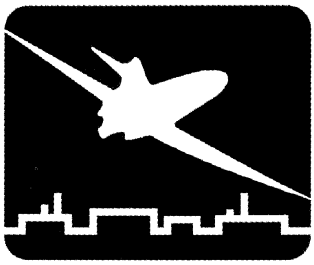

MASTER PLAN UPDATE

FOR

BARTOW
MUNICIPAL AIRPORT
AND
INDUSTRIAL PARK

BARTOW, FLORIDA

Prepared By:

URS
Tampa, Florida

JULY 2015

MASTER PLAN UPDATE FOR
BARTOW MUNICIPAL AIRPORT

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EXECUTIVE SUMMARY
Bartow Municipal Airport and Industrial Park

Bartow Municipal Airport and Industrial Park's last master plan update was completed in 2003. The focus of the 2003 master plan was the Airport's new GA terminal; defining size and footprint, and reviewing and qualifying alternative terminal site locations. This was followed by the 2004 General Aviation/Administration Terminal Facility Project Study, which identified the preferred terminal location, Terminal building size and Terminal overall site configuration. The terminal relocation project study was approved by the Authority in 2004. The new terminal complex consisting of the terminal building, terminal apron, auto parking and temporary terminal access road was designed in 2005 and construction was completed in 2007.

The 2014 Airport Master Plan Update focus includes updating 10 year old information, and assures the airport is in compliance with current FAA design standards. The study also revisits the runway extension project and construction schedule to complete this project. The need for additional hangars, corporate and T-hangars, including the corporate hangar site options, is addressed. The internal loop road system alignment and the enhancement to the airport intermodal area of the Industrial Park have been set. Coordination with major land developers in the area, like Clear Springs and Mosaic's Streamsong Resort Development, as to the possible impact or aviation related facility support anticipated from the airport, is considered in this planning document.

Projects completed since the last (2003) airport master plan update include the following:

Land Acquisition - The airport authority acquired additional airport land on the east side to accommodate the future Runway 27R Extension project to the east;

Taxiway "D1"- This section of taxiway was designed and constructed in accordance with FAA design standards and is located as a future parallel taxiway to the future extension of Runway 27R;

Rehabilitation of Runway 9L/27R - This was a structural overlay and marking project;

New Terminal Complex - Construct New GA Terminal, GA Terminal Apron, Terminal Auto Parking lot and Temporary Terminal Access Road;

New Northeast Industrial Park Road - Designed section of access road into the northeast vacant property area to support future development;

Construct Executive Box (50'x50') Hangars (5 Units) - For larger GA aircraft storage;

New T-Hangars - Construct T-Hangar (10 Units) and Construct T-Hangar (15 Units);

Major Utility Installation - A major force main and water pipe were installed from US Highway 17 through the south side of airport property to Gaskin Road and beyond for offsite industrial park area.

Tree Clearing/Removal Project - (Approach and Transitional surfaces are all clear of obstructions);

New Fencing - Wildlife fencing was installed around the AOA.

Recently completed (2014) or current projects under way included the following:

Runway Extension Justification Study

Exhibit "A" Property Map Update

Internal Road Improvements - Resurfacing and improve Internal Industrial Park roads that include: Avenues A, B, D, Streets First, Second, Third, Frontage Blvd., East Airport Blvd., and Ben Durance Road)

Rehab the Existing GA Apron (Phase 1) – Joint and spall repairs and shattered slab replacement as required to reduce FOD.

Airport Master Plan Update

Taxiway "D" Parallel Mid-Section Design - This project will provide a complete parallel taxiway system to the existing primary Runway 9L/27R.

Major Projects within the next 10 years included the following:

Runway 9L/27R Extension

The Runway Extension is needed to accommodate the expanded demand of the business jet activity at the airport. A Runway Justification Study was completed in 2014. An Environmental Assessment Study is scheduled to begin in 2015. Over the next several years this is to be followed by runway design, construction and installation of precision approach navigation and lighting equipment.

Internal Loop Road

The loop road is required to provide direct access to the GA terminal from US 17. This project includes removal of the temporary terminal access road along the existing GA apron. Also involved in this project is the renegotiation of the Mid Florida Lumber lease area which is required to accommodate the loop road system. This will also free up area along the airside to construct additional corporate size hangars.

Terminal Apron Expansion

With the increased business jet activity at the airport, the GA Terminal Apron needs to be expanded to the west as currently and previously shown in the master plans.

Corporate Hangars

The airport has several small corporate hangar type facilities in their existing Hangar complex area. The airport needs larger corporate hangar facilities to accommodate potential demand.

The master plan has identified several sites to develop corporate hangar facilities directly adjacent to or in close proximity to the existing taxiway system.

Perimeter Fencing Project along the property line

Security wildlife fencing was installed around the airfield operations area in 2013. The airport is still in need to replace the old perimeter airport property fencing along the east and south side of the airport.

Taxiway Connector "L"

Taxiway "L" connector project is proposed to enhance the efficiency of the primary Runway 9L/27R. This connector Taxiway will allow aircraft to exit sooner, thus reducing runway occupancy time (capacity), reduce aircraft ground circulation movement taxing time, and fuel consumption.

Taxiway Connector "H

Taxiway "H" connector project is proposed to enhance the efficiency of the primary Runway 9L/27R. This connector Taxiway will allow aircraft to exit sooner, thus reducing runway occupancy time (capacity), reduce aircraft ground circulation movement taxing time, and fuel consumption.

Future Pavement Rehab Projects include: Runway 9L/27R, Runway 5/23; Runway 9R/27L; Taxiways D, A, B, C; and GA Apron (Phase II)

FUTURE PLANNING CONSIDERATIONS

Clear Springs Development

Clear Springs, a corporate entity, purchased approximately 18,000 acres of land in the late 1990's early 2000's around the airport and south of state road 60. Clear Spring Corporation prepared a comprehensive land use plan of their property along with a phased development plan. Clear Spring's representatives met with the airport staff and airport planning consultant in the early 2000's to discuss possible land use for their property that was adjacent to the airport. Potential opportunities were discussed and noted in the 2003 airport master plan documents.

Clear Spring continues to develop land around the airport and in a 2013 meeting with Clear Spring representatives, they stated the development opportunities adjacent to the airport still exists.

Mosaic Streamsong Resort Development

The Streamsong Resort Development opened in January 2013. The airport has experienced an immediate influx of business jet activity destined for the new Streamsong resort.

As the resort gets more established and schedules additional major events over the years, it is anticipated that more jet activity will use the BOW airport. The airport has programed a runway extension project and an expanded terminal apron project to accommodate additional business jet activity.

Central Polk County Parkway Extension Project

The future Central Polk County Parkway Extension alignment was established several years ago. Preliminary line and grade survey work began on this Parkway alignment in 2013. The section of the Central Polk County Parkway Extension located north of Gaskin Road runs through two parcels on the south side of airport property. The preliminary Central Polk County Parkway Extension corridor through airport property is approximately 16 acres. Additional acreage may be required for drainage but FDOT has not publically defined those areas as of 2014.

As of 2014, FDOT is trying to identify the Central Polk County Parkway Extension right of way needs. FDOT has not programed funding in their 5 year plan to purchase Central Polk County Parkway Extension right-of-way land.

Also, construction funding and a project completion schedule for the Central Polk County Parkway Extension have not been established as of 2014.

Intermodal Facility

The Bartow Municipal Airport and Industrial Park is a true intermodal facility with aviation, rail and major highway access. The intermodal section of the Industrial Park is approximately 76 acres. Existing long term land leases in this area will be expiring in the next 5-7 years. This is an opportunity to redevelop and enhance the intermodal rail access section of the complex.

As part of the internal loop road concepts, the master plan addresses the potential conceptual development of the intermodal facilities. The master plan has identified potential rail spur realignments along with identifying additional intermodal structures with this rail access.

CSX Intermodal Logistic Center

Developing to the north of the airport is the CSX Intermodal Logistic Center. It is expected that this facility will increase industrial related activity in the area and at the airport. The intermodal facility at the airport has direct rail connection to the Logistic Center site.

Southside Airport Development

The master plan updates have looked at the southside as long term development when the north side is close to being fully developed. The southside area has about 200 plus acres of developable aviation related land. Over the past 5 years a major force main and water pipe were installed from US Highway 17 through the south side of airport property to Gaskin Road and beyond.

Infrastructure development and a Southside airport road access have been programed in the 20 year master plan. This could happen sooner rather than later if the demand is there.

Foreign-Trade Zone No. 79

The Bartow Municipal Airport is located in the State of Florida Foreign-Trade Zone (FTZ) No. 79 which includes the Tampa Bay Area and along the I-4 Corridor. FTZ No. 79 assists companies to streamline the process and minimize the costs associated with qualified importing, exporting, manufacturing and distribution activities. Companies located within the FTZ have strategic advantages and tax incentives, and strengthens their competitiveness in their respective industries.

SECTION 1.0

INTRODUCTION

1.1 INTRODUCTION

The Airport Master Plan Update is being undertaken by the Bartow Municipal Airport Development Authority (the Authority) to enhance the safety, operational capability, and financial stability of Bartow Municipal Airport and Industrial Park (BOW).

The 2014 Master Plan Update for BOW will serve as a management guide for airport development so that efficient growth can take place. The anticipated aviation needs of BOW have been identified, and the actions that should be undertaken to accommodate these needs have been organized into a programmed development plan.

The planning study period is for 20 years (2014-2034), with consideration of the site capabilities beyond the year 2034. Development priorities and the staging plan are detailed for the first 10-year period. In addition, long-term development plans have been prepared and are estimated in 2014 dollars, but prioritization of these stages will be based on the airport's needs in future years. It is recognized that with the dynamic nature of the aviation industry, periodic updates to the plan should be made in the 5- to 10-year timeframe.

This study was conducted following the procedures, guidelines, and criteria as set forth by the Federal Aviation Administration (FAA) Airport and Airways Improvement Act of 1982 and as amended by the Airport and Airways Safety and Capacity Expansion Act of 1987. The FAA, the Florida Department of Transportation (FDOT), and the Authority are financing this Master Plan.

1.2 PURPOSE AND GOALS OF THE STUDY

The purpose of this study is to update the 2003 Airport Master Plan to reflect conditions that have occurred since that study was completed. A number of changes have occurred in the aviation industry, and the City of Bartow and Polk County's continued growth has affected the timing and extent of the various improvement recommendations at the airport.

The primary goal of this Airport Master Plan is to provide guidance for the future development of BOW, which will satisfy the aviation demand in a financially feasible and responsible manner, while addressing the aviation, environmental, and socioeconomic issues of the community. In support of this goal, the following objectives of the Airport Master Plan have been identified:

- Identify airside, landside, and airspace improvements or options to optimize the economic aspects of the airport while enhancing safety and operational capability.
- Establish an implementation-phasing schedule for short-, intermediate-, and long-term improvements.

- Identify short-term requirements and recommend actions to optimize near-term funding opportunities.
- Ensure that short-term actions and recommendations do not preclude long-range planning options.
- Identify eligible funding for future airport improvements.
- Incorporate the interests of the public and government agencies into the planning process.
- Be sensitive to the overall environmental characteristics and needs of the City of Bartow and Polk County.

1.3 AIRPORT OWNERSHIP AND MANAGEMENT

BOW is owned and operated by the Authority. The Authority oversees the daily operation, maintenance, planning, design, and construction of BOW.

1.4 PROJECT SCOPE

The Master Plan will follow the guidelines established in the FAA Advisory Circular (AC) 150/5070-6B, "Airport Master Plans," dated May 2007. Specific tasks to be included in this study are as follows:

Task 1 Mobilization – This task reviewed and finalized the project scope, coordination, and specific key issues.

Task 2 Inventory – This task includes the collection of data pertinent to BOW and the area it serves and an inventory of existing airport facilities.

Task 3 Aviation Forecasts Review – This task examined recent aviation activities and reviews the Florida Aviation System Plans latest forecast and the latest FAA Terminal Area Forecasts (TAF) for comparison purposes.

Task 4 Demand/Capacity Analysis – This task reevaluates the ability of existing facilities to support any anticipated forecast changes.

Task 5 Facilities Requirements Program – This task identifies those new or expanded facilities necessary to increase capacities to meet forecast aviation demands.

Task 6 Airport Requirements Summary – The Consultant reviews the revised forecast and airport's facilities requirements program with the executive director.

Task 7 Identification of Alternatives – This task evaluates alternative means of meeting requirements of forecast activities.

Task 8 Environmental Overview – This task includes an overview and identification of those factors listed in FAA AC 150/5050-4A likely to be affected by recommended developments.

Task 9 Review Meetings – A working meeting to present the different planning options to Authority and airport management. The second working meeting to present a preferred concept plan.

Task 10 Airport Development Plans – This task involves detailing the selected alternative into the long-range plan.

Task 11 Airport Layout Plan Set – Update the current Airport Layout Plan (ALP) set.

Task 12 Staging Plans – A revised phasing schedule of proposed airport development will be prepared for the standard 5-, 10-, and 20-year planning periods.

Task 13 Cost Estimates – In conjunction with Task 12, Staging Plans, revised cost estimates for each improvement item will be developed in year 2015 dollar figures.

Task 14 Review Meeting – A final working meeting to present proposed staging program including cost estimates.

Task 15 Financial Feasibility – Prepare a breakdown of funding eligibility for the proposed new staging program.

Task 16 Authority Presentation – Present to the Authority the final preferred plan.

Task 17 Preparation of Reports – This task involves the preparation of draft reports and the completion of the Final Master Plan Report.

1.5 PREVIOUS PLANNING STUDIES

It is important to review the studies and recommendations that have been developed in the past because they have served to shape the airport as presently operated. Some of these recommendations are still under consideration and were included in the analysis and recommendations stated within this document.

1.6 CONCLUSIONS AND RECOMMENDATIONS

The following is a summary of the conclusions and recommendations for the BOW Master Plan Update.

1.6.1 Conclusions

1. BOW is classified in the National Plans for Integrated Airport Systems (NPIAS) as a regional general aviation (GA) airport.

2. The airport will remain part of the City and County's overall long-range comprehensive plan.

3. The location and orientation of runways and airport facilities are compatible with existing and future surrounding area land uses assuming adequate land use control.

4. Runway 9L/27R will remain the primary runway and Runways 9R/27L and 5/23 will remain the secondary runways.

5. Existing runway configuration is adequate to meet the projected 20-year activity demand.

6. The existing adjacent landside areas are sufficient to meet future demand projections based on the present identified role of the airport.

7. Financing airport development is made possible by assumed available Federal, state, and local funds.

8. BOW's airspace is compatible with surrounding airspace of local airports.

1.6.2 Recommendations

It is recommended that the following procedural steps be taken by the Authority to implement the development of BOW:

1. Adopt the ALP.

2. Continue coordination of the Airport Master Plan with the FAA, the County's Metropolitan Planning Organization, the City's Planning and Engineering Departments, and the FDOT.

3. Coordinate detailed site planning and design of improvements with consultants to ensure provision of appropriate physical facilities placement (T-hangars, corporate hangars, fixed base operators (FBOs), terminal building, etc.).

4. Periodically review the Master Plan to ensure compliance with updated FAA requirements and technological advances.

5. Support continued land use zoning on and around the airport.

6. Develop airport design development guideline standards.

7. Update, as needed, the Airport Zoning Ordinance.

8. Continue to review land development (acquisition, easements, zoning) in the approach surfaces and adjacent to airport property to ensure compatibility with airport needs.

9. The airport should maintain documentation of the statistical operational activity levels (local, itinerant, and touch-and-go operations; aircraft fleet mix; runway usage, etc.) at the airport to justify and support future projects.

10. Review major development proposals with the aviation consultant to ensure proper site location, land use organization, and compliance with FAA criteria.

1.7 ORGANIZATION OF THE REPORT

In order to help the readers understand the organization of this document and be able to locate information of particular interest, a brief overview of each section is provided below. This document is comprised of the following 8 sections.

Section 1 – Introduction – This section describes airport setting, brief airport history, airport ownership, purpose of the Master Plan, and organization of the document.

Section 2 – Airport Inventory – This section presents the inventory of existing conditions at the airport.

Section 3 – Forecast of Aviation Demand – This section presents the historical and projected aviation activity over the 20-year planning period.

Section 4 – Demand/Capacity Analysis and Facility Requirements – This section describes and evaluates the airside/airfield elements that include the aviation demand, the ability of the airport to accommodate the demand, and the recommended 20-year facility requirements.

Section 5 – Airport Development Plan – This section describes the facility to be developed as a result of the facility requirements program and presents the long-range plan.

Section 6 – Environmental Overview – This section provides an analysis of the likely consequences expected to result from implementation of the preferred alternative recommended. This overview is based upon environmental factors listed in FAA Order 5050.4B, although only those factors affected by recommended elements of the Master Plan that might require a formal environmental assessment (EA) prior to implementation will be addressed.

Section 7 – Implementation Program (Staging Plan and Cost Estimate) – This section lists the projects and cost estimates for the recommended plan by planning periods (5, 10, and 20 years).

Appendices – Appendices are included which provide supporting materials and a reduced ALP set.

SECTION 2.0

AIRPORT INVENTORY

2.1 INTRODUCTION

Bartow Municipal Airport and Industrial Park (BOW) is owned by the City of Bartow and operated by the Bartow Municipal Airport Development Authority (the Authority). The airport and industrial park serve the general aviation (GA) transportation needs of the City of Bartow, Polk County, the Central Florida Region, and the business community and organizations that utilize the Industrial Park. The airport also serves as a base for the Polk County Natural/Water Resources Division, the Aviation Section of the Polk County Sheriff's Office, and Air Methods/Lifenet. Aviation tenants include firms specializing in general maintenance, avionics, aircraft painting, amphibian aircraft, air ambulance, and antique aircraft maintenance.

The Authority owns and operates the primary fixed base operator (FBO), Bartow Flying Service, which provides GA services such as: fueling, flight instruction (including student training activity), and aircraft storage facilities. FBO aircraft maintenance services that are offered by private business include major aircraft and avionics maintenance.

This section presents a developmental history of the airport and descriptions of the following: the area surrounding the airport, existing on-airport facilities, the airport's stormwater/drainage system, on-airport utilities services, meteorological conditions, and airspace and obstructions in the vicinity of the airport.

2.2 HISTORY AND ORGANIZATION OF THE AIRPORT

In 1941, City of Bartow Mayor C.E. Williams spearheaded the city's initial acquisition of land where the airport is located today. In 1942, the U.S. Government took over this site and subsequently developed it into a training field for the Army Air Corps. Throughout World War II, the field was used for the training of pilots.

In 1945, the General Services Administration returned it to the City of Bartow. In returning it to the city, the government stipulated that the airport must be used for airport purposes. If not, it must be returned to the Federal Government. Between 1945 and 1950, an FBO ran the airport while the large building complex, which had been constructed by the Federal Government, was used by industry and for storage. In 1946, the Federal Government converted approximately 32 barracks into apartment units for returning veterans.

In 1950, the Federal Government again took over the airport and called for bids from civil contractors to staff and operates a pilot training base. Garner Aviation was the successful bidder, and they operated the airport as a civilian contract school until 1955 when the Federal Government again bid for a civilian contractor and Truman Miller this time became the

successful bidder. They operated the training school through 1960 and the termination of the government's contract pilot training concept.

From 1960 to 1967, the City managed the airport and the aviation facilities were leased to an FBO. In 1964, the City made a formal request to the Federal Aviation Administration (FAA) for authority to convert a large building area into an industrial park. The concept was approved and the industrial park was opened, which has allowed the airport to remain self-sufficient.

In July 1967, the City passed an ordinance that established an airport authority. Its official name is the Bartow Municipal Airport Development Authority. The Authority was composed of five City Commission members and an executive director.

Completed Federal- (Airport Improvement Program (AIP)) and state-funded projects over the past 25+ years are briefly discussed in Appendix B.

2.2.1 National Plan of Integrated Airport Systems

The Federal Aviation Administration's (FAA) National Plan of Integrated Airport Systems (NPIAS 2015-2019) lists Florida as having 100 public use airports. 20 of these airports are classified as Part 139 Certificated Air Carrier airports, 79 are classified as General Aviation airports, and one is classified as a Seaplane base. The NPIAS lists the Bartow Municipal Airport as a General Aviation airport. This NPIAS designation allows the Bartow Airport Authority to be eligible to receive Federal funding participation from the FAA via the Airport Improvement Program (AIP). This funding is matched by state and/or local funding.

In cooperation with the aviation community, the FAA completed two top-down reviews of the existing network of general aviation facilities included in the NPIAS. The results of these efforts are contained in the May 2012 report entitled "General Aviation Airports: A national Asset".

As part of these efforts, the FAA documented the important airport roles and aeronautical functions these facilities provide to their communities and the national airport system. These functions include emergency preparedness and response, direct transportation of people and freight, commercial applications such as agricultural spraying, aerial surveying and oil exploration, and many others. Many of these functions cannot be supported efficiently or economically at primary airports.

General aviation facilities were divided into categories based on existing activity measures (e.g., the number and types of based aircraft and volume and types of flights). Of the general aviation facilities studied, 2,455 were grouped into four categories using existing activity, geographic factors, and public interest functions.

These General Aviation Airport Categories as follows:

> *National* – airport system by providing communities with access to national and global markets. These airports have very high levels of activity with many jets and

multi-engine propeller aircraft. These airports average about 200 total based aircraft, including 30 jets.

Regional – Supports regional economics by connecting communities to regional and national markets. These airports have high levels of activity with some jets and multiengine propeller aircraft. These airports average about 90 total based aircraft, including 3 jets.

Local – Supplements local communities by providing access to local and regional markets. These airports have moderate levels of activity with some multiengine propeller aircraft. These airports average about 33-based propeller-driven aircraft and no jets.

Basic – Supports general aviation activities, often serving aeronautical functions within the local community such as emergency response and access to remote communities. These airports have moderate levels of activity with an average of 10 propeller-driven aircraft and no jets.

Based upon the current and future anticipated role and level of aircraft basing and local and itinerant aircraft operational activity, the Bartow Airport is currently categorized with the NPIAS as a Regional General Aviation Airport".

2.3 CHARACTERISTICS OF THE EXISTING AIRPORT

BOW is located in the west central Florida region approximately four miles northeast of the City of Bartow in the southern portion of Polk County. **Figure 2.1** illustrates the location of Bartow and its relationship to major cities in the region and surrounding major roadways.

The existing airport and industrial park is shown in **Figure 2.2**. The airport property (including the industrial park) consists of approximately 2,000 acres (actual 1987.63 acres; reference updated Exhibit "A" Property Map Boundary Survey prepared by URS dated January 30, 2014). The airport is basically configured to include the airfield area, building areas on the north and east side of the airfield, and undeveloped land on the southeast and south side.

BOW has a surveyed elevation of 125 feet above Mean Sea Level (MSL). The Airport Reference Point (ARP) is located at latitude 27 degrees, 56 minutes, and 36.1 seconds north, longitude 81 degrees, 47 minutes, and 00.3 seconds west.

2.3.1 Airfield Facilities

2.3.1.1 Runways

As shown in **Figure 2.2**, the airfield has three paved (asphalt) runways. **Table 2.1** summarizes the existing airfield runway pavement characteristics. Runway 9L/27R has a length of 5,001 feet and a width of 150 feet. Runway 9R/27L has a length of 4,400 feet and a width of 150 feet.

Runway 5/23 has a length of 5,000 feet and a width of 100 feet. Runway 5/23 is used primarily during crosswind conditions.

Runway 9L/27R was overlaid in 2005 and its existing design strength is 108,000 pounds dual gear. As of 2013, the pavement surface is in good condition. Runway 9R/27L is used primarily as a touch-and-go runway for the small aircraft. Its design strength is listed as 30,000 pounds single gear and 60,000 pounds dual gear but as of 2013, the runway pavement surface is in poor condition and in need of resurfacing. Runway 5/23 was reconstructed in 1973 and resurfaced in 1990. The runway 5/23 pavement surface was overlaid in 2001 at pavement design strength of 72,000 pounds dual gear. The runway is in fair condition.

The design strengths of the three runways are sufficient to serve the GA/business jet aircraft that currently operate at the airport. **Table 2.2** summarizes the runway pavement inventory information.

2.3.1.2 Taxiways

Table 2.1 summarizes the existing airfield taxiway pavement characteristics as shown in **Figure 2.2**. On the east side of the airfield, Taxiway A1 connects the GA apron area to the threshold of Runway 23, taxiway A2 connects the thresholds of Runways 23 and 27R, and taxiway A3 connects the thresholds of Runways 27R and 27L. Taxiway C1 is located on the west side of the airfield, connecting Taxiway D to the Runway 9L threshold, taxiway C2 connects the thresholds of Runways 9L and 9R, and taxiway C3 connects the thresholds of Runways 9R and 5. Taxiway D, constructed in 1984, parallels Runway 9L/27R, connecting the GA apron to Taxiway C. Taxiway F connects Runway 9L/27R to 5/23 and Taxiway G connects Runway 5/23 to 9R/27L. Taxiway H connects the Apron Taxiway to Runway 5/23. **Table 2.2** summarizes the taxiway pavement inventory information.

2.3.1.3 Aircraft Parking Aprons and Tie-Downs

Table 2.1 summarizes the existing airfield apron pavement characteristics as shown in **Figure 2.2**. The General Aviation aircraft parking area is located on the north side of the airport. There are two separate aircraft parking apron areas on the north side. The first is the old military apron area located in front of the Air Traffic Control Tower (ATCT), the FBO's, and old airport administration building. This area provides approximately 1,500 feet of frontage and a depth of 400 feet with a total area of approximately 67,000 square yards, with 40 anchor aircraft tie-down positions for transient and based aircraft. The apron is constructed of concrete and has strength of 60,000 pounds for dual gear aircraft. The apron was rehabilitated in 1994 and selected pavement areas were rehabilitated in 2013. In addition to the parking apron, an apron taxiway adjacent to the parking area has a length of 1,600 feet and a width of 50 feet.

The second general aviation parking apron is adjacent to the Terminal. This aircraft parking apron was constructed in 2006 with pavement design strength of 60,000 pounds for dual gear business jet aircraft.

Table 2.2 summarizes the apron pavement inventory information.

TABLE 2.1

EXISTING AIRFIELD CHARACTERISTICS
Bartow Municipal Airport and Industrial Park
Master Plan Update

Airfield Pavement		Length/ Width	Blast Pads/ Overrun	Design Strength	Pavement Composition	Effective Gradient	Lighting	Description
Runways	9L/27R	5,001' x 150'	150' x 150' east end 150' x 150' west end	108,000 lbs. dual wheel	Asphalt	0.002	MIRL	Primary Runway
	9R/27L	4,400' x 150'	150' x 150' east end 150' x 800' west end	30,000 lbs. single wheel 60,000 lbs. dual wheel	Asphalt - 4,100' Concrete - 300' *	0.0018	n/a	Secondary Runway
	5/23	5,000' x 100'	n/a	30,000 lbs. single wheel 72,000 lbs. dual wheel**	Asphalt	0.0029	MIRL	Crosswind Runway
Taxiways	A1	600' x 50'	--	60,000 lbs. dual wheel	Asphalt	--	MITL	Access Taxiway to Runway 23
	A2	1,275' x 50'	--	60,000 lbs. dual wheel	Asphalt	--	MITL	Access Taxiway to Runway 27R
	A3	1,075' x 50'	--	60,000 lbs. dual wheel	Asphalt	--	n/a	Access Taxiway to Runway 27L
	C1	350' x 50'	--	108,000 lbs. dual wheel	Asphalt	--	MITL	Access Taxiway to Runway 9L
	C2	850' x 50'	--	60,000 lbs. dual wheel	Asphalt	--	MITL	Access Taxiway to Runway 9R
	C3	1,250 x 50	--	60,000 lbs. dual wheel	Asphalt	--	MITL	Access Taxiway to Runway 5
	D	2,225 x 50	--	108,000 lbs. dual wheel	Asphalt	--	MITL	Parallel Taxiway to Runway 9L/27R
	D1	1,800 x 50	--	60,00 lbs. dual wheel	Asphalt**	--	MITL	Parallel Taxiway to Runway 9L/27R
	F	400 x 100	--	60,000 lbs. dual wheel	Asphalt	--	MITL	Connector T/W
	G	375 x 50	--	60,000 lbs. dual wheel	Asphalt	--	n/a	Connector T/W
	H	525 x 50	--	60,000 lbs. dual wheel	Asphalt	--	MITL	Connector T/W
Aprons	General Aviation	1,500 x 400	--	60,000 lbs. dual wheel	Concrete	--	Mercury Vapor	Aircraft Apron
	Apron Taxiway	1,600 x 50	--	60,000 lbs. dual wheel	Asphalt	--	MITL	Apron Edge T/W
	Terminal	410 x 80	--	60,000 lbs. dual wheel	Asphalt**	--	MITL	Aircraft Apron

Notes: * East end; ** New construction; n/a = not applicable.
Source: URS Corporation - Updated Master Plan Inventory, 2013.

TABLE 2.2

AIRFIELD PAVEMENT INVENTORY
Bartow Municipal Airport and Industrial Park
Master Plan Update

Airfield Pavement		Length/Width	Pavement Composition	Date of Construction or Last Rehabilitation	Estimated Average Lifecycle
Runways	9L/27R	5,001' x 150'	Asphalt	2005[1]	15 years
	9R/27L	4,400' x 150'	Asphalt - 4,100'	1994[2]	15 years
			Concrete - 300' *		40 years
	5/23	5,000' x 100'	Asphalt	2001[1]	15 years
Taxiways	A1	600' x 50'	Asphalt	2011[1]	15 years
	A2	1,275' x 50'	Asphalt	2011[1]	15 years
	A3	1,075' x 50'	Asphalt	1996[2]	10 years
	C1	350' x 50'	Asphalt	2009[1]	15 years
	C2	850' x 50'	Asphalt	1996[2]	10 years
	C3	1,250' x 50'	Asphalt	1996[2]	10 years
	D	2,225' x 50'	Asphalt	2009[1]	15 years
	D1	1,800 x 50	Asphalt	2003[3]	15 years
	F	400' x 100'	Asphalt	1990	15 years
	G	375' x 50'	Asphalt	1990	15 years
	H	525' x 50'	Asphalt	2011[1]	15 years
Aprons	General Aviation	1,500' x 400'	Concrete	2013[4]	20 years
	Apron Taxiway	1,600' x 50'	Asphalt	2011[1]	15 years
	Terminal	410 x 180	Asphalt	2006[3]	15 years

[1] Overlay.
[2] Sealcoating.
[3] New construction
[4] Reconstruction
* East end.

Source: URS Corporation - Updated Master Plan Inventory, 2013.

2.3.1.4 Airfield Lighting

Runway and Taxiway Lighting – Runway and taxiway lighting identify the edge of pavements during periods of low visibility. All runways, except 9R/27L, are currently equipped with Medium Intensity Runway Lights (MIRL), which can be radio activated by landing aircraft. All taxiways, except for Taxiways A3 and G, are furnished with Medium Intensity Taxiway Lights MITL. Mercury vapor lighting illuminates the old aircraft parking apron. The apron taxiway is also lighted and marked with MITL.

The terminal apron has three high mast light poles and MITL along the apron edge and apron connector taxiways.

The airfield lighting inventory is listed in **Table 2.3.**

TABLE 2.3

AIRFIELD LIGHTING INVENTORY
Bartow Municipal Airport and Industrial Park
Master Plan Update

Airfield Pavement		Lighting	Date of Construction or Last Rehabilitation	Estimated Average Lifecycle
Runways	9L/27R	MIRL	2000	20 years
	9R/27L	n/a-	--	--
	5/23	MIRL	1989	20 years
Taxiways	A-1	MITL	2001	20 years
	A-2	MITL	2001	20 years
	A-3	n/a	--	--
	C-1	MITL	2001	20 years
	C-2	MITL	2001	20 years
	C-3	MITL	1989	20 years
	D	MITL	2001	20 years
	D1	MITL	2003[1]	20 years
	F	MITL	2001	20 years
	G	n/a	--	--
	H	MITL	2001	20 years
Aprons	General Aviation	Mercury Vapor	1974	20 years
	Apron Taxiway	MITL	2001	20 years
	Terminal	MITL	2006	20 years

Source: URS Corporation - Updated Master Plan Inventory, 2013.

2.3.1.5 Navigational Aids

Navigational aids (NAVAIDS) are electronic or visual devices that provide guidance or position information to aircraft in flight. All electronic NAVAIDS provide direction and distance information to their location. Electronic and visual NAVAIDS are described in more detail in the following paragraphs.

Electronic NAVAIDS – A Very High Frequency Omni-directional Radio Range and Tactical Air Navigation (VORTAC) serves BOW from Lakeland, located 12.5 miles to the northwest. The Lakeland VORTAC provides a non-precision approach to Runway 9L. The facility also provides non-precision approaches to other runways at other airports in the area, and as an en route NAVAID for aircraft overflights.

Visual NAVAIDS – A Precision Approach Path Indicator (PAPI) system is installed on Runways 9L/27R and 5/23 to provide visual glide path guidance to the touchdown point on the runway. A PAPI is a system of directional colored lights that tell pilots whether they are above, below, or on the glide path established for a runway.

Runways 9L/27R and 5/23 are equipped with Runway End Identification Lights (REIL). These lights help pilots identify runway ends during nighttime and low visibility conditions.

There is a lighted wind sock between the GA apron and Runway 5/23, on the north side of Runway 9L/27R. A segmented circle is located between the two parallel runways on the east side of Runway 5/23.

The airport beacon is located southeast of Cessna Street and Bravo Avenue. The existing rotating beacon and structural tower (205 feet MSL) is 50-60 years old and needs to be replaced. This is required to assist pilots in locating the airport at night or during inclement weather.

2.3.1.6 Instrument Approaches

Instrument approaches to BOW are made up of a series of predetermined maneuvers using the electronic NAVAIDS, which position an aircraft at a point where the pilot can make a visual landing. Based on the electronic NAVAIDS in place, five published instrument approaches are currently available at BOW. A summary of the established instrument approaches available at BOW is presented in **Figures 2.4** through **2.8**.

2.3.1.7 Airfield Fencing

The airport has two main categories of fence, perimeter and AOA. The airport does not have a complete perimeter fence along the existing property line. A new chain-link security/wildlife fencing of 8 feet securing the entire airfield or AOA was installed in 2012. The fence stretches from the northeast side of the airport (bordering residential land and Ben Durrance Road), to the north side of the airport (along U.S. Highway 17), to the west side of the airport (along 91 Mine Road and residential land) across the southern portion of the airfield to the east side.

The south and east sides of the airport property line are thickly forested. Neighboring landowners constructed and maintains a barbed wire/farm type perimeter fence along the southern property line to protect livestock.

2.3.2 Landside Facilities

All of the airport's buildings are located in the north quadrant of the airport as shown in **Figure 2.3 and Figure 2.9**. The buildings that make up the landside facilities can be defined as aviation use (including administrative, operational support, and GA facilities) and non-aviation uses (industrial park). The Authority owns and operates the 260-acre industrial park that is located contiguous to and north of the aviation facilities.

2.3.2.1 General Aviation Terminal/Administrative Facilities

The General Aviation Terminal complex was constructed in 2007 which includes the Terminal/Administrative Building, Terminal apron and auto parking areas. See **Figures 2.10** and **2.11**

The Terminal/Administration building facility consists of approximately 18,000 total SF. The Terminal facility consists of general aviation customer service related facilities, airport administration offices, restaurant, museum and large meeting/conference room available for community meeting events. The focal point is the Aviation related GA customer services that include the Authority-owned FBO, Bartow Flying Service (discussed in Section 2.3.2.3), receptionist area, lobby/waiting seating area (24 seats), rest rooms, pilots lounge, flight planning/weather room and vending machines.

The restaurant area located adjacent to the main entry areas includes approximately 3,600 SF of inside space and approximately 850 SF of outside porch space. The restaurant indoor seating consists of approximately 84 seats and outdoor seating consists of approximately 40 seats.

As part of the terminal design requirements, a museum room was recommended for this terminal facility. This museum room captures the history of the original WWII Bartow airbase.

The airport administration area occupies approximately total 4,600 SF. The space consists of offices, reception area, small conference room, workroom and files. Adjacent to the administrative space is a large meeting /conference room, restrooms and support space. As part of the building design, a large room was recommended to accommodate the authority meetings, and community events such as the chamber of commerce, and other associations. Also the room is available to tenants for seminars, etc.

Adjacent to the Terminal building airside area is the Terminal Apron. The apron consists of 8,200 SY of asphalt with pavement design strength of 60,000 lbs. dual wheel. The apron is marked along the east and west apron edge areas for six general aviation tie down aircraft parking positions. The center apron area is unmarked and can accommodate different combinations of aircraft parking such as four general aviation aircraft or two business jet parking positions. Also the terminal apron is provided with high mast apron lighting.

Adjacent to the Terminal building is automobile parking for a total of 78 cars/vehicles. This includes 48 public parking spaces, 4 ADA parking spaces, 10 restaurant employee and service provider parking spaces and 16 airport employee/special use parking spaces.

2.3.2.2 Operational Support Facilities

Aircraft Rescue and Firefighting Facility (ARFF) – The Polk County Fire Department's Station 32, located approximately 4 miles northeast of BOW in Eagle Lake, provides "first response" service to BOW in case of an emergency. Additional fire/emergency response support is provided by Station 15 in Jan Phyl Village (about 12 miles northeast of BOW on U.S. Highway 17) and Station 25 on Rifle Range Road near Wahneta (approximately 5 miles due east of the airport). These stations maintain and operate the following equipment that could be used at BOW: a 95-foot aerial 1,500 gallons per minute (GPM) truck; a 1,250 GPM pumper; a 1,000 GMP pumper; a 1,500 GMP tanker; and a hazardous material unit. County firefighters are trained for airport emergencies.

Airport Traffic Control Tower Facility – The ATCT is located adjacent to the GA apron and was originally constructed in the 1950s. The tower height is approximately 70 feet above ground and 194 feet MSL. The ATCT facility is owned and operated by the Authority. The ATCT operates from 7:30 a.m. to 5:30 p.m. daily. FAA-certified air traffic controllers, employed by the Authority, staff this non-Federal air traffic facility.

Fuel Farm Facility – The existing fuel farm facility is located on the north side of the airfield and was built in 1985 and modified in 1993. The facility is comprised of two above ground, double-walled tanks, each having a capacity of 15,000 gallons. One of the tanks holds AVGAS and the other contains Jet-A fuel. Over the past 10 years both tank exteriors have been painted two times. The Jet-A tank was cleaned inside in 2013 and the AVGAS Tank was inspected in 2013. (All filters changed annually).

Self-Service Fuel Facilities

AVGAS Fuel - The self-service AVGAS facility located east of the General Aviation terminal was installed in 2004. The AVGAS tank size is 12,000 gal.

In addition to providing Avgas to aviation customers the authority provides self-service Avgas fueling to Airboat customers via pedestrian gate next to the terminal access road.

Jet-A Fuel - The self-service Jet- A facility located adjacent to the AVGAS self-service facility, was installed in 2002. This fuel facility is exclusive for Air Methods use only. The tank size consists of 400 gal.

Diesel Fuel - The self-service Diesel Fuel facility located adjacent to the Jet-A service facility, was installed in 2011. This Diesel Fuel facility is exclusive for new FBO Fuel trucks use only. The tank size consists of 500 gal.

Fuel Trucks

The airport owns and operates two fuel trucks. The AVGAS Truck was purchased in 2010 and contains 1000 gal. The Jet-A Truck was also purchased in 2010 and contains 3000 gal.

Automated Weather Observation System – An Automated Weather Observation System (AWOS-3) was installed at BOW in 2001. The AWOS-3 records a variety of site-specific meteorological data once each hour, 24 hours per day at the airport. The data collected by the AWOS-3 is gathered and stored by the National Oceanic and Atmospheric Administration (NOAA), National Climatic Data Center (NCDC) in Asheville, North Carolina. Current meteorological data is available to local pilots for flight planning. AWOS-3 is used for ATIS information during ATC operating hours.

2.3.2.3 General Aviation Facilities

FBO Facility – The GA terminal accommodates the Authority-owned FBO Bartow Flying Service. The Bartow Flying Service provides aviation fuel (100LL and Jet-A), ramp services, aircraft rentals, flight instruction, and rental cars. In addition, the terminal facility has passenger waiting area, flight planning room, pilot lounge and public restrooms.

Other Aviation-Related Tenants

Other FBO service type facilities located in proximity to the old GA terminal building 420 includes:

Aircraft Engineering (Building 434) –This aircraft maintenance hangar/facility consists of 10,000-square-foot and provides FBO aircraft maintenance services.

Custom Avionics and Amphibians Plus Hangar (Building 418A and 418B) This 10,800-square-foot hangar/facility (building 418-A) houses a avionics company, Custom Avionics, and an amphibious aircraft company (building 418-B), Amphibians Plus.

Special Use Hangars (Buildings 425, and 353 / 354) A row of Box/T-hangar type units north of the Aircraft Engineering (434) are special use and aircraft storage facilities. These individual units (building 425) are used for personal aircraft maintenance and restoration of aircraft. In this group (building 353 and 354), a company called AeroFab specializes in antique, or vintage, aircraft repair.

Building 410 Florida Health Sciences Center, Inc. d/b/a Tampa General Hospital provide an Air ambulance service. They operate out of building 410 and will be operating 1 to 2 helicopters. They are Polk Counties primary call for medevac pickups.

Building 415 AeroMed 4 (Air Methods) an air ambulance support service group operates out of Hangar/building 415. They perform helicopter maintenance.

Building 420 The old General Aviation Terminal/ Authority administration building 420 consists of approximately 10,000-square-foot. The building located adjacent to the GA apron is sub divided and leased out. Half of the building is used by Home Team Pest Defense. Adjacent to this building is automobile parking for a total of approximately 50 cars/vehicles.

Polk County Sheriff's Facility Located on the northeast side of the airport is the Polk County Sheriff's Department hangar facility. This 3.9-acre site includes a hangar, office area, parking lot, and aircraft ramp apron.

Florida Aircraft Painting Company (Building 502) Florida Aircraft Painting Company hangar facility was constructed in 2002 on the northeast side of the airport, adjacent to the Polk County Sheriff's facility. This facility specializes in aircraft painting.

Aircraft Storage Facilities – Aircraft storage units are located on the north side of the airfield and managed by the authority. They are categorized by type of unit and are listed as follows:

Type of Unit	Number of Units
Single/Twin T-Hangars (older units)	60 units
Corporate Unites (older units)	6 units
Single Port-a-Ports	6 units
Twin Port-a-Ports	7 units
Twin Storage Hangars (new units)	25 units
Corporate/Executive Hangars (box units)	9 units
Other storage/special use units	8 units
Total Aircraft Storage Units	**121 units**

Source: Airport Management Records (2013).

2.3.2.4 Industrial Park

Bartow Airport Industrial Park is located on the north side of the airfield. Access to the industrial park is provided off U.S. Highway 17, a four-lane divided highway. The industrial park has a rail spur directly on site provided by Florida Midland Railroad. Approximately 55 businesses are located in the park, employing about 1,300 people.

2.4 UTILITIES

2.4.1 Electrical Service

Electrical power is furnished to the airport by the City of Bartow. The power is purchased from Orlando Utilities and is distributed through city-owned lines. The City maintains all of the electrical facilities and invoices airport tenants. The airport's airfield electrical vault is located adjacent to the ATCT.

2.4.2 Water Service

The City of Bartow operates the water and sewage systems on the airport. The basic water supply is furnished by four 16" wells located at the Bartow Water Plant, 2500 Hwy 17 north of Bartow. Water treatment consists of a water softener and chlorination. The capacity of the water treatment plant is rated at 6 million gallons per day. The City of Bartow presently serves approximately 20,000 customers from this system. The City constructed a new water treatment plant in May 2002.

