

GREENVILLE-SPARTANBURG INTERNATIONAL AIRPORT

Airport Master Plan Executive Summary



DECEMBER 2019



McFarland Johnson



In late 2016, it was the desire of the Greenville-Spartanburg Airport District to evaluate the Greenville-Spartanburg International Airport through the preparation of an airport master plan to assure that the Airport and its environs are safe and efficient as well as to evaluate the growing needs of airport users and the aviation needs of the surrounding community.

The District envisions the future of GSP as the premier airport in the Upstate advancing the economic prosperity of the region by providing a safe, convenient, user-friendly and cost competitive air transportation system that connects the region with the nation and world. The airport has witnessed significant growth and changes in demand from all facets of the aviation industry including; commercial air service, air cargo activity, GA operators and services as well as non-aeronautical development.

Responding effectively and efficiently to future changes across such a broad spectrum without either over building or under building requires a dynamic and flexible master plan that can identify needed facilities as conditions and/or demands change.

This master plan guides the Airport's plans for future infrastructure development as well as strengthens its commitment to being a community-focused business and vital transportation hub and economic driver for the Upstate region.

Airport Master Plan

OBJECTIVES

- Provide an airport that is safe and reliable
- Maintain or enhance the efficient operation of the Airport
- Provide a long-term development plan which minimizes negative environmental impacts
- Enhance the long-term fiscal sustainability of the Airport
- Develop the Airport to support local and regional economic goals while accommodating new opportunities or shifts in development patterns
- Engage airport stakeholders in the visioning and planning process and communicate externally
- Facilitate long-term airport development strategies through thoughtful land use planning

KEY FACTORS

- Airfield optimization
- Air cargo facility requirements and development considerations
- Commercial terminal expansion
- Access and parking

Connecting Upstate South Carolina with the World.

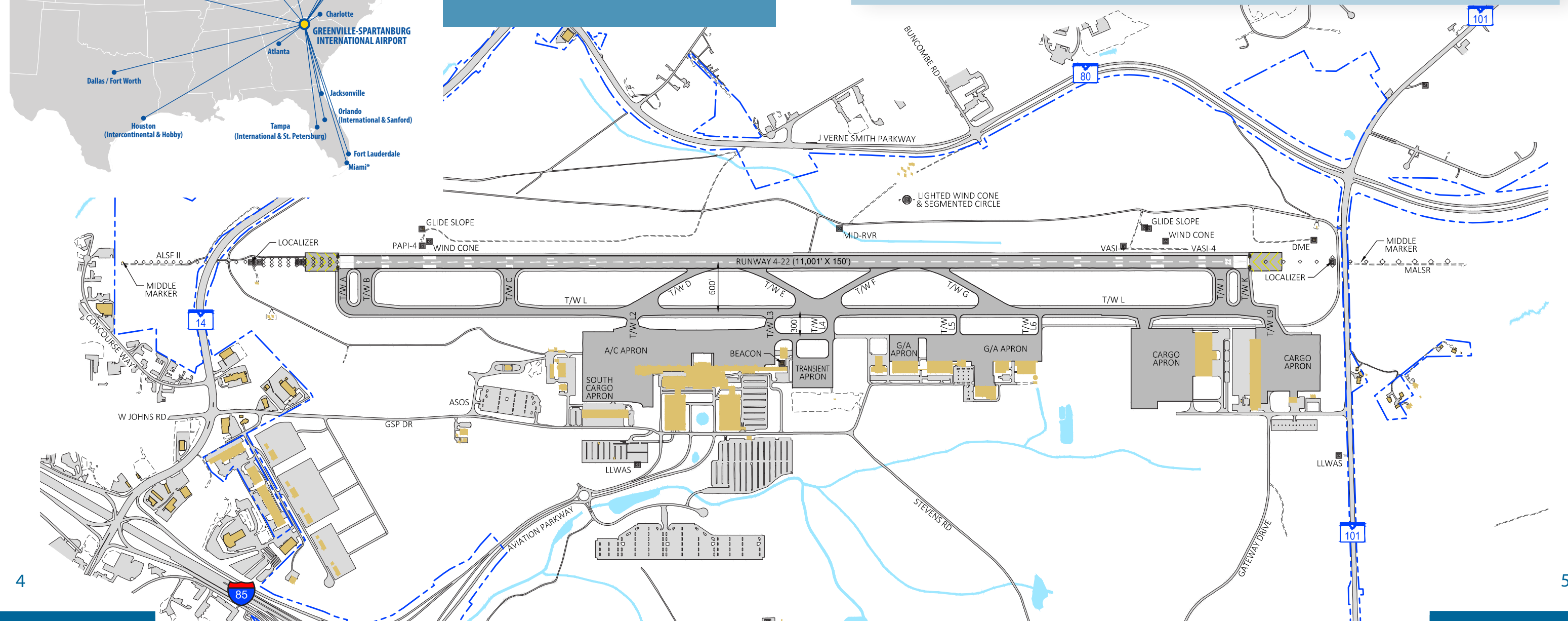
Our Vision

A map of the United States showing flight routes from Greenville-Spartanburg International Airport. The airport is highlighted with a yellow circle and labeled "GREENVILLE-SPARTANBURG INTERNATIONAL AIRPORT". Blue lines radiate from this central point to various other cities, each marked with a blue dot. The cities connected are: Denver, Chicago (O'Hare), Detroit, Newark, NYC (LaGuardia), Philadelphia, Baltimore, Washington D.C. (Dulles & Reagan), Charlotte, Atlanta, Dallas / Fort Worth, Houston (Intercontinental & Hobby), Tampa (International & St. Petersburg), Jacksonville, Orlando (International & Sanford), Fort Lauderdale, and Miami*. The map is in shades of gray, with state boundaries visible.

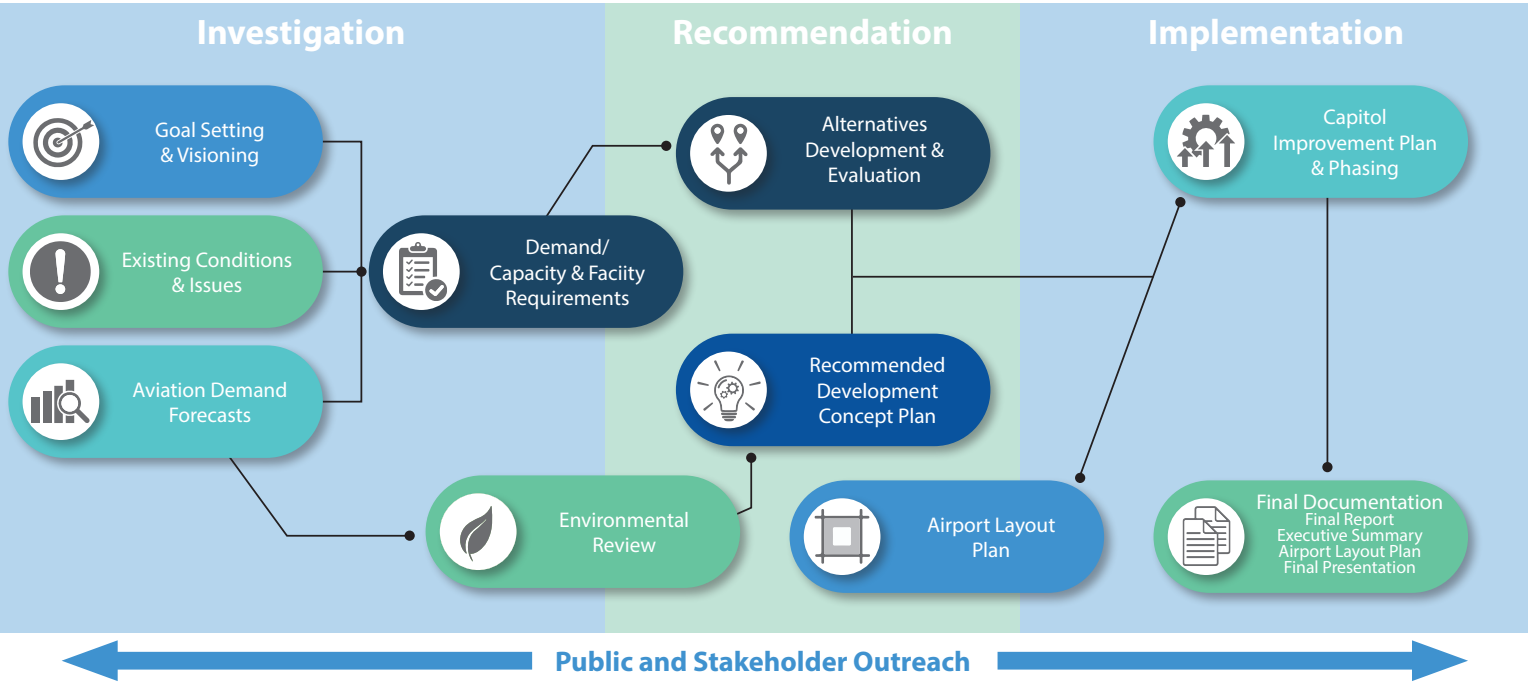
- 11,001' X 150' all-weather runway
- Airport traffic control tower and radar approach control
- 322,446 sq. ft. passenger terminal with 13 gates
- 180,000 sq. yd. air cargo apron
- Thriving fixed-base operator with 40,000 sq. yd. general aviation apron
- Direct access to South Carolina's Upstate region - home to a top-ranked business climate, a world-class research environment and educational facilities, and a superb quality of life.

