GRAND CANYON
NATIONAL PARK AIRPORT
ARIZONA

AIRPORT MASTER PLAN - DRAFT FINAL

ADOT

DRAFT

AIRPORT MASTER PLAN

For

GRAND CANYON NATIONAL PARK AIRPORT
Tusayan, Arizona

Prepared for
THE ARIZONA DEPARTMENT OF TRANSPORTATION

By

COFFMAN ASSOCIATES, INC.

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INTRODUCTION

AIRPORT MASTER PLAN

ADOT

INTRODUCTION

The Airport Master Plan for Grand Canyon National Park Airport (GCN or Airport) has been undertaken to evaluate the Airport's capabilities and role, to review forecasts and future aviation demand, and to plan for the timely improvement of facilities that may best meet that demand and maintain compatibility with the environs. The Master Plan will provide systematic guidelines for the Airport's overall development, maintenance, and operation for the next 20 years.

The goal of the Master Plan is to provide the framework necessary to guide possible future development that will cost-effectively satisfy aviation demand, while considering potential environmental and socioeconomic issues. It is intended to be a proactive document which identifies and then plans for future facility needs well in advance of the actual need for the improvements. This is done to ensure that the airport sponsor, the Arizona Department of Transportation (ADOT), can coordinate environmental reviews, project approvals, design, financing, and construction to minimize the detrimental effects of maintaining and operating inadequate or inefficient facilities.

This study will follow a systematic approach outlined by the Federal Aviation Administration (FAA) to identify existing and future airport needs. The intended result is a recommended development concept which outlines the proposed uses for all areas of GCN's property. This Master Plan will differ from those before in that the study will also include airport sustainability measures. The sustainability analysis will include a baseline assessment outlining historical and current sustainability achievements, as well as integration of proposed sustainability goals and objectives into future airport plans.

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ADOT recognizes the importance of air transportation to the surrounding region, as well as the associated challenges inherent in providing for its unique operating and improvement needs. The cost of maintaining an airport is an investment which yields impressive benefits, which time and again have proven to be greater than the costs. With a sound and realistic Master Plan, GCN can maintain its role as an important link to the national air transportation system for regional users, and protect the existing public and private investments in its facilities.

STUDY OVERVIEW

ADOT is responsible for funding capital improvements at the airport through obtaining FAA and Arizona Department of Transportation – Multi-Modal Planning Division – Aeronautics Group (ADOT-MPD – Aeronautics Group) development grants. In addition, ADOT oversees facility enhancements and infrastructure development conducted by private entities at the Airport. The Master Plan is intended to provide guidance for future development and justification for projects which the airport may receive funding for through an updated capital improvement program (CIP). In turn, the CIP can help identify the future investment required by the FAA and ADOT-MPD – Aeronautics Group.

ADOT has contracted with Coffman Associates, Inc. (a national airport planning firm) to undertake the Master Plan. The study is being prepared in accordance with FAA requirements, including Advisory Circular (AC) 150/5070-6B, *Airport Master Plans*, and AC 150/5300-13A, *Airport Design*.

MASTER PLAN GOALS AND OBJECTIVES

The overall objective of the Airport Master Plan is to provide ADOT with guidance for future development of the Airport to help meet the needs of existing and future users, while also being compatible with area development, other transportation modes, and the environment. Making sustainability a part of this planning process will promote design, project implementation, and financial decisions based upon the principles of environmental stewardship, economic growth, and social responsibility. As a result of incorporating sustainability elements into the master planning process, the Airport can become a more environmentally friendly economic center and neighbor. The Master Plan will benefit the area by providing a single comprehensive plan which supports and balances aviation activities and the environmental preservation of the surrounding environs.

Accomplishing this objective requires an evaluation of the existing Airport so as to make a determination of what actions should be taken to maintain a safe, adequate, and reliable airport facility. The completed Master Plan will produce a development concept which will provide ADOT and Airport officials with a program for future capital needs to aid in planning, scheduling, and budgeting.

While an airport master plan must be developed according to FAA requirements, it can also be prepared in a manner which makes it useful in strategic planning for the airport. The FAA requires specific

elements within a master plan. The elements, to be detailed in the following section, are guidelines which allow for a systematic and technical approach to reach the final recommended plan.

This Master Plan will provide a vision for GCN covering the next 20 years and, in some cases, beyond. With this vision, ADOT will have advance notice of potential future funding needs so that appropriate steps can be taken to ensure that adequate funds are budgeted and planned.

Specific goals and objectives to be considered in the Master Plan include:

- Maintain and ensure the safety and security of the Airport throughout the study process.
- Consider environmental stewardship in all phases of the process and determine the required level of environmental documentation to move forward with each recommendation of the Master Plan.
- Research and evaluate transportation industry and socioeconomic factors likely to affect the air transportation demand in the region.
- Consider the role of the Airport in defining the levels of service and transportation infrastructure needed from an aeronautical and local community perspective.
- Determine the projected needs of airport users over the next 20 years.
- Reflect the goals and visions of the surrounding area, especially those related to quality of life, business and development, and land use.
- Recommend improvements that will enhance GCN's safety, efficiency, and capability to serve the area's aviation needs.
- Focus on prioritizing projects and programs, phasing, and allocating financial resources to reflect the airport's policy and mission for long-term fiscal sustainability.
- Establish a schedule of development priorities and a financial plan for the improvements proposed by this planning effort.
- Prepare an updated Airport Layout Plan (ALP) in accordance with FAA guidelines and incorporate Airports Geographic Information System (AGIS) databases.
- Develop policies and objectives for a sustainability program at the Airport.
- Incorporate an active and productive public involvement and community outreach program throughout the planning process.
- Coordinate the Master Plan with local, state, and federal agencies.

MASTER PLAN ELEMENTS AND PROCESS

The Master Plan is being prepared in a fashion pursuant to the scope of services that has been coordinated with ADOT and the FAA. The following elements are intended to assist in the identification of future facility needs and which provide the supporting rationale for their implementation. **Exhibit IA** provides a graphical depiction of the elements and process involved with the study.

Initiation – The Master Plan process begins with an identification of the study parameters (scope of services, budget, and schedule) and its public involvement program, which includes the establishment of a Planning Advisory Committee (PAC) and Public Information Workshops (PIWs). The PAC consists of


INITIATION
PAC #1
INVENTORY
FORECASTS
DEMAND/CAPACITY
FACILITY REQUIREMENTS
Working Papers
PAC #2
PIW(s)
DEVELOPMENT ALTERNATIVES
Working Papers
PAC #3
PIW(s)
MASTER PLAN CONCEPT/ FINANCIAL PLAN
ENVIRONMENTAL OVERVIEW
SUSTAINABILITY ANALYSIS
Working Papers
PAC #4
PIW(s)
AIRPORT PLANS
DRAFT Master Plan
Master Plan/ ALP Approvals
FINAL Master Plan
PAC = Planning Advisory Committee
PIW = Public Information Workshop
ALP = Airport Layout Plan

approximately 20 members representing organizations, agencies, and groups that have a vested interest in the future of GCN. The PAC advises the Consultant and ADOT on the content and recommendations of the Master Plan through meetings and review of draft working papers. The PIWs allow an opportunity for the general public to be updated on the Master Plan process in an "open house" format. Numerous PIWs are facilitated throughout the study. A project website is also developed to aid in disseminating information related to the Master Plan.

Inventory – The Master Plan inventory efforts focus on collecting and assembling relevant data pertaining to the airport and the region it serves. Information is collected on existing facilities and operational activity, area airspace, weather conditions, population and economic data, vicinity land uses, and environmental conditions of the airport and surrounding area. New aerial photography and planimetric mapping of the Airport is also obtained to aid in the study process. An AGIS survey is also implemented into this element and includes the collection of airport and aeronautical data to meet the demands of the Next Generation National Airspace System.

Forecasts – This portion of the Master Plan examines the potential demand for aviation activity at GCN over the next 20-year period. This analysis utilizes local socioeconomic information, as well as national air transportation trends to quantify the levels of aviation activity which can reasonably be expected to occur at GCN through the planning period of the Master Plan. Specific indicators for based aircraft, aircraft operations, air taxi/air tour/air charter activity, scheduled commercial air service, and peaking characteristics are analyzed. The results of this effort are used to determine the types and sizes of facilities which would be required to meet the projected aviation demand at the Airport through the long term planning period.

Demand/Capacity – This analysis is undertaken utilizing the FAA's airfield capacity/delay model to develop estimates of current and future levels of airfield capacity based on forecasts of future demand and the current airfield configuration. This information is used in support of future airfield needs.

Facility Requirements – This chapter of the Master Plan converts aviation demand needs into types and volumes of actual physical facilities required to meet existing and forecast demands in aviation activity. Airside (runway, taxiways, airspace) and landside (aprons, hangars, support facilities) facility needs are presented that are based on the forecasts previously developed, as well as on FAA design and safety standards. The critical design aircraft and physical planning criteria based upon AC 150/5300-13A, *Airport Design*, is also established in preparation of the needs assessment for airside and landside facilities.

Development Alternatives – The Master Plan considers a variety of solutions to accommodate projected airside and landside facility needs through the long term planning period. This element proposes various facility and site plan configurations which can meet projected facility needs. An analysis is completed to identify the strengths and weaknesses of each proposed development alternative, with the intention of determining a single direction for development.

Master Plan Concept/Financial Plan – Following consideration of a variety of alternatives, the Master Plan presents a single, consolidated long term vision for development of the Airport and a capital improvement program (CIP) to support the timing of the planned development. The recommended concept evolves from the various development alternatives presented, as well as information from the environmental evaluations performed throughout the study process and follows input from the PAC, ADOT, and the general public. A detailed CIP is included which defines the cost and estimated implementation timeline of projects considered feasible and based on demand. Potential funding sources for these projects are also identified.

Environmental Overview – The objective of this element is to provide ADOT with proper guidance regarding, and to facilitate compliance with, the *National Environmental Policy Act* (NEPA). Throughout the study process, environmental factors are evaluated that assess existing and future conditions on and adjacent to the Airport. An environmental inventory will provide baseline environmental information that is then used to identify any issues or constraints that may require consideration during the development of the Master Plan. Once a recommended development concept is determined, an environmental evaluation is developed which takes into consideration feasible airport improvements. This preliminary environmental evaluation follows FAA guidelines in implementing NEPA. Existing and future aircraft noise exposure contours are also prepared based upon existing and projected aircraft activity at the Airport.

Sustainability Analysis – As previously discussed, the Master Plan includes a sustainability component which is incorporated as a stand-alone chapter. Integrating sustainable principles into airport planning is desirable in order to reduce environmental impacts, help maintain high/stable levels of economic growth, and achieve "social progress" which ensures that organizational goals are consistent with the needs and values of the local community. A two-phased approach is utilized in order to develop a Sustainable Management Plan for GCN and includes the establishment of baseline sustainability goals and objectives to be followed by developing sustainability performance targets and implementation strategies.

Airport Plans – The Master Plan incorporates the official FAA-approved ALP and detailed technical drawings depicting existing and proposed facilities, related airspace, land use, and property data. These drawings are used by the FAA and ADOT-MPD – Aeronautics Group in determining grant eligibility and funding.

Final Reports and Approvals – The Master Plan report provides documentation that incorporates all the findings of the master planning process. A Draft Final report is produced first to represent the substantially complete Airport Master Plan and is used in the approval process. Once final edits and corrections are made and the Draft Final report has been approved, the Final Master Plan report is produced. This element also includes the review and ultimate approval of the ALP drawing set by the FAA.

STUDY COORDINATION AND PARTICIPATION

The Grand Canyon National Park Airport Master Plan is of interest to many within the region. This includes local citizens, community organizations, airport users, airport tenants, area-wide planning agencies, and aviation organizations. As the Airport is a strategic component of the regional, state, and national aviation systems, the Master Plan is of importance to both state and federal agencies responsible for overseeing air transportation.

To assist in the development of the Airport Master Plan, ADOT has identified a group of community members and aviation interest groups to act in an advisory role in the development of the Master Plan through the formation of the PAC. The PAC reviews material and provides comments throughout the study to help ensure that a realistic viable plan is developed. The study schedule calls out four points during the process where the PAC convenes to discuss issues related to the Master Plan. To assist in the review process, draft working papers are prepared at various milestones in the planning process. The working paper process allows for timely input and review during each step of the study process to ensure that all master planning issues are fully addressed as the recommended program develops.

A series of PIWs are also conducted as part of the study coordination effort (see **Exhibit IA**). These workshops are designed to allow any and all interested persons to become informed and provide input concerning the Master Plan process. Notices of meeting times and locations are advertised through local media outlets. Draft working papers and other information related to the Master Plan are available to the public via the ADOT website at the following address:
http://www.azdot.gov/gcnairportmasterplan.

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Chapter One

INVENTORY

AIRPORT MASTER PLAN

ADOT

Chapter One
INVENTORY

To produce a realistic and adequate plan for future growth at Grand Canyon National Park Airport (GCN or Airport), it is essential to understand the framework within which the Airport functions. An initial task within this Master Plan consists of gathering data to provide a clear definition of the Airport's physical and operational features, including facilities, users, and activity levels. The information that follows formed the baseline for developing this report.

The initial action necessary in preparing a master plan is the collection of all pertinent data that relates to the area served by the Airport, as well as the Airport itself. This inventory was conducted using the following sources of information:

- *Grand Canyon National Park Airport Master Plan Update*, 2005
- *Grand Canyon National Park Airport Terminal Area Plan*, December 2009
- *Airport Certification Manual (ACM) Class I Airport*, July 2013
- Town of Tusayan, *Tusayan General Plan 2024,* adopted by the Mayor and Council of the Town of Tusayan on April 16, 2014
- On-site visits
- Aerial and ground photography
- Interviews with Arizona Department of Transportation (ADOT) staff, tenants, and users
- Federal, state, and local publications
- Project record drawings

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This chapter briefly describes the physical facilities at the Airport. Aviation-specific information on the airspace, aviation activity, and role of the Airport are described. The chapter also details the environment in which the Airport operates, including socioeconomic characteristics of the region.

AIRPORT SETTING

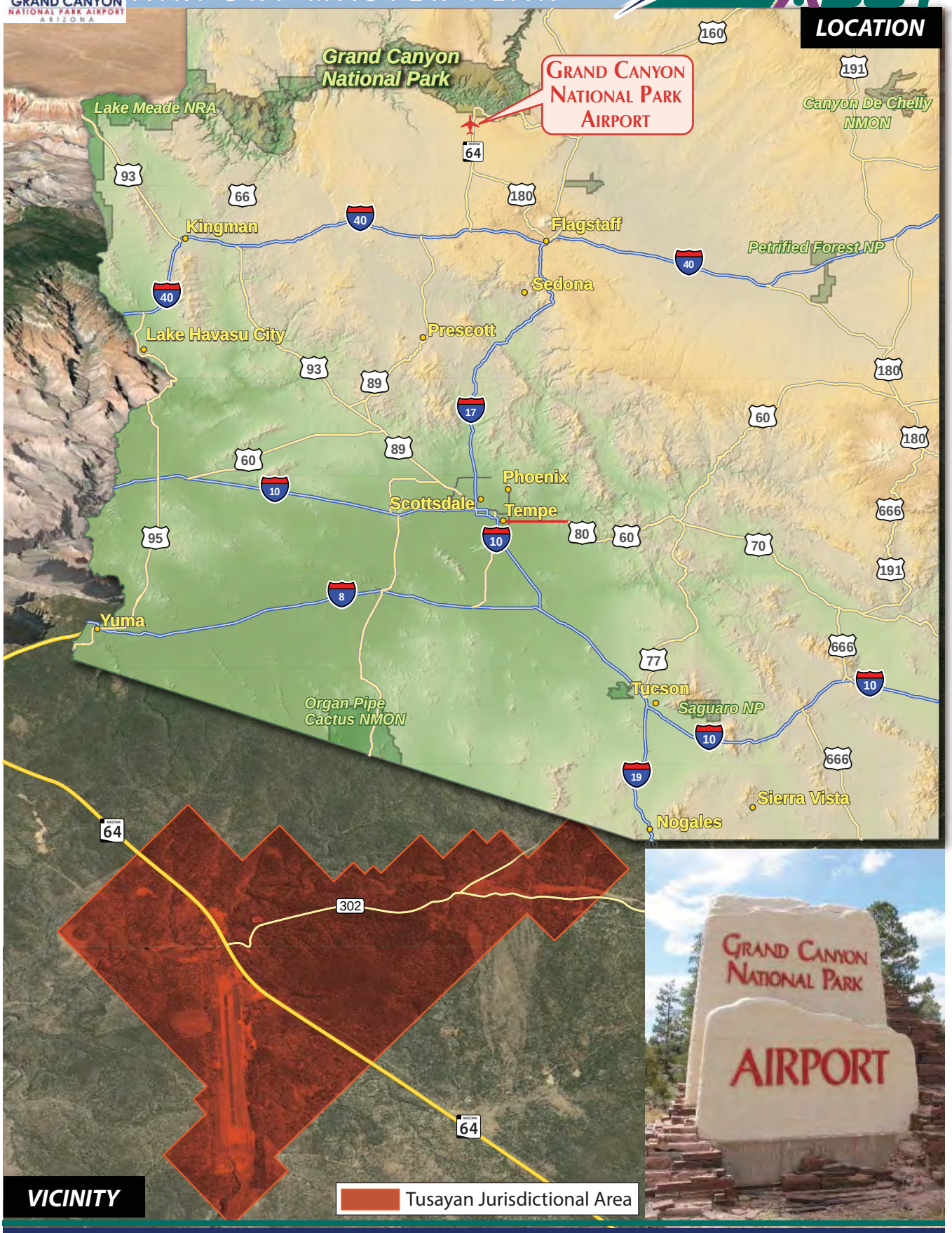
LOCALE

GCN Is located within the jurisdictional boundaries of the Town of Tusayan in Coconino County, Arizona. The Town of Tusayan, incorporated in 2010, has an estimated population of 589[1] and is bound on the north by the Grand Canyon National Park (GCNP) and the Kaibab National Forest to the east, south and west. Tusayan has a land area of approximately 16.8 square miles and is divided by State Highway 64, which extends south to the unincorporated community of Valle and on to U.S. Interstate Highway 40 near Williams. **Exhibit 1A** depicts the regional setting. The Town of Tusayan, due to its location, serves as the primary entrance to the south rim of the GCNP, which is over 1,900 square miles in land area. The GCNP is visited by approximately five million people each year, 90 percent of which visit the south rim.

Grand Canyon National Park
Source: The Canyon.com retrieved from http://www.thecanyon.com/grand-canyon-national-park on January 27, 2016.

GCN is owned by the State of Arizona and operated by ADOT. GCN is classified in the Federal Aviation Administration's (FAA's) National Plan of Integrated Airport Systems (NPIAS) as a non-hub primary commercial service airport. Non-hub airports are defined as those commercial service airports enplaning less than 0.05 percent of the total U.S. enplanements but have more than 10,000 annual enplanements. In 2015, GCN's enplanements (commercial service boardings) totaled 329,128. Flagstaff Pulliam Airport (FLG), located 54 miles to the southeast, is the next closest commercial service airport. For comparison, FLG reported 68,123 enplanements in 2014. The next closest general aviation airport is Valle Airport located 18 miles to the south.

[1] Source: Arizona State Demographer Office.


LOCATION
Grand Canyon National Park
Grand Canyon National Park Airport
Lake Meade NRA
Canyon De Chelly NMON
Kingman
Flagstaff
Petrified Forest NP
Sedona
Lake Havasu City
Prescott
Phoenix
Scottsdale
Tempe
Yuma
Organ Pipe Cactus NMON
Tucson
Saguaro NP
Sierra Vista
Nogales
160
191
64
93
66
180
40
17
89
60
10
95
80
70
666
8
77
19
302
VICINITY
Tusayan Jurisdictional Area
Grand Canyon National Park
AIRPORT

CLIMATE

Knowledge of climate and typical regional weather conditions greatly enhances a pilot's flying capabilities. Likewise, the ability to prepare for these conditions enhances the use of an airport. High surface temperatures and high humidity increase runway length requirements. Runway orientation is dependent on predominant wind patterns for the area. Cloud cover percentages and frequency of other climatic conditions also determine the need for navigational aids and lighting.

According to the Town of Tusayan General Plan, the region's climate can be characterized as semi-arid. **Table 1A** summarizes climatic data sourced from the National Oceanic and Atmospheric Administration (NOAA) Grand Canyon National Park Airport and the Grand Canyon National Park #2[2] weather stations. Data presented represents 94,210 total weather observations for the period beginning January 1, 2005 through December 31, 2014. This data shows an average annual high temperature of 63 degrees and an average annual low temperature of 27 degrees. July is the hottest month of the year with average highs reaching the mid-80s, and January is the coolest month of the year with average lows down to 12 degrees. Precipitation is most plentiful during the month of August, which averages 2.39 inches of precipitation, almost 15 percent of the annual accumulation. The region experiences snowfall amounts totaling almost 50 inches during the winter months each year. Wind patterns for the Airport indicate winds are typically out of the southwest. Wind speeds reach their peak in the springtime, with April averaging the fastest wind speeds at 6.9 knots.

