition Index rating. Pavement evaluation includes runway, taxiway, and apron pavements. A summary of the latest 2015 PCI rating for the runway and selected other airfield pavements follows.

Table 2-7 – Pavement Condition Summary

Component	Surface Type(s)	LCD	2015 PCI Range
Air Cargo Apron	PCC	1990-1998	84-93
Alpha Apron	PCC, APC	1963-2013	3-96
Bravo Apron - East	PCC, APC	1968-2014	21-91
Bravo Apron – West	PCC	1966-1986	10-57
Charlie Apron	PCC	1987-2003	14-84
Terminal Apron	PCC	2010	95
Runway 17L/35R	PCC	1983-1988	80-81
Runway 17R/35L	APC	2001	74-83
Runway 9L/27R	PCC	1992	90-93
Runway 9R/27L	PCC	2009	97
Taxiway H (East GA Taxilanes)	PCC	1963-2007	7-92
Taxiway A, A1, A2, A3, A4, A5	PCC	1977-2007	72-96
Taxiway B, B1	PCC	1964-2015	12-100
Taxiway C, C1, C2, C3	PCC	1983	76-91
Taxiway D	PCC	2015	100
Taxiway E	PCC	2009	98
Taxiway F	PCC	1998	95
Taxiway G	PCC	1989	74
Taxiway S, S1, S2	PCC	2009	95-98
Taxiway U	AC	1983-1992	49-83

Source: GFK Pavement Condition Report (2015)
PCI = Pavement Condition Index rating (0-100), LCD = Last Major Construction Date, AC = Asphalt Concrete, APC = Asphalt Overlay over PCC, PCC = Portland Cement Concrete

There are still pavement sections in the Alpha Apron, Taxiway B and hangar site taxilanes that date back to the original airport construction.

Of particular note is primary Runway 17R/35L. This pavement was constructed with a full concrete section and a 6-inch polymer-modified grooved asphalt overlay was added in 2001. The runway pavement section is showing major signs of wear on the surface with transverse cracks, longitudinal cracks, and heaving. In the summer of 2015, the runway pavement heaved in several spots and caused issues with aircraft operations. The pavement settled after transverse cuts were made into the pavement. However, long-term solutions may necessitate/warrant the complete reconstruction of the pavement section sooner than what the current surface PCI would suggest.

Additional pavement information including PCI maps can be found in **Appendix X: Airfield Pavement Condition.**

Navigational Aids & Airspace

Navigational aids (NAVAIDs) provide visual and electronic guidance to pilots enabling the airport to safely, efficiently and effectively accommodate arriving and departing flights. Airspace is a resource

that is necessary to allow flights to safely operate and maneuver in the airport environment. **Figure 2-2** identifies visual and electronic navigational aids and weather facilities graphically.

VISUAL NAVIGATION AIDS

Visual aids are installed to provide airport usability during periods of darkness and/or low visibility. Pavement markings and lighting systems available at GFK are summarized in the following sections.

Identification Lighting

A white-green rotating beacon is a two-sided light used to assist pilots in the visual identification of a civilian airport. The GFK rotating airport beacon is located directly east of Hangar Mass 2. It operates sunset to sunrise and during Instrument Flight Rules (IFR) conditions.

GFK Airport Beacon

Pavement Edge Lighting

Pavement edge lighting fixtures are installed off the edges of runway and taxiway pavement to help pilots identify the edge and ends pavement to facilitate safe operations in darkness and/or low visibility environments. Runway edge lights are white (bi-directional), except for the final 3,000 feet of runway where the lights change color to yellow then red to warn pilots of the end of the runway. The runway end threshold lights (bi-directional) are green viewing down the runway at the beginning and red viewing at the end of the runway. Taxiway edge lights are blue and omni-directional.

Runway 17R/35L is equipped with High Intensity Runway Lighting (HIRL). It has been expressed by the sponsor the HIRL system for Runway 17R/35L is nearing the end of its useful life. It was noted that replacing the lighting system should be made a priority in the near future.

Runways 17L/35R and 9L/27R are equipped with Medium Intensity Runway Lighting (MIRL). The MIRL system on Runway 17L/35R was upgraded to Light-emitting diode (LED) type lighting system in 2015. There are no known issues with these lighting systems.

Runway 9R/27L is also equipped with Medium Intensity Runway Lighting (MIRL). This runway lighting system was installed in 2009 when the runway was originally constructed and consists of LED lighting. No known issues are present with regards to this lighting system.

In general, taxiway lighting can be found on every taxiway on the airfield. The majority of these taxiway lights are incandescent, while some on the east-side of the airfield are LED. The LED taxiway lights pertain mostly to the construction efforts of the newly constructed Runway 9R/27L. Taxiways B (east of C), C, C1, C2, C3, E, S, S1, S2 and U (north of C1) currently have LED lighting installed.

In-Pavement Runway Lighting

There are some in-pavement edge lights on Runway 17R/35L near the Taxiway B/Runway 17R/35L intersection, and in-pavement lighting for Land and Hold Short (LASHO) operations on Runway 35L. The LASHO lighting is located on the hold-short line just south of Runway 9L/27R.

Flush mounted in-pavement runway lighting provides enhanced lighting of critical runway areas to allow runway operations when visibility is below ½ mile. Touchdown Zone Lighting (TDZL) and Centerline Lighting (CL) are typical for low visibility runways. No GFK runways are equipped with in-pavement TDZL or CL lighting.

Visual Approach Lighting

Visual approach lighting provides vertical descent guidance to pilots for a runway end. This navigational aid is used by the pilot to acquire and maintain the correct glide path for landing. The red and white

lights emitted are interpreted by the pilot to indicate whether they are too high, too low, or on glidepath. Precision Approach Path Indicator Lights (PAPI) are the current FAA standard equipment installed for this purpose, however other types of equipment exist.

Runway 17R/35L, 17L/35R and Runway 9L ends are equipped with a four-box Precision Approach Path Indicator (PAPI-P4L) system installed on the left side of each runway end. Per the FAA Airport Master Record, each PAPI system is set to the standard 3 degree glidepath angle, while Runway 35L is set to a more shallow 2.76 degrees.

The Runway 27R end is equipped with a four-box Visual Approach Slope Indicator (VASI-P4L) system installed on the left side. This provides the same information as a PAPI system but is older technology.

Runway 9R/27L ends are equipped with a two-box Precision Approach Path Indicator (PAPI-P2L) system installed on the left side of each runway end. Per the FAA Airport 5010 Report, all runway ends are set to the standard 3 degree angle.

It should be noted the Grand Forks Regional Airport Authority owns PAPIs on Runway 9R, 27L, 17L, 35R, and 35L. All other VGSI systems are owned and controlled by the FAA (9L, 27R, 17R).

Approach Lighting System

An approach lighting system provides extended runway centerline alignment information near the runway's end for pilots to transition from instrument flight to visual flight for landing in low visibility conditions. There are several types of systems with varying configurations.

Example MALSR (Typical)

GFK Runway 35L has an approach lighting system known as a Medium Approach Lighting System with Runway Alignment Indicator Lights (MALSR). A MALSR system consists of green threshold lamps, a set of high-intensity white and red steady-burning lights located up to 1,400 feet from the runway end, plus a single row of sequenced flashing lights located another 1,000 feet out. The MALSR system supports the Runway 35L Instrument Landing System (ILS).

Runway End Identification Lighting

Runway End Identifier Lights (REILs) are a set of synchronized flashing white strobe lights installed on each side of the runway to provide rapid and positive identification of the approach end of a runway without complex visual approach lighting. The system can be unidirectional toward the runway approach or omnidirectional. Unidirectional REILs are installed on Runway 17R and 27R ends and are in good working condition.

Pilot-Controlled Lighting

Airfield lighting systems allow for pilots to control the complexity and intensity of lights. GFK does not utilize pilot controlled lighting during control tower operating hours. When the tower is closed

Runway 35L PAPI (P4L)

(11:30PM-6:00AM), Pilot controlled lighting on the airfield is utilized. Pilot controlled lighting typically comes in three intensity levels. By clicking the aircraft microphone button three, five, or seven times, the pilot controls the intensity of the lighting. This feature is utilized through the airports UNICOM frequency during non-towered operating hours.

Pavement Markings

Pavement markings provide visual guidance to aircraft to critical areas on the runway and taxiway surface. Runway markings vary in complexity depending on the type of approach. GFK Runway 17R/35L has precision instrument approach markings on both approach ends. Runway 9L/27R has non-precision instrument approach markings on both approach ends. Runways 17L/35R and 9R/27L have visual approach markings on both approach ends.

GFK Pavement Marking Array

Taxiway markings include centerline striping to provide proper clearance from pavement edges and fixed objects. Taxiway/taxilane centerline striping is in place at GFK. Each taxiway/runway intersection contains visually-enhanced centerline markings approximately 150 feet from the runway holding position markings to help prevent runway incursions. Some intersections have taxiway intersection holding position markings.

Runway hold position markings identify the safety setback from active runways in association with airfield guidance signs. Hold position markings are installed 260 feet from centerline of Runway 17R/35L, and 200 feet from the centerline of Runways 17L/35R, 9L/27R and 9R/27L. Runway Guard Lights (RGLs) are installed where taxiways cross mid-field portions of Runway 17R/35L and 9L/27R.

Other pavement markings at GFK include aircraft tie-downs, Secure Identification Display Area (SIDA) security boundaries, aircraft movement area boundary and a VOR calibration arrow. All pavement markings are compliant with FAR Part 139 for certificated airports.

Airfield Guidance Signs

Guidance signs provide location, direction, and guidance information to pilots on the ground to enhance awareness. Signs are placed around the airfield to identify runway and taxiway intersections, runway hold positions and other guidance. Mandatory signs are red and identify an intersection with a runway or critical safety zone. Other types of signs include location, direction, destination and distance remaining signs.

GFK has a full array of airfield guidance signs compliant with FAR Part 139 for certificated airports. Lighted mandatory signs are installed where taxiways meet all runways. All movement area signage on the airfield is lighted and reflective.

ELECTRONIC NAVIGATION AIDS

Electronic navigational aids are installed to provide critical guidance information when operating in the airport environment. These navigational aids often provide horizontal and/or vertical guidance in conjunction with published navigation procedures. Electronic navigation aids available at GFK are summarized below:

Very High Frequency Omni-Directional Range (VOR)

This ground-based navigational aid projects an omni-directional signal that allows equipped aircraft to navigate to and from the station.

The high-altitude Grand Forks (ID: GFK) VOR/DME station, broadcasting on frequency 114.3 MHz, is located on-airport approximately 1,300 feet northwest of Runway 17R/35R and 9L/27R intersection. The facility is owned and operated by the FAA. The navigational aid provides navigation to the airport and runway ends. This VOR station is equipped with Distance Measuring Equipment (DME) providing slant distance information to pilots. The VOR is also used to support instrument approache procedures at GFK.

GFK VOR

Instrument Landing System (ILS)

An Instrument Landing System is installed for a runway end to allow pilots to capture a horizontal and vertical radio beam to the runway threshold to assist in landing. Components of an ILS include the glideslope antenna, localizer antenna, approach lighting system and marker beacons. The glideslope antenna is located alongside the runway providing vertical guidance, the localizer antenna is installed beyond the opposite runway end providing horizontal guidance, the approach lighting system provides visual guidance to the runway end, and the marker beacons provide aural cues for pilots flying the approach.

GFK currently has a Category I ILS system installed for the Runway 35L approach. Approach minimums are ½ mile visibility and 200-foot cloud ceiling height. Aircraft can use the localizer beam from the Runway 35L ILS for what is known as a "back-course" instrument approach procedure. While approach minimums are higher, the ILS equipment is still useful from the 17R approach end.

Global Positioning System (GPS)

GPS is a satellite-based navigation system that allows location to be triangulated from space-based satellites. Equipped aircraft can navigate between user-defined or FAA waypoints with lateral and vertical guidance. With ground-based transmitters known as Wide Area Augmentation System (WAAS) the system can provide accuracy down to a few feet. GPS is widely becoming the preferred aircraft navigation system and FAA is establishing en-route and approach procedures using this satellite-based technology. GPS is used at GFK in the establishment of straight-in instrument approach procedures with horizontal and vertical guidance to the approaches of Runway 17R, 35L, 9L, and 27R.

METEOROLOGICAL FACILITIES

Metrological facilities provide users with up-to-date weather information at the airport to aid in pilot decision making for safe flight operations.

Example Weather Reporting Station

Wind Indicator

Wind direction indicators provide immediate visual indication of the wind direction and velocity. A segmented circle provides a visual indication of the wind cone area together with runway alignment and/or traffic pattern information. At GFK, a primary lighted wind cone is installed near the midpoint of Runway 17R/35L, located 625 feet west of runway centerline. Supplemental wind cones are also located near each landing threshold.

Weather Reporting

There are two types of weather reporting systems on an airport. Automated Surface Observation Systems (ASOS) are operated and controlled by the National Weather Service and FAA. These primary climate stations have equipment that provide weather observations every minute. A second-tier Automated Weather Observation System (AWOS) have varying sets of equipment packages to provide local weather observations.

GFK has an ASOS system installed on-airport. The ASOS is located approximately 3,100 feet from Runway 35L end and 640 feet west of runway centerline. ASOS typically include sensors such as ceilometer (cloud height), visibility, precipitation, freezing rain, lightning, ambient/dew point, anemometer (wind direction), and precipitation accumulation. GFK ASOS is owned and operated by the FAA. Current weather from the ASOS is reported on the Automated Terminal Information Service (ATIS) frequency of 119.4 MHz.

Other

GFK does not have other weather reporting systems in place such as a Low Level Wind shear Alert System (LLWAS) to identify changes in wind speed and/or direction near the airfield, Runway Visual Range (RVR) equipment is installed to report visibility at various points along the runway. GFK has this equipment installed at the Runway 35L touchdown zone approximately 3,000 feet beyond the runway end.

METEOROLOGICAL DATA

Local weather conditions are a significant factor in the design and development of airport facilities. Temperature affects runway length, wind direction and speed affect runway orientation, and visibility and cloud ceiling conditions affect the need for runway navigational aids and lighting. Over the last 30 years (1981-2010) the average maximum temperature at GFK in the hottest month has been 81.0 degrees Fahrenheit (July).

Prevailing winds are from the north-northwest, generally aligned with the airport's runway configuration. Crosswind or tailwind conditions can be hazardous to aircraft operations if they exceed the operational capabilities of the airplane or flight crew. The smallest aircraft are typically the most affected operationally by crosswinds.

Based on GFK runway design, the maximum crosswind component for Runway 17-35 is 20 knots, and Runway 9-27 is 13 knots. The current all-weather combined wind coverage of all runways exceeds FAA minimum recommendations of 95 percent.

Table 2-8 – All-Weather Wind Coverage

Runway	Crosswind Component (Wind Speed)			
	10.5 knots	13.0 knots	16.0 knots	20.0 knots
Runway 17-35	91.40%	95.26%	98.25%	99.52%
Runway 9-27	76.82%	84.36%	92.57%	97.28%
Combined*	**97.81%**	**99.29%**	**99.84%**	**99.99%**

Source: National Climatic Data Center data from Grand Forks International Airport ASOS (2005-2014; hourly)
**Combined assumes up to maximum design aircraft crosswind component for each runway*

Pilots are able to fly with visual reference to the ground and other aircraft during most weather conditions. This is known as Visual Meteorological Conditions (VMC). Pilots are required to reference flight instruments and be on a FAA Instrument Flight Riles (IFR) flight plan when the cloud ceiling is less than 1,000 feet above the ground or the flight visibility is less than 3 statute miles. These conditions are known as Instrument Meteorological Conditions (IMC) and require a pilot to be instrument rated.

Wind coverage during VMC is evaluated to determine the ideal alignment for runways used during visual operations, such as VFR flight training. The current combined VMC wind coverage achieves 95 percent for the smallest design aircraft (10.5 knot crosswind component).

Table 2-9 – VMC Wind Coverage

Runway	Crosswind Component (Wind Speed)			
	10.5 knots	13.0 knots	16.0 knots	20.0 knots
Runway 17-35	91.28%	95.17%	98.21%	99.51%
Runway 9-27	78.22%	85.61%	93.59%	97.94%
Combined*	**97.90%**	**99.32%**	**99.85%**	**99.99%**

Source: National Climatic Data Center data from Grand Forks International Airport ASOS (2005-2014; hourly)
**Combined assumes up to maximum design aircraft crosswind component for each runway*

Wind coverage during IMC is evaluated to determine the ideal alignment for instrument approach to an airport's runway. The current combined IMC wind coverage achieves 95 percent for the overall GFK design aircraft. Runway 35 is able to be utilized 62 percent of the time.