COMMERCIAL AIRLINE BOARDINGS

Passenger Enplanements	1,014,611	1,182,700	1,333,823	1,648,052
AIR CARGO SHIPMENTS				
Enplaned (Tons)	63,807,773	107,081,523	127,742,749	183,220,963
ANNUAL AIRCRAFT OPERATIONS				
ITINERANT OPERATIONS				
Air Carrier	20,242	32,491	35,445	41,066
General Aviation	7,171	11,238	11,201	11,986
Military	2,483	2,483	2,483	2,483
TOTAL ITINERANT OPERATIONS	29,896	46,212	49,129	55,235
LOCAL OPERATIONS				
General Aviation	350	350	350	350
Military	0	0	0	0
TOTAL LOCAL OPERATIONS	350	350	350	350
TOTAL OPERATIONS	30,246	46,632	49,479	55,885
BASED AIRCRAFT	26	28	29	31



MASTER PLAN PROCESS



AIRPORT HISTORY

GSP opened on October 15, 1962, replacing Greenville Downtown Airport and Spartanburg Downtown Airport as the primary airline destination in the region and becoming the first nonmilitary airport in the country to be equipped with a runway centerline lighting system. Throughout the 1970s and 80s, GSP expanded its presence in the national airspace system and developed its air carrier terminal and cargo facilities. The runway was lengthened twice in the 1990s to its present length of 11,001 feet. To honor the tireless work to establish the airport and his decades of service to GSP, the airfield was named for Mr. Roger Milliken in 2004 – Greenville Spartanburg International Airport – Roger Milliken Field.

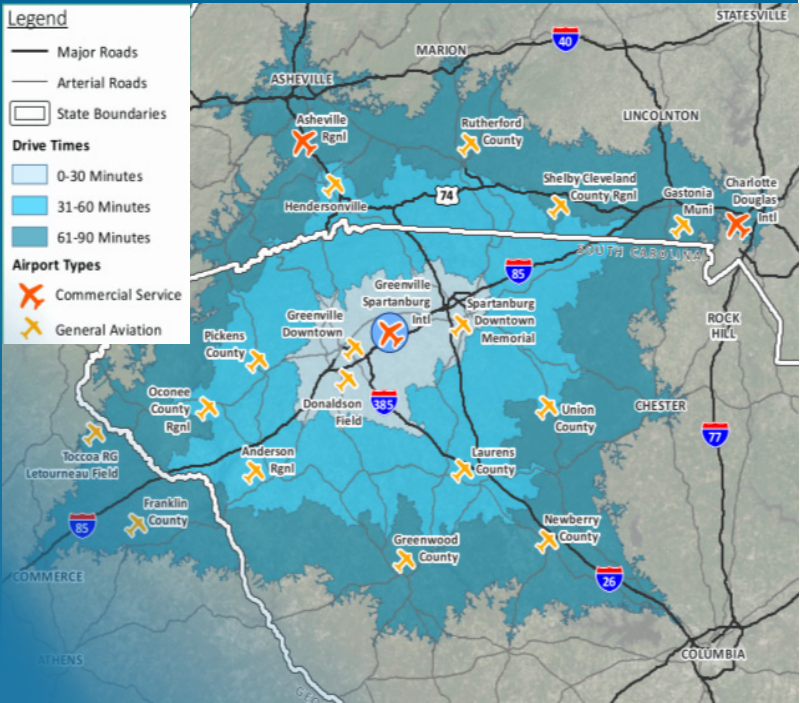
Because of GSP's proximity to large hub airports in nearby Atlanta and Charlotte, the Airport struggled in its early years to attract and retain a variety of air carriers and city pair options. Over the last decade, however, more demand for air services from GSP have been realized and air service has grown. Allegiant Air began flights to Florida in 2006, and in 2011 Southwest Airlines began service to five cities. In 2011 GSP received an ANNIE Award from Airline and Airport News & Analysis for being the fastest-growing

small airport in the United States. In 2012, the Airport contributed over \$817 million to the upstate economy. This number grew to \$2.9 billion in 2018 according to the Greenspan-Spartanburg International Airport Economic Study. Today, the six airlines serving GSP, providing direct flights to 17 destinations, and the regular scheduled cargo services continue to advance the economic prosperity of the region by providing a safe, convenient, user-friendly and cost competitive air transportation system connecting the region with the nation and world.

INVENTORY

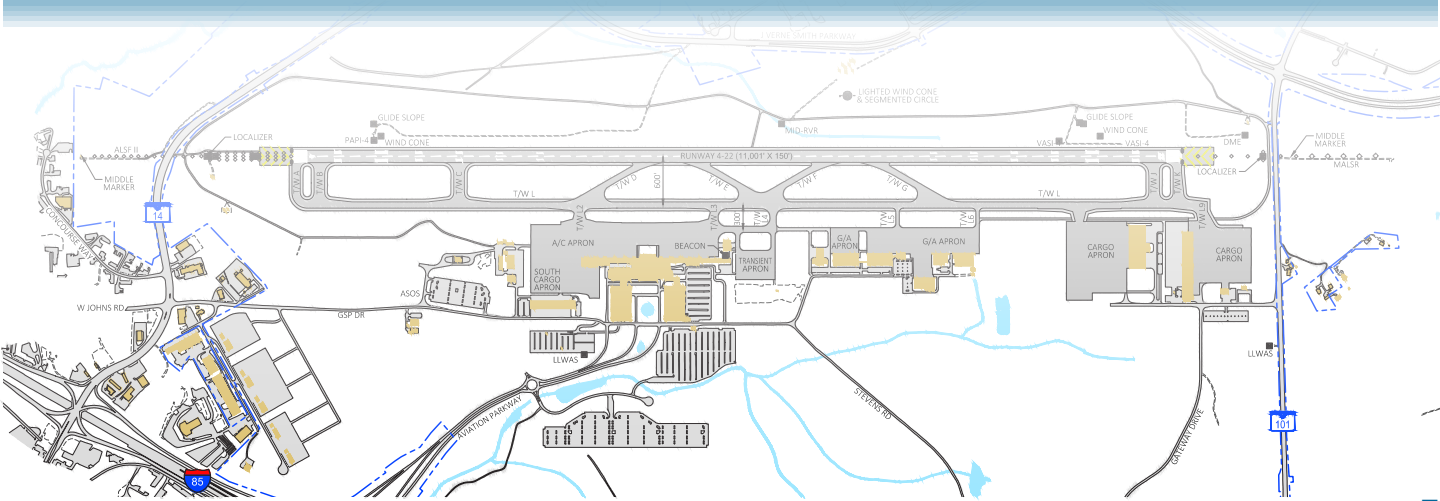
AIRPORT SETTING:

GSP is located approximately three miles south of the City of Greer, SC, 10 miles east of the City of Greenville, SC and 15 miles west of the City of Spartanburg, SC. The Airport resides in both Greenville and Spartanburg Counties, which are located in the northwest corner of the State, also known as South Carolina's Upstate region. The Airport covers approximately 3,600 acres and major cities near GSP include Columbia, SC (79 miles southeast); Charlotte, NC (93 miles northeast); and Atlanta, Georgia (156 miles southwest).