TABLE 1A
Monthly Climate Summary
Grand Canyon National, Arizona

	Temperature Averages		Precipitation			Wind Speed Average Knots
Month	Maximum (F)	Minimum (F)	Mean (inches)	Avg. Snowfall (inches)	Avg. Precipitation Days[1]	
January	42.90°	12.40°	1.54	12.70	11.8	5.5
February	46.00°	16.40°	1.44	9.90	11.1	5.7
March	53.00°	20.60°	1.73	8.50	12.6	6.1
April	60.50°	24.10°	1.02	4.20	7.7	6.9
May	70.40°	30.40°	0.50	0.30	4.9	6.5
June	81.60°	36.30°	0.32	0.00	3.4	6.2
July	84.20°	46.80°	1.87	0.00	12.8	4.2
August	81.80°	47.10°	2.39	0.00	17.3	3.9
September	75.90°	38.80°	1.44	0.00	9.9	4.4
October	64.50°	28.40°	1.33	0.70	8.6	4.7
November	52.40°	19.30°	1.09	4.70	8.5	4.9
December	43.80°	12.80°	1.27	8.60	10.6	5.3
Annual	63.08°	27.78°	15.94	49.60	9.93	5.4

[1]With greater than or equal to 0.1 inch of precipitation.
Source: National Oceanic and Atmospheric Administration (NOAA); Temperature data - Station ID: GHCND USC00023596 Grand Canyon National Park Airport. Precipitation data - Station ID: GHCND: USC00023596 – Grand Canyon National Park #2.

[2] Grand Canyon National Park #2 Station is located approximately seven miles north of the GCN.

Visual meteorological conditions (VMC) at GCN[3] occur 87.4 percent of the time. When under VMC conditions, pilots are able to operate using visual flight rules (VFR) and are responsible for maintaining proper separation from objects and other aircraft. Instrument meteorological conditions (IMC) accounts for all weather conditions less than VMC conditions that still allows for aircraft to safely operate under instrument flight rules (IFR). Under IFR, pilots rely on instruments in the aircraft to accomplish navigation. Considering GCN's existing published instrument approach procedures that allow for ¾-miles visibility minimums and 400-foot cloud ceilings, IFR conditions at GCN[4] occur 8.2 percent of the time. When weather conditions are lower than the approach minimums available at GCN[5], the Airport is essentially closed to traffic. These weather conditions are present only approximately 4.4 percent of the time.

AIRPORT HISTORY

The Grand Canyon National Park Airport, constructed during 1963-1965, was developed on property acquired from the U.S. Department of Agriculture, Forest Service. Phased development, initiated in 1967, of GCN included the construction of a 5,800 feet by 150 feet paved runway which included the construction of a 75-foot wide full-parallel paved taxiway, as well as the construction and dedication of the airport terminal building in October of that year. In addition, a paved aircraft parking apron, as well as a paved access road, were constructed during the same period. In 1968, the airport apron was expanded to 28,600 square yards and the airport passenger terminal building was constructed. Four years later, in 1972, the runway and parallel taxiway were expanded to their current length of 8,999 feet.

During 1973, an aircraft rescue and firefighting (ARFF) station was constructed immediately adjacent to the airport parking apron, while in 1974, and again in 1977, the airport parking apron was expanded. During the period from 1979 to 1982, the Airport was equipped with an instrument landing system (ILS) to include a medium intensity approach lighting system with runway alignment indicator lights (MALSR) allowing precision instrument approach capabilities at the Airport. In 1986-87, the aircraft parking apron was once again expanded to a size of 95,600 square yards. Soon after, in 1989-90, an update to the Airport Master Plan was performed and finalized during January of 1991.

Between 1991 and the completion of the previous Master Plan (2005), several projects were undertaken to acquire new ARFF equipment, upgrade airfield lighting systems and directional signage, terminal building upgrades, and pavement rehabilitation. Between 1995 and 1999, construction of heliport facilities for the commercial aerial tour operators took place to relocate these operators from off-airport sites.

Since the completion of the previous Master Plan in 2005, the Airport has undertaken projects to construct a new ARFF station (completed in 2010) and to improve the runway safety area (RSA) (completed in 2012), which resulted in the elimination of a water catchment system between the runway and taxiway.

[3] VMC conditions – greater than 3.0 statute miles visibility and cloud ceilings of greater than 1,000 feet above ground level.
[4] GCN IFR conditions – less than 3.0 miles visibility but greater than or equal to ¾-miles visibility and greater than or equal to 400-foot cloud ceilings.
[5] Lower than GCN minimums conditions - less than ¾-miles visibility and/or less than 400-foot ceilings.

HISTORIC AIRLINE SERVICE

GCN is not currently served by a scheduled passenger service airline; however, several airlines have served GCN at different times in its past. Operators that have previously provided service include[6]: Air West; Hughes Airwest; Republic Airlines; and TriStar Airlines. Hughes Airwest operated Douglas DC-9-10 and McDonnell Douglas DC-9-30 jetliners to Las Vegas (LAS) and Phoenix (PHX) with continuing one stop, direct service to Los Angeles (LAX) and Burbank (BUR), while TriStar flew British Aerospace Bae 146 jets to Las Vegas (LAS). At one point, Hughes Airwest also operated Fairchild F-27 turboprop aircraft to LAS and PHX with continuing, no change of plane service to Salt Lake City (SLC). Hughes Airwest was then merged into Republic Airlines, which continued to operate DC-9 jet flights into GCN. During the summer of 1982, Republic was operating two daily DC-9 flights nonstop to LAS as well as daily nonstop DC-9 service to PHX and direct one stop service daily to BUR. By the mid-1980s, Republic had ceased all service into GCN.

Air West, the predecessor airline of Hughes Airwest, also operated Douglas DC-9 jets from GCN in addition to flying services with Fairchild F-27 turboprops. Bonanza Air Lines, which merged with Pacific Air Lines and West Coast Airlines to form Air West, flew from GCN prior to the Air West service and operated F-27 turboprops as well with direct service to PHX and SLC with a daily round trip routing of PHX – Prescott, AZ – GCN – Page, AZ – Cedar City, UT – SLC. Bonanza then expanded their F-27 propjet service with nonstop flights to LAS and PHX.

In addition, GCN was served in the past by America West Airlines, operating de Havilland Canada DHC-8 Dash 8 turboprop aircraft to LAS and PHX. Alpha Air, a commuter airline based in California that operated as TWA Express (TWE) flying Beechcraft 1900C turboprops via a code sharing agreement with Trans World Airlines (TWA), also provided service with nonstop flights to LAX or BUR with the latter service continuing on to LAX. Cochise Airlines, a commuter air carrier based in Arizona, served GCN as well with Cessna 402 propeller aircraft with flights to PHX, Tucson (TUS) and other destinations in Arizona. In 1999, Sunrise Airlines was flying daily nonstop service between PHX and GCN with Beechcraft 1900C turboprops.

A number of commuter air carriers also provided nonstop service between LAS and GCN over the years and include: Air Cortez; Air LA; Air Nevada; Air Resorts; Air Vegas; Arizona Pacific Airline; Eagle Canyon Airlines; Grand Airways; Las Vegas Airlines; Nevada Airlines; Omni Air Lines; Pacific National Airlines; Royal West Airways; Scenic Airlines; and Silver State Airlines. Commuter air carriers that also provided nonstop service between PHX and GCN over the years include: Air Nevada and Scenic Airlines.

FAA AIRPORT IMPROVEMENT PROGRAM (AIP) PROJECTS

To assist in funding capital improvements, the FAA has provided funding assistance to the Airport through the Airport Improvement Program (AIP). The AIP is funded through the Aviation Trust Fund, which was established in 1970 to provide funding for aviation capital investment programs (aviation development, facilities and equipment, and research and development). The Trust Fund also finances a

[6] Historical air carrier information from the Official Airline Guide Historic Flight Schedules: http://www.departed-flights.com/oagintro.html

portion of the operation of the FAA and is funded by user fees, taxes on airline tickets, aviation fuel, and various aircraft parts.

Table 1B summarizes FAA AIP grants for Fiscal Year (FY) 2002 through FY 2015. The FAA has granted over $32.4 million for improvements at GCN over the past 13 years.

TABLE 1B
FAA AIP Grant History FY2002-FY2015
Grand Canyon National Airport

Fiscal Year	Grant #	Development Description	AIP Grant Total
2002	18	Expand Apron, Rehabilitate Access Road, Conduct Airport Master Plan Study, Rehabilitate Apron and Runway, Construct ARFF Facility, Acquire ARFF Vehicle, Install Security Fencing and Security Enhancements, Acquire Snow Removal Equipment	$8,754,974
2005	19	Acquire Aircraft Rescue & Firefighting Vehicle, Acquire Snow Removal Equipment, Conduct Miscellaneous Study, Construct Aircraft Rescue & Firefighting Building, Security Enhancements	$4,180,000
2006	20	Acquire Aircraft Rescue & Firefighting Vehicle, Construct Apron, Improve Airport Drainage	$1,765,877
2008	21	Construct Aircraft Rescue & Firefighting Building	$6,142,756
2009	22	Construct Apron, Improve Runway Safety Area - 03/21	$4,000,000
2011	23	Improve Runway Safety Area – 03/21	$227,384
2012	24	Acquire Equipment	$209,919
2013	25	Wildlife Hazard Assessments	$90,000
2014	26	Update Airport Master Plan Study	$630,000
2015	27	Construct Taxiway, Install Apron Lighting, Rehabilitate Runway Lighting, Rehabilitate Taxiway Lighting	$6,468,000
Total			$32,468,910

Source: FAA Airport Improvement Program (AIP) Grant Histories, http://www.faa.gov/airports/aip/grant_histories/lookup/.
Note: All AIP funded projects included a locally funded match.

ADOT MPD Aeronautics Group has also provided assistance to GCN. **Table 1C** presents a summary of these projects and grant totals for FY 2003 through pending projects for FY 2015. Including the active and pending grants, ADOT has granted over $21 million for improvements to the GCN over the past 12 years.

TABLE 1C
ADOT Grant History FY2003-FY2015
Grand Canyon National Airport

Fiscal Year	Grant #	Development Description	ADOT Grant Total
2003	3F56	Runway Rehabilitation; Apron Seal Coat; Road Rehabilitation	$7,030,645
2003	3F57	Design and Construct ARFF/Administration/Maintenance Facility	$9,138,552
2003	3F58	Acquire ARFF Vehicle	$194,200
2003	3F59	Acquire Snow Truck/Plow	$142,806
2003	3F61	Security Access	$185,219
2008	8F42	Acquisition of FAR Part 139 required ARFF Truck	$19,501
2008	8F44	Acquire Snow Blower	$52,892
2009	9F40	Conduct Study of GCN Terminal Area	$276,729
2012	2S52	Water Catchment Basin Removal in Runway Safety Area	$181,186
2012	2G2R	Airport Water Well Study	$58,548
2012	2S2U	GCN Localizer Grading	$83,054
2012	2S64	Crack Seal & Rubberized Asphalt Emulsion Seal Coat	$233,455
2013	3G1B	Purchase Airfield Sweeper, Associated Safety Lightbar, and Air/Ground and Ground/Ground Radios	$20,333
2014	4G2I	Wildlife Hazard Assessment	$8,836
2014	4G3S	Update Master Plan Study	$315,000
2014	4G3T	Conduct Airline Market Study	$138
2014	4G3Y	Install New Airfield Lighting and Construct 20' Shoulders to Runway 3/21 Including Pavement Preservation on Taxiway P and the Aircraft Apron	$375,000
2015	5G1T	Conduct Airline Market Study	$15,300
2015	5S3I	Pavement Maintenance of Taxiway P and Connectors and Marking to Include Runway Centerline	$911,085
2016	6S1C*	Crack Seal/Rubberized Asphalt Emulsion Seal Coat for Taxiway P and the Aircraft Apron	$720,000
2016	6G1L*	Update Master Plan Study	$61,852
2016	6G1M*	Conduct Land Use Study, Minimum Standards Study, Rates and Charges Study, Sustainable Management Plan, and Collect Data for Airport Geographic Information System (AGIS)	$343,589
2016	6G2M*	Pave Taxiway P Shoulders; Rehab Runway 3/21 MIRLs; Rehab MITLs for Taxiway P and Connectors; Rehab Apron Lighting	$635,009
Total			$21,002,929

Source: ADOT MPD – Aeronautics Group, Grant Detail Reports
Note: All ADOT funded projects included a locally funded match.
*Project status is active or pending.

GOVERNING DOCUMENTS

Most airports have governing documents that outline general day-to-day operating procedures and minimum standards to be maintained by tenants and service providers. GCN is governed by Arizona Admin-

istrative Code, Title 17, *Transportation*, Chapter 2, Article 2 *Grand Canyon National Park Airport – Operation and Management*. Article 2 outlines airport fees and charges for services as well as the minimum standards to be maintained by fixed base operators (FBOs) and sets provisions for entering into ground leases. Prohibited activities and procedures for impounding aircraft or vehicles are also detailed.

14 CFR PART 139 CERTIFICATION

An airport must have an Airport Operating Certificate (AOC) if it is serving air carrier aircraft with more than nine seats or serving unscheduled air carrier aircraft with more than 30 passenger seats. 14 CFR Part 139 (Part 139) describes the requirements for obtaining and maintaining an AOC. This includes meeting various Federal Aviation Regulations (FARs) now codified under the CFR.

Airports are classified in the following categories based on the type of air carrier operations served:

- **Class I Airport** – an airport certificated to serve scheduled operations of large air carrier aircraft that can also serve unscheduled passenger operations of large air carrier aircraft and/or scheduled operations of small air carrier aircraft.

- **Class II Airport** – an airport certificated to serve scheduled operations of small air carrier aircraft and the unscheduled passenger operations of large air carrier aircraft. A Class II airport cannot serve scheduled large air carrier aircraft.

- **Class III Airport** – an airport certificated to serve scheduled operations of small air carrier aircraft. A Class III airport cannot serve scheduled or unscheduled large air carrier aircraft.

- **Class IV Airport** – an airport certificated to serve unscheduled passenger operations of large air carrier aircraft. A Class IV airport cannot serve scheduled air carrier aircraft regulated under CFR Part 121.

GCN is currently classified as a Class I CFR Part 139 commercial service airport. This designation supports the unscheduled aerial tour and charter operations conducting commercial passenger services at the Airport.

Part 139 regulations (which implemented provisions of the *Airport and Airway Development Act of 1970*, as amended on November 27, 1971) set standards for: the marking and lighting of areas used for operations; firefighting and rescue equipment and services; the handling and storing of hazardous materials; the identification of obstructions; and safety inspection and reporting procedures. It also required airport operators to have an FAA-approved Airport Certification Manual (ACM).

Airport Certification Manual (ACM)

The ACM is a required document for FAR Part 139 certificated airports that defines the procedures to be followed in the routine operation of the airport and for response to emergency situations. The ACM is a working document that is updated annually as necessary. It reflects the current condition and operation of the airport and establishes the responsibility, authority, and procedures as required. There are required sections for the ACM covering administrative detail and procedural detail. GCN's ACM was most recently updated in July 2013 and includes the following information:

- General Information
- Airport Information
- Maintenance and Inspection Program
- Hazardous Materials
- Aircraft Rescue and Firefighting
- Snow and Ice Control
- Airport Emergency Plan
- Wildlife Hazard Management
- Maintenance of Certification Manual

The ACM also outlines the line of succession for day-to-day operational responsibility. The GCN organizational chart, summarized in **Figure 1A**, includes seven staffing positions that, when fully occupied, includes sixteen employees. Currently, the Airport is in the process of filling several vacant positions.

FIGURE 1A
GCN Organizational Chart

Source: GCN Airport Certification Manual

Airport Emergency Plan (AEP)

An AEP provides guidance for a response to any emergency occurring at an airport and is included as an appendix to the ACM. GCN's AEP specifies response roles for all airport staff. In the event of an emergency, the Airport Manager is to take charge of the situation as the Site Coordinator and assess what assets and other agency resources made available should be used. The types of emergencies included in the plan include:

- Aircraft Incidents and Accidents
- Bomb Incidents
- Structural Fires
- Natural Disasters
- Hazardous Materials
- Sabotage, Hijacks, and Other Unlawful Incidents
- Power Failures
- Fuel Farm Fire
- Water Rescue

Snow and Ice Control Plan

GCN's Snow and Ice Control Plan, included as an appendix to the ACM, outlines Airport snow removal crew responsibilities and required vehicles/equipment in the event of or forecast of snow and/or icy weather conditions. The plan specifies that the runway pavement is the first to be cleared followed by the taxiways, ramp areas, and streets and parking lots.

AVIATION ACTIVITY

Analysis of historical activity levels aid in projecting future trends which will enhance the Airport's ability to plan for facility demands in a timely manner. The following information outlines basic operational activities at the Airport. A more detailed analysis of aviation activity will be provided and discussed in the next chapter on aviation forecasts.

ENPLANEMENTS

GCN provides local and regional access to the national and international aviation systems as well as aerial access to the GCNP. As such, GCN is vital to interstate commerce as well as a key component to local and regional economic infrastructure.

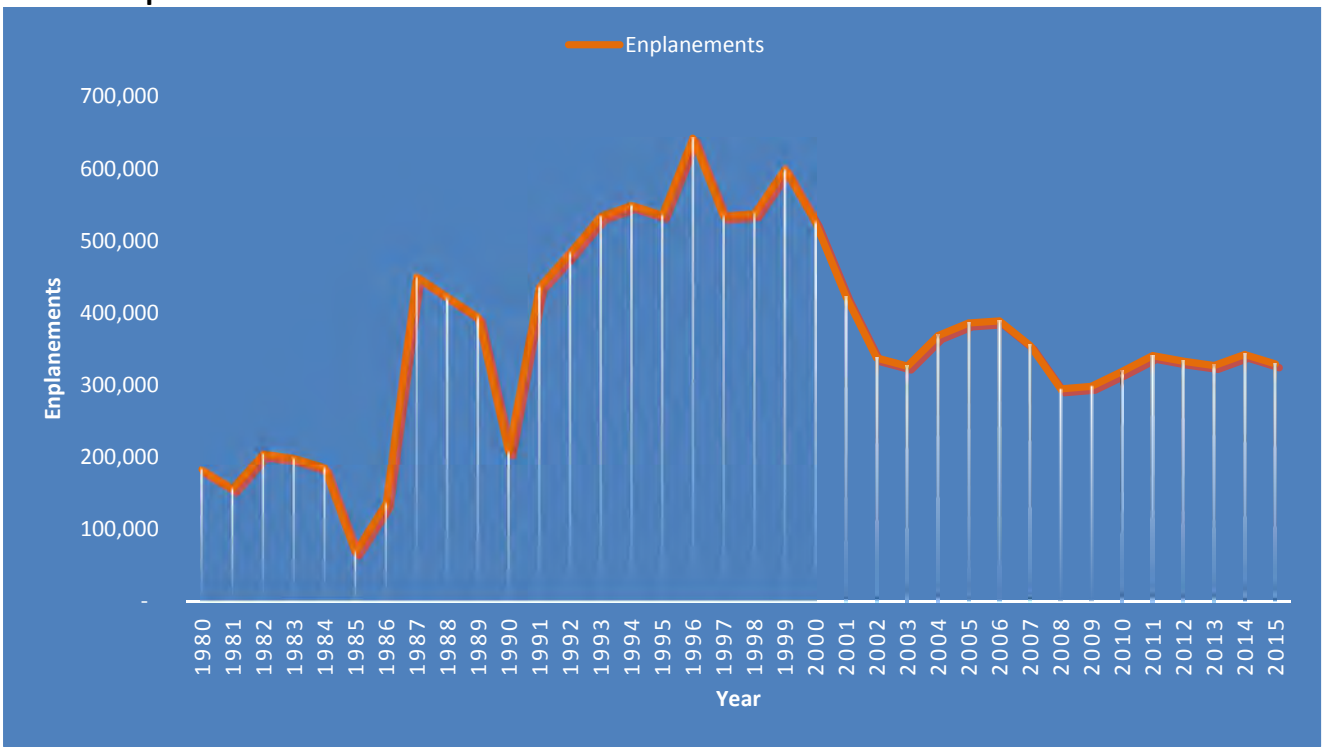
An enplanement includes any revenue passengers that board an aircraft for a fare at an airport. This statistic is important in that it is utilized by the FAA to determine the annual level of entitlement funding dedicated to an airport under the AIP. Airports with at least 10,000 annual enplanements are eligible for a minimum one million dollars in annual entitlement funds. The graph in **Figure 1B** depicts historical enplanements at GCN since 1980. Enplanements dropped significantly from its peak of over 642,200 in 1996 to 337,000 in 2002, a loss of almost 48 percent in just six years. A short growth period followed

from 2003 to 2006. The economic recession caused another decline in enplanements from 2006 through 2008. Since 2011, GCN has averaged 334,250 annual enplanements; however, enplanements for 2015 came in slightly under that average at 329,128. Among all commercial service airports in the country, GCN has ranked between 106th and 150th in enplanements between 2000 and 2014 (rankings for 2015 have not been released). In 2014, GCN ranked 143rd among 389 primary commercial service airports in enplanements and 10th among 251 primary non-hub commercial service airports.

Enplanements at GCN consist primarily of air tour and charter passengers. The air tour and charter operators that carried passengers at GCN during 2015 include:

- Grand Canyon Airlines
- Grand Canyon Helicopters
- Key Lime Air
- Maverick Airlines
- Maverick Helicopters
- Metro Jet, LLC
- Papillon Helicopters
- Southwest Safaris
- Sun Country
- Vision Air
- Westwind Aviation

FIGURE 1B
Historic Enplanements



Sources: FAA Passenger Boarding (Enplanement) Data for U.S. Airports; Grand Canyon National Park Airport Terminal Area Plan, 2009; ADOT Records.