Table 2-10 – IMC Wind Coverage

Runway	Crosswind Component (Wind Speed)			
	10.5 knots	13.0 knots	16.0 knots	20.0 knots
Runway 17-35	92.62%	96.23%	98.66%	99.60%
Runway 9-27	61.34%	70.56%	81.29%	90.03%
Combined*	**96.77%**	**98.90%**	**99.75%**	**99.97%**
Runway 17 Only	38.34%	39.49%	40.30%	40.48%
Runway 35 Only	62.00%	64.47%	66.09%	66.85%

Source: National Climatic Data Center data from Grand Forks International Airport ASOS (2005-2014; hourly)
**Combined assumes up to maximum design aircraft crosswind component for each runway*

According to true hourly weather data the airport experiences IMC weather conditions 8.22 percent of the time. When considering the current instrument approach weather minimums of 200-foot cloud ceiling and ½ mile flight visibility, the airport has weather conditions below this criteria 3.4 days per year where the airport is not usable.

Table 2-11 – Meteorological Analysis

Weather Condition	Percentage	Days per Year	Hours per Year
VMC	91.78%	335.0	8,040
Usable IMC	7.28%	26.6	638
Usability	**99.06%**	**361.6**	**8,678**
Below Weather Minimums*	0.94%	3.4	82
Total	***100.0%***	*365.0*	***8,760***

Source: National Climatic Data Center data from Grand Forks International Airport AWOS (2005-2014; hourly)
**Current IFR minimums are 200-foot cloud ceiling and ½ mile flight visibility for Runway 35L approach*

COMMUNICATION FACILITIES

Communication facilities allow aircraft to transmit and receive clearances to air traffic control to safely and effectively navigate the national airspace system.

Example RCO/RCAG Antenna

Local Area

GFK is a towered airport and is served by a local Airport Traffic Control Tower (ATCT). ATCT is responsible for providing clearances to aircraft on the movement areas of the airport and airspace within five miles. The ATCT is located on the east side of the airport terminal area near the UND Aerospace facilities.

Aircraft communicate with ATCT during normal tower operating hours of 6:00 A.M. to 11:30 P.M. under Class D Airspace within about 5 miles of the airport. Between non-operating hours, aircraft are required to operate with uncontrolled Class E Airspace and announce their presence periodically. Grand Forks ATCT can be contacted on frequency 118.4 MHz and Ground Control on 124.575 MHz.

A recording of weather observations and other pertinant airport information is available on the Automatic Terminal Information Service (ATIS) frequency of 119.40 MHz. Communication link to the local Grand Forks Flight Service Station for flight plan and weather information is available through local Clearance Delivery frequency of 135.725 MHz or through a Remote Communications Outlet (RCO) frequency.

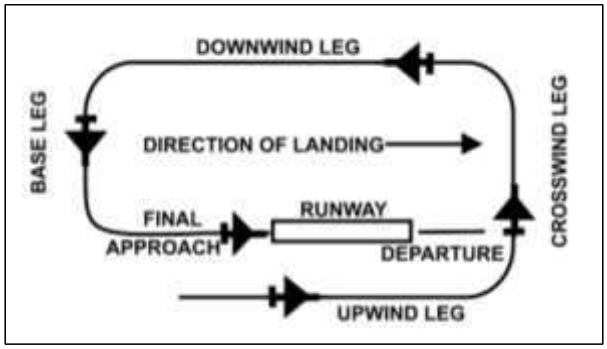
Terminal Area

The terminal area generally describes the airspace within 40 nautical miles of an airport. GFK utilizes the Grand Forks Air Force Base for Terminal RADAR (Approach/Departure) control. The Grand Forks Approach and Departure communication frequency is 118.1 MHz.

En-route, approach and departure surfaces are provided by Minneapolis Air Route Traffic Control Center (ARTCC) located in Farmington, Minnesota. Various air-ground communication transmitters are located regionally to facilitate air-ground radio communications. A Remote Communications Air-Ground (RCAG) station is located southwest of the Runway 9L end and is available on frequency 134.75 MHz. The local presence of this facility enables aircraft to communicate with ATC at a lower altitude in the local area.

APPROACH/DEPARTURE PROCEDURES

Aircraft operate under either Visual Flight Rules (VFR) or Instrument Flight Rules (IFR) depending on weather conditions and/or operational standards.



Standard VFR Airport Traffic Pattern (Source: FAA)

Visual Approach/Departure Procedures

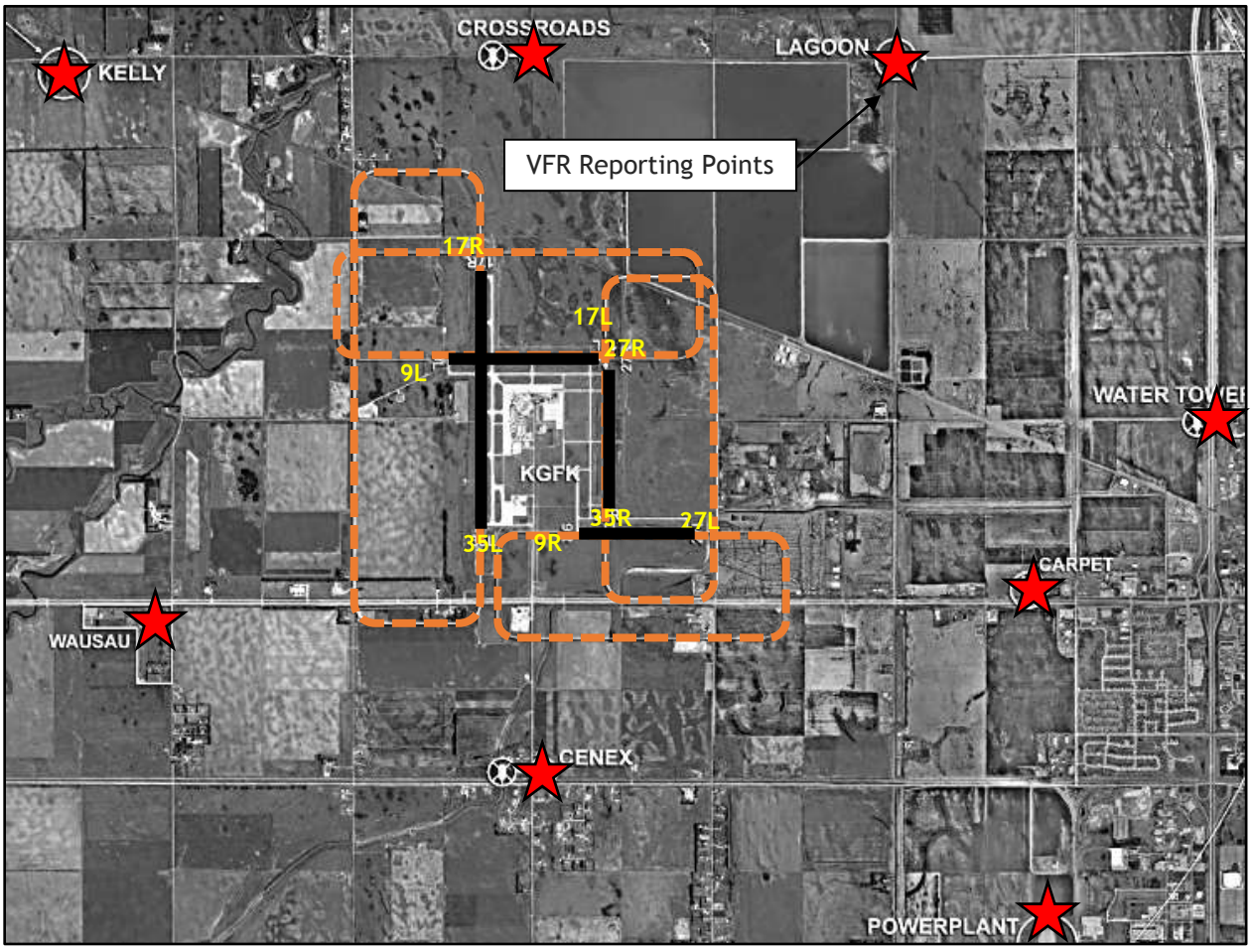
Under VFR, pilots are advised to utilize a standard rectangular traffic pattern around the runway to approach or depart an airport. Standard traffic pattern legs include upwind, crosswind, downwind, base and final. Departures are typically straight-out from a departing runway, a 90 degree crosswind, or 180 degree downwind. Arrivals typically enter a traffic pattern 45 degrees to a downwind leg for landing. All procedures are conducted at the direction of the local ATCT.

In general, most traffic patterns in GFK airspace follow the standard left-hand turn. However, when operating on Runways 27R, 9R, 17R, or 35R the traffic pattern flow is a non-standard right-hand turn. This is done to eliminate crossing air traffic between parallel runways, and also to keep traffic away from airport facilities located in the central-portion of the airfield. The traffic pattern altitude at GFK is 800 feet above ground level (AGL) for small aircraft and 1,500 feet AGL for large aircraft.

Aircraft arriving and departing GFK are sequenced by local ATCT to and from the traffic pattern. With the high volume of activity at GFK, standards VFR arrival checkpoints have been established to facilitate the orderly flow of traffic with UND flight training operations. Standard VFR arrival points are published in the following exhibit.

GFK ATCT also has Land and Hold Short (LAHSO) operations available for flights landing on Runway 27R and 35L to allow for shorter landing lengths to facilitate landing operations on a crossing runway. Unless there are LAHSO restrictions from ATCT, all takeoffs and landings are available for the full runway length.

Exhibit 2-12 – GFK Local Airport Traffic Patterns



Source: University of North Dakota John D. Odegard School for Aerospace Sciences

Table 2-13 – Instrument Approach Procedures

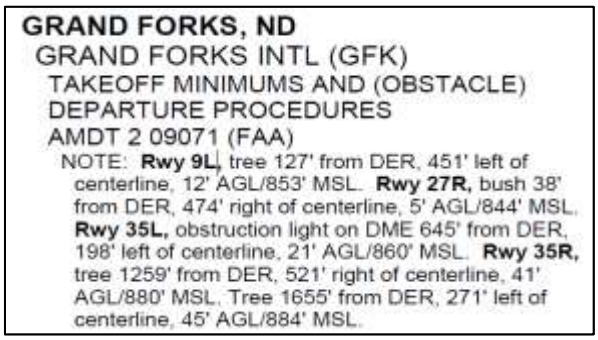
Approach Procedure	Approach Type	Lowest Cloud Ceiling Minimum (HAT)	Lowest Visibility Minimum (n.m.)
ILS or LOC RWY 35L	Precision Approach (Category I ILS)	S-ILS: 200 feet S-LOC: 315 feet Circling: 435 feet	S-ILS: ½ mile S-LOC: ¾ mile
RNAV (GPS) RWY 09L	Non-Precision Approach with Vertical Guidance	LPV: 250 feet LNAV/VNAV: 395 feet LNAV MDA: 377 feet Circling: 435 feet	1 mile
RNAV (GPS) RWY 17R	Non-Precision Approach with Vertical Guidance	LPV: 264 feet LNAV/VNAV: 314 feet LNAV MDA: 337 feet Circling: 435 feet	1 mile
RNAV (GPS) RWY 27R	Non-Precision Approach with Vertical Guidance	LPV: 250 feet LNAV MDA: 617 feet Circling: 615 feet	1 mile
RNAV (GPS) RWY 35L	Non-Precision Approach with Vertical Guidance	LPV: 250 feet LNAV/VNAV: 329 feet LNAV MDA: 335 feet Circling: 435 feet	1 mile
LOC BC RWY 17R	Localizer Back-Course	S-17R: 457 feet Circling: 455 feet	A & B Aircraft: 1 mile C Aircraft: 1 ¼ mile D Aircraft: 1 ½ mile
VOR RWY 17R	VOR with DME/RADAR	S-17R: 377 feet Circling: 435 feet	A, B, & C Aircraft: 1 mile D Aircraft: 1 ¼ mile
VOR RWY 35L	VOR with DME/RADAR	S-35L: 515 feet Circling: 515 feet	A & B Aircraft: ½ mile C Aircraft: 1 mile D Aircraft: 1 ¼ mile

Source: Airnav.com
Note: HAT = Height Above Touchdown, n.m. = nautical miles (reported), VG = Vertical Guidance, NVG = Non-Vertical Guidance, ILS = Instrument Landing System, LPV = Localizer Performance with Vertical Guidance, LNAV = Lateral Navigation, VNAV = Vertical Navigation, VOR = Very High Frequency Omni-Directional Range, DME = Distance Measuring Equipment

Appendix X: FAA Airport Publications contains all charted GFK instrument approach procedures.

IFR/Obstacle Departure Procedures

Special procedures are published at airports to provide aircraft with adequate obstacle clearance. Examples include increased aircraft climb rates or recommended turns. Obstacles to the FAA departure surface are noted however there are not special departure procedures published for GFK. Note the image to the right.


GRAND FORKS, ND
GRAND FORKS INTL (GFK)
TAKEOFF MINIMUMS AND (OBSTACLE) DEPARTURE PROCEDURES
AMDT 2 09071 (FAA)
NOTE: **Rwy 9L,** tree 127' from DER, 451' left of centerline, 12' AGL/853' MSL. **Rwy 27R,** bush 38' from DER, 474' right of centerline, 5' AGL/844' MSL. **Rwy 35L,** obstruction light on DME 645' from DER, 198' left of centerline, 21' AGL/860' MSL. **Rwy 35R,** tree 1259' from DER, 521' right of centerline, 41' AGL/880' MSL. Tree 1655' from DER, 271' left of centerline, 45' AGL/884' MSL.

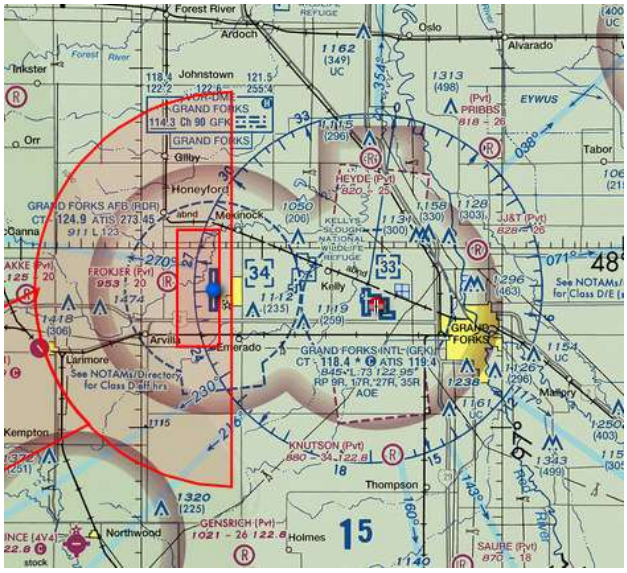
GFK IFR Obstacle Departure Procedure

AIRSPACE & SURVEILLANCE

Airspace Classification

Airspace is segregated into controlled, uncontrolled, special use or other airspace. Each airspace class has different operating rules.

GFK's airspace is somewhat complex, as it sits directly east of the Grand Forks Air Base and its Military Operations Area (MOA). GFK's immediate terminal area airspace is classified as Class D airspace during ATCT operational hours. Class D airspace extends from the surface to 2,500 feet AGL or 3,300 feet MSL with a radius of 5 nautical miles. When ATCT is closed the airspace is Class E airspace with a floor of 700 feet AGL. Class E airspace also extends north and south to protect airspace of the instrument approaches. This airspace is used to transition between the terminal and en-route environment. Beyond the 5 nautical mile ring Class E airspace begins at 1,200 feet above ground level.