AIRSIDE FACILITIES

GSP has a single, bi-directional, asphalt-concrete runway. Runway 4-22 meets the criteria for FAA Airport Reference Code (ARC) D-V indicating Runway 4-22 can accommodate aircraft with wingspans up to but not including 214 feet, a tail height up to but not including 66 feet, and approach speeds up to but not including 166 knots. Runway 4-22 is equipped with high intensity runway edge lighting (HIRL) and has in-pavement centerline lights spaced at 50-foot intervals. Runway 4 is equipped with a 2,400-foot high intensity approach lighting system and Runway 22 is equipped with a 1,400-foot medium intensity approach lighting system. For additional visual guidance, both Runway 4 and Runway 22 are equipped with a four-light precision approach path indicators (PAPI) with standard three-degree glide path angles. Both PAPIs are located on the west side of Runway 4-22. Both runways are marked with precision runway markings and the markings are in good condition. Both Runway 4 and 22 are equipped with instrument landing systems to enable operations during inclement weather, though Runway 4 is available to aircrew and aircraft with special certification when weather is especially poor.



INVENTORY

LANDSIDE FACILITIES

The passenger terminal complex at GSP recently underwent a major renovation and revitalization effort focused on increasing capacity, improving efficiency and elevating the aesthetics of the terminal building and its surroundings. The passenger terminal complex consists of the Main Terminal and two concourses, designated as Concourse A (south) and Concourse B (north). Together, these facilities total approximately 322,446 square feet and serve major and commuter airlines across 13 gates. The Main Terminal has three floors and a basement. The first floor is designated as the Ticketing Level and is unsecure. The Grand Hall is to the floor above, a two-story area with amenities at the Apron Level and Concourse Level that requires passage through security prior to entry. Two transportation cores containing stairs, escalators, and elevators transport passengers between the Ticketing Level and the levels located in the Grand Hall. The terminal facilities are currently utilized by commercial airlines including Allegiant Air (Allegiant), American Airlines (American), Delta Air Lines (Delta), Southwest

Airlines (Southwest), and United Airlines (United) as well as multiple concessionaires.

In January of 2010, GSP opened a new general aviation terminal at the Airport located north of the commercial passenger terminal on the general aviation apron. This facility is approximately 6,700 square feet in size and supported by a 150-stall parking lot. The general aviation terminal is operated by Cerulean Aviation. The GA terminal project was awarded a LEED-Gold Certificate by the U.S. Green Building Council as the building uses 38 percent less energy overall than similar sized buildings and approximately 75 percent less water because of a rain harvest system, which is used to collect rainwater from the roof for toilet flushing. In addition, a solar water heating system provides hot water and the building employs Variable Refrigerant Flow Technology for highly efficient heating and cooling. Multiple glass panels eliminate the use of electrical lights during daylight hours. During construction, 98 percent of the waste generated was recycled.

INVENTORY

AIR CARGO & INDUSTRIAL DEVELOPMENT

Multiple facilities at the Airport provide opportunity for consolidation, shipment and forwarding for cargo and freight tenants. GSP cargo tenants include FedEx, American Airlines Cargo, Delta Cargo, Southwest Cargo, Senator International Freight Forwarding, and UPS.



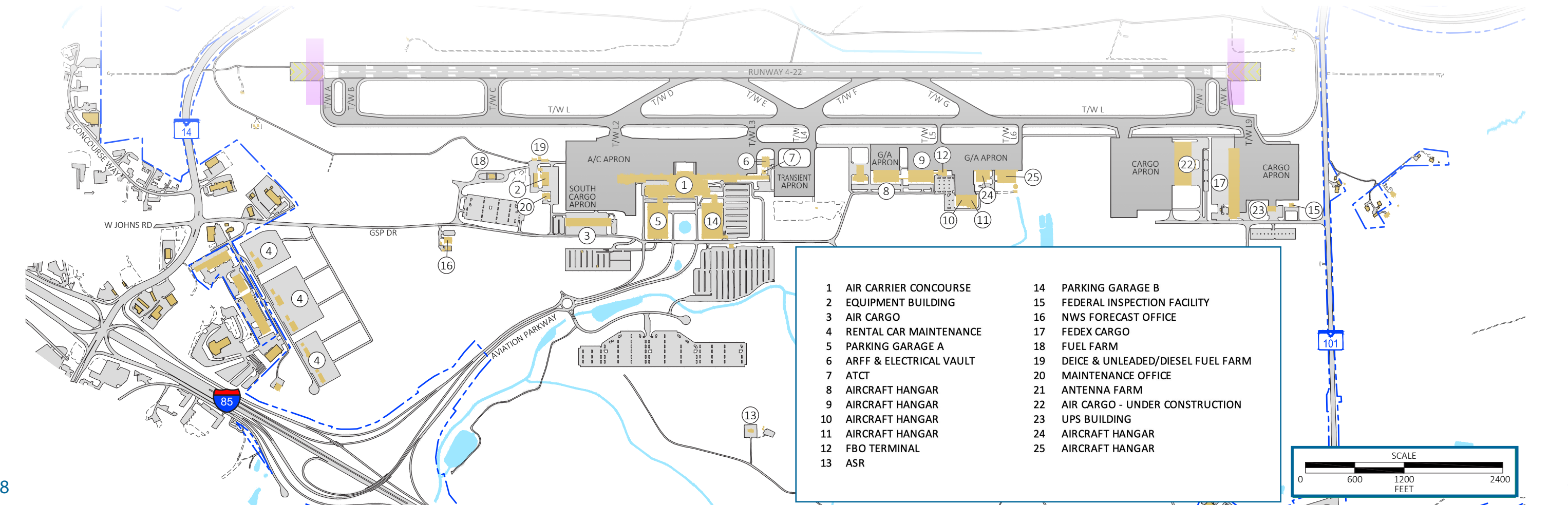
FedEx operates out of the largest cargo center on airport property, located on the main cargo apron area on the north side of the airfield. UPS operates out of the newly constructed north cargo building. The southern cargo

building is shared by American Airlines Cargo, Delta Cargo, Southwest Cargo, Senator International Freight Forwarding Solutions, and Bradford Airport Logistics.

Multiple local and international freight forwarding organizations support the cargo tenants at GSP. For cargo entering the terminal building, Bradford Airport Logistics offers security as well as command and control services for those goods entering the terminal complex.

GSP currently owns and leases out facilities located on Industrial Park Road in three buildings. Building A is located between Airport Road and Runion Road. It has approximately 42,500 square feet and three tenants:

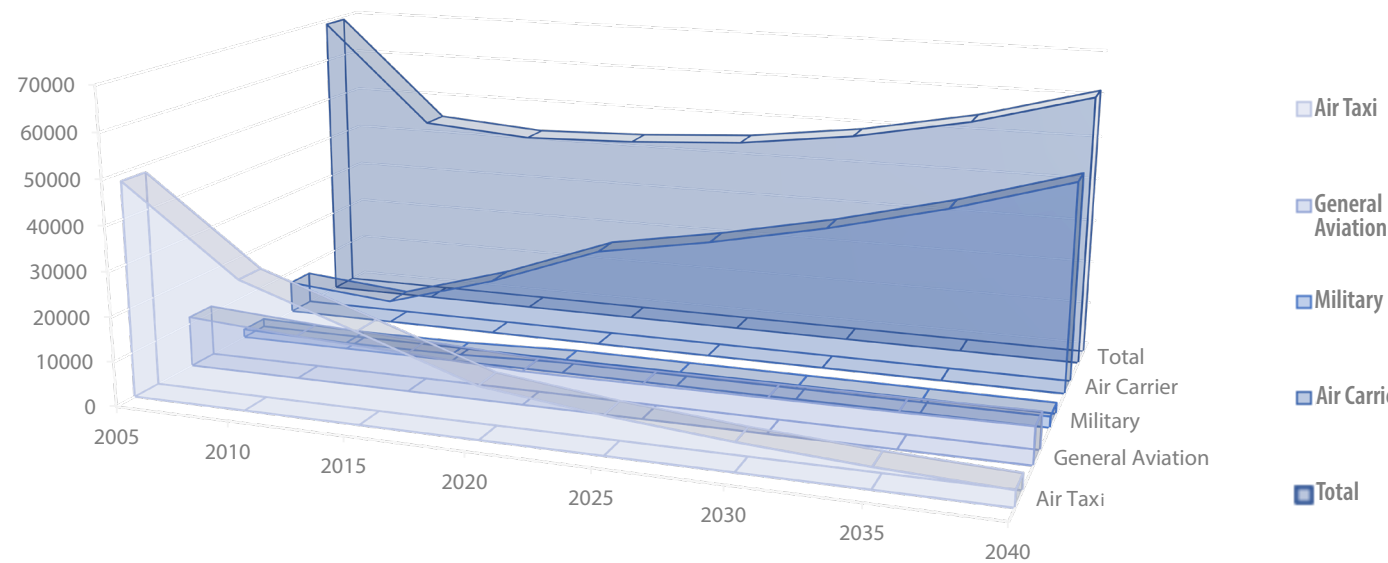
Building B is situated between Industrial Park Road and Runion Road. It has approximately 20,000 square feet and is leased to Forward Air Inc. Building C is situated between Industrial Park Road and Runion Road. It has approximately 39,500 square feet and six tenants.