Calendar year 2015 enplanements by each operator are detailed in **Table 1D**. According to this data, Papillon Helicopter accounted for the most enplanements in 2015 with 96,953 (29.5 percent), followed

by Grand Canyon Airlines with 90,414 (27.5 percent) and Grand Canyon Helicopter with 56,001 (17.0 percent). Maverick Airlines and Maverick Helicopters combined for 58,813 enplanements (17.9 percent). Together, these main air tour operators accounted for almost 92 percent of all enplanements at GCN in 2015.

TABLE 1D
Enplanements by Operator (2015)
Grand Canyon National Park Airport

OPERATOR	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	2015
Grand Canyon Airlines	5,050	6,219	6,803	9,046	10,742	10,209	7,476	10,155	10,144	3,839	5,839	4,892	**90,414**
Grand Canyon Helicopter	1,188	1,703	3,880	4,187	5,797	6,765	8,706	8,436	7,565	4,396	1,907	1,471	**56,001**
Key Lime Air	0	0	0	0	0	0	0	645	524	160	55	166	**1,550**
Maverick Airlines	692	656	876	1,404	1,201	1,360	1,604	1,786	1,966	1,598	859	835	**14,837**
Maverick Helicopters	972	373	3,220	3,831	4,243	4,740	6,402	6,520	5,615	3,437	3,437	1,186	**43,976**
Metro Jet, LLC	217	303	577	169	126	126	180	0	0	0	0	0	**1,698**
Papillon Helicopter	1,647	2,138	3,618	6,242	10,185	10,884	16,010	17,223	16,364	7,598	3,067	1,977	**96,953**
Sun Country	0	0	0	0	162	0	0	0	0	0	0	0	**162**
Vision Air	604	1,074	928	1,317	1,373	1,389	1,028	1,325	1,362	1,008	881	489	**12,778**
Westwind Aviation	90	110	754	1,037	1,585	1,241	762	1,026	2,206	1,377	316	251	**10,755**
TOTAL	**10,460**	**12,576**	**20,656**	**27,233**	**35,414**	**36,718**	**42,168**	**47,116**	**45,746**	**23,413**	**16,361**	**11,267**	**329,128**

Source: ADOT records.

BASED AIRCRAFT

Identifying the current number of based aircraft is important to the master plan analysis as this number helps determine existing demand for a number of different facilities, including aircraft storage hangar space, parking aprons, pilot and passenger services, and various other aircraft support facilities.

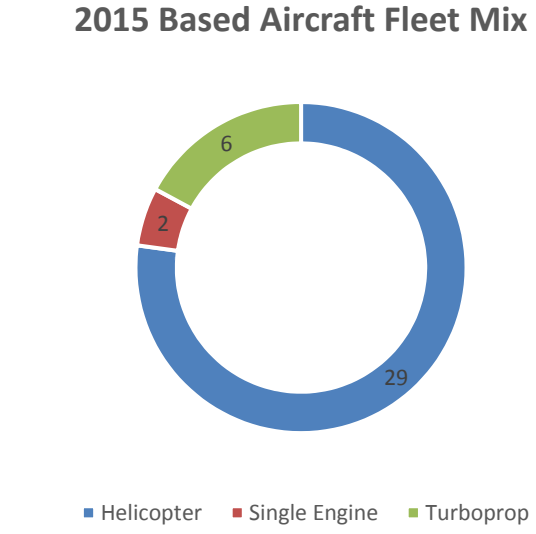
Historic data for based aircraft was retrieved from several sources including the *Grand Canyon National Park Airport Terminal Area Plan*, 2009; the FAA's *Terminal Area Forecast* (TAF); and from ADOT MPD Aeronautics Group Quarterly Based Aircraft reports. This historic based aircraft data, shown in **Figure 1C**, shows only small fluctuations in based aircraft between 1997 and 2008. A drop in based aircraft was seen after 2008, when economic conditions nationwide were hurt by the Great Recession. Since 2008, based aircraft levels have remained in the 30-40 range. In 2015, there were 37 reported based aircraft at GCN.

The vast majority of based aircraft at GCN are aerial tour and charter operator aircraft, which consists primarily of helicopters. **Figure 1D** summarizes ADOT's Based Aircraft report for GCN in 2015. The 2015 fleet mix consisted of 29 helicopters, six turboprops, and two single engine piston aircraft. The helicopters based at GCN consist of the Eurocopter EC 130s, Eurocopter AS350s, and Bell 206s. Turboprops include Cessna 208 Caravans and de Havilland DHC-6 Twin Otters. Single engine piston aircraft based at GCN include a Cessna 172 and a Cessna 206.

FIGURE 1C
Historic Based Aircraft

Sources: *Grand Canyon National Park Airport Terminal Area Plan*, 2009; FAA *Terminal Area Forecast*; ADOT MPD Aeronautics Group.

FIGURE 1D
Based Aircraft Fleet Mix



Source: ADOT Quarterly Based Aircraft Records

OPERATIONS

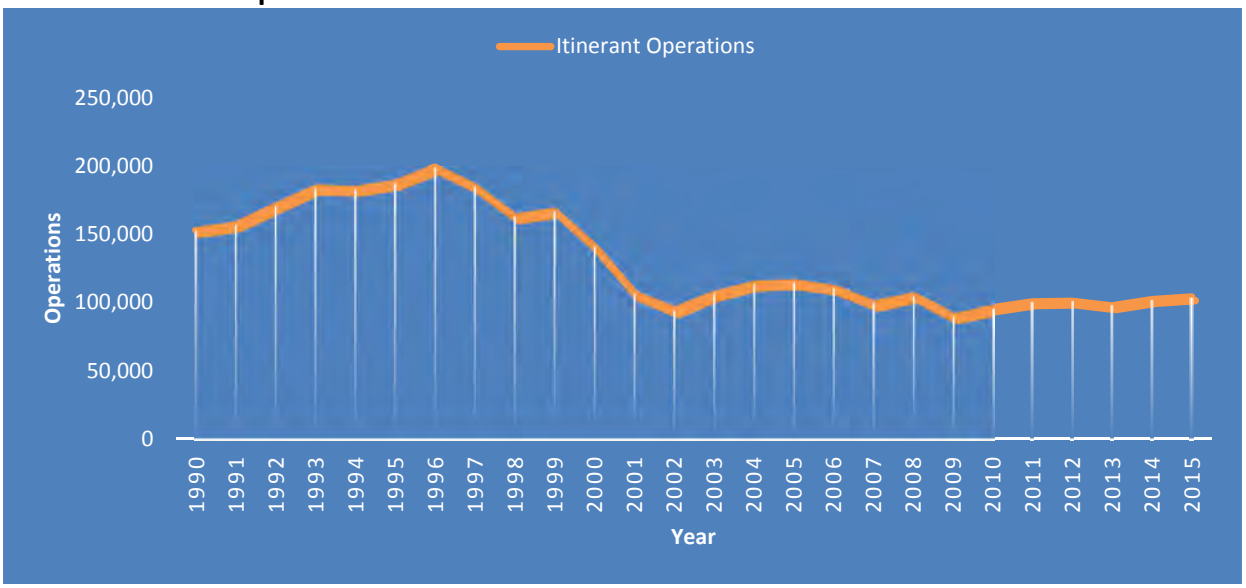
Records of airport operational activities are essential for determining required facilities (types and sizes), as well as eligibility for federal funding. Since the Airport is towered, a detailed account of aircraft operations (takeoffs and landings) is available dating back to 1990. **Table 1E** and **Figures 1E, 1F,** and **1G,** provide a summary of yearly operational statistics, including the breakdown of itinerant and local operations. According to the historical data, GCN reached a 25-year operational peak in 1996 with 201,690 operations. 1996 was also the peak year for air carrier operations (1,235) and air taxi operations (192,447). Between 1996 and 2002, operations declined over 51 percent as the Airport lost the majority of its air carrier operations and a significant amount of air taxi operations. From 2002 through 2015, operations have remained relatively consistent, averaging just over 104,000 each year. Operations for 2015 totaled 105,959, which is up over the previous year by 2.6 percent. Operations have increased in five of the previous six years.

TABLE 1E
Aircraft Operational History
Grand Canyon National Airport

Year	Itinerant Operations					Local Operations			Total Ops
	Air Carrier	Air Taxi	GA	Military	Subtotal	GA	Military	Subtotal	
1990	269	145,369	7,382	177	153,197	3,212	116	3,328	156,525
1991	58	149,606	7,543	165	157,372	3,368	80	3,448	160,820
1992	48	162,954	7,880	154	171,036	2,609	92	2,701	173,737
1993	277	176,765	7,293	121	184,456	2,938	50	2,988	187,444
1994	831	175,784	6,812	127	183,554	3,586	36	3,622	187,176
1995	1,144	180,076	6,519	202	187,941	2,854	66	2,920	190,861
1996	1,235	192,447	5,649	176	199,507	2,121	62	2,183	201,690
1997	442	178,577	6,013	178	185,210	1,308	70	1,378	186,588
1998	679	156,958	5,338	176	163,151	1,217	111	1,328	164,479
1999	851	160,725	5,778	191	167,545	2,343	100	2,443	169,988
2000	157	135,288	5,177	360	140,982	1,769	145	1,914	142,896
2001	62	101,439	4,810	234	106,545	1,494	174	1,668	108,213
2002	47	88,965	5,234	600	94,846	1,956	604	2,560	97,406
2003	24	100,763	5,042	464	106,293	2,082	398	2,480	108,773
2004	35	108,449	4,943	384	113,811	2,371	236	2,607	116,418
2005	50	110,230	4,245	440	114,965	1,439	332	1,771	116,736
2006	26	106,376	3,829	485	110,716	1,088	643	1,731	112,447
2007	20	95,164	3,701	555	99,440	859	631	1,490	100,930
2008	13	100,960	3,811	517	105,301	613	422	1,035	106,336
2009	59	86,276	3,588	501	90,424	776	262	1,038	91,462
2010	25	92,202	3,459	511	96,197	654	240	894	97,091
2011	127	96,702	3,197	570	100,596	662	450	1,112	101,708
2012	107	97,349	3,051	537	101,044	750	511	1,261	102,305
2013	329	94,133	2,752	493	97,707	706	311	1,017	98,724
2014	179	98,468	3,015	543	102,205	591	521	1,112	103,317
2015	37	100,853	2,731	604	104,225	1,181	553	1,734	105,959

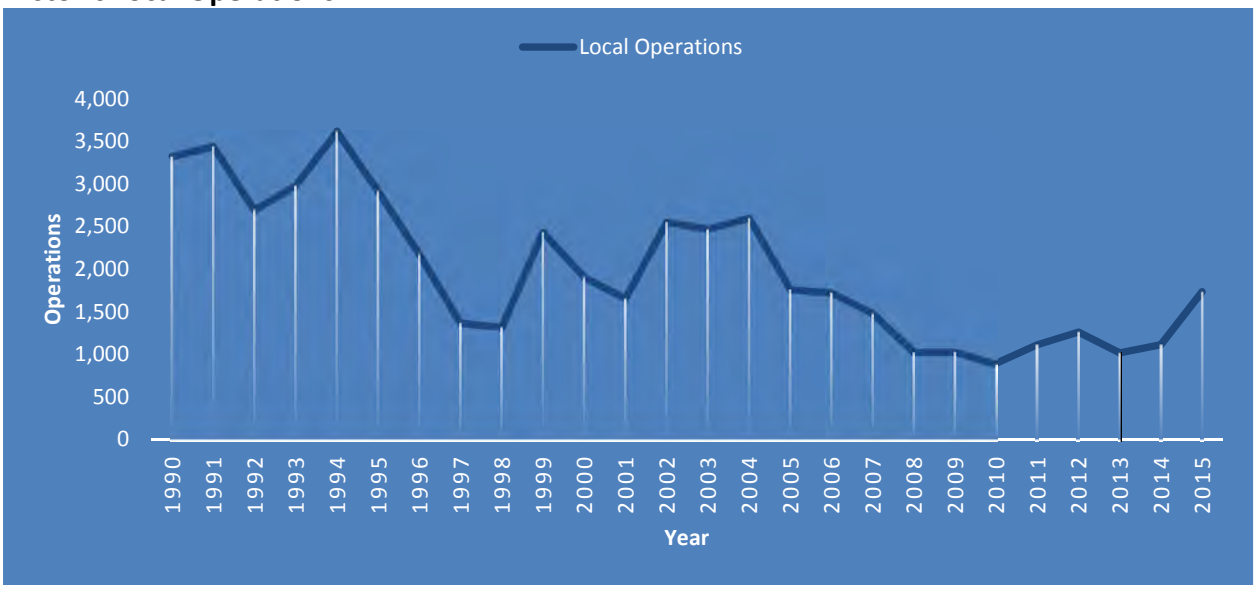
Source: Federal Aviation Administration – The Operations Network (OPSNET), https://aspm.faa.gov/opsnet/sys/Airport.asp.

FIGURE 1E
Historic Itinerant Operations



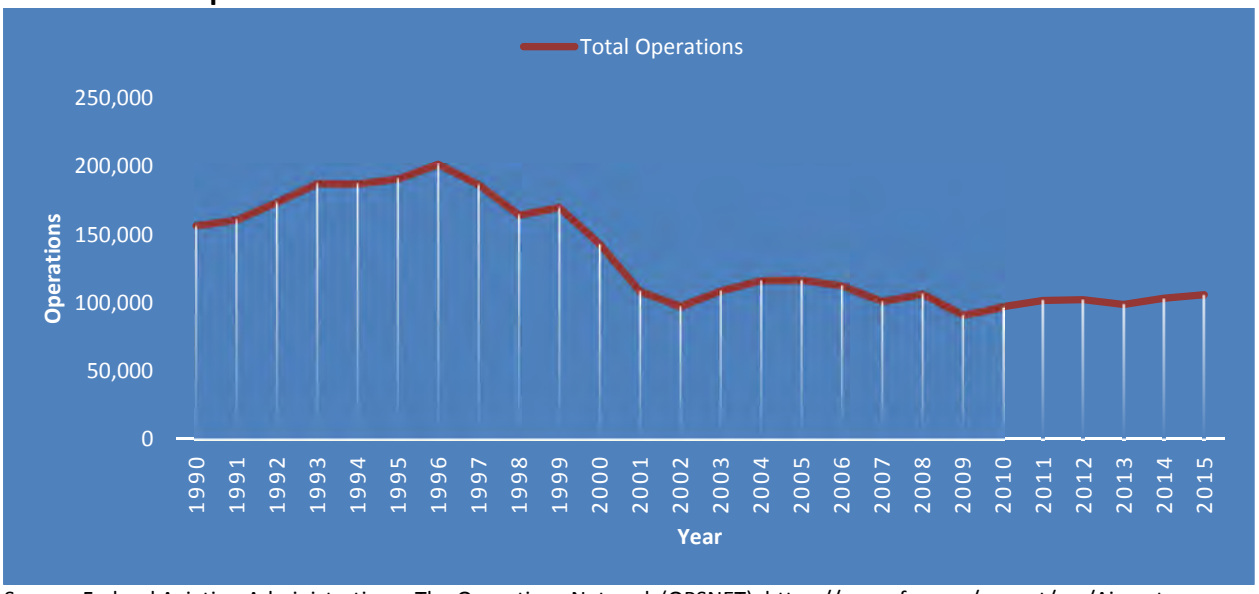
Source: Federal Aviation Administration – The Operations Network (OPSNET), https://aspm.faa.gov/opsnet/sys/Airport.asp.

FIGURE 1F
Historic Local Operations



Source: Federal Aviation Administration – The Operations Network (OPSNET), https://aspm.faa.gov/opsnet/sys/Airport.asp.

FIGURE 1G
Historic Total Operations

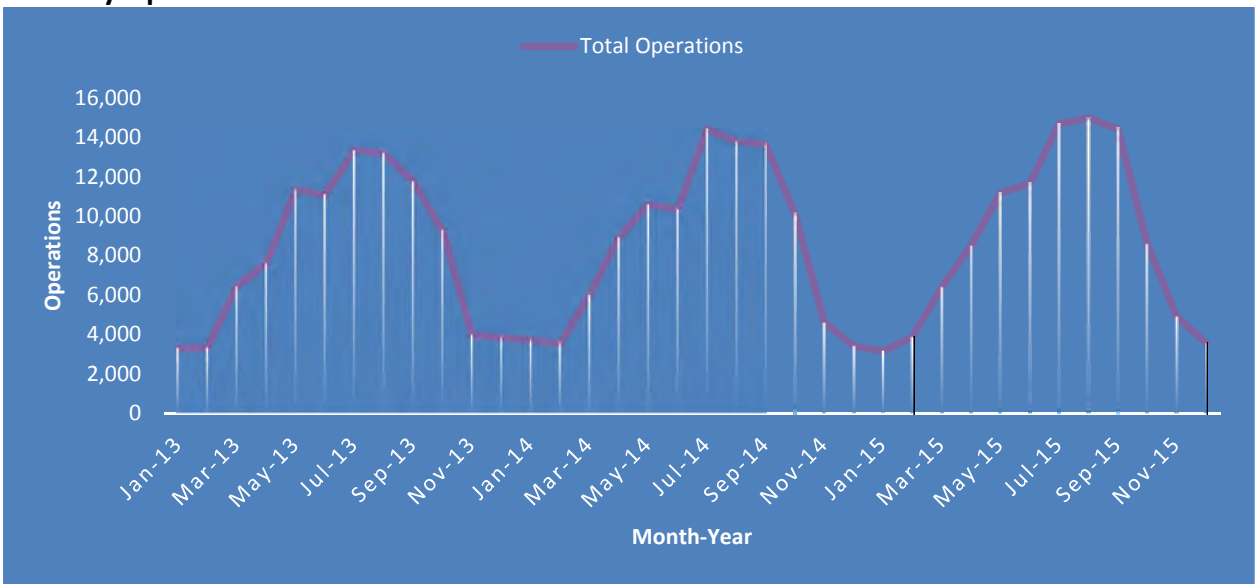


Source: Federal Aviation Administration – The Operations Network (OPSNET), https://aspm.faa.gov/opsnet/sys/Airport.asp.

As has been discussed, activity at GCN is dependent primarily upon the aerial tour season (spring and summer months). This is most evident when examining operational levels on a monthly basis. **Figure 1H** provides a graph of monthly total operations at GCN from January 2013 through December 2015. This graph shows how operations trend up in the early spring and through the summer, start to decline

around September, and reach yearly lows during the winter months when GCNP tourist visits are slowest.

FIGURE 1H
Monthly Operations 2013-2015



Source: Federal Aviation Administration – The Operations Network (OPSNET), https://aspm.faa.gov/opsnet/sys/Airport.asp.

AIRFIELD FACILITIES

Airport facilities can be functionally classified into two broad categories: airfield and landside. The airfield category includes those facilities directly associated with aircraft operations. The landside category includes those facilities necessary to provide a safe transition from surface to air transportation and support aircraft parking, servicing, storage, maintenance, and operational safety. This section describes the airfield facilities, including runways, taxiways, lighting, marking, navigational aids, and weather reporting. Airfield facilities are depicted and detailed on **Exhibit 1B**.

RUNWAYS

GCN has a single asphalt Runway 3-21 that measures 8,999 feet long and 150 feet wide with no threshold displacements. Runway gradient describes the average slope of a runway. Gradient is determined by dividing the runway's high and low points by its length. Runway 3-21 slopes down from its high point (Runway 21 end) toward its low point (Runway 3 end) by 75.9 feet, resulting in a 0.8 percent gradient.

Airfield from the southwest
Source: Coffman Associates

Runway load bearing strength for Runway 3-21 is shown on **Exhibit 1B**. Single wheel loading (SWL) refers to design aircraft landing gear with a single wheel on each main landing gear strut. Dual wheel loading (DWL) refers to design aircraft landing gear with two wheels on each main landing gear strut.