FAA VFR Sectional Chart (Skyvector.com)

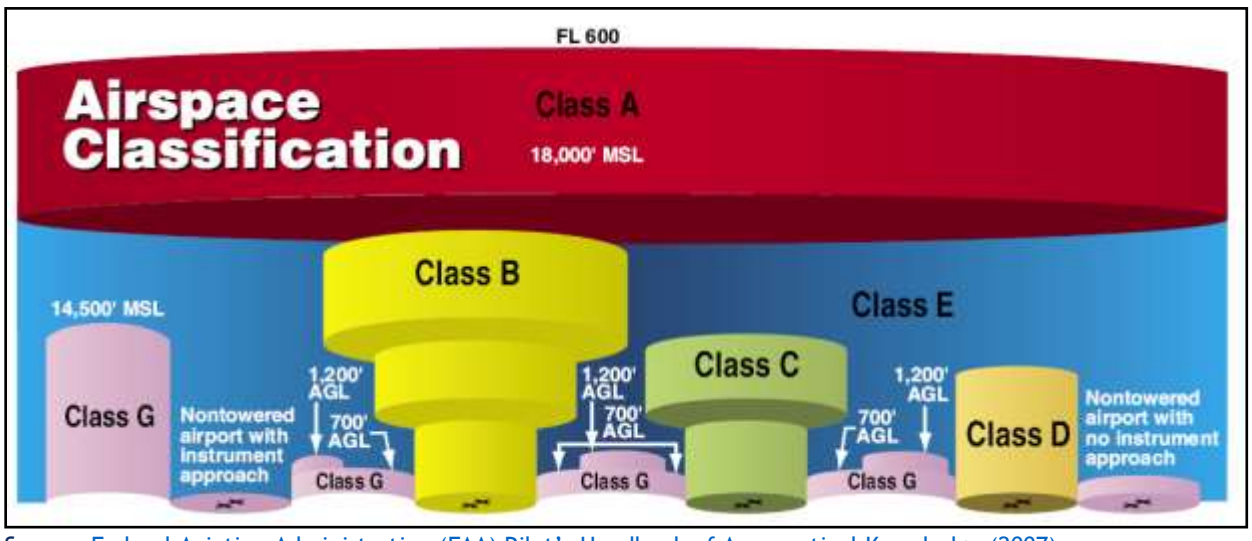
All flights must contact ATC before entering Class D airspace. No ATC clearance or radio communication is required for VFR flights in Class E or G airspace, however ATC services are available. For IFR flights, ATC clearance is required before entering controlled Class E airspace. IFR flights departing GFK must receive an IFR clearance on the ground. GFK is located approximately 75 miles south of Canadian airspace.

Ground Radar

Radar relies on direct line-of-sight, therefore the further the target is away from a radar site the higher altitude is required. The Airport Surveillance Radar (ASR) that identifies aircraft in the local area is located at the Grand Forks Air Force Base located eight miles west of GFK. The ASR provides primary radar for the airspace around GFK starting a few hundred feet above the ground.

Long-range Air Route Surveillance Radar (ARSR) facilities are owned by the FAA providing primary long-range radar to identify aircraft. At GFK, the closest United States ARSR is located in Finley, North Dakota approximately 36 nautical miles from the airport.

Exhibit 2-14 – FAA Airspace Classifications



Source: Federal Aviation Administration (FAA) Pilot's Handbook of Aeronautical Knowledge (2007)

Automatic Dependent Surveillance-Broadcast (ADS-B)

ADS-B is a satellite-based surveillance technology in which aircraft transmit GPS position information to other aircraft and to ATC facilities. ADS-B will supplement primary ground-based radar. FAA has required all aircraft operating within airspace requiring a transponder to have ADS-B transmitting equipment installed by the year 2020 as part of the Next Generation Air Transportation System (NextGen) initiative. Various ground stations have been located nationwide to provide ADS-B coverage. GFK has an ADS-B station located on the airfield. UND Aerospace aircraft are ADS-B equipped.

Table 2-15 – Navigational Aid Summary

Component	Runway 17R/35L	Runway 17L/35R	Runway 9L/27R	Runway 9R/27L
Runway Dimensions	7,351' x 150'	3,901' x 75'	4,206' x 100'	3,300' x 60'
Pavement Markings	Precision	Non-Precision	Visual	Visual
Runway Lighting	HIRL	MIRL	MIRL	MIRL
Taxiway Lighting	MITL	MITL	MITL	MITL
Approach Lighting	MALSR (35L), REIL (17R), PAPIs	PAPIs	PAPI (9L), VASI (27R), REIL (27R)	PAPI (2-box)
Instrument Approach Procedures	ILS (35L) ILS BC (17R) GPS* (17R/35R) VOR (17R/35L)	None	GPS* (9L/27R)	None
Navigational Aids	Airport Traffic Control Tower (ATCT) Airport Surveillance Radar (ASR)			
Meteorological Facilities	Automated Surface Observation System (ASOS) Runway Visual Range (RVR) Lighted Wind Cone			

Source: Airnav.com, FAA Airport Master Record
** With vertical guidance*

AIRSPACE OBSTRUCTIONS

Airspace is an important resource around airports that is very important for safe flight operations. There are established standards to identify airspace obstructions around airports. Title 14 CFR (Code of Federal Regulations): Part 77 *Safe, Efficient Use, and Preservation of the Navigable Airspace* establishes various airspace surfaces in the vicinity of airports. Part 77 is used to determine if an object is an obstruction that penetrates an "imaginary" three-dimensional surface. Surfaces include the primary, approach, transitional, horizontal and conical surfaces each with different standards.

When evaluating objects, the FAA determines whether or not an obstruction is a **hazard** to air navigation. FAA subsequently evaluates the obstruction using more in-depth minimum airspace standards. These include FAA Approach/Departure Surfaces from FAA AC 150/5300-13A, *Airport Design* or instrument procedure surfaces identified in FAA Order 8260.3B, *U.S. Standard for Terminal Instrument Procedures (TERPS)*. Corrective action is then recommended. Examples of corrective action include removing, lowering, or obstruction lighting an object. A general diagram of the Part 77 surfaces is shown in the exhibit of the following page.

Clear airspace is necessary for the safe and efficient use of aircraft arriving and departing an airport. Part 77 airspace standards are defined by the most demanding approach to a runway. There are three main approach types:

- **Precision**: A runway having an existing instrument approach procedure utilizing an existing or planned Instrument Landing System (ILS) with horizontal and vertical guidance. Visibility minimums are less than ¾ mile.

- **Non-Precision**: A runway having an existing instrument approach procedure utilizing air navigation facilities with horizontal guidance, or area type navigation equipment, for which a straight-in non-precision instrument approach procedure has been approved or planned. Approaches with vertical guidance are considered non-precision. Visibility minimums are typically 1 mile but as low as ¾ mile.

- **Visual**: A runway intended solely for the operation of aircraft using visual approach procedures, with no straight-in instrument approach procedure published or planned.

There are two runway classifications:

- **Utility**: A runway that is constructed for and intended to be used by propeller driven aircraft of 12,500 pounds maximum gross weight and less.

- **Other-Than-Utility**: A runway that is constructed for and intended to be used by aircraft greater than 12,500 pounds maximum gross weight.

The combination of the approach type and the runway classification defines the dimensional criteria for each approach. The Part 77 airspace dimensional criteria for GFK is identified in the following table.

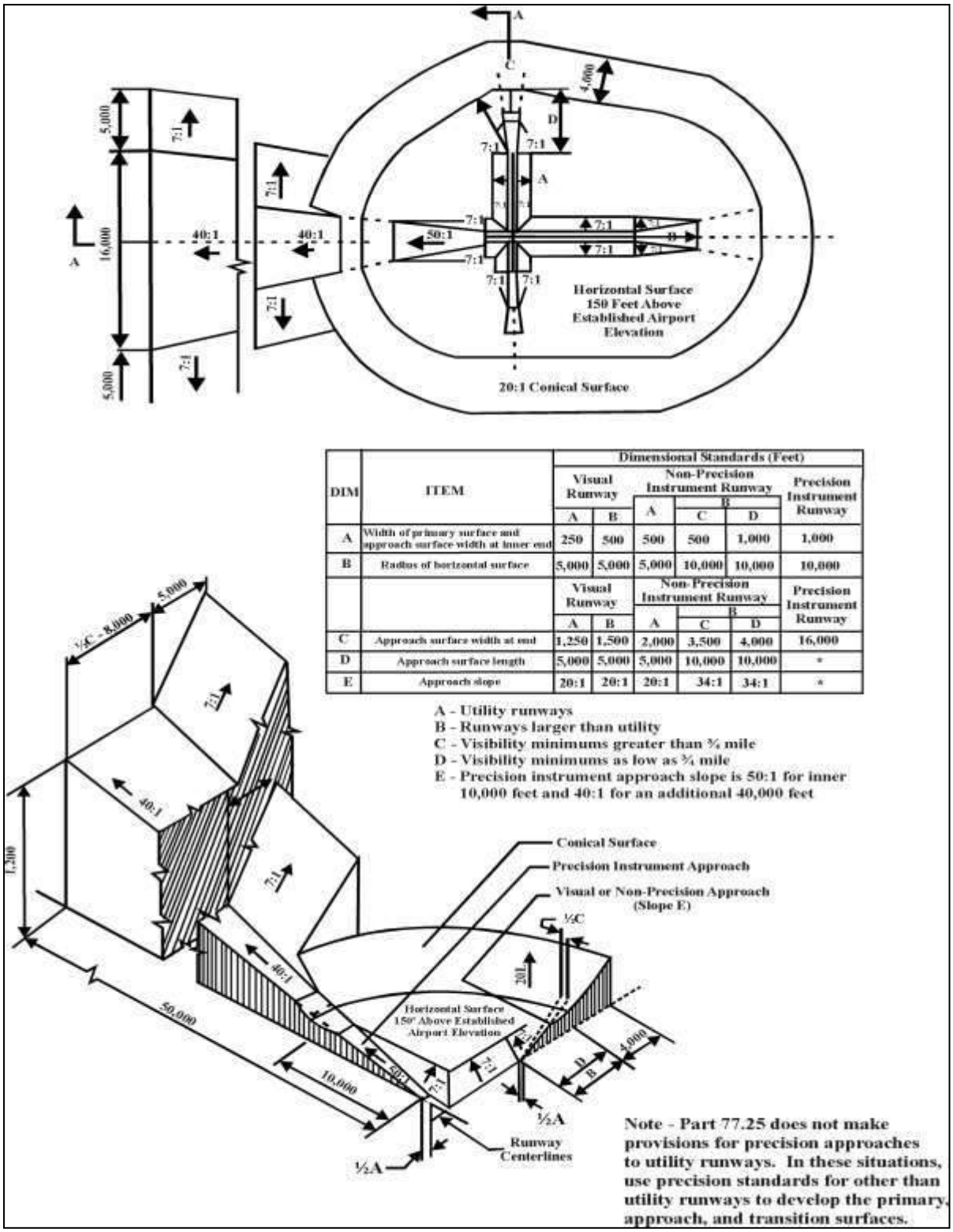
Table 2-16 – Existing Part 77 Approach Airspace Standards

Runway End	Approach Standards	Distance From Runway End	Inner Width*	Outer Width	Length	Slope
17R	Non-Precision Other-Than-Utility Greater than ¾ mile	200’	500’	3,500’	10,000’	34:1
35L	Precision Other-Than-Utility	200’	1,000’	16,000’	50,000’	50:1/ 40:1
17L	Visual Utility	200’	250’	1,250’	5,000’	20:1
35R	Visual Utility	200’	250’	1,250’	5,000’	20:1
9L	Non-Precision Other-Than-Utility Greater than ¾ mile	200’	500’	3,500’	10,000’	34:1
27R	Non-Precision Other-Than-Utility Greater than ¾ mile	200’	500’	3,500’	10,000’	34:1
9R	Visual Utility	200’	250’	1,250’	5,000’	20:1
27L	Visual Utility	200’	250’	1,250’	5,000’	20:1

Source: 14 CFR Part 77, FAA Airport Master Record
**Inner width is also the Primary Surface width driven by the most demanding approach to a runway.*

Based on GFK’s most up-to-date FAA Airport Master Record, there are no critical Part 77 approach surface obstructions to any runway end at GFK. As a part of the master plan process, a more detailed obstruction analysis will be completed using data from an Aeronautical Survey. This detailed obstruction identification and mitigation disposition is identified in the Airport Layout Plan developed at the end of this planning study located in **Appendix X: Airport Layout Plan**.

Exhibit 2-17 – FAR Part 77 Airspace



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 Runway		Non-Precision Instrument Runway			Precision Instrument Runway
		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 ¾ mile
D - Visibility minimums as low as ¾ mile
E - Precision instrument approach slope is 50:1 for inner 10,000 feet and 40:1 for an additional 40,000 feet

Note - Part 77.25 does not make provisions for precision approaches to utility runways. In these situations, use precision standards for other than utility runways to develop the primary, approach, and transition surfaces.

Source: Federal Aviation Administration (FAA)

SURROUNDING AIRPORTS

Public use airports in the United States with instrument procedures within 50 nautical miles of GFK were reviewed to provide background into the other area airports.

Table 2-18 – Surrounding Public Airports

Airport Name / City	FAA ID	Location from GFK	Based Aircraft	Instrument Approach	Longest Runway
Grand Forks Int'l	***GFK***	**-**	***147***	**ILS**	***7,351' x 150'***
Grand Forks AFB	RDR	9 nm	12	ILS	12,351' x 150'
Northwood Municipal	4V4	22 nm	18	GPS	3,160' x 60'
Crookston Municipal	CKN	23 nm	33	GPS	4,300' x 75'
Warren Municipal	D37	24 nm	6	GPS	3,199' x 75'
Grafton – Hutson Field	GAF	29 nm	29	GPS	4,074' x 115'
Hillsboro Municipal	3H4	36 nm	22	GPS	3,301' x 60'
Thief River Falls Regional	TVF	41 nm	25	ILS	6,504' x 150'
Cooperstown Municipal	S32	49 nm	13	GPS	3,500' x 60'
Hallock Municipal	HCO	49 nm	12	GPS	4,007' x 75'

Source: Airnav.com, FAA Airport Master Record

The next closest Part 139 certificated airport with an ILS would be Thief River Falls Regional Airport (TVF) in Thief River Falls, MN roughly 40 nautical miles northeast of GFK. Another option is Hector International Airport (FAR) in Fargo, ND roughly 65 nautical miles to the south of GFK with a 9,000-foot long runway. Both airports are roughly one hour of drive time away from GFK.

Commercial Passenger Terminal

The passenger terminal complex is located along Airport Drive in the southwest portion of the terminal area. It is located east of Runway 17L/35R along Taxiway A at the intersection with Taxiway F. The terminal complex was constructed in 2010 replacing the existing complex on the northwest quadrant of the GFK terminal area.

TERMINAL BUILDING

The terminal building serves multiple functions to process passengers and baggage on commercial airlines. Airlines utilizing the terminal include Allegiant Airlines, Delta Air Lines regional subsidiaries and occasional charter aircraft. The passenger terminal consists of a terminal building and one concourse that is approximately 50,000 square feet in size on two levels. There are currently two aircraft gates each with a passenger loading bridge.

First Floor

First floor functional areas include ticketing lobby, airline offices, baggage screening, baggage handling, baggage claim, car rental offices, public waiting/circulation areas and restrooms. There is approximately 28,000 square feet of total space.

The ticketing lobby is located in the north portion of the terminal with four ticket counters (8 podium spaces) for processing passengers and five electronic podiums operated by the airlines. Airline offices are located behind the ticketing area.

Ticketing Lobby

Outbound baggage facilities consist of an in-line baggage handling system (BHS) located behind the airline ticketing and offices. Baggage is screened by TSA and sorted to carousels to be transported by baggage cart to aircraft. The baggage handling area to process inbound and outbound bags is enclosed/heated. This area also has a shipping/receiving area on the south side.

The baggage claim area is located in the south portion of the terminal buidlling. There is one baggage carrosel with approximately 110 linear feet claim frontage and a large bag door for passengers to pick up their arriving luggage. There are three car rental offices serving Avis, Enterprise, and Hertz. The lower level also includes a small office, electrical and data rooms, a men's and women's restroom, shipping/receiving area and airline office space. Escalators, stairs and an elevator provides passenger access to the second floor. There are three other stairwells in secure areas.

Baggage Claim

Second Floor

Second floor functional areas include Transportation Security Administration (TSA) screening/queuing, gate hold rooms/passenger waiting areas, greeter's lobby, restrooms, concessions, administration offices, conference room and TSA offices. There is approximately 21,900 square feet of total space.

The passenger security screening checkpoint is located on the second level adjacent to the exit lane and greeter lobby. The checkpoint operates around departing flight times. There is currently one checkpoint lane. Equipment includes a metal detector and an x-ray baggage screener. The checkpoint's size and configuration causes the waiting queue to extend into the general circulation area during peak times. A second lane for TSA Pre-Check passengers is planned.