2.4.3 Sewer Service

The airport has a 300,000-gallon per day master pumping station that pumps sewage approximately 25,000 feet to the main wastewater plant in the City. The collection system

consists of five lift stations that serve the airport and adjoining subdivisions. This system services approximately 700 connections.

2.4.4 Telephone Service

Verizon provides telephone service at the airport.

2.4.5 Natural Gas Service

Central Florida Gas Company provides natural gas service to the airport. The service is used by a limited number tenants in the industrial park.

2.4.6 Utility Corridor South Side

Two new major utility lines have been installed by the City of Bartow on airport property. The City of Bartow installed a 16" inch water main parallel to a 24" inch force main from US 17 Highway south along the west side of airport property and east along the southern section of airport property and south again crossing Gaskins road. The water main project was completed in 2011.

2.5 AIRPORT DRAINAGE

Airport drainage is provided by a system of storm sewers, culverts, swales, and ditches. A floodplain map of the airport and its surrounding area is shown in **Figure 2.16.** Wetland areas are located mainly on the east, west and south sides of airport property. Runoff from the airport ultimately channels into Peace Creek, located one mile south of the airport. The runoff then flows in a southerly direction into the Peace River, which leads into Charlotte Harbor and the Gulf of Mexico.

2.6 LAND USE AND ACCESS

2.6.1 Off-Airport Land Use

The land contiguous to BOW is partially developed with single-family dwellings, citrus groves, and some light industry along U.S. Highway 17. The airport is owned by the City of Bartow, but the surrounding land is located in Polk County. The County presently has a zoning ordinance that covers all of the land surrounding the airport and has been helpful in preserving the airport's integrity.

Northeast of the airport, a large subdivision is disseminated throughout with citrus groves. The land to the east is essentially undeveloped with scattered residential or agricultural use. Southeast, south, and southwest of the airport are a few scattered homes, but the land is primarily utilized for agriculture. Some of this agricultural use is being considered for industrial use. Southwest of the airport is vacant farmland and woodlands. There are a number of small single-family subdivisions and citrus groves to the west and a few scattered homes northwest of

the airport across U.S. Highway 17. The area to the north of U.S. Highway 17 is relatively undeveloped with the exception of scattered agricultural operations. The area surrounding the airport is shown on **Figure 2.17**.

2.6.2 Airport Surface Access

U.S. Highway 17, a four-lane divided roadway, provides the major surface access to the airport from the City of Bartow and south. The secondary access to the airport is from Bomber Road to Ben Durrance Road on the northeast side of the airport. The County park/ride share area lies just north of the airport property line near the intersection of U.S. Highway 17 and Bomber Road.

The Florida Midland Railroad runs adjacent to U.S. Highway 17 and the airport property; with a spur connecting the airport property to several sidetracks that branch off into the airport industrial park area.

2.7 APPROACHES, OBSTRUCTIONS, AND AIRSPACE

2.7.1 Approaches to Runways and Obstructions

The following is a description of the approaches and runway protection zones (RPZs) to all of the runways at BOW. **Table 2.4** documents the existing RPZ data.

TABLE 2.4

EXISTING RUNWAY PROTECTION ZONE DATA
Bartow Municipal Airport and Industrial Park
Master Plan Update

Runway	Approach Category	Approach Slope	Runway End Elevation	Runway Protection Zone Dimensions		
				Length	Inner Width	Outer Width
9L	Non-Precision	34:1	117.0’	1,700’	500’	1,010’
27R	Non-Precision	34:1	114.7’	1,700’	500’	1,010’
9R	Visual	20:1	112.4’	1,000’	500’	700’
27L	Visual	20:1	111.9’	1,000’	500’	700’
5	Non-Precision	34:1	108.0’	1,700’	500’	1,010’
23	Non-Precision	34:1	122.3’	1,700’	500’	1,010’

Source: URS Corporation - Updated Master Plan Inventory, 2013.

2.7.1.1 Approach to Runway 9L

The existing trapezoidal-shaped RPZ extends approximately 150 feet beyond the west airport property line. The property line is located 1,750 feet from the threshold of Runway 9L. Beyond the property line and within the approach zone are several single-family dwellings.

2.7.1.2 Approach to Runway 27R

The existing Runway 27R RPZ is clear. The airport property line is located approximately 5,050 feet east of the existing threshold of Runway 27R. The approach zone is free of obstructions.

2.7.1.3 Approach to Runway 5

The existing Runway 5 RPZ is within airport property. The approach to the runway is heavily wooded with trees beginning approximately 1,200 feet southwest of the Runway 5 threshold. No manmade obstructions are within the approach to this runway. The airport property line is located approximately 2,200 feet to the southwest. Within the southwest approach zone and outside airport property is the Gordan Heights housing development and beyond that is the Clear Springs property.

2.7.1.4 Approach to Runway 23

The existing Runway 23 RPZ is within airport property. A large portion of this approach surface is over trees. No manmade obstructions are within the approach zone of this runway. The northeast approach to Runway 23 beyond airport property is the Wheeler Heights housing development.

2.7.1.5 Approach to Runway 9R

The Runway 9R RPZ and approach surfaces are clear. The property line is located approximately 1,800 feet from the threshold. Beyond the property line and in the approach zone is a citrus grove and single-family dwellings. There is an avigation easement over the citrus grove to protect airspace in the event the citrus grove land use changes in the future.

2.7.1.6 Approach to Runway 27L

The approach to Runway 27L is partially covered with trees at approximately 1,000 feet from the end of the runway. The RPZ is clear. No manmade restrictions are within the approach to this runway. The existing eastern airport property line is located approximately 5,600 feet to the east of the Runway 27L threshold.

2.7.2 Airspace Considerations

BOW is situated within the center of the County's aviation activity, with three public and private airports in a 15-mile radius. Winter Haven Municipal Airport (GIF), Lake Wales Municipal Airport (X07), and Lakeland Linder Regional Airport (LAL) are public facilities. Plant City Municipal Airport (PCM) is a public facility located in eastern Hillsborough County. Although it is anticipated that each will continue to be quite active during the planning period, the runway direction and traffic patterns preclude any serious airspace problems. Private facilities in Polk County include the Chalet Suzanne Airstrip (X25) and South Lakeland Airport (X49), which are limited in extent and most likely will not generate sufficient traffic to interfere with BOW.

Public and private airports in this area are listed below:

Airport Name	Ownership	Distance and Direction from BOW
Winter Haven Municipal (GIF)	Public	8 miles north
Lake Wales Municipal (XO7)	Public	10 miles southeast
Chalet Suzanne (X25)	Private	11 miles east

Lakeland Linder Regional (LAL)	Public	15 miles west-northwest
South Lakeland ((X49)	Private	17 miles east
Plant City Municipal* (PCM)	Public	24 miles west-northwest

* Hillsborough County

Five towers are located within the airport traffic area (ATA). The tallest tower is 537 feet above ground level, with the additional towers southwest of the airport. The existing non-precision instrument approach is to Runway 9L off the Lakeland VORTAC, and this cluster of towers does not currently present a problem. The City of Bartow is located approximately 5 miles southwest of Runway 5.

Airspace or reservation areas in the BOW area, as shown on the Miami Sectional Chart, are depicted in **Figure 2.19**. BOW's controlled airspace overlaps lightly with that of LAL, GIF, and X07; however, this causes no capacity limitations at any of the airports, as explained in Section 4.0, Demand/Capacity Analysis and Facility Requirements. **Figure 2.20** shows the area airports in relation to BOW.

2.8 METEOROLOGICAL DATA

Weather conditions play an important role in determining an airport's capacity and facility requirements. Items of interest are temperature and precipitation, ceiling and visibility, as well as local wind conditions. Temperature information will be used to determine runway length requirements, while precipitation, ceiling, and visibility data will be used to determine the capacity of the existing airfield. Wind data will be used to determine the need for any additional runways.

The detailed meteorological analysis for BOW was obtained from the U.S. Weather Bureau, "Summary of Hourly Observations" for Lakeland, Florida, from the period 1969 through 1972.

2.8.1 Temperature and Precipitation

Average temperature in the Bartow area is 72.8 degrees Fahrenheit (° F). Average monthly temperatures range from 82.2° F in July and August to 60.1° F in January.

Average rainfall per year is 47.7 inches. The wettest months are July and August, averaging 7.11 and 7.63 inches of precipitation, respectively. The dry season runs from October through April, when the average monthly rainfall is between 1.35 and 3.44 inches.

2.8.2 Ceiling and Visibility

The FAA has defined certain limits of ceiling height and visibility limit as visual meteorological conditions (VMC) and instrument meteorological conditions (IMC). These limits affect flight operations by establishing certain rules and procedures for pilots, aircraft, and ATC. During VMC, pilots must adhere to visual flight rules. During IMC, pilots must adhere to instrument flight rules.

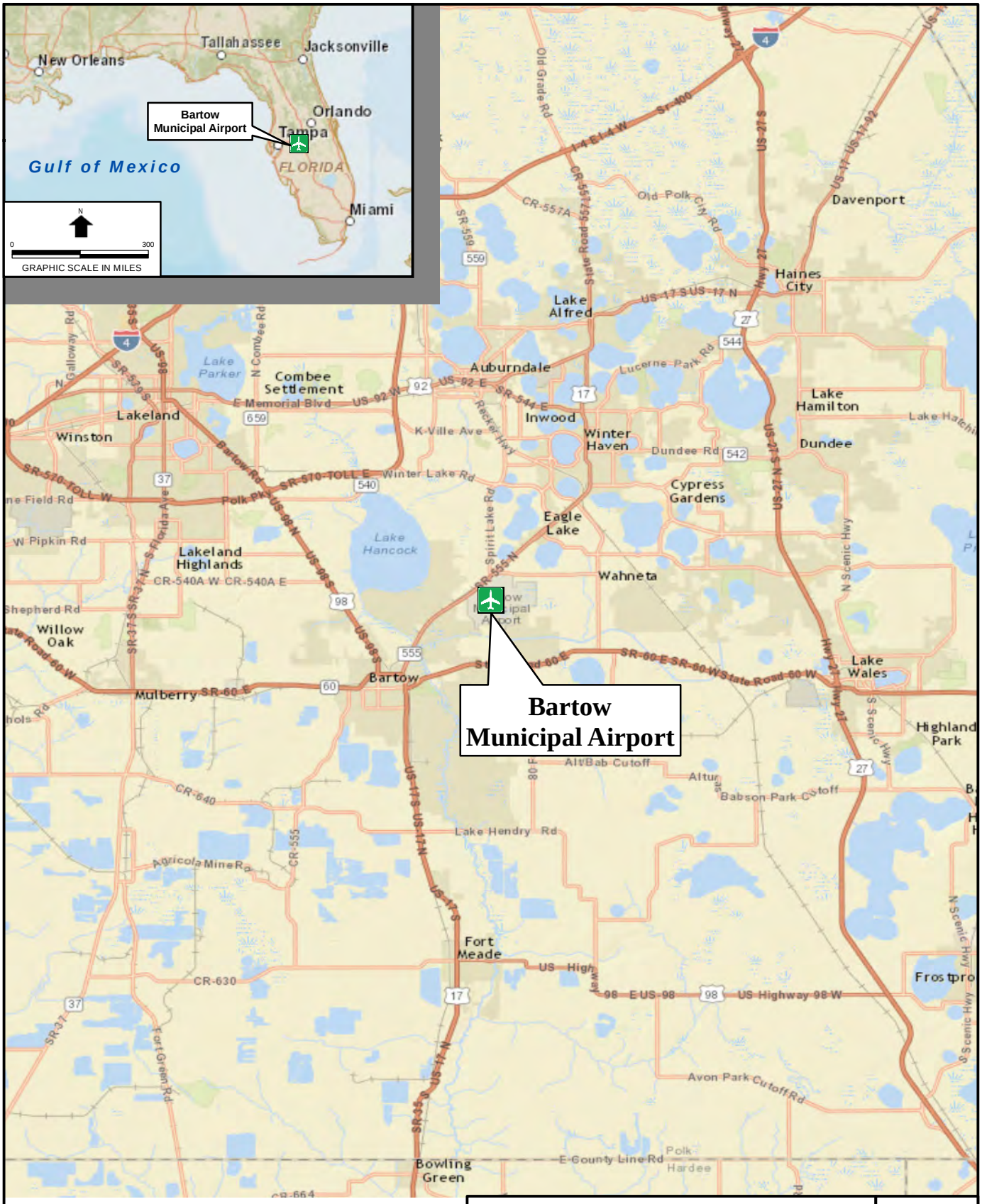
VMC is defined as that period when the ceiling is greater than 1,000 feet and the visibility is greater than 3 miles. IMC is defined as that period when the ceiling and visibility is less than 1,000 feet and 3 miles, but greater than 200 feet and 0.5 mile.

The breakdown of the occurrence of VMC versus IMC conditions at BOW has not been calculated. However, it is estimated that VMC conditions occur over 95 percent of the time and IMC conditions occur less than 5 percent of the time.

2.8.3 Wind Analysis

Wind coverage indicates the percentage of time that crosswind components are within an acceptable velocity. For the purpose of runway wind analyses, a crosswind component can be defined as the wind that occurs at a right angle to the runway centerline. A crosswind component of 16 knots (15 miles per hour) was used for analyzing the runway system at BOW.

The predominant winds in the Bartow area are from the east-northeast. At a 16-knot crosswind component, Runway 5/23 has 99.78 percent coverage, while Runway 9/27 has 99.76 percent coverage. Combined 16-knot crosswind component coverage is 99.95 percent. The greatest winds over 10.5 knots are from the northeast, while strong winds are experienced from the northwest, west, and southwest. The wind rose is shown on **Figure 2.21**.



AIRPORT LOCATION MAP

BARTOW MUNICIPAL AIRPORT AND INDUSTRIAL PARK

FIGURE 2.1

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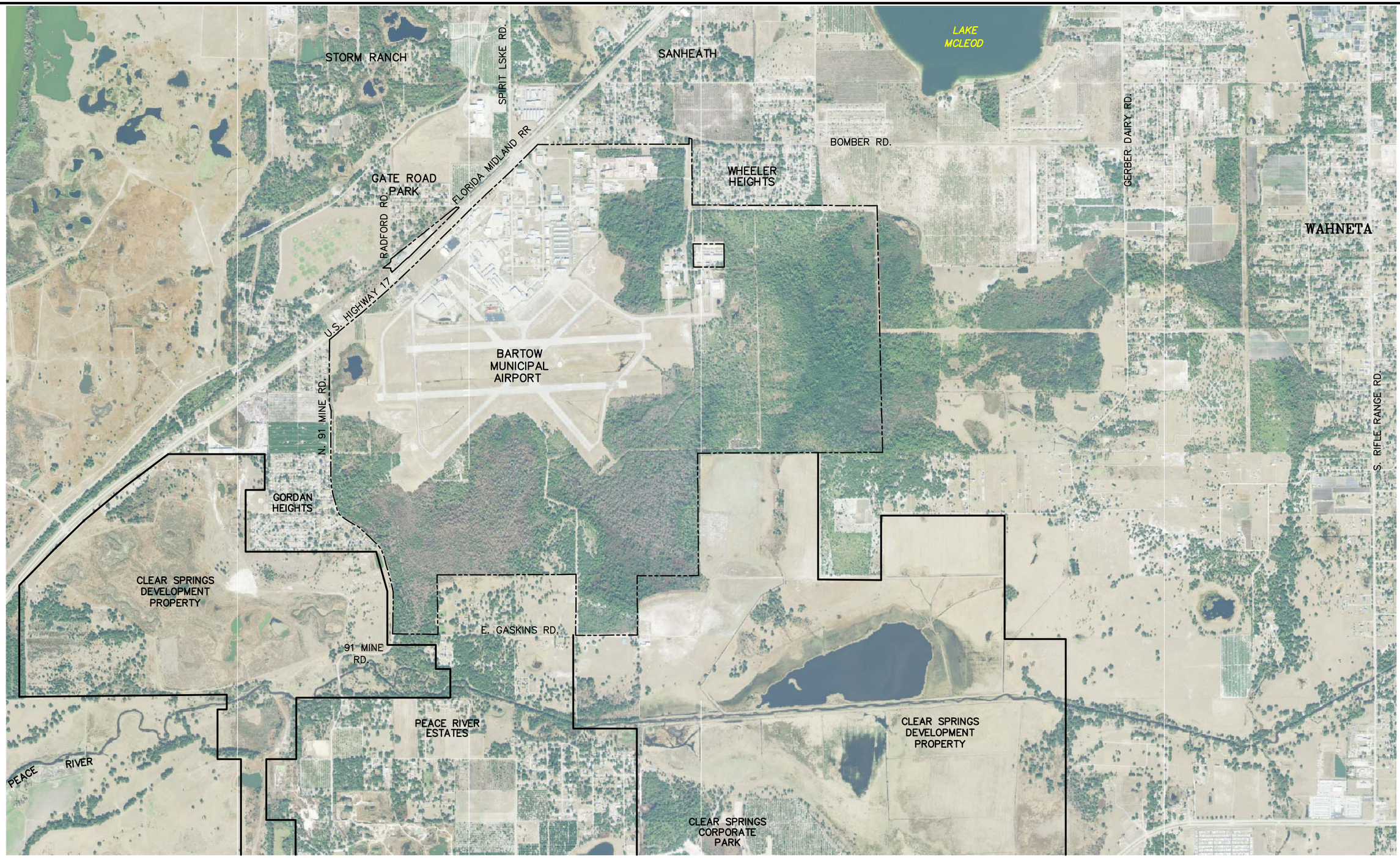
Path: S:\Projects_GIS\Tertiary\Projects\Airports\Bartow Municipal Airport\Master Plan Update 2013\applications\mxd\figures\Figure 2-1 Airport Location Map.mxd, Date Saved: 2/2/2015 11:40:09 AM



SOURCE: AERIAL FROM FDOT SURVEYING AND MAPPING, FLOWN IN 2011.

N

2000 0 2000

GRAPHIC SCALE IN FEET

EXISTING AERIAL PHOTOGRAPH (2011)

BARTOW MUNICIPAL AIRPORT AND INDUSTRIAL PARK

FIGURE 2.2

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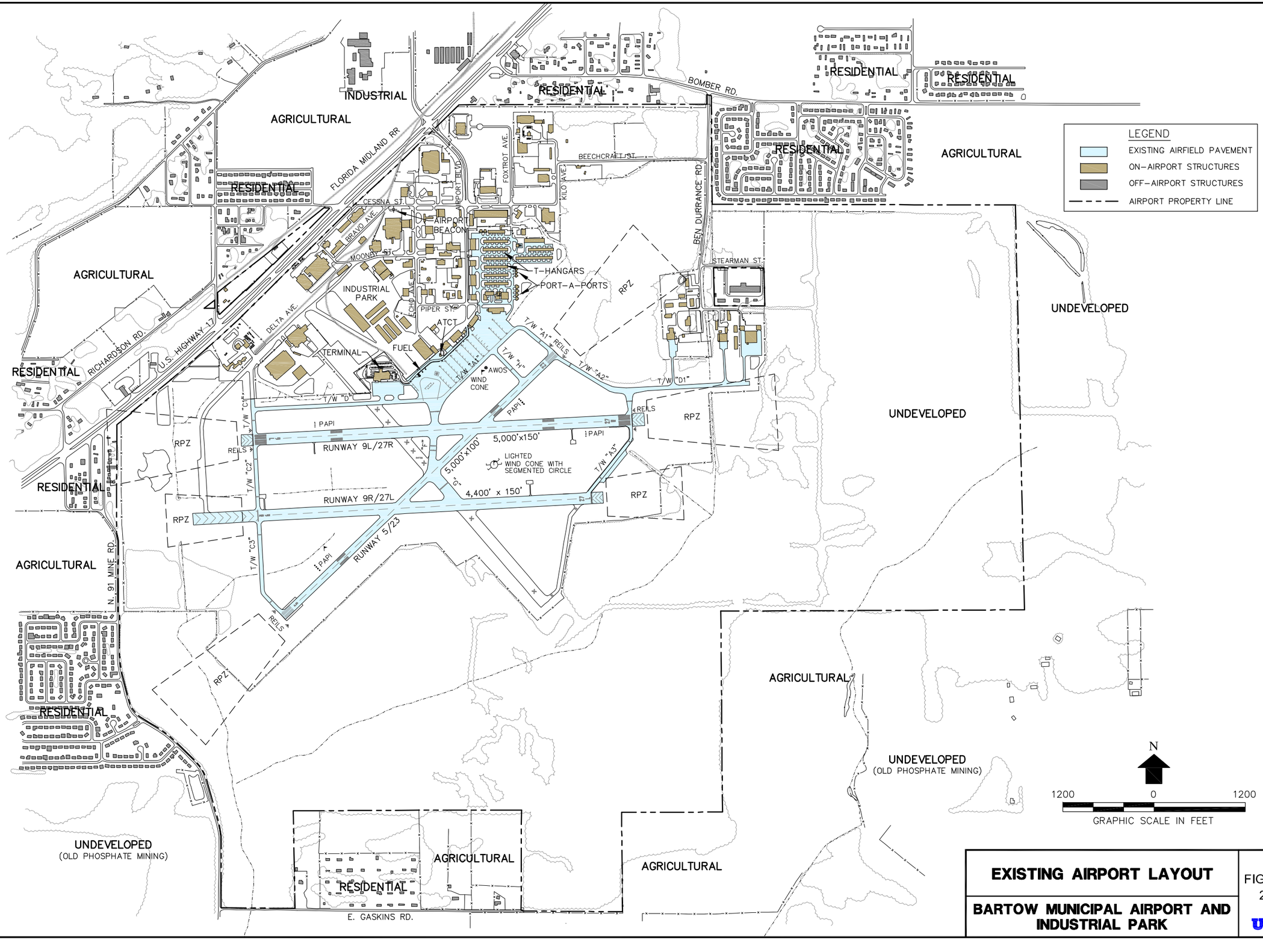

EXISTING AIRPORT LAYOUT

BARTOW MUNICIPAL AIRPORT AND INDUSTRIAL PARK

FIGURE 2.3

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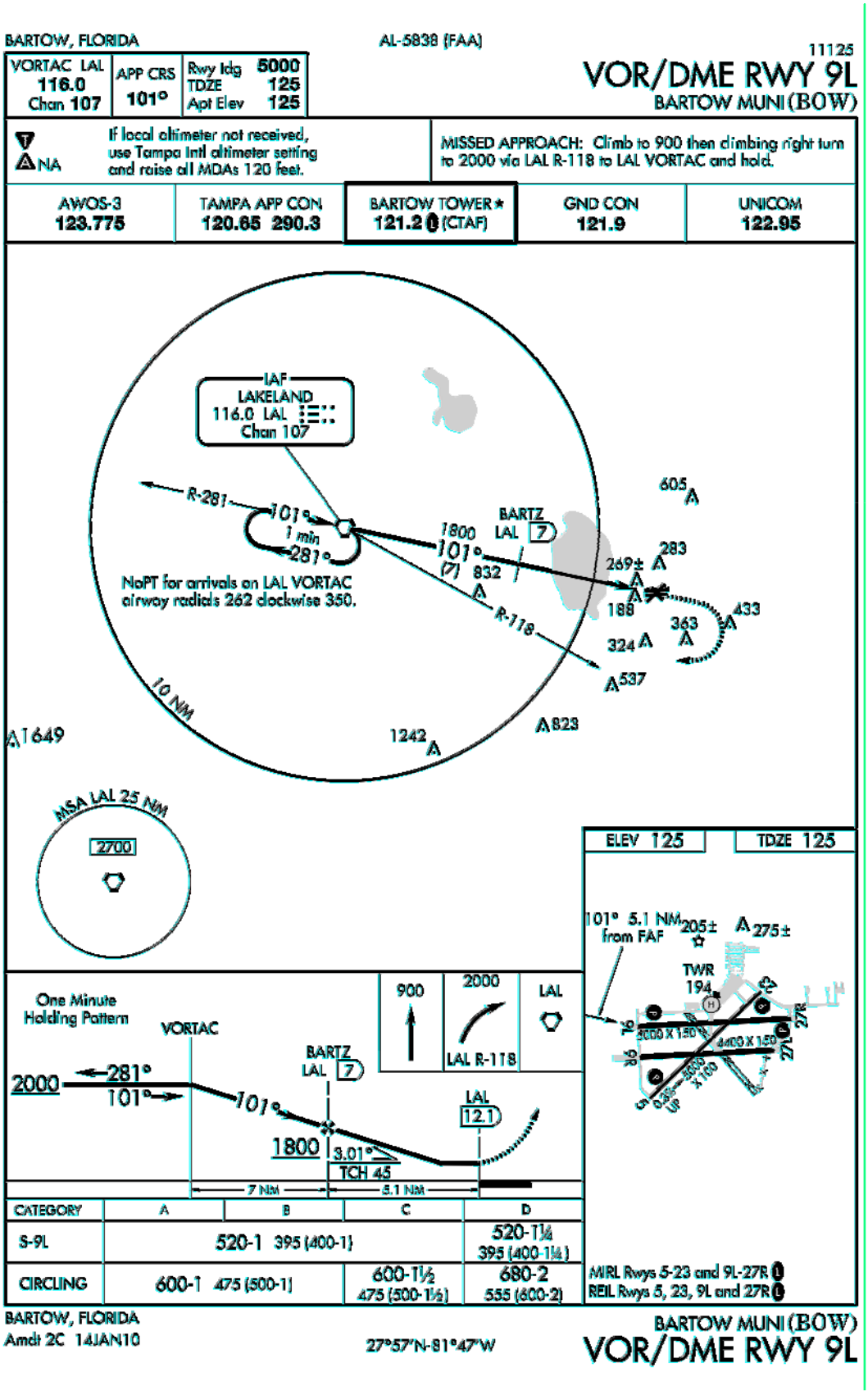
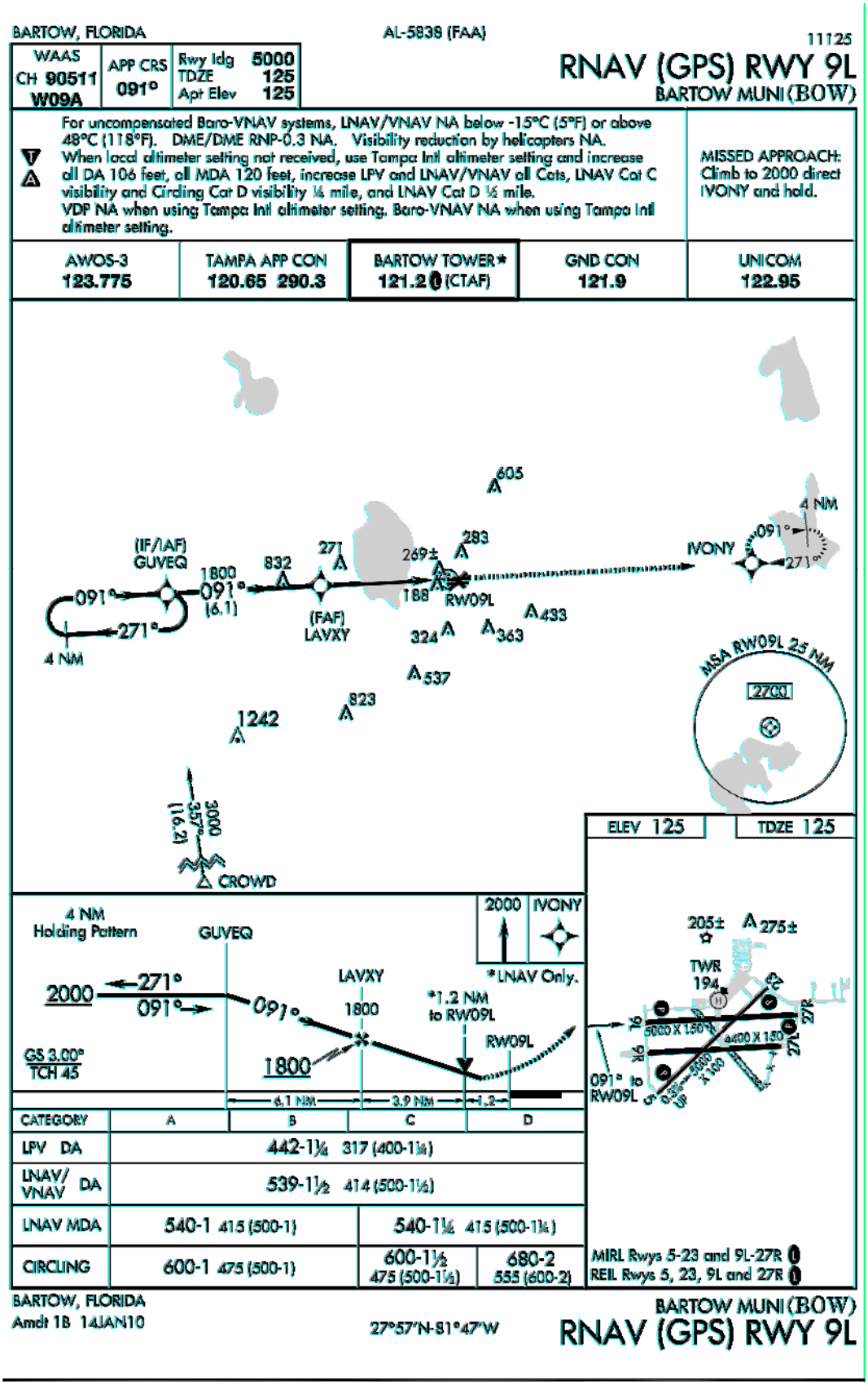


S:\Projects_APPLAN\BARTOW\AMP UPDATE 2013\Figures\FIG 2.4.dwg 01/26/2015 8:54

VOR/DME RUNWAY 9L APPROACH CHART	FIGURE 2.4
BARTOW MUNICIPAL AIRPORT AND INDUSTRIAL PARK	URS



RNAV (GPS) RUNWAY 9L APPROACH CHART	FIGURE 2.5
BARTOW MUNICIPAL AIRPORT AND INDUSTRIAL PARK	URS

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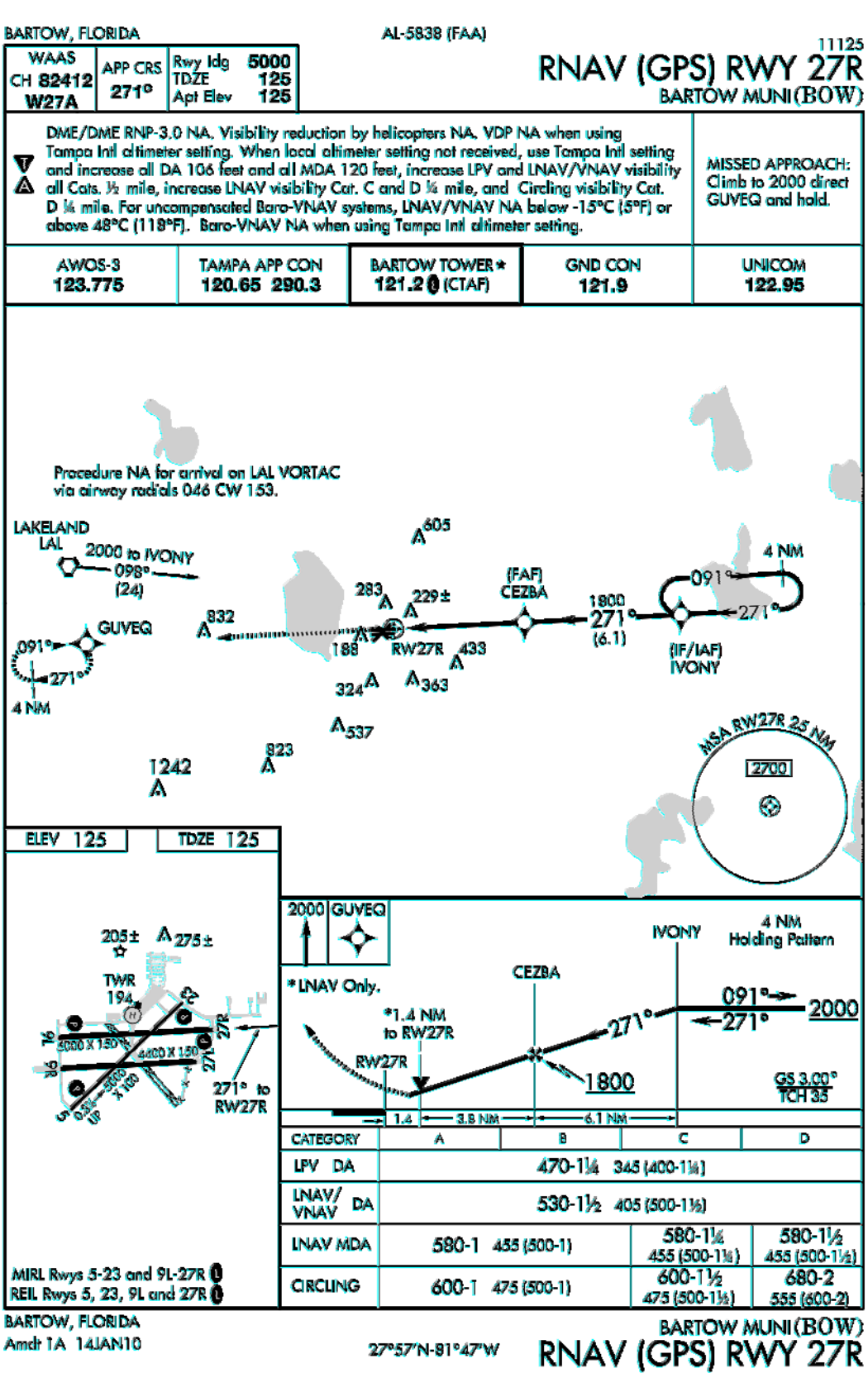

RNAV (GPS) RUNWAY 27R APPROACH CHART	FIGURE 2.6
BARTOW MUNICIPAL AIRPORT AND INDUSTRIAL PARK	URS

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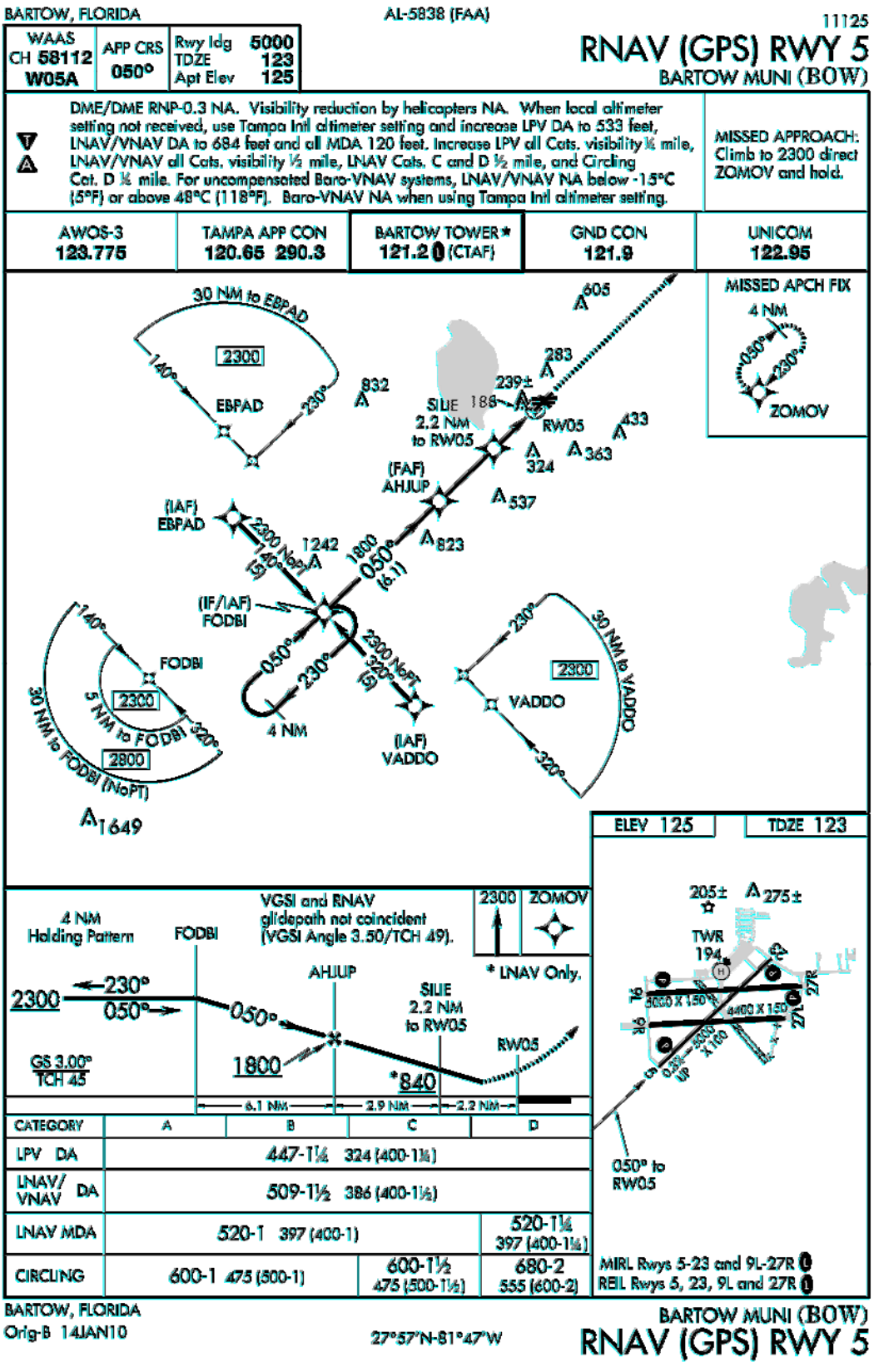

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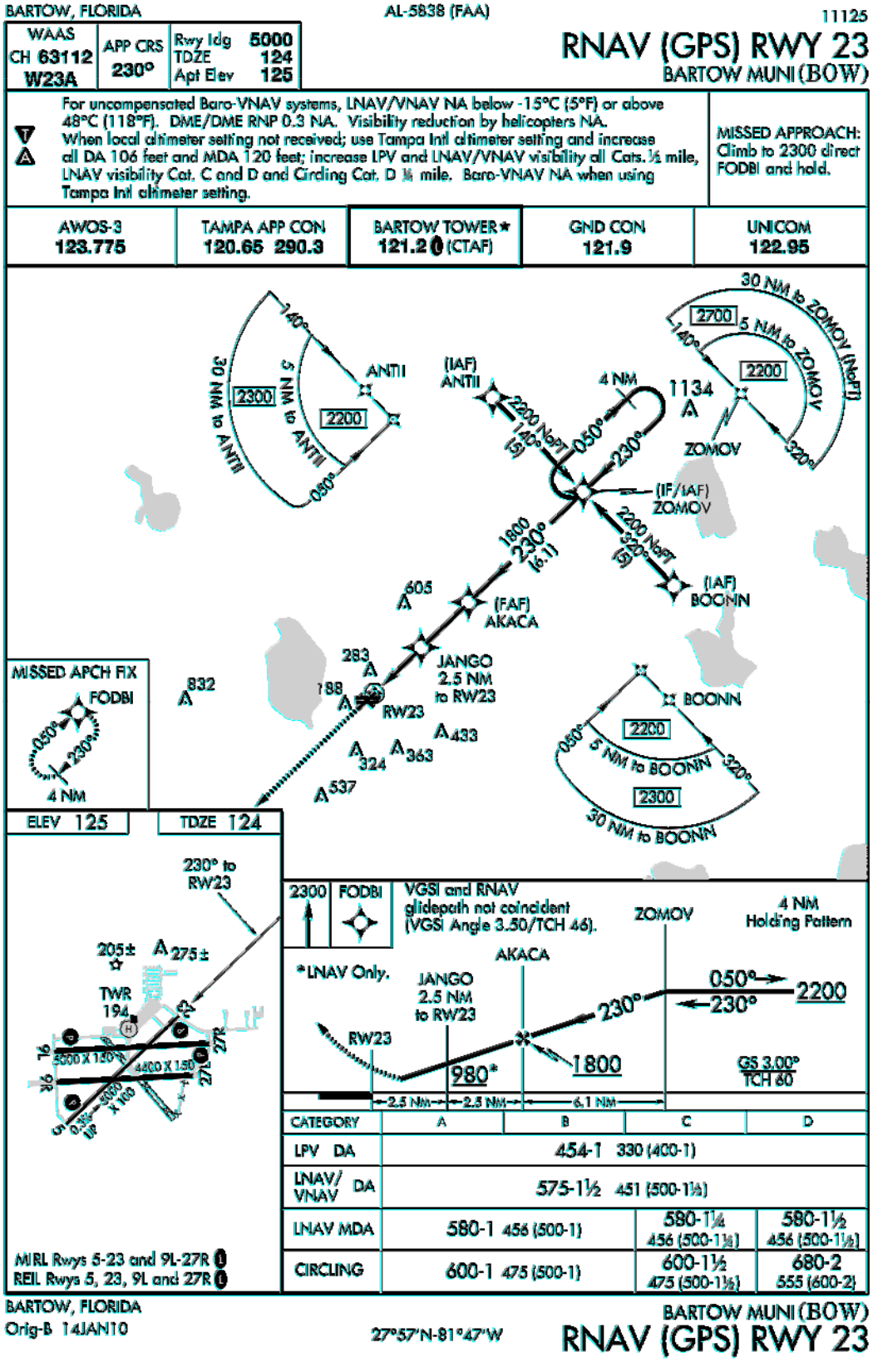
RNAV (GPS) RUNWAY 5 APPROACH CHART	FIGURE 2.7
BARTOW MUNICIPAL AIRPORT AND INDUSTRIAL PARK	URS



S:\Projects_APPLAN\BARTOW\AMP UPDATE 2013\Figures\FIG 2.8.dwg 01/26/2015 8:58

RNAV (GPS) RUNWAY 23 APPROACH CHART	FIGURE 2.8
BARTOW MUNICIPAL AIRPORT AND INDUSTRIAL PARK	URS

N

500 0 500

GRAPHIC SCALE IN FEET

AGRICULTURAL

RESIDENTIAL

RESIDENTIAL

RESIDENTIAL

RESIDENTIAL

UNDEVELOPED

INDUSTRIAL PARK

FLORIDA MIDLAND RR

U.S. HIGHWAY 17

BOMBER RD.

BEECHCRAFT ST.

FOXTROT AVE.

KILO AVE.

BEN DURRANCE RD.

CESSNA ST.

BRAVO AVE.

ALPHA AVE.

MOONEY ST.

AIRPORT BEACON

AIRPORT BLVD.

PIPER ST.

ECHO AVE.

DELTA AVE.

STEARMAN ST.

RPZ

RPZ

RPZ

ATCT

TERMINAL

FUEL

AWOS

WIND CONE

T/W "A1"

T/W "A2"

T/W "A3"

T/W "H"

T/W "D"

T/W "D1"

T/W "C1"

T/W "C2"

T/W "F"

RUNWAY 9L/27R

RUNWAY 5/23

5,000'x150'

5,000'x100'

9L

27R

23

LIGHTED WIND CONE WITH SEGMENTED CIRCLE

J:\BARTOW\MASTER PLAN\EXHIBITS\FIG 5.4-REVISED.DWG 04/14/05 16:49

EXISTING BUILDING AREA

BARTOW MUNICIPAL AIRPORT AND INDUSTRIAL PARK

FIGURE 2.9

URS

SITE #23
MID-FLORIDA LUMBER
(17.3 AC.)

PARCEL 3

SITE #19
HOMES OF MERIT
(12.5 AC.)