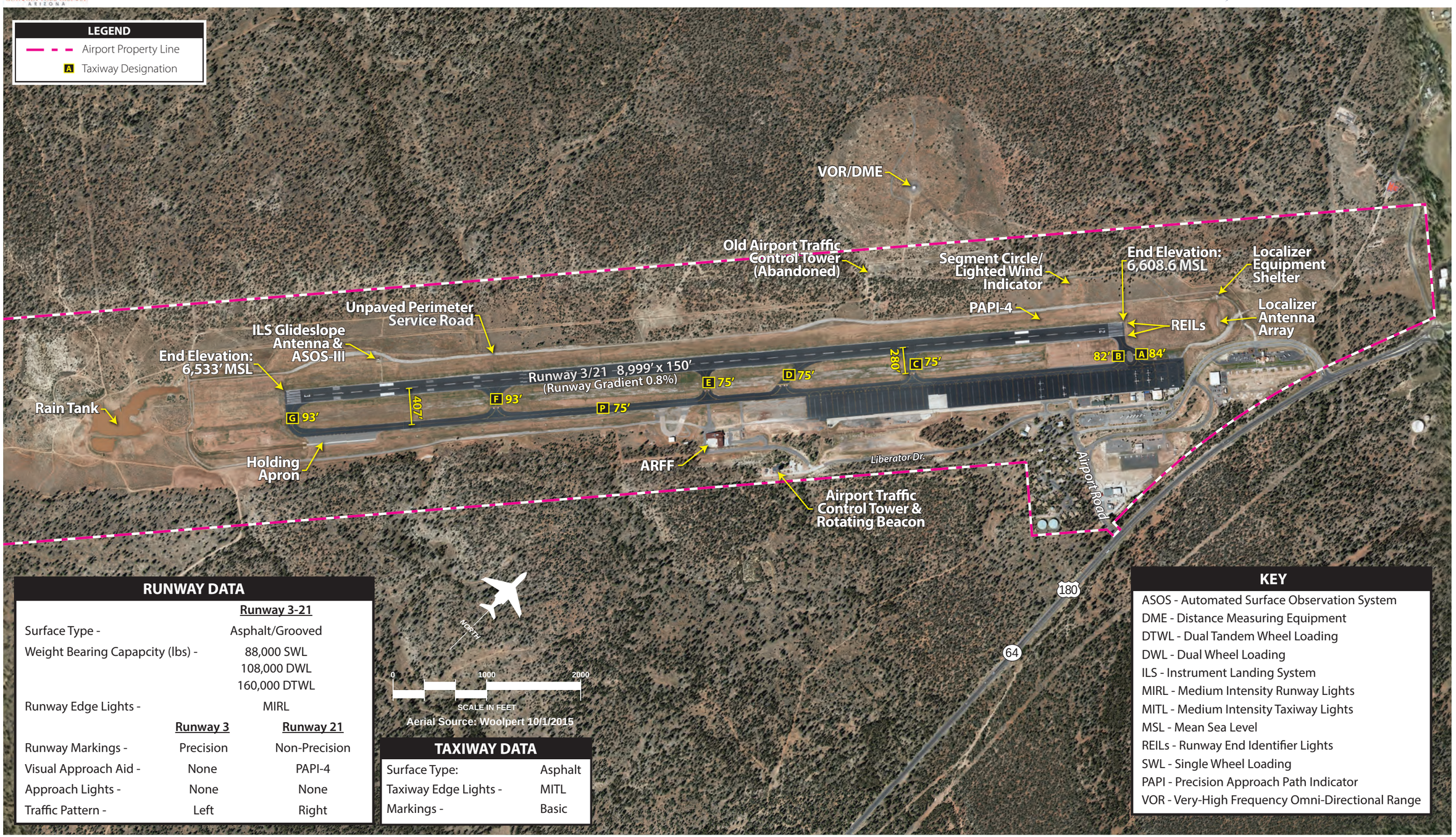
TAXIWAYS

The taxiway system at GCN provides access to the runway from the apron and landside facilities. The entirety of the taxiway system is constructed of asphalt. Runway 3-21 is served by a full-length parallel Taxiway P, which is 75 feet wide. Connecting taxiways extend between the parallel taxiway and the runway, allowing aircraft to enter and exit the runway environment. Connecting taxiways include the following:

- Taxiway A – 84 feet wide; connects Taxiway P and the main apron to the Runway 21 threshold. Taxiway A merges with Taxiway B at the Runway 21 threshold.
- Taxiway B – 82 feet wide; connects Taxiway P and the main apron to the Runway 21 threshold. Taxiway B merges with Taxiway A at the Runway 21 threshold.
- Taxiway C – 75 feet wide; connecting taxiway located approximately 2,180 feet from the Runway 21 threshold.
- Taxiway D – 75 feet wide; acute-angled connecting taxiway located approximately 3,175 feet from the Runway 21 threshold.
- Taxiway E – 75 feet wide; connecting taxiway located approximately 4,360 feet from the Runway 3 threshold.
- Taxiway F – 93 feet wide; connecting taxiway located approximately 2,080 feet from the Runway 3 threshold.
- Taxiway G – 93 feet wide; connects Taxiway P to the Runway 3 threshold.

AIRFIELD PAVEMENT CONDITION

As a part of the Arizona Department of Transportation (ADOT) Airport Pavement Preservation Program (APPP), Grand Canyon National Park Airport's airfield pavements are inspected on a 3-year cycle. Pavements are assessed using the pavement condition index (PCI) methodology for visually assessing pavement conditions. PCI provides a numerical indication of overall pavement condition. Types and amounts of deterioration are used to calculate the PCI value of the section. The PCI ranges from 0 to 100, with 100 representing a pavement in excellent condition.



RUNWAY DATA

	Runway 3-21
Surface Type -	Asphalt/Grooved
Weight Bearing Capapcity (lbs) -	88,000 SWL 108,000 DWL 160,000 DTWL
Runway Edge Lights -	MIRL

	Runway 3	Runway 21
Runway Markings -	Precision	Non-Precision
Visual Approach Aid -	None	PAPI-4
Approach Lights -	None	None
Traffic Pattern -	Left	Right

TAXIWAY DATA

Surface Type:	Asphalt
Taxiway Edge Lights -	MITL
Markings -	Basic

KEY

ASOS - Automated Surface Observation System
DME - Distance Measuring Equipment
DTWL - Dual Tandem Wheel Loading
DWL - Dual Wheel Loading
ILS - Instrument Landing System
MIRL - Medium Intensity Runway Lights
MITL - Medium Intensity Taxiway Lights
MSL - Mean Sea Level
REILs - Runway End Identifier Lights
SWL - Single Wheel Loading
PAPI - Precision Approach Path Indicator
VOR - Very-High Frequency Omni-Directional Range

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GCN's pavements were inspected on June 9, 2013. The PCI ratings, surface types, and surface areas reported for each pavement section on the Airport are depicted on **Exhibit 1C**. Runway 3-21 was found to have a PCI rating of 78, and Taxiway P and each of the connecting taxiways had a PCI rating of 74. The holding apron at the Runway 3 end of Taxiway P had the highest PCI rating at 93. The apron is made up of three separate sections, which were found to have PCI ratings ranging from 83 to 72. Two helicopter parking spaces located at the north end of the apron had a PCI rating of 32. It should be noted that GCN currently has active and pending grants for ongoing pavement maintenance for Taxiway P and the connecting taxiways, as well as for paving of the taxiway shoulders.

As was previously mentioned, the runway and taxiway system is constructed entirely of asphalt concrete (AC) or asphalt overlay over asphalt concrete (AAC). The apron is primarily AC or AAC; however, one section of the apron is constructed of Portland cement concrete (PCC). The PCC section is used as the aircraft de-icing pad. Total airfield pavement area at GCN totals 1,349,999 square feet (sf) for the runway; 1,046,547 sf for the taxiway system including the holding apron at the Runway 3 end; and 1,022,567 sf for the apron area.

AIRFIELD LIGHTING

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

Airport Identification Lighting: The location of the airport at night or during low-visibility weather is universally identified by a rotating beacon. A rotating beacon projects two beams of light, one white and one green, 180 degrees apart. The airport beacon is located atop the airport traffic control tower (ATCT).

Runway Pavement and Edge Lighting: Pavement edge lighting utilizes light fixtures placed near the edge of the pavement to define the lateral limits of the pavement. This lighting is essential for safe operations during night and/or times of low visibility in order to maintain safe and efficient access to and from the runway and aircraft parking areas. Runway 3-21 is equipped with a medium intensity runway lighting (MIRL) system. The MIRL lights are split between white and yellow within the Runway 3 caution zone (last 2,000 feet of the runway).

Rotating Beacon atop the ATCT
Source: Coffman Associates

Approach Lighting System (ALS): An ALS is a configuration of lights positioned symmetrically along the extended runway centerline to supplement navigational aids, such as an instrument landing system (ILS), to provide lower visibility minimums. Examples include the ALS with Flashing Lights (ALSF); ALS with

Sequenced Flashers I & II (ALSF-1/ALSF-2); Medium Intensity ALS with Runway Alignment (MALSR); and the Medium Intensity ALS (MALS). Airports equipped with an ILS are typically equipped with a MALSR, which extends approximately 2,400 feet from the runway threshold. Airports with land constraints often utilize the MALS, which is a smaller system that does not include the runway alignment lighting fixtures. Historically, GCN was equipped with a MALS that extended for 1,400 feet from the Runway 3 threshold; however, this system has since been decommissioned.

Visual Approach Lighting: Visual approach aids have been installed at the Airport to assist pilots in determining the correct descent path to the runway end during an approach to the Airport. A visual approach slope indicator (VASI-4) is available on the Runway 21 threshold. The system provides a definite white and red lighting projection along the desired descent path to the touchdown point using light units arranged in bars. The VASI at GCN consists of four light units, two light units in each bar. When on the proper glide path, the downwind bar appears white and the upwind bar appears red. If the approach is too low, both bars are seen as red. The Runway 21 VASI system provides a standard 3.00-degree glide path.

Visual Approach Slope Indicator (VASI) Boxes
Source: Coffman Associates

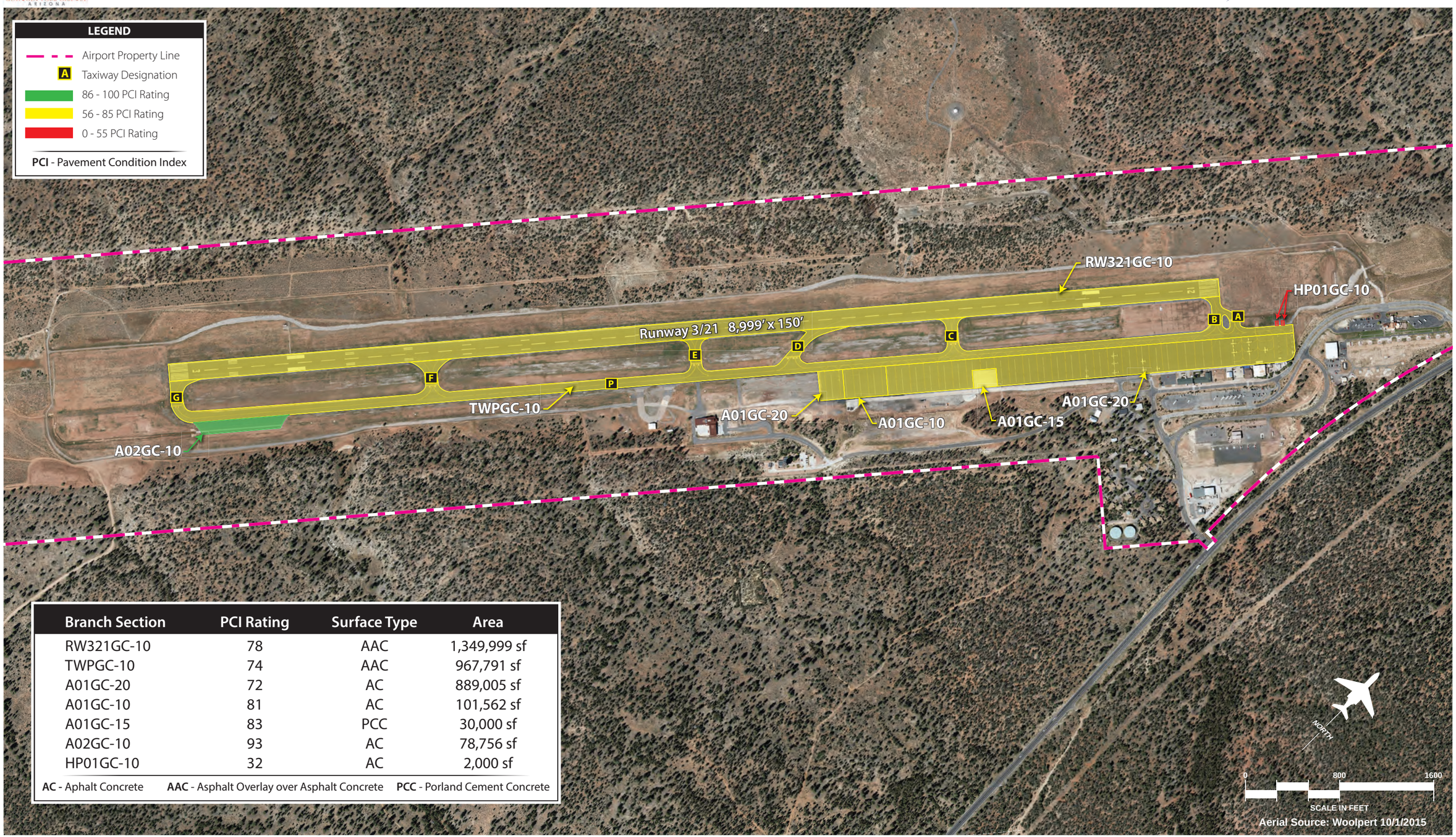
VASI systems are no longer installed by the FAA as the more modern precision approach path indicator (PAPI) is the preferred visual approach lighting system available today. According to Airport management, the VASI system has been replaced with a four-box PAPI system.

Runway End Identifier Lights (REILs): REILs provide a visual identification of the runway end for landing aircraft. The system consists of two flashing light assemblies located approximately 75 feet to either side of the runway landing threshold. This is a standard REIL alignment for runways equipped with VASI systems. These flashing lights can be seen day or night for a distance of up to 20 miles depending on visibility conditions. Runway ends serving jet aircraft without an ALS should be outfitted with REILs. The Runway 21 threshold is equipped with REILs.

Taxiway Lighting: Taxiway P and associated connector taxiways are equipped with blue medium intensity taxiway lights (MITL).

Medium Intensity Taxiway Light (MITL)
Source: Coffman Associates

Obstruction Lighting: Objects that obstruct the Federal Aviation Regulation (FAR) Part 77 imaginary surfaces are marked with red lights. Obstructions at GCN equipped with red obstruction lighting include:



Branch Section	PCI Rating	Surface Type	Area
RW321GC-10	78	AAC	1,349,999 sf
TWPGC-10	74	AAC	967,791 sf
A01GC-20	72	AC	889,005 sf
A01GC-10	81	AC	101,562 sf
A01GC-15	83	PCC	30,000 sf
A02GC-10	93	AC	78,756 sf
HP01GC-10	32	AC	2,000 sf

AC - Aphalt Concrete **AAC** - Asphalt Overlay over Asphalt Concrete **PCC** - Porland Cement Concrete

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- Airport beacon – maintained by ADOT
- Primary wind cone at segmented circle – maintained by ADOT
- Communications tower (old beacon in housing area) - maintained by ADOT
- Supplemental wind cone at the south end of Runway 21 – maintained by ADOT
- ARFF Operations Building – maintained by ADOT
- Localizer antenna – maintained by the FAA
- ATCT – maintained by the FAA
- VOR – maintained by the FAA
- Wind indicators – maintained by the FAA
- ASOS – maintained by the National Weather Service
- Water tower – maintained by the Town of Tusayan
- Radio Antenna – maintained by the Town of Tusayan
- Papillon Helicopters (drive-through awning) – maintained by Papillon
- National Park Service (NPS) hangar – maintained by the NPS

Pilot-Controlled Lighting: During nighttime hours when the ATCT is closed (June 1 – September 30 [8:00 p.m. to 6:00 a.m.]; October 1 – May 31 [7:00 p.m. to 7:00 a.m.]) pilots can utilize the pilot-controlled lighting system (PCL) to activate certain airfield lights from their aircraft through a series of clicks of their radio transmitter utilizing the CTAF frequency (119.0 MHz). The edge lights for Runway 3-21 and the Runway 3 MALS can be turned on with this system. Typically, the airfield lights will remain on for approximately 15 minutes.

AIRFIELD SIGNAGE

Airfield identification signs assist pilots in identifying runways, taxiway routes, and critical areas. Runway 3-21 is equipped with lighted signs located at each taxiway intersection. Taxiways are identified using lighted location and directional signs.

Airfield Directional Signage
Source: Coffman Associates

Distance Remaining Signage: Runway 3-21 is equipped with lighted distance remaining signage on the east side of the runway. These signs alert pilots to how much runway length remains in 1,000-foot increments.

AIRPORT MARKINGS

Pavement markings aid in the movement of aircraft along airport surfaces and identify closed or hazardous areas on the airport. The Airport provides and maintains parking systems in accordance with Part 139.311(a) and Advisory Circular 150/5340-1, *Standards for Airport Marking*.

Runway 3 is equipped with precision runway markings, which identifies the runway centerline, designation, threshold markings, aiming points, edge markings, and touchdown zones. Runway 21 is equipped with non-precision markings, which include the runway centerline, designation, threshold markings, edge markings, and aiming points.

All taxiways at the Airport are marked with yellow centerline and hold position markings. Centerline markings assist pilots in maintaining proper clearance from pavement edges and objects near the taxiway edges. Aircraft hold positions are marked at each runway/taxiway intersection. Yellow holding position markings for Runway 3-21 are located 280 feet from the runway centerline and are enhanced by lead-in runway designation markings.

NAVIGATIONAL AIDS

Navigational aids are electronic devices that transmit radio frequencies, which pilots of properly equipped aircraft translate into point-to-point guidance and position information. The types of electronic navigational aids available for aircraft flying to or from GCN include the very-high frequency omnidirectional range (VOR) and global positioning system (GPS).

The VOR provides azimuth readings to pilots of properly equipped aircraft by transmitting a radio signal at every degree to provide 360 individual navigational courses. Frequently, distance measuring equipment (DME) is combined with a VOR facility to provide distance as well as direction information to the pilot. The Grand Canyon VOR/DME, located at the Airport, serves the regional area.

GPS was initially developed by the United States Department of Defense for military navigation around the world. However, GPS is now used extensively for a wide variety of civilian uses, including civil aircraft navigation.

GPS uses satellites placed in orbit around the globe to transmit electronic signals, which pilots of properly equipped aircraft use to determine altitude, speed, and navigational information. This provides more freedom in flight planning and allows for more direct routing to the final destination. GPS provides for enroute navigation and non-precision straight-in instrument approaches to GCN.

INSTRUMENT LANDING SYSTEM (ILS) EQUIPMENT

Airports with ILS approaches are equipped with both a glideslope antenna and localizer antenna array. The glideslope antenna provides vertical guidance to landing aircraft and can be located on either side

of the runway; however, it is best to locate the glideslope antenna on the side of the runway with the least possibility of signal reflections from buildings, power lines, vehicles, aircraft, etc. The localizer antenna array is used to establish and maintain an approaching aircraft's position relative to the runway centerline until visual contact confirms the runway alignment and location. Typically, the localizer antenna array is sited on the extended runway centerline between 1,000 feet and 2,000 feet from the end of the runway.

Runway 3 at GCN is equipped with an ILS. The glideslope antenna is located on the west side of Runway 3 where potential signal obstructions are limited. The localizer antenna array is located approximately 1,000 feet beyond the Runway 21 end.

Instrument Landing System (ILS) Localizer Antenna Array
Source: Coffman Associates

Localizer Equipment Shelter
Source: Coffman Associates

Instrument Landing System (ILS) Glideslope Antenna and AWOS-III Equipment
Source: Coffman Associates

WEATHER AND COMMUNICATION

GCN is served by an automated surface observing system (ASOS). The ASOS provides automated aviation weather observations 24 hours per day. The system updates weather observations every minute, continuously reporting significant weather changes as they occur. The ASOS system reports cloud ceiling, visibility, temperature, dew point, wind direction, wind speed, altimeter setting (barometric pressure), and density altitude (airfield elevation corrected for temperature). The ASOS equipment is located on the west side of the airfield co-located with the ILS glideslope antenna equipment. Weather information can be obtained from the ASOS by utilizing the Automated Terminal Information Service (ATIS) radio frequency (124.3 MHz) or by calling 928-638-0672. ATIS broadcasts are updated hourly and provide arriving and departing pilots with the current surface weather conditions, communication frequencies, and other important Airport-specific information. The ASOS equipment was commissioned in May 1998 and installed by the National Weather System.

GCN is equipped with a lighted wind cone and segmented circle located approximately 650 feet immediately west of the Runway 21 threshold. The wind cone indicates wind direction and speed to pilots and the segmented circle indicates aircraft traffic pattern information. A supplemental lighted wind cone is located near the approach end of Runway 3.

LANDSIDE FACILITIES

Landside facilities including the terminal building, aerial tour operator facilities, hangars, apron areas, access roads and parking lots are detailed on **Exhibit 1D**.