Gate Waiting Area

The gate area provides passenger waiting area for outbound passengers and circulation for inbound passengers. There are two gates; Gate 1 located on the north and Gate 2 located on the south end of the terminal building. Both gates have passenger boarding bridges that both pivot and extend to accommodate various sized aircraft. The entire waiting area and circulation corridor is 40 feet deep causing passenger congestion when two aircraft are loading and unloading in the peak hour. The second floor also features men's and women's restrooms, and a restaurant/bar/gift shop concessionaire and miscellaneous storage, mechanical and custodial space.

The following table breaks down the terminal space by function areas with these spaces depicted graphically in **Exhibit 2-20 and 2-21**.

Table 2-19 – Passenger Terminal Space Breakdown

Space Category	Lower Level Area	Upper Level Area	Total
Airline Offices	1,489	0	1,489
Airport Administration	492	1,601	2,093
Baggage Claim	4,092	0	4,092
Baggage Handling	5,808	0	5,808
Public Space, Restrooms	7,545	11,990	19,535
Rental Car	744	0	744
Concessions	0	1,532	1,532
Security Screening & TSA	1,071	4,178	5,429
Ticketing	5,002	0	5,002
Other	108	678	786
Mech., Equip., Storage	1,713	1,952	3,665
TOTAL	**28,064**	**21,931**	**49,995**

Source: Grand Forks International Airport, KLJ Analysis; Note: Area expressed in Square Feet (SF)

APRON & GATES

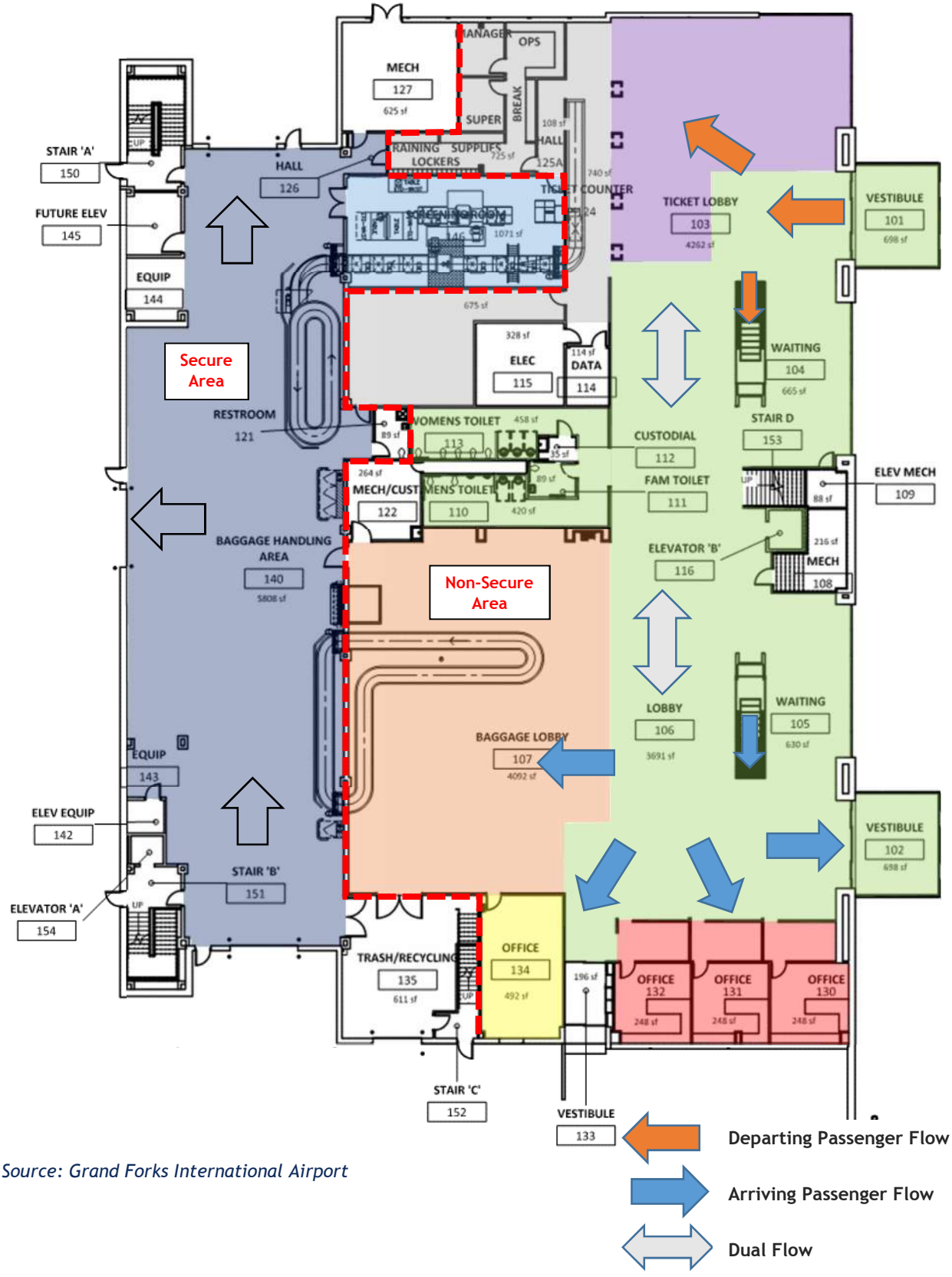
The 20,619 square yard air carrier apron is accessed by aircraft from Taxiway A and F. There are three aircraft parking stands and a passenger boarding bridge for each gate. A service vehicle roadway connection is located on the north end. Vehicles travel within Taxiway Object Free Areas (TOFA).

GFK has a total of two gates. Gate 1 accommodate aircraft as large as a Boeing 757-200 operated by Allegiant Airlines and charter operators. Gate 2 accommodates regional jet aircraft such as the CRJ-200 or CRJ-900. Two of the three parking stands are accessible through Gate 2. There are no Federal Inspection Services (FIS) facilities at the GFK terminal.

Gate 1

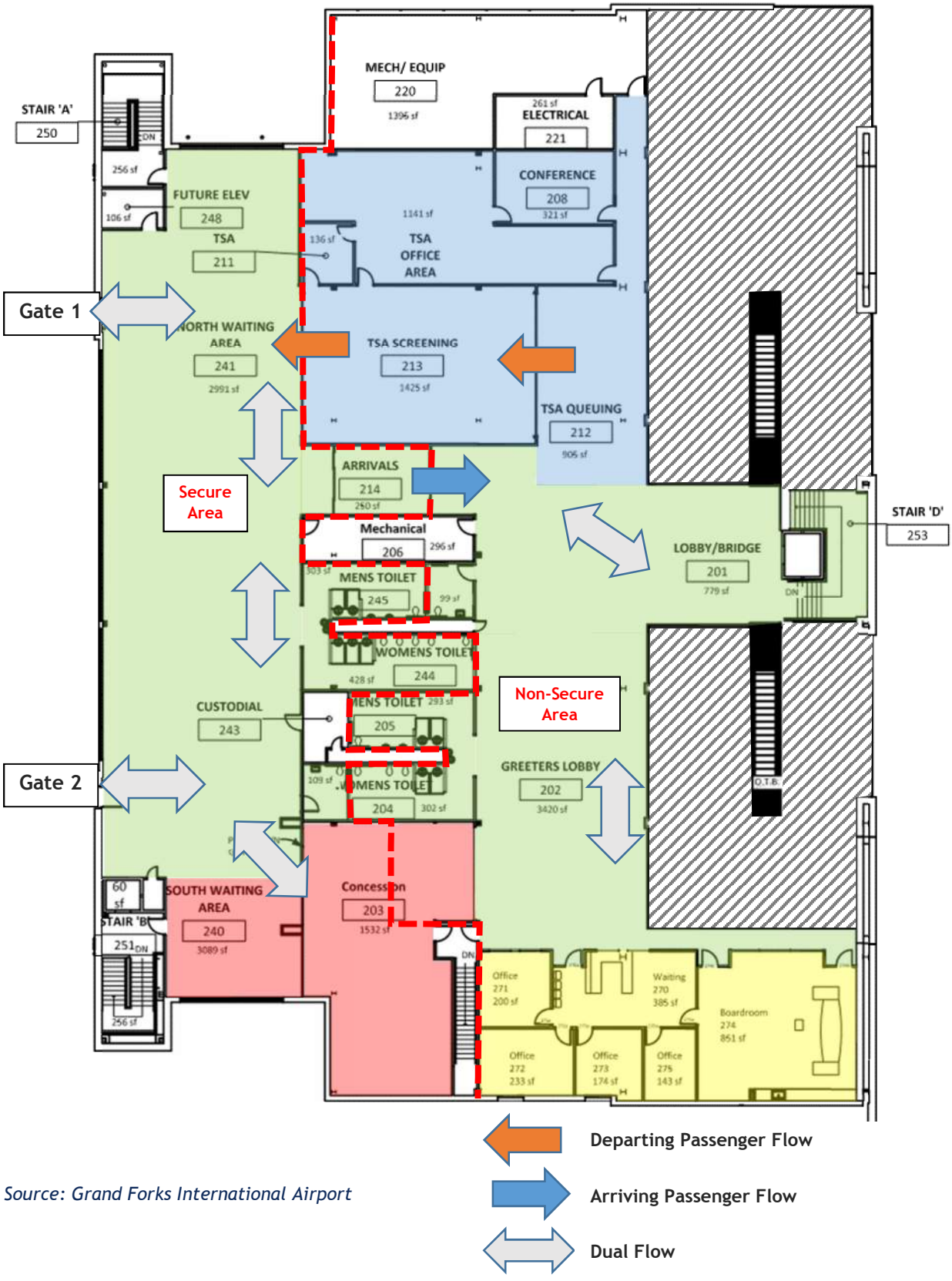
GFK Passenger Terminal & Apron

Exhibit 2-20 – Passenger Terminal First Floor



Source: Grand Forks International Airport

Exhibit 2-21 – Passenger Terminal Second Floor



Source: Grand Forks International Airport

CIRCULATION & PARKING

The passenger terminal complex is accessed via Airport Road from signalized intersection with U.S. Highway 2. Airport Road is a two-lane roadway providing access to the passenger terminal curbside, rental car and public parking facilities. The passenger terminal complex is accessible by continuing westbound along an extension of Airport Drive where a one-way, two to three-lane roadway provides access to the terminal curbside. The airport exit along with recirculation access to return to the terminal is accessed via a roundabout at the exit point, south of the terminal complex. **Figure 2-4: Passenger Terminal Complex** depicts these facilities.

GFK Terminal Curbside

The terminal curbside roadway consists of an inner and outer roadway for the pick-up and drop-off of passengers. The three-lane inner roadway provides approximately 260 linear feet of curbside with 220 linear feet covered. The roadway features one curbside parking lane, an overflow/maneuvering lane and a through lane. A separated outer area for commercial vehicle, shuttle and taxicab staging is available directly west of automobile parking (Lot A). This area provides a staging lane and a maneuvering lane. Two pedestrian crosswalks provide access across the curbside connecting the parking lots with the terminal building.

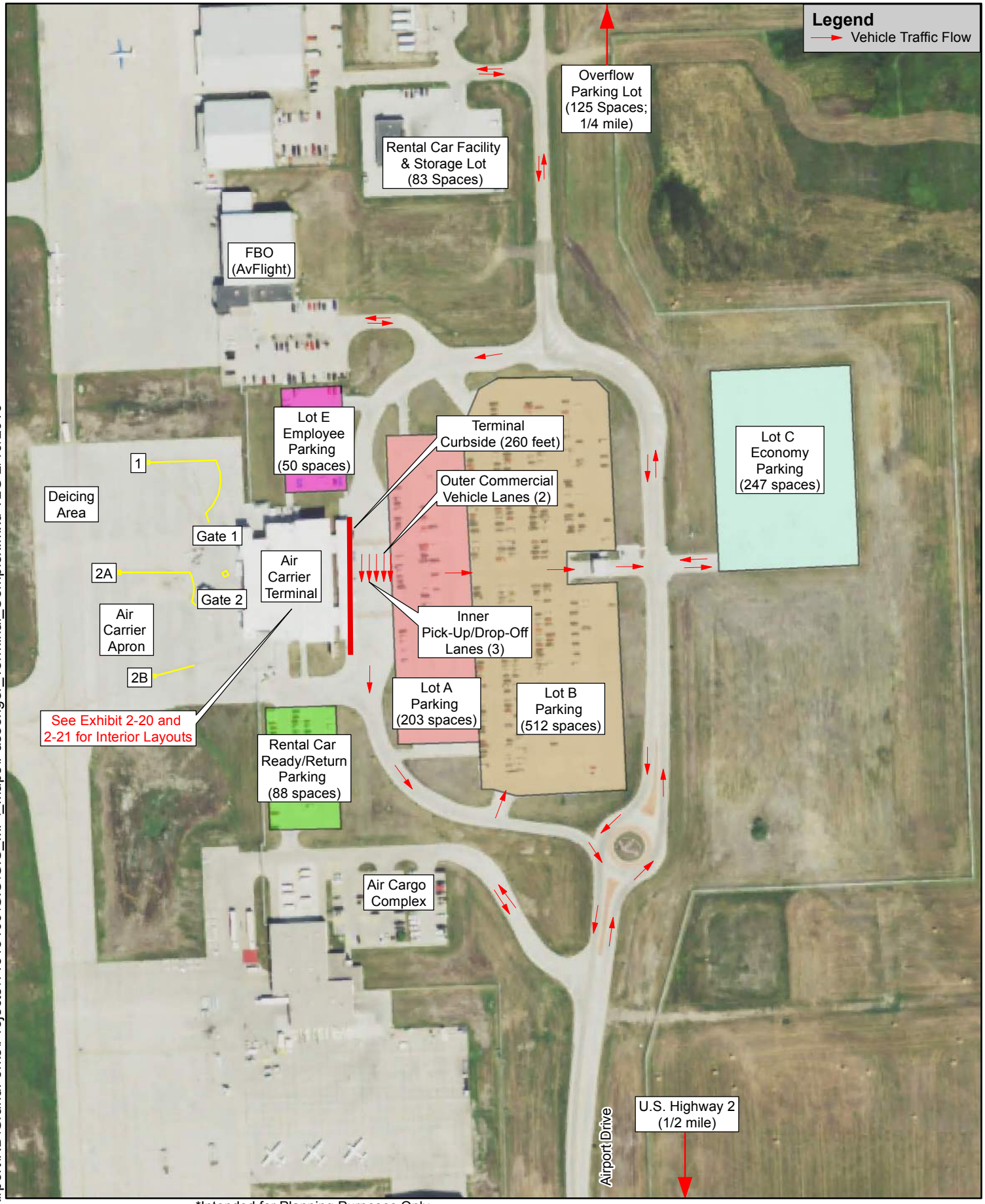
Automobile parking facilities include public, employee and rental car parking lots. All parking facilities are located within the terminal complex. Public parking is available directly to the east of the terminal building (Lots A and B). An economy parking (Lot C) lot constructed in 2014 is located across Airport Drive to meet parking demands during peak months. Passengers walk up to 1,150 feet from the far end of the economy lot to the terminal building entrance.

Table 2-22 – Terminal Parking Facilities

Group	Parking Lot Use/Name	Spaces
Public	Public Pay Parking (Lot A)	203
Public	Public Pay Parking (Lot B)	512
Public	Economy Pay Parking (Lot C)	247
	Total Public	**962**
Employee	Employee Parking (Lot E)	50
Employee	Parking Booth Staff	4
	Total Employee	**54**
Rental Car	Ready/Return	88
Rental Car	Storage	83
	Total Rental Car	**171**
	Grand Total	**1,187**

Source: Grand Forks International Airport

The airport also has a 125-stall overflow lot located east of the old ARFF/Operations facilities and sometimes shuttles commercial passengers to and from this lot when high-volumes of vehicle traffic are anticipated. However, due to the construction of the east economy lot, this now occurs on a less frequent basis. Based on recent overnight vehicle counts, peak public automobile parking in the terminal complex occurs in late December, late February early March 2015 with over 700 peak overnight parkers.