OLD RUNWAY
PAVEMENT

OLD TAXIWAY PAVEMENT

RETENTION AREA

RETENTION AREA

RETENTION AREA

ELECTRIC
PULL BOX

FUTURE
GENERATOR TANK

FUTURE
GENERATOR

SERVICE
TRANSFORMER

CHILLER

CITY ELECTRIC
PULL BOX

VERIZON
PULL BOX

LIFT
STATION

PUBLIC PARKING

PROPANE
TANK

EXISTING TERMINAL

GATE

HIGH MAST
LIGHTS

APRON

57.5'
ADG II

57.5'
ADG II

57.5'
ADG II

57.5'
ADG II

SIGN

SIGN

DRAINGE
INLET (TYP)

RAILROAD SPUR

PARCEL 1

INDUSTRIAL PARK

MID-FLORIDA
LUMBER STORAGE

VACANT
BUILDING
410

LIFE-NET
HANGAR
415

411
A

411

ELEC.
VAULT

ATCT

AIRPORT ACCESS ROAD

JET A
FUEL

FUEL

AVGAS
FUEL

PEDESTRIAN
GATE

APRON

REMOTE
LARGE CORPORATE JET
PARKING POSITIONS

TAXIWAY "A1"

TAXIWAY "D"

TAXIWAY "F"

120

125

N

100 0 100

GRAPHIC SCALE IN FEET

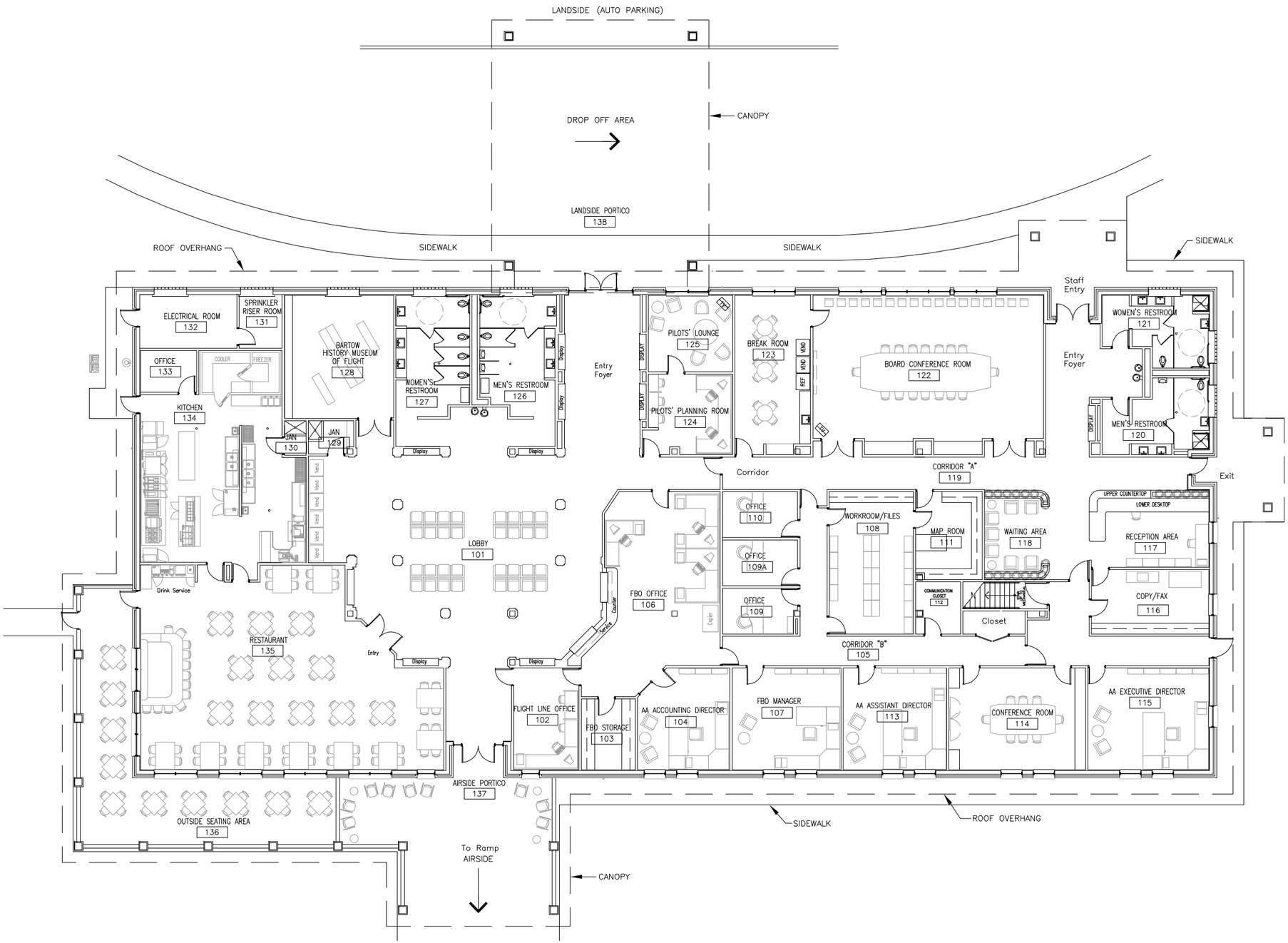
EXISTING TERMINAL AREA

BARTOW MUNICIPAL AIRPORT AND INDUSTRIAL PARK

FIGURE
2.10

URS

S:\Projects_APPLAN\BARTOW\AMP UPDATE 2013\Figures\FIG 2.10.dwg 01/26/2015 9:02



N

20 0 20

GRAPHIC SCALE IN FEET

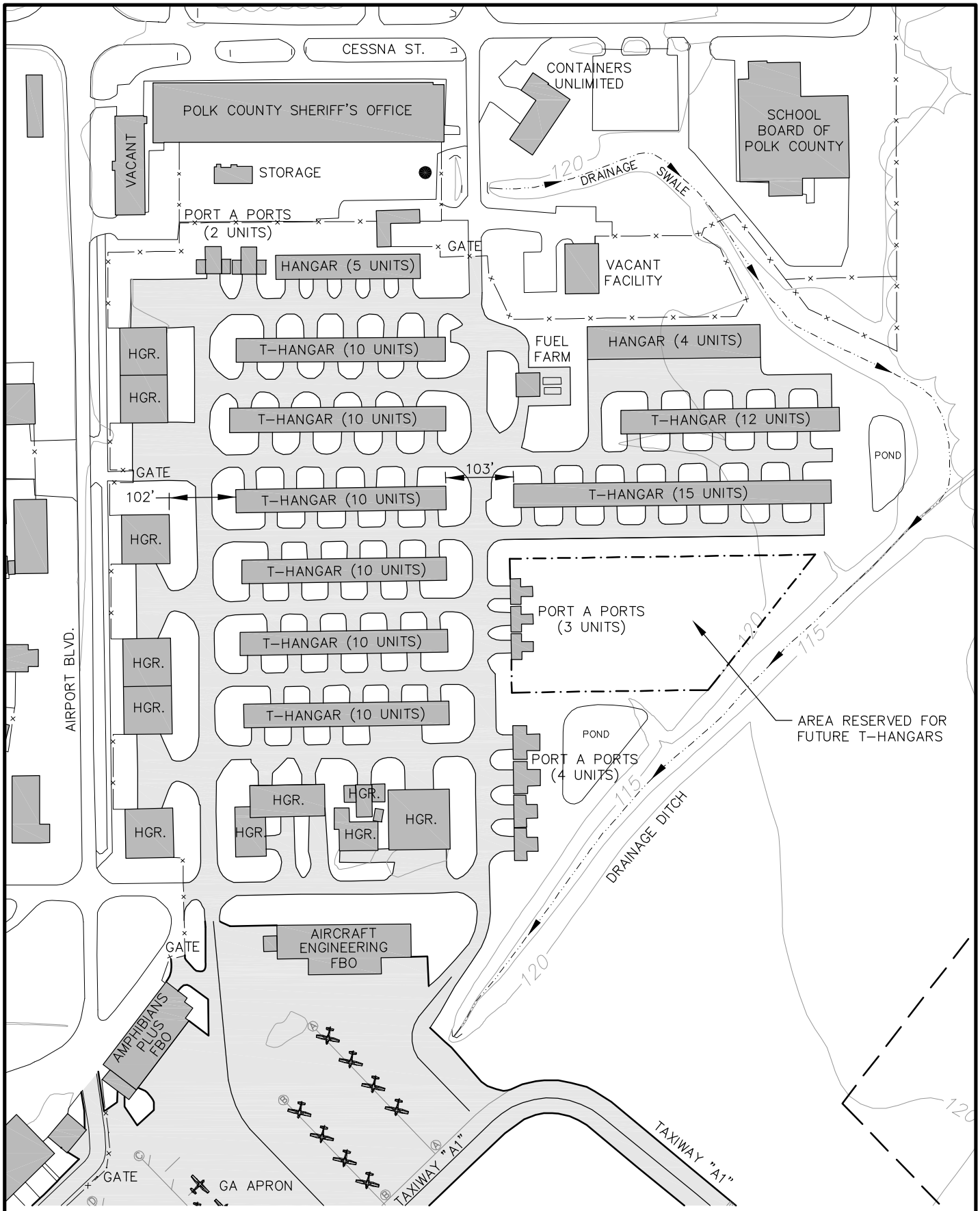
EXISTING TERMINAL BUILDING LAYOUT

BARTOW MUNICIPAL AIRPORT AND INDUSTRIAL PARK

FIGURE 2.11

URS

S:\Projects_APPLAN\BARTOW\AMP UPDATE 2013\Figures\FIG 2.11.dwg 01/26/2015 9:03



S:\Projects_APPLAN\BARTOW\AMP UPDATE 2013\Figures\FIG 2.12.dwg 02/23/2015 16:29

EXISTING T-HANGAR AREA

BARTOW MUNICIPAL AIRPORT AND INDUSTRIAL PARK

FIGURE 2.12

URS

CESSNA ST.

BEN DURRANCE RD.

RESIDENTIAL

UNDEVELOPED

STEARMAN ST.

RPZ

T/W "A1"

T/W "A2"

T/W "A3"

T/W "D1"

T/W "H"

5,000'x100'

RUNWAY 5/23

23

27 R

27 L

LIGHTED
WIND CONE WITH
SEGMENTED CIRCLE

RPZ

RPZ

UNDEVELOPED

N

500 0 500

GRAPHIC SCALE IN FEET

J:\BARTOW\MASTER PLAN\EXHIBITS\FIG 5.4-REVISED.DWG 04/14/05 16:49

EXISTING EAST QUADRANT

BARTOW MUNICIPAL AIRPORT AND INDUSTRIAL PARK

FIGURE 2.13

URS

AGRICULTURAL

N

400 0 400

GRAPHIC SCALE IN FEET

RESIDENTIAL

FLORIDA MIDLAND RR

U.S. HIGHWAY 17

CESSNA ST.

BRAVO AVE.

ALPHA AVE.

MOONEY ST.

AIRPORT BEACON

AIRPORT BLVD.

FOXTROT AVE.

KILO AVE.

BEECHCRAFT ST.

INDUSTRIAL PARK

DELTA AVE.

ECHO AVE.

PIPER ST.

RPZ

ATCT

TERMINAL

FUEL

AWOS

WIND CONE

T/W "A1"

T/W "H"

T/W "A2"

T/W "D"

RUNWAY 5/23

23

05

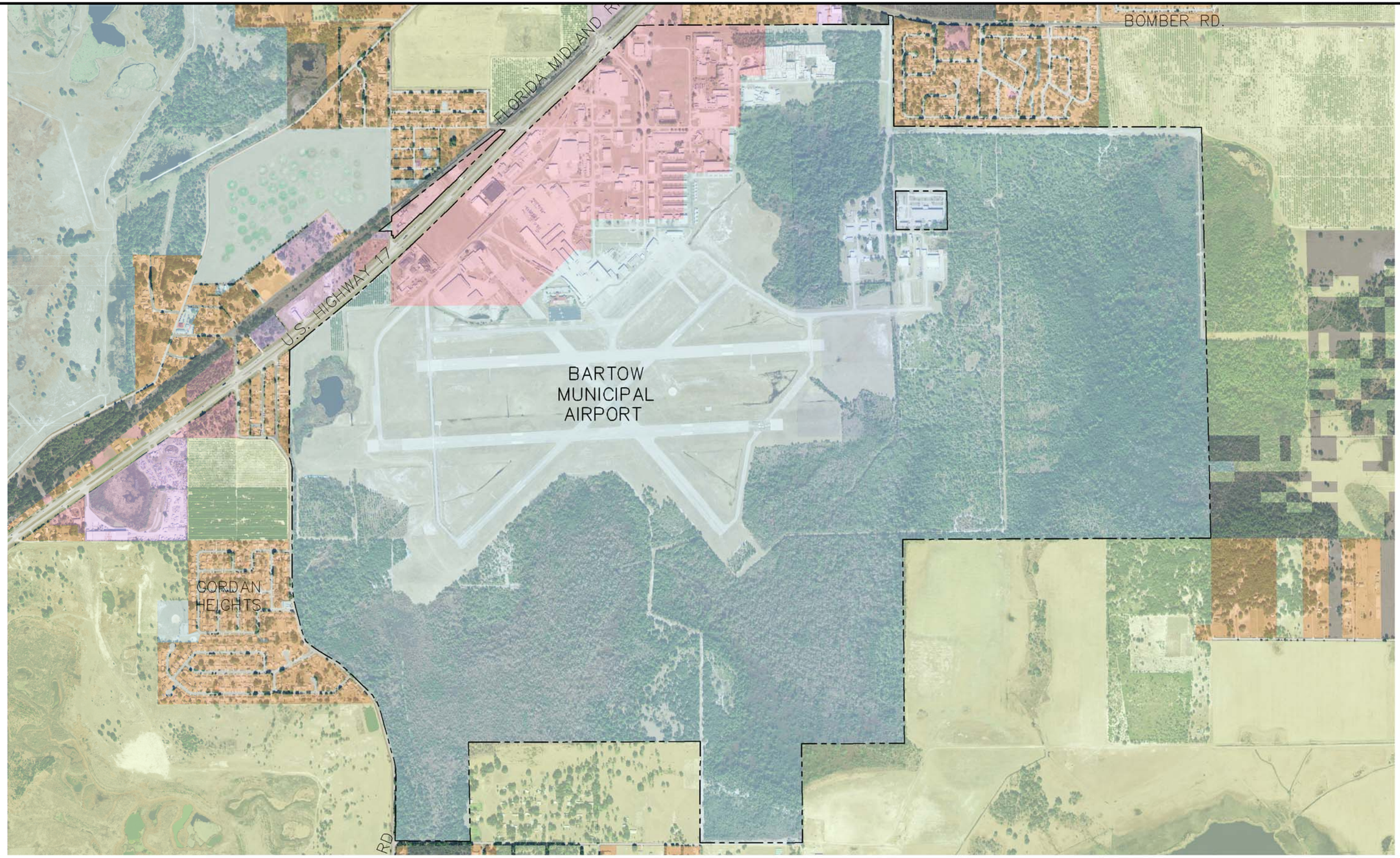
J:\BARTOW\MASTER PLAN\EXHIBITS\FIG 5.4-REVISED.DWG 04/14/05 16:49

EXISTING INDUSTRIAL PARK

BARTOW MUNICIPAL AIRPORT AND INDUSTRIAL PARK

FIGURE 2.14

URS



LEGEND

- INSTITUTIONAL
- RESIDENTIAL
- COMMERCIAL
- INDUSTRIAL
- GOVERNMENTAL
- AGRICULTURAL
- MISCELLANEOUS

N

2000 0 2000

GRAPHIC SCALE IN FEET

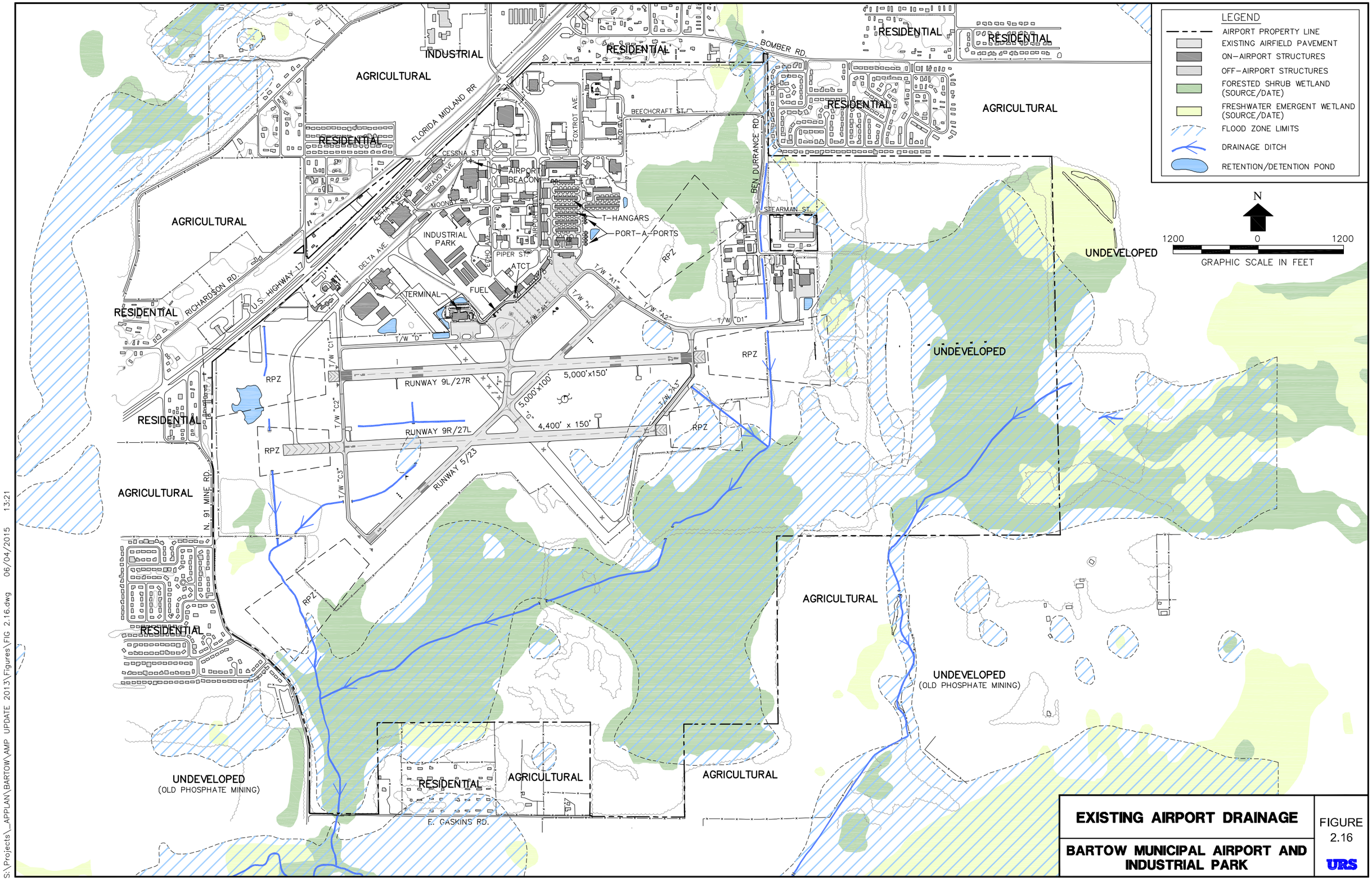
EXISTING LAND USE

BARTOW MUNICIPAL AIRPORT AND INDUSTRIAL PARK

FIGURE 2.15

URS

S:\Projects_APPLAN\BARTOW\AMP UPDATE 2013\Figures\FIG 2.15.dwg 01/26/2015 9:08



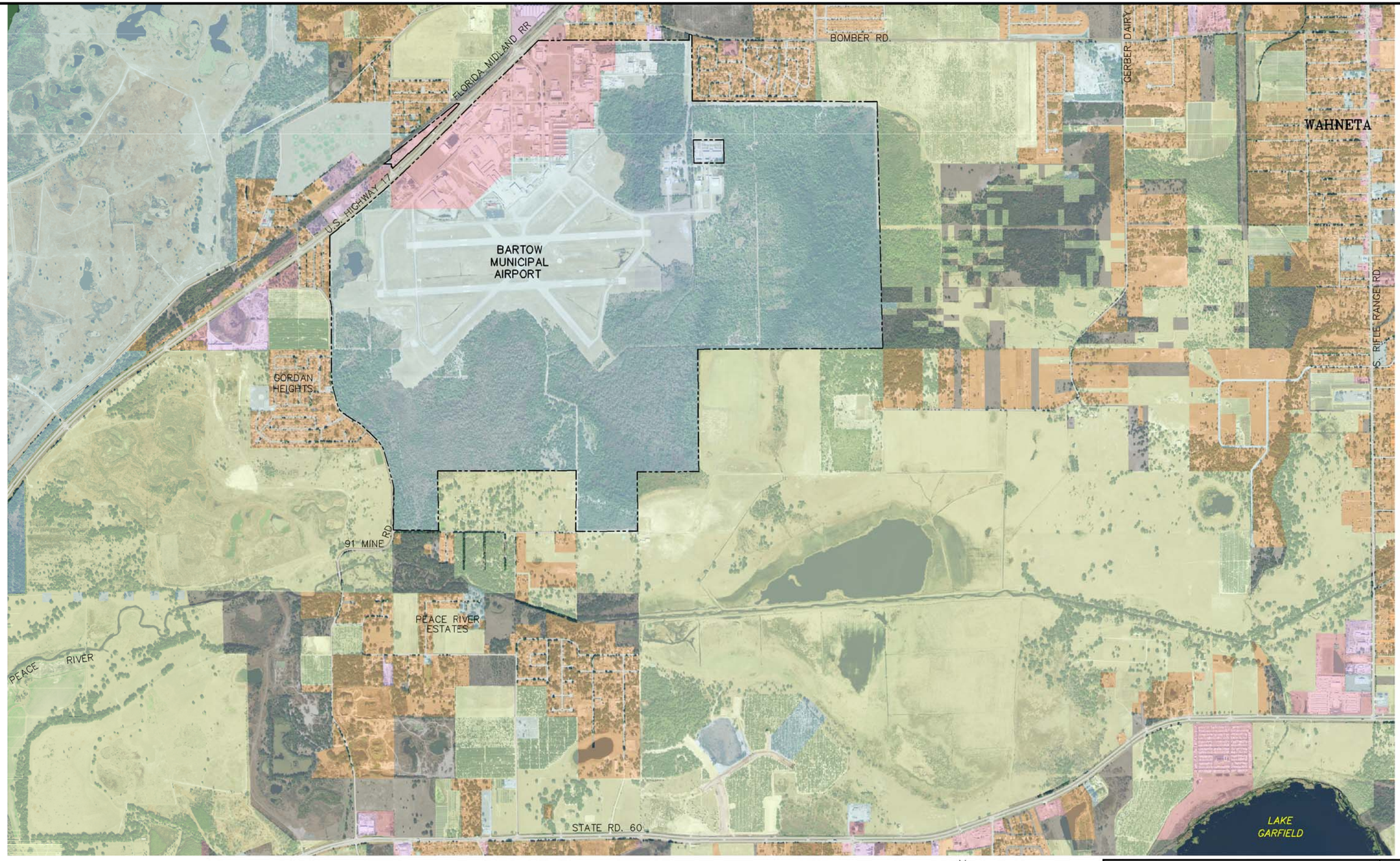
S:\Projects_APPLAN\BARTOW\AMP UPDATE 2013\Figures\FIG 2.16.dwg 06/04/2015 13:21

EXISTING AIRPORT DRAINAGE

BARTOW MUNICIPAL AIRPORT AND INDUSTRIAL PARK

FIGURE 2.16

URS



LEGEND

- INSTITUTIONAL
- RESIDENTIAL
- COMMERCIAL
- INDUSTRIAL
- GOVERNMENTAL
- AGRICULTURAL
- MISCELLANEOUS

N

2000 0 2000

GRAPHIC SCALE IN FEET

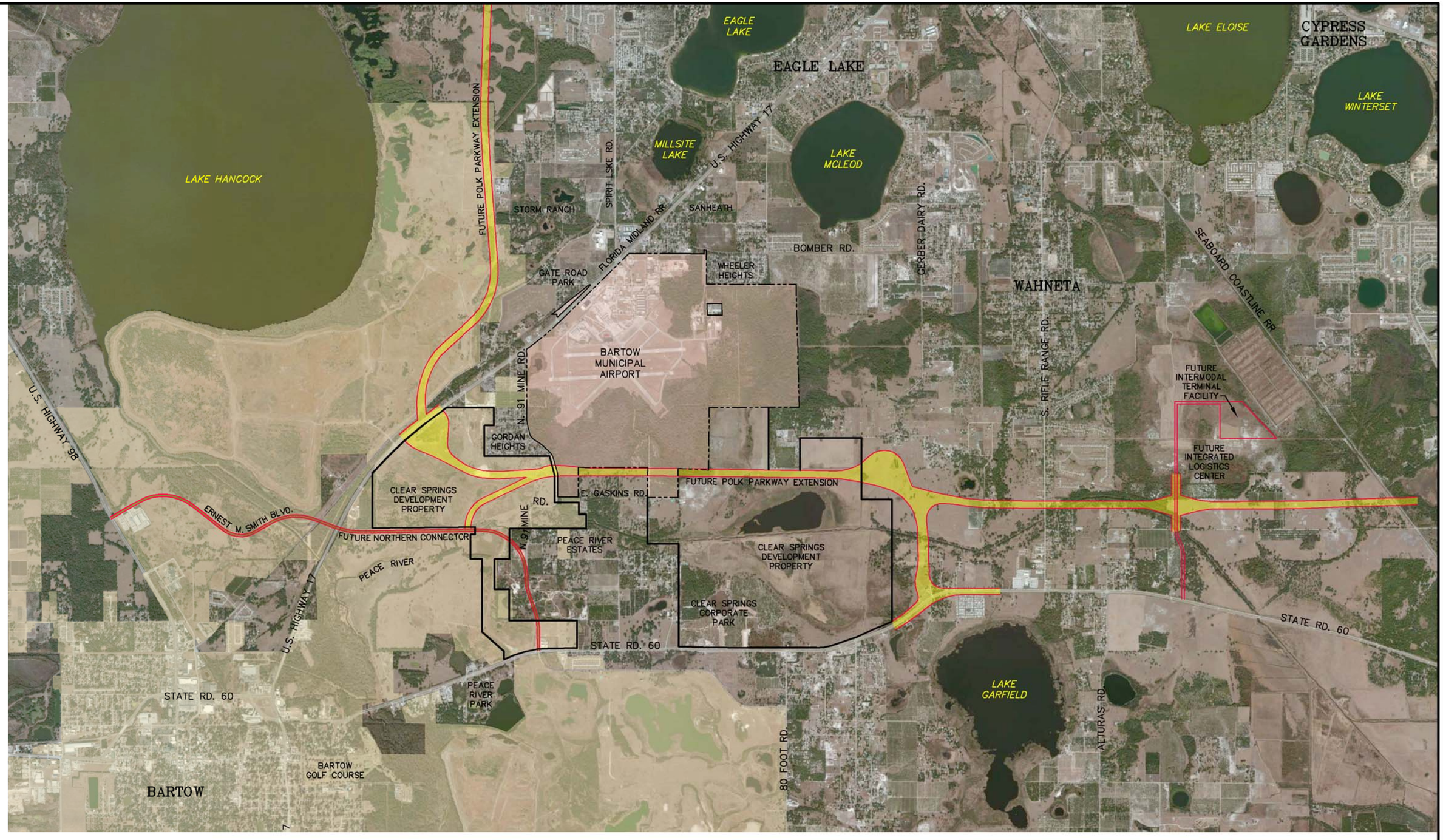
EXISTING SURROUNDING LAND USE

BARTOW MUNICIPAL AIRPORT AND INDUSTRIAL PARK

FIGURE 2.17

URS

S:\Projects_APPLAN\BARTOW\AMP UPDATE 2013\Figures\FIG 2.17.dwg 01/26/2015 9:15



LEGEND
- AIRPORT PROPERTY
- CITY LIMITS
- FUTURE NORTHERN CONNECTOR
- FUTURE POLK PARKWAY

N

4000 0 4000

GRAPHIC SCALE IN FEET

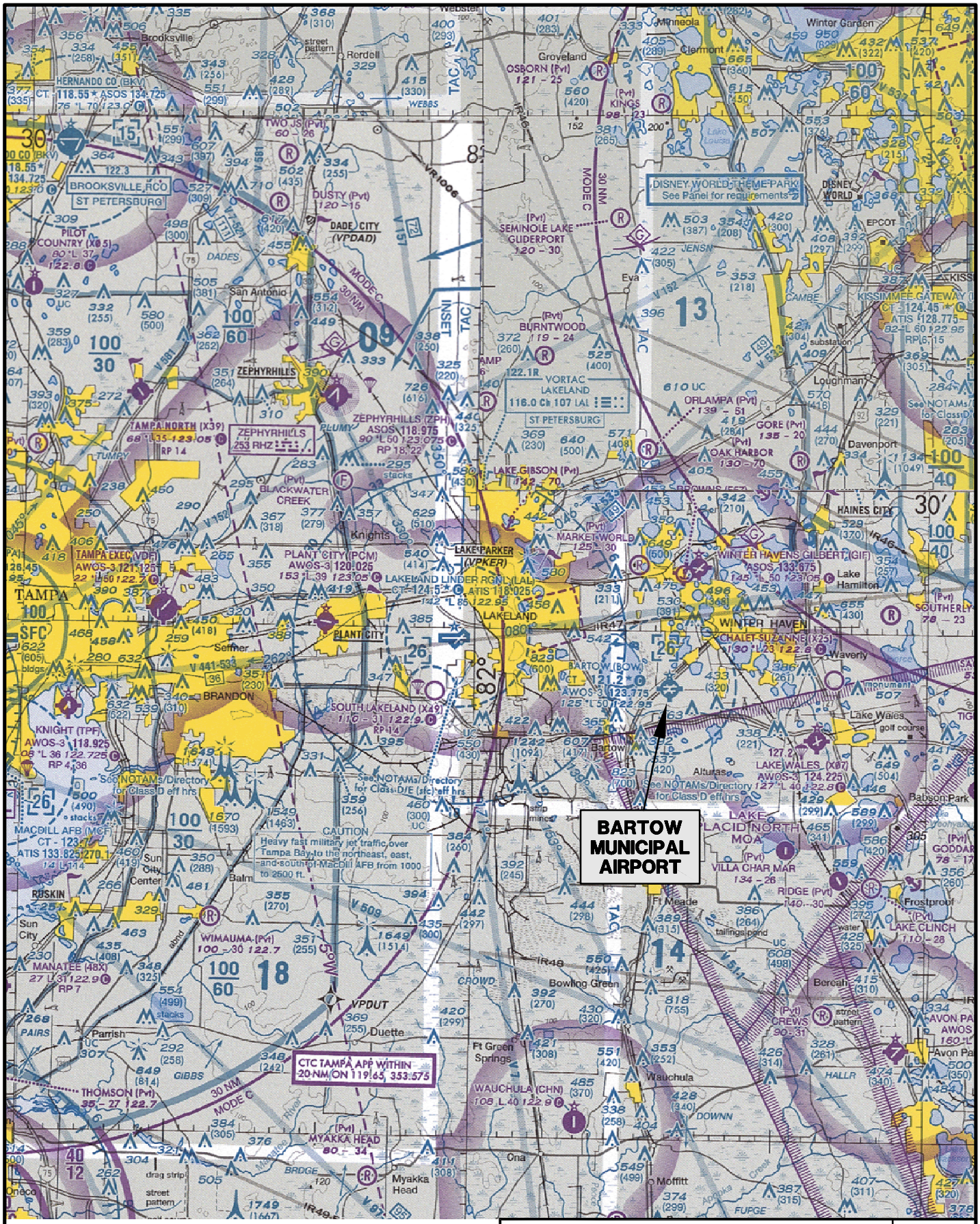
EXISTING AND PLANNED SURROUNDING ROADWAY IMPROVEMENTS

BARTOW MUNICIPAL AIRPORT AND INDUSTRIAL PARK

FIGURE 2.18

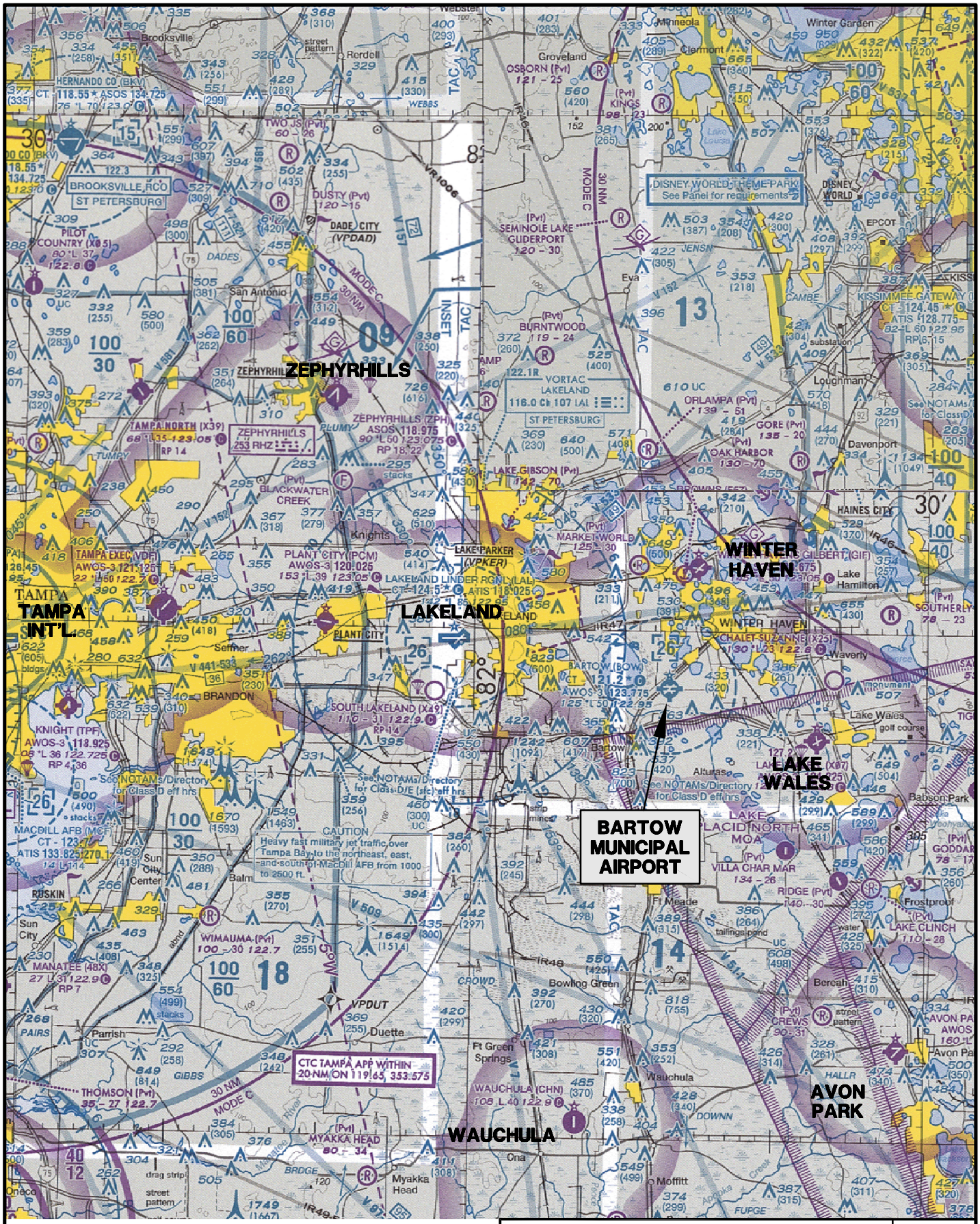
URS

S:\Projects_APPLAN\BARTOW\AMP UPDATE 2013\Figures\FIG 2.18.dwg 01/26/2015 9:17



S:\Projects_APPLAN\BARTOW\AMP UPDATE 2013\Figures\FIG 2.19.dwg 01/26/2015 9:18

AERONAUTICAL CHART	FIGURE 2.19
BARTOW MUNICIPAL AIRPORT AND INDUSTRIAL PARK	URS



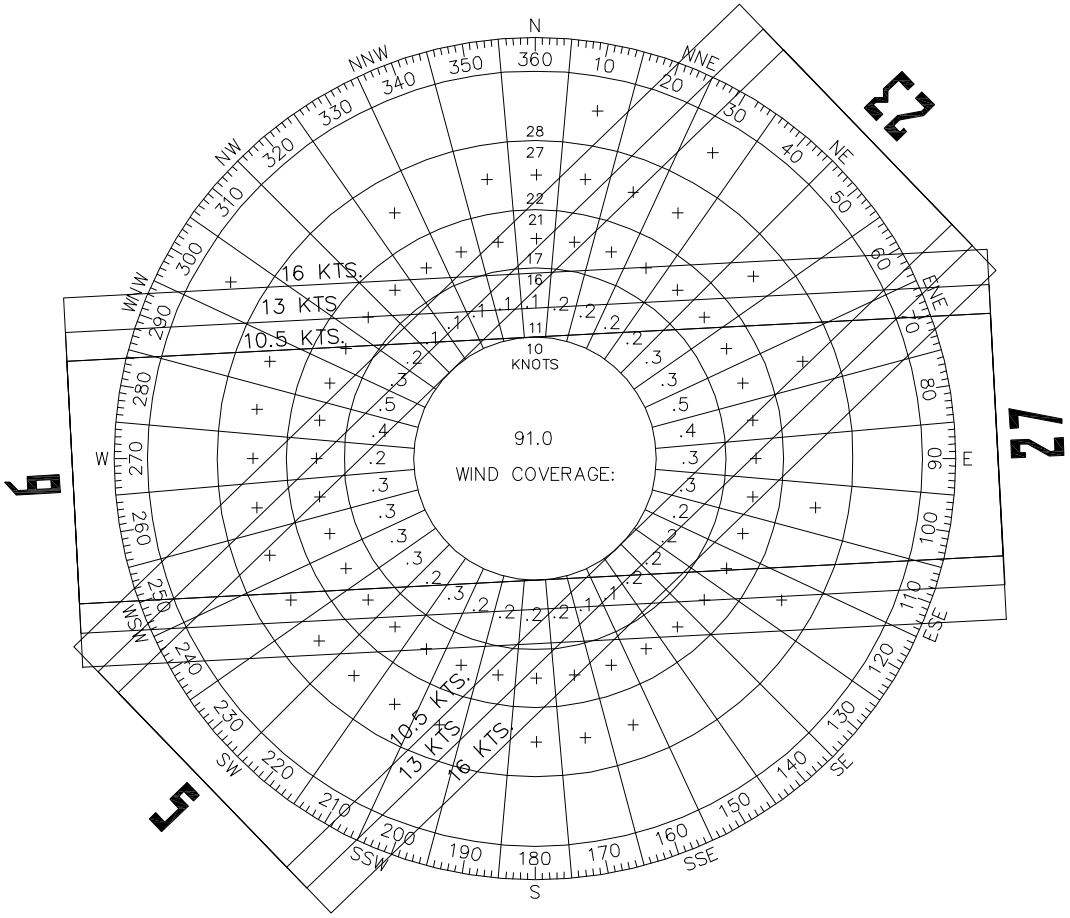
S:\Projects_APPLAN\BARTOW\AMP UPDATE 2013\Figures\FIG 2.20.dwg 01/26/2015 9:19

AIRSPACE INTERACTION WITH OTHER AIRPORTS

BARTOW MUNICIPAL AIRPORT AND INDUSTRIAL PARK

FIGURE 2.20

URS



METEOROLOGICAL CONDITION	RUNWAY	RUNWAY WIND COVERAGE BY PERCENT			
		10.5 KNOTS (12 MPH)	13 KNOTS (15 MPH)	16 KNOTS (18 MPH)	OBSERVATIONS
ALL – WEATHER	5/23	96.76	98.48	99.78	133,236
ALL – WEATHER	9/27	97.19	98.53	99.76	
ALL – WEATHER	5/23 & 9/27	98.93	99.65	99.95	

WIND ROSE DEPICTED RELATIVE TO TRUE NORTH (NAD 83)
RUNWAY 5 ORIENTATION: 46°04'55.200" (TRUE)
RUNWAY 23 ORIENTATION: 226°05'13.200" (TRUE)
RUNWAY 9 ORIENTATION: 87°04'44.400" (TRUE)
RUNWAY 27 ORIENTATION: 267°05'09.600" (TRUE)
MAGNETIC DECLINATION: 5°16'49" (5.9°)

NOTES:

1. THIS GRAPHICAL CHART PLOTS, FOR THE DATA PERIOD LISTED, THE RECORDED OCCURRENCES (IN PERCENT) OF WIND BY DIRECTION AND SPEED WHILE THE RECTANGULAR BOXES REPRESENT THE MAXIMUM ACCEPTABLE CROSSWIND COMPONENTS OF 10.5, 13, AND 16 KNOTS FOR BOTH RUNWAYS BASED ON ARC C–III AIRCRAFT DESIGN AND CROSSWIND LIMITATIONS. THE AIRFIELD COVERAGE CAPABILITY (ALL RUNWAYS) IS THUS DETERMINED BY TOTALING ALL OCCURRENCES FALLING WITHIN THE RECTANGLE.
2. RUNWAYS ARE NUMBERED USING MAGNETIC HEADINGS WHILE WIND DATA IS PRESENTED USING TRUE HEADINGS. THEREFORE, THERE IS A 5°16'49" DIFFERENCE BETWEEN THE RUNWAY HEADINGS AND THE WIND ROSE HEADINGS.

SOURCES:
U.S DEPARTMENT OF COMMERCE; NATIONAL CLIMATIC DATA CENTER (NCDC) ASHEVILLE, NORTH CAROLINA, SURFACE OBSERVATION DATA OBTAINED FOR WEATHER STATION: BARTOW MINICIPAL AIRPORT
STATION NO.: 722123
RECORD PERIOD: 2004–2013
SURFACE OBSERVATION DATA COMPILED BY URS, 2014.

ALL-WEATHER WIND ROSE

BARTOW MUNICIPAL AIRPORT AND INDUSTRIAL PARK

FIGURE 2.21

URS

S:\Projects_APPLAN\BARTOW\AMP UPDATE 2013\Figures\FIG 2.21.dwg 06/10/2015 7:50

SECTION 3.0

AVIATION ACTIVITY FORECASTS

3.1 INTRODUCTION

Unlike large air carrier airport, general aviation airports seldom face substantial airfield capacity-related issues and few capital improvement projects are driven by projected aviation activity in a given future year or reaching an operational threshold. However, knowledge of past activity, understanding current trends, and a forecast of aviation activity can provide useful information for managing the facility and identifying any capacity-related issues, should they exist.

Because the Federal Aviation Administration (FAA) and the Florida Department of Transportation (FDOT) both prepare aviation forecasts for the Bartow Municipal Airport (BOW), the preparation of an independent forecast of aviation activity for the Bartow Municipal Airport was not conducted for this Master Plan update. A review of the FAA's *Terminal Area Forecast* (TAF) and the FDOT *Florida Aviation System Plan* (FASP) forecast was conducted for the purpose of selecting a forecast was most suitable for use in this Master Plan update.

3.2 GENERAL AVIATION TRENDS

3.2.1 NATIONAL AVIATION TRENDS

The *FAA Aerospace Forecast, Fiscal Years 2014 - 2034*[1] was reviewed to identify industry trends and as an aid in the evaluation of the FAA TAF and FDOT FASP forecasts. The Aerospace Forecast projects U.S. aviation demand at a broad, national level and provides a long-term outlook for aviation trends. The element most applicable to BOW is information related to the general aviation (GA) fleet and hours flown. The Aerospace Forecast also explores the economics of the aviation industry in general, as well as trends expected to affect the commercial and general aviation communities. The forecast was reviewed to ascertain the general condition of the general aviation industry as a whole and to provide a sense of future aviation activity growth that may occur at the BOW throughout the Master Plan Update planning period.

The 2010 Rule for Re-Registration and Renewal of Aircraft Registration revalidation of the FAA's Civil Aircraft Registry. One effect is that the number of registered "active" GA aircraft in the national fleet went down by 6.4 percent between 2010 and 2012 (from 223,370 to 209,034 active aircraft). Assuming a similar decline in 2013 as a result of cleaning up from the Registry inactive aircraft that previously thought to be active, GA active fleet is estimated to have decreased 3.0 percent in 2013 to 202,865.