TERMINAL BUILDING

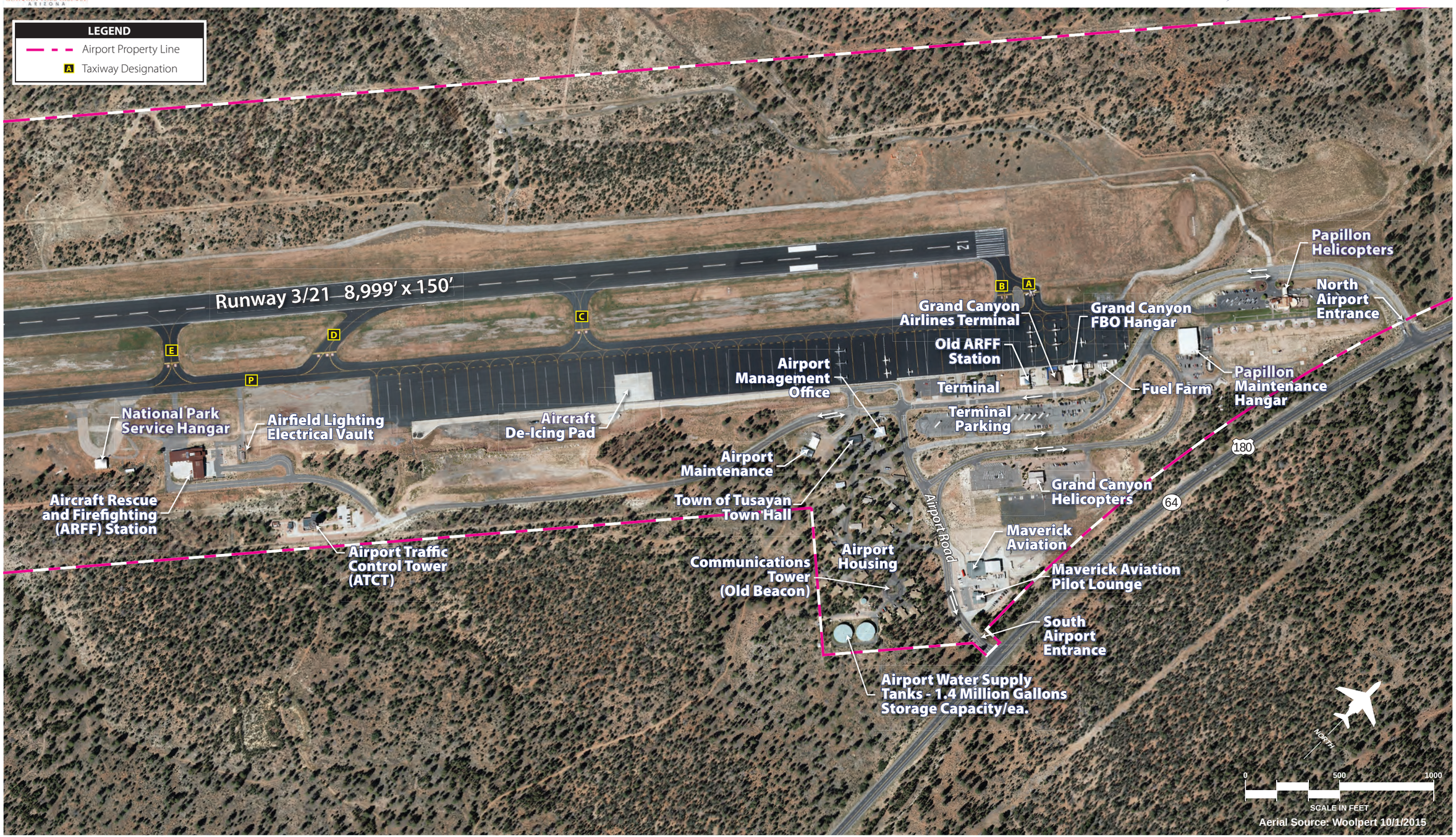
The airline terminal building at GCN was constructed in 1968 and expanded to its current footprint in 1972. The terminal building encompasses approximately 8,500 square feet (sf). The building is approximately 220 feet long and 38 feet deep. There are five gates distributed along this linear terminal. Gate Two is in the north wing, Gates Three and Four operate out of the central foyer, and Gates Five and Six are in the south wing. The airline terminal is currently utilized by charter and aerial tour operators including Westwind Air Service and Vision Air. None of the current operators provide scheduled airline operations. Paragon Skydive began operations at GCN in April 2016 and currently leases space within the terminal building.

TABLE 1F
Existing Passenger Terminal
Grand Canyon National Park Airport

	Area (s.f.)
Leasable Tenant Areas	2,823
Lobby & Waiting Area	990
Baggage Claim Area	972
Open Corridor Space	2,026
Public Restrooms	668
Management/Admin. Area	594
Mechanical/Equipment Area	413
Total Building Area	**8,486**

Source: *Grand Canyon National Park Airport Terminal Area Plan,* December 2009.

Table 1F summarizes available terminal space.


LEGEND
Airport Property Line
A Taxiway Designation
Runway 3/21 8,999' x 150'
21
B
A
C
D
E
P
Grand Canyon Airlines Terminal
Grand Canyon FBO Hangar
Old ARFF Station
Papillon Helicopters
North Airport Entrance
Airport Management Office
Terminal
Fuel Farm
Papillon Maintenance Hangar
Terminal Parking
National Park Service Hangar
Airfield Lighting Electrical Vault
Aircraft De-Icing Pad
Airport Maintenance
180
Grand Canyon Helicopters
64
Aircraft Rescue and Firefighting (ARFF) Station
Town of Tusayan Town Hall
Airport Road
Maverick Aviation
Airport Traffic Control Tower (ATCT)
Communications Tower (Old Beacon)
Airport Housing
Maverick Aviation Pilot Lounge
South Airport Entrance
Airport Water Supply Tanks - 1.4 Million Gallons Storage Capacity/ea.
North
0
500
1000
SCALE IN FEET
Aerial Source: Woolpert 10/1/2015

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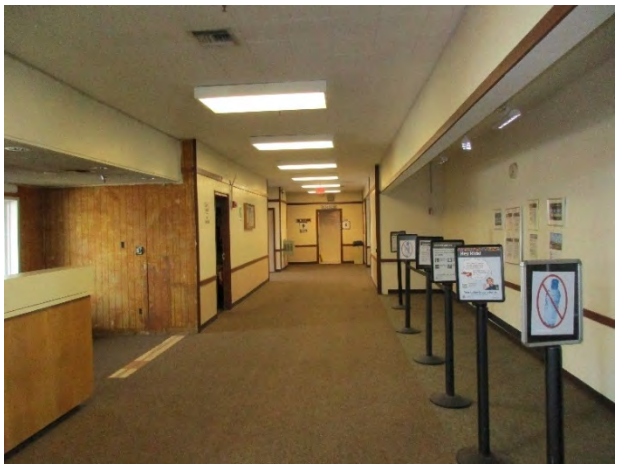
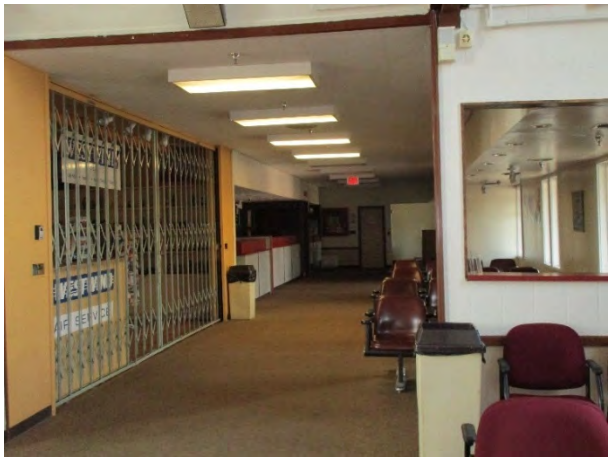
Airline Terminal Building
Source: Coffman Associates

The north wing of the terminal includes ticket counters as well as a waiting area with 49 seats. Space in the north wing next to the central foyer has previously been utilized for concessionaires, but is currently unoccupied. The central foyer provides a large waiting area with vaulted ceiling and a wood-burning fireplace located in the center. There are 51 seats in the central foyer, as well as vending machines and advertising along the walls. Additional ticket counter space is located in the south wing along with restrooms next to Gates Five and Six. The gate area includes additional ticket counter space as well as seating for 32.

Airline Terminal – Lobby and Gates 3 & 4
Source: Coffman Associates



Airline Terminal – South Wing
Source: Coffman Associates



Airline Terminal – North Wing
Source: Coffman Associates

A utility building at the north end of the terminal houses the main electrical vault, generator, water treatment, and water pump. A vehicle garage is located at the south end of the terminal along with an adjacent vehicle parking lot with 19 vehicle parking spaces.

A layout of the terminal building is depicted on **Exhibit 1E**.

GENERAL AVIATION FACILITIES

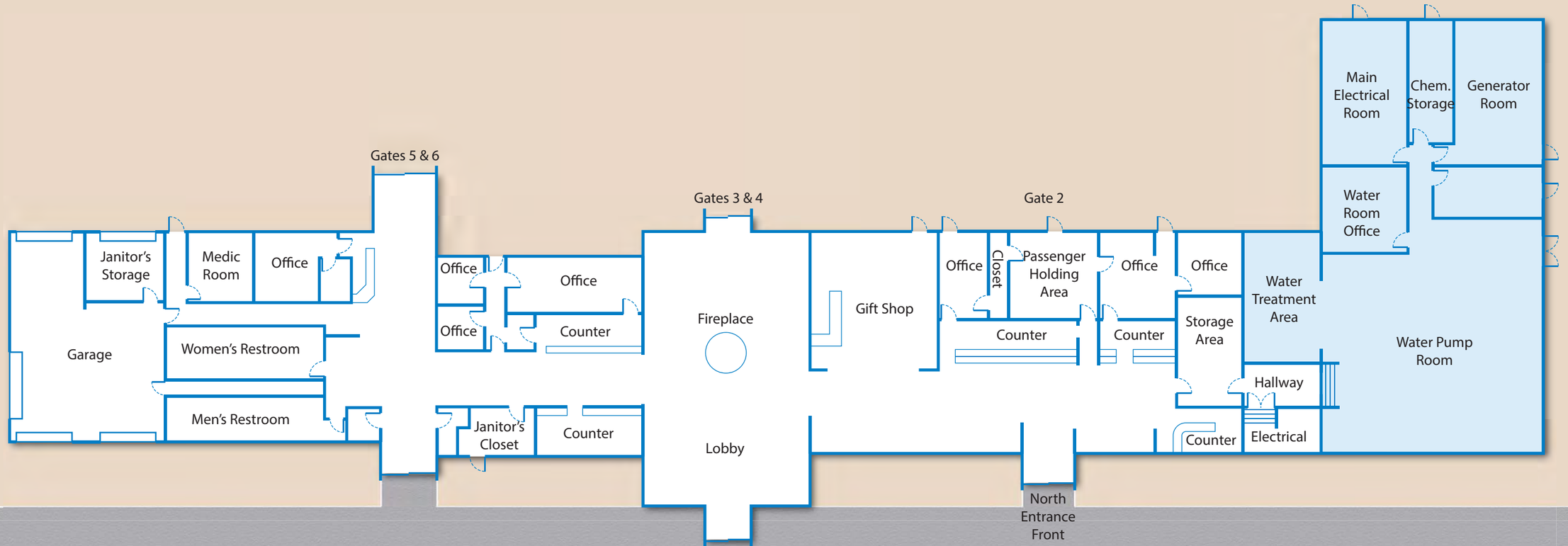
Grand Canyon Airlines (GCA) serves as the Airport's only fixed base operator (FBO). GCA is located at the north end of the ramp on the east side of the general aviation apron area. Services provided by GCA include the following:

- Aerial sightseeing tours
- Aircraft charter flights
- Aircraft tie-downs
- Fueling and line services
- Aircraft service/repair
- Airframe maintenance
- Ground transportation

GCA facilities front the general aviation ramp and include a 5,473 sf GCA terminal building that houses the company's administrative offices, ticket counter, waiting area, and concessions for aerial tour operations. GCA's fixed-wing aerial sightseeing and charter fleet includes DHC-6-300 Twin Otters, Cessna Citation Caravans, and a Cessna 182. GCA employs approximately 25 staff currently.

Grand Canyon Airlines Terminal
Source: Coffman Associates

Apron



Arrival/Departure Curb

LEGEND

Non-Terminal Facilities

0 20

SCALE IN FEET

NORTH

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Immediately to the north of the GCA terminal building is a 10,000 sf hangar that houses GCA's FBO and maintenance operations.

Grand Canyon FBO Hangar
Source: Coffman Associates

GCA's fuel farm is located to the north of the FBO hangar and includes two 20,000 gallon tanks, one each for Avgas (100LL) and Jet A fuel, plus a 6,000-gallon tank for diesel fuel and a 2,000-gallon tank for unleaded mogas. Fuel is available daily from 7:00 a.m. to 7:00 p.m. with on-call service available during off-hours.

Grand Canyon Airlines Fuel Farm
Source: Coffman Associates

HELICOPTER OPERATOR FACILITIES

Three helicopter tour operators have facilities east of the terminal and airport access road. Each operator has its own touchdown and lift-off (TLOF) area as well as helicopter parking and private terminal facilities, which were constructed between 1995 and 1999. The tour operators include: Papillon Helicopters; Grand Canyon Helicopters; and Maverick Helicopters. Each tour operator is subject to 25-year lease agreements with ADOT that expire in 2019. The following is a description of each operator and its associated facilities.

Papillon Helicopters – Papillon Helicopters operates from the northernmost helicopter facility. Its facilities include three TLOFs as well as 11 helicopter pads for loading passengers. There are six additional pads for parking on the east side of the leasehold. Services offered by Papillon include helicopter charters from GCN and flights from the Boulder City Municipal Airport in Nevada to GCN with transfers to helicopter tours and/or buses for ground tours of the south rim. Its association with Grand Canyon Airlines allows Papillon to offer options for combined fixed wing and helicopter tour packages.

Papillon Grand Canyon Heliport Terminal
Source: Papillon website - http://www.papillon.com/about-papillon/locations-and-terminals

Papillon's terminal building includes a vehicle parking lot with capacity for approximately 60 automobiles and nine tour buses. There is a covered, drive-up entrance to the terminal as well. Besides the terminal facility, Papillon has a 13,000 sf maintenance and storage hangar; a second, 1,400 sf hangar; and an above ground fuel storage tank with storage capacity of 34,000 gallons of Jet A fuel.

Papillon has a fleet of helicopters including: Bell 206s, Eurocopter 130s, Eurocopter AS350s; and the McDonnell Douglas 900. Since Papillon and Grand Canyon Helicopters are under the same ownership group, both operators utilize this fleet of helicopters and employees.

Grand Canyon Helicopters – Grand Canyon Helicopters, which is under the same ownership as Papillon Helicopters, operates from a facility located east of the airline terminal building. Grand Canyon Helicopters' facilities consist of seven helipads on the west edge of a 60,000 sf ramp that serves as the TLOF.

Grand Canyon Helicopters Terminal
Source: Coffman Associates

Immediately to the west of the ramp are the private terminal and two vehicle parking lots. The private terminal facility has a footprint of approximately 4,700 sf and the parking lots provide a combined 48 marked private vehicle parking spaces and four parking spaces for tour buses. A 12,000 gallon above ground Jet A fuel storage tank is located at the north end of the north parking lot. As was previously mentioned, Grand Canyon Helicopters and Papillon are under the same ownership group and therefore utilize the same aircraft fleet and employees.

Maverick Helicopters – Maverick Helicopters, which is part of the Maverick Aviation Group, is located near the south airport entrance and includes three helipads, a 7,600 sf private terminal, an adjacent 4,800 sf maintenance hangar, and a separate pilot lounge facility with a footprint of approximately 3,700 sf. Maverick's facilities also include seven helicopter parking spaces north of the maintenance hangar. An above ground fuel storage tank is located north of the maintenance hangar.

Maverick Helicopters Terminal
Source: Coffman Associates

Maverick provides tour packages from GCN as well as Las Vegas and Phoenix. Some packages include a flight from Las Vegas to GCN on Maverick Airlines 19-seat Beechcraft 1900B aircraft, then a helicopter tour on Maverick Helicopters seven-seat Eco-Star (Eurocopter EC130). Automobile parking is provided to the east and is shared with a pilot lounge facility. The parking lot provides 55 marked automobile parking spaces and two tour bus parking spaces.

SKY DIVING OPERATOR

Paragon Skydive, which offers tandem jumps, began operating at GCN in April 2016. Aircraft operated by Paragon will not enter GCNP airspace and jumpers will not float over the Canyon. The sky diving landing zone is located towards the south end of the airfield to the east of Taxiway P. Paragon leases space within the terminal building for its operations.

APRON FACILITIES

GCN has a large ramp area fronting the terminal area totaling approximately 113,600 square yards (sy) of pavement. The ramp is subdivided into two areas according to the Airport's ACM. The northern 8,533 sy is utilized for general aviation and is associated with GCA's FBO facilities and services. The general aviation portion of the ramp also includes 17 marked fixed-wing aircraft tiedown spaces and two helicopter parking spaces. The remaining 105,067 sy is designated for commercial and transient aircraft use. A 3,333 sy portion of the transient ramp is utilized for aircraft deicing activities.

Aircraft Parking Ramp
Source: Coffman Associates

NATIONAL PARK SERVICE HANGAR

The NPS maintains a hangar immediately south of the ARFF station along Taxiway P. The 3,600 sf hangar has access to the airfield via a loop taxiway. The hangar is accessible to ground vehicles through airport controlled security gates.

National Park Service Hangar
Source: Coffman Associates

ACCESS AND PARKING

Besides the Airport, Tusayan and the south rim of the Grand Canyon can be accessed by both rail and highway. The Grand Canyon Railways track runs 65 miles from Williams to its station in the Grand Canyon Village near the south rim. The line passes approximately 1.5 miles west and southwest of GCN. The historic railroad has been in operation since 1901 and runs twice daily between the Village and its headquarters in Williams.

Arizona Highway 64 is the main access to the local area. The two-lane highway extends from Interstate 40 near Williams to the south gate of the GCNP. It provides direct access to GCN as well as the main arterial route through Tusayan. Besides rental cars and private vehicles, tour and shuttle buses provide ground access between GCN, Tusayan, and the Grand Canyon.

On-airport vehicle access is provided via an interior road system. Two entrances to the Airport provide access from Highway 64. The north entrance is a four-lane, divided median roadway. Proceeding south into the airport, it provides access to Papillon Helicopters on the left. Another intersection slightly further south connects with a two-lane access road that proceeds south and east past Grand Canyon Helicopters. At this point, the north- and south-bound lanes split to opposite sides of the terminal parking lot. The terminal parking lot is accessible from the eastern-most southbound lane.

The roadway then continues south to pass in front of the general aviation area as well as the airline terminal. A curb lane, which extends for approximately 785 feet, provides access for visitors of both facilities. Just south of the terminal, the north access road intersects with the south access road at a four-way stop. The road continues as a two-way, two-lane road south past the Airport management office, the Tusayan Town Hall, and maintenance buildings to the security gate at the ATCT complex. At the ATCT security gate, the road splits to the west and extends to the ARFF station.

Visitors wishing to return to the terminal or the south entrance turn left at the four-way stop, adjacent to the terminal and the Airport management office, then left again onto the two-lane, one-way road on the east side of the terminal parking lot. There are two access points to the terminal parking lot from this roadway as well as a return to the southbound lanes at the north end of the parking lot. The roadway continues north to become the northbound lanes of the divided access road.

The south entrance is a two-lane roadway that provides access to Maverick Helicopters on the right and the airport housing and Airport management office and the Tusayan Town Hall on the left. The south entrance road terminates at the security fence along the aircraft ramp south of the airline terminal.

Directional signage located along the interior road system provides direct guidance to the terminal, helicopter operators, and Airport support facilities. Standard regulatory signs (stop, speed limit, parking, and one-way signs) and guidance signs (street name, arrow, numbered highway, and parking area signs) are placed along the interior road system.

Airport Welcome Sign and Directional Signage
Source: Coffman Associates

The terminal parking lot is constructed of asphalt and consists of three rows of vehicle parking spaces separated by vehicle circulation lanes. The outer rows are marked for passenger vehicles and the inner row is marked for passenger bus parking. In total, the terminal parking lot consists of 84,500 sf of pavement and 186 passenger vehicle parking spaces (includes six handicapped spaces) and 34 passenger bus spaces.

SUPPORT AND OTHER FACILITIES

Several support facilities serve as critical links in providing the necessary efficiency to aircraft ground operations, such as ARFF, airport maintenance and administration.

Aircraft Rescue and Firefighting Facilities (ARFF)

GCN's new ARFF Operations Building is located near midfield south of the ATCT facility and was opened on June 16, 2010. The ARFF station is typically staffed by 10 firefighters. The ARFF station received numerous awards for its design and construction including: Coconino County Sustainable Building Award, Design Excellence – Advance Level Plus; Arizona Masonry Guild, Inc., Excellence in Masonry Architectural Award; and the Fire Industry Equipment Research Organization's Merit Award for Fire Station Design. The ARFF facility has also received the U.S. Green Building Council's Leadership in Energy and

Environmental Design (LEED) Gold rating for sustainable buildings. The ARFF building has an adjacent vehicle parking lot with 14 marked vehicle parking spaces, including reserved spaces for carpool vehicles and alternative fuel vehicles.

Carpool and Alternative Fuel Vehicle Parking – ARFF Station
Source: Coffman Associates

As a Class I Part 139 certificated airport, GCN is required to maintain ARFF Index B facilities and equipment, which can accommodate aircraft lengths of up to 126 feet. The Airport is equipped with two ARFF trucks: a 1985 Oshkosh T1500 and a 2008 E-One P-502. The E-One P-502 Titan Force is the primary ARFF vehicle providing a 1,500-gallon water tank, a 220-gallon foam tank and 500 pounds of dry chemical storage. The Oshkosh T1500 Striker truck is the back-up ARFF vehicle providing a 1,500-gallon water tank, a 200-gallon foam tank, and 450 pounds of dry chemical storage. The Airport also utilizes a 2006 Ford F550 truck for additional back-up ARFF support, which provides 300 gallons of water storage, 20 gallons of foam storage, and 500 pounds of dry chemical storage.

Prior to the construction of the new ARFF facility, the Airport's ARFF equipment was stored in a building on the ramp located between the Grand Canyon Airlines Terminal and the airline terminal. This 2,000 sf facility is currently used to store airport maintenance equipment.