FAA APPROVED AVIATION DEMAND FORECAST

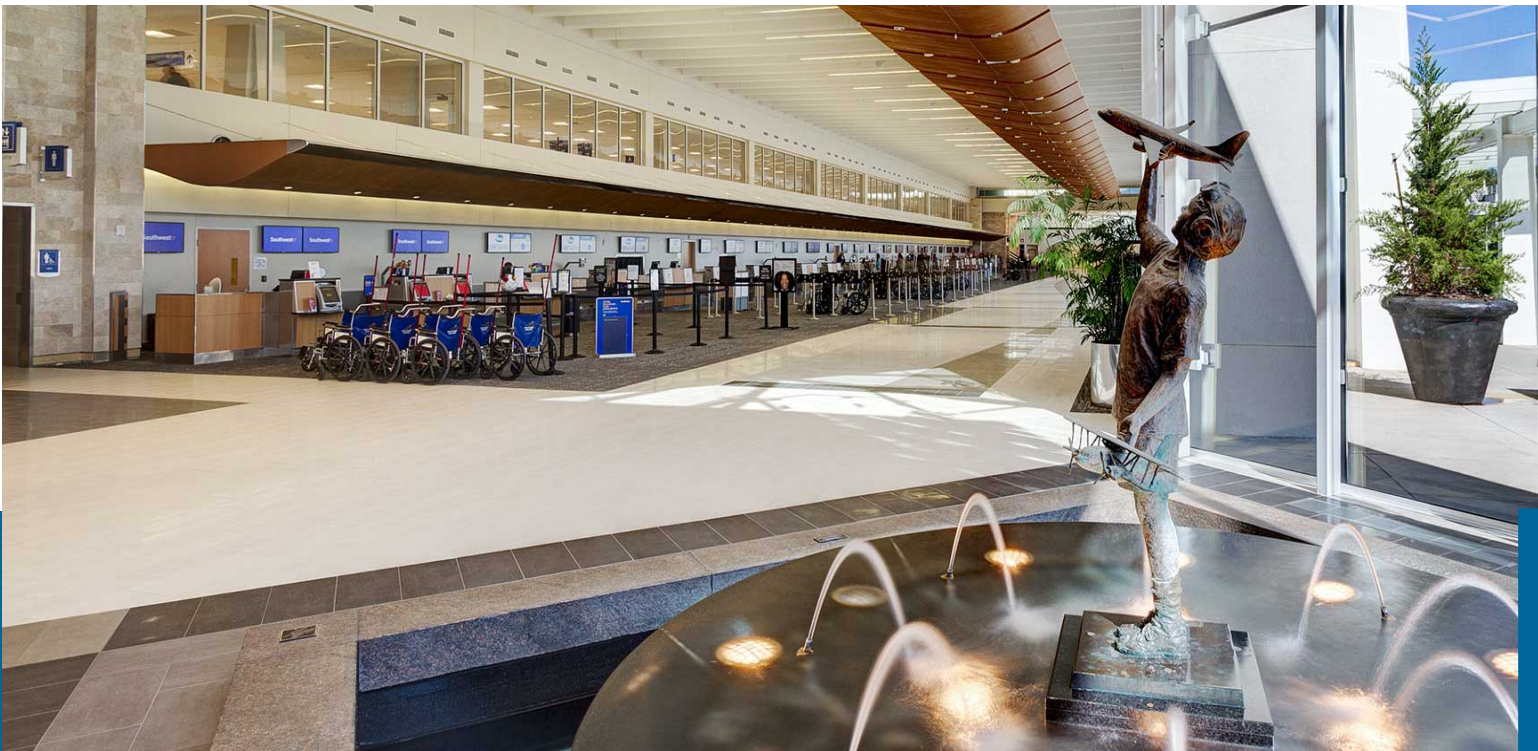
The historical data for aircraft operations, shown below depicts various trends for each type of operation. Air carrier operations have fluctuated in the last 25 years with the initial growth of air service followed by a reduction in airlines at GSP. However, in the last 10 years, air service operations have increased year over year. Additionally, as a result of airlines employing larger aircraft from GSP, historical enplanement growth remains high at about 4.5% average annual growth. Air taxi operations peaked in 2005 at 48,221 and have followed a steady negative trend since. Total general aviation operations have seen a consistent decline historically, with both local and itinerant operations following negative trends, and military operations have remained consistently low over the last 25 years. Overall, the decline in total operations that has been seen historically has plateaued in recent years, with positive trends on the forecast horizon.

Annual Operations Forecast by Type



The project development process (planning, environmental, design and construction) for large scale airport improvements can often take in excess of 10 years meaning the planning process begins long before the project objectives are necessary. While many uncertainties exist beyond the 20-year planning period, forecast results were developed for the 2045, 2055 and 2065 planning-year horizons. Facility requirements and alternatives will identify potential facility land development needs to ensure that short term development does not impede long term facility needs. The table below contains the forecast highlights for the beyond planning period horizons.

	Enplanements	Air Cargo (pounds)	Operations	Based Aircraft
2045	2,153,123	302,738,694	63,895	35
2055	2,745,443	500,219,598	72,203	39
2065	3,500,708	826,520,202	81,592	44



RECOMMENDED IMPROVEMENTS

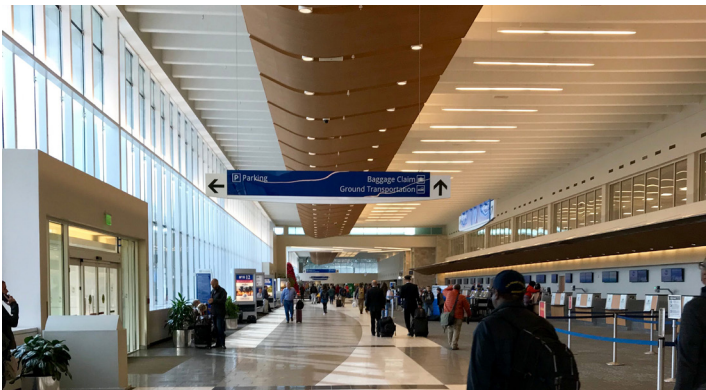
The 2003 Airport Master Plan Update represents the most significant Airport specific planning study for GSP in recent years. Since that plan was established, many of the recommendations made have been implemented, including the rehabilitation of Runway 4-22 and renovation of the terminal building core and passenger apron area.

This updated master plan builds upon the 2003 effort with a specific focus on planning for the future needs related to commercial air traffic and air cargo operations at the Airport.



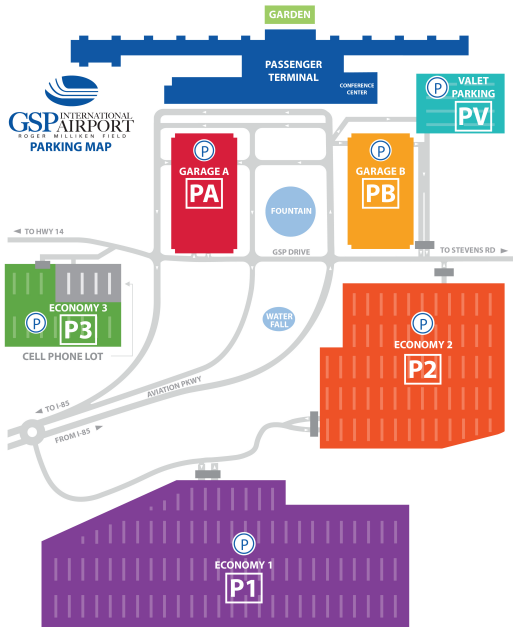
AIRFIELD —

Based on existing and projected uses, GSP’s Runway 4-22 is sized and equipped to meet the existing and long term demand. The master plan recommends some improvements to taxiway fillet geometry to better support the largest aircraft operating at the Airport as well as a future improvement of the Runway 22 approach lighting system to enable Category II/III approaches to that runway end to ensure properly equipped aircraft can utilize that runway in the worst visibility conditions. Theoretical capacity analysis of GSP’s single runway indicated it could accommodate up to approximately 170,000 aircraft operations annually before chronic unacceptable delay would impact operational efficacy. To plan for supporting such level of operations in the long-term, the Master Plan identifies and depicts the location of a future parallel runway between the existing runway and Interstate I-85.