The Aerospace Forecast notes that the active general aviation fleet is projected to increase at an average annual rate of 0.5 percent over the 21-year forecast period, growing from an estimated

[1] *FAA Aerospace Forecast, Fiscal Years 2014 – 2034*. Federal Aviation Adminsitration. https://www.faa.gov/about/office_org/headquarters_offices/apl/aviation_forecasts/aerospace_forecasts/2014-2034/. March 12, 2014.

202,865 in 2013 to 225,700 aircraft by 2034. The number of active piston-powered aircraft (including rotorcraft) is projected to decrease at an average annual rate of 0.3 percent from the 2013 total of 141,325 to 131,615 by 2034, with declines in both single and multi-engine fixed wing aircraft, but with the smaller category of piston-powered rotorcraft growing at 1.7 percent a year. Single-engine fixed-wing piston aircraft, which are much more numerous within this group, are projected to decline at a rate of 0.4 percent, while multi-engine fixed wing piston aircraft are projected to decline by 0.5 percent a year.

Hours flown by turbine aircraft are forecast to increase 3.2 percent yearly over the forecast period, compared with a decline of 0.4 percent for piston-powered aircraft. Jet aircraft are forecast to account for most of the increase, with hours flown increasing at an average annual rate of 4.2 percent over the forecast period. The large increases in jet hours result mainly from the increasing size of the business jet fleet, along with a measured recovery in utilization rates from recession induced record lows. Turboprop hours are also expected to continue their increase, which were significantly higher than previously estimated.

An increase in business jet traffic is already being experienced at BOW. Based upon the trends identified in the FAA's FAA Aerospace Forecast, it can be assumed that the Bartow Municipal Airport – barring unforeseen circumstances and lack of constraints – would continue participate in the national growth trends and that activity at the airport will increase over time.

3.2.2 LOCAL TRENDS

3.2.2.1 Increased Business Jet and Large Turbo Prop Activity at BOW

A review of airport records and discussions with Airport Management shows that BOW continues to experience a strong base of aviation customers that operate a wide variety of general aviation aircraft, including business jets, and that growth in aviation activity at the airport is expected to continue.

Third party records examined for this Master Plan update provided a sample of data for recent aircraft activity at BOW. FlightAware, Inc. provides private aviation flight tracking services over North America and 44 other countries. Among other products, the company provides airport-specific traffic reports for defined periods of time. The airport activity reports include aircraft types, aircraft N-numbers, aircraft owner information, origin and destination cities, and arrival/departure dates and times[2]. FlightAware's databases were queried for this study to determine the level of turbine aircraft activity at BOW during the selected twelve month period (March 24, 2012 through March 25, 2013)[3]. The database provided information on Instrument Flight Rules (IFR) arrivals and departures at BOW during the twelve month period.

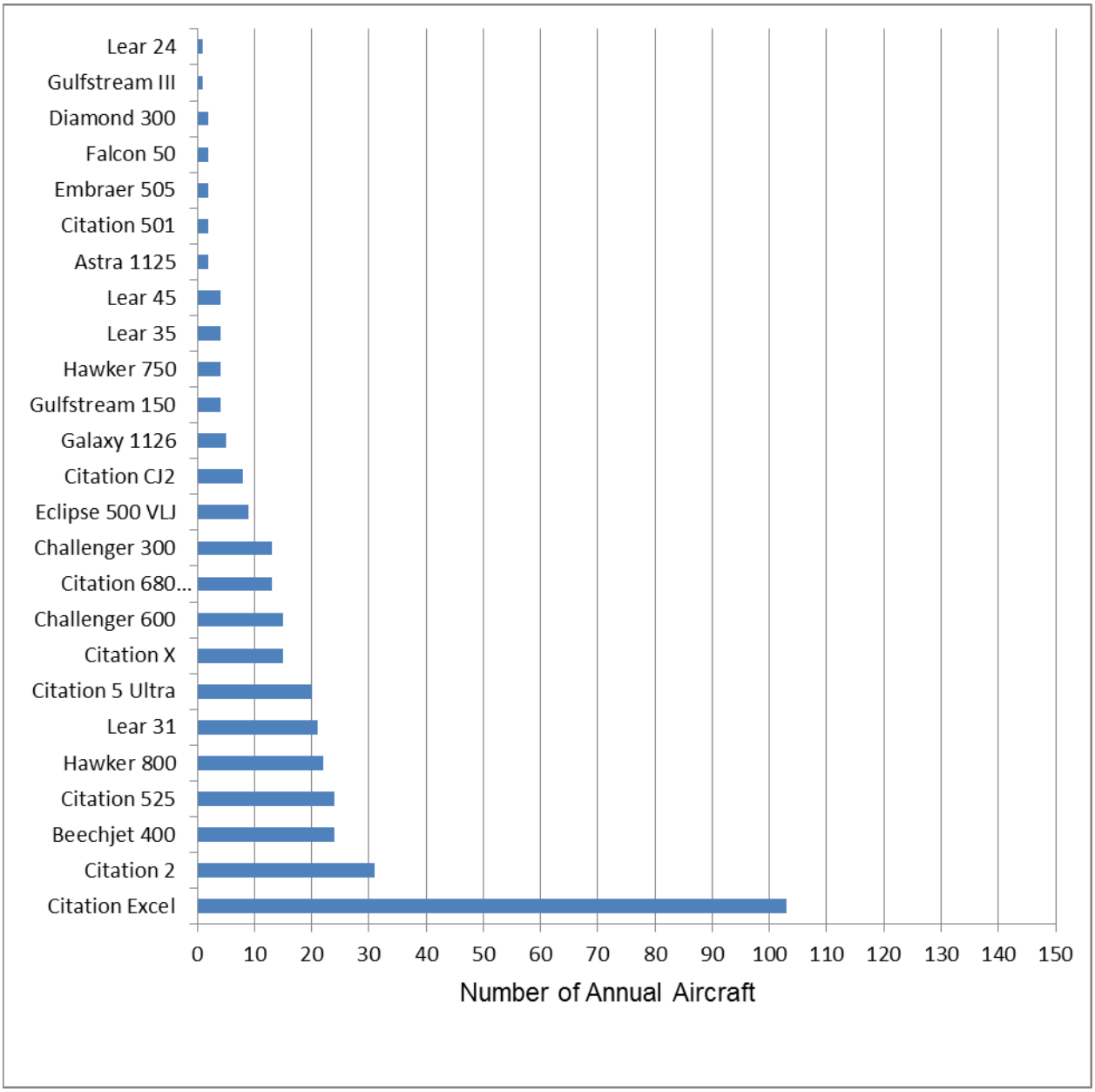
[2] FlightAware only tracks flights with filed IFR flight plans. Use of FlightAware data should not be interpreted as a definitive record of all flights in and out of BOW. However, because many large aircraft operators file and complete IFR flight plans, use of this data provides a relatively accurate representation of turboprop and turbine aircraft operations at the airport during the 12 month period.

[3] FlightAware, Inc. Flight History Report for the Bartow Municipal Airport, March 24, 2012 through March 25, 2013. Report downloaded by URS Corporation on March 26, 2013.

FlightAware reported 2,790 IFR arrivals and departures at BOW during the twelve month query period. Of the 2,790 IFR operations, 80 (2.8 percent) had aircraft type and owner information "blocked" and 195 (7 percent) listed no aircraft type. For the operations not listing aircraft type, URS queried the on-line FAA Civil Aviation Registry database using N-numbers to help determine aircraft type. As expected, most of the recorded IFR arrivals and departures at BOW were conducted by small single-engine piston aircraft (i.e., Cessna 182, Cirrus SR22). However, the database showed that a substantial number and a wide variety large turboprop and business jet aircraft use BOW. The Beechcraft King Air-200, Super King Air-300, and King Air-350 generated 286 (10.3 percent) of the recorded IFR operations at BOW during the twelve month period. During the same period, 351 (12.6 percent) of the recorded IFR operations at the airport were by business jet aircraft. The most common business aircraft reported for this period include the Hawker 750, Hawker 800, Citation 560XL, Citation 525, Citation X, Challenger 600, Lear 31, Citation II, and the Beechjet 400. A summary of the business aircraft that frequent BOW, as reported by FlightAware, is summarized in **Table 3-1**.

TABLE 3-1

NUMBER OF OPERATIONS BY BUSINESS JET AIRCRAFT AT KBOW
Bartow Municipal Airport and Industrial Park
Master Plan Update



Source: FlightAware Airport Activity Report, KBOW, March 24 2012 through March 25 2013. Adapted by URS Corporation, 2013.

In 2013, an Airport Customer Runway Use Survey was conducted as part of the Master Plan update. In addition to survey questions related to airport services and facilities, the survey solicited information about aircraft use and runway length needs. The survey responses further documented the fact that a wide variety of business jets and large turboprop aircraft use BOW. In addition to

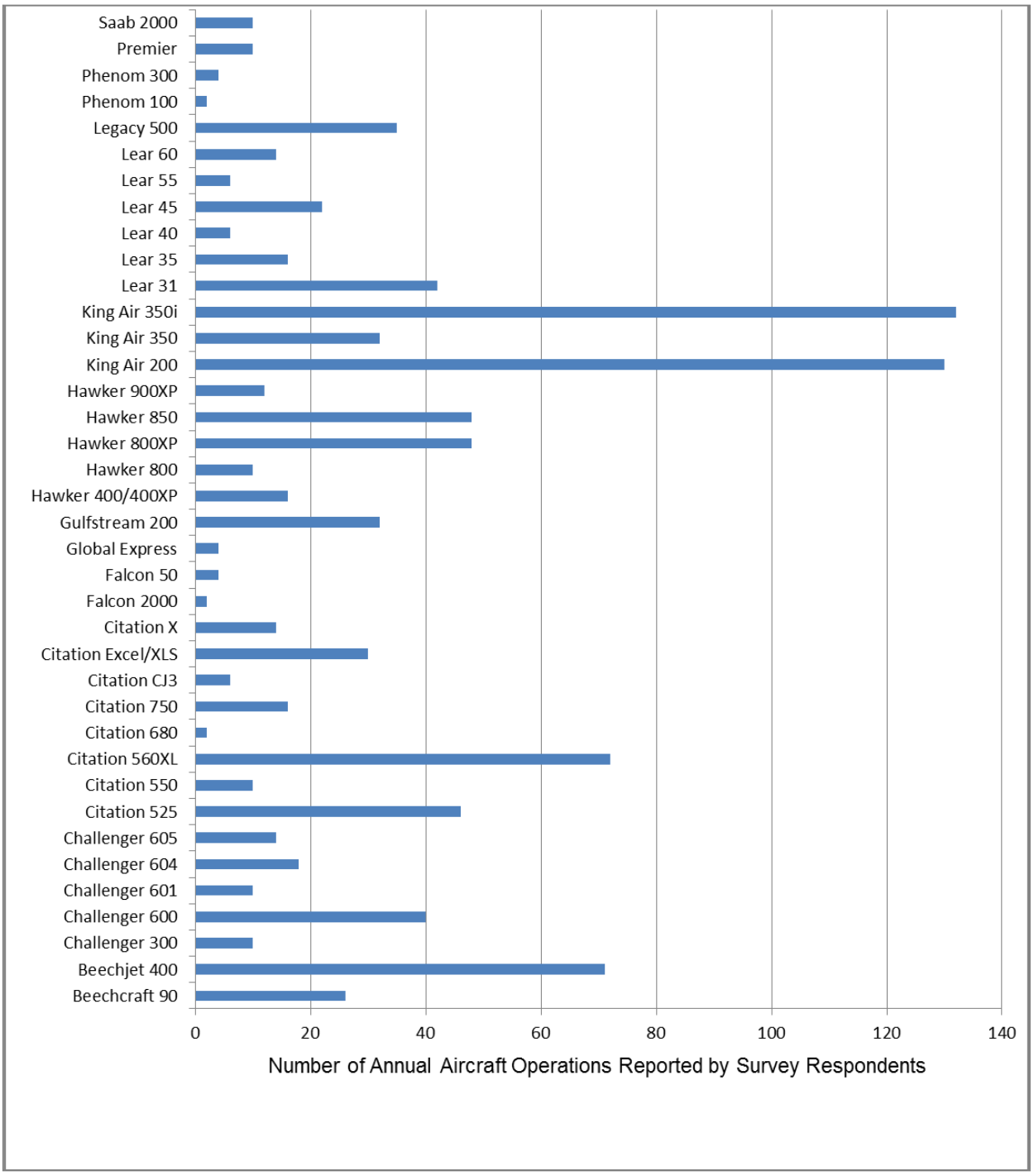
reporting current airport use, several survey respondents indicated they would increase their use of the airport if additional runway length was available at BOW. These most common aircraft types that the survey respondents use when visiting BOW include the King Air 350i, 350, and 200 models; Legacy 500, Lear 31, Hawker 800XP and 800 models; Gulfstream 200, Citation 560XL and XLS; Citation 525; Challenger 600; and the Beechjet 400. A summary of the business aircraft that frequent BOW, as reported by BOW customers, is summarized in **Table 3-2**.

Recent business aviation activity at BOW reflects a trend towards smaller, lighter business jets. This is in line with national trends that favor the economics and performance characteristics of Very Light Jets. Small business jet aircraft models, such as the Citation XL and BeechJet 400, generated approximately half of the turbine aircraft operations identified in the survey and a majority of the operations reported by FlightAware. However, a substantial number of corporate aircraft operations at BOW are conducted by medium and large business jets and large turboprop aircraft.

Another significant trend at BOW is the continued growth in charter and fractional jet activity. A substantial number of operations at BOW by NetJets, Flight Options, XOJET, and FlexJet reflect not only business-related trips, but the increasing travel associated with area leisure destinations, such as the new Streamsong golf resort.

TABLE 3-2

NUMBER OF ANNUAL JET AND TURBOPROP AIRCRAFT OPERATIONS REPORTED BY AIRPORT CUSTOMER SURVEY RESPONDENTS
Bartow Municipal Airport and Industrial Park
Master Plan Update



Source: KBOW Airport Customer Survey, 2012 - 2014. Compiled by URS Corporation, 2014.

3.2.2.2 Area Development and Growth

With the recent development of lower Polk County by the major land developers, including the Clear Corporation and The Mosaic Company, there are strong commercial, industrial and recreational growth patterns taking place in Polk County. Clear Springs Corporation, which owns approximately 18,000 acres of land, opened a Phase 1 Business Park just south of BOW, off State Route 60. The company's Land Use Plan includes additional future commercial and industrial uses at this location. Mosaic, which also owns an 18,000-acre tract of south of Bartow, opened the Streamsong Championship Golf Resort in January 2013. This resort, which includes a large hotel complex, immediately generated new business jet activity at BOW. The effect of these developments can be seen in the recent increase in operations at BOW by corporations and charter/fractional jet operators. Over time, it is anticipated that corporate travel and events at the Streamsong resort will generate even more business jet activity at BOW.

In addition to area land development projects, the FDOT is in the process of extending the Central Polk Parkway to the west and south of the airport. This new highway corridor is also expected to improve access to the airport and generate addition business growth opportunities in Bartow and Central Polk County.

3.3 FAA TERMINAL AREA FORECAST FOR BOW

The FAA's 2014 TAF[4] was reviewed for use in the development of this Airport Master Plan update. The TAF is a detailed forecast that the FAA Office of Aviation Policy and Plans (APO) produces annually for airports in the National Plan of Integrated Airport Systems (NPIAS). The TAF is prepared to assist the FAA in planning for the agency's internal budgeting and staffing requirements. TAF projections are made at the individual airport level and are derived, in part, on national and regional FAA aviation forecasts. The TAF assumes an unconstrained demand for aviation services (independent of the ability of the airport and the air traffic control system to supply the capacity required to meet the demand).

The FAA 2014 TAF depicts, to some extent, the effect of the 2008-2009 economic recession on aircraft operations at BOW. Although many airports in Florida and across the United States, many of which experienced decreases of 20 percent to 30 percent, or greater, the TAF showed BOW did not suffer the decrease in activity as experienced at many of Florida other airports[5]. Acknowledging that the number of aircraft operations at smaller airports is estimated, the airport did experience some decrease in activity due, in large part to economic conditions and high fuel prices. However, the airport is presently seeing a resurgence in business travel and recreational flying, which agrees with the FAA's projected return to a growth pattern at BOW.

The radical change in the number of reported aircraft operations at BOW, when compared to prior year TAF releases is attributed to the 2010 Rule for Re-Registration and Renewal of Aircraft Registration, which is revalidation of the FAA's registry database and is providing a revised number

[4] Federal Aviation Administration. *Terminal Area Forecast*. Issued February 2014.

[5] It should be noted that the number of annual aircraft operations reported for many general aviation airports, including BOW, are

of active GA aircraft in the national fleet and projected aircraft operations. The reduction in estimated aircraft operations at BOW between 2011 and 2012 was 21,609 aircraft operations. The reported number of aircraft operations at the airport in 2012 was 27,759, which equates to an average 76 aircraft operations per day.

Based on a variety of economic factors, the FAA 2014 TAF projects the number of based aircraft at BOW increasing from 104 in 2013 to 211 in 2040, an increase of 103 percent at a compound annual growth rate (CAGR) of 2.65 percent. Likewise, the number of annual aircraft operations is projected to increase by 61 percent over the same period, with a CAGR of 1.8 percent. A summary of the 2014 FAA TAF for the Bartow Municipal Airport is presented in **Tables 3-3** and **3-4** show the historic and projected activity at BOW. Based on a review of past growth rates at BOW and other factors, the FAA's growth projections for BOW were found to be reasonable.

estimated by FDOT and the FAA. Actual aircraft operation counts are not available.

TABLE 3-3

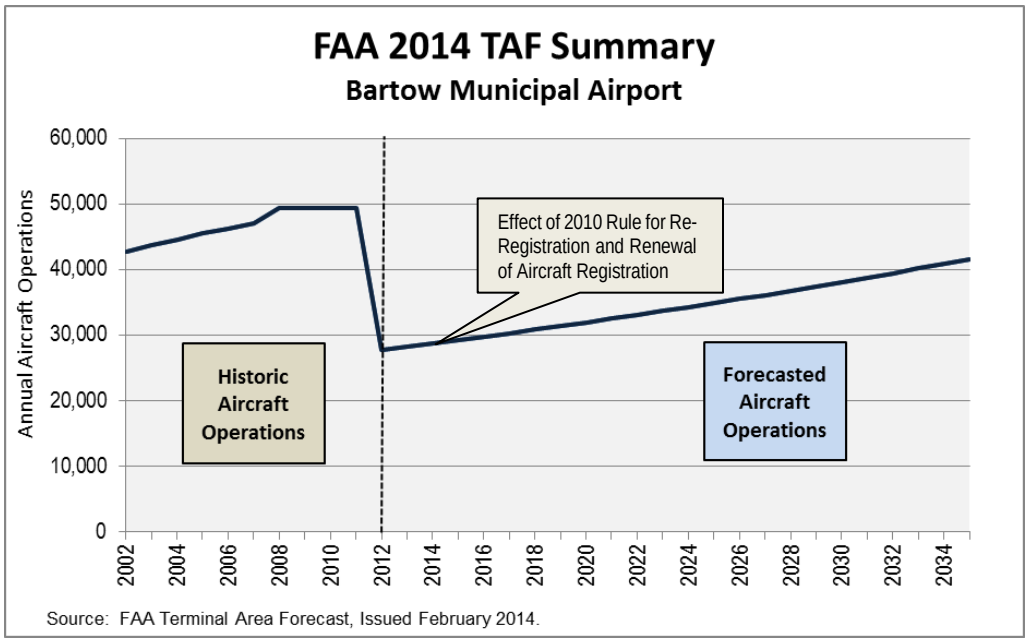
FAA TAF HISTORICAL AND PROJECTED AIRCRAFT OPERATIONS – BARTOW MUNICIPAL AIRPORT
Bartow Municipal Airport and Industrial Park
Master Plan Update

	Itinerant					Local				
Year	Air Carrier	Air Taxi / Commuter	General Aviation	Military	Total	Civil	Military	Total	Total Aircraft Operations	Based Aircraft
2002	0	0	17,725	281	18,006	24,716	0	24,716	42,722	115
2003	0	0	18,110	281	18,391	25,253	0	25,253	43,644	117
2004	0	0	18,490	281	18,771	25,783	0	25,783	44,554	115
2005	0	0	18,875	281	19,156	26,320	0	26,320	45,476	115
2006	0	0	19,210	281	19,491	26,787	0	26,787	46,278	115
2007	0	0	19,552	281	19,833	27,263	0	27,263	47,096	115
2008	0	2	28,594	152	28,746	20,622	0	20,622	49,368	100
2009	0	0	28,594	152	28,746	20,622	0	20,622	49,368	94
2010	0	0	28,594	152	28,746	20,622	0	20,622	49,368	100
2011	0	0	28,594	152	28,746	20,622	0	20,622	49,368	101
2012	0	0	14,354	32	14,386	13,373	0	13,373	27,759	102
2013	0	0	14,609	32	14,641	13,610	0	13,610	28,251	104
2014	0	0	14,868	32	14,900	13,852	0	13,852	28,752	107
2015	0	0	15,132	32	15,164	14,098	0	14,098	29,262	109
2016	0	0	15,401	32	15,433	14,349	0	14,349	29,782	111
2017	0	0	15,675	32	15,707	14,604	0	14,604	30,311	113
2018	0	0	15,954	32	15,986	14,864	0	14,864	30,850	116
2019	0	0	16,237	32	16,269	15,128	0	15,128	31,397	118
2020	0	0	16,525	32	16,557	15,396	0	15,396	31,953	120
2021	0	0	16,818	32	16,850	15,669	0	15,669	32,519	123
2022	0	0	17,117	32	17,149	15,947	0	15,947	33,096	125
2023	0	0	17,422	32	17,454	16,231	0	16,231	33,685	127
2024	0	0	17,732	32	17,764	16,520	0	16,520	34,284	130
2025	0	0	18,047	32	18,079	16,814	0	16,814	34,893	133
2026	0	0	18,368	32	18,400	17,113	0	17,113	35,513	136
2027	0	0	18,695	32	18,727	17,416	0	17,416	36,143	139
2028	0	0	19,028	32	19,060	17,724	0	17,724	36,784	142
2029	0	0	19,366	32	19,398	18,038	0	18,038	37,436	145
2030	0	0	19,710	32	19,742	18,358	0	18,358	38,100	149
2031	0	0	20,060	32	20,092	18,684	0	18,684	38,776	153
2032	0	0	20,416	32	20,448	19,016	0	19,016	39,464	158
2033	0	0	20,779	32	20,811	19,354	0	19,354	40,165	163
2034	0	0	21,148	32	21,180	19,697	0	19,697	40,877	168
2035	0	0	21,523	32	21,555	20,047	0	20,047	41,602	174
2036	0	0	21,905	32	21,937	20,403	0	20,403	42,340	180
2037	0	0	22,294	32	22,326	20,766	0	20,766	43,092	187
2038	0	0	22,690	32	22,722	21,135	0	21,135	43,857	194
2039	0	0	23,093	32	23,125	21,510	0	21,510	44,635	202
2040	0	0	23,503	32	23,535	21,892	0	21,892	45,427	211

Source: Federal Aviation Administration, Terminal Area Forecast. February 2014.

TABLE 3-4

FAA 2014 TAF SUMMARY
Bartow Municipal Airport and Industrial Park
Master Plan Update



3.4 FDOT FLORIDA AVIATION SYSTEM PLAN FORECAST

The FDOT, in cooperation with the FAA and Florida's public airports, and through the Continuing Florida Aviation System Planning Process (CFASPP), developed the Florida Aviation System Plan (FASP). The FASP incorporates traditional aviation system planning elements that are typically associated with most State aviation system plans and includes an analysis of the intermodal aspects of Florida's transportation system and a strategic planning element. The 2005 FASP update also included the development of a statewide aviation database, called the Florida Aviation Database.

Each year, as part of the CFASPP, the FDOT Aviation Office develops and updates forecasts of based aircraft and operational activity levels for each public-use airport in Florida. **Table 3-5** summarizes the 2013 FASP forecast for the Bartow Municipal Airport (based aircraft and aircraft operations). The FDOT forecast indicate that the airport had 149 based aircraft and 31,093 aircraft operations in 2012. The FASP forecast projections of based aircraft increases from 152 in 2013 to 215 in 2032, representing a CAGR of 1.8 percent. For the same period, the number of annual aircraft operations at the airport is expected to increase from 31,668 to 44,862, representing a CAGR of 1.85 percent. Based on a review of past growth rates at BOW and other factors, the FDOT FASP forecast was also found to be reasonable.

TABLE 3-5

FDOT FASP GENERAL AVIATION FORECAST (2009-2028)
Bartow Municipal Airport and Industrial Park
Master Plan Update

Year	Based Aircraft	Aircraft Operations
Historical Activity		
2002	115	49,216
2003	124	42,015
2004	128	38,911
2005	136	45,476
2006	148	42,341
2007	148	47,752
2008	149	47,967
2009	145	49,368
2010	160	38,846
2011	150	27,759
2012	149	31,093
Projected Activity		
2013	152	31,668
2014	155	32,254
2015	157	32,851
2016	160	33,459
2017	163	34,078
2018	166	34,708
2019	169	35,350
2020	173	36,004
2021	176	36,670
2022	179	37,348
2023	182	38,039
2024	186	38,743
2025	189	39,460
2026	193	40,190
2027	196	40,933
2028	200	41,691
2029	203	42,462
2030	207	43,248
2031	211	44,048
2032	215	44,862
Period	**Compound Annual Growth Rate**	
2002-2012	2.62%	-4.5%
2013-2032	1.8%	1.85%

Source: Florida Aviation System Plan (FASP), 2014.

3.5 SELECTION AND ADOPTION OF FORECAST

Although both the FAA and FDOT incorporated revised aircraft operation estimates in their forecasts, which lowered the number of reported operations at BOW, both agencies projected similar growth rates for based aircraft and aircraft operations. The growth rates were found to be consistent with historic growth rates and are considered reasonable and suitable for use in this Master Plan update. The substantial drop in the number of reported ("estimated) aircraft operations would appear to be a troubling issues, but few planning and meaningful capacity thresholds at BOW are tied directly to the number of annual aircraft operations. Therefore, the need for a new, independent forecast was determined not to be necessary for planning future facilities at the airport. **The forecasted annualized average growth rates and the projected number of aircraft operations contained in the FAA 2014 TAF were found to be reasonable and were recommended for use in preparing this Airport Master Plan update.**

However, the FAA and FDOT forecasts showed different based aircraft information. The FAA showed 102 based aircraft at the airport in 2012 and FDOT showed 149. For this time period, the number of based aircraft at BOW was 120. Therefore, the Based Aircraft forecast this Master Plan Update modifies the FAA 2014 TAF based aircraft projection to start from 149 instead of 102. The FDOT 1.84% CAGR was applied to the actual based aircraft count at BOW (instead of the higher FAA TAF 2.65 CAGR). **Table 3-6** summarizes the recommended aviation activity forecast for BOW.

TABLE 3-6

SUMMARY OF RECOMMENDED AVIATION ACTIVITY FORECAST
Bartow Municipal Airport and Industrial Park
Master Plan Update

	Forecast Year					
Forecast Category	**2015**	**2020**	**2025**	**2030**	**2035**	**2040**
Aircraft Operations	29,262	31,953	34,893	38,100	41,602	45,427
Based Aircraft	149	163	178	194	212	231

Source: FAA 2014 Terminal Area Forecast. Based aircraft projections adapted and modified by URS Corporation, 2014.

3.6 FORECASTS OF AVIATION ACTIVITY AND PEAKING DEMAND

3.6.1 VERY LIGHT JETS

Since the mid-2000s, Very Light Jets (VLJs) have made a substantial impact on the general aviation jet fleet. The relatively inexpensive twin-engine VLJs are able to operate from short runways and have lower operating costs, when compared to "traditional" business jets. Although the VLJs and other small business jets may lack seat capacity and have less range, they have become more prevalent as companies seek to reduce costs and remain competitive in the post-recession economy. It is anticipated that VLJs will continue to generate a substantial amount of activity at BOW during this Master Plan update planning period.

3.6.2 FLEET MIX

The projection of the number of based aircraft throughout the 20-year planning period was assessed to determine the probable types of aircraft that would call BOW home. Looking forward, the future mix of based aircraft by type is anticipated to remain generally proportional to the existing based aircraft fleet mix. However, the based aircraft fleet mix forecast assumes that the exceptional service and facilities provided at BOW will continue to attract aircraft owners and that the planned Runway 9L/27R extension (from 5,000 feet to 6,700 feet) would barring development or activity, such as a large flight school or aircraft-specific maintenance center, change slightly throughout the 20-year planning period. As the local economy and airport facilities are developed (i.e., extension of Runway 9/27 and construction of additional hangars), it is anticipated that there will be an increased number of turbine aircraft and helicopters at the airport. Currently, no jets are based at the airport. If a longer runway is provided, it is anticipated that the airport will be utilized by an increased number of jet aircraft. The forecasted number of aircraft, by type, is summarized in **Table 3-7**.

TABLE 3-7

BASED AIRCRAFT FLEET MIX FORECAST
Bartow Municipal Airport and Industrial Park
Master Plan Update

Aircraft Category	2013		2015		2020		2025		2030		2035		2040	
Single-Engine	90	75.0%	115	77.2%	126	77.3%	137	77.0%	150	77.3%	164	77.4%	179	77.5%
Multi-Engine	13	10.8%	13	8.7%	14	8.6%	16	9.0%	17	8.8%	18	8.5%	20	8.7%
Jet	2	1.7%	4	2.7%	4	2.4%	5	2.8%	5	2.6%	6	2.8%	7	3.0%
Helicopter	4	3.3%	6	4.0%	7	4.3%	7	3.9%	0	4.1%	8	3.8%	9	3.9%
Other / Seaplanes	11	9.2%	11	7.4%	12	7.4%	13	7.3%	14	7.2%	16	7.5%	16	6.9%
TOTALS	**120**	**100%**	**149**	**100.0%**	**163**	**100.0%**	**178**	**100.0%**	**194**	**100.0%**	**212**	**100.0%**	**231**	**100.0%**

Source: URS Corporation, 2013.

3.6.3 OPERATIONAL PEAKING CHARACTERISTICS

Based on FAA TAF projections, forecasts for key aviation activities were developed for the master plan update. The activities included average month operations, peak month operations, average daily operations for peak month, busy day operations, transient aircraft on apron on busy day. Estimates for peak hour operations and passengers and based aircraft fleet mix were also developed. A summary of these forecasts are presented in **Table 3-8**.

TABLE 3-8

OPERATIONAL PEAKING CHARACTERISTICS
Bartow Municipal Airport and Industrial Park
Master Plan Update

Description	2012	2015	2020	2025	2030	2035
Annual Aircraft Operations	27,759	29,262	31,953	34,893	38,100	41,602
Annual Itinerant Operations (approximate)	14,379	15,158	16,552	18,075	19,736	21,550
Peak Month and Day Activity Forecast						
Peak Month Operations	3,007	3,170	3,462	3,780	4,128	4,507
Averages Daily Operations for Peak Month	99	105	114	125	136	149
Busy Day Operations	109	116	126	138	150	164
Transient Aircraft on Apron on Busy Day	15	16	17	18	20	22
Peak Hour Activity Forecast						
Peak Hour Operations	20	21	23	25	28	30

Source: URS Corporation, 2013.

3.7 FORECAST COMPARISON TO FAA TERMINAL AREA FORECAST

FAA forecast development guidance includes the requirement to develop a comparison between the Airport Master Plan Update forecasts and the FAA's TAF. The FAA's TAF was adopted for use in this Master Plan update so a comparison is not required. However, the Based Aircraft element of the TAF was modified to bring it in line with the FASP and actual aircraft counts at the airport. The summary of Aviation Activity Forecast is presented in **Table 3-9**.

TABLE 3-9
SUMMARY OF AVIATION ACTIVITY FORECAST

A. FORECAST LEVELS AND GROWTH RATES

	Forecast Level of Aviation Activity					Average Annual Compound Growth Rates			
Passenger Enplanements	**2012**	**2015**	**2020**	**2025**	**2030**	**2012 to 2015**	**2012 to 2020**	**2012 to 2025**	**2012 to 2030**
Air Carrier	0	0	0	0	0	--	--	--	--
Commuter	0	0	0	0	0	--	--	--	--
Total Enplanements	0	0	0	0	0	--	--	--	--
Operations									
Itinerant									
Air Carrier	0	0	0	0	0	--	--	--	--
Commuter/Air Taxi	0	0	0	0	0	--	--	--	--
Total Commercial Operations	0	0	0	0	0	--	--	--	--
General Aviation	14,379	15,158	16,552	18,075	19736	1.77%	1.77%	1.78%	1.77%
Military	0	0	0	0	0	--	--	--	--
Local									
General Aviation	13,380	14,104	15,401	16,818	18,364	1.77%	1.77%	1.77%	1.77%
Military	0	0	0	0	0	--	--	--	--
Total Operations	27,759	29,262	31,953	34,893	38,100	1.77%	1.77%	1.78%	1.77%
Instrument Operations	0	0	0	0	0	--	--	--	--
Peak Hour Operations	20	21	23	25	28	1.64%	1.76%	1.73%	1.89%
Cargo/Mail(Enplaned+Deplaned Tons)	0	0	0	0	0	--	--	--	--
Based Aircraft									
Single-Engine (Non-jet)	90	115	126	137	150	8.51%	4.30%	3.28%	2.88%
Multi-Engine (Non-jet)	13	13	14	16	17	0.00%	0.93%	1.61%	1.50%
Jet Engine	2	4	4	5	5	25.99%	9.05%	7.30%	5.22%
Helicopter	4	6	7	7	8	14.47%	7.25%	4.40%	3.93%
Other/Seaplanes	11	11	12	13	14	0.00%	1.09%	1.29%	1.35%
Total Based Aircraft	**120**	**149**	**163**	**178**	**194**	7.48%	3.90%	3.08%	2.70%

TABLE 3-9 (CONTINUED)
SUMMARY OF AVIATION ACTIVITY FORECAST

B. OPERATIONAL FACTORS

Average Aircraft Size (Seats)	2010	2015	2020	2025	2030
Air Carrier	--	--	--	--	--
Commuter	--	--	--	--	--
Average Enplaning Load Factor	**2010**	**2015**	**2020**	**2025**	**2030**
Air Carrier	--	--	--	--	--
Commuter	--	--	--	--	--
GA Operations Per Based Aircraft	**231**	**196**	**196**	**196**	**196**

URS Corporation, 2015.

SECTION 4.0

DEMAND/CAPACITY ANALYSIS AND FACILITY REQUIREMENTS

4.1 INTRODUCTION

This section discusses the physical airport facilities that will be required to serve the forecasted levels of activity. These facilities are recommended to be in place to prevent constraint of forecasted activity due to the lack of capacity. Construction of new facilities or expansion of existing facilities should be triggered by the level of activity forecast for the period, not to an arbitrary calendar year.

Specific airport facilities were evaluated to determine their existing capacities. Then, by applying the forecasted demand of aviation activity for each planning period, future requirement projections could be made. The following elements were evaluated: airfield facilities, airspace, landside facilities, drainage, and on-airport surface access transportation system. A discussion of each topic follows.

4.2 AIRFIELD FACILITIES

Airfield facilities required are those associated with the landing, takeoff, and ground maneuvering of aircraft. They consist of runways, taxiways, aprons, lighting, and instrument approaches. For airfield planning, the Federal Aviation Administration (FAA) has established a coding system called an Airport Reference Code (ARC) that represents two components related to the operational demands of aircraft anticipated to utilize the airport. The first component of the coding system is the Aircraft Approach Category, which is a grouping of aircraft that have similar landing approach speed characteristics. The second component is the Airplane Design Group, which groups aircraft by wingspan. Most often, airport planning considerations are based on pre-established ARCs, which in turn establish airport design criteria. Both components are described in detail as follows:

Aircraft Approach Categories

A – Approach speeds less than 90 knots

B – Approach speed 91 knots or more, but less than 121 knots

C – Approach speed 121 knots or more, but less than 141 knots

D – Approach speed 141 knots or more, but less than 166 knots

E – Approach speed 166 knots or more

Airplane Design Groups

I – Wingspans up to, but not including 49 feet

II – Wingspans 49 feet up to, but not including 79 feet

III – Wingspans 79 feet up to, but not including 118 feet

IV – Wingspans 118 feet up to, but not including 171 feet

V – Wingspans 171 feet up to, but not including 214 feet

VI – Wingspans 214 feet up to, but not including 262 feet

In the case of Bartow Municipal Airport and Industrial Park (BOW), ARC classification is defined by runway. The design aircraft of Runway 9L/27R is the DC9-30, or an ARC of C-III. The Runway 5/23 design aircraft is the Gulfstream V with an ARC of D-III. Runway 9R/27L accommodates general utility aircraft with an ARC of B-II. The Aircraft Approach Categories and Airplane Design Groups associated with each runway establish the design criteria detailed in this section.

4.2.1 Runways

This section addresses runway requirements in terms of quantity, length, other dimensional criteria, and strength and condition of pavement.

4.2.1.1 Number of Runways

The number of runways and their respective orientations that are required at an airport can be determined by analyzing three elements. First, the wind coverage must be such that the crosswind component on a runway is less than 12 mph at least 95 percent of the time. At BOW, the primary and crosswind runway both can attain this. **Figure 2.21**, previously presented, shows the wind rose and coverage for each runway. Wind coverage on Runways 9L/27R and 9R/27L is 97.19 percent, Runway 5/23 is 96.76 percent, and both together attain a combined coverage of 98.93 percent.

The second element to be considered is the capacity. The 20-year projected high annual activity level is 61,110 recorded operations and 79,443 total adjusted operations. FAA criteria documents list this crosswind airfield configuration as having a practical annual capacity capability of approximately 230,000 operations. This capacity exceeds all current projections.

The third element is any special aeronautical consideration that may exist at the airport. The consideration that most often justifies an additional runway is the need to distribute air traffic. Most often, traffic is distributed to minimize noise impacts on surrounding land uses. Instead of directing air traffic onto a single runway, traffic can be distributed onto two parallel runways. At BOW, this air traffic distribution is currently utilized, but not because of noise. Bartow ATCT distributes itinerant activity on the primary Runway 9L/27R and student training activity on the secondary Runway 9R/27L.

4.2.1.2 Runway Length

The required lengths of the runways are dependent upon the characteristics of the aircraft that are anticipated to use them. Characteristics such as aircraft performance (acceleration and lift off speed) at the specific design temperature of the airport, aircraft weight, flight stage length, airport elevation, and runway gradient must be evaluated. Each of these factors has been integrated into design curves provided by the aircraft manufacturers, which was used to determine lengths within this study. FAA Advisory Circular (AC) 150/5300-13A, provides the methodology used in this analysis to determine the runway length requirements.

Aircraft characteristics were evaluated based upon the forecasts of operational fleet mix. These forecasts project that jet aircraft, which require the critical runway lengths, will account for 2 to 3 percent of all operations (approximately 1,900 to 2,390 annual operations by 2020). This level of activity indicates that the runway analysis should use the planning standard of 75 percent of the general aviation (GA) jet fleet.

Another aircraft characteristic that was evaluated was the useful load. The useful load is the difference between the maximum takeoff weight (MTOW) and the operating weight empty. The useful load is, therefore, the passengers, cargo, and usable fuel, with the fuel being the major consideration. With the type of aircraft activity that occurs at BOW, which can precipitate long stage length flights, a 90 percent useful load was assumed.

Airport runway length considerations consist of two conditions relating to density altitude. First is the mean maximum temperature of the hottest month (92.5 degrees Fahrenheit (°F) in August at BOW). The second is the official airport elevation (125 feet above mean sea level (msl)) at the centroid of the airfield. These two factors result in a density altitude at BOW of 2,275 feet.

The FAA's Airport Design Program for Microcomputers, Version 4.2D (Chapter 1 Paragraph 106 of FAA's AC 150/5325-4B, "Runway Length Requirements for Airport Design") was used with inputs to the program as follows:

Airport elevation ..... 125 feet msl
Mean daily maximum temperature of the hottest month ..... 92.5° F
Maximum difference in runway centerline elevation ..... 0 feet
Dry runways

The Airport Design Program recommends a runway length of 6,910 feet for 75 percent of large aircraft (60,000 pounds or less) at 90 percent useful load.

To obtain a more accurate required runway length, aircraft manufacturer data were examined to determine runway length requirements of specific aircraft types that use the airport presently and will continue to in the future, as shown in **Table 4.1**. Runway length requirements are presented at ISA at sea level with MTOW, BOW density altitude with MTOW, and BOW density altitude with 90 percent of useful load. Taking into account BOW's elevation and mean daily maximum temperature of the hottest month (August), runway length requirements for the GA

fleet (all aircraft shown in Table 4.1 except the Boeing Business Jet and DC-9-32 used in previous studies) at BOW require 3,470 feet to 7,100 feet with MTOW and 3,220 feet to 6,500 feet with 90 percent of useful load.

The density altitude information, aircraft manufacturer data, and the design curves of the FAA AC indicate a primary runway length of 6,500 to 7,000 feet is needed to accommodate the GA jet aircraft fleet at 90 percent of useful load. In the previous Master Plan, 6,700 feet was recommended to accommodate the GA jet aircraft fleet. Ultimately, 8,100 feet of runway may be required to accommodate the GA aircraft fleet at MTOW. Updated forecasts and facility requirements would be accomplished to confirm this possible ultimate requirement at a later date.

The secondary runways can be retained at their existing lengths, since Runway 5/23 provides adequate length for crosswind runway coverage and Runway 9R/27L provides adequate length for flight training activity.

4.2.1.3 Pavement Strength and Condition

Pavement strength requirements are those that are needed to support the most critical aircraft that is anticipated to use the airport. For pavement strength, the critical aircraft chosen for the Runway 9L/27R is the 737-100. Considering the airport's service to the industrial park and business community, this will be considered the critical pavement strength design aircraft.

The pavement strength of Runway 9L/27R is 108,000 pounds dual gear. All airfield pavements associated with the primary runway and support taxiways, etc., should meet this strength requirement or be designed for a future overlay to obtain this strength.

The crosswind Runway 5/23 and associated taxiways are designed at a pavement strength of 72,000 pounds dual gear. The pavement structures associated with Runway 5/23 are sufficient based on its role and operational use as a crosswind runway. The secondary Runway 9R/27L has a design strength of 30,000-pound single gear and is sufficient based on its role and operational use as a flight training runway.

TABLE 4.1

RUNWAY LENGTH REQUIREMENTS FOR HIGH PERFORMANCE AIRCRAFT FLEET
Bartow Municipal Airport and Industrial Park
Master Plan Update

Aircraft Type	ARC[1]	Maximum Takeoff Weight (lbs)	Operating Weight Empty (lbs)	Operating Weight at 90% of Useful Load (lbs)	Balanced Field Length (BFL) Requirements		
					ISA a Sea Level[2] MTOW (ft)	BOW Density Altitude[3] MTOW (ft)	BOW Density Altitude[3] with 90% Useful Load (ft)
Cessna Citation V (Model 560)	C-II	16,300	9,650	15,635	3,180	3,470	3,220
Cessna Citation VII (Model 650)	C-II	23,000	11,700	21,870	4,690	5,420	5,005
Cessna Citation X (Model 750)	C-II	35,700	21,700	34,300	5,580	7,090	6,500
Gulfstream III	D-II	69,700	38,470	66,577	5,115	5,700	5,250
Gulfstream IV-SP	D-II	73,600	42,500	70,490	5,450	6,000	5,500
Gulfstream V	D-III	90,500	48,000	86,250	6,110	7,100	6,500
Dassault Falcon 2000	C-II	35,800	19,700	34,190	5,240	6,000	5,500
Canadair Regional Jet (CRJ) Model CL-600-2B19, Series 200	C-II	47,500	30,100	45,760	5,000	5,650	5,250
Boeing Business Jet (737)	C-III	171,000	92,345	163,135	7,700	7,900.	7,200
DC-9-32	C-III	108,000	56,855	102,886	7,700	8,100	6,600

[1] Airport Reference Code.
[2] 0 ft. MSL Elevation, 59° F.
[3] 125 feet MSL Elevation, 92.5° F (Density Altitude = 2,275 feet).