P:\Airport\ND\GrandForks\Projects\14515100\GIS\GIS_MP_Maps\Passenger_Terminal_Complex.mxd TLG 2/16/2016

*Intended for Planning Purposes Only

N

0 125 250 500 Feet

Grand Forks International Airport
Airport Master Plan
Passenger Terminal Complex
Figure 2-4

Rental car facilities consist of the ready/return parking lot located south of the terminal building leased to each of the rental car concessionaires Hertz, Avis and Enterprise/National. The consortium of rental car agencies at GFK (known as Autocore) jointly operate a consolidated rental car facility that was constructed in 2010. This facility features a 4,000 square foot building with three service bays, a car wash bay, and an adjacent 83-stall concrete parking lot. The building is located north of the terminal complex along Airport Drive.

Air Cargo

GFK air cargo facilities are primarily located on the southwest corner of the terminal area along Air Cargo Drive. FedEx operates out of this complex south of the passenger terminal. Additional air cargo facilities are located along the Alpha Apron. FedEx mainline aircraft, feeder aircraft and other carriers serve also serve the air cargo needs at GFK. See **Figure 2-3: Terminal Area Facilities Map**.

GFK FedEx Facility

FedEx air cargo processing activities are performed in a dedicated 20,700 square foot building located along the north edge of the Air Cargo Apron along Airport Drive. The processing facility has landside and airside access, but semi-trucks drive onto the apron to access the facility and load/unload trailers. The building contains approximately space for offices and processing packages. FedEx recently added a third bay in 2014 that allows an additional semi to load/unload packages. FedEx also operates a maintenance and ground service equipment storage building to the north, off of the Bravo Apron.

During normal operations, FedEx aircraft deliver cargo to/from its U.S. hub in Memphis, Tennessee. These larger mainline aircraft are loaded and unloaded on the Air Cargo Apron. Packages are sorted and disbursed to “feeder aircraft”, many of which are operated by Corporate Air. Sorting also occurs in the adjacent cargo processing building to transfer to ground vehicles. Some ground vehicle operations travel between the air cargo apron and the Alpha apron which leads to inefficiency and safety concerns within the air operations area.

Other cargo air mail (USPS) is also removed from larger FedEx aircraft and sent to Consolidated Airline Service (CAS) facility along the Alpha Apron for sorting and processing. Air mail is sent to Bismarck, ND for distribution and processing. Likewise, CAS processes incoming mail and brings it to the FedEx Air Cargo Apron Space.

The 20,619 square yard Air Cargo Apron provides aircraft parking for two (2) larger mainline aircraft and nine (9) smaller feeder aircraft. The Air Cargo Apron area is a SIDA area with an elevated level of security. More than one mainline aircraft would block access to the feeder aircraft apron. A 23,625 square foot aircraft storage hangar is adjacent to the south side of the air cargo apron for feeder aircraft.

FedEx announced in February 2016 it will vacate its leased space at GFK to move its air operations from GFK to Fargo’s Hector International Airport.

General Aviation

General Aviation (GA) elements include facilities that serve aeronautical needs of the flying public beyond those needed for commercial airlines. Facilities include those necessary for the movement of passengers as well as parking, service and storage of aircraft. Examples of these facilities include the aircraft storage hangars, aircraft parking apron, GA terminal and fixed based operators (FBO).

The GA facilities at GFK are primarily located along the Alpha Apron where AvFlight serves as the airport's full-service FBO. Several public and private aircraft storage hangars are also located on the west side of the terminal area adjacent to the Alpha Apron. Landside access is provided off of Airport Drive directly north of the passenger terminal complex. Other facilities classified as GA would be the University of North Dakota John D. Odegard School for Aerospace Sciences training complex located in the northeast quadrant of the terminal area adjacent to the Bravo and Charlie Aprons. A map depicting these GA facilities is shown in **Figure 2-3**.

FIXED BASE OPERATORS

Fixed Base Operators (FBOs) are commercial businesses providing multiple aviation services to the public, primarily for general aviation. Specialized Aviation Service Providers (SASOs) are commercial aviation businesses providing one or a few services.

FBO Hangar and Terminal

AvFlight is the only FBO operating at GFK. Formerly GFK Flight Support, AvFlight operates from several buildings, hangars, and office space in the west portion of the terminal area. AvFlight provides full FBO services including fuel sales (100LL and Jet-A) with mobile fueling, aircraft parking, aircraft handling, de-icing, passenger lobby, pilot lounge, aircraft charter, aircraft sales, avionics, aircraft maintenance, flight instruction, aircraft ground handling and ground transportation services. AvFlight processes people and baggage for charter flights, and provides ground handling for scheduled Allegiant flights. AvFlight also provides hangar leases, as well as overnight heated hangar space for transient aircraft.

AvFlight's main FBO complex features an aircraft/equipment storage hangar, FBO offices and terminal. AvFlight provides approximately a 10,000 square foot terminal and FBO office facility providing passenger and crew amenities. AvFlight has a total of 45 stalls for employee and customer parking at the main FBO complex.

GA TERMINAL BUILDING

A terminal building for general aviation traffic serve multiple functions for inbound and outbound general aviation passengers and pilots. Services provided at GFK include a flight briefing computer, telephone/internet, restrooms, waiting area, pilot's lounge, conference room, concessions and access to courtesy vehicles. Currently these services are provided by GFK's Fixed Base Operator.

UNIVERSITY OF NORTH DAKOTA

The John D. Odegard School for Aerospace Sciences at the University of North Dakota (UND) runs the most prestigious flight school in the world at GFK. The school attracts aerospace students worldwide for flight training. UND Aerospace has its main flight training facility in GFK, with satellite facilities in Crookston, MN and Phoenix, AZ.

UND Aerospace Complex from Charlie Apron

UND Aerospace is the largest tenant at GFK with facilities located in the northeast quadrant of the terminal area along Bravo and Charlie Aprons. As of September 2015, UND owns and operates a fleet of 96 airplanes; many of which are used for flight training. A complex of connected buildings provides aircraft storage, faculty offices/administration, classrooms and support facilities for UND's extensive flight training operation, featuring a five-story administration building built in 1988 located along the north side of the Charlie Apron.

AIRCRAFT STORAGE HANGARS

GFK has 147 reported civil aircraft based at the airport. All are stored in aircraft storage hangars. Hangar facilities consist of large conventional hangars (greater than 10,000 square feet), small conventional hangars (10,000 square feet or less) and nested "T" hangars. Aircraft storage facilities are depicted in **Figure 2-3: Terminal Area Facilities Map**.

The northeast and eastern side of the terminal area consists mainly of UND Aerospace aircraft and maintenance equipment storage facilities. Available aircraft storage spaces range between 10,000 and 20,000 square feet in size. They vary in purpose (helicopter storage/maintenance, multi-engine storage, single engine storage, maintenance) and store all of UND's based aircraft. Aircraft are frequently left on the Bravo and Charlie Apron areas due to frequent use of aircraft and flight instruction.

Directly north of the air carrier apron area is the airport's only Fixed Base Operator (FBO). Hangars operated by the FBO are located north of the main FBO facility. The main FBO hangar features heated overnight storage for select based and transient aircraft.

Other GA hangars are located directly north of AvFlight. A portion of this area consists of T-hangar buildings that have reached the end of their useful life, some of which are over 50 years old. The hangars have extended beyond their useful life and are in need of complete replacement. A list of existing aircraft storage hangars is included in the following table.

Table 2-23 – Aircraft Storage Facilities

Facility Number	Location	Description	Storage Area (SF)
1	Air Cargo Apron	AvFlight/Corporate Air	23,800
5	Alpha Apron	AvFlight FBO	15,700
6	Alpha Apron	AvFlight/CBP	14,600
7	Alpha Apron	Valley Med Flight	19,000
9	Alpha Apron	Hangar (Mass #4)	4,700
10	Alpha Apron	Hangar (Mass #3)	5,400
11	West GA Taxilanes	T-Hangar (Valley)	7,700
12	West GA Taxilanes	T-Hangar #6 (A/B)	9,800
13	West GA Taxilanes	T-Hangar	3,000
14	West GA Taxilanes	T-Hangar #7 (C/D)	7,600
15	West GA Taxilanes	Rydell Hangar	6,500
16	West GA Taxilanes	Minnkota Hangar	5,000
17	Alpha Apron	Air Cargo Hangar (FedEx)	5,000
18	Alpha Apron	Hangar (Mass #2)	10,400
28	Bravo Apron	UND Hangar (Mass #1)	15,000
31	Bravo Apron	UND Hangar	6,700
32	Bravo Apron	UND Hangar	14,100
33	Bravo Apron	UND Hangar	10,000
34	Charlie Apron	UND Hangar	15,000
35	Charlie Apron	UND Hangar	16,300
36	Charlie Apron	UND Hangar	10,000
39	Charlie Apron	UND Hangar	19,000
51	Charlie Apron	UND Hangar	18,500
TOTAL		***Conventional Hangars***	*201,400*
		Corporate Hangars	*33,300*
		T-Hangars (24 units)	*28,100*
		Grand Total	**262,800**

*Source: GFK Terminal Area Drawing (September 2014), KLJ Analysis; *Not currently used for aircraft storage*

Support Facilities

Support facilities are necessary to facilitate the day-to-day maintenance and operation of the airport. A map depicting these facilities is shown in **Figure 2-3: Terminal Area Facilities Map**.

AIRPORT ADMINISTRATION

Airport Authority administration space is located on the second floor of the passenger terminal building. This nearly 2,000 square foot area contains office space, reception/waiting area, and a boardroom/conference room. There are four (4) airport administration offices. There is waiting area space dedicated for guests, an administrative assistant area and space to store files. The board room is used for public meetings, interviews, and airport personnel meetings and is approximately 850 square feet in size. Additional administration space for operations staff is located in the Snow Removal Equipment (SRE) building and Aircraft Rescue and Fire Fighting (ARFF) complex.

AIRCRAFT RESCUE AND FIRE FIGHTING (ARFF)

ARFF coverage is provided by Airport Authority staff. Old ARFF facilities are located on the north portion of the Alpha Apron and jointly house ARFF, Operations and Customs and Border Protection (CBP). This ARFF/Operations building has room for two (2) crash fire rescue trucks, one (1) ambulance and one (1) airport operations vehicle. It also has two sleeping quarters as ARFF/Operations staff are on-site 24 hours a day and 7 days per week. The existing ARFF/Operations portion of the building is nearly 5,300 square feet in size and is over 40 years old.

As of 2016, the airport is completed a major construction project that relocated ARFF and Operations to a location directly north of the existing structure. This new ARFF/Operations complex was constructed to replace the existing structure that is dated, undersized and has operational inefficiencies. The new 14,000 square foot facility is larger and has space dedicated to incident command. The tentative plan is to maintain the old facility for Customs and Border Protection until a permanent solution can be made. These facilities are identified in **Figure 2-2**.

New ARFF/Operations Complex

AIRPORT MAINTENANCE

Airport maintenance is conducted by Airport Authority staff. Airport maintenance consists of pavement, painting, lighting, building, snow removal, grass cutting, and other miscellaneous items required to keep the airport functional and operational at all hours of the day. Like the ARFF building, the 13,000 square foot equipment and maintenance building was old and undersized to house all of the airport's Snow Removal Equipment (SRE).

New SRE Building Interior

In 2014, the airport constructed and opened a new 21,800 square foot SRE building directly east of the old air carrier apron area in the northwest corner of the terminal area. The new facility is larger and can hold all of the airport's Snow Removal Equipment with 15 equipment bays, driving lane, shop, sand and de-icing fluid storage area. The old maintenance building is still in use by the airport for storage of airport parts and materials. It also houses one of the airport's electrical vaults and generators associated with the entire west side of the airport.

GFK owns a total of 26 pieces of mobile equipment and attachments for ARFF coverage, snow removal, de-icing, grass cutting and airport operations. For snow removal the airport owns 15 pieces of equipment including three blowers, two brooms, two plows, two blades, two plow/sanders, two loaders a sweeper and a sand truck.

FUELING FACILITIES

GFK features an airport-owned fuel farm located in the middle of the terminal area on the west side of Airport Drive. The fuel farm includes above-ground fuel tanks and pumps capable of providing service on both the landside and the airside portions of the airport. The fuel farm has a total of eight (8) fuel storage tanks including three (3) AVGAS 100LL, three (3) Jet-A, one (1) Auto, and one (1) diesel.

Table 2-24 – Fuel Storage Facilities

Tank #	Fuel Type	Capacity (Gal.)
1	100LL AVGAS	20,000
2	100LL AVGAS	20,000
3	100LL AVGAS	20,000
4N	JET-A	20,000
4C	JET-A	20,000
4S	JET-A	20,000
7	Auto Gas (87 Octane)	12,000
8	Diesel	12,000
	Total AVGAS	**60,000**
	Total JET-A	**60,000**

Source: Grand Forks International Airport

The landside portion provides access to fill the tanks and four (4) pumps to dispense automobile fuel for public and rental car vendor use. This area has a drive-through loop to permit large fuel trucks access without having to turn around or back into a spot.

Currently, the airport does not have self-service fueling for aircraft operations. Fueling operations are conducted via fuel trucks on the airside. Fuel trucks are owned and operated by AvFlight (FBO) and respond to general aviation fuel requests and commercial/cargo aircraft fueling needs. UND Aerospace conducts their own fueling operations of their aircraft via UND-owned fuel trucks.

FENCING & SECURITY

GFK has an existing security fence network that surrounds the entirety of the airport. Multiple manual gates are located around the perimeter of the airport. Several electric controlled-access gates are located between airside/landside facilities on the interior of the airport. These gates allow authorized individuals to swipe badges to gain entry to the airside portion of the airport. The fence is 10 feet high.

Security is established and maintained per TSA Part 1542 regulations. Airport staff and tenants requiring access to the sterile side of the terminal/apron area are required to wear and display airport badging on the outermost portion of all garments at all times. When operating on the apron/sterile side of the terminal, badging requirements are known as Security Identification Display Areas (SIDA). The SIDA area is denoted by red lines on terminal and air cargo apron pavement. There are various secure access points around the terminal complex.

CUSTOMS & IMMIGRATION

GFK has United States Customs and Border Protection (CBP) facilities and staff located on-site. The CBP facility is located along the Alpha Apron with two (2) aircraft parking positions. There is approximately 1,700 square feet of CBP office and processing space to processes international air traffic coming from Canada.

CBP staff consists of two officers with regular normal hours of operation during the week. Outside of normal staffing hours, CBP staff is available and on-call for irregular operations or non-scheduled flights needing customs clearance. However, due to staff size and building size, CBP at GFK is limited to processing 10 passengers per flight before additional staff would be required. Because of GFK's proximity to the Canadian border, there are also CBP staff in Pembina, ND (80 miles north) that occasionally will travel to GFK for assistance as well.

DEICING FACILITIES

Deicing at GFK is conducted in various locations depending on the type of operation. Commercial passenger aircraft are pushed back from their gate and staged on the western portion of the air carrier apron area for de-icing operations. There is no separate holding location for aircraft deicing operations. The de-icing aircraft location can cause logistical issues with maneuvering other aircraft in the air carrier apron. There is no deicing containment system.

Air cargo deicing operations are conducted on the air cargo apron at aircraft parking locations. Aircraft are also deiced on the south portion of Alpha Apron near the FBO. The University of North Dakota does not practice deicing operations. Occasionally, aircraft will be brought into a hangar to allow the aircraft time to thaw/remove frost.

Ground Access, Circulation & Parking

These facilities provide vital connectivity within the airport facility and from the airport to the surrounding community. Facilities are depicted in **Figures 2-3 and 2-4.**

GROUND ACCESS & CIRCULATION

Public access for the airport is provided by an east/west U.S. Highway 2 (Gateway Drive). A signalized intersection at Airport Drive provides the public with access to all GFK terminal area facilities. The airfield is laid out to allow the separation of airside and landside vehicular traffic. Signs guide vehicles to each facility (FedEx, Air Carrier Terminal, AvFlight, UND, etc.) and automobile parking is located at each facility. Airport Drive is located within airport property.

There is currently a proposal to modify the traffic control at U.S. Highway 2 and Airport Drive/County Road 5 intersection. This intersection has been identified by the North Dakota Department of Transportation as one of the most crash prone rural intersections in the state. One option being proposed in the U.S. Highway 2 Access Study is to realign Airport Drive approximately 1,000 feet to the east in a "staggered T-intersection configuration" to remove the signalized intersection and increase safety.