PASSENGER TERMINAL —

The recent terminal improvement project known as WINGSPAN was a \$125 million renovation of the GSP terminal building initiated in 2012 and completed in 2017. This project modernized the facility, renovated the airside sculpture garden, provided a 1,700-square-foot conference center. In the future, concourse expansions and additional aircraft gates will be required to fully meet anticipated demand. Specifically, an additional 5 gates are anticipated to enable the airport to approach 2 million annual enplaned passengers (MAEP) and 15 gates would be needed to accommodate 3.5 MAEP. To plan for such future growth, the master plan depicts a reorganization of Concourse A gates, an extension to Concourse B to provide for additional gates and better utilize the existing transient apron area, and the future construction of Terminal 2.



PARKING IMPROVEMENTS —

To determine future roadway access and parking facility requirements at GSP, the performance of existing facilities was assessed through detailed review of peak activity vehicular movements about the GSP campus along with daily activity records for each parking lot over a three-year period. This information enabled the understanding of traffic profiles during various peak activity periods across an average day as well as typical demands on parking facilities and their peaking characteristics. Ultimately, recommendations were made to increase capacity, limit full stop intersections, decouple terminal curb and parking traffic, and balance garage utilization. Additionally, the master plan calls for an additional 2,000 premium automobile parking positions and 1,800 economy positions.



AIR CARGO —

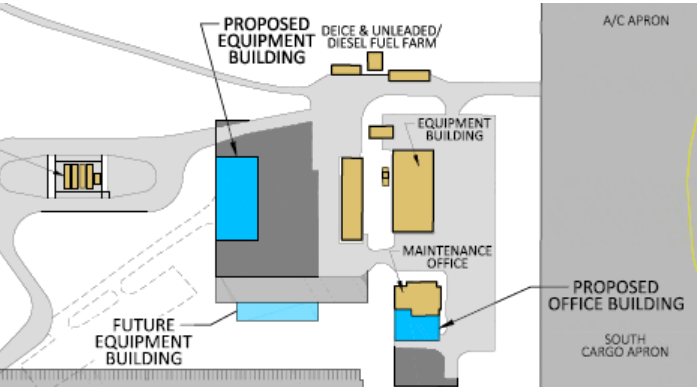
The accommodation of the growing air cargo demand was a primary focus of this master plan effort. The master plan identifies strong growth in air cargo at GSP for both integrated carriers, such as FedEx and UPS, and all cargo carriers such as Senator International Freight Logistics, LLC (Senator). With compound annual growth rates forecasted between 3.2 percent and 6.1 percent, GSP can expect to facilitate the movement of anywhere from 103 million pounds to 250 million pounds by 2037, and upwards of 826 million pounds by 2065 should trends continue. Existing cargo facilities and equipment at GSP will be unable to support the variety and quantity of air cargo anticipated in the future. In fact, new cargo facilities were already under construction during the development of the master plan. Ultimately, however, more facilities will be needed. The master plan identifies a cargo development area capable of simultaneously supporting up to 21 widebody aircraft with direct frontage to a cargo processing facility. Potentially more cargo capacity could be realized on the far western side

of the airfield where large aprons and clearspan hangars are proposed for a future maintenance, manufacturing, repair or overhaul (MMRO) use. These facilities are sized to accommodate a variety of wide-body and narrow body aircraft.



GENERAL AVIATION —

The demand for general aviation hangar and apron space is anticipated to grow at GSP in the coming years primarily as a result of increased utilization of business jet aircraft within the national airspace system and the economic growth and activity in the Upstate Region. To best support a variety of general aviation uses, the master plan provides a future expanded general aviation (GA) area at GSP that includes nearly 300,000-square-feet of additional clearspan hangar space and ample associated aircraft apron.



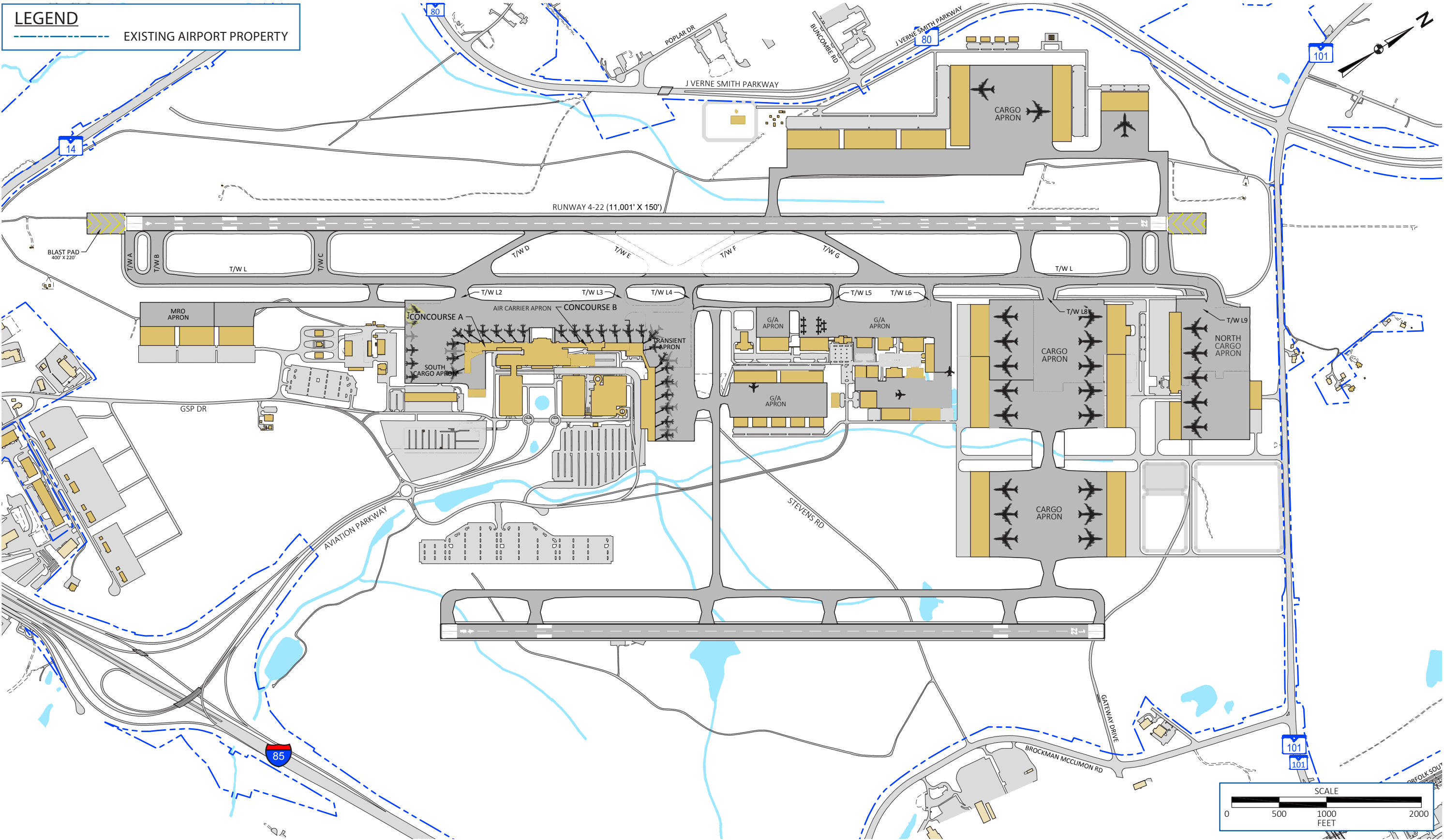
OPERATIONS & MAINTENANCE —

The area between the southern edge of the air carrier apron and the airport fuel farm is identified for expanded operations and maintenance facilities. To support the growing demands on airport operations and maintenance staff, an expanded equipment yard and storage buildings are planned along with an expanded maintenance office and associated parking area. These facilities more than double the existing operations and maintenance facilities.