Compiled by URS Corporation, 2013.

Note: Balanced field length requirements based on calm wind and dry runway conditions, takeoff flap settings, and anti-ice off.

Sources: Cessna Aircraft Company, February 2000; Gulfstream Aerospace Company, March 2000 and March 2001; Dassault Falcon Jet, February 2000; Bombardier Inc., August 1997; The Boeing Company, December 2000; Jane's All the World's Aircraft, 1995-96; Climatography of the United States No. 81, Monthly Station Normals of Temperature, Precipitation, and Heating and Cooling Degree Days (1961 - 1990): Florida, January 1992.

The FAA Form 5010 Airport Master Record lists the pavement condition of Runway 9L/27R as fair and 5/23 as poor. Runway 9R/27L is listed in good condition. Runway 5/23 was overlaid in 2001. According to airport management records and asphalt pavement life span, Runways 5/23 and 9R/27L should be re-examined and scheduled for rehabilitation when appropriate. **Table 4.2** lists the tentative pavement rehabilitation schedule as required by pavement age and condition.

TABLE 4.2

TENTATIVE PAVEMENT REHABILITATION SCHEDULE
Bartow Municipal Airport and Industrial Park
Master Plan Update

Airfield Pavement		Length/Width (in feet)	Pavement Composition	Date of New Construction or Last Rehabilitation	Estimated Average Lifecycle	Approximate Date of Future Required Maintenance
Runways	9L/27R	5,001 x 150	Asphalt	2005[1]	15 years	2020
	9R/27L	4,400 x 150	Asphalt - 4,100'	1994[2]	15 years	**
			Concrete - 300' *		40 years	
	5/23	5,000 x 100	Asphalt	2001[1]	15 years	2016
Taxiways	A1	600 x 50	Asphalt	2011[1]	15 years	2026
	A2	1,275 x 50	Asphalt	2011[1]	15 years	2026
	A3	1,075 x 50	Asphalt	1996[2]	10 years	2011
	C1	350 x 50	Asphalt	2009[1]	15 years	2024
	C2	850 x 50	Asphalt	1996[2]	10 years	2011
	C3	1,250 x 50	Asphalt	1996[2]	10 years	2011
	D	2,225 x 50	Asphalt	2009[1]	15 years	2024
	D1	1,800 x 50	Asphalt	2003[3]	15 years	2018
	F	400 x 100	Asphalt	1990	15 years	**
	G	375 x 50	Asphalt	1990	15 years	**
	H	525 x 50	Asphalt	2011[1]	15 years	2026
Aprons	General Aviation	1,500 x 400	Concrete	2013[4]	20 years	2033
	Apron Taxiway	1,600 x 50	Asphalt	2011[1]	15 years	2026
	Terminal	410 x 80	Asphalt	2006[3]	15 years	2021

[1] Overlay.
[2] Seal coating
[3] New Construction
[4] Reconstruction
* East end.
** Date to be determined.

Source: URS Corporation - Updated Master Plan Inventory, 2013.

4.2.1.4 Dimensional Criteria

Airport standard dimensional criteria are used to layout the airfield geometry. These criteria are based on aircraft size, primarily wingspan, as specified in FAA AC 150/5300-13A. Wingspan is the basis for determining adequate clearance between moving aircraft and objects such as

buildings, parked aircraft, and other moving aircraft. Runway and taxiway widths are based upon aircraft landing gear width plus a degree of error for imprecise centerline landing or taxiing.

The largest aircraft which are anticipated to use the airport come under Airplane Design Group III as defined in the FAA AC: aircraft with wingspans up to but not including 118 feet. Dimensional criteria are presented in **Table 4.3** along with the runway length requirements. Existing airfield geometry meets or exceeds these requirements.

Runway Protection Zones

Runway protection zones (RPZs) are trapezoidal-shaped areas projected onto the ground directly under the inner portion of the approach surface. These zones are designated safety areas with no structures permitted therein. Airport control of these areas is essential, preferably by purchase of the land in fee title, however, avigation easements may be acquired which limit object heights on property not owned by the airport. Currently, the RPZ non-precision approach on Runway 9L is not completely situated within airport property boundaries and requires an avigation easement.

Any future extension of Runway 9L/27R and proposed instrumentation (see Section 4.3.2) would expand the width of the RPZ on Runway 9L from an inner width of 500 feet to 1,000 feet and an outer width of 1,010 feet to 1,510 feet. The expansion of the RPZ would require additional avigation easement acquisition. The Runway 9L threshold would not be relocated on the west end.

Runway Safety Areas

The Runway Safety Area (RSA) is an area, centered on the runway that is: (1) cleared and graded, (2) drained to prevent water accumulation, (3) capable of supporting ARFF equipment or aircraft without damage, and (4) free of non-functional objects. The RSA enhances the safety of aircraft that undershoot, overrun, or veer off the runway, and it provides greater accessibility for ARFF equipment during such incidents.

All RSAs at BOW comply with the dimensions set forth in FAA AC 150/5300-13A. The dimensions of the RSAs (for Aircraft Approach Categories C & D) are 500 feet wide and 1,000 feet beyond the runway end.

Future runway extensions would require clearing and grading (in addition to the other requirements listed earlier in this section) of the newly formed RSA on the Runway 27R end.

4.2.2 Taxiways

4.2.2.1 Number of Taxiways

The number of taxiways serving the runways at BOW adequately serves the demand for the runway system. Two connector taxiways from Runway 9R/27L to Taxiway D and Taxiway H are recommended to provide quicker exit taxi times from the runway. Also, a complete full-length

parallel taxiway system to Runway 9L/27R is recommended by constructing a 2000 LF Taxiway section between Taxiway D and Taxiway D1.

In addition, as activity levels increase a full-length parallel taxiway is recommended for Runway 5/23 to provide more direct access to the Runway 5 end and more efficient use of the airfield.

TABLE 4.3

ULTIMATE AIRFIELD GEOMETRIC CRITERIA
Bartow Municipal Airport and Industrial Park
Master Plan Update

Criteria		Primary Runway 9L/27R	Secondary Runway 9R/27L	Crosswind Runway 5/23
Design Aircraft	Aircraft Approach Category	C	B	D
	Airplane Design Group	III	II	II
Runway Length	Existing	5,000 feet	4,400 feet	5,000 feet
	Future	6,700 feet	4,400 feet	5,000 feet
	Ultimate	8,100 feet	4,400 feet	5,000 feet
Runway Width		150 feet	150 feet	100 feet
Taxiway Width		50 feet	35 feet	35 feet
Runway Centerline to Taxiway Centerline		400 feet	300 feet	300 feet
Runway Centerline to Aircraft Parking Area		500 feet	400 feet	400 feet
Runway Centerline to Property/BRL		750 feet	750 feet	750 feet
Taxiway Centerline to Fixed or Moveable Object and Property Line		93 feet	65.5 feet	65.5 feet
Taxilane Centerline to Fixed or Moveable Object		81 feet	57.5 feet	57.5 feet
Runway Safety Area Dimensions	Width	500 feet	500 feet	500 feet
	Length (Beyond Runway End)	1,000 feet	1,000 feet	1,000 feet

n/a = not available.
BRL = Building Restriction Line.

Source: FAA AC 150/5300-13, Change 6.

4.2.2.2 Pavement Strength and Condition

As stated earlier, the design weight of 108,000 pounds will be considered the critical pavement strength. Taxiways D and A, which are associated with the primary runway, and would be constructed to meet this strength requirement.

The taxiways associated with the crosswind Runway 5/23 are designed at a pavement strength of 72,000 pounds dual gear. Taxiways A, C, and H should be improved to accommodate the design aircraft: the Gulfstream V business jet. Maximum takeoff weight of this aircraft is 90,500 pounds dual gear. The taxiways associated with the secondary Runway 9R/27L have design strength of 30,000-pound single gear and are sufficient based on their role and operational use.

Table 4.2 lists the tentative pavement rehabilitation schedule, including taxiways, according to airport management records and asphalt pavement life span.

4.2.2.3 Dimensional Criteria

Airport standard dimensional criteria are used to layout the airfield geometry. These criteria are based on aircraft size, primarily wingspan, as specified in FAA AC 150/5300-13A. Based on the AC and the most demanding Airplane Design Group forecast to use the airport (III), taxiway widths should be a minimum of 50 feet. All taxiways meet FAA width standards. Slightly larger aircraft could still use the airfield and would have to be monitored while taxiing adjacent to parked aircraft and facilities to maintain adequate wingtip clearance.

4.2.3 Aircraft Parking Aprons

4.2.3.1 Based Aircraft Apron

The current availability of tie-down positions is adequate for long-range planning needs. Approximately 1,530 square yards, or 0.32 acres of apron space are currently used for the tie-down based aircraft. A total of 2,772 square yards, or 0.57 acres, would be required for long-range planning. The current density of hangar space will be continued in the future; however, a greater number of tie-down aircraft could be concentrated into smaller areas by parking the aircraft in standard nested rows as apron capacity is reached. This type of configuration is not presently needed.

Table 4.2 lists the tentative pavement rehabilitation schedule, including the GA apron, according to airport management records and concrete pavement life spans.

4.2.3.2 Transient Aircraft Apron

The estimated 2013 number of peak daily transient aircraft is approximately 75, as shown in **Table 4.4**. Using the methodologies described in FAA AC 150/5300-13A, the peak daily transient aircraft would be approximately 96 to 120 by the end of the planning period. This number of aircraft would require up to 47,520 square yards of apron space, which amounts to 9.82 acres of land.

Currently, transient aircraft utilize parking positions on the terminal apron and GA apron that are not used by based aircraft. Presently, there is adequate apron space for both transient and based aircraft. The current apron tie-down space is anticipated to be adequate for BOW's ultimate long-range requirements for based and transient aircraft.

Table 4.2 lists the tentative pavement rehabilitation schedule, including the GA apron, according to airport management records and concrete pavement life spans.

TABLE 4.4

AIRCRAFT STORAGE HANGAR AND TIE DOWN REQUIREMENTS
Bartow Municipal Airport and Industrial Park
Master Plan Update

Area	Existing	Estimated Requirements*							
		2018		2023		2025		2035	
	2013	Low	High	Low	High	Low	High	Low	High
Number of T-Hangar Units	96	104	112	111	128	119	145	126	163
Number of Executive (Box) Hangar Units									
Number of Corporate (10,000 sf+) Hangar Units									
Based Aircraft Apron Tie-Down Positions	40	40	40	60	60	75	75	89	89
Based Aircraft Apron Tie-Down Area (sy)	1,530	1,815	1,964	1,947	2,244	2,079	2,541	2,211	2,855
Peak Day Transient Aircraft	75	81	86	86	96	91	108	96	120
Transient Aircraft Apron Tie-Down Area (sy)	27,000	32,076	34,056	34,056	38,016	36,036	42,768	38,016	47,520
Total Apron Tie-Down Area (sy)	66,666	66,666	66,666	66,666	66,666	66,666	66,666	66,666	66,666
Total Apron Tie-Down Area (acres)	13.8	13.8	13.8	13.8	13.8	13.8	13.8	13.8	13.8

sf = square feet; sy = square yards.

Source: FAA AC 150/5300-13 Change 16, Appendix 5; URS Corporation, 2013.

4.2.4 Airfield Lighting

4.2.4.1 Approach Lighting

Runway End Identification Lights (REILs) are installed on Runways 9L/27R and 5/23. These meet the existing and forecast demand for approach lighting at BOW.

4.2.4.2 Runway and Taxiway Lighting

The Runway 9R/27L lighting (installed in the early 1970s) is not used. The runway should have Medium Intensity Runway Edge Lights (MIRLs) installed to enhance safety and visibility of Runway 9R/27L during the nighttime.

All taxiways (except A3 and G) are lighted and do not require rehabilitation at this time. However, the average life span of fixtures normally does not exceed 25 years. Consideration should be given to installing Medium Intensity Taxiway Edge Lighting (MITL) to Taxiways A3 and G in the future if aircraft use increases to a level that would require a safety enhancement, and updating lighting systems at 20-25 year intervals.

The mercury vapor lighting was installed on the GA parking apron in 1974 and should be examined to determine if rehabilitation or replacement is appropriate. **Table 4.5** lists the tentative lighting rehabilitation inventory according to airport management records and lighting life spans.

4.3 AIRSPACE

Facilities associated with an aircraft in flight are generally considered airspace facilities. Examples of such facilities include surrounding flight corridors, navigational and visual aids, and approach surfaces. The following paragraphs discuss each of these facilities in relationship to BOW.

4.3.1 Flight Corridors

Sufficient free airspace surrounding the airport should exist to permit safe and efficient air activity operations. This is not a precise quantitative amount of space and is usually not a concern to an airport until it becomes restrictive.

Figure 2.9 shows a section of the aeronautical chart covering the Bartow area. As can be seen, BOW is located north of the Lake Placid Military Operations Area (MOA). This area is one of several MOAs and numerous Restricted Areas, which surround the MacDill Air Force Base and Avon Park Air Force Range. MOAs and Restricted Areas have limitations to the airspace, with the greatest limitations directly over the bombing range, and progressively lessening limitations as distance from the range increases. Lake Placid MOA is in effect intermittently during daylight hours Monday through Friday, and occasionally Saturday and Sunday, and does not allow aircraft to fly above 7,000 feet up to 18,000 feet.

TABLE 4.5

TENTATIVE LIGHTING REHABILITATION SCHEDULE
Bartow Municipal Airport and Industrial Park
Master Plan Update

Airfield Pavement		Lighting	Date of New Construction or Last Rehabilitation	Estimated Average Lifecycle	Approximate Date of Future Required Maintenance
Runways	9L/27R	MIRL	2000	20 years	2020
	9R/27L	--	--	--	--
	5/23	MIRL	1989	25 years	2015
Taxiways	A1	MITL	2001	20 years	2021
	A2	MITL	2001	20 years	2021
	A3	n/a	--	--	--
	C1	MITL	2001	20 years	2021
	C2	MITL	2001	20 years	2021
	C3	MITL	1989	25 years	2016
	D	MITL	2001	20 years	2021
	D1	MITL	2003	20 years	2023
	F	MITL	2001	20 years	2021
	G	n/a	--	--	--
	H	MITL	2001	20 years	2021
Aprons	General Aviation	Mercury Vapor	1974	40 years	2016
	Apron Taxiway	MITL	2001	20 years	2021
	Terminal	MITL	2006	20 years	2026

n/a = not applicable.

Source: URS Corporation - Updated Master Plan Inventory, 2013.

4.3.2 Navigational and Visual Aids

Most navigational aids (NAVAIDs) and visual aids can be installed at the discretion of the airport, although those associated with in-flight vectoring or those that affect other area airports require FAA approval.

FAA has established a listing of 'Entry Criteria' for NAVAIDs (including visual aids) in the document “Airway Planning Standard No. 1 - Order 7031-2C,” and subsequent revisions. The document details the minimum air traffic activity levels required prior to FAA consideration of funding for NAVAIDs. However, if the airport does not have the minimum levels of activity, NAVAIDs can still be installed at the airport sponsor's expense.

4.3.2.1 Air Navigation

The airport uses the VOR located at LAL for navigation to BOW. The existing VOR is adequate for vectoring aviation activity to and from BOW.

4.3.2.2 Precision Instrument Approach

Earlier master plans indicated that a precision instrument approach should be established by placing an Instrument Landing System (ILS) on the primary runway (9L/27R). The ILS is still justified and priority of installation should be increased to enhance the landing safety factor of increasing corporate jet traffic (utilizing higher performance aircraft), instrument flight training, a runway extension, and the lack of a precision approach at the airport. Current national trends of near term and future growth indicate increases in fractional ownership in corporate high performance aircraft using airports such as BOW as an alternative to scheduled commercial airline service at other airports. The installation of an ILS would increase safety of landing aircraft and assist the BOW ATC in managing traffic flow.

4.3.2.3 Non-Precision Approach

The existing non-precision approaches on Runway 9L and 27R should be retained. The current approaches utilize Distance Measuring Equipment (DME) and the VOR at Lakeland and GPS. The established approach procedures were previously presented in **Figures 2.4** through **2.8**. Additional non-precision approach systems would not be required in the future with the addition of an ILS on the primary runway.

4.3.2.4 Visual Approach Aids

Precision Approach Path Indicator (PAPI) visual approach equipment should be installed on Runway 9R/27L. The runway is utilized by student pilots and such equipment would be instrumental in their flight training. PAPI equipment (4-light) is installed at each end of Runway 9L/27R and each end of Runway 5/23.

4.4 LANDSIDE FACILITIES

The area pertaining to aviation that contains buildings, structures, and the apron, but is not a part of the airfield, is referred to as the landside area.

The landside facilities consist of the administration terminal building and parking, the fueling facilities, the FBO area, the ATCT, and possibly an ARFF station. General land envelope sizes are presented for each of these areas to be used for land use planning. Specific detailed facility requirements needed to plan the aviation-related areas are documented.

4.4.1 Administration/General Aviation Terminal Building Area

The administration/GA terminal building area consists of three major functional areas: the building structure, the auto parking lot, and the aircraft apron. These three elements are discussed in the following paragraphs.

4.4.1.1 Administration/General Aviation Terminal Building Requirements

The existing administration/GA terminal building was constructed in the 2007. There is expanded administrative space, FBO space, restaurant, aviation museum, and aviation customer/general public space.

The new facility accommodates four disciplines. The first is the airport and industrial park administration offices and operations. The second would be the airport owned and operated FBO (Bartow Flying Service) service. The third area would be the customer/visitor public space. The fourth would be revenue producing lease floor space and restaurant.

4.4.1.2 Administration/General Aviation Terminal Auto Parking Requirements

Auto parking facilities for airport authority members, authority staff, Bartow Flying Service customers, general public, tenants, air taxi passengers, etc., is located adjacent to the administration/terminal facility. The initial phase (2007) consists of 100 spaces with the ability to expand to 200 spaces in the long term if needed.

The initial auto parking lot size takes into consideration the FBO/itinerant passengers that might want to leave their vehicle parked for a day or more. In addition, with the preliminary indication that a restaurant facility would be included in the terminal, general public parking spaces have been included to accommodate restaurant patrons.

4.4.1.3 General Aviation Terminal Apron Requirements

It is estimated aircraft fleet mix of potential users directly related to the GA terminal facility will change. The goal is to establish transient/customer aircraft parking/tie-down positions that are convenient and within reasonable walking distance to the new GA terminal. Several aircraft parking fleet mix scenarios will probably be implemented through the years, and as the BOW facility generates more business, the fleet mix would change considerably as more corporate aircraft parking positions will need to be identified in the future.

4.4.2 Fixed-Base Operator Areas

Technically, there are three FBOs on the airport. The Authority provides fuel sales, flight training, and aircraft rentals. The Authority-operated FBO services are conducted from the GA terminal building.

The two additional FBOs are located northeast of the existing administration/passenger terminal facility. One FBO specializes in providing avionics service; the other FBO provides aircraft maintenance service. Both FBOs currently occupy approximately 1.8 acres of land. Assuming FBO requirements increase proportional to increases in activity at the airport, a total of 3 acres should be reserved for long-range on-airport land use planning.

4.4.3 Aircraft Storage

The Authority owns, maintains, and leases the existing aircraft storage units located northeast of the terminal building. In 2014, the airport had 114 storage hangar units, which housed approximately 114-118 aircraft (some of the larger corporate/executive hangars store more than one aircraft). There are 87 T-hangars, 7 port-a-ports, 5 special use storage hangars, 9 executive hangars, and 6 corporate hangars. All hangars are in fair to good condition.

The current ratio of hangars to tie-down based aircraft is unusually high. Typically, an airport can anticipate that between one-third and one-half of the based aircraft will use hangars, not the 94 percent that exist at BOW. However, many of the aircraft are based at the airport because the Authority has made available hangar facilities. The airport management maintains a waiting list for hangar space.

Assuming this ratio of based aircraft using hangars continues, long-range forecasts would require 30 to 64 additional hangars to be constructed in this 20 year planning period.

4.4.4 Corporate/Special Use Hangars

The corporate/special use category can be defined as aviation related service or business that require a parcel of land to construct custom designed facilities that the tenant requires in order to conduct their operation or business. This would include the construction of hangars, support buildings, aircraft pavement areas, vehicle parking for employees and customers, fuel storage, etc., to be placed within their land lease. These land lease parcels can range in size from 1 acre to 4 acres or more. Examples of BOW's current aviation land leases are Polk County Environmental Services (mosquito control), the Polk County Sheriff's Aviation Group, and Florida Aircraft Painting Company.

At BOW, there is a need and opportunity to develop additional corporate/special use hangar land leased for hangar construction. For the Master Plan facility requirement purposes, the plan should consider designating and reserving 10-15 acres of land for this use. The land area to be considered for this use needs to have both airfield access and public vehicular access.

4.4.5 Fueling Facility

The fuel farm storage facility at BOW consists of two above ground storage tanks (in accordance with EPA standards), each with a capacity of 15,000 gallons. One tank holds Jet A fuel and the other AvGas fuel. It is estimated that this fuel storage facility would be sufficient for the 20-year planning period.

Self-service fuel consists of 500 gallon Jet A and AvGas tanks. Two additional tanks one for diesel truck only and the other is private owned and used for helocopters.

4.4.6 Air Traffic Control Tower

The airport has an existing ATCT, which is owned and operated by the Authority. Based upon activity forecasts, this tower is not eligible for Federal funding under current FAA minimum operational criteria. This tower will not become eligible for Federal funds throughout the planning period. However, the tower, originally built in the 1950s, is an asset and will be retained as long as the Authority deems it financially feasible. The existing ATCT was refurbished in 2013 and will be used until a new tower is funded and built. A new, modern ATCT is considered as a replacement to the existing ATCT for long-range planning purposes.

The ATCT site for BOW will require about 1/4 acre for a standalone structure. The site of a new ATCT should provide for the maximum visibility to all runway ends, including runway extensions, runway approaches, and the airport's air traffic patterns.

4.4.7 Aircraft Rescue and Firefighting

The airport is currently served by multiple Polk County Fire Department stations in the area, as described in Section 2.0, Airport Inventory. These off-airport stations provide adequate service to the airport in its present role. However, coordination with FAA on equipment requirements in accordance with Federal Aviation Regulation - Part 139 should be continuously observed.

4.4.8 Industrial Park

The industrial park has been an economic success for the Authority and should be maintained over the planning period to ensure economic growth of the airport and surrounding area. Due to the age and maintenance costs of some of the older industrial park buildings, new facilities are replacing old structures as needed.

4.4.9 Industrial Park Intermodal Center

Within the BOW Industrial Park is the intermodal activity. Five rail spurs have been installed over the years.

A realignment of the Florida Midland Railroad spur would make the parcel of property more efficient. This would allow the internal airport loop road to be completed. This road would also link to the proposed second entrance road.

4.5 UTILITIES

The utilities at BOW are provided by the City of Bartow and are adequate to meet the projected short-term demand of the aviation and industrial park facilities. In the future, as greenfield sites are proposed to be developed, the Authority should consider a Master Utility Plan that will identify future pipe sizes, utility line easements, and fire protection systems for the entire airport. In the event that the airport land is annexed by the City of Bartow, then the City would be responsible for conducting a Master Utility Plan in conjunction with the Authority.

Two major utility lines were installed through airport property in 2010 and 2011. They extended from US 17 on the west side of the airport to Gaskin Road on the southeast side of the airport. This will help in the long-term development of the south side of the airport.

4.6 AIRPORT DRAINAGE

The airport drainage at BOW is adequate to meet the existing and projected short-term demand of aviation and industrial park facilities on the current developed land. However, the Master Drainage Plan previously completed for the entire airport should be updated as the Authority considers developing green field sites.

4.7 ACCESS AND SURFACE TRANSPORTATION SYSTEM

The surface transportation roadway system surrounding the airport and on-airport access throughout the industrial park building area is described in the following paragraphs.

4.7.1 Off-Airport Access

The off-airport system of roads that feed to the airport are in excellent condition and supply more capacity than will be needed for the airport. The main access road to the airport is U.S. Highway 17, which was reconstructed in 1985 to a four-lane divided highway. The new proposed Polk County Parkway Extension west and south of the airport will provide easier access to the I-4.

4.7.2 On-Airport Access

The on-airport roadway system is a grid network that was put in place by the military when the airport was built in the 1940s. This network has been repaired and maintained to a good operating condition. The present main entrance road provides a direct route to the aviation areas. It is encouraged that the landscaping and quality of this road be repeated whenever roadway rehabilitation is undertaken in the future.

A second airport entrance is recommended to be constructed on the west side of the airport. This new intersection would alleviate the historic and projected traffic congestion at the airport's existing main entrance intersection during peak a.m. and p.m. hours.

In the future, it is recommended an on-airport loop road, or perimeter road, would be constructed to provide access to the south part of the airport. This on-airport perimeter road would be constructed and provide access from Gaskin road via 91 Mine Road on the south and west side of the airport looping around the east side of the airfield and connecting to Ben Durrance Road on the northeast side of the airport. Also, the long term construction of the Central Polk Parkway Extension along the southern part of the airport will enhance business operations at the airport.

4.8 SUMMARY

In general, the existing facilities at BOW are in good condition, but the terminal apron will need to be expanded to accommodate the increase in aviation activity that is anticipated from the business jets. Two new mid field taxiway connectors ("L" & "H") from Runway 9L/27R are recommended as enhancements to the primary runway. The primary runway, Runway 9L/27R, is proposed to be extended from the existing 5,000 feet to 6,700 feet as previously planned and recommended. The crosswind and parallel runway can remain at the existing lengths. A parallel taxiway system serving Runway 5/23 is recommended for the future. The primary runway should be enhanced with NAVAIDs and visual aids that include a precision ILS approach and other modern airport lighting equipment. These improvements would be designed and should be installed in conjunction with the proposed runway extension.

SECTION 5.0

THE AIRPORT DEVELOPMENT PLAN

5.1 INTRODUCTION

It is implicit in the planning for Bartow Municipal Airport and Industrial Park (BOW) that the existing site be developed to its full potential to serve all segments of general aviation (GA) in accordance with the recommendations contained in Section 4.0, Demand/Capacity Analysis and Facility Requirements. A staging program of improvements has been planned that will ensure an adequate balance between aviation needs, community goals, funding, and financial feasibility. Detailed staging and cost estimates are described in Section 7.0, Implementation Program.

This section describes the basic planning elements of the recommended overall 20-year development program of the airport through the year 2035. The following six major subjects are discussed in this section:

1) The recommended long term plan,
2) Land Use Plan,
3) Developed and Non-Developed Land Program,
4) Runway Extension,
5) Land Acquisition,
6) Building Area
   - Aviation related land area
   - BOW Industrial park area
   - BOW Intermodal area
   - South side ultimate development area

Planning is an interactive process. This process examined the various areas enumerated above. However, for ease in explanation, each subject is discussed individually in the following analysis.

5.2 RECOMMENDED LONG-RANGE PLAN

The recommended long-range plan, shown on **Figure 5.3**, depicts the airport as it might look toward the end of the forecast period should all projects be completed. The airport has been expanded to include the necessary elements as set forth in the facilities requirements program. This layout is not intended as a finite plan, but demonstrates the areas as they might appear toward the end of the forecast period. The principal features of the plan area are as follows:

- Extend Runway 27R 1,700 feet to the east;
- Expand GA Terminal Apron;
- Install airport perimeter property line fencing (Security);
- Rehabilitate existing runways and taxiways as required;
- Install an Instrument Landing System (ILS) on runway end 27R;

- Construct additional T-Hangars;
- Construct additional corporate hangars;
- Construct a new future airport traffic control tower (ATCT);
- Expand GA apron to the west;
- Develop lease plots adjacent to parallel Taxiway D-1 serving extended Runway 9L/27R for aviation uses;
- Construct new parallel taxiway to Runway 5/23;
- Construct two midfield taxiway connectors;
- Install new Precision Approach Path Indicator (PAPI) systems on Runway 9R/27L;
- Remove old specified industrial park buildings;
- Construct second airport entrance off U.S. Highway 17;
- Construct corresponding internal airport loop road;
- Construct a perimeter road system from the northeast section of the airport south connecting to 91 Mine Road on the southwest side;
- Construct new electric vault; and
- Reserve south area adjacent to airfield for future aviation-related use.

5.3 AIRPORT LAND USES

An essential ingredient to efficient operation of an airport is the organization of functions on the facility into manageable units. These units should be organized in such a manner as to provide equal status to like uses; at the same time it should separate units to allow for expansion as the airport continues to develop.

Categories of on-airport land use for regulatory purposes are set forth as follows:

Land Use Classification

Aviation Uses	**Non-Aviation Uses**
Airfield	Non-Aviation Commercial and Industrial
Terminal Area	Open Space Buffer Zones
Commercial Aviation (FBO)	
Non-Commercial Aviation (Aircraft Storage)	
Operation and Safety	
Runway Protection Zones	

These classifications are shown on the Airport Future Land Use Plan, **Figure 5.1**, and described as follows:

- Airfield – The runway/taxiway complex and their required clearances make up this aeronautical operation area.
- Terminal Area – This area encompasses the GA passenger terminal building,

GA transient apron, automobile parking lot, rental car areas, entrance road, and any terminal support services.

- Commercial Aviation Area – This area consists of the FBOs and aircraft services. These activities involve the sale of aviation services to the general public, including maintenance, storing, and servicing of aircraft; sale of aircraft; sale of aircraft parts and accessories; sale of aircraft fuel, lubricants, and propellants; and operation of non-scheduled and charter transportation.
- Non-Commercial Aviation Area – Those activities which involve the facilities for storage and service of aircraft owned by an individual, private organization, or corporation solely for its own benefit (T-Hangars, shade hangars, executive hangars, and corporate hangars).
- Operations and Safety – These areas incorporate all facilities required to operate the airport, including ATCT facilities; security; aircraft rescue and firefighting; navigational aids and airport maintenance.
- Runway Protection Zones – Areas in which the height of any structure or natural obstruction is mandated. These areas are usually cleared open space.
- Non-Aviation Commercial and Industrial – Commercial/industrial uses not directly related to aviation and not requiring airfield access, which are subject to the development and performance standards established for the airport as a whole.
- Open Space/Buffer Zones – Areas on the airport property that have been designated to remain undeveloped.

5.4 DEVELOPED/UNDEVELOPED AIRPORT PROPERTY

Shown on **Figure 5.2** is the developed land and the non-developed land for the north side of the Bartow Municipal Airport.

The existing leased land area and the building area consist of approximately 186 acres of land.

The aviation related land consists of T-Hangar expansion in the current T-Hangar area along with potential corporate hangars in some of the undeveloped aviation related land. There are approximately 26 acres indicated for this type of use on the plan.

In addition, there is approximately 100 acres of BOW land on the north side of the airport that is undeveloped.

5.5 LAND ACQUISITION OR CONTROL

5.5.1 Land Use Controls

A critical factor in accessing the success of the program planned for the airport involves the control and regulation of land in the airport's environs. This factor is critical because of the need to regulate heights of structures and control other hazards to air navigation, minimize the negative environmental impact of aircraft operations on surrounding areas, and provide protection for public and private property.

There are several ways to regulate land in the airport environs: (1) purchase of fee simple title to land and its conversion to compatible uses, (2) purchase of avigation easements, and

(3) airport district zoning. In the case of BOW, the combination of the three methods would create a compatible airport-community environment.

5.5.2 Purchase of Fee Simple

This is the most effective and certainly the most expensive method to control land. However, for close-in areas, which receive high levels of aircraft noise and are critical to aircraft operations, this method is mandatory. In recognition of these facts, the FAA has established guidelines for the purchase of land that is eligible for Federal assistance. To prevent future encroachment, the Authority purchased the 142.2-acre tract east of the airport. This land acquisition will be returned to the Authority when the runway extension program begins.

5.5.3 Purchase of Avigation Easements

Purchase of fee simple as described above requires that the land be taken off the local tax rolls and converted to or retained in a compatible use. This is normally not a serious problem for areas that are not developed, but for many areas around the airport this is not the case, and this approach would require the displacement of some residential homes. Purchase of easements provides an acceptable alternative.

The purchase of easements over property could establish maximum heights for structures on the property, eliminate other potential hazards to navigation (lights, smoke, interference to radio and navigational signals), ensure the right of aircraft to fly over or near the property without fear of legal action due to noise impact or potential safety hazards, and prevent the conversion of the property to uses which may be more incompatible. Approximately 3.5 acres of the Runway 9L non-precision RPZ extends beyond airport property on the west side and the Authority would be best suited to purchase easements.

5.5.4 Airport District Zoning

For the purpose of land use protection, the scenario that includes potential military aircraft activity should be examined. In previously completed studies, it was noted that the impact of civil and military aircraft noise by the year 2020 could extend approximately 1.5 miles from the end of the runways for the 65 Ldn contour. Obviously, it would be financially impossible to purchase this entire area. It is not as critical as land within the 75 Ldn contour from an environmental standpoint. However, consideration should be given to minimize this impact and to eliminate hazards to air navigation.

Recognizing that zoning is not retroactive and is subject to many limitations, it still appears to be a feasible way to achieve the goal of compatibility between the airport and its neighbors in the areas not directly purchased.

The present county zoning ordinance should be amended to address both the goals of land use compatibility and safety in air navigation, based upon two different zones. The first zone would encompass the area within the 65 Ldn noise contour and the second zone would present the applicable Federal Aviation Regulation (FAR) Part 77 Surfaces at BOW. The Approach/Imaginary Surface Plan in the ALP Set defines those areas that are critical to air navigation and graphically illustrates the airspace surfaces which should not be penetrated by tall ground structures.

Land uses in the 65 Ldn contour should be limited to commercial, industrial, recreational or agricultural. Residential uses or places of public assembly should be discouraged in this area if possible.

5.5.5 Land Use Protections Strategy

It is recommended that the Authority pursue the following course of action to ensure compatibility between the airport and its neighbors:

1) The Authority should purchase avigation easements as indicated to ensure compatibility of land use.

2) The Authority should comply with the Polk County Airport Zoning Ordinance for protection of airport property. Legislation passed in the State of Florida mandates land use zoning around airports. The Polk County Joint Airport Zoning Board was, therefore, created to adopt and administer the required airport zoning regulations.

5.6 AIRFIELD PLAN

The airfield plan is shown on **Figure 5.3**. Based on the development of aviation facilities adjacent to the runway system, the alignment of the primary Runway 9L/27R and secondary Runways 5/23 and 9R/27L are fixed. The three runways are in place and all are compatible with existing surrounding land uses. The high cost of runway relocation would be most impractical to consider; therefore, the runway alignments will remain the same throughout the foreseeable future.

As documented in Section 4.0, Demand/Capacity Analysis and Facility Requirements, a 1,700-foot runway extension has been recommended. This extension has been recommended to serve the GA jet aircraft fleet. It is desirable to place this extension on the primary Runway 9L/27R system. The additional runway length improves operational safety and selected critical aircraft that already use the airport would be able to increase their payloads and haul distances.

5.6.1 BOW Runway Extension Program

Introduction

In the early 1980's, business jet activity was increasing at BOW. The 1986 airport master plan study conducted a pilot/user survey on the desirable runway length. A runway analysis was conducted as part of the 1986 master plan and it was determined that a 6,700 foot long runway would be recommended.

Process

The 1,700 runway extension to the east end of runway 27R has been shown on the previous and current FAA approved ALP for the past 25 years. Over the past ten years, two opportunities have occurred that effects the east side of the airport. The land to the east was for sale and this was an opportunity for the authority to purchase this land using their own money to reserve the land for the future runway extension project.

Property Acquisition

The Airport purchased 140± acres on the east side of the Bartow Municipal Airport to accommodate the proposed future Runway 9L/27R extension. The following identifies the property acquisition information:

Total cost = $298,262.00 paid for out of Airport funds, not City or County funds.

The Stipulated Final Judgment is dated March 8, 2005; Case No. 53-2004CA-4484, Section 08; for Parcel #252924-000000-011020; purchased from SW Southeast Holdings, Inc.

When a Federal Grant is being offered to extend the runway, the airport will request reimbursement for the land acquisition as part of the runway extension project.

The second opportunity was the need to extend Taxiway "A" to the east to accommodate additional aviation related hangar development. With the foot print of the future runway extension to the east established, a proposed taxiway '"A" extension was located based on a 400 'future runway to taxiway separation. The proposed taxiway '"A" (A1) extension to the east was constructed in 2003.

Runway Extension Justification Report

A runway extension justification study and report was completed by URS in January, 2014. The study documented current business jet activity and evaluates the need for additional runway length on the airport's primary runway.

Streamsong Resort Development opened for business in January 2013 and has spurred strong corporate jet traffic at BOW. Survey of these users provide strong support for an extension to the primary runway.

The study documented 808 annual business jet and large turboprop operations (existing and latent) that need, and would benefit from, a longer runway at the Bartow Municipal Airport.

The substantial use threshold in FAA Advisory Circular 5325-4B for determining runway design length is at least 500 forecasted annual operations by aircraft requiring additional runway length. The 808 annual aircraft operations identified in this report meet and exceed this substantial use threshold criterion. Therefore, a runway extension at the Bartow Municipal Airport is justified.

Environmental Assessment

Prior to the construction of the runway extension the FAA requires an EA study be performed for this airfield improvement. The study requires approval from appropriate governmental agencies prior to implementation.

Design and Permitting Phase

The project design and permitting will include mitigation for flood plain and wetland impacts. The extension will be designed for a total runway length of 6700 feet and will include modification to existing runway edge lighting and visual aids.

Construction Phase

In review of the runway extension, the east end of Runway 27R is the preferred extension end. This area is currently undeveloped. With the additional land acquisition to the east, the full 1,700-foot runway extension, a 1,000-foot safety area, and precision instrument landing

equipment can be constructed on the east end. Also included within airport property is the precision instrument runway protection zone (RPZ).

In 2015-2016, the full parallel taxiway to the existing runway will be completed. The taxiway will enhance the jet activity at the airport and keeping the ground jet circulation away from the GA Apron and GA parked aircraft.

5.7 BOW BUILDING AREA DEVELOPMENT

With the recommended airfield system established, the next task is to look at each building area and organize the various aviation functions into the space available based upon the acreage set forth in Section 4.0, Demand/Capacity Analysis and Facility Requirements. The items to be considered are: (1) the existing facilities, and (2) the location and size of undeveloped areas.

The future aviation related and non-aviation related organization of land use is shown on **Figure 5.4** diagram.

5.7.1 Internal BOW Road System

An important part of the building area plan is the internal roadway system. Most of the roads were established in the 1940's as part of the BOW airbase. In 2014, these roads were resurfaced which will give them a number of years of good useful life.

With the future redevelopment of parts of the area, heavy truck use will show more wear on selected streets. These streets will eventually need to be strengthened and widened.

Along with the future street improvements is the second airport entrance from US Highway 17 as shown on **Figure 5.4**. This is the same option location selected by the Authority in 2003. In July 2014, the airport authority again selected the second entrance location as their preferred location. There are several issues with this location but the authority selected this as their preferred location. As a backup second entrance road location the authority selected, on July 2014, the road option that aligns past the GA terminal and runs parallel to Taxiway D and links into Airport Blvd on the west. Roadway alignment option reviews are included in Appendix A.

5.7.2 Intermodal Opportunity

It should be noted that the July 2014 airport authority meeting the authority elected to negotiate with the Husky Cargo on the old Home of Merit property next to Taxiway D. These negotiations were completed and the Husky Cargo owns and operates the old Home of Merit property. It is important to note the Husky Cargo states that in the future they may use the rail system, to receive or deliver goods. This would enhance the intermodal center as one of the intermodal concepts.

5.7.3 Long Term Building Area

There is a need to increase the aviation facilities within the 20-year time frame and beyond, as indicated in Section 4.0. In addition to the identified requirements, adequate land area is available to support expansion of any and all facilities.

In addition, the south quadrant contains wetland areas. Any future development into such areas will require preliminary environmental site investigation leading to eventual Federal permitting and other agency approval.

The south quadrant, however, should be reserved for BOW's long-range aviation growth needs beyond the 20-year planning period or needs to be identified by potential aviation investors. Perhaps some major aviation industrial manufacturer who is looking for a 50- to 100-acre site with airside access would find this site attractive.

Because this area is undeveloped green space, up front infrastructure cost would be incurred with site preparation, the construction of taxiways, access road, utilities, and other various substantial capital improvements.

5.8 AVIATION RELATED BUILDING AREA

Located within the building area are the existing and future aviation-related and industrial park (non-aviation-related) facilities. Within this context, each use is discussed as follows.

5.8.1 General Aviation Terminal Area

This area encompasses GA terminal-related functions that include the GA terminal building, transient aircraft parking apron, and public/rental car/employee auto parking. The terminal building provides space for GA pilots and passengers, Authority-operated customer services (fuel sales, aircraft sales, flight training), and the airport administration offices. The old terminal building underwent its last renovation in 1989. In 2007, a new modern facility replaced the existing terminal building. The facility area included the future construction of a new ATCT as a separate stand-alone structure.

5.8.2 Terminal/Administration Building

The new terminal site has four key elements to the plan. They include the building, aircraft parking, auto parking, and access.

The BOW terminal site is central to the airfield system, will have good access from U.S. Highway 17, and has a site large enough to accommodate the initial design components plus space available for future expansion.

5.8.3 Commercial Aviation Area

This area consists of the FBO/customer service facilities, fuel sales, transient, and local tie-down areas.

All functions carried out by the private FBOs, including employee and customer parking, should occur on their leased premises. As expressed in the preceding discussion of facility requirements, the need for additional space could be anticipated. Past experience shows that three to five acres is the minimum land area required per FBO facility including hangar, storage space, aircraft apron, all automobile parking (both customer and employee) access, etc.

For management and planning purposes, it is important to divide these future areas into lease plots and adopt a set of development standards, which include security requirements, paved parking lots, landscaping, etc.

In this Master Plan, the existing FBO facilities would remain in their current locations. Specialty FBO facilities would be constructed adjacent to corporate hangar facilities. Long-term large FBO needs would be developed in the south quadrant.

5.8.4 Non-Commercial Aviation

This classification consists of storage areas and is divided into two categories: (1) single storage units (T-Hangars) which usually accommodate small aircraft, and (2) corporate or executive hangars to accommodate larger aircraft or corporate fleets.

The plan identifies existing and new aircraft storage areas on the airport as shown on **Figures 5.5-5.12**. This function does not require prime land exposure, as do commercial aviation facilities; therefore, remote areas are often desirable.

5.8.5 T-Hangars

The plan, as shown on **Figure 5.7**, illustrates the complete buildout of the existing T-Hangar area with the construction of 21 T-Hangar units. This should satisfy the small aircraft storage requirements through the forecast period. As shown on **Figures 5.8-5.10** there are additional T-Hangar options for long term expansion considerations.

5.8.6 Corporate/Executive Hangars

Many firms owning aircraft desire to have their own hangars on individual sites. This is particularly true of owners of large multi-engine aircraft, which cannot be accommodated in standard T-Hangars, or corporations that have a fleet of aircraft and maintenance personnel and wish to keep them together. The existing corporate/executive hangar area is fully developed. For planning purposes, three areas for new corporate/executive hangars have been designated for this purpose. The first area is on the east side adjacent to the existing and new parallel Taxiway A, as shown on **Figure 5.12**. The second area is north of Runway 9L end and indicated on the same exhibit. The third area is the redevelopment of the old terminal area, shown on **Figure 5.5**.