Access to airside facilities on the airfield is restricted to airport personnel only, and fenced off with locked or controlled-access gates. Gravel roads around the airport perimeter fence allow access to the airport perimeter. Currently, the airport does not have a dedicated perimeter road around airfield pavements for airfield inspections or access to on-airport facilities. Vehicles currently circulate on the runway, taxiway and apron pavements. Airside gravel roads provide access to individual facilities on the airfield, such as navigational aids. The first 300 feet of each road is paved from runways and taxiways.

AUTOMOBILE PARKING

There are a total of 1,978 documented parking spaces at GFK for airport tenants and users. Automobile parking is located near each respective facility on the airfield. Parking related to the commercial passenger terminal is discussed previously in this chapter. A total of 1,315 parking spaces are dedicated for passenger, employee and rental car use. Facilities are depicted in **Figures 2-3 and 2-4.**

There are 663 automobile parking spots remaining serving other facilities in the GFK terminal area. UND Aerospace, the largest tenant on the airport, has a total of 279 automobile parking spaces for students and staff. There are times where the parking lot is full during peak flight training operations.

Table 2-25 – Other Airport Parking Facilities

Tenant	Parking Lot Use/Name	Spaces
UND Aerospace	UND Aerospace Students/Staff	264
UND Aerospace	UND Employee Parking	15
FAA	FAA Airway Staff	65
FAA	FAA ATCT (Tower) Staff	20
FedEx	FedEx Maintenance Staff, Trucks	13
Airport	Airport Staff/Customers	30
CBP	U.S. Customs Staff	3
Airport	Old ARFF Station	20
Various	Hangar Tenant Lease Parking	94
AvFlight	FBO Customer Parking	45
FedEx	Staff, Customers, Trucks	81
Corporate Air	Pilots	13
	TOTAL	**663**

Source: Grand Forks International Airport

PUBLIC TRANSPORTATION

Public transportation is sometimes provided by the Airport Authority when vehicles are parking in overflow lots. This transportation is provided by a small bus and does not leave airport property. There is no public transportation on Cities Area Transit between the Airport and the city of Grand Forks. The closest route is #41 providing service to the Walmart on Gateway Drive/North 55th Street, over 4 miles from the Airport. Several local taxi operators are registered to serve passengers from GFK. Local hotels also provide airport shuttles to/from their respective properties.

Other

UTILITIES

The following utility infrastructure is available at the airport to serve facility demands:

- **Stormwater:** Stormwater on the airport is managed by an above-ground system of ditches and culverts, as well as a series of underground storm sewer pipes and tile lines. Drainage across the north portion of the airfield generally flows to the north to a wetland complex north and west of Runway 17R end. West midfield drainage flows to the west to a surface low elevation point. Drainage for the south portion of the terminal area and east airfield flows via a storm sewer system and outlets into the English Coulee Diversion drainage channel to the northeast of Runway 27L end. North terminal area drainage is accomplished via a series of storm sewer pipes with outlets to the east, north or west to other drainage areas.

- **Landside Power:** Electric service is provided to airport property via overhead lines along U.S. Highway 2. This primary underground power line runs north-south along the east side of Airport Drive with a series of lines to serve the terminal area. A secondary line is located on the west side of Airport Drive. Service is provided by Nodak Electric Cooperative. The terminal is also served by a back-up generator. Additional underground lines from County Road 5 west of the airport service facilities to the west of Runway 17R/35L.

- **Airfield Power:** The west airfield electrical vault is located in the old airport maintenance building. Primary power runs westward under the Alpha Apron, Taxiway A and Runway

17R/35L. The east airfield electrical vault is located in a remote building 500 feet east of Runway 35R. Power is provided by an east-west line from the Air Cargo area to the east airfield.

- **Water:** Water is sourced from an on-airport well station in the Grand Forks Water Area #38. The pump house is located at the northeast corner of U.S. Highway 2 and Airport Drive. The water main line runs north-south along the east side of Airport Drive. Public and private feeder lines provide service to all airport facilities in the terminal area. Service is provided by the city of Grand Forks.
- **Sanitary:** Sanitary sewer utilities are provided by the city of Grand Forks. Sanitary lines are located throughout the airport serving each functional area. Older T-hangars in the west general aviation area are not served by sanitary sewer. Two wastewater lift stations (#34, #35) provide flow from lower to higher elevations. Sanitary force main lines exit the airport to the east from the Air Cargo area to east of Runway 17L/35R.
- **Telecommunications:** Telecommunications lines (telephone, cable television and internet) service runs from the intersection of U.S. Highway 2 and Airport Drive north-south along Airport Drive to serve the terminal area. Feeder lines provide service to the Air Cargo, Passenger Terminal, FBO, Airport Operations and UND Flight Training complex. Service in Grand Forks is provided by multiple providers.
- **Natural Gas:** Natural gas service is provided with a connection at the northwest corner of U.S. Highway 2 and Airport Drive. The primary natural gas line runs north-south along the west side of Airport Drive to service Air Cargo, Passenger Terminal, FBO, Airport Operations and UND Flight Training complex on both sides of the terminal complex. Service is provided by Nodak Electric Cooperative.
- **Heating & Cooling:** Heating and cooling of the passenger terminal is accomplished through a geothermal system. Due to the high water table, 30-40 foot deep geothermal lines were dug horizontally to a point east of Airport Drive. Other public buildings are heated by natural gas heaters and cooled through electric-powered air conditioning units.
- **Other:** An underground fuel line runs east-west through airport property to serve the Grand Forks Air Force Base. This fuel line has an existing 20-foot easement. An unused on-airport underground fuel line runs from the fuel farm to the old ARFF station.

Surrounding Land Use

Background

The effect of airport planning decisions extends well beyond the airport property boundary. The land uses that surround the airport must be evaluated to help determine the impact of airport planning decisions.

Compatible land uses are defined as those uses that can coexist with a nearby airport without either constraining the safe and efficient operation of the airport or exposing people working or living nearby to unacceptable levels of noise or safety hazards. Typical airport land use compatibility elements for airports include:

- FAA airspace standards for airport safety and operational capability.
- FAA land use compatibility near runway ends associated with the Runway Protection Zone (RPZ) for the safety of people and property on the ground.
- State or local airport land use standards, if applicable.

- FAA wildlife hazard mitigation plans for aircraft operational safety.
- FAA land use compatibility within designated day-night average sound level (DNL) noise exposure contours to avoid significant impacts to activities on the ground.

This section provides an overview of existing land uses and plans. Surrounding land uses are depicted graphically in **Figure 2-5: Land Use Map.**

Existing Land Uses

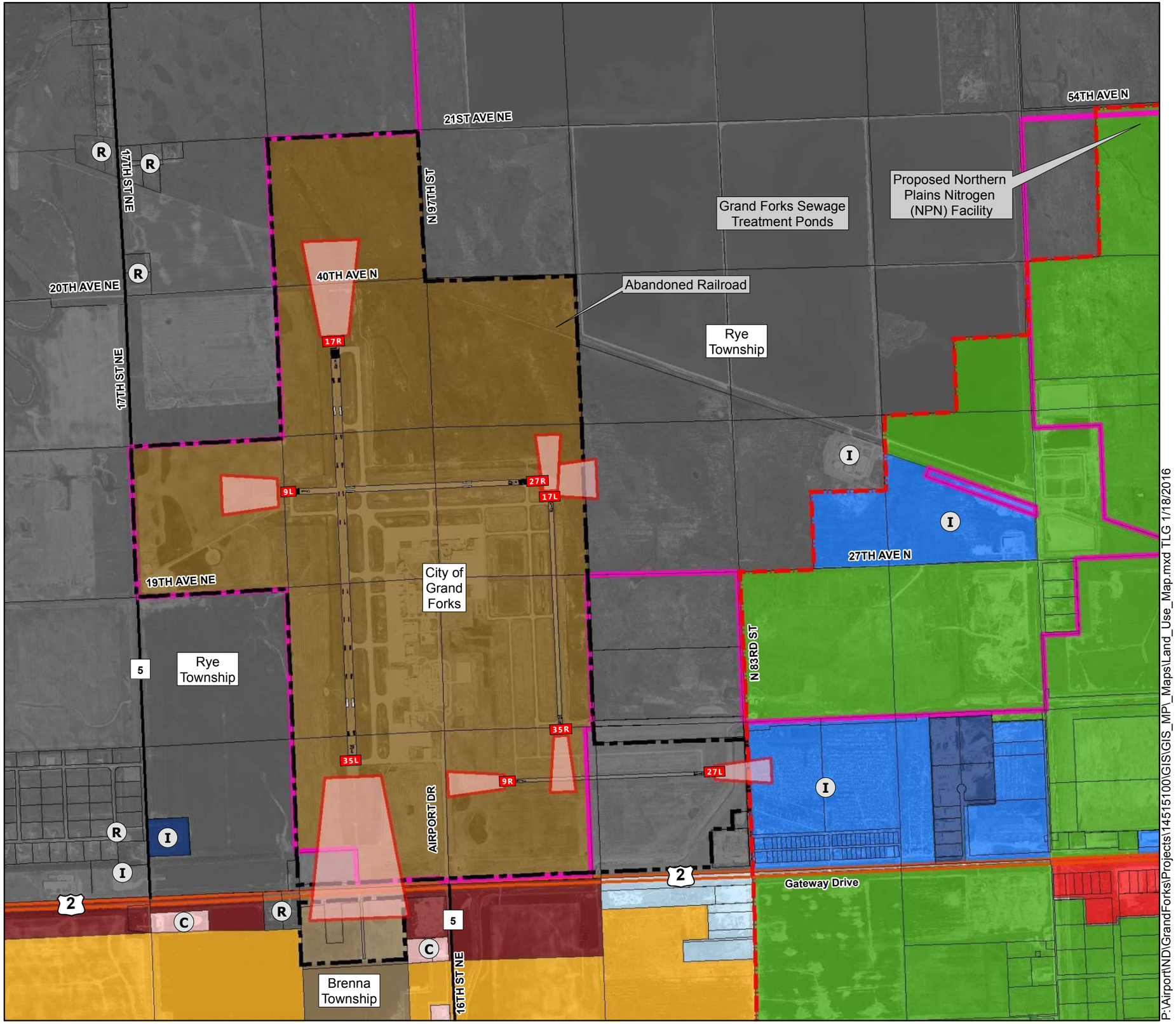
Although GFK itself is within the Grand Forks city limits, airport property is located approximately 2 miles to the west of the core contiguous Grand Forks city limit boundary. Airport property is within portions of Sections 21, 28, 33, 4, 34, 35, and 27 of Rye Township in Grand Forks County.

Surrounding existing land uses include primarily open prairie and agricultural production. There are scattered rural residential and commercial properties to the west of the airport. To the east along Gateway Drive lies commercial/industrial properties including an auto parts salvage yard.

There are no non-aeronautical structures within any of the existing FAA Runway Protection Zones (RPZs) to the runway ends as they exist today. U.S. Highway 2, a four-lane divided highway, traverses within the RPZ for Runway 35L approximately 2,150 feet from the runway end. North 83rd Street, a public gravel road, is located 750 feet from the Runway 27L end within the RPZ. Salvage cars are parked within the RPZ for Runway 27L beginning 850 feet from the runway end.

According to the 2014 Wildlife Hazard Assessment (WHA) conducted for GFK, the airport has had 191 reported wildlife strikes from October 1990 to October 2014. The city of Grand Forks water treatment lagoons are located as close as 2,700 feet northeast of the GFK runways with approximately 1,350 acres of open water. The WHA identified the location, size and number of birds observed as the single most dangerous hazard to aircraft encountered during the 2014 WHA study. In the future water will be pumped from the city's sewage lagoons to support the operation of a proposed nitrogen fertilizer plant located approximately 2 miles northeast of GFK. GFK is also located 4 miles southeast of Kelly Slough National Wildlife Refuge, a major wildlife attractant.

A series of County drainage ditches owned by the Grand Forks County Water Resource District serve runoff throughout the area. During the construction of Runway 9R/27L a total of 5,000 linear feet of drainage ditch (English Coulee Diversion) was realigned around the new runway. GFK storm sewer runoff drains into this ditch.



Legend

- Existing Airport Property
- Existing Runway Protection Zone
- Grand Forks City Limits
- Grand Forks Extraterritorial Boundary (2 miles)

Existing Zoning

- Agricultural
- Aeronautical
- General Business
- Industrial
- Planned Unit Development - Heavy Industrial
- Preservation District
- Reservation District
- General Commercial
- Rural Business Reserve
- Rural Industrial
- Township Zoning

- C = Commercial
- R = Residential
- I = Industrial/Institutional

Source: City of Grand Forks Land Use Plan (2040), Grand Forks County Zoning Map, Grand Forks GIS

N

0 1,000 2,000 4,000 Feet

*Intended for Planning Purposes Only

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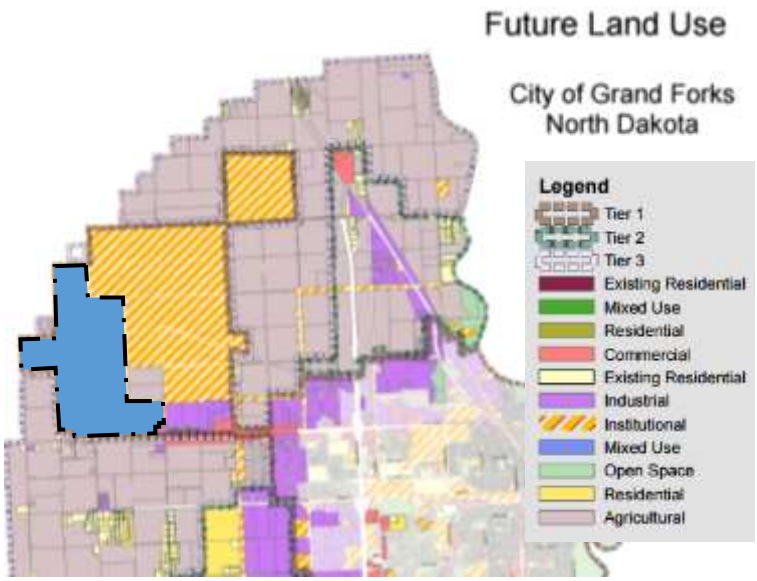
KLJ

Grand Forks International Airport
Airport Master Plan
Land Use Map
Figure 2-5

Land Use Controls

In 2006, the Grand Forks Regional Airport Authority developed a Land Use Compatibility Plan (LUCP) for GFK. This plan was intended to serve as a tool for the airport, city of Grand Forks, nearby communities and federal/state agencies to review and comprehend on and off airport land use requirements and recommendations surrounding GFK. The LUCP has not been formally adopted by the city of Grand Forks or Grand Forks County. Local city ordinances do regulate uses at GFK along with surrounding airspace within city limits.



City of Grand Forks 2040 Land Use Plan

The city of Grand Forks' existing Comprehensive Land Use Plan was adopted in 2011 and forecasted through 2040. This plan generalized the land surrounding GFK to the east as industrial, institutional or city extraterritorial area. Grand Forks city extraterritorial zoning extends two miles from city limits.

According to the Grand Forks County Zoning District Map, directly surrounding airport property are sections of Rye Township zoning to the north and west, airfield reserve/preservation district (agricultural) within 1 mile of the airport to the south, rural business reserve to the east of County Road 5 south of the airport, rural residential single family to the west.

Currently, the city of Grand Forks is developing a comprehensive 2045 land use plan update to help guide future community development. This plan includes areas that are identified within the GFK LUCP. This plan is in development stages as of December 2015. Project leaders are incorporating the recommendations of the GFK LUCP.

North Dakota Department of Transportation is conducting a study for the intersection of U.S. Highway 2, Airport Drive/County Road 5. This is a direct result of hazardous conditions for vehicles and numerous accidents in this intersection. Solutions are being developed and proposed to the city on how to mitigate/minimize vehicular accidents in this area which may affect land use.

Surrounding Land Use Considerations

Based on the identified existing land uses and land use plans around the airport, there are a few potential land use conflicts that should be documented and addressed as needed in this Master Plan.

- **Northern Plains Nitrogen (NPN):** NPN is a proposed nitrogen fertilizer plant located approximately 2 miles northeast of GFK. Separate studies were completed to evaluate the potential for visual and thermal plumes to impact local airport flight operations. NPN is scheduled to begin construction in early 2017.