ARFF Operations Building
Source: Coffman Associates

Previous ARFF Building
Source: Coffman Associates

Ford F550 ARFF Vehicle
Source: Coffman Associates

Oshkosh T1500 Striker ARFF Vehicle
Source: Coffman Associates

Airport Maintenance Facilities and Equipment

The GCN maintenance facilities are located immediately south of the Tusayan Town Hall and Airport maintenance office. There are four buildings in the maintenance complex totaling approximately 5,000 sf. These facilities are utilized for the storage of maintenance equipment and materials. The ARFF facility is also utilized for the storage of various maintenance equipment including pavement sweepers and snow removal equipment (SRE). A full listing of GCN fleet vehicles and equipment including ARFF and SRE is summarized in **Table 1G**.

TABLE 1G
GCN Fleet Vehicles and Equipment

Equipment #	Year, Make & Model	Description
023N	2008 MB 21` BROOM	BROOM REVERSIBLE
152M	2003 LAND PRIDE RC6010	MOWER WING
191C	1986 ROLAIR H5380GE	COMPRESSOR AIR ELECTRIC 17.1 CFM
432P	1988 VIKING VCT1186	SNOWPLOW 11 FT
488P	1993 MONROE 545811EXP	SNOWPLOW 11 FT
722S	1997 SWENSON MV-120	SPREADER 6.5 CY
748P	2004 MONROE MPR54-58-11-1Z	SNOWPLOW 11 FT
762P	1997 MONROE MPR-54-58	SNOWPLOW 11 FT
763P	1997 MONROE HDBW-12	SNOWPLOW 11 FT
764P	2004 MEYER E-60	SNOWPLOW 8 FT
840P	2015 CURTIS X1100CW	SNOWPLOW 6 FT
882D	2015 LUND 83548	TANK DIESEL PORTABLE 98 GAL
BP39	2006 CHEVROLET K1500	P/U 1/2 TON W/PLOW BLADE 4X4
BR64	2008 FORD F150	P/U 1/2 TON 4X4
BR65	2008 FORD F150	P/U 1/2 TON 4X4
BS12	2008 CHEVROLET G1500	VAN 1/2 TON 8 PASS
BS18	2001 DODGE R1500	P/U 1/2 TON 4X4
BT20	2011 FORD F150	P/U 1/2 TON EXT CAB 4X4
BT21	2011 FORD F150	P/U 1/2 TON CREW CAB 4X4
D738	2001 DODGE R3500	TRUCK 1 TON DUMP
D976	2006 FORD F550	TRUCK 1.5 TON AIRCRAFT RESCUE
D977	2008 FORD F350	TRUCK 1 TON AIR STAIR
E573	1993 IHC 2574	TRUCK SNOWPLOW 6 CY
E706	2004 MACK CV712	TRUCK SNOWPLOW 6.5 CY
E709	2008 E-ONE P-502	TRUCK AIRCRAFT RESCUE
E710	1985 OSHKOSH T1500	TRUCK AIRCRAFT RESCUE
E711	1997 IHC 5000	TRUCK SNOWPLOW 6.5 CY W/WING 4X4
K040	1996 CUMMINS VTA28G2	GENERATOR DSL 480 KW
K041	1995 KOHLER 200R0Z07	GENERATOR 200 KW
L806	1986 CASE 580K	LOADER BACKHOE
M044	1989 FORD 7710FC415M	MOWER SEEDER
N014	2009 OSHKOSH H2723B	SNOW BLOWER 4X4
S187	2013 ELGIN BROOM BEAR	SWEEPER
T330	1993 TOPLINE TL-71SCT	TRAILER RESPONSE
T429	2008 BIG TEX 50LA-14	TRAILER UTILITY 14 FT
Z026	1982 VICTORY MB2	TUG AIRPLANE GROVE MB-2
Z034	2015 KUBOTA RTVX1100C	UTV 4X4
Z035	2015 KUBOTA RTVX1100C	UTV 4X4 W/FRONT PLOW

Source: Airport records

Airport Administration

The Airport's management office is located in a 3,264 sf modular facility southeast of the airline terminal. This facility was originally acquired in 1984. The building includes offices for management and operations, conference room, and restrooms. The management office has an adjacent gravel vehicle parking lot.

Airport Management Office
Source: Coffman Associates

Perimeter Fencing

Perimeter fencing is a standard security feature of most airports. Security fencing restricts access to private facilities as well as the airfield operations area (AOA). Standard security fencing consists of seven-foot chain-link fencing with a top guard such as barbed wire strands. The Airport's AOA and airside facilities are appropriately equipped with security/wildlife control fencing to restrict access. The security/wildlife control fencing is 8-foot tall chain link fence topped with three strands of barbed wire. A 15-foot unpaved road is located on the inside and outside of the perimeter fencing to allow for repair and inspection.

Perimeter Security Fence
Source: Coffman Associates

Airfield Electrical Vault

Electrical vaults are reinforced facilities that house power cables and transformers for the airfield electric systems such as lighting systems and navigational aids. GCN's electrical vault is located immediately north of the ARFF station and is only accessible through a secured access gate. The Airport is equipped with an emergency diesel generator to serve as a backup for powering airfield lighting in the situation of a power failure.

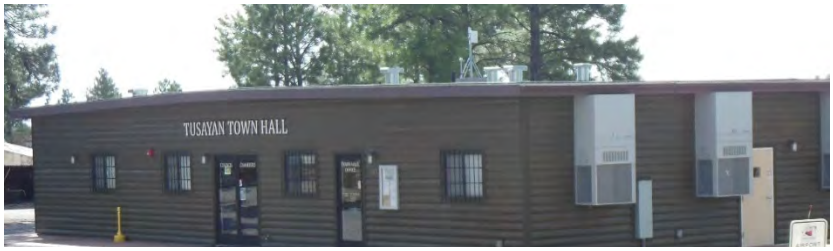
Airfield Lighting Electrical Vault
Source: Coffman Associates

Town of Tusayan Town Hall

The Town of Tusayan leases a 2,650 sf modular building on the Airport for its Town Hall. This building is located immediately south of the Airport management office and includes the Town Council chamber, office space, and restrooms. According to the Town of Tusayan website[7], the Town has plans

[7] Source: http://tusayan-az.gov/contact/, accessed on January 26, 2016.

to build a new Town Hall facility in an undisclosed location. The Town Hall building has an adjacent unpaved vehicle parking lot.



Tusayan Town Hall
Source: Coffman Associates

Airport Housing

GCN has an on-site residential housing area located to the south of the south airport entrance and east of the Airport management office. With limited housing options in the Town of Tusayan, many Airport employees and employees of Airport businesses are housed within this area that includes 23 residential units.

UTILITIES

The availability and capacity of the utilities serving the Airport are factors in determining the development potential of Airport property. The Airport receives water from Hydro Resources. Airport water is stored in two storage tanks with a combined capacity of 2.8 million gallons located east of the Airport housing area. The Airport had previously utilized a self-contained rain water containment system with a capacity of 3.175 million gallons. However, due to the location of the rain containment system between the runway and taxiway, within airport safety areas, the FAA required the Airport eliminate the use of this system due to safety concerns.

Arizona Public Service (APS) provides electrical power to the Airport, Tusayan Sanitary District handles waste water from the Airport, and Waste Management is the waste services and recycling services provider to the Airport. Telecommunication and internet services are provided by Century Link. Natural gas is not available at the Airport. A more detailed discussion of utility providers and usage information will be provided in the Sustainability Chapter of the Master Plan.

AREA AIRSPACE AND AIR TRAFFIC CONTROL

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

AIRSPACE STRUCTURE

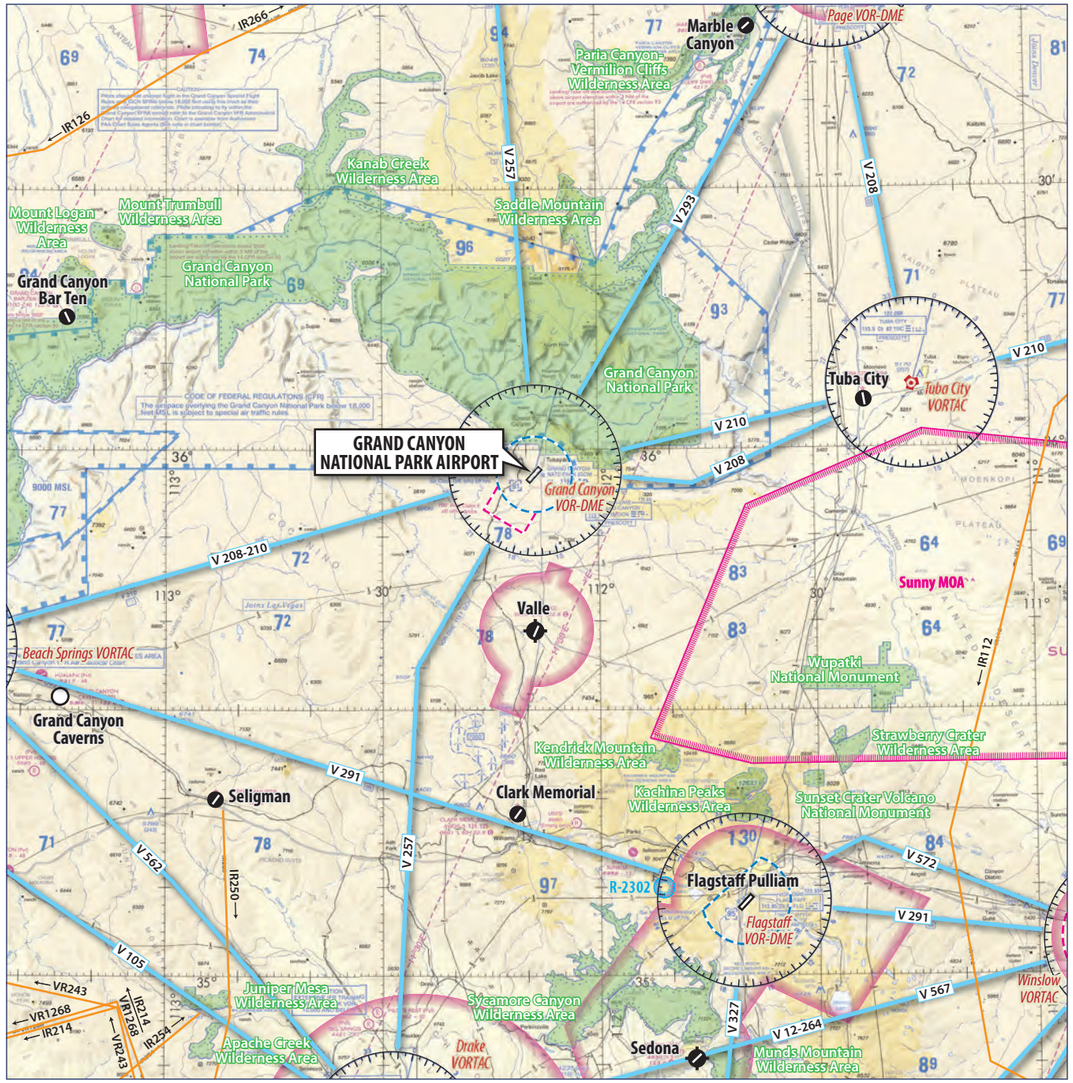
Airspace within the United States is broadly classified as either "controlled" or "uncontrolled." The difference between controlled and uncontrolled airspace relates primarily to requirements for pilot qualifications, ground-to-air communications, navigation and air traffic services, and weather conditions.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

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

Class B Airspace: Class B airspace has been designated around some of the country's major airports, such as Phoenix Sky Harbor International Airport, to separate all aircraft within a specified radius of the primary airport. Each Class B airspace is specifically tailored for its primary airport. All aircraft operating within Class B airspace must have an ATC clearance. Certain minimum aircraft equipment and pilot certification requirements must also be met. This airspace is the most restrictive controlled airspace routinely encountered by pilots operating under visual flight rules (VFR) in an uncontrolled environment. The nearest Class B airspace is centered on McCarran International Airport (LAS), approximately 146 nautical miles (nm) to the west. Phoenix Sky Harbor International Airport, located approximately 151 nm to the south, is also located within Class B airspace.

Class C Airspace: The FAA has established Class C airspace at approximately 120 airports around the country that have significant levels of instrument flight rules (IFR) traffic. Class C airspace is designed to regulate the flow of uncontrolled traffic above, around, and below the arrival and departure airspace required for high-performance, passenger-carrying aircraft at major airports. In order to fly inside Class C airspace, an aircraft must have a two-way radio, an encoding transponder, and have established communication with the ATC facility. Aircraft may fly below the floor of the Class C airspace or above the Class C airspace ceiling without establishing communication with ATC. The nearest Class C airspace to GCN surrounds the Tucson International Airport and Davis Monthan Air Force Base, approximately 238 nautical miles to the southeast.

Class D Airspace: Class D airspace is controlled airspace surrounding airports with an ATCT. The Class D airspace typically constitutes a cylinder with a horizontal radius of four or five nautical miles (NM) from the airport, extending from the surface up to a designated vertical limit, typically set at approximately 2,500 feet above the airport elevation. As shown on **Exhibit 1F**, GCN operates within Class D airspace during the operational hours of the ATCT. Aircraft operators operating within Class D airspace are required to make contact with GCN air traffic control prior to entering or departing GCN airspace and must maintain contact while within the controlled airspace to land at GCN or to transverse the area. When the ATCT is inactive, GCN airspace reverts to Class E airspace.

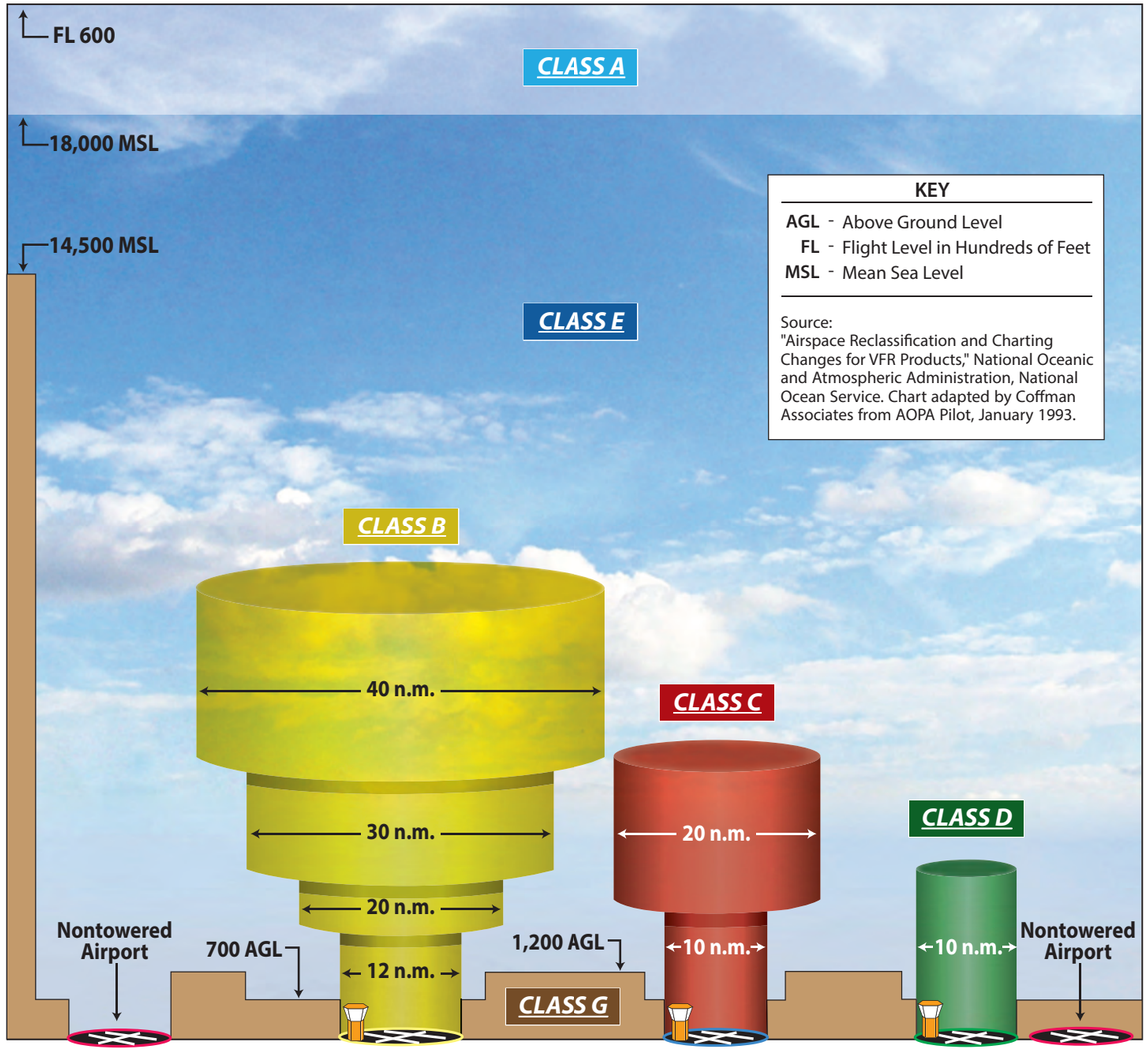


- Airport with other than hard-surfaced runways
- Airport with hard-surfaced runways 1,500' to 8,069' in length
- Airports with hard-surfaced runways greater than 8,069' or some multiple runways less than 8,069'
- VORTAC
- Compass Rose
- Class D Airspace
- Class E Airspace
- Class E Airspace with floor 700 ft. above surface
- Victor Airways
- Military Training Routes
- Wilderness Area
- Prohibited, Restricted, Warning, and Alert Areas
- Alert Area and MOA - Military Operations Area

NORTH

Source: Las Vegas Sectional Chart, US Department of Commerce, National Oceanic and Atmospheric Administration, March 5, 2015

Phoenix Sectional Chart, US Department of Commerce, National Oceanic and Atmospheric Administration, April 30, 2015



KEY

AGL - Above Ground Level
FL - Flight Level in Hundreds of Feet
MSL - Mean Sea Level

Source:
"Airspace Reclassification and Charting Changes for VFR Products," National Oceanic and Atmospheric Administration, National Ocean Service. Chart adapted by Coffman Associates from AOPA Pilot, January 1993.

DEFINITION OF AIRSPACE CLASSIFICATIONS

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

GRAND CANYON AREA CHART

FOR PLANNING PURPOSES ONLY
GRAND CANYON NATIONAL PARK
SPECIAL FLIGHT RULES AREA
SCALE 1:750,000

LEGEND

- SPECIAL FLIGHT RULES AREA
- FLIGHT FREE ZONE — No Flights Below 14,500 Feet MSL
- 127.05 — MONITOR FREQUENCY

COMMERCIAL AIR TOUR OPERATORS
FIXED WING VFR ROUTES

- BDN — BLUE DIRECT NORTH
- BDS — BLUE DIRECT SOUTH
- ONLY FOR USE TO AVOID IMC WEATHER
- 1 — BLACK 1
- 1A — BLACK 1 ALPHA

SUPPORT OPERATIONS

- 1 — BROWN 1 (INFO ONLY)
- 6 — BROWN (Helicopter Only)

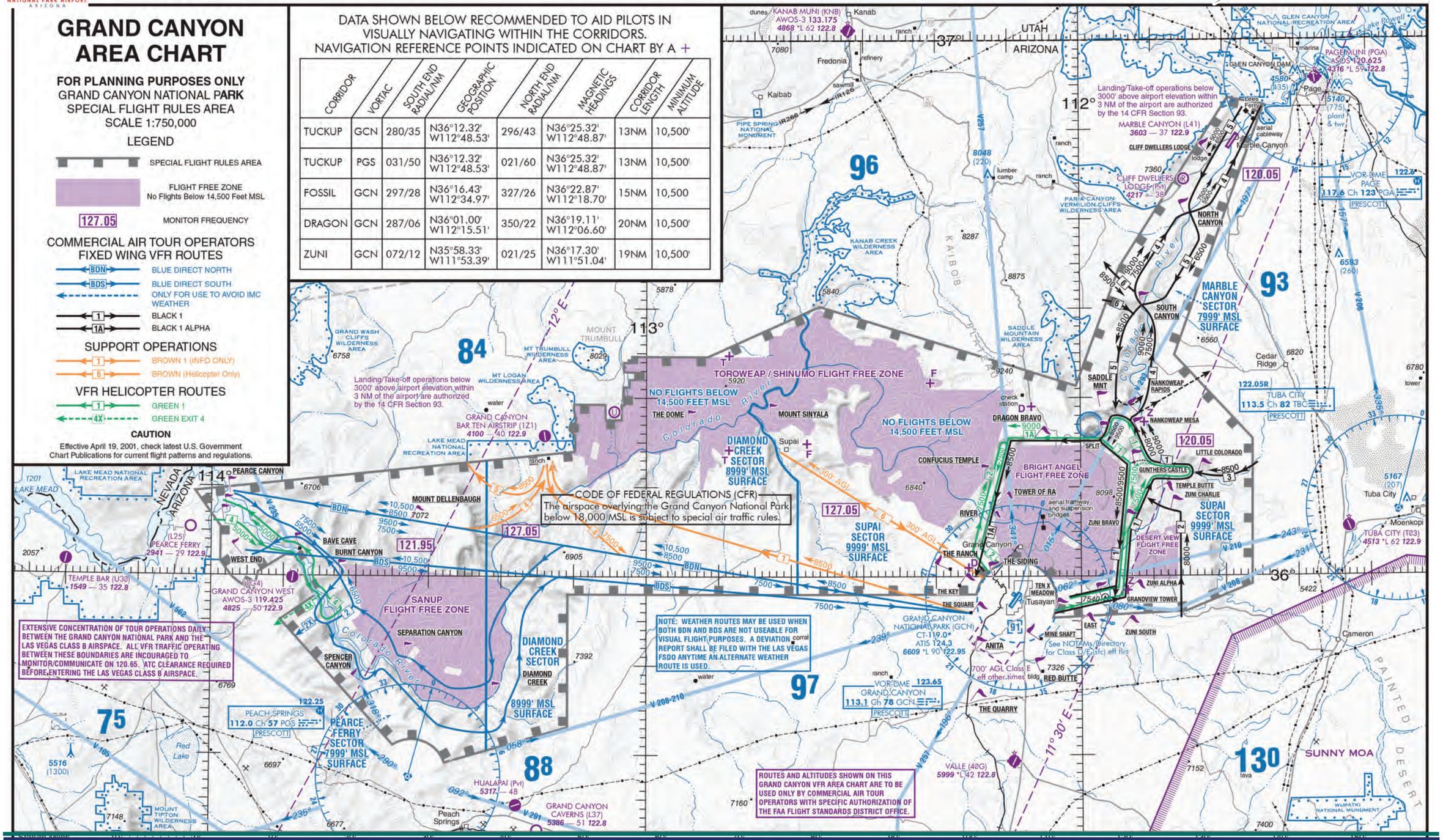
VFR HELICOPTER ROUTES

- 1 — GREEN 1
- 4X — GREEN EXIT 4

CAUTION
Effective April 19, 2001, check latest U.S. Government Chart Publications for current flight patterns and regulations.