5.9 BOW INDUSTRIAL PARK

The Bartow Municipal Airport Industrial Park began as part of the original Army Air Base. These non-aviation facilities transitioned into other uses after the military transferred the air base to the City of Bartow. For a number of years these facilities served a variety of small and medium size businesses. The building area was maintained over the years with some buildings being demolished. The authority has maintained roads and performed other upkeep building maintenance. When the time comes and these buildings fall into disrepair or have no further use they will be demolished and replaced with new structures. Most of the older facilities or small lots will be removed eventually and replaced.

As determined under the developed and non-developed areas, there are a number of vacant lots currently suitable for development. These lots range from several acres to 10 acre sites.

5.9.1 Non-Aviation Commercial/Industrial Site

As part of the long term plan to enhance the airport's financial self-sufficiency, additional land has been reserved for future non-aviation commercial and industrial development. In addition, considering the large capital expense of improving undeveloped areas, the plan recommends existing industrial park improvements prior to any new non-aviation development outside the existing industrial park.

5.10 INTERMODAL PLAN

10 Year Intermodal Plan

The Industrial Park area was created from the original Air Base facilities and some of these facilities are 70 years old and are still in use. Much of the original infrastructure roads, utilities lines and drainage system are still in place although some have been replaced and upgraded over the years. The existing roads have been resurfaced recently with FDOT funding and should provide a wearing surface for a number of years.

The plan calls for the demolition of older buildings that have served their useful life, making the site available for redevelopment. Although the roads were resurfaced, some of the roads received considerable amount of heavy truck traffic activity will need to be strengthened in the near to intermediate term.

As part of this improvement plan the existing Intermodal area was reviewed and several options were discussed. The existing intermodal area consists of approximately 40 acres; approximately 8000 LF of rail spurs and has approximately 380,000 SF of existing warehouse/distribution/shed type facilities.

The plan, as shown on **Figure 5.11**, calls for an Airports Intermodal Center area to be expanded to approximately 70 acres. A 10-20 year Long Term Intermodal Concept was prepared that illustrates the potential development of this Airports Intermodal Center. It includes rail spur realignments, additional rail spurs and expanded rail spurs. The land adjacent to the rail spurs could facilitate approximately 260,000 SF of additional warehouse distribution facilities.

The proposed implementation plan is to reconfigure the Mid-Florida Lumber site that would accommodate both the aviation facilities plan and provide comparable replacement facilities for the Mid-Florida lumber tenant. Utilizing the FDOT Strategic Intermodal System (SIS) guidelines, the following projects have been identified as part of the Intermodal implementation plan.

Intermodal Initial project items

Site preparation (drainage) rail spur realignment area.

Realign and construct new rail spur segment.

Construct parallel rail spur segment including new rail switch.

Construct loading/unloading paved platform areas adjacent to realigned and new rail spurs.

Construct paved material stock pile/staging areas.

Remove section of exiting rail spur.

Construct new 36,000+ SF warehouse facility and truck court.

Demolish existing 36,000 SF warehouse storage structure.

Construct intermodal/terminal access road.

Site preparation (grading/drainage of rail spur realignment area).

The existing site area was formerly the infield area between the old Air Base aircraft parking ramp and the old abandoned runway. The infield areas require fill material and the drainage structures need to be assessed and updated as needed.

Construction (rail spur/pavement areas)

The construction phase includes the rail spur realignment, new parallel rail spur extension, loading /unloading platforms next to the rail spur, and stock pile staging areas for bulk material.

Warehouse Structure

Within the Warehouse Structure area, the replacement structures for the existing warehouse that needs to be demolished in order to make room for the construction of the intermodal/terminal access road must be constructed. The replacement structure is an open sided facility with no electrical power. The final structure size may change depending on if any of the existing structural material can be relocated.

According to FDOT Strategic Intermodal System (SIS) guidelines, all of the items are eligible for FDOT intermodal funding.

Mid Florida Lease Area Section

The Loop Road section design phase will include surveys and testing. This effort will establish the true alignment of this section of loop road and what facilities and infrastructure has to be relocated or removed in order to complete the project. Also it will define the cost of construction to build this section and convert the existing temporary road back to apron usage.

Current sections of the Mid Florida lease are required to implement this phase of the loop road. This Phase of the loop road will remove the temporary access apron road to the terminal. This will restore this apron area back to its original use area. Also this phase will open up the opportunity to develop large corporate hangars along the apron frontage.

The Mid Florida lease expires 2021. The airport and consultant met with the Tenant to discuss overall planning concept and the tenant's long term plans. At this time the tenant was not sure what his long term plan was. He did say that in the near term he would have to make a decision. The tenant did mention he could possible release some property.

Therefore, renegotiation of lease could take place sooner than later as mentioned by the tenant. The following is the project description of the project.

Internal Loop Road (Phase I Design) (section of mid- FL Lumber property required) - 2016

Project Narrative: Design Phase I Internal Loop Road section from Echo Avenue connecting to Airport Blvd. and through section of Mid- FL Lumber leased property to Homes of Merit leased property. This Mid- FL Lumber leased property section consists of approximately 5 acres and is required for the project.

Also as part of the design the project it will include the design for removal

and replacement of the existing rail spur. This will require coordination and negotiations with the Mid Florida Railroad.

In addition, the temporary terminal entrance road will revert back to full aviation use and the design for relocating existing security fencing and converting temporary road to apron will be part of this project.

This design Phase which should include preliminary negotiations with Mid-Florida Lumber and railroad will establish the full scope and cost of the project, including relocation of the railroad spur.

5.11 EAST QUADRANT DEVELOPMENT PLAN

This is an expandable aviation-related development area, which is currently occupied by the Polk County Environmental Agency, the Polk County Sheriff's Department, and the Florida Aircraft Painting Company. With the undeveloped land available and the proposed extension of Runway 9L/27R to the east, additional aviation frontage along the new parallel Taxiway D-1 would become prime aviation-related property. Segments of this land should be reserved for additional aviation development. Examples of such development could include corporate aviation facilities, specialty FBO, helicopter maintenance facilities, and agricultural aviation hangars and facilities.

The east quadrant development plan that is shown on **Figure 5.12** was prepared and accepted was put together several years ago. The central access road that serves the City of Bartow electrical department on the corner of Ben Durrance Road and the new access road will eventually form part of the airport loop road to the south side of the airport. This section of the access road was designed but never built.

The overall east quadrant plan is divided up with approximately 50 acres of non-aviation commercial property on the north side and approximately 20 acres (including taxiway access) of aviation aircraft storage units on the south side.

5.12 SOUTH AIRPORT DEVELOPMENT PLAN

The south quadrant plan, as shown on **Figure 5.13**, has aviation frontage adjacent to Runways 9R/27L and 5/23, is also considered prime aviation real estate. However, based on the projected 20-year facility requirements program, it appears that all the aviation growth within this planning period can be accommodated on the north side of the airport.

In addition, the south quadrant contains wetland areas. Any future development into such areas will require preliminary environmental site investigation leading to eventual Federal permitting and other agency approval.

The south quadrant, however, is reserved for BOW's long-range aviation growth needs beyond the 20-year planning period or needs to be identified by potential aviation investors. Perhaps some major aviation industrial manufacturer who is looking for a 50-to 100-acre site with airside access would find this site attractive.

Because this area is undeveloped green space, up front infrastructure cost would be incurred with site preparation, the construction of taxiways, access road, utilities, and other various substantial capital improvements.

The south side of the airport has always been part of the long range BOW plan. When the north side of the airport is fully developed, the south side is the proposed long term development area.

Two things have taken place over the last several years that enhances the south side development. The first is the installation of two major utility lines from US 17 along the east side of airport to Gaskin Road toward the west side of the airport property. The second thing is the proposed Central Polk Parkway Extension that will be aligned along the southern border of the BOW property. The airport master plan always had a future connection to Gaskin Road on the south side.

BOMBER RD.

FLORIDA MIDLAND RR

RESERVED FOR FUTURE INDUSTRIAL PARK DEVELOPMENT

BEN DURRANCE RD.

FUTURE EAST QUADRANT DEVELOPMENT

U.S. HIGHWAY 17

T/W "A1"

T/W "A"

T/W "A2"

T/W "D"

T/W "D1"

T/W "C1"

T/W "C2"

RUNWAY 9L/27R 6,700' x 150'

5,000' x 100'

T/W "A3"

RUNWAY 9R/27L 4,400' x 150'

RUNWAY 5/23

T/W "C3"

ULTIMATE AIRPORT LOOP ROAD

RESERVED FOR FUTURE AVIATION RELATED DEVELOPMENT (52 ACRES)

RESERVED FOR FUTURE AVIATION RELATED DEVELOPMENT (88 ACRES)

N. 91 MINE RD.

UTILITY CORRIDOR

RESERVED FOR FUTURE INDUSTRIAL PARK

PROPOSED POLK PARKWAY EXTENSION RIGHT-OF-WAY

E. GASKINS RD.

LEGEND

- AIRFIELD RELATED
- FUTURE AIRPORT ACCESS ROADWAY
- AVIATION RELATED DEVELOPMENT
- NON-AVIATION RELATED (INDUSTRIAL PARK)
- GREENBELT/BUFFER ZONE
- EXISTING AIRFIELD PAVEMENT
- FUTURE PAVEMENT (CONCEPTUAL)
- FUTURE BUILDINGS (CONCEPTUAL)
- EXISTING DRAINAGE FLOW
- AIRPORT PROPERTY LINE

N

1200 0 1200

GRAPHIC SCALE IN FEET

FUTURE AIRPORT LAND USE PLAN

BARTOW MUNICIPAL AIRPORT AND INDUSTRIAL PARK

FIGURE 5.1

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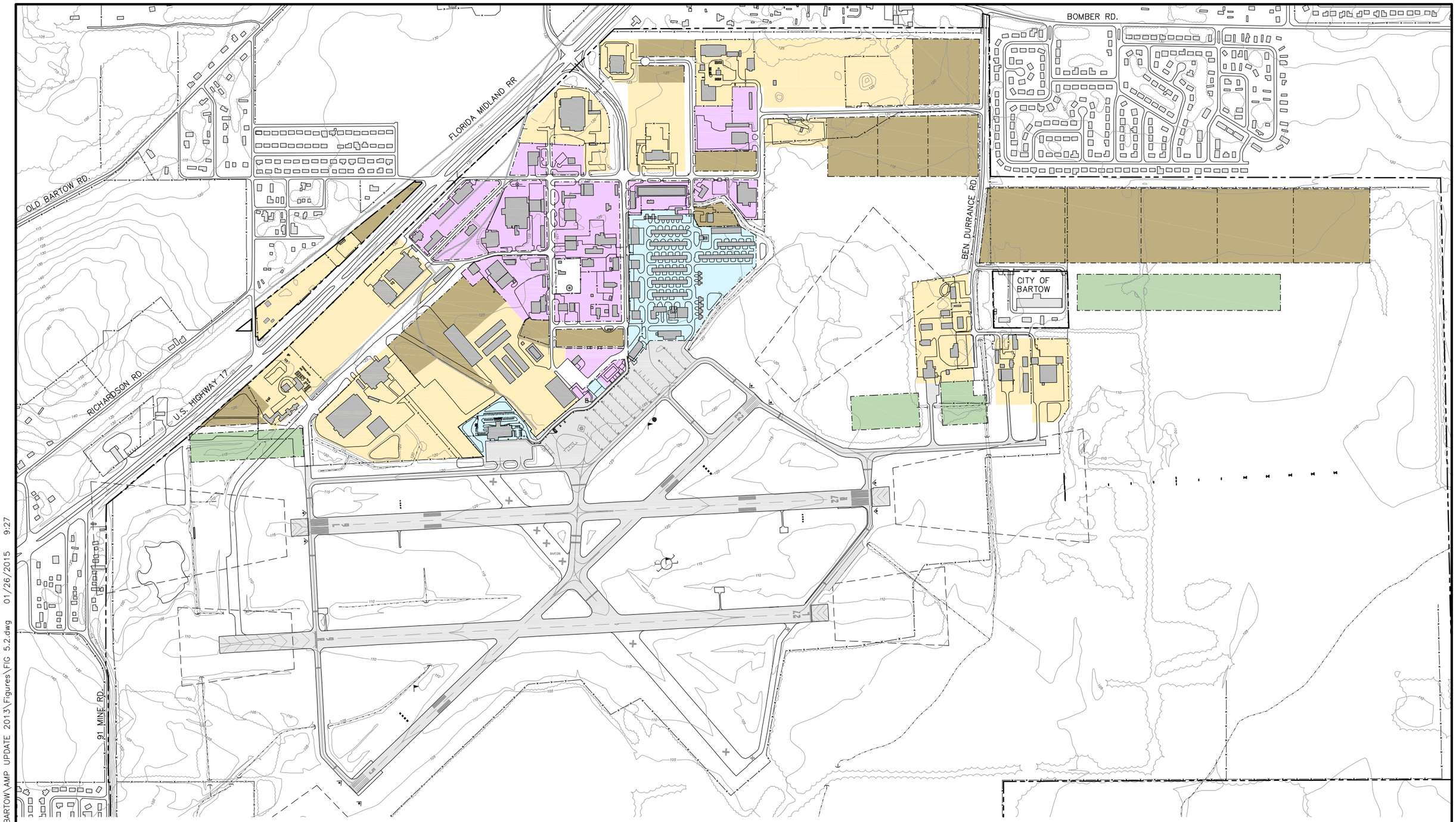

DEVELOPED/UNDEVELOPED AIRPORT PROPERTY

BARTOW MUNICIPAL AIRPORT AND INDUSTRIAL PARK

FIGURE 5.2

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GA APRON EXPANSION & TAXIWAY RELOCATION

TERMINAL APRON EXPANSION

TAXIWAY "D" PARALLEL EXTENSION

PROPOSED 1,700' RUNWAY EXTENSION

PROPOSED TAXIWAY "L" CONNECTOR

PROPOSED TAXIWAY "H" CONNECTOR

FUTURE PARALLEL TAXIWAY & MIDFIELD CONNECTORS

FUTURE MIDFIELD CONNECTOR

RESERVED FOR FUTURE AVIATION RELATED DEVELOPMENT (88 AC.)

RESERVED FOR FUTURE AVIATION RELATED DEVELOPMENT (52 AC.)

RUNWAY EXTENSION PROGRAM
- ENVIRONMENTAL ASSESSMENT
- SITE PREPARATION
- DRAINAGE
- FENCE RELOCATION
- PAVEMENT
- LIGHTS
- NAVAIDS
- ILS

FLORIDA MIDLAND RR
BEACON
BEN DURRANCE RD.
U.S. HIGHWAY 17
FUT. ATCT
ATCT
T/W "A1"
T/W "A"
T/W "H"
T/W "A2"
T/W "D"
T/W "D1"
T/W "C1"
T/W "C"
RUNWAY 9L/27R
6,700' x 150'
FUTURE 1,700' R/W EXTENSION
FUTURE REILS
FUTURE MALSR
FUT. PAPI
FUT. GLIDE SLOPE
FUT. LOCALIZER
T/W "A3"
T/W "F"
5,000' x 100'
T/W "G"
RUNWAY 9R/27L
4,400' x 150'
T/W "C2"
T/W "C3"
FUTURE T/W
RUNWAY 5/23
ULTIMATE AIRPORT LOOP ROAD
N. 91 MINE RD.

LEGEND
- EXISTING AVIATION FACILITIES
- FUTURE AVIATION FACILITIES DEVELOPMENT
- LONG-TERM AVIATION FACILITIES DEVELOPMENT
- FUTURE NAVAID CRITICAL AREA

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800 0 800

GRAPHIC SCALE IN FEET

FUTURE AIRFIELD DEVELOPMENT

BARTOW MUNICIPAL AIRPORT AND INDUSTRIAL PARK

FIGURE 5.3

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LEGEND
AVIATION–RELATED AREA (37.4 AC.)
TERMINAL AREA (10.0 AC.)
INDUSTRIAL PARK AREA (130.0 AC.)
POTENTIAL INTERMODAL CENTER (78.8 AC.)
POTENTIAL ACCESS ROAD
EXISTING RAILROAD SPURS

EXISTING INTERSECTION

POTENTIAL INTERSECTION

OPTION "A"

FLORIDA MIDLAND RR

U.S. HIGHWAY 17

AMERICOLD

INTERMODAL CENTER
78.8 AC.

INDUSTRIAL PARK
7.0 AC.

INDUSTRIAL PARK
16.4 AC.

41.4 AC.

19.6 AC.

13.7 AC.

3.3 AC.

28.3 AC.

AVIATION

6.2 AC.

17.1 AC.

3.0 AC.

3.7 AC.

2.3 AC.

AVIATION
5.4 AC.

AVIATION TERMINAL
10.0 AC.

N
400 0 400
GRAPHIC SCALE IN FEET

FUTURE AVIATION-RELATED & NON-AVIATION-RELATED LAND AREA

BARTOW MUNICIPAL AIRPORT AND INDUSTRIAL PARK

FIGURE 5.4

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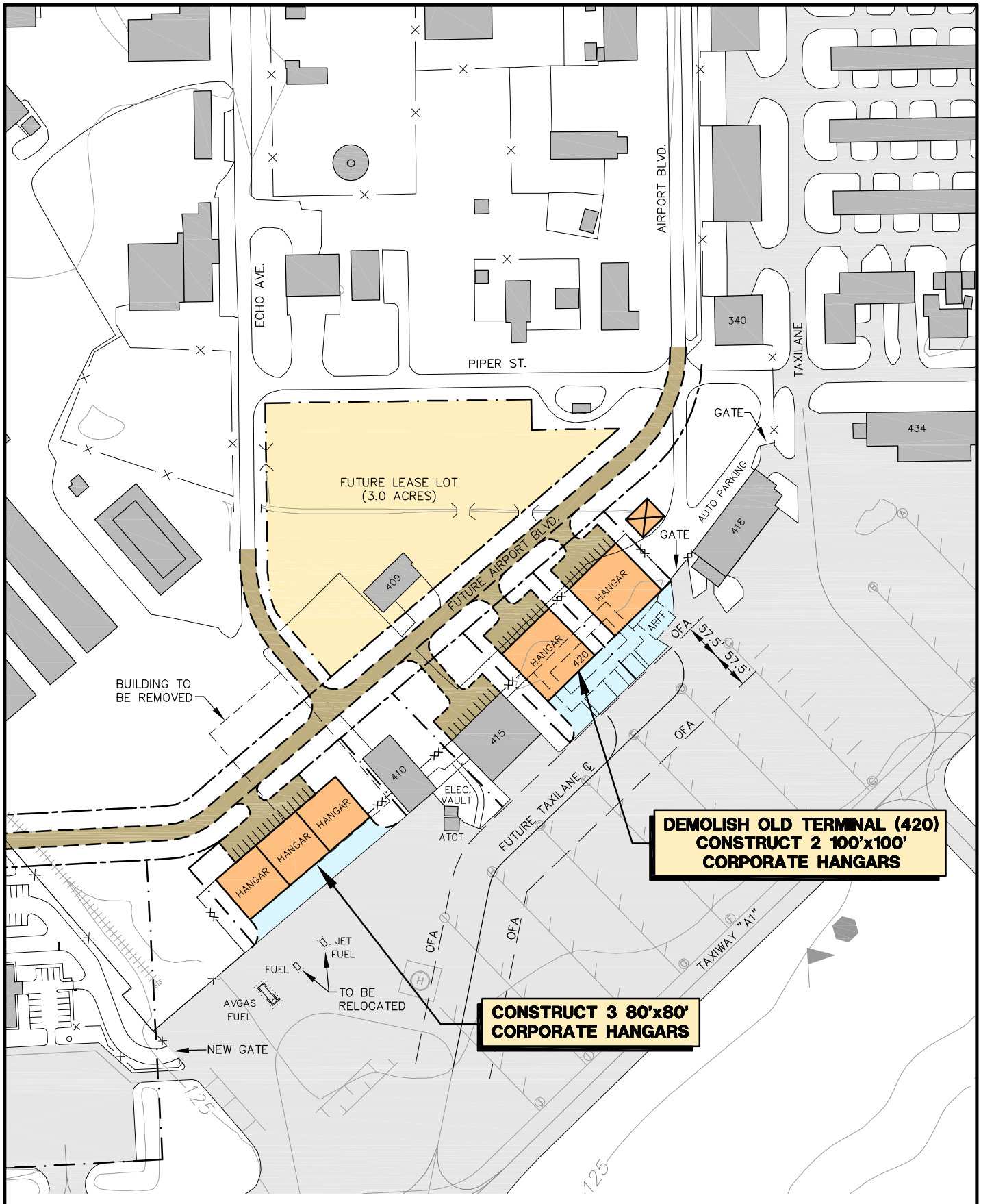

S:\Projects_APPLAN\BARTOW\AMP UPDATE 2013\Figures\FIG 5.5.dwg 02/23/2015 16:49

REDEVELOP OLD TERMINAL SITE

BARTOW MUNICIPAL AIRPORT AND INDUSTRIAL PARK

FIGURE 5.5

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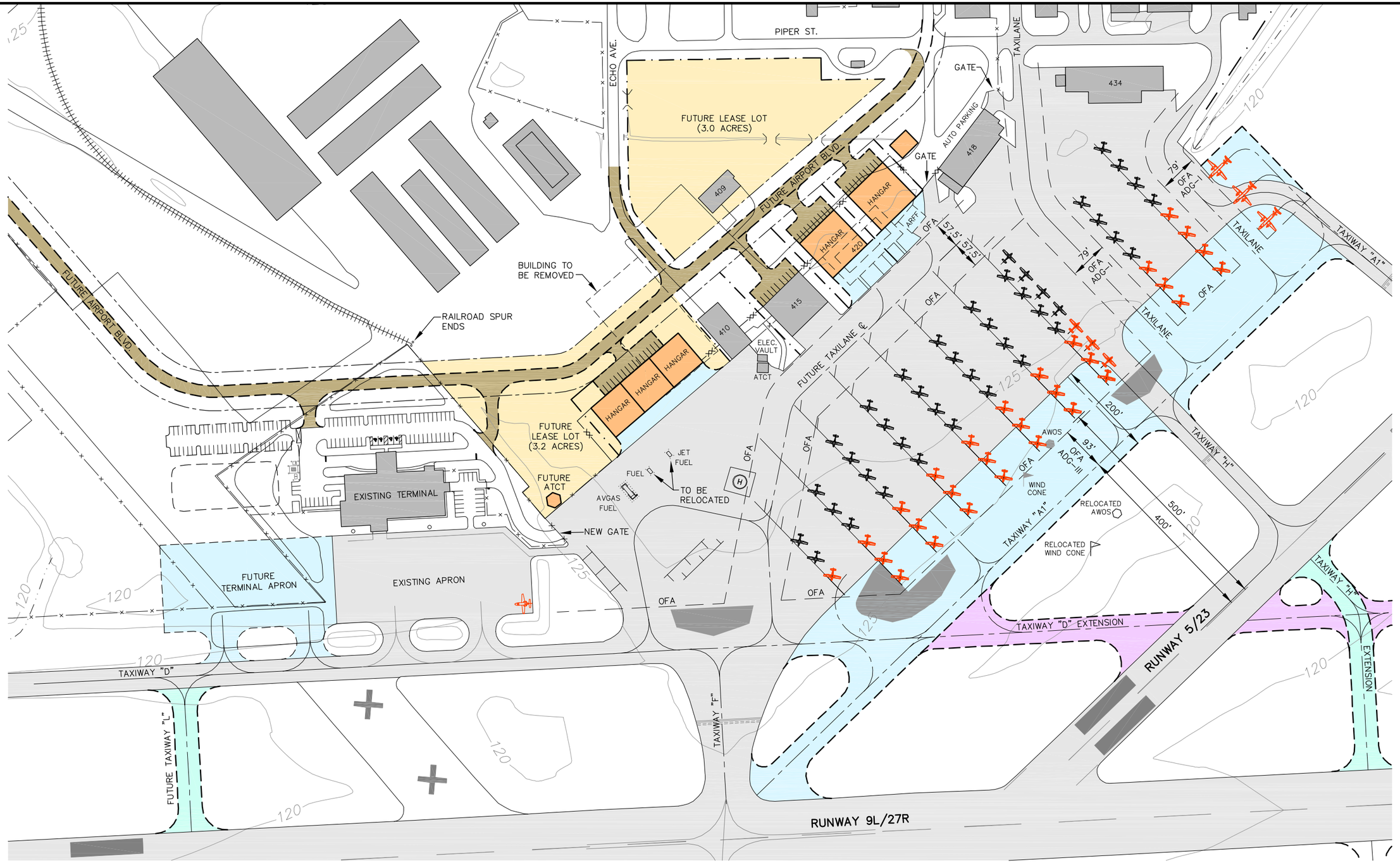

LEGEND

- GA APRON & APRON TAXIWAY EXPANSION
- FUTURE TAXIWAY "L" & "H" EXTENSION
- FUTURE TAXIWAY "D" EXTENSION
- FUTURE BUILDING/STRUCTURE
- FUTURE ACCESS ROAD/PARKING
- FUTURE LEASE AREA
- FUTURE ISLANDS PER AC 150/5300-13A, CHAPTER 4, SECTION 401, b, (5) (g).
- NEW AIRCRAFT TIEDOWN POSITION
- EXISTING AIRCRAFT TIEDOWN POSITION

57 – EXISTING TOTAL TIEDOWNS
16 – TIEDOWNS LOST WITH CORPORATE HANGAR DEVELOPMENT
41 – EXISTING TIEDOWNS TO REMAIN
32 – NEW TIEDOWNS
73 – FUTURE TOTAL NUMBER OF TIEDOWNS

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200 0 200

GRAPHIC SCALE IN FEET

GA APRON & APRON TAXIWAY EXPANSION

BARTOW MUNICIPAL AIRPORT AND INDUSTRIAL PARK

FIGURE 5.6

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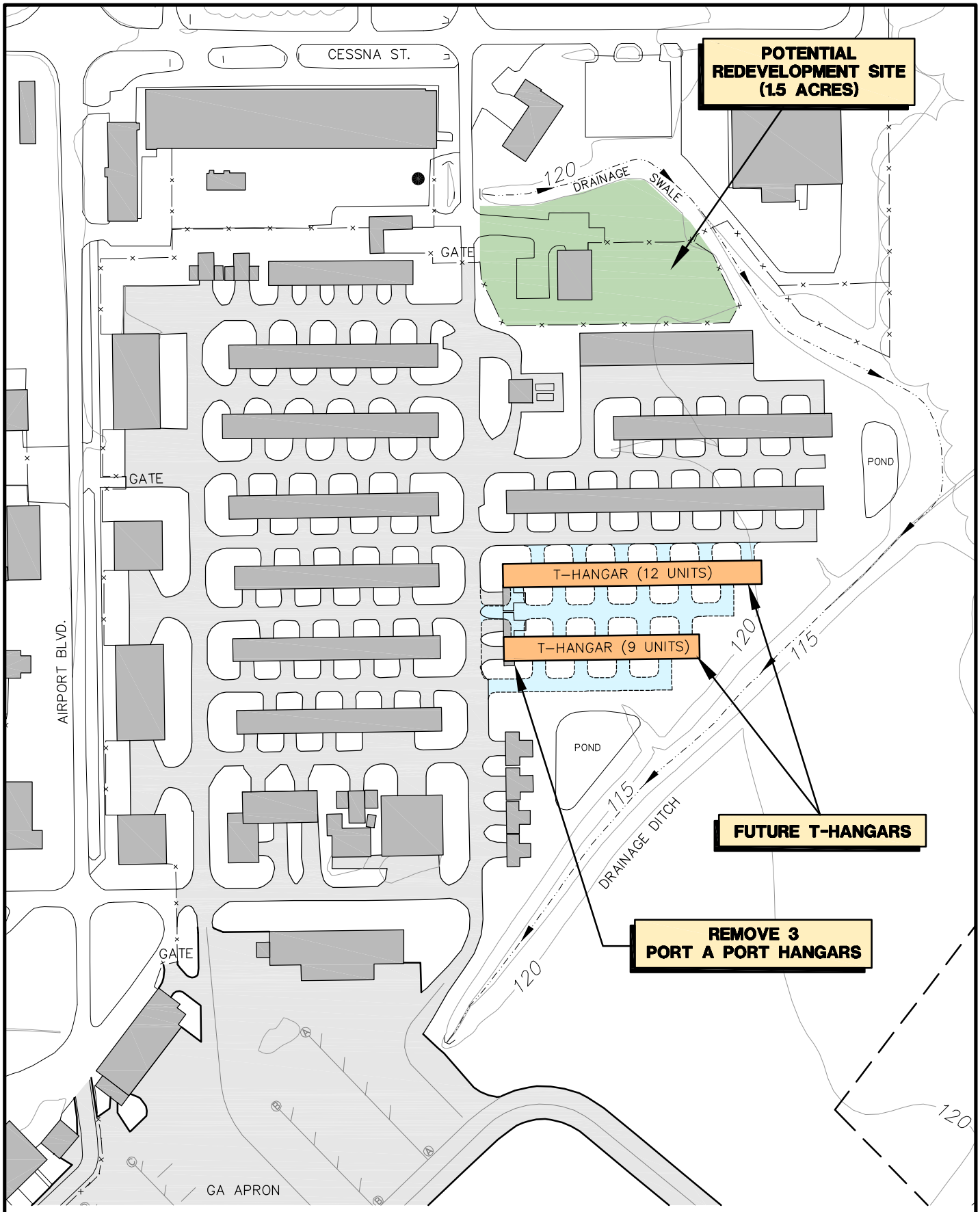


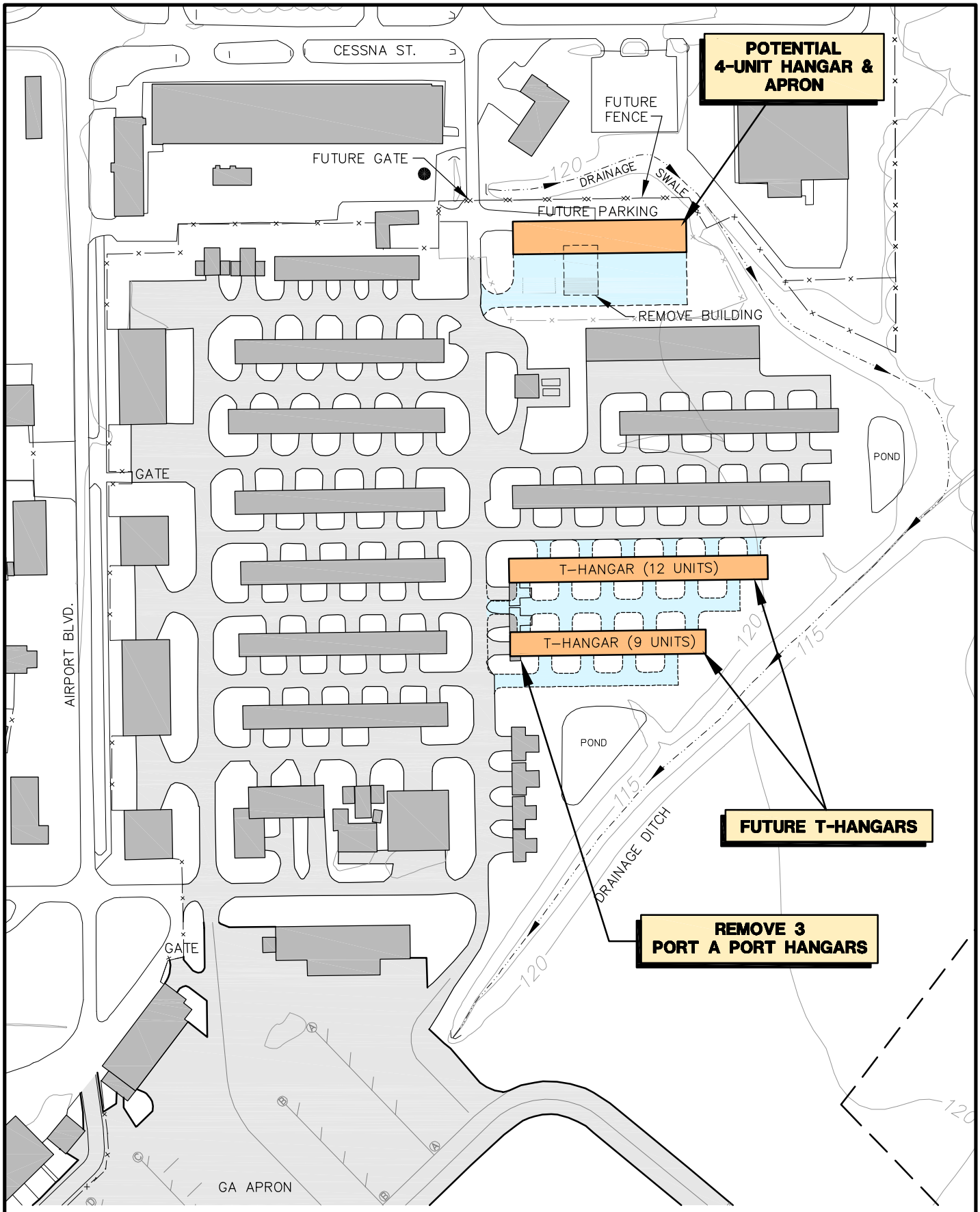
S:\Projects_APPLAN\BARTOW\AMP UPDATE 2013\Figures\FIG 5.7.dwg 02/24/2015 8:26

NEAR-TERM T-HANGAR DEVELOPMENT

BARTOW MUNICIPAL AIRPORT AND INDUSTRIAL PARK

FIGURE 5.7

URS



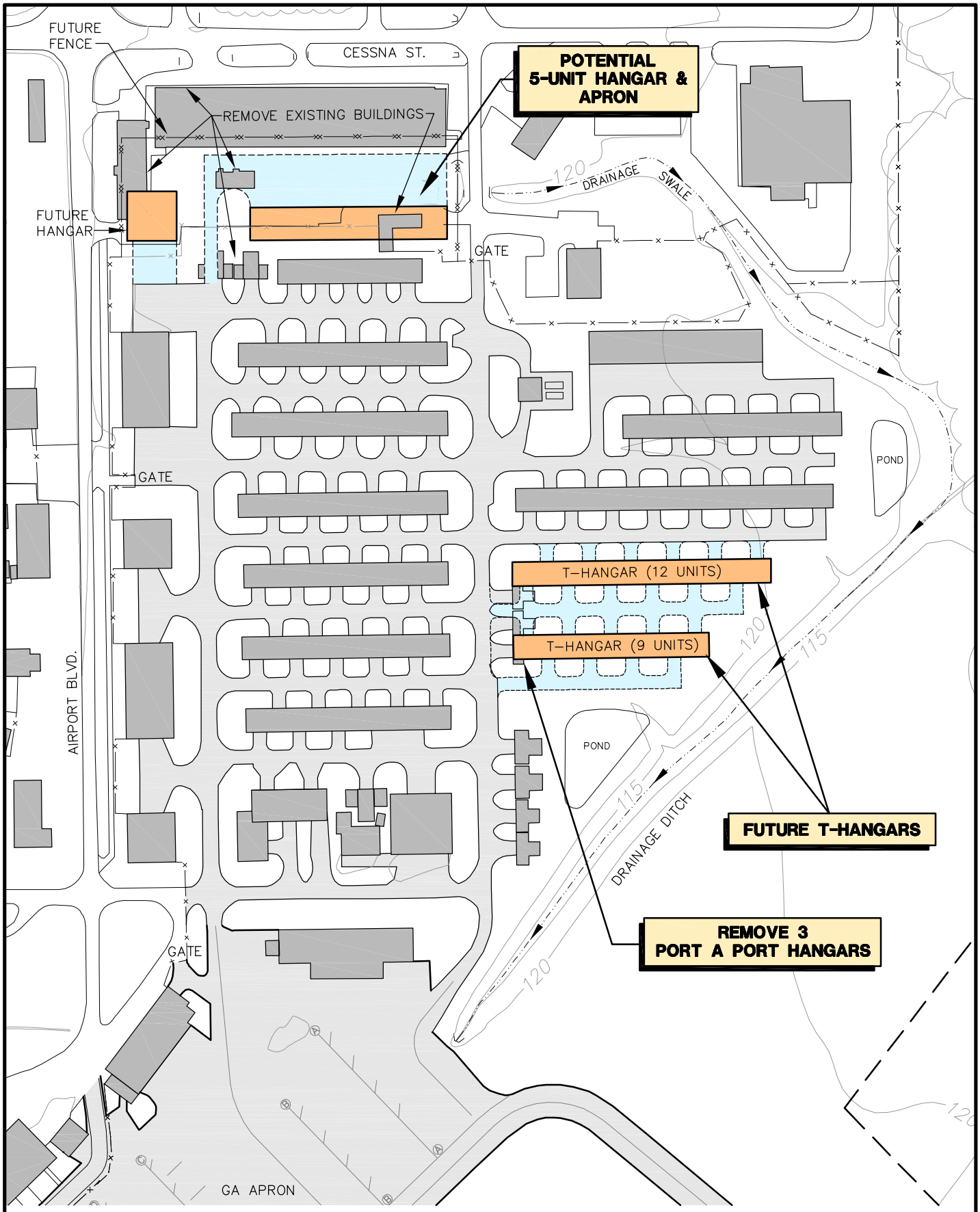
FUTURE T-HANGAR/HANGAR DEVELOPMENT OPTION 1

BARTOW MUNICIPAL AIRPORT AND INDUSTRIAL PARK

FIGURE 5.8

URS

S:\Projects_APPLAN\BARTOW\AMP UPDATE 2013\Figures\FIG 5.8.dwg 02/24/2015 8:30



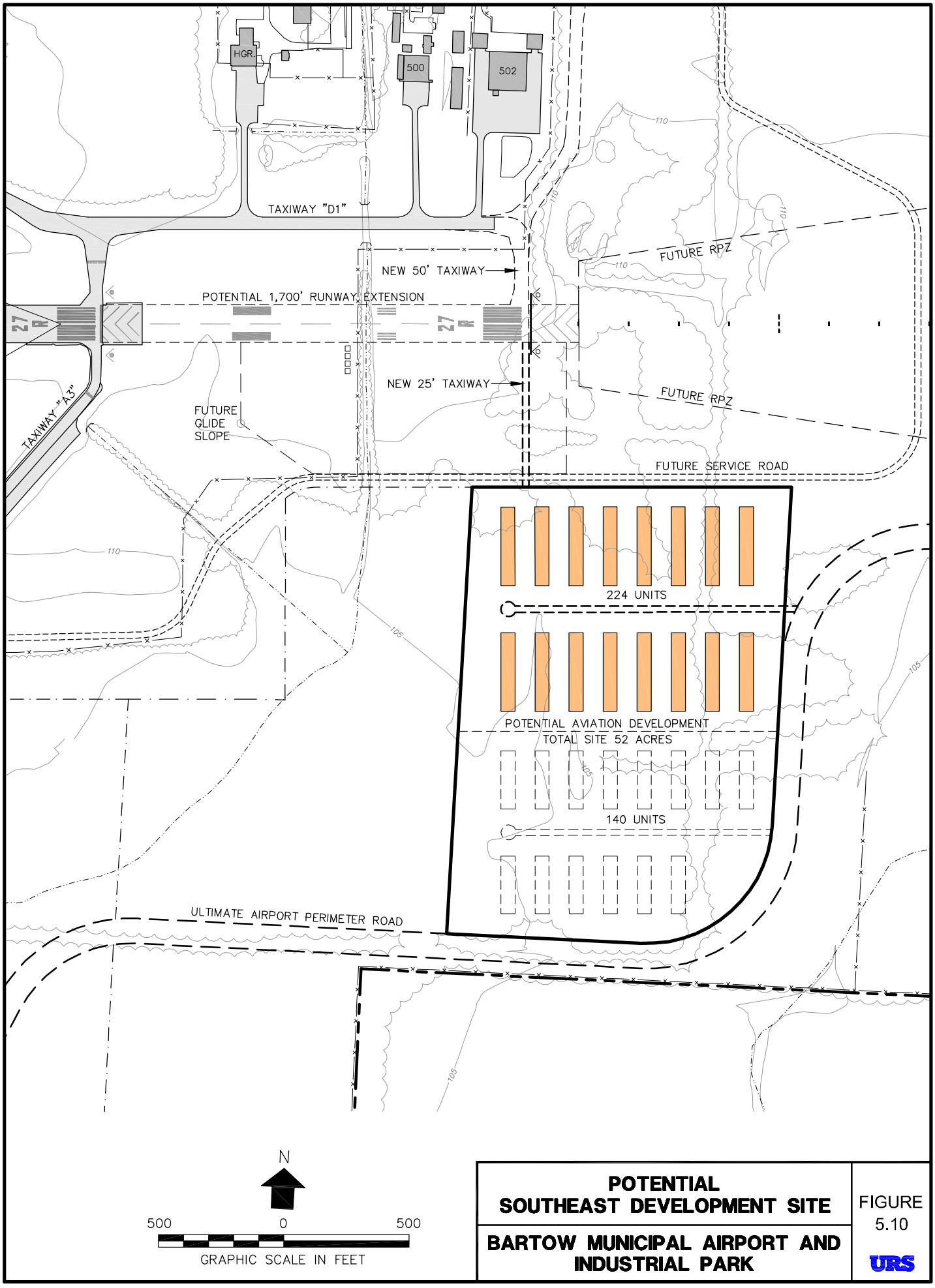
S:\Projects_APPLAN\BARTOW\AMP UPDATE 2013\Figures\FIG 5.9.dwg 02/24/2015 8:33

FUTURE T-HANGAR/HANGAR DEVELOPMENT OPTION 2

BARTOW MUNICIPAL AIRPORT AND INDUSTRIAL PARK

FIGURE 5.9

URS



S:\Projects_APPLAN\BARTOW\AMP UPDATE 2013\Figures\FIG 5.10.dwg 02/24/2015 8:36

POTENTIAL SOUTHEAST DEVELOPMENT SITE

BARTOW MUNICIPAL AIRPORT AND INDUSTRIAL PARK

FIGURE 5.10

URS

LEGEND

- EXISTING LEASE AREAS
- EXISTING RAIL SPUR (6,475 FT.)
- EXISTING RAIL SPUR TO BE REMOVED (1,177 FT.)
- POSSIBLE RAIL SPUR EXPANSION (4,044 FT.)
- EXISTING STRUCTURE
- NEW STRUCTURE
- POTENTIAL MATERIAL STAGING AREAS
- POTENTIAL TRUCK COURT/PARKING
- PROPOSED TRUCK ROUTE
- FUTURE AIRFIELD PAVEMENT

N

300 0 300

GRAPHIC SCALE IN FEET

FLORIDA MIDLAND RR
CESSNA ST.
AIRPORT BEACON
ALPHA AVE.
BRAVO AVE.
MOONEY ST.
AIRPORT BLVD.
FLORIDA NATIONAL GUARD
T-HANGAR 239
T-HANGAR 241
T-HANGAR 421
T-HANGAR 422
T-HANGAR 423
T-HANGAR 424
COUNTY FIRE STATION
TANK
AIRPORT MAINT.
ECHO AVE.
PIPER ST.
INDUSTRIAL PARK
TRUCK COURT
PARKING
303 SLAB
PARCEL 2
PARCEL 4 COLUMBIA PROPANE (0.6 AC.)
PARCEL 3 COLUMBIA PROPANE (0.4 AC.)
PARCEL 2 FLA. HIGHWAY PRODUCTS (2.0 AC.)
PARCEL 1 FLA. HIGHWAY PRODUCTS (2.1 AC.)
U.S. HIGHWAY 17 (S.R. 555)
SITE #1 AMERICOLD CORPORATION (14.0 AC.)
OPTION "A"
SITE #21 KEMIRON (5.3 AC.)
AREA 316
DELTA AVE.
FUTURE AIRPORT BLVD.
PARCEL 5-A
PARCEL 5
SITE #19 HOMES OF MERIT (12.5 AC.)
FUTURE AVIATION DEVELOPMENT
POND
SITE #23 MID-FLORIDA LUMBER (17.3 AC.)
PARCEL 3
FUTURE APRON
APRON
TAXIWAY "D"
ELEC. VAULT 411A
ATCT 411
HELIPAD
ARFF
AWOS
WIND CONE
T/W "A"
T/W "H"

CONCEPT WAREHOUSE/ DISTRIBUTION CENTER WITH RAIL SPUR ENHANCEMENT

BARTOW MUNICIPAL AIRPORT AND INDUSTRIAL PARK

FIGURE 5.11

URS

S:\Projects_APPLAN\BARTOW\AMP UPDATE 2013\Figures\FIG 5.11.dwg 02/24/2015 8:47

LEGEND

- AIRPORT PROPERTY LINE
- EXISTING BUILDINGS
- EXISTING PAVEMENT
- FUTURE HANGARS
- FUTURE AIRFIELD PAVEMENT
- FUTURE ROADWAY
- WETLANDS
- WETLANDS TO BE REMOVED
- POTENTIAL LEASE/PARCEL LINES
- UTILITIES (W, S)

EXISTING AIRPORT PROPERTY LINE
SUB DIVISION
EXISTING OVERHEAD POWER LINE
EXISTING AIRPORT PROPERTY LINE
DRAINAGE DITCH
DRAINAGE DITCH
100' POWER LINE/ DRAINAGE/UTILITY EASEMENT
EXISTING WETLAND
EXISTING WETLAND
EXISTING WETLAND
BMA-43
8" PVC
BEN DURANCE ROAD
3" PVC FORCE MAIN
PROPOSED SANITARY LIFT STATION
STEARMAN ST.
EXISTING ROAD
PROPOSED 3" SANITARY FORCE MAIN
PROPOSED 8" PVC WATER MAIN
PROPOSED FIRE HYDRANT
PROPOSED 8" SANITARY GRAVITY SYSTEM
BMA-44
PVC
POLK CO. ENVIRONMENTAL SERVICES (1)
CITY OF BARTOW ELECTRICAL DEPARTMENT (OUT PARCEL 7.58 AC.)
MH
DRAINAGE
POTENTIAL DRAINAGE ESMT.
1.5 AC PARCELS (TYP)
200' (TYP)
320' (TYP)
560' ±
100' R.O.W.
LS # 27
GATE
FUTURE TAXIWAY
OFA
50'
65' TO LEASE LINE
100' PROPOSED TREELINE
65' TO T/W OFA
FUTURE TREELINE
500'
2" PVC
2" PVC
6" PVC (FUTURE)
BMA-43
FLORIDA AIRCRAFT PAINTING FACILITY (3) 5.9 AC
84'
EXISTING OVERHEAD CITY OF BARTOW POWER LINE
EXISTING WETLAND
ACCESS ROAD
ACCESS ROAD
BRL
FUTURE SERVICE ROAD
POLK CO. SHERIFF'S HANGAR (2) 4.3 AC.
FUTURE RPZ
TAXIWAY "D1"
RSA
RSA
EXISTING RPZ
400'
FUTURE 1,700' RUNWAY EXTENSION
FUTURE MALSR LIGHT SYSTEM
400' LIGHT LANE
27R
9R

13	14	15	16	17
11± AC.	10± AC.	10± AC.	10± AC.	10± AC.