- **On-Airport Encumbrances:** A 20-foot wide pipeline easement runs through GFK airport property. From east to west, the pipeline easement runs under Runway 17L/35R, the south portion of Charlie Apron, between Hangar #17 and #18, under Runway 17R/35L and directly

west out to the Grand Forks Air Force Base. Other on-airport utility encumbrances also exist, however City Code of Ordinances 20-0108 (Ord. #3547, 1995) identifies any lease shall be subordinate to the Airport relative to the operation or maintenance of the airport.

- **Other On-Airport Land Use:** Other long-term leases on airport property should continue to be evaluated for compatibility with the airport's planned development and FAA grant assurances.

- **Off-Airport Land Uses:** There is concern of a future residential development near the Wal-Mart along U.S. Highway 2 and North 55th Street (4 miles east) which may be residential development incompatible with the recommendations in the current GFK LUCP. Airport staff understand the Grand Forks 2045 Land Use Plan Update incorporate the recommendations of the LUCP.

Airport Zoning

The city of Grand Forks included language in their local Code of Ordinances 18-0022 identifying an Airport District. The intent is to provide an area for airport operations and limit development inconsistent with such use to minimize conflicts with other uses. No zoning regulations exist in Grand Forks County, however the Airport's LUCP is available for guidance for planning/zoning officials.

The local ordinance regulates and restricts the heights of objects in proximity to the airport. The purpose was to help ensure airspace and land uses around GFK meet safety requirements for existing airport operations. Airspace restrictions are believed to meet or exceed standards identified in FAR Part 77 for the existing airport configuration.

Additionally, Code of Ordinances 20-0109 has the following language for approach protection:

> *The City of Grand Forks and the authority reserves the right to take any action that may be necessary to protect the aerial approaches of the airport against obstruction, together with the right to prevent any outside party from erecting, or permitting to be erected, any building or other structure on the airport which in the opinion of the city or the authority would limit the usefulness of the airport or constitute a hazard to aircraft.*

To maintain surrounding land use compatibility, this Master Plan study shall review the possibility of implementing a multi-jurisdictional airport airspace and land use safety zoning overlay ordinance based on the existing and planned future airport configuration.

Non-Aeronautical Land Uses

The Grand Forks Regional Airport Authority dedicates airport property for aeronautical use. Each non-aeronautical use request is considered on a case-by-case basis. Land outside of critical airfield areas is primarily utilized for compatible agricultural production with a multi-year lease. The Grand Forks Regional Airport Authority has adequate control to maintain agricultural uses in compatibility with FAA setback requirements.

Financial Overview

The Grand Forks Regional Airport Authority (GFRAA) is responsible for supporting the maintenance, operations, ARFF, and capital improvements at GFK to local and FAA standards. The airport has 28 full-time staff to accomplish this every day for GFK.

A cursory review of the airport's financial structure was completed. The financial overview is important in considering the sponsor's ability to fund future capital improvements. Data was gathered from public financial statements submitted to the FAA.

Commercial service airports have multiple opportunities for revenue streams to fund airport projects and maintain the airport in a self-sustaining manner. These revenue streams can come from both aeronautical and non-aeronautical sources. Examples include parking fees, airline rents, concessions, fuel flowage/sales, landing fees, hangar leases and other land leases. Airports also obtain funding for airport projects from the FAA, state grant systems and local mills/levies. Capitalizing on opportunities to maintain the airport in a self-sustaining manner is a constant goal of the airport.

Expenses & Revenues

OPERATING REVENUES

GFRAA collected over $4.1 million in operating revenue in 2014 for the Grand Forks International Airport. Approximately 47.5 percent of the revenue was connected to non-aeronautical sources. Airport revenues over two percent include:

- Parking and Ground Transportation (33.5%)
- Terminal Arrival Fees/Rents (12.9%)
- Rental Cars (9.6%)
- Passenger Airline Landing Fees (9.2%)
- Cargo Landing Fees (8.0%)
- Fuel Sales/Flowage Fees (7.3%
- Cargo and Hangar Rentals (3.1%)
- FBO Revenue (2.2%)
- Land and Non-Terminal Facility Leases (2.2%)

OPERATING EXPENSES

GFRAA incurred over $7.1 million in operating expenses in 2014 for the Grand Forks International Airport. Approximately 51.6 percent of the expenses were for depreciation. The breakdown of the approximately $3.4 million in operating expenses is as follows:

- Personnel Compensation and Benefits (55.0%)
- Contractual Services (27.4%)
- Communications and Utilities (9.8%)
- Supplies and Materials (2.7%)
- Insurance Claims and Settlements (1.0%)

Some expenses, including capital improvements are offset by the receipt of grants and other revenue. The cost to provide ARFF coverage for GFK is over $550,000 annually, with repairs and maintenance costing over $250,000 in 2014. Security and law enforcement costs totaled over $10,000 in 2014.

NON-OPERATING REVENUES & EXPENSES

GFRAA collects a Passenger Facility Charge (PFC) of $4.50 per enplaned revenue passenger to be used to fund the local share of eligible airport capital improvements. In 2014, GFRAA collected $584,931 in PFCs. The airport also collected over $22 million in grant receipts for completed capital improvements in 2014.

Assets & Debt

GFRAA had over $48 million in net assets at the end of 2014. GRFAA has over $6 million remaining on bonds issued to fund various airport capital improvements over the years. Annual debt service costs are nearly $325,000 annually. The airport has nearly $800,000 in restricted debt reserves and $6.7 million in cash and investments to cover ongoing airport operating costs of the facility.

Airport Business Model

GFK is a financially self-sustaining facility but relies on financial aid and grants to fund significant airport capital improvements. The local share of capital improvements are financed through a mix of bonds, airport reserves, aeronautical and non-aeronautical airport revenues. Over the past three years GFK has averaged positive operating cash flow of $830,000 per year. When accounting for annual depreciation there has been a negative operating income of $2.8 million per year on average. This is similar to the financial situation of most non-hub commercial service airports nationwide. As a result, grant funds from the FAA and State are necessary to help fund necessary airport improvements as assets naturally depreciate.

Environmental Inventory

This section provides an overview of environmental conditions and issues at GFK and the immediate vicinity. The purpose of this section is to provide a cursory overview of potential or known environmental features which should be considered in the alternatives analysis. This review does not meet the full analytical and procedural requirements associated with the NEPA process. The intent is to assemble readily available information in a systematic manner.

Figure 2-6: Environmental Overview Map provides a graphical depiction of the existing environmental conditions described in this section.

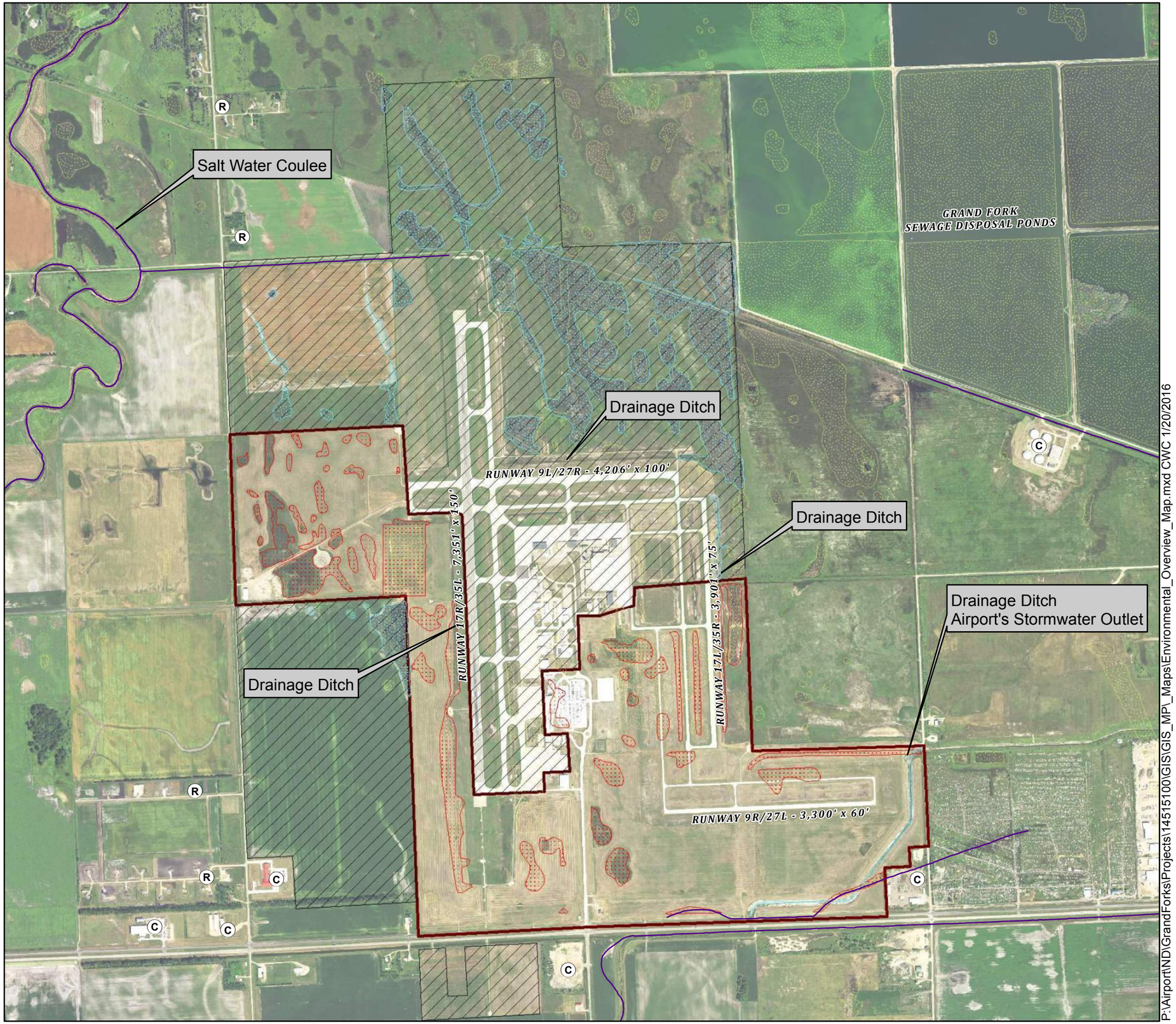
NEPA Process

A thorough review of the existing environmental conditions provides the foundation to review for potential impacts of airport development actions. Appropriate NEPA documentation in accordance with FAA Order 5050.4B, *NEPA Instructions for Airport Actions*, and FAA Order 1050.1, *Environmental Impacts*: *Policies and Procedures*, needs to be conducted prior to commencing with future projects. The following environmental documentation is required for airport actions:

- **Categorical Exclusion (CATEX)** This documentation is used for actions that have a very low potential for environmental impacts. Typical projects that can be covered by a CATEX include planning projects and standard, low-impact development projects such as pavement maintenance or lighting replacement. Documentation required includes the completion of a checklist and supporting information as needed certifying that the project will not exceed applicable environmental impact thresholds.

- **Environmental Assessment (EA)** Typical projects that require an EA are those that are not categorically excluded, and include significant development actions, land acquisition, and runway extensions. Extraordinary circumstances such as wetland impacts, historical properties, or floodplains could also trigger the need to complete an EA. Documentation required includes a more comprehensive environmental review of the proposed action and the potential for impacts resulting from the project. Public and agency review is an important part of the EA process. The primary purpose of the EA is to determine if an Environmental Impact Statement (EIS) is required. If the EA produces a FONSI (Finding of No Significant Impact), an EIS is not required. A FONSI is usually valid for three years.

- **Environmental Impact Statement (EIS)** This is the most comprehensive level of environmental analysis in the NEPA program. Projects that require an EIS include those that will have significant impacts as determined in the EA process. A Record of Decision (ROD) is produced at the end of the process in support of the Final EIS. The EIS is typically valid for a three year period.



Legend

- KLJ Wetlands (Office Delineation)
- Previously Delineated and Mitigated Wetlands
- NWI Wetlands

Wetland Delineations

- Delineated for Previous Project
- KLJ Office Delineation

Source: KLJ Analysis, USFWS National Wetland Inventory, GFK Environmental Assessment to Minimize Wildlife Hazards

(R) = Residential Property

(C) = Commercial/Government

N

0 0.25 0.5 1 Miles

*Intended for Planning Purposes Only

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Grand Forks International Airport
Airport Master Plan
Environmental Overview Map
Figure 2-6

Environmental Features

DRAINAGE DITCHES & WETLANDS

Temporary Standing Water at GFK
Source: GFK WHA (2014)

The extremely flat topography at GFK creates many drainage challenges. Rather than runoff away from the airport, water naturally wants to pond or pool in low areas creating marshy areas or wetlands. This can lead to problems with localized flooding and could possibly attract wildlife that could pose a risk to aircraft using the airport.

Drainage at GFK generally flows through a network of manmade or altered ditches and underground storm sewer into a drainage ditch located on the southeast portion of the airport. This ditch flows into English Coulee Diversion about one mile east of where it leaves the airport. English Coulee Diversion discharges into the Red River. The airport is located within the Turtle River watershed.

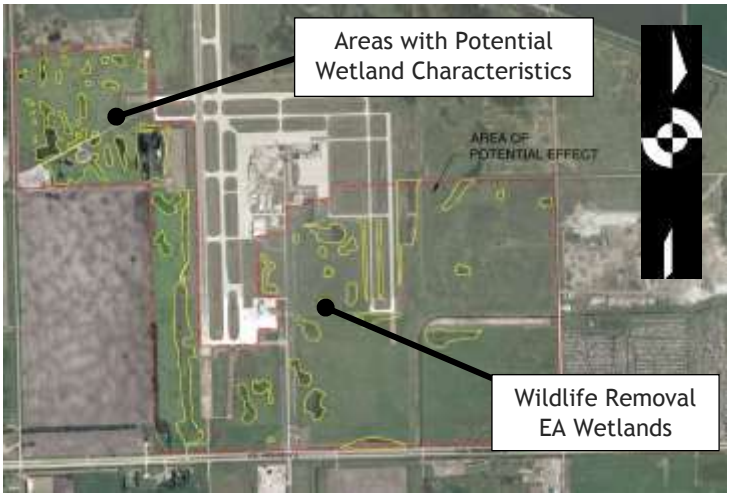
There are wetlands in the National Wetland Inventory (NWI) located on the Airport property. Many of these wetlands appear to have been unsuccessfully drained by the ditches in and around the airport. Additionally, it does appear that many of the ditches themselves have developed wetland characteristics most notably wetland vegetation. All wetlands would require delineation to clearly identify their boundaries. In addition to maintaining water quality in rivers and recharging groundwater among other positive benefits, wetlands may have the potential to attract wildlife that can be hazardous to aircraft using the Airport. The following exhibits depicts the NWI wetlands.

Exhibit 2-26 – National Wetland Inventory Map

Source: U.S. Fish and Wildlife Service

In 2005, GFK completed an Environmental Assessment (EA) to examine removal of all wetlands on airport property. As part of that EA, all wetlands on airport were to be removed and mitigated in wetland banks located within Towner, Benson, and Nelson Counties. The study area contains areas delineated as wetlands as part of the EA. However, as wetlands in this area were already environmentally approved for removal and mitigation, no wetland impacts are considered to be associated with the airport development project in that area. Wetlands removal associated with the above will require further coordination USACE, for projects in this area, to clarify permitting requirements. The following exhibit depicts the wetlands from the completed EA.

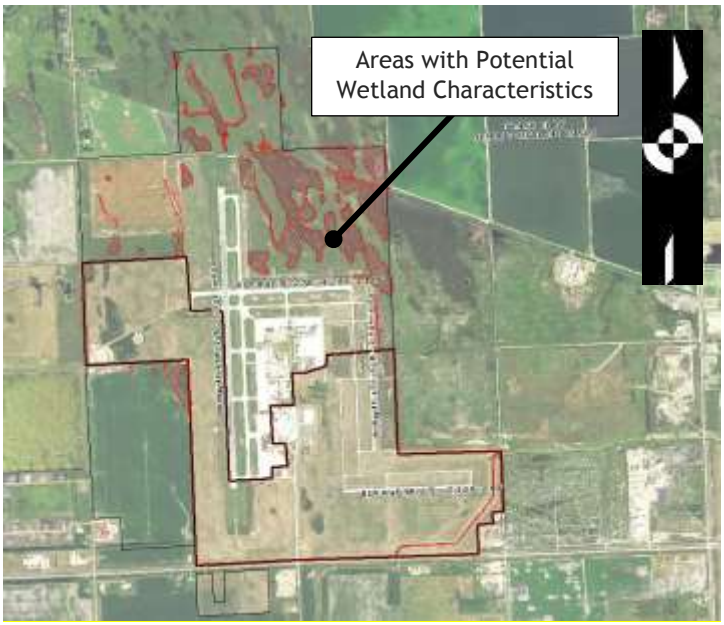
Exhibit 2-277 – Previous Wetland Delineation for Wildlife Mitigation (Wetland Removal) Project



Source: Environmental Assessment to Minimize Wildlife Hazards at the Grand Forks International Airport

Potential areas in and around GFK with wetland characteristics include land to the north and northeast of the airfield and land to the west of Runway 9L-27R that was included in the previous wetland study. Due to the inconsistencies between NWI and visual evidence of wetlands on aerial photography a desktop delineation was completed for areas not already delineated during the previous EA. The following exhibit depicts the high potential areas for wetlands based on a desktop review.