DATA SHOWN BELOW RECOMMENDED TO AID PILOTS IN VISUALLY NAVIGATING WITHIN THE CORRIDORS.
NAVIGATION REFERENCE POINTS INDICATED ON CHART BY A +

CORRIDOR	VORTAC	SOUTH END RADIAL/NM	GEOGRAPHIC POSITION	NORTH END RADIAL/NM	MAGNETIC HEADINGS	CORRIDOR LENGTH	MINIMUM ALTITUDE
TUCKUP	GCN	280/35	N36°12.32' W112°48.53'	296/43	N36°25.32' W112°48.87'	13NM	10,500'
TUCKUP	PGS	031/50	N36°12.32' W112°48.53'	021/60	N36°25.32' W112°48.87'	13NM	10,500'
FOSSIL	GCN	297/28	N36°16.43' W112°34.97'	327/26	N36°22.87' W112°18.70'	15NM	10,500
DRAGON	GCN	287/06	N36°01.00' W112°15.51'	350/22	N36°19.11' W112°06.60'	20NM	10,500'
ZUNI	GCN	072/12	N35°58.33' W111°53.39'	021/25	N36°17.30' W111°51.04'	19NM	10,500'



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

When the ATCT is inactive, GCN operates within Class E airspace, as depicted on **Exhibit 1F**. Class E airspace surrounds the Airport and extends to the southwest to account for the instrument approach procedure for Runway 3. GCN Class E airspace extends from the surface up to but does not include 18,000 feet MSL.

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

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

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

Special Use Airspace

Grand Canyon National Park Special Flight Rules Area (SFAR 50-2): The GCNP is subject to special air traffic rules to protect the airspace of the park. Code of Federal Regulations (CFR) Special Federal Aviation Regulation (SFAR) No. 50-2 designates the airspace subject to the special flight rules as well as the specific routes that air tour operators are allowed to travel on and the altitudes and direction of travel on those routes. The SFAR airspace is identified on **Exhibit 1F**. The majority of the GCNP is identified as flight free zones (purple shading), in which no flights are allowed below 14,500 feet except for emergency situations. The SFAR also designates specific operating altitudes and routes for commercial air tour over-flight operations for fixed-wing aircraft and helicopter aircraft.

SFAR 50-2 airspace is divided into four sectors: Supai Sector, Marble Canyon Sector, Diamond Creek Sector, and Pearce Ferry Sector. The two sectors that have the most significant impact on GCN operations are the Supai and Marble Canyon sectors. The Supai Sector is located immediately west, north and east of GCN and has an altitude envelope beginning at the surface and extending up to 9,999 feet MSL. The Marble Canyon Sector is located approximately 27 nm north/northeast of GCN and has an operational airspace limitation beginning at the surface and extending upward to 7,999 feet MSL.

Designated routes for commercial air tour operators relevant to GCN operations are depicted on **Exhibit 1F** and include the following:

- Blue Direct North (BDN) – VFR Fixed-wing aircraft route with operating altitudes ranging between 7,500 feet and 10,500 feet MSL.
- Blue Direct South (BDS) – VFR Fixed-wing aircraft route with operating altitudes ranging between 7,500 feet and 10,500 feet MSL.
- Black 1 – VFR Fixed-wing aircraft route with operating altitudes ranging from 8,500 feet to 9,500 feet MSL.
- Black 1 Alpha – VFR Fixed-wing aircraft route with an operating altitude of 8,500 feet MSL.
- Green 1 – VFR helicopter route with an operating altitude of 7,500 feet MSL.
- Green 1 Alpha – VFR helicopter route with an operating altitude of 9,000 feet MSL.
- Green 2 – VFR helicopter route with an operating altitude of 7,500 feet MSL.

The FAA has issued an *Air Tour Limitation Rule*, which limits the total number of commercial air tour operations that may be conducted in the GCNP SFAR. Currently, GCN is allocated 45,000 air tour operations each year.

Wilderness Areas: As depicted on **Exhibit 1F**, there are numerous protected wilderness areas in the vicinity of the Airport that are subject to Federal Aviation Administration's (FAA) Advisory Circular (AC) 91-36D, *Visual Flight Rules (VFR) Flight Near Noise-Sensitive Areas*. In part, AC 91-36D specifies a minimum altitude of 2,000 feet above the highest terrain within 2,000 feet laterally or 2,000 feet above the upper-most rim of a canyon or valley.

Victor Airways: For aircraft arriving or departing the regional area using VOR facilities, a system of Federal Airways, referred to as Victor Airways, has been established. Victor Airways are corridors of airspace eight miles wide that extend upward from 1,200 feet AGL to 18,000 feet MSL and extend between VOR navigational facilities. Victor Airways are shown with blue lines on **Exhibit 1F**.

For aircraft enroute or departing GCN, there are several Victor Airways available converging at the Grand Canyon VOR/DME.

Military Operations Areas: Military Operating Areas (MOAs) are areas of airspace where military activities are conducted. The nearest MOA to GCN is the Sunny MOA, which has a western boundary that begins approximately 23 nautical miles east/southeast of GCN. The Sunny MOA is controlled by the Albuquerque Air Route Traffic Control Center (ARTCC) with active military aircraft operating from 12,000 feet to 17,999 feet MSL.

Military Training Routes: Military training routes near GCN are identified with the letters IR or VR and a three-digit number. The arrows on the route indicate the direction of travel. Military aircraft travel on these routes below 10,000 feet MSL and at speeds in excess of 250 knots. **Exhibit 1F** depicts the military training routes in the vicinity of GCN.

Restricted Areas: Restricted areas are depicted on **Exhibit 1F** with brown hatched lines. The only restricted area in the vicinity of GCN is R-2302, which has a circular boundary with a 6,600-foot radius centered on the U.S. Army Navajo Ordinance Depot located immediately west of Flagstaff Pulliam Airport. This restricted area encompasses the airspace from the surface to an altitude of 10,000 feet and is in use from 8:00 a.m. to 12:00 a.m. Monday through Saturday. The controlling agency for R-2302 is the Albuquerque ARTCC.

AIRSPACE CONTROL

The FAA has established 21 ARTCCs throughout the continental United States to control aircraft operating under IFR within controlled airspace and while enroute. An ARTCC assigns specific routes and altitudes along Federal Airways to maintain separation and orderly traffic flow. The Los Angeles ARTCC controls IFR airspace enroute to and from GCN.

Flight service stations (FSS) are air traffic facilities which provide pilot briefings, flight plan processing, inflight radio communications, search and rescue (SAR) services, and assistance to lost aircraft and aircraft in emergency situations. FSSs also relay air traffic control clearances, process notices to airmen (NOTAMs), broadcast aviation meteorological and aeronautical information, and notify Customs and Border Protection of trans border flights. The Prescott FSS is the nearest FSS to GCN.

Airport Traffic Control Tower (ATCT)
Source: Coffman Associates

Airport Traffic Control Tower (ATCT)

The GCN ATCT operates daily from 6:00 a.m. to 8:00 p.m. from June 1 to September 30 and from 7:00 a.m. to 7:00 p.m. from October 1 to May 31. The tower is owned and operated by the FAA and it is located on the east side of the runway near the midpoint of Runway 3-21. The 121-foot high tower was constructed during 2000-2002 and commissioned in March 2003. The ATCT complex is accessible via the interior airport roadway system and has an adjacent vehicle parking lot with 34 marked parking spaces that are accessible through a secured access gate.

As of January 2016, the GCN tower is staffed by eleven (11) controllers and two (2) tower managers. The primary responsibilities for tower controllers is to sequence and separate local arriving and departing traffic and to provide ground control direction to aircraft taxiing on the ground. Tower radio frequencies are 119.0 MHz for Canyon Tower and 121.9 MHz for Canyon Ground. When the tower is not operational, radio communications are provided by Prescott radio on radio frequency 122.1R MHz.

FLIGHT PROCEDURES

Flight procedures are a set of predetermined maneuvers established by the FAA, using electronic or visual navigational aids that assist pilots in locating and landing or departing from an airport. For GCN, there are instrument approach procedures and departure procedures as shown on **Exhibit 1G**.

Instrument Approach Procedures

The capability of an instrument is defined by the visibility and cloud ceiling minimums associated with the approach. Visibility minimums define the horizontal distance the pilot must be able to see in order to complete the approach. Cloud ceilings define the lowest level a cloud layer (defined in feet above the ground) can be situated for the pilot to complete the approach. If the observed visibility or ceilings are below the minimums prescribed for the approach, the pilot cannot complete the instrument approach.

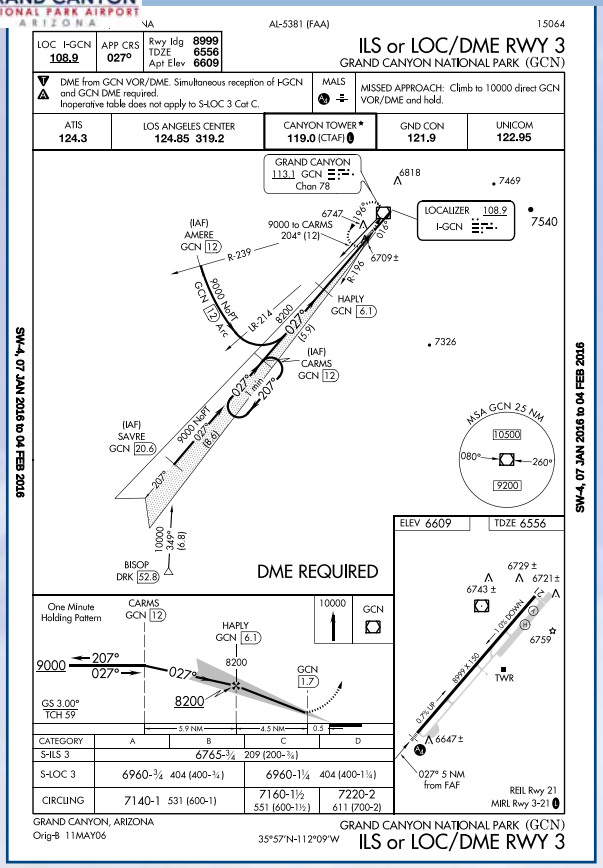
There are currently three published instrument approach procedures into Runway 3 at GCN: ILS or LOC/DME; RNAV (GPS); and VOR. The ILS and RNAV approaches provide both course and vertical guidance, while the LOC/DME and VOR approaches provide only course guidance. The ILS provides the most sophisticated approach procedures permitting pilots of aircraft with suitable equipment to land when cloud ceilings are as low as 200 feet and visibility as low as ¾-miles.

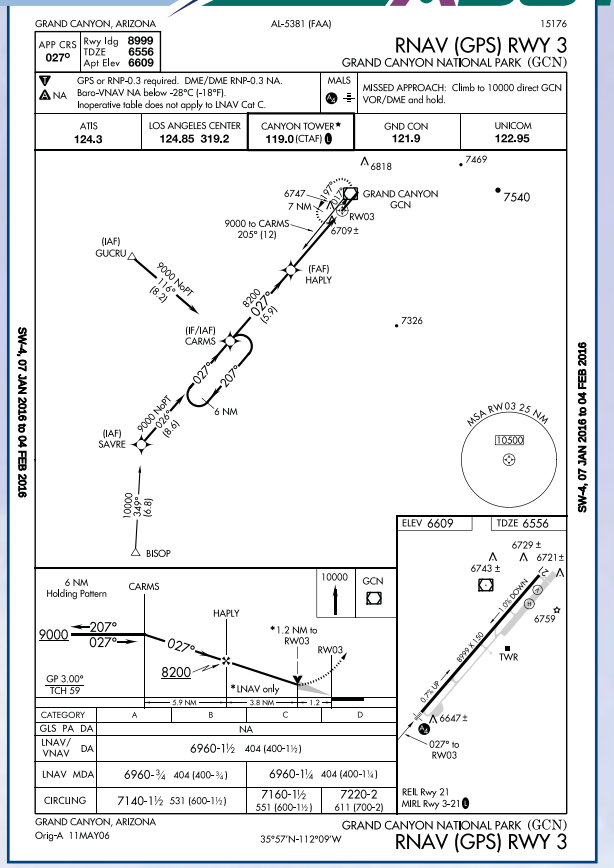
Departure Flight Procedures

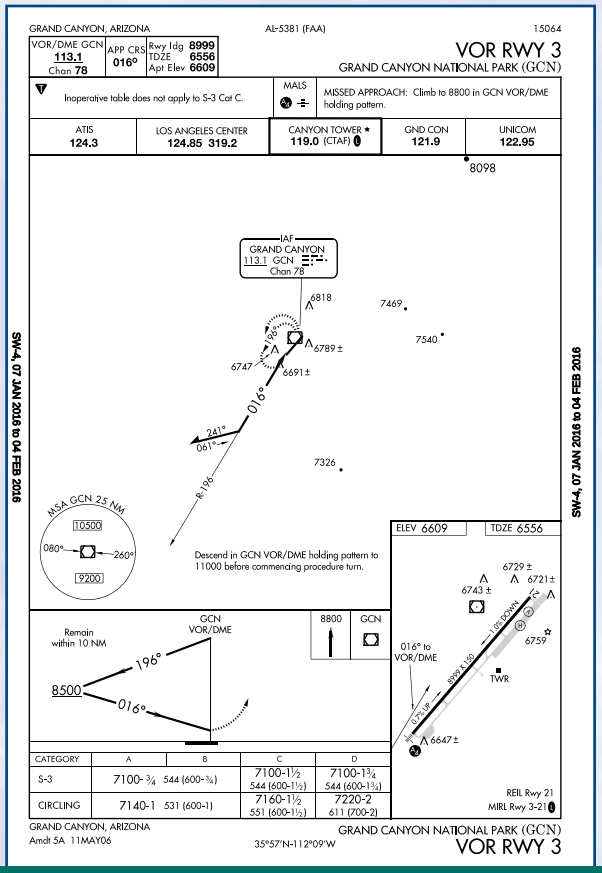
In more congested airspace, pilots may be instructed to utilize a departure procedure. There are two departure procedures published for GCN, including the Grand Two Departure and the Parks Two Departure. Both procedures apply to departures from Runway 21.

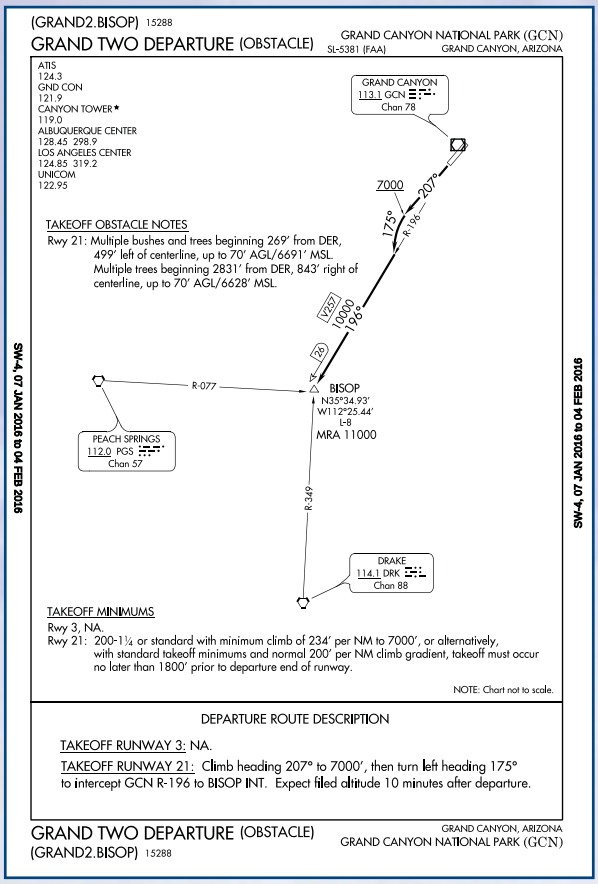
Local Operating Procedures

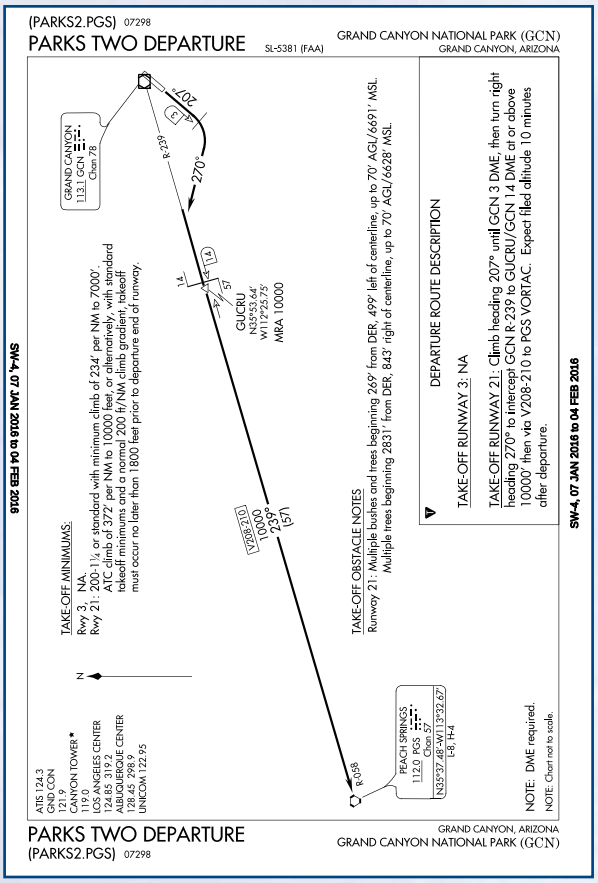
The traffic pattern at the Airport is maintained to provide the safest and most efficient use of the airspace. A standard left-hand traffic pattern is published for Runway 3, while Runway 21 has a right-hand traffic pattern. As a result, fixed-wing aircraft operating at GCN remain to the northwest of the Airport when operating within the local traffic pattern. The typical traffic pattern altitude for propeller aircraft is between 800 and 1,000 feet above ground level (AGL) and 1,500 feet AGL for turbine aircraft.