4	5	6	7	8	9	10	11	12
PKG	PKG	PKG	PKG	PKG	PKG	PKG	PKG	PKG	PKG
HGR	HGR	HGR	HGR	HGR	HGR	HGR	HGR	HGR
APRON	APRON	APRON	APRON	APRON	APRON	APRON	APRON	APRON

N

300 0 300

GRAPHIC SCALE IN FEET

CONCEPTUAL N.E. SITE PLAN

BARTOW MUNICIPAL AIRPORT AND INDUSTRIAL PARK

FIGURE 5.12

URS

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BOMBER RD.

FLORIDA MIDLAND RR

RESERVED FOR FUTURE INDUSTRIAL PARK DEVELOPMENT

BEN DURRANCE RD.

FUTURE EAST QUADRANT DEVELOPMENT

U.S. HIGHWAY 17

T/W "A1"

T/W "A"

T/W "A2"

T/W "D"

T/W "D1"

T/W "C1"

T/W "C2"

RUNWAY 9L/27R 6,700' x 150'

5,000' x 100'

T/W "A3"

RUNWAY 9R/27L 4,400' x 150'

ULTIMATE AIRPORT LOOP ROAD

RESERVED FOR FUTURE AVIATION RELATED DEVELOPMENT (52 ACRES)

N. 91 MINE RD.

T/W "C3"

RUNWAY 5/23

RESERVED FOR FUTURE AVIATION RELATED DEVELOPMENT (88 ACRES)

ULTIMATE AIRPORT LOOP ROAD

UTILITY CORRIDOR

RESERVED FOR FUTURE INDUSTRIAL PARK

FUTURE PARKWAY OVERPASS REQUIRED

FUTURE DRAINAGE STRUCTURE REQUIRED

FUTURE DRAINAGE STRUCTURE REQUIRED

PROPOSED POLK PARKWAY EXTENSION RIGHT-OF-WAY

E. GASKINS RD.

LEGEND

- EXISTING AIRPORT ACCESS ROADWAYS
- FUTURE AIRPORT ACCESS ROADWAY
- AIRFIELD RELATED
- AVIATION RELATED DEVELOPMENT
- NON-AVIATION RELATED (INDUSTRIAL PARK)
- GREENBELT/BUFFER ZONE
- EXISTING AIRFIELD PAVEMENT
- FUTURE PAVEMENT (CONCEPTUAL)
- FUTURE BUILDINGS (CONCEPTUAL)
- EXISTING DRAINAGE FLOW
- AIRPORT PROPERTY LINE

N

1200 0 1200

GRAPHIC SCALE IN FEET

S:\Projects_APPLAN\BARTOW\AMP UPDATE 2013\Figures\FIG 5.13.dwg 06/04/2015 14:04

SOUTH AIRPORT DEVELOPMENT & NEW SOUTH AIRPORT ACCESS ROAD

BARTOW MUNICIPAL AIRPORT AND INDUSTRIAL PARK

FIGURE 5.13

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SECTION 6.0

ENVIRONMENTAL OVERVIEW

6.1 INTRODUCTION

This section provides a general overview of some environmental conditions that should be considered relative to proposed improvements to Bartow Municipal Airport and Industrial Park (BOW). Although a detailed assessment of impacts is beyond the scope of this master plan study, this chapter broadly discusses some of the more important environmental considerations that may have to be further evaluated in order to meet Federal, state, and/or local requirements prior to detailed design and construction.

6.2 ENVIRONMENTAL EVALUATION REQUIREMENTS

FAA Order 5050.4B: *National Environmental Policy Act Implementing Instructions for Airport Actions* provides instruction for the preparation of environmental studies for proposed airport development actions. Order 1050.1E *Environmental Impacts: Policies and Procedures* identifies environmental impact categories that should be considered in the environmental process. Order 1050.1E lists the following impact categories:

- Air Quality
- Coastal Resources
- Compatible Land Use
- Construction Impacts
- Department of Transportation Act: Section 4(f)
- Farmlands
- Fish, Wildlife, and Plants
- Floodplains
- Hazardous Materials, Pollution Prevention, and Solid Waste
- Historic, Architectural, Archaeological, and Cultural Resources
- Light Emissions and Visual Impacts
- Natural Resources and Energy Supply
- Noise
- Secondary (Induced) Impacts
- Socioeconomic Impacts, Environmental Justice, and Children's Environmental Health and Safety Risks
- Water Quality
- Wetlands
- Wild and Scenic Rivers

It should be emphasized that the information contained in this section is not a formal Environmental Assessment (EA) or Environmental Impact Statement (EIS) as referred to in the National Environmental Policy Act of 1969 (NEPA) or the Airport and Airway Improvement Act of 1982. This overview will, however, point out those areas that may have the potential to be impacted by the proposed airport development at BOW and which may require further environmental study before project implementation.

[PB1]To assist in the environmental study process, the preliminary evaluations discussed in this section address potential impacts associated with projects proposed at BOW.

6.3 ENVIRONMENTAL PROCESS

Normally, airport improvement projects that are considered to be Federal actions or which receive Federal funding must be examined from an environmental standpoint in order to comply with NEPA, the Airport and Airway Improvement Act of 1982, and other pertinent laws. Guidance in the FAA's consideration of environmental impacts is provided in Order 1050.1E, "*Environmental Impacts: Policies and Procedures*;" Order 5050.4B, "*National Environmental Policy Act Implementing Instructions for Airport Actions*," as well as the Council on Environmental Quality's "*Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act*," found in 40 CFR 1500-1508.

For any proposed airport action, the FAA performs an initial environmental determination that considers the type of action and its potential effect upon the environment. The result of the determination is generally the selection of one of three environmental processes:

Categorical Exclusion (Cat Ex) – When a proposed action does not result in significant environmental impacts for which an EA or EIS would be required. The Cat Ex may require a brief documentation of the project's description and environmental impact potential in order to support its processing as a Cat Ex.

Environmental Assessment – is prepared for proposed actions with expected minor or uncertain environmental impact potential. An EA requires similar analysis and documentation as an EIS, but with somewhat less detail and coordination. Depending upon whether or not certain environmental thresholds of significance are exceeded, an EA will either lead to a Finding of No Significant Impact (FONSI) or require the preparation of an EIS.

Environmental Impact Statement – is prepared for major Federal actions that are generally known to have the potential for significant environmental impacts. Actions that normally require an EIS include initial Airport Layout Plan approval or airport location approval, Federal financial participation, or airport layout approval for a new runway capable of handling air carrier aircraft at a commercial service airport. An EIS involves thorough evaluation and documentation of a proposed action's purpose and need, alternatives, affected environment, and environmental consequences. The study requires coordination with involved Federal, state, and local agencies and the public.

When the FAA determines that environmental evaluation is required, FAA Orders 5050.4B and 1050.1E are used as guides in the preparation of such studies.

6.4 IDENTIFICATION OF PROPOSED PROJECT

Within the Master Plan, the 10-year Capital Improvement Program identifies several projects, such as extension of Runway 9L/27R, construction of aircraft storage T-Hangars, rehabilitation of Runway 5/23, construction of a new airport entrance road, and rehabilitation of the east side airfield drainage system. A complete listing of 5-Year Capital Improvement Program projects is provided in Section 7.0, Implementation Program.

6.5 EXAMINATION OF ENVIRONMENTAL IMPACT CATEGORIES

The following is a brief overview of the environmental impacts associated with the proposed Master Plan development program. This analysis does not constitute formal submittal for FAA decision-making purposes. Additional analysis may be required in the form of a Cat Ex, EA, or EIS.

6.5.1 Air Quality

For NEPA purposes, FAA Order 1050.1E Change 1 Appendix A provides the following air quality impact criteria: "Potentially significant air quality impacts associated with an FAA project or action would be demonstrated by the project or action exceeding one or more of the NAAQS for any of the time periods analyzed".

Consistent with the FAA's *Air Quality Procedures for Civilian Airports and Air Force Bases and Addendum* (i.e., the 2004 Air Quality Handbook), Chapter 1, paragraph 6, (d), (1) of the FAA's current *Environmental Desk Reference for Airport Actions* (i.e., the Desk Reference) denotes that, for NEPA purposes, actions at a general aviation airport such as BOW do not necessarily require a NAAQS analysis using dispersion modeling if the total annual number of general aviation/air taxi operations do not exceed 180,000. [1,2] Based on the 2014 FAA TAF, aircraft operations at BOW are forecast to be 31,953 and 45,427 total annual operations in 2020 and 2040, respectively, well below the 180,000 annual operations threshold.

However, the 2004 Air Quality Handbook has been superseded by the *Aviation Emissions and Air Quality Handbook* as of July 2014. In this new handbook, the approach to determining the extent of air quality analysis is more qualitative and does not reference the threshold of 180,000 operations described above. Specifically, the new Handbook advises that, if the proposed project will effect a reasonably foreseeable increase in emissions within an attainment area, the emissions should be quantified and disclosed. The emissions levels should only be converted to

[1] Federal Aviation Administration. *Air Quality Procedures for Civilian Airports and Air Force Bases*.1997, updated by addendum 2004.

[2] Federal Aviation Administration. *Environmental Desk Reference for Airport Actions*. Office of Airports, Office of Airport Planning and Programming, Airports Planning and Environmental Division. APP-400. Online: http://www.faa.gov/airports/environmental/environmental_desk_ref/. October 2007.

pollutant concentrations via dispersion modeling for comparison to the NAAQS if such modeling is specifically requested during agency scoping and public involvement.

Based on the type and magnitude of projects identified in this MPU a substantial increase in emissions in the vicinity of BOW is not expected as a result of the proposed projects and an air quality assessment is not warranted.

6.5.2 Coastal Resources

Although BOW is not located on the coast, it is included in Florida's coastal zone as defined by the Coastal Zone Management Act (the entire state of Florida is included in the Coastal Zone Program). Therefore, as part of any future environmental studies, the impact of the proposed project on coastal resources will have to be evaluated.

6.5.3 Construction Impacts

The following are typical temporary environmental impacts that may be expected to result from construction of the proposed projects at BOW:

- Increased noise from construction operations.
- Temporary increase in water turbidity in drainage areas would likely occur during the period when excavated areas are exposed prior to paving or plantic cover.
- Temporary degradation of air quality from dust on certain projects would result from construction.

In order to minimize these potential temporary environmental construction impacts, all on-site construction activities should be conducted in accordance with AC 150/5370-10F, "Standards for Specifying Construction of Airports," and through the use of Best Management Practices (BMPs). These controls should be considered throughout the preparation of the plans and specifications and should be maintained by the contractor during the life of the construction project. Use of the above referenced measures would mitigate most construction-related impacts that may be considered significant to the environment or the surrounding community.

6.5.4 Department of Transportation Act: Section 4(f)

Section 4(f) of the Department of Transportation (DOT) Act requires the approval of the Secretary of the DOT for any project that impacts publicly-owned land such as a public park, recreation area, or wildlife refuge of national, state, or local significance or a historic site of national, state, or local significance. The proposed project at BOW would not directly impact publicly owned land with these categories or attributes.

6.5.5 Farmlands

Prime farmland is land that is best suited for producing food, feed, forage, fiber, and oilseed crops. Soils that make up prime farmland typically have adequate moisture supply from either

precipitation or irrigation. Unique farmlands are lands that are suitable for the production of high-value crops or high yields of specific crop(s).

As defined in the Farmland Protection Policy Act (FPPA), land is not considered prime farmland if it is already in urban development or has been committed to urban development through zoning measures. As defined in the FPPA (7 CFR Section 658):

"Prime farmland that a state or local government has designated, through zoning or planning, for commercial, industrial or residential use that is not intended at the same time to protect farmland, this land will not be covered by the Act, since it will be deemed to be "committed to urban development" and thus outside the Act's definition of "prime farmland" subject to the Act."

Since BOW is committed to urban development and zoned industrial, the FPPA would not apply.

6.5.6 Fish, Wildlife, and Plants

An inventory of biotic communities within the proposed project area must be performed in any future environmental analysis. Data should be gathered from field surveys, U.S. Geologic Survey Quadrangle maps, aerial photographs, U.S. Fish and Wildlife Service (USFWS) National Wildlife Inventory maps, and Florida Fish and Wildlife Conservation Commission (FFWCC).

Consultation with the USFWS and FFWCC would take place within any future environmental analysis to identify any Federal or state flora or fauna considered threatened and/or endangered that may occur within the BOW area.

6.5.7 Floodplains

The Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) was referenced to determine floodplains in and around BOW. The 100-year flood boundary is shown on **Figure 6.4**. Part of the proposed improvements (the extension of Runway 9L/27R to the east) would approach the 100-year flood boundary on the eastern side of the airport. Analysis must be performed in future planning and design studies to determine if the proposed runway extension would impact the floodplains around BOW shown on **Figure 6.4**.

6.5.8 Hazardous Materials, Pollution Prevention, and Solid Waste

No known on-site sources of hazardous materials or waste have been identified at BOW. This is a former military facility and remnants of old military ammunitions have been uncovered during previous projects. **If hazardous materials are identified during construction activities, the proper regulatory agencies will be notified and appropriate actions will be taken by the Airport Sponsor and the contractor.**

The portion of the proposed improvements that relates strictly to airside facilities (runway, taxiway, lighting systems, etc.) would not create any impacts related to solid waste collection or

disposal, other than temporary impacts associated with the generation and disposal of construction and demolition debris.

The construction associated with the building replacement or apron expansion would likewise temporarily increase the generation of construction related solid waste. Once these projects are constructed, the amount and type of solid waste generated would be similar to that generated by the existing facilities. Therefore, a significant impact is not anticipated with regard to the generation and disposal of solid waste.

No active landfills are located within 10,000 feet of any runway (existing or proposed) at BOW. Therefore, the airport complies with the guidelines contained in FAA AC 150/5200-33B, "Hazardous Wildlife Attractants On or Near Airports."

6.5.9 Historic, Architectural, Archaeological, and Cultural Resources

The proposed project area is not believed to contain any historic, architectural, archaeological, or cultural resource sites. However, coordination with State Historic Preservation Officer (SHPO) and possibly the State of Florida Division of Historical Resources must take place during additional environmental analysis and review.

6.5.10 Light Emissions and Visual Impacts

Although increased numbers of lighted visual aids are recommended in this plan, it is not anticipated that they would result in any significant impacts to off-airport locations. The potential for impacts related to airport lighting including the Runway End Identification Lighting System (REILs) and Medium Intensity Approach Lighting System (MALSR) would be discussed in an EA.

New buildings and support facilities would be developed in context with other existing structures at BOW (i.e., similar size and construction). While the visual landscape would change as a result of the projects addressed in this MPU, it would be compatible with the airport environs and not result in intrusive visual impacts.

6.5.11 Natural Resources and Energy Supply

Impacts on energy supplies and natural resources are related to changes of stationary facilities, such as airfield lighting or terminal buildings, as well as any increase of fuel consumption by aircraft or ground vehicles.

Energy requirements would increase as a result of the proposed improvements. However, this increase is not sufficient to have a significant effect on local energy supplies.

No known natural sources of mineral or energy resources would be impacted by the proposed project.

6.5.12 Noise

Previous Master Plan Studies

Noise is a by-product of the operation of an airport. To understand the potential impact of noise due to aircraft operations at BOW, a noise analysis was conducted as part of the 2003 Master Plan Update (MPU) to account for existing and future operational conditions.

For the 2003 MPU noise study the FAA's Integrated Noise Model (INM), Version 6.0c, (the computer-based mathematical model) was used for predicting aircraft noise at and around the airport. INM calculates noise exposure from information provided by the user (physical layout of airport runways and flight tracks, any non-standard alternative operational or performance data, frequency and time of operation) and data contained in the model (aircraft noise levels, standard operational and performance data). The results of the model can be expressed for a variety of noise metrics either at specific receiver locations or in contours of equal noise exposure for selected values.

The metric of choice is the Average Day-Night Sound Level (Ldn or DNL), which is the yearly average of the A-weighted (to approximate the frequency response of the ear) sound level, in decibels (dBA), integrated over a 24-hour period. It incorporates a 10 dBA additional weighting for events between 10 p.m. and 7 a.m. to account for the increased annoyance to noise during the night hours.

Average annual DNL contours are widely used to relate noise in residential environments to annoyance by speech interference, and in some part, by sleep and activity interference. Several advantages to its use include:

- Widespread acceptance among Federal, state, and local governments.
- Accounts for repetitive noise environment with some variation imposed by weekday, weekend, and seasonal activity.
- Reasonable and practical to understand and use for planning, enforcement, and monitoring.
- Consistent with Federal (FAA, Housing and Urban Development (HUD), Department of Defense, Veterans Affairs) participation criteria.
- Easily applied for future noise prediction.

Various agencies, including the FAA and HUD, have established guidelines for determining the impact of noise on people. One method is to identify land uses that are "normally compatible" or "incompatible" with different levels of noise exposure. The FAA Federal Aviation Regulation (FAR) Part 150 provides a detailed table indicating compatibility of land uses with the outdoor noise environment. By comparing the predicted or measured DNL level at a particular site with values in the table, the range of compatible uses may be determined. **Table 6.5-1** is from FAR Part 150 and provides guidance for review of land use compatibility. In general, the determination of DNL contour levels 65, 70, and 75 is useful for most evaluations of noise impact.

Operations by aircraft type for the existing (2000) and forecast (2020) conditions were documented in the 2003 MPU and are provided in **Table 6.5-2** for reference purposes. Fleet mix used to develop the noise contours reflects both existing and forecast conditions as presented in the Forecast Section of this report. The forecast levels of activity reflect the "high" scenario presented in Section 3.0, Forecasts of Aviation Demand. Since the DNL metric takes into account the increased annoyance of nighttime (10:00 p.m. to 7:00 a.m.) operations, it was estimated that ten percent of all operations (not including the possible military jet training operations) took place at night.

Table 6.5-3 lists the estimated runway utilization for the existing and forecast conditions. Runway 9L/27R, as the primary runway, is utilized the most, followed by the crosswind runway (5/23) and the shorter secondary runway (9R/27L). Helicopter operations were modeled to and from the helicopter pad located on the GA ramp. All flight tracks, or average routes to and from the runways and helicopter pads, were modeled as straight-in and straight-out along the extended runway centerlines.

Noise contours for the existing conditions in 2000 are presented on **Figure 6.1** for all aviation activity. The noise contours do not extend outside the airport boundary and do not contain any noise sensitive land uses.

Noise contours for the forecast conditions in 2020 are presented on **Figure 6.2** for all aviation activity. The forecast condition was modeled with the 1,700-foot extension to Runway 9L/27R (total length of 6,700 feet) to the east. The noise contours do not extend outside the airport boundary and do not contain any noise sensitive land uses.

2014 Master Plan Update

Noise modeling was not performed as part of this 2014 MPU. However, a comparison of the 2014 MPU aviation forecast for CY2020 as presented in Section 3.0 with the previously developed 2020 forecast from the 2003 MPU suggests that aircraft operations are forecast to be approximately 60 percent below the levels forecast in 2003. Because the noise contours did not extend outside the airport boundary using the aviation forecast developed in 2003 (79,443 total annual operations) it is reasonable to conclude that the noise contours representing the significantly fewer operations as presented in this 2014 MPU (31,953 total annual operations) would not extend outside the airport boundary, and would not contain any noise sensitive land uses.

TABLE 6.5-1

FEDERAL AVIATION REGULATION14 CFR PART 150 LAND USE COMPATIBILITY WITH YEARLY DAY-NIGHT AVERAGE SOUND LEVELS
Bartow Municipal Airport and Industrial Park
Master Plan Update

	Yearly Day-Night Average Sound Level (DNL)					
	Below 65 Decibels	65-70 Decibels	70-75 Decibels	75-80 Decibels	80-85 Decibels	Over 85 Decibels
Residential						
Residential (Other than mobile homes and transient lodges)	Y	N[1]	N[1]	N	N	N
Mobile Home Parks	Y	N	N	N	N	N
Transient Lodging	Y	N[1]	N[1]	N[1]	N	N
Public Use						
Schools	Y	N[1]	N[1]	N	N	N
Hospitals, Nursing Homes	Y	25	30	N	N	N
Churches, Auditoriums, Concert Halls	Y	25	30	N	N	N
Governmental Services	Y	Y	25	30	N	N
Transportation	Y	Y	Y[2]	Y[3]	Y[4]	Y[4]
Parking	Y	Y	Y[2]	Y[3]	Y[4]	N
Commercial Use						
Offices, Business, and Professional	Y	Y	25	30	N	N
Wholesale and Retail Building Materials, Hardware, and Farm Equipment	Y	Y	Y[2]	Y[3]	Y[4]	N
Retail Trade - General	Y	Y	25	30	N	N
Utilities	Y	Y	Y[2]	Y[3]	Y[4]	N
Communications	Y	Y	25	30	N	N
Manufacturing and Production						
Manufacturing, General	Y	Y	Y[2]	Y[3]	Y[4]	N
Photographic and Optical	Y	Y	25	30	N	N
Agriculture (Except Livestock) & Forestry	Y	Y[6]	Y[7]	Y[8]	Y[8]	Y[8]
Livestock Farming & Breeding	Y	Y[6]	Y[7]	N	N	N
Mining & Fishing, Resource Production & Extraction	Y	Y	Y	Y	Y	Y
Recreational						
Outdoor Sports Arenas, Spectator Sports	Y	Y[5]	Y[5]	N	N	N
Outdoor Music Shells, Amphitheaters	Y	N	N	N	N	N
Nature Exhibits & Zoos	Y	Y	N	N	N	N
Amusement, Parks, Resorts, Camps	Y	Y	Y	N	N	N
Golf Courses, Riding Stables, Water Recreation	Y	Y	25	30	N	N

Note: The designations contained in this table do not constitute a Federal determination that any use of land covered by the program is acceptable or unacceptable under Federal, State or local law. The responsibility for determining the acceptable and permissible land uses and the relationship between specific properties remains with the local authorities. FAA determinations under Part 150 are not intended to substitute Federally determined land use for those determined to be appropriate by local authorities in response to locally determined needs and values in achieving noise-compatible land uses.

KEY:

SLUCM Standard Land Use Coding Manual.
Y (Yes) Land Use and related structures are compatible without restrictions.
N (No) Land Use and related structures are not compatible and should be prohibited.
NLR Noise Level Reduction (outdoor to indoor) are to be achieved through incorporation of noise attenuation into the design and construction of structure.
25,30, or 35 Land use and related structures are generally compatible; measures to achieve NLR of 25, 30, or 35 dB must be incorporated in design and construction of structure.

Where the community determines that residential or school uses must be allowed, measures to achieve outdoor to indoor NLR of at least 25 dB and 30 dB should be incorporated into building codes and be considered in individual approvals. Normal residential construction can be expected to provide a NLR of 20 dB, thus, the reduction requirements are often stated as 5, 10, or 15 dB over standard construction and normally assume mechanical ventilation and closed windows year round. However, the use of NLR criteria will not eliminate outdoor noise problems.

[2] Measures to achieve NLR of 25 dB must be incorporated into the design and construction of portions of the buildings where the public is received, office areas, noise-sensitive areas, or where the normal noise level is low.

[3] Measures to achieve NLR of 30 dB must be incorporated into the design and construction of portions of the buildings where the public is received, office areas, noise-sensitive areas, or where the normal noise level is low.

[4] Measures to achieve NLR of 35 dB must be incorporated into the design and construction of portions of the buildings where the public is received, office areas, noise-sensitive areas, or where the normal noise level is low.

[5] Land use compatible provided special sound reinforcement systems are installed.

[6] Residential buildings require an NLR of 25 dB.

[7] Residential buildings require an NLR of 30 dB.

[8] Residential buildings not permitted.

= Non-compatible land use.

Source: 14 CFR FAR Part 150, Appendix A, Table 1 (28 December 1995).

TABLE 6.5-2

OPERATIONS BY AIRCRAFT TYPE - EXISTING (2000) AND FORECAST (2020)
Bartow Municipal Airport and Industrial Park
Master Plan Update

Aircraft Group	INM Aircraft	2000			2020		
Single Engine	GASEPF	82.0%	41,080	112.5479	80.0%	63,555	174.1233
Multi-Engine (Non-Turboprop)	BEC58P	10.0%	5,010	13.7260	10.0%	7,944	21.7644
Multi-Engine (Turboprop)	DHC6	2.0%	1,002	2.7452	2.0%	1,589	4.3534
Jet	LEAR35	2.0%	1,002	2.7452	3.0%	2,383	6.5288
Helicopter	B206L	4.0%	2,004	5.4904	5.0%	3,972	10.8822
Total		**100%**	**50,098**	**137.2547**	**100%**	**79,443**	**217.6521**

TABLE 6.5-3

RUNWAY UTILIZATION BY AIRCRAFT TYPE - EXISTING (2000), FORECAST (2020), AND FORECAST (2020) WITH POSSIBLE MILITARY ACTIVITY
Bartow Municipal Airport and Industrial Park
Master Plan Update

Aircraft Group	INM Aircraft	Runway						Total
		9L	27R	9R	27L	5	23	
Single Engine	GASEPF	25%	20%	12%	8%	18%	17%	100%
Multi-Engine (Non-Turboprop)	BEC58P	30%	25%	6%	4%	18%	17%	100%
Multi-Engine (Turboprop)	DHC6	36%	26%	2%	1%	18%	17%	100%
Jet	LEAR35	36%	26%	2%	1%	18%	17%	100%
Military Jet	F4C	50%	50%	0%	0%	0%	0%	100%

Notes: Helicopter operations modeled to/from helipad on GA apron.
No military jet operations modeled in the existing (2000) or forecast (2020) conditions.

Source: URS Corporation, 2001.

6.5.13 Secondary (Induced) Impacts

An action is judged as having significant social impacts if it involves any of the following:

- The relocation of any residences or businesses;
- The alteration of surface transportation patterns;
- The division or disruption of established communities;
- The disruption of orderly, planned development; or
- An appreciable change in employment.

The proposed project would not require the relocation of any residences or businesses; alter surface transportation patterns; divide or disrupt established communities; disrupt orderly, planned development; or cause an appreciable change in employment.

It is anticipated that the improvements of BOW as a GA airport and industrial park would increase employment levels slightly, resulting in a positive economic impact on the area.

6.5.14 Socioeconomic Impacts, Environmental Justice, and Children's Environmental Health and Safety Risks

Socioeconomic impacts as a result of the Proposed Projects were evaluated based on the following FAA Order 1050.1E thresholds of significance (FAA, 2006a):

- Extensive relocation of residents without sufficient replacement housing,
- Extensive relocation of community businesses that would create severe economic hardship for the affected communities,
- Disruptions of local traffic patterns that substantially reduce the LOS of the roads serving the airport and its surrounding communities, and
- A substantial loss in community tax base.

Social impacts were determined through the evaluation of the areas affected by each alternative.

Environmental justice impacts were evaluated through quantification of populations and households affected by land acquisition and potential noise impacts associated with the Proposed Projects to determine if there would be a disproportionately high adverse impact on minority and low-income populations and households.

6.5.15 Water Quality

The existing stormwater airport drainage system has been in place since the airport was built in 1944. It is sufficient for the airport's current needs. However, the proposed runway extension project may affect this system.

The extension of Runway 9L/27R to the east would likely require the modification of a drainage ditch around the end of the runway. The relocation would not hinder the runway extension and would have no significant adverse impact on water quality in the area.

6.5.16 Wetlands

Wetlands have been identified in three main areas. They are located to the west of Runway 9L/27R, in the northeast quadrant, and on the south side of the airport. The western wetland area is a pond located beyond the RSA and no impacts are anticipated to this area. Future development in the northeast portion of the airport may have the potential to affect wetlands, shown on **Figure 6.4**. It is anticipated that permits would be required prior to any development. In addition, an EA would be required for the Runway 27R extension.

Impacts to the wetland area may occur if the area to the south of the airfield is developed for aviation or non-aviation purposes. Permits (and possibly an EA) would most likely be required prior to any project implementation into this area. Improvements to the south side are not considered in the short- to intermediate-range development plan at BOW.

6.6 SUMMARY

Due to potential wetland impacts, the proposed extension of Runway 9L/27R and associated lighting system are likely to require an EA in accordance with FAA Order 5050.4B. In addition, the runway extension may require a state DRI analysis. Other proposed developments at BOW are not anticipated to have much potential for environmental impacts that would significantly constrain the recommended development.

Alterations and improvements to the drainage system are items of importance. Noise does not have a major impact on surrounding land uses. However, it is of extreme importance that zoning measures be maintained to protect the airport and ensure noise compatible use of the land.

It is the intent of the Bartow Municipal Airport Development Authority to submit the completed Master Plan document to Polk County for adoption and inclusion into their comprehensive plan.

SECTION 7.0

IMPLEMENTATION PROGRAM
(STAGING AND COST ESTIMATES)

7.1 INTRODUCTION

The major value of long-term planning is to ensure that adequate provisions have been made for growth and that land use is organized in such a fashion that any expenditure for capital improvements will become part of a long-range development. It is not practical, nor is it necessary, to complete all improvements shown in one program. In fact, it would be financially impossible to undertake one massive improvement program for the 20-year requirements. It should be a policy to construct new airport facilities only as activity demand illustrates the economic benefit of making such improvements. However, it is possible to establish a series of priorities and to set forth these priorities within the framework of the forecasts in planning periods of 0-5 years (short-range), 5-10 years (intermediate-range), and 10-20 years (long-range).

It should also be pointed out that in using a theory of constructing new facilities only when demand indicates a need, periodic review of the overall plan and individual projects must be made. This review will ensure that any changes in criteria resulting from technological advances will be fully considered as airport development progresses.

In general, the investigative work undertaken for this study indicates that priorities should be established as follows:

- Ensure that all airfield (runway/taxiway system) elements are adequate and permit for safe, reliable aircraft operations.
- Develop additional aviation facilities to increase airport revenues.
- Acquire land and control land through zoning to permit airfield expansion, to preclude incompatible land use encroachment, and provide adequate noise buffer zones.
- Reserve aviation development areas to meet long-range activity demands.
- Develop non-aviation industrial/commercial areas to increase airport revenues.

Under this general priority list, it is possible to outline improvement programs for the stages consistent with the financial capability of the airport to implement the programs. The following paragraphs set forth the programs on this basis.

It should be noted that possible changes in the funding capability of the Bartow Municipal Airport Development Authority (the Authority) and Federal or state governments might require delaying certain actions until funding is available. However, the general sequencing of development action should remain as shown.

7.2 RECOMMENDED 5-YEAR CAPITAL IMPROVEMENT PROGRAM

The program recommends specific annual airport and Industrial Park improvements beginning in 2015 and continuing through 2019. **Table 7.1** lists the recommended 5-year capital improvements.

The major items discussed within this planning period include the proposed runway extension, new access road to the terminal, airfield drainage improvements, and the continuous rehabilitation of airfield pavement and airfield lighting systems. **Tables 2.2** and **2.3**, previously referenced, identify specific airfield pavement and airfield lighting systems airfield requiring rehabilitation. Additional improvements involve the construction of additional aircraft storage hangars, and Industrial Park improvements.

The cost estimates for this program show total project costs and possible sources of funding. The project cost for the short-range improvement program which includes engineering services, contingencies, etc., is estimated at $23,545,157 (2014 dollars). These estimates are identified in **Table 7.1**, which is presented after the descriptions of recommended capital improvements. **Table 7.1** lists joint Federal, state, and airport funded projects. Proposed improvement items in the 5-year Capital Improvement Program (CIP) are graphically illustrated on **Figure 7.1**, which follows **Table 7.1**.

The following list of airside and landside projects are recommended to be completed during the next 5-year timeframe:

Construct Taxiway D Parallel Mid-Section - 2015

Project Narrative: Construct Taxiway D Parallel Mid-Section – Construct parallel 2,200-lf middle section to Taxiway D. This section would connect existing parallel taxiway sections “D” and “D1” and provide a complete ADG III parallel taxiway system to Runway 9L/27R.

Project Justification: This project would provide a full parallel taxiway system to the primary Runway 9L/27R thereby increasing the efficiency of aircraft ground traffic movement on the airport.

Project Cost: The estimated project cost for this new construction is $2,499,041.

Wildlife Management Plan - 2015

Project Narrative: After the review of the Wildlife Hazard Assessment Study, the FAA determined that a Wildlife Hazard Management Plan (WHMP) is required.

Project Justification: The FAA requested BOW to complete a Wildlife Hazard Management Plan (WHMP) is required.

Project Cost: The estimated cost for this plan is $15,000.

Runway 9L/27R Extension Program (Phase I) - 2016

Project Narrative: Phase one of the runway extension program involves the preparation of an Environmental Assessment (EA).

Project Justification: Prior to construction of the Runway 9L/27R extensions, an EA study must be performed on this proposed airfield improvement. The study requires approval from appropriate governmental agencies prior to implementation.

Project Cost: The estimated cost of this environmental study is $180,000.

Drainage Improvements (Design and Construction PH 1 - 2016)

Project Narrative: The east side airfield drainage system, originally constructed in the 1940's, has experienced extensive deterioration over the years. The drainage system needs to be replaced in order to prevent complete failure of the system.

Project Justification: The existing drainage system has failed in some areas resulting in serious depressions in the airfield and failure of runway pave ment.

Project Cost: The estimated cost of this project is $750,000.

New Entrance Road – 2016

Project Narrative: This project is the design and construction of the new entrance road from US 17 connecting to Airport Blvd. and through a section of Mid-FL Lumber leased property.

The project will include the removal and replacement of the existing rail spur and renegotiate the lease with Mid-FL Lumber Co.

In addition, the temporary terminal entrance road will revert back to full aviation use and the design for relocating existing security fencing and converting temporary road back to apron will be part of this project.

Project Justification: This project provides direct access from US 17 to the terminal building and a second access to the industrial park area.

Project Costs: The estimated costs are $2,012,500.

Airport Pavement Markings - 2016

Project Narrative: This project will remark the entire airfield including runways, taxiways and aprons.

Project Justification: The current airfield marking has faded and/or is covered with rubber or algae and needs to be enhanced for safety.

Project Cost: The estimated cost of the project is $332,885.00

Install PAPI's on Runway 9R-27L - 2016

Project Narrative: Runway 9R-27L is a visual approach runway and used for pilot training. The PAPI's will be installed at a 3° angle to match the published visual approach slope.

Project Justification: The PAPI's will provide additional visual aid to pilots landing on the runway.

Project Cost: The estimated cost of the project is $83,520.

Site Preparation and Construction of Corporate Hangar - 2016

Project Narrative: The Authority continuously has inquiries related to businesses wanting to relocate to the airport. All existing corporate hangars are leased.

Project Justification: Construction of this facility will support the relocation of future business to the airport and thereby increasing the revenue to the airport and continue the development of the airport.

Project Cost: The estimated cost of the project is $603,750.

Drainage Improvements (Design and Construction PH II – 2017)

Project Narrative: The east side airfield drainage system, originally constructed in the 1940's, has experienced extensive deterioration over the years. The drainage system needs to be replaced in order to prevent complete failure of the system.

Project Justification: The existing drainage system has failed in some areas resulting in serious depressions in the airfield and failure of runway pavement.

Project Cost: The estimated cost of this project is $750,000.

Runway 9L/27R Extension Program (Phase II) Design & Permitting / Reimbursement of 142 Acres of Property Acquisition - 2017

Project Narrative: The second phase of the runway extension program is the project design, and involves permitting, surveying and testing program. The runway is programed to be extended 1,700 feet to the east along with taxiway connectors. A lighted parallel Taxiway "D-1" segment was constructed in

2002. Airfield lighting (medium intensity runway lights (MIRLs) would be installed. The existing Precision Approach Path Indicator (PAPI) and Runway End Identification Lighting (REIL) systems on runway end 27R would be relocated.

The Airport has already purchased 140± acres on the east side of the Bartow Municipal Airport to accommodate the proposed future Runway 9L/27R extension. The following identifies the property acquisition information:

Total cost = $298,262.000 paid for out of Airport funds, not City or county funds.

The Stipulated Final Judgement is dated March 8, 2005; Case No. 53-2004CA-4484, Section 08; for Parcel #252924-000000-011020; purchased from SW Southeast Holdings, Inc.

The airport is requesting reimbursement for the land acquisition as part of this phase of the runway extension project.

Project Justification: Presently, the length of Runway 9L/27R limits jet traffic from purchasing full fuel and full passenger loads. Extending Runway 9L/27R would accommodate the majority of the fleet of business jet traffic. The airport feels the extension would attract air cargo or other types of business that would locate at BOW primarily because of the extended length of the runway.

Project Cost: The project cost is estimated at $1,022,262.

Install New Airport Beacon – 2017

Project Narrative: Total replacement is needed for the existing airport beacon with new equipment and structure.

Project Justification: Due to the age of the existing airport beacon equipment and tower structure, a new structural beacon and tower is needed. It is difficult to locate parts when maintenance is needed on the existing system.

Project Cost: The estimated cost of the new beacon is $144,000.

Entrance Road – Structure Removal and Replacement – 2017

Project Narrative: This project relocates the Mid-FL storage building and rail spur to allow for the construction of the new entrance road.

Project Justification: The building and rail spur conflict with the roadway alignment and require relocation.

Project Cost: The estimated cost is $750,000.

Construct New T-Hangars – 2017

Project Narrative: Forecasts indicate the need for additional T-Hangars. The site infrastructure is mostly in place.

Project Justification: These hangars supplement those existing and provide a positive revenue stream to the airport.

Project Cost: The estimated project cost is $1,242,720.

Drainage Improvements (Const. Ph III) - 2018

Project Narrative: Drainage Improvements – In May 2006, the Stormwater Master Plan for the Bartow Municipal Airport was completed and a conceptual permit was issued by the Southwest Florida Water Management District. A condition of the permit was to begin an improvement project by July 1, 2008. It is proposed to construct an earthen berm and outfall structure on the western boundary of the airport which will allow the existing pond to be used for stormwater attenuation and treatment.

Project Justification: Drainage Improvements – Construction of the system is required for continued development within this specific drainage basin which includes the Industrial Park and Airport Terminal area. Construction of this system will minimize and possibly eliminate drainage design, construction and permitting of future planned projects, including the terminal apron expansion.

Project Cost: The estimated project cost is $552,000.

Rehab Eastside Drainage System (PH IV) – 2018

Note: This project is for grading, ditch excavation and cleaning, etc.

Project Narrative: The east side airfield drainage system, originally constructed in the 1940's, has experienced extensive vegetation growth over the years. The entire north/south stormwater drainage system needs to be rehabilitated in order to prevent the area from turning into wetland.

Project Justification: Extensive vegetative growth over the years has limited the effectiveness of the existing drainage system.

Project Cost: The estimated project cost is $3,711,216.

Runway 9L/27R Extension Program (Phase III) Construction - 2018

Project Narrative: The third phase of the runway extension program involves overall project site preparation including land clearing/grubbing, grading, and drainage improvements. The runway is programed to be extended 1,700 feet to the east.

Project Justification: Presently, the length of Runway 9L/27R limits business jet traffic from purchasing full fuel and full passenger loads. Extending Runway 9L/27R would accommodate the majority of the fleet of business jet traffic. The airport feels the extension would attract air cargo or other types of business that would locate at BOW primarily because of the extended length of the runway.

Project Cost: The project cost is estimated at $1,982,900.

Refurbish/Improve Existing T-Hangars - 2018

Project Narrative: T-Hangars constructed in the 1960s need refurbishing/improvements, etc. These are 10-unit facilities and this project would include two 10-unit sets.

Project Justification: Deterioration of the hangars (metal, rust, etc.) to the point of not being able to repair. These older hangars are paid for and produce revenue for the airport.

Project Cost: The estimated project cost is $240,000.

Install Airport Property Perimeter Security Fencing - 2018

Project Narrative: With the purchase of the east 142.2-acre tract of land, the new airport boundary would be enclosed with the installation of 10,000 linear feet of perimeter security fencing.

Project Justification: Secure airport property from unauthorized entry of vehicles and people.

Project Cost: The cost of this project is estimated at $800,000.

Rehabilitate Runway 9R/27L - 2019

Project Narrative: Runway 9R/27L would be rehabilitated to provide a new wearing surface and a crowned pavement section for improved grade and crown for drainage. The runway is to be resurfaced to the existing 150-foot width. The resurfacing will consist of surface preparation, a 3-inch bituminous resurfacing for the 100-foot-wide keel section, and a one-inch minimum thickness at the edges.

Project Justification: Runway 9R/27L, originally constructed in the mid-1950s, is in poor condition and requires pavement rehabilitation.

Project Cost: The project cost is estimated at $1,637,000.

Construct New Access Road Into Northeast Property (Phase I) - 2019

Project Narrative: As part of developing the northeast quadrant, a new access road (Phase I) would be constructed to provide access into the site.