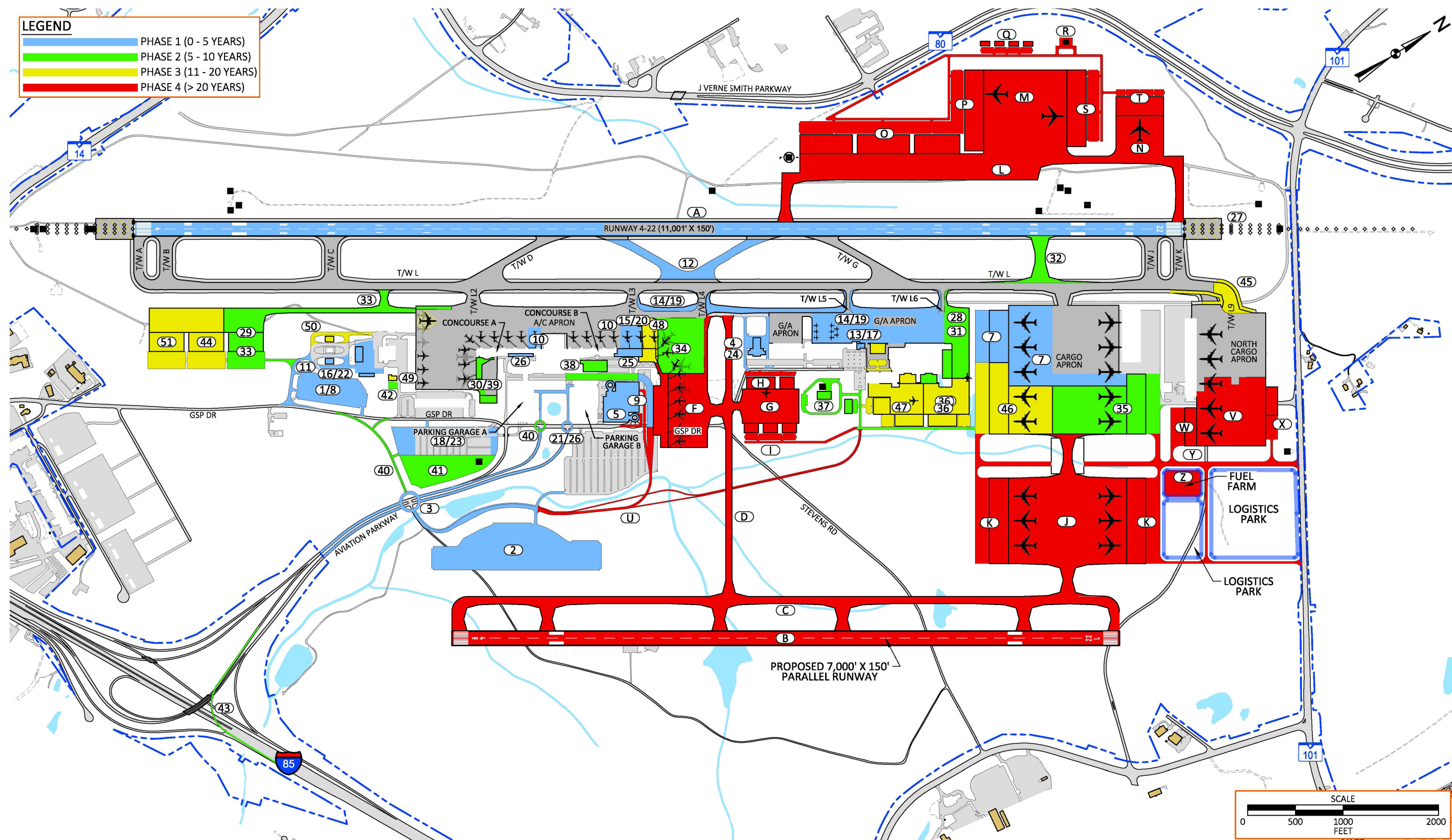
DEVELOPMENT PLAN

LEGEND

EXISTING AIRPORT PROPERTY

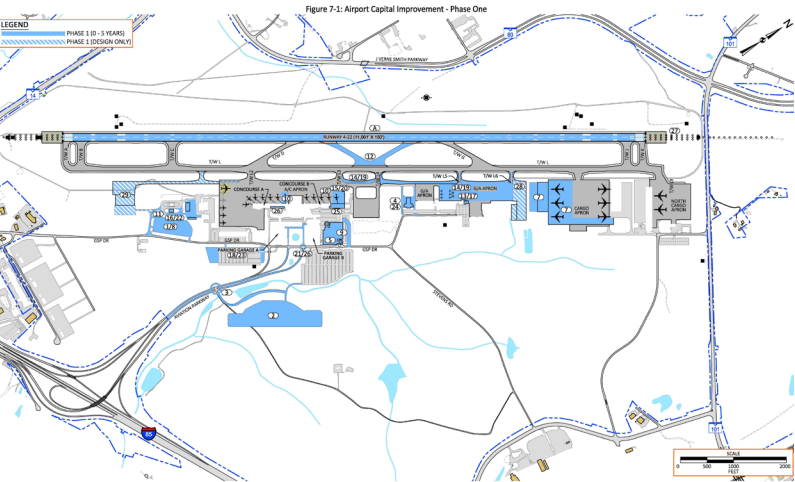


IMPLEMENTATION/PHASING PLAN



SUMMARY OF PROGRAM COSTS BY PHASE

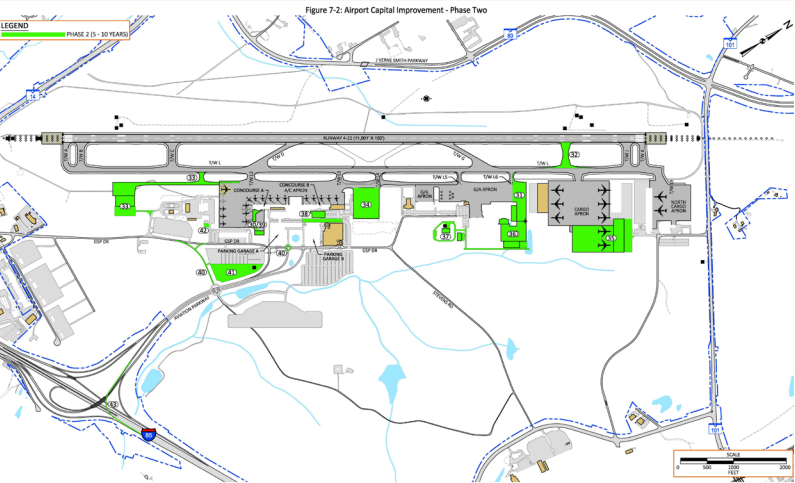
Phase I (0 to 5 Years), 2019-2023



Key Projects and Costs

Runway 22 Rehabilitation	\$12.8 MM
Economy Surface Lot Expansion	\$1.1 MM
ARFF Relocation	\$7.7 MM
Air Cargo Apron Expansion	\$15.0 MM
Construct Garage C	\$45.0 MM
Concourse B Expansion	\$11.5 MM

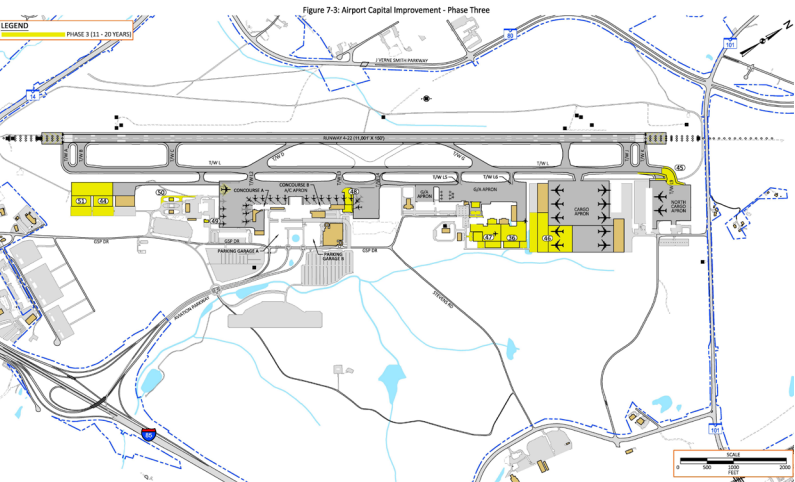
Phase II (6 to 10 Years), 2024-2028



Key Projects and Costs

General Aviation Apron Expansion	\$10.1 MM
Transient Apron Rehabilitation	\$14.7 MM
Air Cargo Apron Building Expansion	\$15.5 MM
ATCT Relocation Design & Construction	\$20.5 MM
Terminal Baggage Claim & Curb Design/Construction	\$12.8 MM