Exhibit 2-28 – Desktop Review of Wetland Inventory Map



Source: KLJ Analysis

Projects with wetland impacts greater than one half acre of wetlands require a U.S Army Corps of Engineers (USACE) general permit and must be reviewed in an EA to complete the NEPA documentation process. Extension of Runway 9L-27R would impact wetlands located west of the runway. A field delineation may be required and coordination with USACE completed in an EA.

AIR QUALITY CLASSIFICATION

The FAA Orders 1050.1F and 5050.4B outline procedures for determining when airport-related projects require an air quality analysis, and if so, what level of analysis may be necessary. An emissions inventory will likely be required for the Runway 9L-27R extension project, however the project is not anticipated to cause an increase in operations but is needed to meet current design requirements. The runway provides secondary air carrier service during high-crosswind weather observations and the existing runway cannot accommodate the change of air-carrier aircraft now servicing the Airport. The Airport is located within an area of attainment for all National Ambient Air Quality Standards (NAAQS); a detailed analysis is not required.

FLOOD ZONES

Floodplains constitute lands situated along rivers and their tributaries that are subject to periodic flooding on the average interval of 100 years or less. GFK is not located within a 100-year floodplain; therefore, no further analysis is required.

HISTORIC AND CULTURAL FEATURES

A file search was completed by the North Dakota State Historical Preservation Office (SHPO). There are no archaeological sites or historic structures registered on the National Register of Historic Places (NRHP) within a one mile radius of the Grand Forks International Airport. There is a potential that undiscovered cultural features exist on and around the Airport. Additional research, including a field survey, may be necessary to adequately assess the area's potential to contain historic properties.

Before a project that involves land disturbance is implemented, an analysis to identify the potential for cultural resources would need to be conducted for the project area. Coordination with the SHPO is necessary for projects involving land disturbance. Additionally, any project affecting buildings that have the potential to be listed in the National Register of Historic places would require coordination with SHPO.

Structures that are more than 50 years old and are eligible for inclusion on the NRHP. Further review is required to determine if these structures have significant historical, cultural or architectural characteristics. Considering the airport was constructed in the early 1960s, the original airport structures would be more than 50 years old. Based on older photos, this would include buildings 9, 10, 12, 14, 22, 23 and 28 as depicted on **Figure 2-4: Airfield Facilities Map**.

Projects that involve ground surface disturbance in areas not previously disturbed by the construction of the Airport will also need to be surveyed by a qualified Archeologist and a determination of affect to historic properties would need to be obtained from the SHPO. Resolutions of any adverse effects would need to be coordinated with the SHPO. Further review regarding potential cultural sites historic properties may be required at the environmental documentation phase.

SECTION 4(F)

Section 4(f) is applicable to projects which require the use of publicly-owned land from a public park, recreation area, or wildlife and waterfowl refuge of national, state, or local significance, or land of an historic site of national, state, or local significance.

There are no known publicly owned lands from parks, recreation areas, or refuge areas within the immediate vicinity of the Airport. Kelly Slough National Wildlife Refuge (NWR) is located about 3.5 miles to the northwest of GFK. This NWR would be protected under section 4(f) however the NWR would not be impacted by airport development. Further review regarding potential cultural sites or historic properties may be required at the environmental documentation phase of any projects that would require ground disturbance.

BIOTIC RESOURCES

Biotic resources includes flora and fauna that are present in an area. GFK is located in the Lake Agassiz Plain Ecoregion according to US Geological Survey. In the past, vegetation in this area would have been a combination of tallgrass prairie most of which has been replaced by agriculture.

GFK Airport Setting

The major crops produced throughout the Lake Agassiz Plain include potatoes, sugar beets, sunflowers, wheat, barley, corn, and soybeans. Pasture and hay are common in areas of marginal soils away from the more fertile lands in the valley.

The following is not a complete list of fauna that could be present in the area; it represents the species most likely to be encountered. Waterfowl are present in the surrounding area due to the proximity to the Red River and numerous wetlands in the area: mallards, wood ducks, ring-necked duck, and Canada goose are the most numerous nesting waterfowl. Mammals such as the white-tailed deer, coyote, raccoon, badger, porcupine, and snowshoe hare are also known to be in the area.

According to the U.S. Fish and Wildlife Services website, federally listed endangered, threatened, proposed or candidate species in Grand Forks County include the Whooping crane, Northern long-eared bat, Gray wolf, and Sprague's pipit.

NATURAL RESOURCES

Existing operations at the Airport would not cause demands that would exceed available or future natural resource or energy supplies.

OTHER NEPA ELEMENTS

Noise

Noise emitted from aircraft can significantly affect the well-being of people living or working near an airport. The FAA requires noise studies for certain projects. If a project involves Airplane Design Groups I and II and has forecasted operations of less than 90,000 annual propeller operations or 700 annual adjusted jet operations, then no further noise analysis is required. GFK exceeds these thresholds and proposed improvements involve Airplane Design Groups III; therefore, noise analysis will likely be required for the Runway 9L/27R extension project, however the project is not anticipated to cause an increase in operations but is needed to meet current design requirements. The runway provides secondary air carrier service during high-crosswind weather observations and the existing runway cannot accommodate the change of air-carrier aircraft now servicing the Airport. The Airport is located within an area of attainment for all National Ambient Air Quality Standards (NAAQS) a detailed analysis is not required.

GFK is located outside the greater city limits with very few noise sensitive areas surrounding the airfield. Approximately 0.7 miles southwest of the Runway 35L end there is a residential area of about seven homes. There is also a residence located about 0.7 miles northwest of the Runway 17R end. The Bible Baptist Church is located approximately 1.6 miles east on US Highway 2.

Land Use

FAA typically evaluates land use in terms of compatibility of existing and planned uses in the vicinity of the airport usually associated with the airport's noise impacts. In general, GFK is surrounded by prairie, golf courses, water features, open spaces, agriculture and human development. Other land use considerations including surrounding physical land uses, airport zoning regulations and FAA airport design land use compatibility standards have been previously identified in this Chapter. GFK prepared an Airport Land Use Compatibility Plan in 2006 for community land use planning purposes.

Property directly to the west and northwest of GFK is private crop land. The city of Grand Forks sewage disposal ponds are located to the northeast of the airfield and should be monitored to ensure the ponds are not attracting wildlife that could pose a danger to aircraft using GFK.

Water Quality

Federal laws establish the authority to define water quality standards, control discharges into surface and subsurface waters, develop waste treatment management plans and practices, and issue permits for discharges. A National Pollution Discharge Elimination System (NPDES) permit is required for any airport development disturbing at least one (1) acre. The North Dakota Department of Health (DOH) enforces environmental regulations in North Dakota.

An extensive system of vegetated swells and ditches at GFK appears to effectively treat stormwater and provide necessary capacity during runoff events. Runway and aircraft deicing products are used at the Airport, and the airport has fueling operations.

Solid Waste

The airport has not produced significant amounts of solid waste including garbage, refuse or sludge as compared to the broader community. FAA requires a Solid Waste Management Plan to be developed as part of this Airport Master Plan study. A Solid Waste study is located in **Appendix X: Recycling & Solid Waste Plan.**

Farmland

Impacts to farmlands considered to be prime, unique or statewide or locally important need to be considered under NEPA. These lands can be used for the production of the Nation's food supply. A search of the USDA Natural Resources Conservation Service (NRCS) web soil survey identified farmlands on-airport and within 1 mile of the airport that are classified as prime farmland, prime farmland if drained and farmland of statewide importance. Further consultation with NRCS is required in a project environmental review stage to calculate the Farmland Conversion Impact Rating to determine if impacts would be significant.

Agricultural Land Uses North of GFK

Hazardous Materials

There are no known contaminated areas within 1 mile of the airport. This is based on a review of the ND DOH database regarding underground storage tanks, listings for superfund sites, and sites covered under the Resource Conservation and Recovery Act. Prior to acquisition of new land to be owned in fee title by an airport sponsor, FAA recommends that an Environmental Due Diligence Audit (EDDA) be performed. An EDDA includes a more detailed review of an area, relative to NEPA-level review, for the possible presence of environmental contamination.

WILDLIFE HAZARD MANAGEMENT

FAA has implemented procedures and guidelines to mitigate wildlife damages to aircraft and aviation operations. Wildlife collisions have increased over the past two decades and reporting has increased awareness of hazards to human health, safety and financial losses.

GFK lies within the path of two major bird migration flyways of North America. United States Department of Agriculture (USDA) Wildlife Services conducted a Wildlife Hazard Assessment (WHA) study at GFK from September 2013 through October 2014. This study was completed as an airport certification requirement to identify daily and seasonal wildlife activity and provide recommendations for mitigating wildlife hazards at GFK. From October 1990 to October 2014 there have been 191 reported wildlife strike recorded at GFK. Recommendations include but are not limited to: 1) occasionally mowing grasslands within the fence, 2) mitigating long-standing water detention areas

around the airport, 3) installing an apron skirt to minimize mammals from entering airport property, and 4) incorporating other general wildlife management and control practices.

Socioeconomic Data

Historic socioeconomic data provides a foundation for evaluating the nature of airport community. For purposes of this Master Planning analysis, the Grand Forks Metropolitan Statistical Area (MSA) made up of Grand Forks County, ND and Polk County, MN has been determined to represent the core local airport service area.

Population

As of 2014, the city of Grand Forks has an estimated population of 58,277[2] with Grand Forks MSA having an estimated population of 101,842 according to the U.S. Census Bureau. Population has grown since a low point was achieved around 2003. Over the past 10 years MSA population has grown by nearly 6 percent, or 0.51 percent annual growth. This compares a North Dakota statewide population growth rate of 0.62 percent annually since 2000.

Table 2-29 – Population Summary

Year	Grand Forks MSA	North Dakota	United States
1990	103,177	637,685	249,622,814
2000	97,405	642,023	282,162,411
2010	98,577	674,629	309,330,219
2014 (est.)	101,842[3]	700,316	320,976,914
Annual Growth Rate	*-0.05%*	*0.38%*	*1.01%*

Source: Woods & Poole Economics, U.S. Census Bureau

Income

Per Capita Personal Income (PCPI) in 2014 for Grand Forks County is $39,024 in 2009 dollars, which is 18 percent less than the statewide average and nearly 5 percent below the United States average. It has grown historically greater than average nationwide.

Table 2-30 – Per Capita Personal Income

Year	Grand Forks MSA	North Dakota	United States
1990	$23,073	$23,526	$28,699
2000	$29,189	$30,786	$36,473
2010	$36,387	$41,771	$39,144
2014 (est.)	$39,260	$46,067	$41,079
Annual Growth Rate	*2.15%*	*2.72%*	*1.44%*

Source: Woods & Poole Economics (2009 Dollars)

Employment

Grand Forks has a strong healthcare, retail, and governmental-based economy. The non-seasonally adjusted unemployment rate within Grand Forks MSA as of October 2015 was 2.0 percent as compared to the North Dakota statewide rate of 2.0 percent and the United States rate of 4.8 percent. Unemployment rate in Grand Forks MSA and North Dakota has historically been significantly lower than national figures.

[2] Grand Forks/EGF Metropolitan Planning Organization, http://www.theforksmpo.org/PDFS/2014GFPopEst.pdf
[3] U.S. Census Bureau estimates Grand Forks MSA population (2014) at 101,842, http://www.census.gov/popest/data/metro/totals/2014/

State and Local Government makes up the largest share of total employment in the Grand Forks MSA with nearly 17 percent of the workforce. The largest single employer in this category is the University of North Dakota. The health care industry, led by Altru Industries, makes up more than 15 percent of the workforce in the MSA.

Table 2-31 – Grand Forks MSA Employment (2014)

Industry	Employment	Earnings (in millions)
State and Local Government	11,893	$ 583.49
Health Care and Social Assistance	10,631	$ 485.295
Retail	9,410	$ 242.937
Accommodation and Food Services	5,582	$ 86.695
Construction	3,489	$ 187.806
Manufacturing	3,478	$ 173.421
Other Services (Except Public Administration)	3,286	$ 95.518
Professional and Technical Services	2,332	$ 113.198
Farming	2,675	$ 269.311
Administrative and Waste Services	2,296	$ 56.124
Transportation and Warehouse	2,203	$ 118.461
Finance & Insurance	2,184	$ 85.074
Wholesale Trade	2,113	$ 130.45
Real Estate & Rental Leasing	2,046	$ 38.703
Federal Military	1,938	$ 157.879
Federal Civilian Government	1,300	$ 111.192
Arts, Entertainment, and Recreation	1,160	$ 13.769
Information	749	$ 34.314
Educational Services	713	$ 11.483
Mining	394	$ 22.588
Forestry, Fishing, Related Activities	386	$ 18.619
Management of Companies	248	$ 13.273
Utilities	297	$ 36.819
All Industries	**100% (70,803)**	**100% ($3,086.419)**

Source: Woods & Poole Economics (2009 dollars)

Table 2-32 – Grand Forks Major Employers

Employer Name	Industry	Number of Employees
University of North Dakota	Post-Secondary Education	4,325
Altru Health System	Health Care	4,200
Grand Forks Air Force Base	Military	3,984
Grand Forks Public Schools	Public Education	1,100
Valley Memorial Homes	Health Care	715
Amazon.com	Non-store Retailer	700
LM Wind Power	Machinery Manufacturing	625
American Crystal Sugar	Food Processing	563
City of Grand Forks	Government	469
Hugo's (4 locations, Grand Forks)	Food & Beverage Stores	452
Riverview Health	Health Care	400
J.R. Simplot	Food Processing	400
Crookston Public Schools	Public Education	300

Table continues on following page

Employer Name	Industry	Number of Employees
Polk County	Government	300
Grand Forks County	Government	280
University of Minnesota-Crookston	Post-Secondary Education	273
Northland Community & Technical College	Post-Secondary Education	207
ICS, Inc.	Construction	225
New Flyer of American (MN) Inc.	Manufacturing	212
Rydell GM Auto Center	Motor Vehicle & Parts Dealer	205
Dee Inc. Foundry & Mfg.	Manufacturing	200

Source: City of Grand Forks (2015)

Total Grand Forks MSA employment has lagged behind the statewide and national growth rates but continues to grow at a rate slightly higher than population.

Table 2-33 – Total Employment (in thousands)

Year	Grand Forks MSA	North Dakota	United States
1990	59.697	373.873	138,331.1
2000	64.62	443.467	165,371.0
2010	68.460	504.067	173,626.7
2014 (est.)	70.803	549.331	183,038.2
Annual Growth Rate	*0.68%*	*1.55%*	*1.17%*

Source: Woods & Poole Economics

Retail Sales

Retail sales is an economic indicator of vitality. Grand Forks MSA growth rates are less than statewide and national averages. The city of Grand Forks is a major contributor to retail sales within the Grand Forks MSA. Canadian traffic has been known to consistently shop in Grand Forks, especially on the weekends.

Table 2-34 – Retail Sales (in millions)

Year	Grand Forks MSA	North Dakota	United States
1990	$1,310.462	$7,333.298	$2,803,666
2000	$1,652.096	$9,932.24	$3,902,969
2010	$1,564.858	$10,887.885	$4,149,070
2014 (est.)	$1,666.25	$12,116.135	$4,617,326
Annual Growth Rate	*0.97%*	*2.03%*	*2.10%*

Source: Woods & Poole Economics (2009 dollars)

Conclusion

The information collected and documented in this Inventory chapter provides a baseline foundation to update the Grand Forks International Airport long-range plan. This information will feed into future sections to determine how facilities will meet the projected airport needs based on aviation activity forecasts.