Project Justification: As part of our compliance with our Grant Assurances, the airport is preparing the property to the east for "Future Aviation Development," as indicated on the Airport Layout Plan (ALP). Vehicular access is needed to pursue development and expansion into this area.

Project Cost: The estimated project cost is $498,000.

Rehab Taxiway C – 2019

Project Narrative: Taxiway C will also have served its design life and will require rehabilitation. The entire taxiway would be rehabilitated at the existing 50-foot width. The Design Group III 50-foot segment would be over-layed with a 1-1/2 inch bituminous surface on a prepared surface (approximately 1,944 sy). The Design Group II 50-foot-wide taxiway section be over-layed with a 1-1/2 inch bituminous surface on a prepared surface for the 35-foot wide center section (approximately 10,305 sy) with a 7-1/2 foot wide slurry seal on each side (approximately 3,583 sy).

Project Justification: The existing Taxiway C pavement has served the design life and is showing signs of deterioration. Resurfacing is needed according to the State Airfield Pavement Management Plan.

Project Cost: The estimated project cost is $540,000.00

Runway 9L/27R Extension Program (Phases IV Construction) - 2019

Project Narrative: The fourth phase of the runway extension program involves the construction of the airfield pavement and installation of lighting and visual aids. The runway is programed to be extended 1,700 feet to the east along with taxiway connectors. A lighted parallel Taxiway "D-1 " segment to this runway extension was constructed in 2002. Airfield lighting (medium intensity runway lights (MIRLs) would be installed. The existing Precision Approach Path Indicator (PAPI) and Runway End Identification Lighting (REIL) systems on runway end 27R would be relocated.

Project Justification: Presently, the length of Runway 9L/27R limits business jet traffic from purchasing full fuel and full passenger loads. Extending Runway 9L/27R would accommodate the fleet of business jet traffic. The airport feels the extension would attract air cargo or other types of business that would locate at BOW primarily because of the extended length of the runway.

Project Cost: The project cost is estimated at $3,025,283.

Rehab T-Hangar Taxilanes - 2019

Project Narrative: The T-Hangar Taxiways have served their design life and require rehabilitation. The taxilanes would be milled and over-layed.

Project Justification: The T-Hangar Taxiways require rehabilitation. According to the FDOT Pavement Report, the T-Hangar Taxiways are in poor condition and need to be rehabilitated.

Project Cost: The project cost is estimated at $506,250.

TABLE 7.1

20-YEAR CAPITAL IMPROVEMENT PROGRAM
0-5 YEAR PLANNING PERIOD AND DEVELOPMENT PROJECTS
Bartow Municipal Airport and Industrial Park
Master Plan Update

Year	Project Description	Federal	State	Local	Total Project Cost Estimate
2015	Construct T/W D Parallel Mid-Section	2,249,137	124,952	124,952	2,499,041
	Wildlife Management Plan	13,500	750	750	15,000
	Aircraft Tug Tow	0	72,000	18,000	90,000
	Total Costs 2015 Projects	**2,262,637**	**197,702**	**143,702**	**2,604,041**
2016					
	Runway 9L/27R Extension Program (Phase 1- EA)	162,000	9,000	9,000	180,000
	Drainage Improvements (Construction – Phase 1)	675,000	37,500	37,500	750,000
	New Airport Entrance Road (Phase 1 Design and Construction)	0	1,610,000	402,500	2,012,500
	Airport Pavement Markings	0	266,308	66,577	332,885
	Install PAPI on Runway 9R/27L	0	66,816	16,704	83,520
	Site Preparation and Construction of Corporate Hangar	0	483,000	120,750	603,750
	Total Costs 2016 Projects	**837,000**	**2,472,624**	**653,031**	**3,962,655**
2017					
	Drainage Improvements (Construction Phase 2)	675,000	37,500	37,500	750,000
	Runway 9L/27R Extension Program and Reimbursement for Property Acquisition (Phase II-Design (permitting/survey/testing)	920,036	51,113	51,113	1,022,262
	Install New Airport Beacon	129,600	7,200	7,200	144,000
	Entrance Road – Structure Remove and Replace	0	600,000	150,000	750,000
	Construct New T-Hangar (12 Units)	0	994,176	248,544	1,242,720
	Total Costs 2017 Projects	**1,724,636**	**1,689,989**	**494,357**	**3,908,982**
2018					
	Rehabilitate East Side Airport Drainage System (Construction Phase 3)	496,800	27,600	27,600	552,000
	Airfield Drainage Improvements (Construction Ph 4)	3,340,094	185,561	185,561	3,711,216
	Runway 9L/27R Extension Program (Phase III Construction – site)	1,784,610	99,145	99,145	1,982,900

Year	Project Description	Federal	State	Local	Total Project Cost Estimate
	preparation / drainage / wildlife fence relocation)				
	Refurbish/Improve Existing T-Hangars	0	120,000	120,000	240,000
	Airport Property Perimeter Security Fence (south & east boundary)	0	640,000	160,000	800,000
Total Costs 2018 Projects		**5,621,504**	**1,072,306**	**592,306**	**7,286,116**
2019					
	Rehabilitate Runway 9R/27L	0	1,309,824	327,456	1,637,280
	Construct New Access Road to Northeast Property (Phase I)	0	249,000	249,000	498,000
	Rehabilitate Taxiway C	486,000	27,000	27,000	540,000
	Runway 9L/27R Extension Program (Phase IV- pavement/lighting, PAPI/REIL, drainage construction)	2,722,755	151,264	151,264	3,025,283
	Improve/Repair Fuel Farm	0	41,400	41,400	82,800
Total Costs 2019 Projects		**3,208,755**	**1,778,488**	**796,120**	**5,783,363**
Total Costs 0-5 Year Projects		**13,654,532**	**7,211,109**	**2,679,516**	**23,545,157**

7.3 INTERMEDIATE-RANGE CAPITAL IMPROVEMENTS (6-10 YEARS)

The following is a list of the intermediate stage (6-10 year) development items for Bartow Municipal Airport and Industrial Park (BOW). Several items listed include facilities and airfield improvements, which would be constructed as the need is justified. The industrial park will continue to grow and the cost presented in this plan only represents order of magnitude and will serve as a preliminary budget.

The project cost for the intermediate-range improvement program, which includes engineering services and contingencies, is estimated at $28,136,645 (2014 dollars). These project cost estimates are listed in **Table 7.2**, which is presented after the brief descriptions of proposed intermediate-range improvement items. In addition, recommended improvements are graphically illustrated on **Figure 7.2**, which follows **Table 7.2**.

Rehabilitate Runway 9L/27R and Groove - 2020

Project Narrative: Runway 9L/27R was last rehabilitated in 2005 and, with an estimated 15-year life cycle, will require a complete overlay in the future. The resurfacing will provide a new wearing surface and a crowned pavement section for improved grade and crown for drainage. The runway is to be overlaid to the existing 150-foot width. The runway rehabilitation will consist of surface preparation, a 3-inch bituminous overlay for the

100-foot-wide keel section, and a one-inch minimum thickness at the edges. As a safety feature, Runway 9L/27R would be grooved.

Project Justification: The existing pavement shows load stress cracking over the entire length, has served its design life, and needs to be rehabilitated.

Project Cost: The total estimated project cost is $2,500,000.

Rehabilitate Existing Concrete Apron (Phase 2) - 2020

Project Narrative: The existing P.C.C. apron pavement will require repair. The pavement joints would be resealed and the concrete spall areas would be patched where necessary.

Project Justification: The last apron rehabilitation project was done in 2013 and did not complete all the work required.

Project Cost: The estimate project cost is $700,000.

Extend Terminal Apron - 2020

Project Narrative: Expand the general aviation Terminal apron to the west. The terminal apron expansion would be approximately 180' x 180' and include a new connector Taxiway. The project would be designed in accordance with ADG II standards and would include grading, drainage, modifications, removal of a section of old abandoned runway pavement, taxiway edge lighting, signage and pavement marking.

Project Justification: The Terminal apron expansion project is needed due to the increased Business jet traffic activity at the airport. The business jet activity at the airport is projected to grow in the near term and beyond. The Business jet aircraft require parking positions that can power-in/power-out and maintain a safe distance from the smaller parked aircraft on the Terminal apron. The Business jet fleet utilizing BOW includes a verity of aircraft from the ADG III Gulfstream V, Global Express to the ADG II Lears, Citations, etc.

Project Cost: The estimated project cost is $782,514.

Rehabilitate Runway 5/23 - 2020

Project Narrative: Portions of Runway 5/23 were rehabilitated in 2000. The runway will require a complete resurfacing during the 10-20 year CIP. The overlay will provide a new wearing surface and a crowned pavement section for improved grade and crown for drainage. The runway is to be overlaid to the existing 100-foot width. The resurfacing will consist of surface preparation, a 3-inch bituminous overlay for the 50-foot-wide keel section, and a one-inch minimum thickness at the edges. PAPI's and REIL's at both ends will need to be replaced.

Project Justification: Ten-year pavement life cycle.

Project Cost: The project cost is estimated at $1,411,200.

Install New and Relocated Rail Lines - 2020

Project Narrative: This project would install new and relocate existing rail lines within the industrial park to best provide rail access to developable land parcels.

Project Justification: Providing rail access to underdeveloped land will provide a higher and best use for the continued development of the industrial park.

Project Cost: The project cost is estimated at $1,200,000.

Construction of Aircraft Storage T-Hangars (9 Units) - 2021

Project Narrative: Nine new T-Hangar units would be constructed south of the new 10-unit T-hangar facilities. The project would include site preparation, drainage, taxilanes, and landscaping. The taxilane would be 25-feet wide with a 2-inch bituminous surface and a 6-inch limestone rock base. Existing Port-a-Port Hangars (2 units) would have to be relocated or demolished.

Project Justification: Future aircraft storage demand requirements and revenue to the airport.

Project Cost: The total project cost is estimated at $450,000.

Install Security System - 2021

Project Narrative: The existing Airport Security System will require replacement and upgrading.

Project Justification: It is necessary to periodically update the airport security system to ensure safety and security on the airfield operational area.

Project Cost: The total project cost is estimated at $30,000.

Construction of Corporate Hangar - 2021

Project Narrative: A new 70'-foot x 70'-foot corporate hangar similar to existing units along Airport Blvd. would be constructed in an area designated by the Master Plan for corporate development.

Project Justification: Meets aircraft storage demands and provides revenue to the airport.

Project Cost: The estimated cost for this project is $603,750.

Relocate/Construct New Airfield Electrical Vault (Midfield Location) - 2021

Project Narrative: The construction of a new airside electrical vault is needed to accommodate existing and anticipated additional airfield electrical systems. The vault should be relocated in conjunction with being rebuilt to preclude conflict with construction of new facilities and to reduce the length of many of the new cable runs required in the airside area. This

will improve the distribution of power within the system and greatly enhance the efficiencies possible through the design of a well-balanced electrical distribution system. The building should be equipped with large equipment access doors and an overhead crane system for installation and removal of heavy transformers and switchgear. Relocation of usable transformers and switchgear related to existing systems will offset part of the cost of the new airside electrical vault.

Project Justification: This facility is 50± years old and the transformers, etc., have deteriorated with age and lightning strikes. The facility needs to be replaced.

Project Cost: The project cost is estimated at $792,000.

Avigation Easement/Zoning Protection - 2021

Project Narrative: Approximately 2.5 acres (an area of about 100 feet x 750 feet) of Runway 9L non-precision RPZ extends beyond airport property on the west side.

Project Justification: For adequate control, the airport should adopt county zoning (or acquire avigation easement if necessary) for the Runway 9L RPZ.

Project Cost: The estimated cost for this project is $79,200.

Construct New Access Road Into Northeast Property (Phase II) - 2021

Project Narrative: As part of developing the northeast quadrant, a new access road (Phase II) would be constructed to provide access into the site.

Project Justification: As part of our compliance with our Grant Assurances, the airport is preparing the property to the east for "Future Aviation Development," as indicated on the ALP. Vehicular access is needed to pursue development and expansion into this area. Development of the northeast site provides revenue to the airport.

Project Cost: The estimated project cost is $835,000.

Expand GA Terminal Apron (Ultimate Phase) - 2022

Project Narrative: The aircraft apron would be extended to the west by constructing additional apron space to the west side of the existing apron/building area.

Project Justification: Additional parking apron to support future aviation development.

Project Cost: The project cost is estimated at $800,000.

Construct New Taxiway H Extension - 2022

Project Narrative: The new Taxiway "H" connector exit would be constructed from Runway 9L/27R to existing Taxiway "H". This midfield taxiway connector would be constructed at a 50-foot width with a 2-inch bituminous surface.

MITLs would be installed on Taxiway H from the apron taxiway to Runway 9L/27R.

Project Justification: This is a runway capacity enhancement and safety item. This taxiway connector would increase the efficiency of aircraft ground traffic movement on the airport.

Project Cost: The estimated project cost for this new construction is $589,808.

Runway 9L/27R Instrument Landing System - 2022

Project Narrative: Current instrument air traffic activity does not qualify the airport for a FAA-funded Instrument Landing System (ILS). However, the plan provides for the capability of installing an ILS in the future either in conjunction with the runway extension project or shortly after depending on FDOT funding.

Project Justification: An ILS will increase the business jet traffic and an increase in jet fuel sale can be anticipated, which provides additional revenue to the airport.

Project Cost: The estimated project cost is $2,401,249.

Seal and Mark T-Hangar Taxilanes, Taxiways F, G and A3 - 2023

Project Narrative: The age of these pavements has exceeded 20 years and rehabilitation is required to maintain their viability.

Project Justification: Sealing of the pavements is most economical when a structural overlay is not required.

Project Cost: The estimated project costs are as follows:

T-Hangar Taxilanes - $100,000
Taxiways F&G - $20,000
Taxiway A3 - $34,000

Construct Parallel Taxiway North of Runway 5/23 - 2023

Project Narrative: A lighted 50-foot-wide parallel taxiway to Runway 5/23 would be constructed to improve overall aircraft ground traffic activity and would increase operational utilization and capacity of Runway 5/23.

Project Justification: Construction of the 5/23 parallel taxiway increases airport capacity and the efficiency of aircraft ground traffic movements.

Project Cost: The estimated project cost is $3,000,000.

Construct New Airport Traffic Control Tower - 2023

Project Narrative: A new modern Airport Traffic Control Tower (ATCT) is needed to replace the old tower facility. The new ATCT would be sited in approximately the

same location. A tower height and site location analysis would be part of this project.

Project Justification: The existing ATCT is 50± years old.

Project Cost: The estimated project cost is $2,797,920.

Construct New Connector Taxiway L - 2023

Project Narrative: The new Taxiway "L" connector exit would be constructed from Runway 9L/27R to existing Taxiway "L". This midfield taxiway connector would be constructed at a 50-foot width with a 2-inch bituminous surface. MITLs would be installed on Taxiway L from the apron taxiway to Runway 9L/27R.

Project Justification: This is a runway capacity enhancement and safety item. This taxiway connector would increase the efficiency of aircraft ground traffic movement on the airport.

Project Cost: The estimated project cost is $506,253.

Design for Airport East and South Side Perimeter Roads - 2023

Project Narrative: This project will set the horizontal and vertical alignments for the roadways and define the developable areas of the airport which can be accessed by these roadways. The project includes all required permitting.

Project Justification: These roadways are required to continue the development of the airfield.

Project Cost: The estimated project cost is $500,000.

Construction of Corporate Hangar - 2024

Project Narrative: A new 70'-foot x 70'-foot corporate hangar similar to existing units along Airport Blvd. would be constructed in an area designated by the Master Plan for corporate development.

Project Justification: Meets future aircraft storage demand requirements and provides revenue to the airport.

Project Cost: The estimated cost for this project is $603,750.

Construction Airport East and South Side Perimeter Road System - 2024

Project Narrative: This construction phase project follows the design and permitting project of the previous year.

Project Justification: These roadways open up the east and south sides of the airport to development.

Project Cost: The estimated cost for this project is $7,200,000.

Rehabilitate Airfield Signage - 2024

Project Narrative: The airfield signage is over 20 years old and maintenance costs are increasing annually. Signs need to be replaced with more efficient LED signs.

Project Justification: The signage has served its' useful life and maintenance costs continue to increase.

Project Cost: The estimated cost for this project is $100,000.

TABLE 7.2

20-YEAR CAPITAL IMPROVEMENT PROGRAM-
6-10 YEAR PLANNING PERIOD AND DEVELOPMENT PROJECTS
Bartow Municipal Airport and Industrial Park
Master Plan Update

Year	Project Description	Federal	State	Local	Total Project Cost Estimate
2020	Rehab Runway 9L/27R	2,250,000	125,000	125,000	2,500,000
	Rehab Existing GA Apron (Phase II)	630,000	35,000	35,000	700,000
	Expand Terminal Apron (Need mid-FL Property)	704,262	39,126	39,126	782,514
	Rehabilitate Runway 5/23; replace PAPI's and REIL's both ends	1,270,080	70,560	70,560	1,411,200
	Install New and Relocate Rail Lines	0	600,000	600,000	1,200,000
	Total Costs 2020 Projects	**4,854,342**	**869,686**	**869,686**	**6,593,714**
2021	Construct New T-Hangar (9 units)	0	360,000	90,000	450,000
	Install Security System	0	24,000	6,000	30,000
	Site preparation and construction corporate Hangar	0	483,000	120,750	603,750
	Relocate /construct new electrical vault (Midfield location)	712,800	39,600	39,600	792,000
	Avigation Easements / Zoning Protection	71,280	3,960	3,960	79,200
	Construct New Access Road into Northeast Property (Phase II)	0	417,500	417,500	835,000
	Total Costs 2021 Projects	**784,080**	**1,328,060**	**677,810**	**2,789,950**
2022	Expand GA Terminal Apron (Ultimate Phase)	720,000	40,000	40,000	800,000
	Extend Taxiway "H"	530,828	29,490	29,490	589,808
	Runway 9L/27R Install Instrument Landing System / MALSR	2,161,125	120,062	120,062	2,401,249
	Total Costs 2022 Projects	**3,411,953**	**189,552**	**189,552**	**3,791,058**
2023	Seal and Mark T-Hangar Taxilanes (State/Local)	0	80,000	20,000	100,000
	Seal and Mark Taxiways "F" & "G" (State/Local)	0	16,000	4,000	20,000
	Seal and Mark Taxiway "A3" (State/Local)	0	27,200	6,800	34,000
	Construct parallel apron taxiway north of Runway 5/23	2,700,000	150,000	150,000	3,000,000
	Construct New ATCT	0	2,238,336	559,584	2,797,920

Year	Project Description	Federal	State	Local	Total Project Cost Estimate
	Construct New Connector Taxiway "L"	455,627	25,313	25,313	506,253
	Preliminary design airport east and south side perimeter road system from Ben Durance Road to E. Gaskin Road supporting future south side aviation related development; Testing, Survey, Permitting, drainage requirements etc. included in this Phase I	0	400,000	100,000	500,000
	Total Costs 2023 Projects	**3,155,627**	**2,936,849**	**865,697**	**6,958,173**
2024	Construction of corporate Hangar	0	483,000	120,750	603,750
	Construct airport east and south side perimeter road system supporting future south side development	0	5,760,000	1,440,000	7,200,000
	Replace Airfield Signage	80,000	10,000	10,000	100,000
	Total Costs 2024 Projects	**80,000**	**6,243,000**	**1,560,750**	**7,903,750**
	Total Costs 6-10 Year Projects	**12,286,002**	**11,567,147**	**4,157,495**	**28,036,645**

7.4 LONG-RANGE CAPITAL IMPROVEMENTS (10-20 YEARS)

The following is a list of the long-range stage (10-20 year) development items for BOW. Several items listed include facilities and airfield improvements, which would be constructed as the need is justified. The industrial park will continue to grow and the cost presented in this plan only represents order of magnitude and will serve as a preliminary budget.

The project cost for the long-range improvement program, which includes engineering services and contingencies, is estimated at $9,950,000 (2014 dollars). These project cost estimates are listed in **Table 7.3**, which is presented after the brief descriptions of proposed long-range improvement items. In addition, recommended improvements are graphically illustrated on **Figure 7.3**, which follows **Table 7.3**.

Improve/Repair Fuel Farm

Project Narrative: The fuel farm was constructed in the late 1980s and improvements/ repairs will need to be made within this time period.

Project Justification: Safety and environmental protection.

Project Cost: The estimated budget cost is $100,000.

Construct Corporate Hangar

Project Narrative: Within this planning period, several new 8,000- to 10,000-square-foot (sf) corporate hangars would be constructed in areas designated for corporate development. Site development would include permits, site preparation (possibly some fill material), drainage, utilities, apron/taxiway pavement, building structure, security fencing, and landscaping.

Project Justification: Meet future aircraft storage demand requirements and provide revenue to the airport.

Project Cost: The estimated project budget cost per unit is approximately $600,000.

Remove Industrial Park Buildings

Project Narrative: The door plant and old industrial park buildings 404 and 405 are to be removed in preparation for future aviation facility construction.

Project Justification: Aged buildings have become costly to maintain and should be removed.

Project Cost: The estimated cost for this project is $100,000.

Construct Midfield Taxiway Connectors

Project Narrative: A 50-foot-wide taxiway connector would be constructed between Runway 9L and 9R. The connector would link the runways with Taxiway D. Another 50-foot-wide taxiway connector would be constructed between Runways 27L and 27R. The connector would link the runway with proposed Taxiway H.

Project Justification: Improves the flow of aircraft ground traffic movements.

Project Cost: The midfield taxiway connectors project cost is estimated at $900,000.

Construct Aircraft Holding Aprons

Project Narrative: The increase in daily air traffic activity at the airport could warrant the construction of aircraft holding aprons at runway ends 9L, 27R, 9R, 5, and 23. These holding pads would allow pilots to complete their preflight checks away from operational taxiways, thereby alleviating aircraft ground traffic congestion.

Project Justification: Improves the flow of aircraft ground traffic movements.

Project Cost: The total cost estimate for this project is $1,500,000.

Development of Aviation Facilities on the South Side of Airport

Project Narrative: Once the existing north aircraft hangar area is fully developed, future aviation development would be concentrated on the south side of the airport. This is a greenfield site that requires precise detailed site planning of the entire south side prior to implementation. Along with new

infrastructure, taxiways and aprons, additional T-hangar units and corporate hangars, etc., would be constructed.

Project Justification: Future growth area on the airport.

Project Cost: The total cost estimate for this project is to be defined in the future with phased development – Budget $5,000,000 1st Phase.

Refurbish/Improve Existing T-Hangars

Project Narrative: T-hangars constructed in the 1970s need refurbishing/improvements, etc.

Project Justification: Deterioration of the hangars (metal, rust, etc.) to the point of not being able to repair. These older hangars are paid for and produce revenue for the airport.

Project Cost: The estimated project cost for the new roadway is $250,000.

Rehabilitate Existing Taxiways D, A, H, C and Apron Taxiway

Project Narrative: The pavement age of these facilities will exceed 20 years in the long-range capital improvement period and an overlay will be required.

Project Justification: These taxiways will be overlaid with a nominal 2" bituminous pavement course material.

Project Cost: The estimated project cost is $2,500,000.

TABLE 7.3

20-YEAR CAPITAL IMPROVEMENT PROGRAM
11-20 YEAR PLANNING PERIOD AND DEVELOPMENT PROJECTS
Bartow Municipal Airport and Industrial Park
Master Plan Update

Year	Project Description	Federal	State	Local	Total Project Cost Estimate
10-20	Improve/Repair Fuel Farm	$0	$80,000	$20,000	$100,000
10-20	Construct Corporate Hangar	$0	$480,400	$120,000	$600,000
10-20	Remove Industrial Park Buildings	$0	$80,000	$20,000	$100,000
10-20	Construct Midfield Taxiway Connectors	$0	$720,000	$180,000	$900,000
10-20	Construct Aircraft Holding Aprons	$1,350,000	$75,000	$75,000	$1,500,000
10-20	Construct Aviation Facility on South Side of Airport	$0	$4,000,000	$1,000,000	$5,000,000
10-20	Refurbish T-Hangars	$0	$200,000	$50,000	$250,000
10-20	Rehabilitate Taxiways	$2,225,000	$125,000	$125,000	$2,500,000
Total Costs	**10-20 Year Projects**	**$3,575,000**	**$5,760,000**	**$1,590,000**	**$10,950,000**

Total Cost 0-5 Year Projects	**$13,654,532**	**$7,211,109**	**$2,679,516**	**$23,545,157**
Total Cost 6-10 Year Projects	**$12,286,002**	**$11,567,147**	**$4,157,495**	**$28,036,645**
Total Cost 11-20 Year Projects	**$3,575,000**	**$5,760,000**	**$1,590,000**	**$10,950,000**
Total 20 Year Project Costs	**$29,515,534**	**$24,538,256**	**$8,427,011**	**$62,531,802**

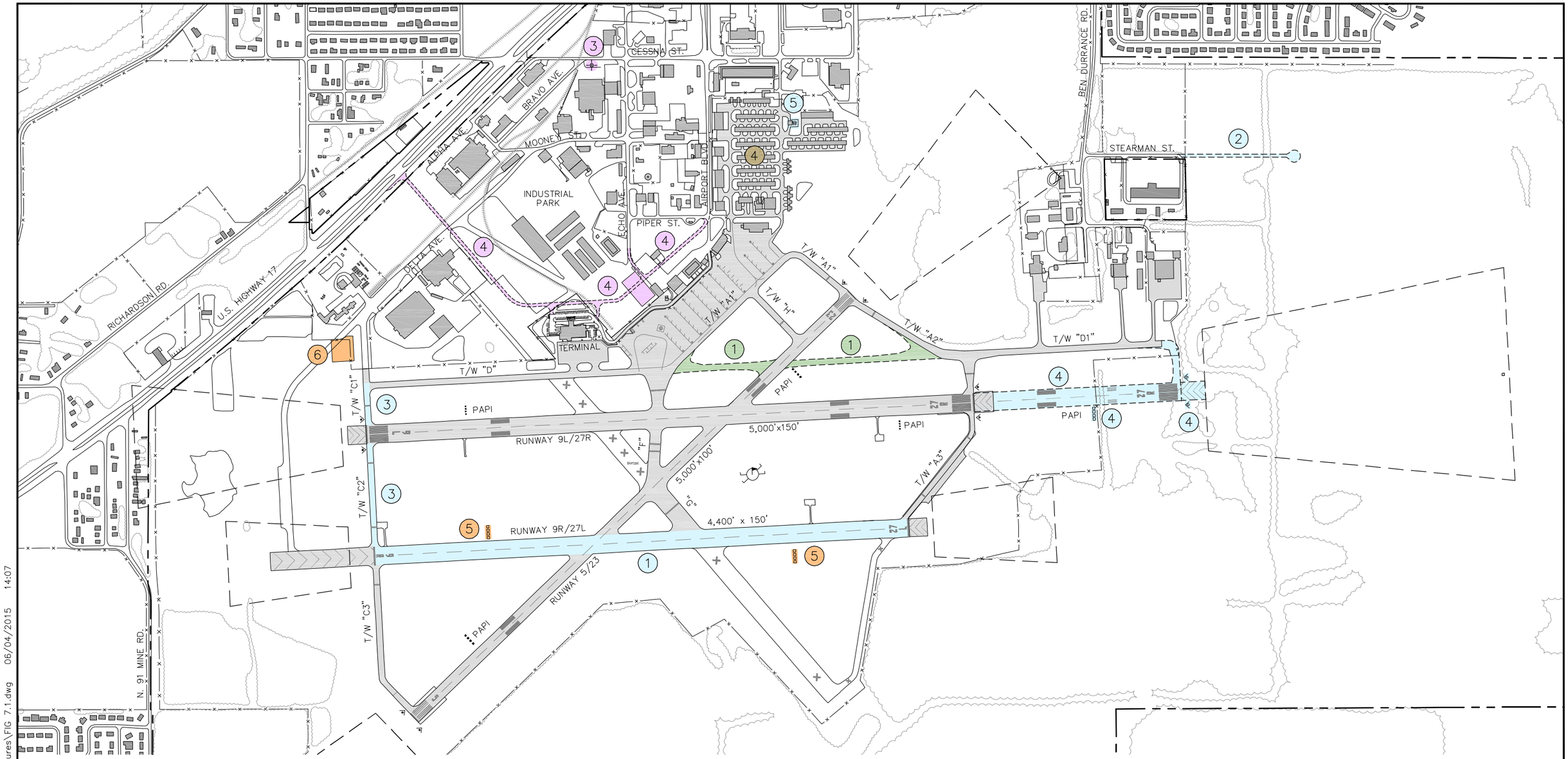
7.5 SUMMARY OF AIRPORT AND INDUSTRIAL PARK IMPROVEMENT STAGING

The total estimated cost for projects listed in the 0-5 year CIP (2014-2018) is $23,545,157. The Authority's estimated project participation cost is $2,679,516. Federal participation is estimated at $13,654,532 with projected state involvement at $7,211,109.

The total estimated cost for projects described in the intermediate-range CIP is $28,136,645.

The total estimated cost for projects stated in the long-range (ultimate) CIP and beyond the year 2024 is $9,950,000.

The total estimated cost of all airport and industrial park improvements proposed during the 20-year planning period is $62,635,801.



2015–2017 PROJECTS	
	2015 PROJECTS
PROJECT NO.	PROJECT NAME
1	CONSTRUCT TAXIWAY D PARALLEL MID–SECTION
2	WILDLIFE MANAGEMENT PLAN (NOT DEPICTED)
3	AIRCRAFT TUG TOW (NOT DEPICTED)
	2016 PROJECTS
PROJECT NO.	PROJECT NAME
1	RUNWAY 9L/27R EXTENSION PROGRAM (PHASE 1–EA) (NOT DEPICTED)
2	DRAINAGE IMPROVEMENTS (CONSTRUCTION–PHASE 1) (NOT DEPICTED)
3	NEW AIRPORT ENTRANCE ROAD (PHASE 1–DESIGN AND CONSTRUCTION) (NOT DEPICTED)
4	AIRPORT PAVEMENT MARKINGS (NOT DEPICTED)
5	INSTALL PAPI ON RUNWAY 9R/27L
6	SITE PREPARATION AND CONSTRUCTION OF CORPORATE HANGAR
	2017 PROJECTS
PROJECT NO.	PROJECT NAME
1	DRAINAGE IMPROVEMENTS (CONSTRUCTION–PHASE 2) (NOT DEPICTED)

2017 (CONT'D.)–2018 PROJECTS	
	2017 PROJECTS
PROJECT NO.	PROJECT NAME
2	RUNWAY 9L/27R EXTENSION PROGRAM AND REIMBURSEMENT FOR PROPERTY ACQUISITION (PHASE 2–DESIGN–PERMITTING/SURVEY/ TESTING) (NOT DEPICTED)
3	INSTALL NEW AIRPORT BEACON
4	ENTRANCE ROAD–STRUCTURE REMOVE AND REPLACE
	2018 PROJECTS
PROJECT NO.	PROJECT NAME
1	REHABILITATE EAST SIDE AIRPORT DRAINAGE SYSTEM (CONSTRUCTION–PHASE 3) (NOT DEPICTED)
2	AIRFIELD DRAINAGE IMPROVEMENTS (CONSTRUCTION–PHASE 4) (NOT DEPICTED)
3	RUNWAY 9L/27R EXTENSION PROGRAM (PHASE 3–CONSTRUCTION– SITE PREPARATION/DRAINAGE/WILDLIFE FENCE RELOCATION (NOT DEPICTED)
4	REFURBISH/IMPROVE EXISTING T–HANGARS
5	AIRPORT PROPERTY PERIMETER SECURITY FENCE (SOUTH AND EAST BOUNDARY) (NOT DEPICTED)

2019 PROJECTS	
PROJECT NO.	PROJECT NAME
1	REHABILITATE RUNWAY 9R/27L
2	CONSTRUCT NEW ACCESS ROAD TO NORTHEAST PROPERTY (PHASE 1)
3	REHABILITATE TAXIWAY C
4	RUNWAY 9L/27R EXTENSION PROGRAM (PHASE 4–PAVEMENT/ LIGHTING, PAPI/REIL, DRAINAGE CONSTRUCTION)
5	IMPROVE/REPAIR FUEL FARM

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GRAPHIC SCALE IN FEET

CAPITAL IMPROVEMENT PROGRAM (2015-2019)

BARTOW MUNICIPAL AIRPORT AND INDUSTRIAL PARK

FIGURE 7.1

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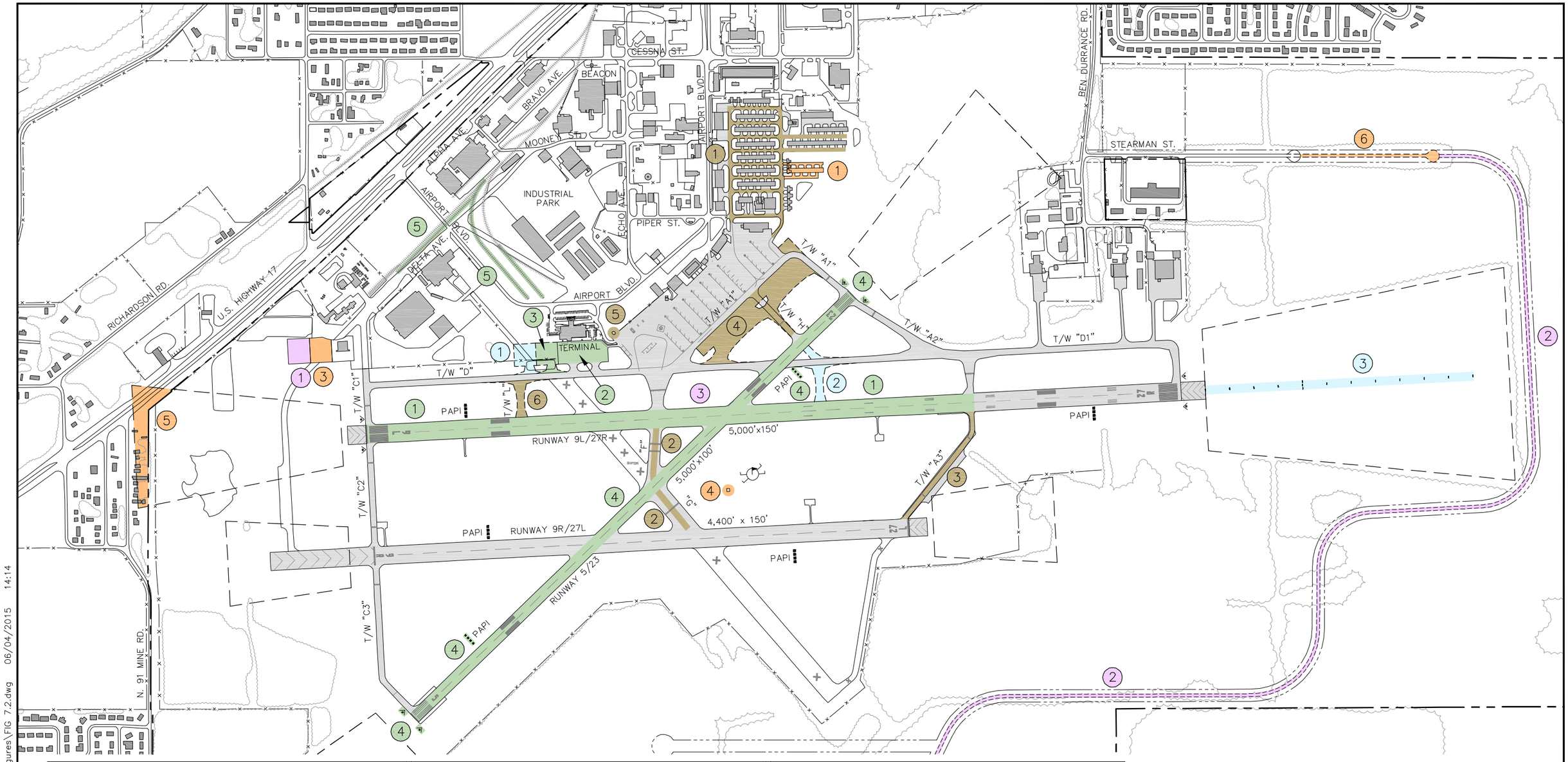

2020–2021 PROJECTS	
	2020 PROJECTS
PROJECT NO.	PROJECT NAME
1	REHABILITATE RUNWAY 9L/27R
2	REHABILITATE EXISTING GA APRON (PHASE 2)
3	EXPAND TERMINAL APRON (NEED MID-FLORIDA PROPERTY)
4	REHABILITATE RUNWAY 5/23; REPLACE PAPI'S AND REILS BOTH ENDS
5	INSTALL NEW AND RELOCATE RAIL LINES
	2021 PROJECTS
PROJECT NO.	PROJECT NAME
1	CONSTRUCT NEW T-HANGAR (9 UNITS)
2	INSTALL SECURITY SYSTEM (NOT DEPICTED)
3	SITE PREPARATION AND CONSTRUCTION CORPORATE HANGAR
4	RELOCATE/CONSTRUCT NEW ELECTRICAL VAULT (MIDFIELD LOCATION)
5	AVIGATION EASEMENTS/ZONING PROTECTION
6	CONSTRUCT NEW ACCESS ROAD INTO NORTHEAST PROPERTY (PHASE 2)

2022–2023 PROJECTS	
	2022 PROJECTS
PROJECT NO.	PROJECT NAME
1	EXPAND GA TERMINAL APRON (ULTIMATE PHASE)
2	EXTEND TAXIWAY H
3	RUNWAY 9L/27R-INSTALL INSTRUMENT LANDING SYSTEM/MALSR
	2023 PROJECTS
PROJECT NO.	PROJECT NAME
1	SEAL AND MARK T-HANGAR TAXILANES (STATE/LOCAL)
2	SEAL AND MARK TAXIWAYS F & G (STATE/LOCAL)
3	SEAL AND MARK TAXIWAY A3 (STATE/LOCAL)
4	CONSTRUCT PARALLEL APRON TAXIWAY NORTH OF RUNWAY 5/23
5	CONSTRUCT NEW AIRPORT TRAFFIC CONTROL TOWER (ATCT)
6	CONSTRUCT NEW CONNECTOR TAXIWAY L
7	PRELIMINARY DESIGN AIRPORT EAST AND SIDE SIDE PERIMETER ROAD SYSTEM FROM BEN DURRANCE ROAD TO E. GASKIN ROAD SUPPORTING FUTURE SOUTH SIDE AVIATION RELATED DEVELOPMENT; TESTING, SURVEY, PERMITTING, DRAINAGE REQUIREMENTS ETC. INCLUDED IN THIS PHASE 1 (NOT DEPICTED)

2024 PROJECTS	
PROJECT NO.	PROJECT NAME
1	CONSTRUCTION OF CORPORATE HANGAR
2	CONSTRUCT AIRPORT EAST AND SOUTH SIDE PERIMETER ROAD SYSTEM SUPPORTING FUTURE SOUTH SIDE DEVELOPMENT
3	REHABILITATE AIRFIELD SIGNAGE (NOT DEPICTED)

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GRAPHIC SCALE IN FEET

CAPITAL IMPROVEMENT PROGRAM (2020-2024)

BARTOW MUNICIPAL AIRPORT AND INDUSTRIAL PARK

FIGURE 7.2

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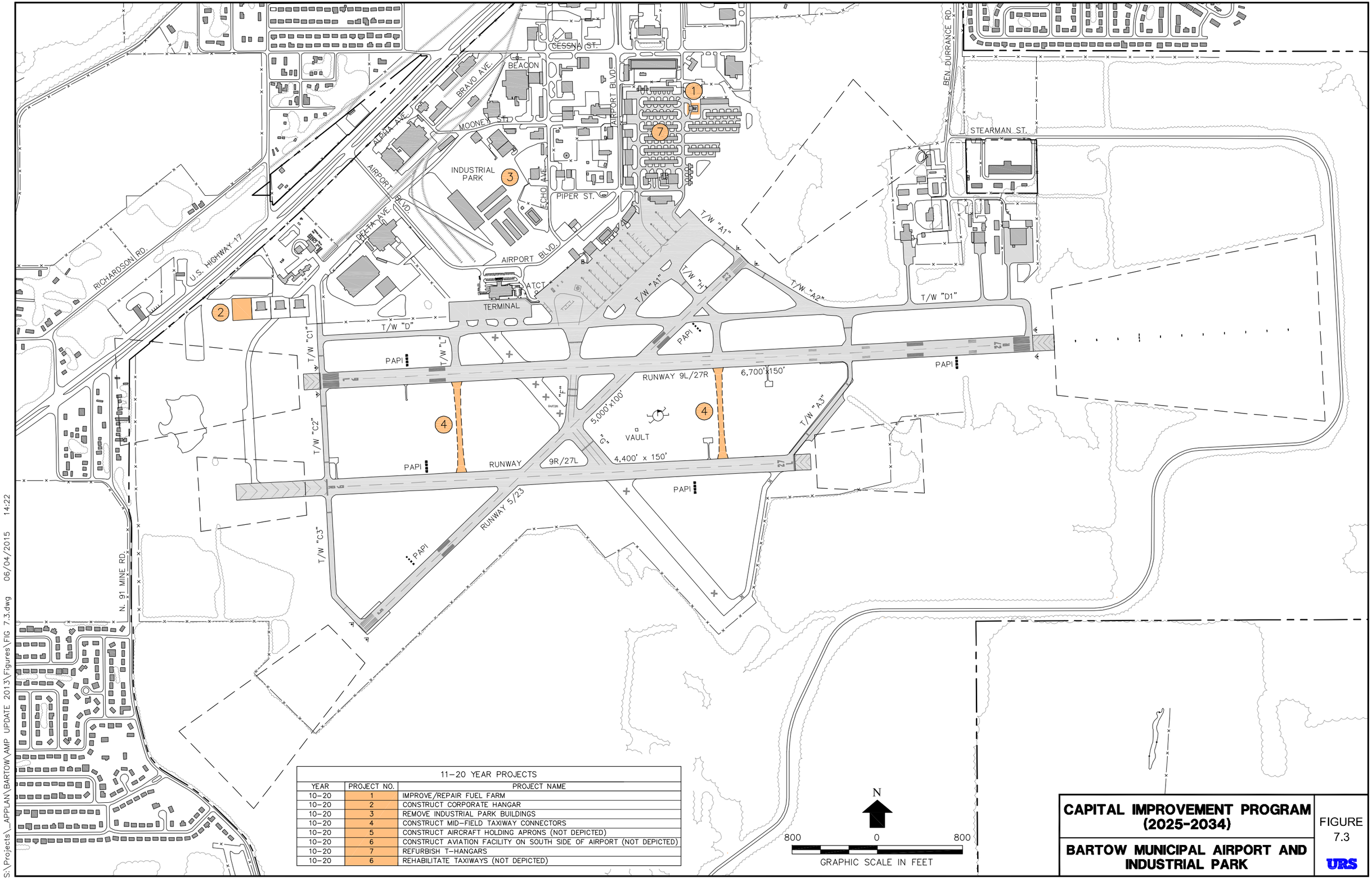

11–20 YEAR PROJECTS		
YEAR	PROJECT NO.	PROJECT NAME
10–20	1	IMPROVE/REPAIR FUEL FARM
10–20	2	CONSTRUCT CORPORATE HANGAR
10–20	3	REMOVE INDUSTRIAL PARK BUILDINGS
10–20	4	CONSTRUCT MID–FIELD TAXIWAY CONNECTORS
10–20	5	CONSTRUCT AIRCRAFT HOLDING APRONS (NOT DEPICTED)
10–20	6	CONSTRUCT AVIATION FACILITY ON SOUTH SIDE OF AIRPORT (NOT DEPICTED)
10–20	7	REFURBISH T–HANGARS
10–20	6	REHABILITATE TAXIWAYS (NOT DEPICTED)

CAPITAL IMPROVEMENT PROGRAM (2025-2034)

BARTOW MUNICIPAL AIRPORT AND INDUSTRIAL PARK

FIGURE 7.3

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