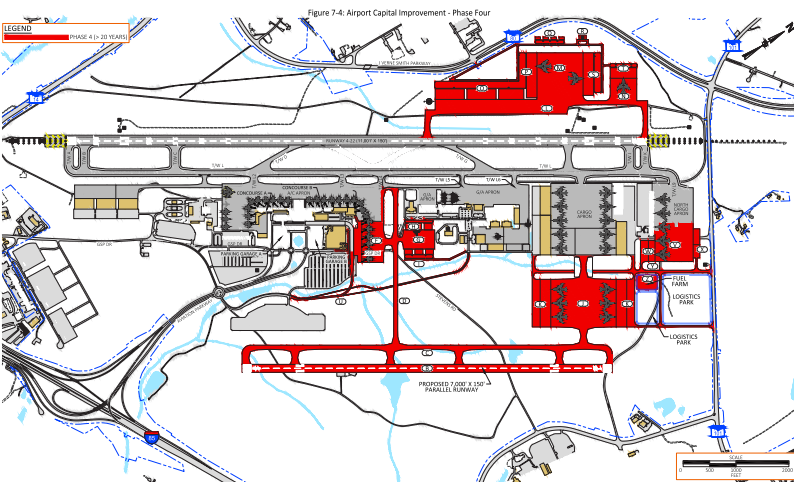
Phase III (11 to 20 Years), 2029-2038



Key Projects and Costs

Taxiway L9 Alignment	\$8.5 MM
GA Apron Expansion	\$38.7 MM
Concourse B Buildout	\$18.3 MM
South MRO Development	\$7.5 MM
Air Cargo Apron Building Expansion	\$ MM

Phase IV (Beyond 20 years) 2039+



Key Projects and Costs

Proposed Runway 4R-22L	\$50.4 MM
Proposed Parallel Taxiways and Connectors	\$58.1 MM
Apron and Terminal Expansion Projects	\$49.7 MM
Cargo Apron and Building Expansion Buildout	\$79.8 MM
Northwest Apron 5 Hangars Parking and Road Construction	\$77.4 MM

FINANCIAL PLAN SUMMARY

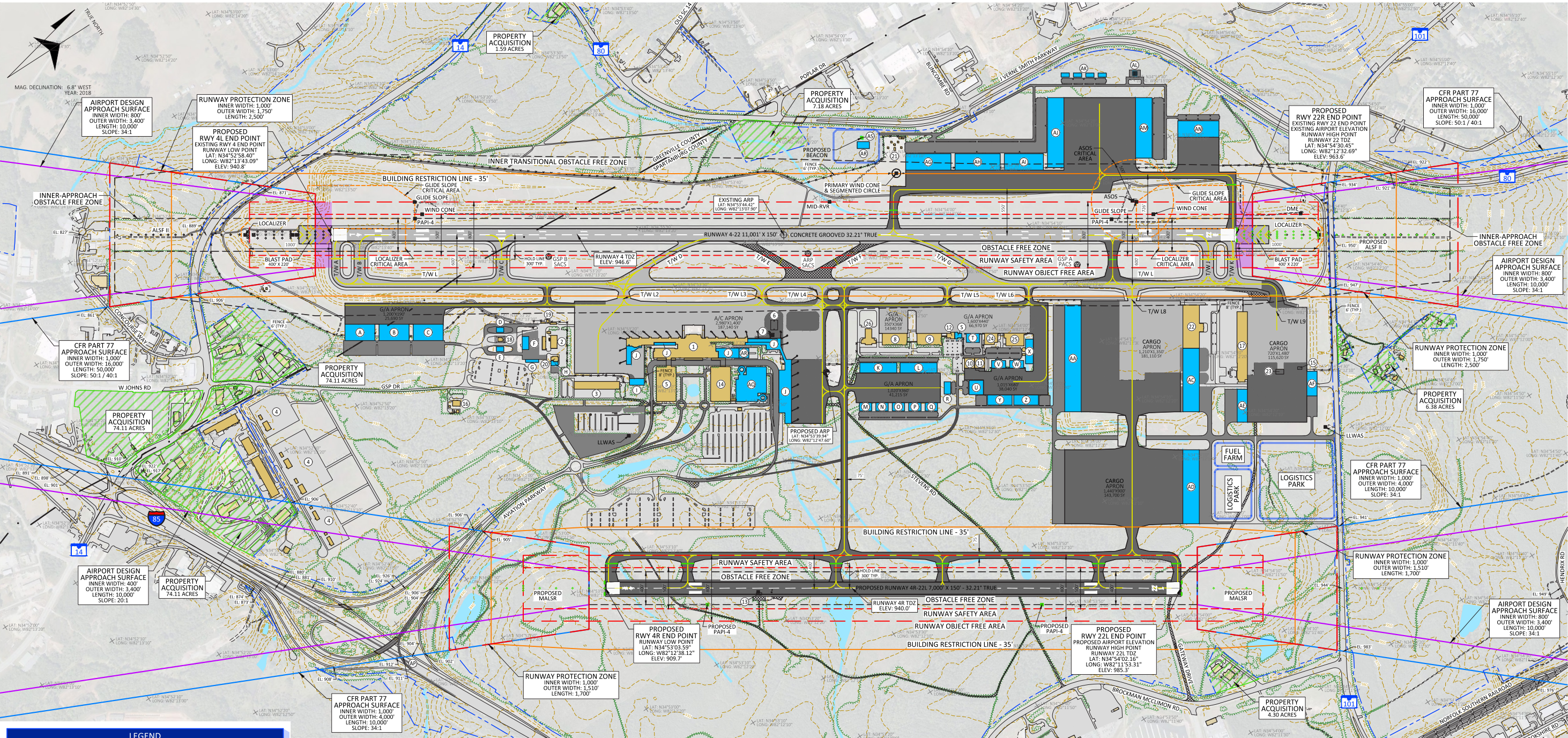
Land and facilities at GSP represent some of the Airport's most valuable assets for revenue generation. This is evidenced by the portion of operating revenues generated by airside facility use fees, rent payments made to the Airport by tenants of existing facilities, and revenues generated by concessionaires in the terminal. For this analysis, revenues from passenger parking, various ground transportation services (as detailed below), and expense reimbursements are not included so that the strength of GSP revenue generation direct from aeronautical operators can be assessed. A snapshot of operating revenues anticipated from facility rents and tenant fees budgeted for FY 2019 is presented below.

Facility Rents and Tenant Fees	FY 2019 Budgeted Revenues
Landing and Other Airside Fees	\$3,202,640
Space and Ground Rental Fees	\$10,927,865
Concessions and Other Revenue ^{1/}	\$4,895,360
Total ^{1/}	\$19,025,866
FY 2019 Budget Operating Revenues	\$40,761,296
Percentage of FY 2019 Operating Budget	47%

In addition, the Airport District has diversified business operations that include additional revenue from the following sources.

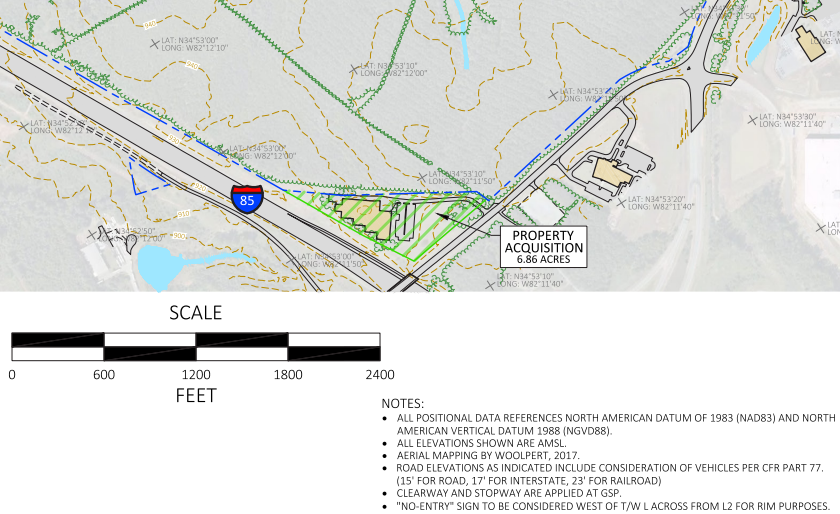
FBO Revenue Stream	FY 2019 Budgeted Revenues
Aircraft Deicing	\$56,000
Aircraft Ground Handling - Passenger	\$75,000
Ground Aircraft Handling	\$1,069,233
Warehousing Fees	\$1,179,695
Lease Income	\$411,526
Ground Support Income	\$104,032
Gross Profit from Fuel Sales	\$4,137,551
Total	\$7,033,037
FY 2019 Budget Operating Revenues	\$40,761,296
Percentage of FY 2019 Operating Budget	17%