NA AL-5381 (FAA) 15064
ILS or LOC/DME RWY 3
GRAND CANYON NATIONAL PARK (GCN)
LOC I-GCN 108.9
APP CRS 027°
Rwy Idg 8999
TDZE 6556
Apt Elev 6609
DME from GCN VOR/DME. Simultaneous reception of I-GCN and GCN DME required. Inoperative table does not apply to S-LOC 3 Cat C.
MALS
MISSED APPROACH: Climb to 10000 direct GCN VOR/DME and hold.
ATIS 124.3
LOS ANGELES CENTER 124.85 319.2
CANYON TOWER* 119.0 (CTAF)
GND CON 121.9
UNICOM 122.95
GRAND CANYON 113.1 GCN Chan 78
LOCALIZER 108.9 I-GCN
(IAF) AMERE GCN 12
9000 to CARMS 204° (12)
R-239
R-196
IR-214
9000 NoPT GCN (12) Arc
(IAF) HAPLY GCN 6.1
(IAF) CARMS GCN 12
(IAF) SAVRE GCN 20.6
9000 NoPT
BISOP DRK 52.8
10000 340° (6.8)
MSA GCN 25 NM
10500
9200
DME REQUIRED
One Minute Holding Pattern
CARMS GCN 12
HAPLY GCN 6.1
GCN 1.7
9000
207°
027°
8200
GS 3.00°
TCH 59'
10000
GCN
5.9 NM
4.5 NM
0.5
CATEGORY A B C D
S-ILS 3 6765-¾ 209 (200-¾)
S-LOC 3 6960-¾ 404 (400-¾) 6960-1¼ 404 (400-1¼)
CIRCLING 7140-1 531 (600-1) 7160-1½ 551 (600-1½) 7220-2 611 (700-2)
ELEV 6609 TDZE 6556
6729 ± 6721 ± 6743 ± 6759
1.00% DOWN
8899 X 150
0.75% UP
6647 ±
TWR
027° 5 NM from FAA
REIL Rwy 21
MIRL Rwy 3-21
SW-4, 07 JAN 2016 to 04 FEB 2016
GRAND CANYON, ARIZONA
Orig-B 11MAY06
35°57'N-112°09'W
GRAND CANYON NATIONAL PARK (GCN)
ILS or LOC/DME RWY 3


GRAND CANYON, ARIZONA AL-5381 (FAA) 15176
RNAV (GPS) RWY 3
GRAND CANYON NATIONAL PARK (GCN)
APP CRS 027°
Rwy Idg 8999
TDZE 6556
Apt Elev 6609
NA
GPS or RNP-0.3 required. DME/DME RNP-0.3 NA. Baro-VNAV NA below -28°C (-18°F). Inoperative table does not apply to LNAV Cat C.
MALS
MISSED APPROACH: Climb to 10000 direct GCN VOR/DME and hold.
ATIS 124.3
LOS ANGELES CENTER 124.85 319.2
CANYON TOWER* 119.0 (CTAF)
GND CON 121.9
UNICOM 122.95
GRAND CANYON GCN
7 NM
RW03
6709 ±
9000 to CARMS 205° (12)
(IAF) GUCRU
9000 NoPT
(FAF) HAPLY
8200
(IF/IAF) CARMS
6 NM
(IAF) SAVRE
BISOP
MSA RW03 25 NM
10500
6 NM Holding Pattern
CARMS
HAPLY
9000
207°
027°
8200
GP 3.00°
TCH 59'
*1.2 NM to RW03
*LNAV only
10000
GCN
5.9 NM
3.8 NM
1.2
CATEGORY A B C D
GLS PA DA NA
LNAV/VNAV DA 6960-1½ 404 (400-1½)
LNAV MDA 6960-¾ 404 (400-¾) 6960-1¼ 404 (400-1¼)
CIRCLING 7140-1½ 531 (600-1½) 7160-1½ 551 (600-1½) 7220-2 611 (700-2)
ELEV 6609 TDZE 6556
6729 ± 6721 ± 6743 ± 6759
1.00% DOWN
8899 X 150
0.75% UP
6647 ±
TWR
027° to RW03
REIL Rwy 21
MIRL Rwy 3-21
SW-4, 07 JAN 2016 to 04 FEB 2016
GRAND CANYON, ARIZONA
Orig-A 11MAY06
35°57'N-112°09'W
GRAND CANYON NATIONAL PARK (GCN)
RNAV (GPS) RWY 3


GRAND CANYON, ARIZONA AL-5381 (FAA) 15064
VOR RWY 3
GRAND CANYON NATIONAL PARK (GCN)
VOR/DME GCN 113.1 Chan 78
APP CRS 016°
Rwy Idg 8999
TDZE 6556
Apt Elev 6609
Inoperative table does not apply to S-3 Cat C.
MALS
MISSED APPROACH: Climb to 8800 in GCN VOR/DME holding pattern.
ATIS 124.3
LOS ANGELES CENTER 124.85 319.2
CANYON TOWER* 119.0 (CTAF)
GND CON 121.9
UNICOM 122.95
8098
IAF
GRAND CANYON 113.1 GCN Chan 78
6818
7469
7540
6789 ±
6747
6691 ±
016°
241°
061°
R-196
7326
MSA GCN 25 NM
10500
080°
260°
9200
Descend in GCN VOR/DME holding pattern to 11000 before commencing procedure turn.
Remain within 10 NM
GCN VOR/DME
196°
8500
016°
8800
GCN
CATEGORY A B C D
S-3 7100-¾ 544 (600-¾) 7100-1½ 544 (600-1½) 7100-1¾ 544 (600-1¼)
CIRCLING 7140-1 531 (600-1) 7160-1½ 551 (600-1½) 7220-2 611 (700-2)
ELEV 6609 TDZE 6556
6729 ± 6721 ± 6743 ± 6759
1.00% DOWN
8899 X 150
0.75% UP
6647 ±
TWR
016° to VOR/DME
REIL Rwy 21
MIRL Rwy 3-21
SW-4, 07 JAN 2016 to 04 FEB 2016
GRAND CANYON, ARIZONA
Amdt 5A 11MAY06
35°57'N-112°09'W
GRAND CANYON NATIONAL PARK (GCN)
VOR RWY 3


(GRAND2.BISOP) 15288
GRAND TWO DEPARTURE (OBSTACLE)
GRAND CANYON NATIONAL PARK (GCN)
SL-5381 (FAA)
GRAND CANYON, ARIZONA
ATIS 124.3
GND CON 121.9
CANYON TOWER* 119.0
ALBUQUERQUE CENTER 128.45 298.9
LOS ANGELES CENTER 124.85 319.2
UNICOM 122.95
GRAND CANYON 113.1 GCN Chan 78
7000
207°
175°
R-196
TAKEOFF OBSTACLE NOTES
Rwy 21: Multiple bushes and trees beginning 269' from DER, 499' left of centerline, up to 70' AGL/6691' MSL. Multiple trees beginning 2831' from DER, 843' right of centerline, up to 70' AGL/6628' MSL.
12257
10000
195°
7.2
R-077
BISOP
N35°34.93'
W112°25.44'
L-8
MRA 11000
PEACH SPRINGS 112.0 PGS Chan 57
R-349
DRAKE 114.1 DRK Chan 88
TAKEOFF MINIMUMS
Rwy 3, NA.
Rwy 21: 200-1¼ or standard with minimum climb of 234' per NM to 7000', or alternatively, with standard takeoff minimums and normal 200' per NM climb gradient, takeoff must occur no later than 1800' prior to departure end of runway.
NOTE: Chart not to scale.
DEPARTURE ROUTE DESCRIPTION
TAKEOFF RUNWAY 3: NA.
TAKEOFF RUNWAY 21: Climb heading 207° to 7000', then turn left heading 175° to intercept GCN R-196 to BISOP INT. Expect filed altitude 10 minutes after departure.
SW-4, 07 JAN 2016 to 04 FEB 2016
SW-4, 07 JAN 2016 to 04 FEB 2016
GRAND TWO DEPARTURE (OBSTACLE)
(GRAND2.BISOP) 15288
GRAND CANYON, ARIZONA
GRAND CANYON NATIONAL PARK (GCN)


(PARKS2.PGS) 07298
PARKS TWO DEPARTURE
GRAND CANYON NATIONAL PARK (GCN)
SL-5381 (FAA)
GRAND CANYON, ARIZONA
GRAND CANYON 113.1 GCN Chan 78
207°
R-239
270°
GUCRU
N35°53.64'
W112°25.75'
MRA 10000
V208 210
10000
239°
5.7
TAKE-OFF MINIMUMS:
Rwy 3, NA.
Rwy 21: 200-1¼ or standard with minimum climb of 234' per NM to 7000'. ATC climb of 372' per NM to 10000 feet, or alternatively, with standard takeoff minimums and a normal 200 ft/NM climb gradient, takeoff must occur no later than 1800 feet prior to departure end of runway.
TAKE-OFF OBSTACLE NOTES
Runway 21: Multiple bushes and trees beginning 269' from DER, 499' left of centerline, up to 70' AGL/6691' MSL. Multiple trees beginning 2831' from DER, 843' right of centerline, up to 70' AGL/6628' MSL.
DEPARTURE ROUTE DESCRIPTION
TAKE-OFF RUNWAY 3: NA
TAKE-OFF RUNWAY 21: Climb heading 207° until GCN 3 DME, then turn right heading 270° to intercept GCN R-239 to GUCRU/GCN 14 DME at or above 10000' then via V208-210 to PGS VORTAC. Expect filed altitude 10 minutes after departure.
R-208
PEACH SPRINGS 112.0 PGS Chan 57
N35°57.48' W112°27.67'
L-8, H-4
ATIS 124.3
GND CON 121.9
CANYON TOWER* 119.0
LOS ANGELES CENTER 124.85 319.2
ALBUQUERQUE CENTER 128.45 298.9
UNICOM 122.95
NOTE: DME required.
NOTE: Chart not to scale.
SW-4, 07 JAN 2016 to 04 FEB 2016
SW-4, 07 JAN 2016 to 04 FEB 2016
PARKS TWO DEPARTURE
(PARKS2.PGS) 07298
GRAND CANYON, ARIZONA
GRAND CANYON NATIONAL PARK (GCN)

Aside from the GCNP Special Flight Rules Area (SFAR 50-2), GCN does not have aircraft restrictions, curfews, or a mandatory noise abatement program, as these programs would violate the federal *Airport Noise and Capacity Act* (ANCA) of 1990. Federal law requires the Airport to remain open 24 hours a day, 7 days a week, and to accept all civilian and military aircraft that can be safely accommodated.

AREA AIRPORTS

A review of other public-use airports with at least one paved runway within a 50-nautical mile radius of GCN was conducted to identify and distinguish the types of air service provided in the region. It is important to consider the capabilities and limitations of these airports when planning for future changes or improvements at GCN. **Exhibit 1H** provides information on public-use airports within the vicinity of the GCN. Information pertaining to each airport was obtained from FAA Form 5010-1, Airport Master Record.

SOCIOECONOMIC PROFILE

The following sections will analyze socioeconomic indicators including population, economy/employment, and income for the Town of Tusayan, Coconino County, and the State of Arizona. This information is useful in identifying economic trends that will be evaluated and applied to projections of aeronautical activity at GCN. Socioeconomic data was obtained from the U.S. Census Bureau; the U.S. Department of Labor, Bureau of Labor Statistics; Woods and Pool Economics, *The Complete Economic and Demographic Data Source*, 2015, and the Arizona State Demographer Office.

POPULATION

Historic population trends for the Town of Tusayan, Coconino County, the State of Arizona, and the United States is detailed in **Table 1H**. Accounting for approximately 2.1 percent of the total state population, Coconino County is the State's 7th largest county by population according to 2015 estimates prepared by the Arizona State Demographer Office. While the County has grown over the past 45-year period at a healthy compound annual growth rate (CAGR) of 2.5 percent, this lags behind the rest of the state, which has grown at a CAGR of 3.2 percent. The median age for residents of Coconino County has steadily risen from 21 in 1970 to 31 in 2015.

The Town of Tusayan, which accounts for approximately 0.4 percent of the County population in 2015, has grown by only 44 residents since the U.S. Census Bureau included it in its count in 2000. The median age for residents of Tusayan according to the most recent U.S. Census Bureau report is 34 years of age.

TABLE 1H
Historic Population Trends

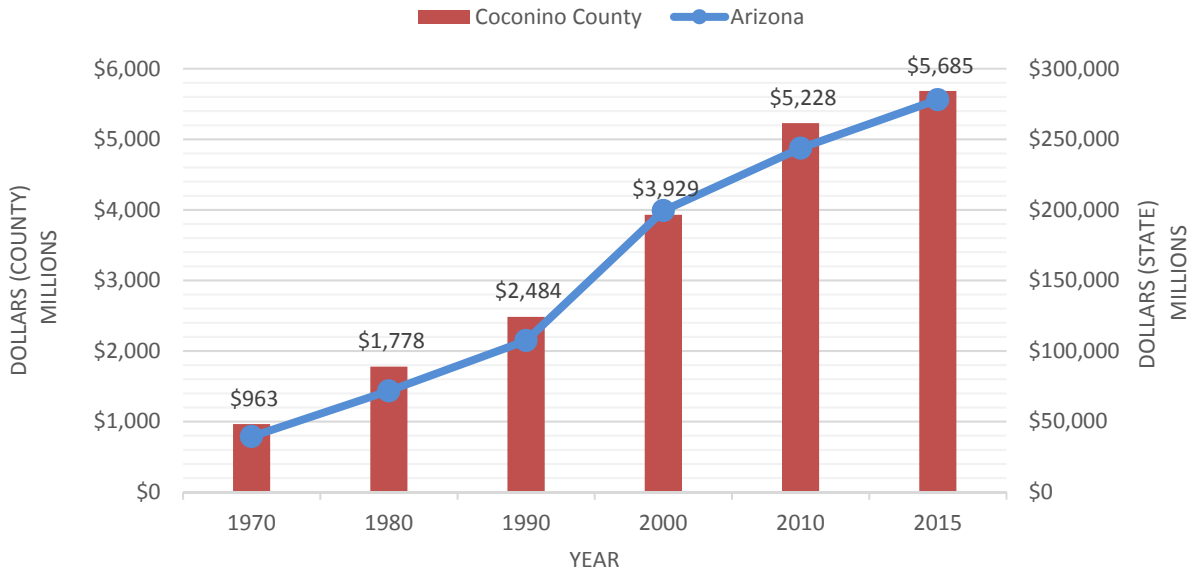
Year	Town of Tusayan	Coconino County	Arizona	United States
1970	--[a]	48,326	1,775,399	204,053,325
1980	--[a]	75,008	2,718,425	226,548,632
1990	--[a]	96,591	3,665,228	248,709,873
2000	545	116,320	5,130,632	281,421,906
2010	558	134,421	6,392,017	308,745,538
2015	589	141,602	6,758,251	321,449,752
CAGR	0.5%	2.5%	3.2%	1.1%

Source: U.S. Census Bureau; Arizona State Demographer Office
CAGR – Compound Annual Growth Rate
[a] Population data for the Town of Tusayan is unavailable prior to 2000.

ECONOMY

Gross regional product (GRP) is a measure of the market value of the goods and services produced within an area in a given period of time. The local economy in Tusayan is composed almost exclusively by businesses serving tourists to the GCNP. However, the County economy is more diverse and includes business centers in Flagstaff, Sedona, and Page among other communities. The County employment sectors (excluding government sectors) with the highest earnings in 2015 were Healthcare and Social Assistance (16 percent of total earnings) and Manufacturing (11 percent of total earnings). Historic trends show County GDP has grown at a CAGR of 4.0 percent over the past 45-year period, which is only slightly behind the state CAGR of 4.4 percent for the same time period. Historical GDP trends for the County and the State of Arizona are shown in **Figure 1J**.

FIGURE 1J
Gross Regional Product (2009 Dollars)



VALLE AIRPORT (40G)

Airport Sponsor: Grand Canyon Valle Corporation
Distance from GCN: 18.1 n.m. South
NPIAS Classification: Not Classified
Primary Runway: 1-19 **Length:** 4,199′ **Width:** 45′

Surface Type/Condition:	Asphalt/Good
Strength Rating:	N/A
Marking:	Basic
Runway Lighting:	MIRL
Visual Approach Aids:	None
Based Aircraft:	8
Estimated Operations:	6,550
Services Provided:	Aviation Fuel (100LL); Tiedowns; Hangars
Published Instrument Approach Procedures:	3 - GPS; VOR/DME

TUBA CITY AIRPORT (T03)

Airport Sponsor: Navajo Nation
Distance from GCN: 38.0 n.m. East Northeast
NPIAS Classification: General Aviation - Basic
Primary Runway: 15-33 **Length:** 6,230′ **Width:** 75′

Surface Type/Condition:	Asphalt/Fair
Strength Rating:	12,500 SWL
Marking:	Nonprecision
Runway Lighting:	MIRL
Visual Approach Aids:	VASI-2 (15, 33)
Based Aircraft:	0
Estimated Operations:	250
Services Provided:	Aircraft Tiedowns
Published Instrument Approach Procedures:	None

H.A. CLARK MEMORIAL FIELD AIRPORT (CMR)

Airport Sponsor: City of Williams
Distance from GCN: 38.9 n.m. South
NPIAS Classification: General Aviation - Basic
Primary Runway: 18-36 **Length:** 6,000′ **Width:** 100′

Surface Type/Condition:	Asphalt/Good
Strength Rating:	N/A
Marking:	Nonprecision
Runway Lighting:	MIRL
Visual Approach Aids:	PAPI-4 (18, 36)
Based Aircraft:	3
Estimated Operations:	6,100
Services Provided:	Aviation Fuel (100LL); Tiedowns; Hangars
Published Instrument Approach Procedures:	None

NORTH (All Pictures)

KEY
GPS - Global Positioning System
MIRL - Medium Intensity Runway Lights
NM - Nautical Miles
PAPI - Precision Approach Path Indicator
SWL - Single Wheel Loading
VASI - Visual Approach Slope Indicator

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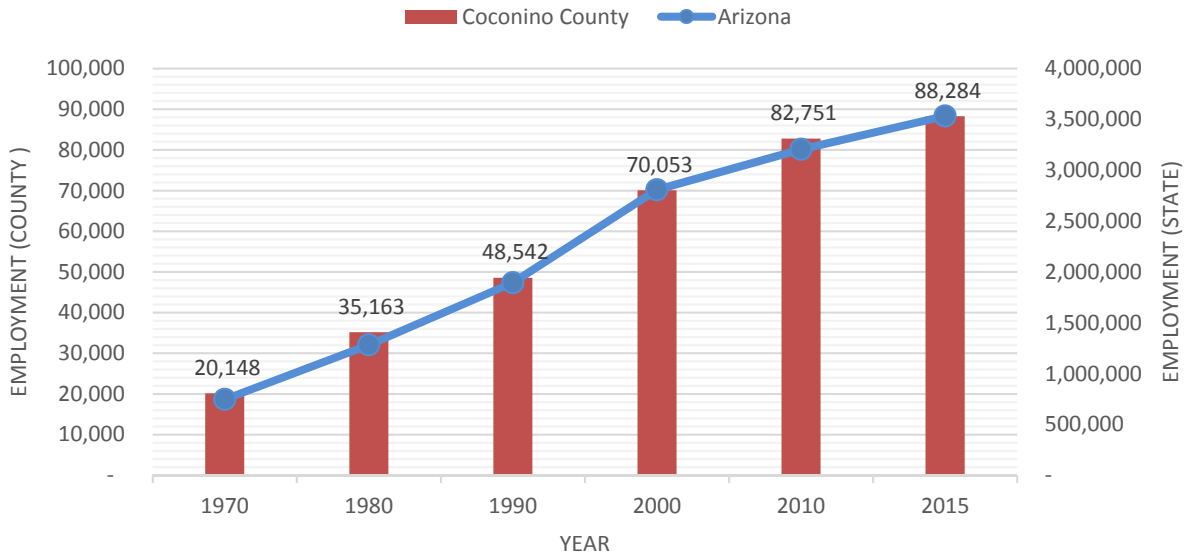
The largest employment sectors (excluding government sectors) in the County in 2015 include Accommodation and Food Services (13.7 percent), Healthcare and Social Assistance (11.6 percent), and Retail (10.7 percent). Total County employment growth over the past 45-year period has followed closely with state trends growing at a CAGR of 3.3 percent to the state's 3.5 percent. Total employment trends for the County and the State of Arizona are shown in **Figure 1K**.

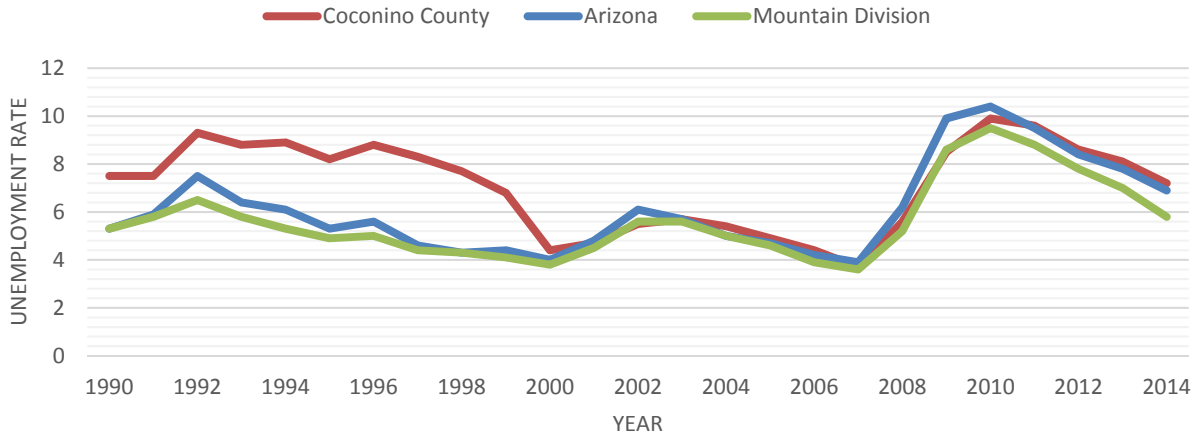
FIGURE 1K
Total Employment



Historical unemployment rates show the effects of the recent economic recession on employment. Unemployment rates had been on a steady decline up until 2008, which saw rates jump almost two percent in the County. Unemployment rates peaked in 2010 and once again have steadily declined. Unemployment rates for the state and for the U.S. Census Bureau Mountain Division[8] are also shown for perspective. Current State and County unemployment rates are slightly higher than the Mountain Division. **Figure 1L** depicts historical unemployment rates for Coconino County, the State of Arizona, and the U.S. Census Bureau Mountain Division.

[8] U.S. Census Bureau Mountain Division includes the states of Arizona, New Mexico, Nevada, Utah, Colorado, Wyoming, Idaho, and Montana.

FIGURE 1L
Unemployment Rates (Not Seasonally Adjusted)



INCOME

Per capita personal income (PCPI) levels for the County have historically lagged behind state income levels. In 1970, County PCPI was 18.3 percent below the state level. However, that gap has shrunk significantly in recent years with County PCPI only 0.5 percent lower than the state level in 2010. **Figure 1M** depicts historic PCPI trends for Coconino County and the State of Arizona.

FIGURE 1M
Per Capital Personal Income (2009 Dollars)