APPROVED AIRPORT LAYOUT PLAN



LEGEND		
DESCRIPTION	EXISTING	PROPOSED
RUNWAY CENTERLINE		
HOLD LINE		
RUNWAY SAFETY AREA (RSA)	N/A	
RUNWAY OBJECT FREE AREA (ROFA)	N/A	
RUNWAY PROTECTION ZONE (RPZ)	N/A	
OBSTACLE FREE ZONE (OFZ)	N/A	
PRECISION OBSTACLE FREE ZONE (POFZ)		SAME
BUILDING RESTRICTION LINE - 35' (BRL)	N/A	
NAVAID CRITICAL AREA		SAME
CFR PART 77 APPROACH SURFACE	N/A	
AIRPORT DESIGN APPROACH SURFACE		
AIRPORT REFERENCE POINT		
AIRPORT PAVEMENT		
GROUND VEHICLE PAVEMENT		
ON-AIRPORT BUILDINGS		
OFF-AIRPORT BUILDINGS		SAME
TO BE REMOVED	N/A	
AIRPORT PROPERTY		
COUNTY BOUNDARY		SAME
NGS MONUMENT		SAME
FENCE		SAME
TREE LINE		SAME
GROUND ELEVATION CONTOURS (10')		SAME
WATER		SAME

FACILITIES TABLE					
EXISTING			PROPOSED		
ID	FACILITY NAME	TOP ELEV.	ID	FACILITY NAME	ID
1	AIR CARRIER CONCOURSE	980.7'	A	AIRCRAFT HANGAR	AA
2	EQUIPMENT BUILDING	957.8'	B	AIRCRAFT HANGAR	AC
3	AIR CARGO	955.3'	C	AIRCRAFT HANGAR	AD
4	RENTAL CAR MAINTENANCE	931.2'	D	FUEL FARM	AE
5	PARKING GARAGE A	953.6'	E	FUEL FARM	AF
6	ELECTRICAL VAULT	953.1'	F	EQUIPMENT BUILDING	AG
7	ATCT AND BEACON	1,045.1'	G	EQUIPMENT BUILDING	AH
8	AIRCRAFT HANGAR	988.2'	H	OFFICE BUILDING	AI
9	AIRCRAFT HANGAR	997.4'	I	AIRLINE GSE	AJ
10	AIRCRAFT HANGAR	972.7'	J	TERMINAL EXPANSION	AK
11	AIRCRAFT HANGAR	974.2'	K	AIRCRAFT HANGAR	AL
12	FBO TERMINAL	968.8'	L	AIRCRAFT HANGAR	AM
13	ASR	959.3'	M	AIRCRAFT HANGAR	AN
14	PARKING GARAGE B	953.6'	N	AIRCRAFT HANGAR	AO
15	FEDERAL INSPECTION FACILITY	974.1'	O	AIRCRAFT HANGAR	AP
16	MWS FORECAST OFFICE	958.3'	P	AIRCRAFT HANGAR	AQ
17	FEDEX CARGO	992.3'	Q	AIRCRAFT HANGAR	AR
18	FUEL FARM	947.2'	R	AVIATION SUPPORT	AS
19	DEICE & UNLEADED/DIESEL FUEL FARM	953.6'	S	FBO EXPANSION	AT
20	MAINTENANCE OFFICE	948.7'	T	AIRCRAFT HANGAR	AV
21	ANTENNA FARM	1,041.2'	U	AIRCRAFT HANGAR	AW
22	AIR CARGO	998.0'	V	AIRCRAFT HANGAR	AX
23	UPS CARGO	983.5'	W	AIRCRAFT HANGAR	AY
24	AIRCRAFT HANGAR	985.0'	X	AIRCRAFT HANGAR	AZ
25	AIRCRAFT HANGAR	995.0'	Y	AIRCRAFT HANGAR	BA
26	ARFF	963.5'	Z	AIRCRAFT HANGAR	BB



GREENVILLE-SPARTANBURG AIRPORT DISTRICT

APPROVED _____ DATE _____

FEDERAL AVIATION ADMINISTRATION
ATLANTA AIRPORTS DISTRICT OFFICE

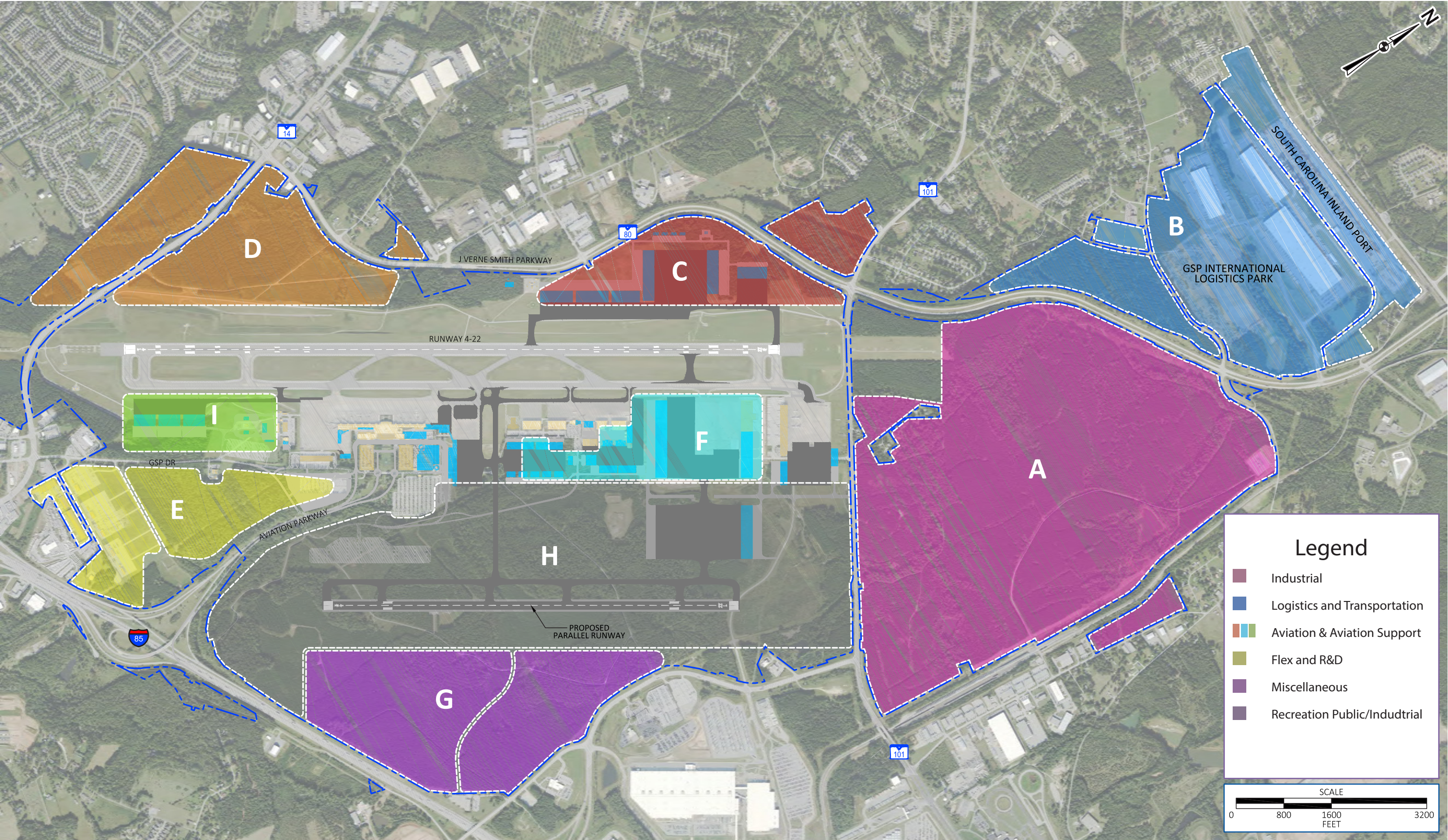
CONDITIONALLY APPROVED: _____ (MANAGER, ATLANTA ADO) DATE: _____

SUBJECT TO COMMENTS IN LETTER DATED: _____ AIRSPACE STUDY NUMBER: _____

REV	DATE	DESCRIPTION	BY	SPONSOR

GREENVILLE-SPARTANBURG INTERNATIONAL AIRPORT			
GREER, SOUTH CAROLINA			
AIRPORT LAYOUT PLAN			
SCALE: 1" = 600'	DESIGN: JM	SHEET: 2	
DRAWN: RGT	PROJECT: 18219.00	DATE: MARCH 2020	
CHECKED: _____	DATE: _____		

PROPERTY MAP



GREENVILLE-SPARTANBURG INTERNATIONAL AIRPORT



FOR FURTHER PROJECT INFORMATION

Contact:

*Greenville - Spartanburg Airport District
2000 GSP Drive, Suite 1
Greer South Carolina 29651*

Phone: 864-848-6254



McFarland Johnson